13th International Scientific Conference

Energy and Climate Change

Virtual event

PROCEEDINGS

organized by

Energy Policy and Development Centre (KEPA)

National and Kapodistrian University of Athens

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	Dr. Foteini THOMAIDOU Economic Research Division, Alpha Bank
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9 OCTOBER 2020, Athens – Greece
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	Mrs. Vaya PITELI, PRAXI Network
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	Prof. Ioannis BARTZIS, National Representative for COST
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Scientific Sessions – Brokerage event

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List of participants

No.	Title	First Name	Last Name	Organization
1	Mrs.	Konstantina	Agra	Green Fund, Hellas
2	Mr.	Emmanouil	Assimakopoulos	Hellas
3	Prof.	Ioannis	Bartzis	National Representative for COST, Hellas
4	Mrs.	Anna	Baskakova	State Agency on Energy Efficiency and Energy Saving of Ukraine
5	Mr.	Pedro	Bizarro	Covenant of Mayors
6	Prof.	Peter	Braesicke	European Climate Research Alliance
7	Ms.	Gizem	ÇAKMAK	TUBITAK Marmara Research Center, Turkey
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9	Mrs.	Athina	Chatzipetrou	Hellenic Development Bank, Hellas
10	Amb.	Traian	Chebeleu	Black Sea Economic Cooperation-PERMIS
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12	Prof.	Edoardo	Croci	Bocconi University, Italy
13	Mr.	Ramu	Damodaran	United Nations Academic Impact, U.S.A
14	Mr.	Eyup	Dervisoglu	Embassy of Turkey in Hellenic Republic
15	Mr.	Christos	Dimas	Ministry of Development & Investments, Hellas
16	Prof.	Argiro	Dimoudi	University of Thrace, Hellas
17	Amb.	David	Dondua	Embassy of Georgia in Hellenic Republic
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21	Ms.	Fanny	Gyllander	University of Gotheburg, Sweden
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23	Prof.	George	Halkos	University of Thessaly, Hellas
24	Prof.	Dejan	Ivezic	University of Belgrade, Serbia

25	Prof.	Thor	Jenssen	University of Bergen, Norway
26	Mrs.	Spyridoula	Kati	Alpha Bank, Hellas
27	Mrs.	Kalliopi	Kiriakidou	Regional Governance of Ditiki Macedonia, Hellas
28	Mr.	Dimitris	Kitsikopoulos	RESCoop, Electra – Energy cooperative, Hellas
29	Dr.	Ashot	Kocharian	Black Sea Economic Cooperation-PERMIS
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32	Prof.	Andonaq	Lamani	Polytechnic University of Tirana
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36	Mrs	Eleni-Danai	Mavraki	DAFNI Network, Hellas
37	Mr.	Stavros	Mavroudeas	ENVENA Ltd., Hellas
38	Ms	Kyriaki	Metaxa	Heirich Böll Stiftung, Hellas
39	Mr.	Konstantinos	Mitropoulos	Regional Unit of Peloponnesus, Hellas
40	Mr.	Athanasios	Nasiakopoulos	Regional Union of Thessalia, Hellas
41	Prof.	Nikitas	Nikitakos	Univerisity of Aegean, Hellas
42	Mr.	Angel	Nikolaev	BSERC, Bulgaria
43	Mr.	Konstantinos	Ntampegliots	Regional Union of Thessalia, Hellas
44	Mr.	Burak	Özugergin	Embassy of Turkey in Hellenic Republic
45	Mrs.	Svitlana	Pasichna	State Agency on Energy Efficiency and Energy Saving of Ukraine
46	Mr.	Georgios	Patoulis	Regional Government of Attiki, Hellas
47	Mrs.	Panagiota	Pimenidou	University of Bradford, United Kingdom
48	Mrs.	Vaya	Piteli	PRAXI Network, Hellas
49	Prof.	Anca	Popescu	ISPE, Romania
50	Dr.	Nikos	Psimmenos	Greek Life Task Force, Hellas

51	Dr.	Lulin	Radulov	BSERC, Bulgaria
52	Mr.	Giorgi	Shoshitashvili	Embassy of Georgia in Hellenic Republic
53	Amb.	Sergii	Shutenko	Embassy of Ukraine in Hellenic Republic
54	Dr.	Eleftherios	Siskos	Paul Scherrer Institut, Switzerland
55	Prof.	Tom	Skauge	Bergen University College and University of Oslo, Norway
56	Mr.	Adamadios	Skordiles	Hellas
57	Mr.	Panteley	Spassov	Embassy of Bulgaria in Hellenic Republic
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59	Mr.	Benjamin	Struss	EUKI, Germany
60	Dr.	Foteini	Thomaidou	Alpha Bank, Hellas
61	Prof.	Milton	Typas	National and Kapodistrian University of Athens, Hellas
62	Mr.	Konstantinos	Tsatsakis	Suite 5 Data Intelligence Solutions, Cyprus
63	Amb.	Anatol	Vangeli	Embassy of Republic of Moldova in Hellenic Republic
64	Ms.	Camelia	Vasilev	ISPE, Romania
65	Mrs.	Anna	Vasylets	Embassy of Ukraine in Hellenic Republic
66	Mr.	Ivan	Zaika	State Agency on Energy Efficiency and Energy Saving of Ukraine
67	Mrs.	Ioanna	Zarogiannou	Epixeiro (web-site), Hellas
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DAY 1: 7th Green Energy Investments Forum

Session: Keynote addresses

Welcome address by Prof. Dimitrios MAVRAKIS

Director of KEPA, National and Kapodistrian University of Athens, Hellas

Your Excellencies

Honorable participants

It is my pleasure and honor to welcome you at the 7th Green Energy Investments Forum, organized in the frame of the 13th Annual International Scientific Conference on "Energy and Climate Change".

This year the Forum attempts to outline priorities for the "Sustainable Recovery Plans" that must be developed and implemented in the short timeslot of the coming three years.

During the peak of COVID – 19 crisis, the daily global CO_2e emissions "cut to 2006 levels" while an emissions decline of up to 7.5% is expected in 2020.

A temporary and violent adjustment of the forecasted pathway of 2°C till 2030 according to goals set in the Paris Agreement.

The price for this decline was the contract of global economy by around 6% in 2020 according to OECD, with 300 million full-time jobs that can be lost and 450 million companies facing risks of serious disruption according to ILO.

Global efforts focus on how to bring about an economic recovery that repairs the damage inflicted by the crisis while putting the world on a stronger footing for the future

According to Dr. Fatih Birol of IEA, "policy makers have to make enormously consequential decisions in a very short space time. Those decisions will shape economic and energy infrastructure for decade to come and will almost certainly determine whether the world has a chance of meeting its long-term energy and climate goals".

In response to calls from governments, IEA and IMF have outlined a three years Sustainable Recovery Plan with three main goals of boosting economic growth, create jobs and build more resilient and cleaner energy systems.

These goals can be achieved by a number of policies that in the three years' timeslot will deliver shovel-ready clean energy projects that boost resilience, develop a strong pipeline of new projects, provide tailor support for distressed industries , mobilize private finance and take advantage of International Cooperation.

In this context, the Energy Policy and Development Center in its dual capacity as Coordinator of the Green Energy Network of the BSEC and the international Hub for SDG7 of the UNAI and in an effort to contribute in efforts of the BSEC – MS to set priorities in the aforementioned "Sustainable Recovery Plans" has initiated the following priorities targeting to: i) Improve energy efficiency of the building sector up to the "Smart Zero Energy Buildings" combining "Smart Finance" procedures, ii) confront "Energy Poverty" by aggregating and transforming energy – poor consumers inti prosumers with the active involvement of their municipalities including Smart Finance procedures, iii) intensifying the penetration of RES, bio-fuels, bio-gas, geothermic energy and hydrogen into national markets, iv) combine RES production and electrification of short-medium maritime routes, v) introduction of LNG in maritime and heavy road transportation.

In the extreme short time-margins the establishment of quite strict and efficient procedures is a "sine qua non" condition.

To that aim it is proposed an outline of procedures for the interest parts: i) should be invited to communicate their set of SRP priorities, ii) organize "round tables" among potential actors and conclude in priorities, iii) motivate market players, iv) develop "structured policy dialogues" leading to "smart financing procedures" and v) disseminate "lessons-learned" and "best practices".

The existing obstacles to be overcome, apart from the extreme short time-margins are those related to the lack of information on existing international financing instruments, leading to leverage of the initial amounts, the legislative and bureaucratic inertia and the existing behavioral obstacles among local societies.

Esteemed participants,

I have tried to present you an outline of proposals that may be useful in efforts of policymakers to develop their "Sustainable Recovery Plans".

I am confident that during this Forum we will have the opportunity to enhance our understanding on these issues and contribute in strengthening national and regional cooperation.

Thank you

Short CV

Prof. Dimitrios Mavrakis is the Director of KEPA, the UNAI hub for SDG7; coordinator of the "BSEC – Green Energy Network" focused on Renewable Energy Sources (RES) and Energy Efficiency (EE) for scientists, market stakeholders, and policy makers, from the countries of BSEC under the supervision of BSEC – PERMIS; coordinator of PROMITHEASnet, the Energy and Climate Change Policy Network, consisted of academic institutes from S.E. Europe, Black Sea and Central Asia; Chief editor of the "Energy View of the BSEC countries"; Chief editor of the "Energy View of the BSEC countries"; Chief editor of the "Euro-Asian Journal of Sustainable Energy Development Policy"; Editor of the worldwide disseminated "PROMITHEAS newsletter"; Chairman of the annual international scientific conference on "Energy and Climate Change" (13th year); Initiator of the European Energy Community.

His main studies and activities are related with energy geopolitics, development of regional energy markets, energy interconnections, transcontinental energy corridors, design of climate policy instruments, exploration of interactions between climate policy tools, development and assessment of mitigation/adaptation policy mixtures.

He was appointed as member of the Advisory Groups on Energy (AGE) of E.C. for FP6 and FP7 and was the Project Coordinator of several FP6, FP7 and H2020 projects.

<u>Current activities:</u> He currently promotes the "UNAI Hub SDG7 Society", the "75 UN – 75 Trees UNAI SDG7" initiative and the Green Energy Investments Fora among the BSEC - MS. He also promotes regional cooperation on Climate Change Policy issues among academic institutions, governmental authorities and market stakeholders from the countries of EU and the BSEC; knowledge transfer about climate change, EE, RES, development of scenarios for mitigation/adaptation, looking-forward energy modelling; he participates in the BSEC Working Group on energy.

Speech of Amb. Michael CHRISTIDES

BSEC PERMIS Secretary General

Ladies and Gentlemen, dear participants,

Excellency, dear Mr. Deputy Minister Mr. Fragogiannis, thank you so much for being with us today.

First of all I wish to thank the organizers, especially Professor Mavrakis and his team, for their excellent work in organizing this important event and, of course, for allowing me to welcome and thank all participants for being together with us today.

Unfortunately, these are really extraordinary situations we are facing today because of the pandemic; yet, together with Prof. Mavrakis we decided that it would be very useful not to cancel but keep this annual event – actually, two events, since we refer to the BSEC – Green Energy Investments Forum and to the 13th International Scientific Conference on Energy and Climate Change, which will follow tomorrow. So, as I said, we decided that it would be very useful and opportune to organize them, even under these extraordinary conditions.

By now we are all aware of the devastating effects of the pandemic; we are already talking about a new "normal" in our lives and, perhaps, we are not just talking about it, we have to live through it.

In what concerns relations among nations, let me say that the pandemic has put international cooperation to a severe, new test: we all remember that the first, almost instinctive, reaction of States was to turn inward, to close borders and to take restrictive measures. At the same time, the pandemic brought to the surface, with renewed severity, conflicts and tensions that existed for many-many years. Only at a second stage did we comprehend that, if we really want to confront this new situation, we have to work even closer together, we have to cooperate, we have to exchange experiences, good practices and vital information.

All of the above turmoil I believe has contributed to bring forward issues, especially in the energy sector, that we thought we would be confronting in ten-twelve years; yet they are here today, we have them before us and we are called-upon to find solutions to all the huge problems: the decarbonization of our economies, the greater use of renewable energy and new sources of energy, how to confront the negative impact of climate change which is a dire reality, and so on. All the above are some of the reasons that Prof. Mavrakis and us decided to hold our Forum, despite the necessity of hosting it in this impersonal, online way that we are obliged to use this year.

Ladies and Gentlemen, I wish to reiterate that the Black Sea Economic Cooperation Organization has a close contact with Prof. Mavrakis and with KEPA. As you know, we have established together in 2015 the *BSEC – Green Energy Network* which is active for more than five years, operating under Prof. Mavrakis and with the supervision of the Secretariat of BSEC.

We are happy with what we did until today, yet, as conventional wisdom has it, "the biggest room of all, is the room for improvement", thus we would very much like to do even more; yet this "more" does not only depend on our efforts, but also on the sense of ownership that our BSEC Member States feel towards this network, which is actually their network!

The BSEC Organization has helped promote many projects in the energy sector; only with financing from the BSEC Project Development Fund we were able to promote the implementation of three projects in the years past.

Recently, with funds from our *Black Sea Project Promotion Facility,* we have concluded a project together with the UNECE, concerning the energy efficiency standards in older buildings in our Member States, an issue whose importance has already been underlined by Prof. Mavrakis.

Further, as you all know KEPA has been recently selected by the United Nations Academic Impact as its hub for Sustainable Development Goal 7, which envisages, exactly, to ensure the access to Affordable, Reliable and Sustainable Modern Energy for all.

The implementation of UN SDG 7, is another field where we also cooperate with KEPA; for example, BSEC PERMIS followed with great interest and promoted among its Member States another KEPA initiative, the "75UN – 75 Trees UNAI SDG7"; already eight of our BSEC Member States have expressed their keen interest to participate by planting thousands of new trees in their respective territories.

In conclusion and as you see, we are very active in the energy sector and we plan to remain so; at the same time, we are of course looking forward to the deliberations that will take place during these two days, in order to come up with new ideas and new initiatives, because only in this way we will be able to confront the new challenges that the pandemic has put before us; we are obliged to cooperate efficiently and, let me say, also in a tangible way.

Allow me to thank again all participants for their presence today in this forum and to wish to all of you a successful meeting; we are looking forward to your conclusions in order to amplify, among other, the activity of our organization in this very important sector, the sector of energy and of climate change.

Thanking you again for your kind attention, I return the microphone to you dear Ambassador Chebeleu.

Short CV

Ambassador Michael B. CHRISTIDES is the Secretary General of the Permanent International Secretariat (PERMIS) of the Organization of the Black Sea Economic Cooperation (BSEC), headquartered in Istanbul, Turkey. Born in Thessaloniki, Greece in 1949, Ambassador CHRISTIDES joined the Hellenic MFA in 1976 as first in his Class and served with distinction until his retirement in August 2014. Among other assignments he served as Ambassador of Greece to Bulgaria, to Turkey and to Argentina and held senior posts in the Hellenic MFA. After his retirement Ambassador CHRISTIDES was elected by the BSEC Council of Ministers of Foreign Affairs as Secretary General of the BSEC PERMIS, assuming his duties on 1 July 2015. Following the unanimous endorsement by all BSEC Member States, the same Council of Ministers of Foreign Affairs reappointed on 15 December 2017 Ambassador CHRISTIDES for a second three-year term-in-office, as of 1 July 2018.

Opening speech
Mr. Spyridon - Adonis GEORGIADIS

Minister of Development & Investments, Hellas

Dear participants and organizers,

First of all, I want to thank you for the invitation. It is a great honor of being with you for one more year.

Unfortunately, this time from distance because of COVID-19 and all the pandemic that has changed all of our lives in 2020.

But even under COVID-19 and even under this crisis and maybe even more because of the crisis, sustainable growth, renewable energy and the change in the way we work and live, have become really very important.

Greece, as you may know, decided to decarbonize its energy sector until 2023. Here, in the Ministry of Development and Investment we are applying a huge master plan for the region that had the lignite plants.

Also, with the Ministry of Environment and Energy we have legislated an even more fast procedure in licensing renewable energy projects, because we really want to change all the mixture of our energy and find ways to reach sustainable growth, set exactly the economy and all the things that will make humanity live in a better world.

So, conferences, as your own, are really important and for one more reason. The Recovery Fund of the European Union needs mature plans in the renewable energy and the green technology, in all fields. In combination with the ordinary European funding, this gives Greece a chance to transform our country to a green country with energy efficient buildings, with renewable energy and with respect for the environment.

For all these reasons I welcome your conference and I wish you a good success.

Short CV

Mr. Spyridon – Adonis Georgiadis is a graduate of the Department of History and Archeology of the Philosophy School of the National and Kapodistrian University of Athens. In 1993 he undertook the management of the publications "GEORGIADIS - LIBRARY OF GREEKS". In 1994 he founded the Center for Free Studies "HELLENIC EDUCATION". He was elected as a Member of the Parliament in the elections of 2007 and 2009 under the political party of Laos. In February 2012, he joined the political party of New Democracy, resigning from his parliamentary position. He was elected with the New Democracy Party in the 2012 and 2015 national elections. In 2011 he was Deputy Minister of Shipping in the Government of Mr. Loukas Papadimou and in 2013 Minister of Health in the Government of Mr. Antonis Samaras. On January 18, 2016, he was appointed by the decision of Mr. Kyriakos Mitsotakis, the President of the New Democracy party, as one of the two Vice-Presidents of the party to supervise the parliamentary work of the party. On July 9, 2019, Mr. Georgiades was sworn as Minister of Development and Investments in the government of Mr. Kyriakos Mitsotakis.

Keynote address
"Sustainable Recovery Plans – Outlining priorities"

Mr. Kostas FRAGOGIANNIS

Deputy Minister for Economic Diplomacy and Openness,
Ministry of Foreign Affairs, Hellas

Ladies and gentlemen,

dear Organisers of this Forum,

I would like firstly to express my great joy for taking part in this event, which touches upon a very important and current issue. As we all know, the Covid pandemic has caused tremendous disruptions worldwide and has affected almost every aspect of human activity. While the battle against it is far from over, we need to start thinking not only about how to mitigate its devastating impact on our societies and economies, but also how to best navigate the post-covid environment, building on comprehensive and sustainable recovery plans.

In the current globalised economic landscape where our economies are -to a large degree - interconnected, national sustainable recovery plans cannot be entirely successful if they rely exclusively on domestic policy measures and initiatives. These are a necessary but not sufficient prerequisite to overcome the crisis. Domestic policies need to be matched with efforts to strengthen interstate cooperation in every field possible and in a mutually beneficial way.

In doing so, we must make full and good use of all available tools to promote interstate cooperation and the Black Sea Economic Cooperation Organization is, by far, the most appropriate, home-grown vehicle, that can help drive forward fruitful and productive cooperation between our 12 Member States in the wider Black Sea region.

Ladies and gentlemen,

We all understand that the economy and the natural environment are inextricably linked, and we are constantly seeking to control their interactions to reduce negative externalities. Towards this direction, the 'circular economy' is progressively becoming an essential model for government and business stakeholders alike. However, despite this change of direction, today's economy is still largely linear and excessively inefficient in terms of good use of natural resources and reduction of the pollution generated. It goes without saying that this 'take-make-use-dispose' economy will have detrimental consequences for human well-being.

On a planet with limited material resources, a circular economy is more than ever necessary in order to sustain, not to mention to improve, life and well-being. Despite the triviality of this statement, today's economy has grown to be strikingly "linear" and wasteful of resources. This economic model not only threatens the availability of the very resources that enable it, but also generates additional negative impacts on our environment. Among these, climate change, is of maximum concern, and that is why combating it ranks high on the international political agenda. Mainstreaming sustainable development, environment-friendly and energy-efficient considerations in every stage of our policy-making is of outmost importance if we truly want to live up to and deliver on our Climate-Change ambitions and Sustainable Development Goals.

EU, the Greek Government and I personally believe, that environmental and climate policies can contribute decisively to the past-Covid19 recovery. To this end, EU has set the Green Deal as a plan to make the EU's economy sustainable. The European Green Deal provides an action plan to boost the efficient use of resources by moving to a clean, circular economy and at the same time restore biodiversity and cut pollution in order to achieve a Europe-neutral climate by 2050. In addition, European Green Deal will spur Europe's recovery from the coronavirus crisis by turning green challenges into innovation opportunities.

Greece will make the most of European funds to develop its green economy. For that reason, the Greek Government is committed to promoting sustainable development, green energy and innovation

as necessary conditions for the continuous improvement of social, economic and environmental situation in the country. The Greek Government's policy priority remains the complete phase-out of lignite dependency for electricity production by 2028 and the promotion of e-mobility.

More than 30% of the Recovery Fund will be channeled into green growth actions. In addition to the 19 billion euros in grants allocated to Greece from the Recovery Fund, loans of 12,5 billion euros are also foreseen on favorable terms. Energy saving programs in residential and other buildings, electrical interconnections, Renewable Energy Sources, electrification, measures for nature protection, de-lignitation, spatial planning in combination with sustainable development and management of solid and liquid waste, are the main axes proposed by Greece to be financed by the Recovery Fund.

In addition, the Hellenic Development Bank of Investments (HDBI) has launched a program called Greek Green Funds for venture capital and private equity funds to finance businesses in the sectors of renewable energy production and technology, energy conservation infrastructure, sustainable development, and circular economy. The program is expected to generate more than 4 billion euros in investments.

The way forward for the Greek economy cannot but include and base heavily on alternative sources with a green footprint for the whole sector. At the same time global challenges cannot be addressed without multilateral cooperation at international level and better coordination in areas of common interest. The Greek Ministry of Foreign Affairs and I personally promote and try to facilitate potential private sector investment in the Greek energy sector. As a Deputy Minister of Foreign Affairs responsible for Economic Diplomacy and Openness, I attach the utmost importance to the development and internationalization of companies and the creation of considerable added value for my country.

Last but not least, I believe that we should make full use of the platform provided by BSEC to strengthen our cooperation aimed at the protection and preservation of the environment, pursuing the implementation of greening projects in our region. We all very well know that there is no single, magic solution to the socio-economic fallout caused by the pandemic. What is certain is that our countries are facing common problems that call for common and coordinated action, for today and the day after. Interstate cooperation is key. And we firmly believe that BSEC provides us with a useful platform to strengthen our cooperation as we begin to prepare ourselves to restart our economies and introduce the necessary recovery plans to bring sustainable progress and prosperity to all BSEC Member-States and their citizens.

Thank you very much for your attention.

Short CV

Kostas Fragogiannis was born in 1959, in Kavala, where he completed his basic education. After graduating from the British Institute of Marketing (HND), he continued his studies in the U.S., earning a BS in Business Administration and an MBA in International Management & Computer Systems from the University of San Francisco.

For over 30 years, he has held senior executive positions in major companies and groups, such as Emporiki Bank, Interbank, Delta, the Vasilakis Group, Ant1, the Viohalco Group, Vivartia, and the Chipita Group, where he was also a founding member of the Group's international operations 24 years ago. Before assuming his duties as Deputy Minister of Foreign Affairs for Economic Diplomacy and Openness, he was the Development Manager of the Chipita Group, contributing significantly to the further growth and development of the Group's international operations.

Having successfully handled development projects worth hundreds of millions of euros throughout the world, he has gained invaluable experience in negotiating with organizations in countries where he has overseen investments. Through his role in the development and internationalization of companies, he has contributed to the creation of thousands of jobs, while also creating considerable added value in each country where he has been active. He has led a total of 18 productive investment projects in 16 countries, 9 investment consortiums, 5 buyouts and, finally, the founding of multiple commercial enterprises in dozens of countries.

Through his many years of international experience, he has gained a full and up-to-date perspective on what is required to effectively attract foreign investments and to promote exports and growth in the international economy.

Speech from Mr. Ramu DAMODARAN

Chief of United Nations Academic Impact,

Deputy Director for Partnership and Public Engagement in the United Nations Department of Public Information's Outreach Division

My greetings and good wishes to all of you at this 13th International Conference on Energy and Climate Change and the Green Energy Investments Forum being organized by the Energy Policy and Development Centre of the National and Kapodistrian University of Athens.

An institute which we in the United Nations Academic Impact are proud to have as our global hub on the Sustainable Development Goal relating to effective, sustainable energy.

My last trip from New York was actually to your Conference in 2019 and like many of you I have been virtually off plains since then, working from the United Nations in New York. And it is for the source of tremendous strength and encouragement to all of us that so much work continues to be done by universities and institutions around the world, not only individually but in concert with other entities to further in a very practical and demonstratable way to work with UN and that is what it is trying to do for people even at this difficult time.

I am particularly heartened by the efforts of the Energy Policy and Development Centre, in particular Professor Dimitrios Mavrakis, Dr. Popi Konidari and others who have worked with the Organization Black Sea Economic Cooperation to further something that Dr. Mavrakis and I have talked a year ago.

The idea of persuading universities around the world to work with national governments, to really have a campaign to plant trees in honor of the 75th anniversary of United Nations which we are celebrating this year.

There is a certain symbolism to that because trees are after all, those that grow roots in literally or figurative sense of our history.

We think back to queen Phyllis of Trace and how she sat crying for her lost love Demophon to return from the battle. When he did not return, she was convinced that he had found another love and killed herself, but the Ancient Greek Gods took pity upon her and transformed her into an almond tree. When Demophon did come back he embraced the tree and it blossomed.

That beautiful story whether myth or fact or fantasy I think sums up what we are trying to do in this program. We are using trees not only for their scientific basis of nurturing and sustaining our environment but also as metaphors of what we in the world must do at this time and should have done as far back as 1945 when the United Nations came to be.

There is the African problem that he who plants the tree knows that he or she will never sit in this tree. That is a metaphor again for our times.

Whatever we do today, whether it is in terms of energy whether it is in terms of climate change we are not to get immediate results, while if we choose not to do certain things we may get immediate results in terms of quick fixes of developments, of industrial output, but with complete disregard of what happens later and down in the line.

So if we have the courage as academics, as intellectuals, as scholars, as practitioners to think beyond the horizon of our indigent time and think of the world as we would like it to be then there can be no more stronger metaphor than the tree.

The tree that begins as a small sampling and grows to nurture the earth at which it is planted.

Give the tree to the children, the women and the men who gather beneath its branches.

So that long term view, up to Velafond which is really what sustainable development and the sustainable goals are really about is an opportunity for us to bring in all the wonderful actors and participants, at this meeting.

Be there governments, be there regional or international organizations, be there the universities, be there the financial institutions. And I am particularly grateful to the governments of Armenia, of Azerbaijan, of Bulgaria, of Greece, of Moldova, of Romania, of Turkey, of Ukraine who have joined in this tree planting initiative with the Energy Policy and Development Centre and with the organization of the Black Sea Economic Cooperation. Because you have shown that what happens in the wonderful, pictures and almost magical coastline of the Black Sea, it is something that can be replicated around the world and indeed with Dr. Mavrakis's leadership it is happening.

He has reached the branch of friendship out, beyond the region, to Canada, to Manitoba, to Japan, to Kazakhstan and so we really have the seeds – if you will – of a global movement.

Where each tree planted, it is one more dream set in motion and in time one more dream realized. That is what the United Nations is all about. We count of the support of women and men like you. We are grateful to that support for the imagination you bring and above all your contribution that everything you do as scholars, as thinkers, as bankers is something which will further the global human cause and enrich the dignity and the work of the human person.

Thank you

Short CV

Mr. Ramu Damodaran is Deputy Director for Partnership and Public Engagement in the United Nations Department of Public Information's Outreach Division and is chief of the United Nations Academic Impact initiative, which aligns institutions of higher learning and research with the objectives of the United Nations and the States and peoples who constitute it. He is also the current secretary of the United Nations Committee on Information. His earlier posts with the Organization have included the Departments of Peacekeeping and Special Political Questions, as well as the Executive Office of the Secretary-General. Ramu Damodaran has been a member of the Indian Foreign Service, where he was promoted to the rank of Ambassador, and where he served as Executive Assistant to the Prime Minister of India as well as in the diplomatic missions in Moscow and to the United Nations, and in a range of national governmental ministries.

Remarks by Prof. Asaf HAJIYEV

Secretary General of PABSEC

Dear colleagues,

Distinguished representatives of academic community and diplomatic corps,

Ladies and Gentlemen.

It is a great pleasure for me to address this gathering, dedicated to the one of the topical issues of modern times – Green Energy and Sustainable Recovery Plans.

Today our life is full of unexpected challenges. This requires mobilization of the efforts at national, regional and international levels, exchange of experience and examination of the potential for further cooperation. Over the past years, renewable energy has seen remarkable progress. It is expected that the clean renewable energy will play strong role in post-pandemic stimulus packages and the countries will seize the opportunities for contributing to recovery and building a more inclusive and sustainable world.

People live in an environment, which provides everything for their survival. Now with speedy population growth, increased needs and powerful modern technologies natural resources are being used on unbelievably large scales. Unfortunately, many of the natural resources are not going to last forever and wise use of natural resources becomes topical problem today. It is widely advocated that natural resources are to be preserved, developed and managed in a sustainable manner through strengthened regional, national and local capacities. Rational management of natural resources and concept of green energy is a priority and a common goal for many countries. According to the World Bank information the most developed part of the world (USA and Canada) use only 5% of natural resources and pay more attention for modern technologies.

The concept of a green economy gained important international recognition in 2012 at the United Nations Conference on Sustainable Development in Rio de Janeiro. The main theme of which was Green Economy in the context of Sustainable Development and Poverty Eradication. The Outcome Document "The Future We Want" states that "*there are different approaches, visions, models and tools available to each country to achieve sustainable development*" and emphasizes that a green economy is important tool for achieving sustainable development.

Today, the green economy and green energy are becoming global trends. The UN declared 2010-2020 a decade of green economy, and the member countries transformed their economies towards the greening principles. At present, the role of renewable energy resources (solar energy, wind energy, geothermal energy, energy of sea tides, waves, etc.) is increasing. This is because the technological progress has caused accelerated pace of energy consumption and promoted the search for renewable and more environmentally friendly types of energy resources.

Natural, climatic and geographic conditions in the BSEC region, as well as the existing potential of fuel and energy resources of the countries in the region, including the available resources of fossil fuels and renewable energy sources, outline the priorities in the development and utilization of various types of new and renewable energy sources.

Exhaustible or non-renewable natural resources exist in limited quantities and cannot be replaced or reproduced, neither do they renew themselves. Such resources can only be conserved, used less, some of them may be recycled, but once these resources are gone, they are gone forever. One of the very important exhaustible resources today is oil and gas. Humankind must manage these resources rationally to make them as long as possible. On the other hand, the natural resources that can last forever regardless of human activities are relatively non-exhaustible. They renew themselves but can be damaged by human misuse. Water and air are such resources, but they can be damaged by pollution. Natural resources that reproduce themselves or that can be reproduced by human efforts are considered renewable. If managed well, it is possible to use such resources and yet have as much left afterward as before the use. Wise and rational management of such resources leads to their

efficient renewal. This is important aspect of green energy, which is very topical today for all countries.

The BSEC region is rich in natural resources and is well known for the diversity of ecosystems, habitats and biological diversity due to its highly varied climatic, geologic, topographic and hydrologic conditions. There are marine ecosystems, coastal zones, lakes, rivers, forests and high mountain ecosystems.

The green energy legislation in general corresponds with problems and needs raised by the practice and are in accordance with the rhythm of development of individual states. Legislative frameworks are complemented by institutional reforms and constitute important step towards sustainable development. Adequate legislation, well defined competences of respective authorities, shared responsibility, viable institutional framework of interrelated governmental and nongovernmental organizations have important role in efficient and rational management of natural resources in the context of green energy.

The PABSEC has elaborated several recommendations in this area, for instance "Green Economy. Blue Growth", "Development of New and Renewable Sources of Energy in the BSEC Member States", "Rational Management of Natural Resources in the Black Sea Region: Enhancement of Legislative Framework" and "Cooperation in the Field of Energy", where it is noted that efficient natural resources management requires integrated and sustainable approach and needs application of effective policies at global, national and local levels.

The BSEC member states have developed national strategies for sustainable development including many policies that have effect upon resource use and their environmental implication. They carry out international cooperation on a bilateral and multilateral basis, at regional and global levels, cooperating with other countries, international organizations, participating in international programs and projects.

Today's conference is a very good example of such an effort, and, hereby, I would like to congratulate professor Mavrakis for his efforts in organizing these policy conferences and thank for extending invitation to the PABSEC.

The green energy policies imply numerous challenges for decision makers. Therefore, an appropriate institutional framework, a clear policy and strategic and effective implementation of plans are required to alleviate some of the current difficulties.

The Earth, where we live is a closed ecosystem, and this sets limits to use of natural resources. Resources need protection maintenance and enhancement. For many renewable resources, the key challenge is to ensure their sustainable regeneration by safeguarding the reproductive capacities of ecosystems, although humans generally rely on the natural system to re-grow, renew and purify its resources.

As countries become richer and more developed, as technology stretches and magnifies natural resources potential, people must closely guard the quality of ecosystem as all living things depend upon their use of natural resources. Green energy is a key factor for meeting the present and future needs and benefits of peoples with due regard to raising quality of human life along with sustainable development of environmental ingredients that make up that quality.

The Parliamentary Assembly of the Black Sea Economic Cooperation, within its competence, has developed many important documents on topical issues of economic cooperation in the Region.

Today, when the Coronavirus pandemic places immense impact on societies and economies, unprecedented in the whole history of the Black Sea Economic Cooperation, it is necessary to take decisive and innovative action both by individual states and at the regional level.

We must unite our efforts and in this regards the Black Sea unite all us.

I would like to wish productive and successful deliberations during the Forum.

Thank you for your attention.

Short CV

Dr. Asaf Hajiyev was born in 1951. 2001-2015 was Professor and Chair of the Department of Theory of Probability and Mathematical Statistics at the Baku State University. In 2014 he was elected Academician (Executive member) of the Azerbaijan National Academy of Sciences, Institute of Control Systems.

He holds the Dr. Sci. degree from Bauman Moscow State Technical University (1992) and has done Ph.D. (1979) and post-doctoral research (1985-1989) at Lomonosov Moscow State University. He has vast research and teaching experience as the Chair of the department of Probability and Statistics, and of the Department of Controlled Queues, Institute of Control Systems at the Azerbaijan National Academy of Sciences; Chair of the Department of Theory of Probability and Mathematical Statistics, Baku State University; Senior Scientific Researcher, Department of Probability Statistics, Royal Institute Technology in Stockholm. Being a renowned researcher, he has served at the several universities around the world including China, Germany, Italy, Portugal, Sweden, Turkey, and USA. He serves on the editorial boards of many prestigious national and international academic journals. He has been an organizing member and the Keynote speaker at numerous international conferences. He has been honored with many prestigious awards like: Azerbaijan Lenin Komsomol Prize Winner on Science and Engineering; Grand Prize at the International Conference "Management Science and Engineering Management" Macao; and Grand Prize at the İnternational Conference "Management Science and Engineering Management" at Islamabad, Pakistan.

He is the Honorary Academician of Academy of Sciences of Moldova, foreign member of the Mongolian National Academy of Sciences, Member of TWAS (The World Academy of Sciences), Honorary Professor of Chengdu university (China) and elected member of the International Statistical Institute.

He has also the honor of holding the office of the Vice-President and since 2015 the Secretary General of the Parliamentary Assembly of the Black Sea Economic Cooperation Organization. He serves on the boards of many international academic organizations and institution. He has more than 150 peer reviewed scientific publications to his credit, published in the highly reputed journals.

Development of Green Economy in Georgia

Amb. David DONDUA

Ambassador of Georgia to the Hellenic Republic

In the modern world for the achievement of economic growth, it is necessary to introduce new type of economic model, which will be directed towards green growth. For the promotion of sustainable development of the country and inclusive economic growth, the Ministry of Economy and Sustainable Development of Georgia works on elaboration of green growth concept and green growth strategy.

Georgia as a Contracting Party in the *Energy Community*, currently, is dealing with energy market transformation which will have a strong direct and indirect impact on the development of renewable energy.

As a member of the *Energy Community Treaty*, we have defined obligations. In this regard, Georgia follows the provisions of the EU Directives and is transposing its *acquis* according to the *Energy Community* work program.

Furthermore, we have obligation within the framework of *Paris Agreement*, which means that we should achieve sustainable development of energy sector, which is accomplished, by development of energy efficiency and renewable energy.

Energy Efficiency is a core topic of the Government's agenda, which is driven by the country's dependence on imported energy resources and at the same time by a constant increase in energy demand. On the other hand, Georgia's primary generation source is hydro, but due to seasonality of the hydro resources, the country faces locally insufficient basic electricity generation to meet the demand. Therefore, Government believes that energy efficiency is a smart solution for demand-side management.

With the joint effort of Georgian Government and EU relevant authorities, the legislative framework has been developed, based on EU Energy Efficiency *acquis* assembling the three key laws on energy efficiency in general; on energy efficiency of buildings; and on energy labelling. The main goals of this framework are:

a) to increase energy savings, the security of energy supply, and energy independence, and to remove the barriers to the improvement of energy efficiency in the energy market.

b) to promote the rational utilization of energy resources and improvement of the energy performance of buildings, taking into account climatic and outdoor conditions, as well as indoor climate requirements and cost-effectiveness.

c) to establish a common legal framework for promotion and implementation of the energy efficiency measures to ensure the achievement of the goal set by the protocol "Concerning the accession of Georgia to the treaty establishing the Energy Community".

Furthermore, the *Law of Georgia on Promotion of Production and Utilization of Energy from Renewable Sources* was adopted by the Parliament in December 2019. The purpose of this Law is to create legal grounds for the encouragement, promotion and consumption of energy received from renewable sources. Currently, the normative acts stemming from the Law are being prepared by the Government.

Georgia, like Greece, has an immense untapped potential of wind and solar, as well as hydro and geothermal resources. The effective use of renewable energy sources could result in the production of an additional 20 TWh, which would save about 7 million tonnes of conventional fuels. The full utilization of Georgia's renewable energy resources could significantly contribute to climate change mitigation in the country.

Currently, the *Energy and Climate Integrated Plan* is being drafted which will set the targets for 2030 in such dimensions, as: energy efficiency; energy security; internal energy market; decarbonisation; R&D and competitiveness.

For the definition of general directions of green economy, with the support of GIZ, draft "Green economy policy document" has been prepared, which was aimed at assisting in modernization of Georgian economy, creation of base for sustainable and green development. The document highlights main sectors, actions and international trends, which are in direct connection with green economy development in the country.

Simultaneously, Georgia is working on green growth national strategy. This strategy will be based on the main principles of *OECD Green Growth Declaration* and will stress on only preliminary selected sectors, particularly: tourism, construction and agriculture. The corresponding action plan will be elaborated with schedule of planned activities, which will assist to the green development of mentioned sectors.

As for introduction of green economy principles in the construction sector, it is directly connected with the energy efficiency. With consideration of the fact, that in Europe, 40% of used energy comes on construction sector, it becomes necessary to undertake energy efficiency measures in this sector.

Currently we are participating in the *EU4Environment Program*. The program of the European Union aims to assist six Eastern Partner countries to preserve their natural capital and increase people's environmental well-being, by supporting environment-related action, demonstrating and unlocking opportunities for greener growth, and setting mechanisms to better manage environmental risks and impacts.

We hope that in the long run, introduction of green economy will promote to the decline in spending of businesses, development of new directions in business activities, development of sustainable transport system and ecotourism, introduction of smart and resource efficient technologies. Rational use of natural capital creates conditions for better economic dates.

Introduction of green economy principles in the private sector promote to the competitiveness, rising of employment and incomes; in the medium- and short term it drops expanses and rises efficiency. As a result, we will receive improving business environment, market diversification and more jobs.

Economic recession caused by the Covid-19 pandemic prompts us more to vigorously continue active work to accelerate the energy efficiency policy implementation and to create enabling environment for the energy efficiency investment, with the plan of further engagement of different foreign organizations and financial institutions.

Short CV

Amb. DAVID DONDUA was appointed as Deputy Foreign Minister in November 2014. He is in charge of policy planning, security policy, conflict resolution and bilateral relations with neighbouring countries. He leads Georgian delegation at Geneva International Discussions and chairs State Commission on delimitation and demarcation of state borders. Prior to his current assignment David Dondua served as First Deputy State Minister for European and Euro-Atlantic Integration (2012-2014) and Chief of Cabinet of the Chairman of Parliament of Georgia (2008-2012). He is a career diplomat. He joined the Ministry of Foreign Affairs in 1993 and held different position in the capital as well as abroad, including Deputy Chief of Mission at the Embassy to US and ambassador to NATO. David Dondua is also associated professor of Tbilisi Open University and guest lecturer at Tbilisi State University. Before joining Foreign Service, he worked as an assistant professor at the Institute of Geography of the Academy of Sciences of Georgia and was deputy director of Tbilisi #6 Gymnasium. Amb. David Dondua is founder member of Georgian Oral History Association and member of scientific council of Geographic Society of Georgia.

Speech of Amb. Anatol VANGHELI

Ambassador of the Republic of Moldova to the Hellenic Republic

Dear Minister Georgiadis,
Dear Deputy Minister Fragogiannis,
Dear Secretary General Christides,
Dear Deputy Secretary-General Chebeleu,
Dear Professor Mavrakis,
Excellences Ambassadors,
Dear participants,

1. Let me thank you for inviting the Embassy of Moldova this year again to participate to the present Conference shaped in an unusual format due to the pandemic situation, which changed everything we knew before and we have to adapt somehow to an all-new reality. It should be mentioned that although there is no evidence that climate change is influencing the spread of COVID-19, but we know that Corona virous is set to cause the biggest annual fall in CO_2 emissions.
2. Further, I would like to underline some key points regarding the renewable energy sector in Moldova. In 2012, the Republic of Moldova undertook to obtain a share of 17% of renewable sources in gross final energy consumption by 2020. Accordingly, these figures were included in the National Action Plan in the field of renewable energy for the period 2013-2020. It aimed, among other things, at the development of photovoltaic and wind technologies.
3. Moldova is now well above the binding 17% renewable energy target in 2020, with the exception of the target in the transport sector. At present, Moldova registered a 27,8% share of energy from renewable sources mostly due to switching to biomass in the heating sector.
4. On the other hand, the Republic of Moldova has still a major renewable energy potential, which, until now, has remained almost unused. With the increasing competitiveness of renewable energy costs, policymakers have gradually recognized renewable energy as an important means of addressing the energy challenges and achieving a sustainable future. Work have been done to advance the regulatory framework enabling bankable renewable energy projects in Moldova.
5. Both the above figures and the number of addresses received by the Ministry of Economy and Infrastructure, confirmed the interest of the investor community in the country and abroad, for less intermittent technologies, especially biogas, with the subsequent conversion of this resource in electricity and heat. The approval by the state authorities at the end of February 2020, of the Decision on fixed tariffs and ceiling prices for electricity produced from renewable energy sources, has materialized in the submission, during March-July, of a number of 25 files by investors in electricity generation capacities.
6. At the same time, the country remains committed to the objectives of the Paris Agreement and has set an unconditional target of reducing greenhouse gas emissions to 64-67% below 1990 by 2030. The reduction commitment can be increased to 78% below 1990, conditioned by a global agreement that addresses certain important issues. These include low-cost financial resources, technology transfer and technical cooperation, accessible to all on a scale commensurate with the challenge of global climate change.
7. Ladies and Gentlemen, on this note, I would like to finalize and I sincerely hope, that the findings and recommendations identified in the present Forum will strengthen our countries concern for renewable energy, as a solution for economic growth, job creation and increasing energy security. The Republic of Moldova authorities are ready to help accelerate the country's transition to a sustainable energy future.

Thank you

Short CV

He studied at the State University of Balti in Moldova. His master degree was in Cultures and Economies of Central and Eastern Europe at the University Grenoble III in France. His PhD studies were in political science at the Institute of Political Studies in Grenoble of France. He has also a diploma in Law studies from the State University of Moldova.

He served for the period 1996-2013 as Attaché at the Political Analysis Department of the Ministry of Foreign Affairs, First and Secondary Secretary at the International Security Department of the Ministry of Foreign Affairs of Moldova and Deputy Director of the Economic International Relation Division of MFAEI. He also joined the OSCE mission to Kosovo and Georgia.

For the period 2010-2015 he was the Counsellor and later the Ambassador of the Republic of Moldova to Israel. For the period April 2015 – July 2017 he was the Secretary General of the Ministry of Foreign Affairs and European Integration of Moldova.

He is the Ambassador of the Republic of Moldova to the Hellenic Republic since July 2017 and to the Republic of Cyprus since July 2018.

Speech of Amb. Burak ÖZÜGERGİN

Ambassador of Turkey to the Hellenic Republic

Excellencies,

Dear Colleagues,

Ladies and Gentlemen,

Thank you for the invite. I am happy to be with all of you this morning.

The virus has already changed us. Nothing will be the same again, at least for a long, long time. This of course presents enormous challenges for the public and private sectors - and the world of academia. But it is what it is. So now maybe we can start thinking how to make things even better than before. That is why I think the theme for this morning (sustainable recoveries) is ***timely***, and it is ***appropriate***. It is ***timely*** because we must chart a better course for ourselves for the future once we develop the capabilities to deal with the immediate, medical dimension of the virus. And we must start thinking ***now***. The theme is also ***appropriate***, because we simply cannot allow ourselves to fall back on the same production and consumption behaviors as before. The way we work, and the way we play, will be, and should be, ***different***. In other words, we should be looking at not only recovery, but a sustainable one at that. That's why I like the theme.

The way we see it, a sustainable recovery will require addressing at least three policy dimensions to be successful:

- Enhancing international cooperation,
- Increasing investment in renewable resources,
- Transforming our cities and towns into ***smart*** cities and towns.

Let me speak very briefly on each of these areas.

I. International Cooperation:

Channeling scarce resources from immediate daily needs of citizens to addressing climate change was already a hard bargain for many governments. Doing it under the conditions of the COVID - induced slump is now nothing less than a colossal task.

But the depth and the duration of the downturn ***will*** depend on the choices we make ***today***. At the national level, we will all in our own way come up with recovery plans involving green transformation, creating new employment opportunities, improving welfare and delivering concrete results on climate change related targets. The ***implementation*** of those plans, however, will require appropriate financing tools, either through international economic and financial institutions as credit lines or from the private sector as investments. Even so, the success of such recovery plans will be limited at best, if the domain of the plans is confined to national boundaries. Thus, a healthy multilateral system hospitable to increased international cooperation, including the sharing of experience and know-how will be crucial. I suppose this is one of the reasons we have BSEC, and why we are here today.

II. Investing in Renewables:

At the national level, we are trying to change the composition of our energy basket through increasing the use of local and renewable sources over ***imported hydro-carbon resources***. Over the last 18 years, the established capacity of renewables has increased almost ***four times***, while the share of renewables in electricity production ***doubled*** – to account for ***almost half*** of Turkish electricity production. In terms of established capacity in renewables, Turkey currently holds ***6th*** place in Europe. A major investment program, worth 1 billion USD is already underway in central Turkey which will dramatically increase the established capacity. We are also investing in research and development of solar technology. Most recently in August, Turkish entrepreneurs have completed a

400 million USD worth factory investment for photo-voltaic panels that will employ up to 1400 people.

By the way, I am informed that we managed to get into Guinness World Records by planting eleven million trees last November in the space of one hour. If everything goes as planned, in the next three years, renewables will reach 63% in Turkey's energy basket.

III. Smart Cities:

The pandemic has made us realize that the way our cities are planned, the way we allocate resources and the way we deliver services are woefully inadequate. But even before the pandemic hit, we were already working on steps to improve our cities. We already have in place a ***National Smart Cities Strategy and Action Plan*** for the next 3 years, drafted together with the relevant stakeholders. That would make us the fourth country in the world to prepare such a strategy.

Providing financial incentives and funds to municipalities and entrepreneurs, for transforming ordinary cities into "smart cities" is obviously a major component of the strategy. The smart cities strategy will involve optimizing the allocation of resources and delivery of services, resulting in significant savings. For example, initial studies suggest that, with smart systems, a 45% savings in the cost of waste collection and transportation could be achieved while allowing for more recyclable water. There are many examples of smart city applications - from the delivery of health services to disaster preparedness or urban transportation. The bottom line is, investing even a fraction of recovery funds in smart cities ***will*** yield multiple benefits. So that is what we in Turkey will be doing in the coming years.

Ladies and gentlemen,

One last word about the ***travel industry***, which is presently one of the hardest hit sectors in the world. It so happens that to varying degrees, this is a major - for some even vital - industry for many of our nations. Put simply, ***we need to support*** the tourism and travel sectors by ***cooperating***. There is nothing wrong with competition, in fact I am a great believer in the positive effects of competition. However, we should really get going on collaborating among this group with a view to restoring the sector as soon as possible. We are all, after all, both source and destination countries. And what better way to help sustainable recovery than revitalizing the tourism sector, which in our language is nicknamed "an industry without chimneys"?

Thank you.

Short CV

He started in 1985 his career as Attaché at the Department of International Economic Relations. For the period 1987 -1992 he served as Attaché at the Cabinet of the Minister of Foreign Affairs and at the Turkish Embassy in London as Attaché, Third and Second Secretary. He was the Vice-Consul, Turkish Consulate General in Benghazi for the period 1992-1994. He joined the Cabinet of the Undersecretary of the Ministry of Foreign Affairs as Second and First Secretary from 1994 to 1996. In 1996, he was positioned at the Permanent Mission of Turkey to the United Nations as First Secretary and Counsellor. He became the Chief of Section, Acting Head of Department of Maritime Affairs in 2000. For the period 2003 –2007, he was Counsellor, First Counsellor at the Turkish Embassy in Washington. In 2007 he was Head of Department, European Union Affairs and in 2008 under the Minister of Plenipotentiary, he was the Head of Information at the Department and Foreign Ministry Spokesperson. From 2010 up to 2018 he served as Ambassador of the Republic of Turkey to Croatia, Director General for Bilateral Political Affairs and Acting Deputy Undersecretary for Bilateral Political Affairs. He is the Ambassador of Turkey at the Hellenic Republic since 18.12.2018.

Speech of Amb. Sergii SHUTENKO

Ambassador of Ukraine to the Hellenic Republic

Ladies and Gentlemen,
Distinguished participants,

I am delighted to join the 7th Green Energy Investments Forum.

Energy efficiency and energy security are now operative words for companies and countries alike; going forward, renewable and alternative energy issues will only become more important.

Energy efficiency for Ukraine is not only the key to economic development when the country reduces the consumption of energy resources and the population saves on utilities - but also to climate neutrality.

Climate Change is a huge challenge facing humanity today and it demands collective actions.

First of all, I would like to note that **Ukraine is taking important strides to increase the use of renewable-energy sources** and alternative fuels as part of its broader strategy to reduce its reliance on traditional fossil fuels. Ukraine remains an industrial and European country, offering opportunities for investors and industry professionals, including in renewable energy.

The Government of Ukraine welcomes the recent developments in the EU regarding the policy response to climate change and environmental challenges, specifically the development and implementation of the European Green Deal.

Ukraine is already contributing to joint efforts to create a climate-neutral European continent, under the Paris Agreement, the UN Sustainable Development Goals 2030, and the EU-Ukraine Association Agreement. Ukraine sees itself as an integral contributor to the European Green Deal goals. The concept of the European Green Deal, among other things, is a logical continuation of the international economy greening efforts.

Ukraine, as well as other European countries which have either association agreements or free trade agreements with the EU, is also part of the European Green Deal, since the EU policy in sectors covered by the European Green Deal will directly or indirectly affect trade conditions with third countries and their commitments to approximate their national legislation to the EU acquis in the framework of the functioning of free trade areas.

In order to establish a detailed national approach to Ukraine's integration into processes related to the European Green Deal, the **Government of Ukraine** within the above mentioned dialogue with the EU **proposes to develop a joint Roadmap for Ukraine's participation in the European Green Deal**, taking into account the priorities of sustainable economic development, achievement of the UN Sustainable Development Goals 2030, in particular drawing from the Western Balkan's experience.

One of the prospective areas of cooperation within the European Green Deal **is clean, affordable and safe energy** which is of common interest for all Parties. It can be implemented by fulfilling the following steps:

- increasing energy efficiency along the energy supply chain, incentivization of energy efficiency measures, mobilization of investment for implementation of energy efficiency and innovative technologies;

- just transition of the coal sector, which includes the transformation of coal-mining regions into territories attractive for investment;

- development of hydrogen energy, conducting research and exploring possibilities for hydrogen storage and prospective of use of the Ukrainian gas transmission infrastructure for transportation of gas mixtures;

- distributed renewable energy, implementation of projects on renewable energy sources in local communities, development of energy cooperatives, smart grids, energy storage systems, promotion of co-generation;

- integration of energy markets into the European markets, connection of the Ukrainian electricity transmission operator to the ENTSO-E (European Network of Transmission System Operators for Electricity).

So, Ukraine is interested and is already preparing for the planned European Green Deal.

Yesterday in Brussels within the XXII Ukraine-EU Summit a number of bilateral documents were signed, among them - an Agreement between the Government of Ukraine and the European Commission on financing the Climate Package for a Stable Economy: (CASE) in Ukraine. The agreement provides for the development and implementation of policies and measures that effectively support the transition to climate-neutral, clean, resource-efficient and secure energy supply and consumption; supporting climate change mitigation by reducing emissions of greenhouse gases and ozone-depleting substances; stimulating the transition to a clean and circular economy.

I would like to stress the **opportunities to invest in Ukraine's alternative energy sector**. They are exceedingly favorable as the country has diverse reserves of raw material and a well-educated workforce possessing the technical know-how required to develop and introduce the latest commercial advances in this sector.

As a result, interest in Ukraine's renewable energy sector continues to grow. Energy companies or public organizations from Germany, Norway, Finland, France and Canada therefore seized this opportunity and decided to take part in the Ukrainian energy transformation.

On July 21, 2020 Ukraine's parliament approved the **"Investment nanny" bill**, which offers state assistance and oversight to large investment projects. The bill provides a 15-year state guarantee on foreign investments upon signing a direct special agreement with the Ukrainian government.

So I will finish by saying that the **Government of Ukraine is absolutely committed** to supporting green energy initiatives as renewables become mainstream.

It is good to see that as a result of reforms that are underway, **Ukraine is in the TOP-10 countries that are most attractive to invest in green energy**, placing the 8th position according to the Climatescope 2019 Annual Report.

Thank you for attention.

Short CV

He graduated from the Kyiv Engineering and Construction Institute in 1993 and the Young Diplomats School of the Ministry of Foreign Affairs of Germany in 1996. He received in 1999 his Master of Art in International Management and Planning from the US Naval Postgraduate School (Monterrey, CA).

His career as diplomat started in 1995 when he was placed as the Attaché, Third Secretary of the Arms Control and Disarmament Department of the Ministry of Foreign Affairs of Ukraine. He has served as the Second and First Secretary of the Ukrainian mission to NATO; as the Deputy Director and Director General of the Office of the Minister for Foreign Affairs of Ukraine. He was also at the MFA of Ukraine, the Deputy Director of the Arms Control and Military-Technical Cooperation Department; the Deputy Director and Director General of the Human Resources Department; the Director-General of the International Security Department; and the Ambassador at large, Non Proliferation and Arms Control Division, International Security Department. For the period 2006-2010 he was the Consul General of Ukraine in Thessaloniki-Greece. Since 2018, he is the Ambassador Extraordinary and Plenipotentiary of Ukraine to the Hellenic Republic.

Intervention by Prof. Edoardo CROCI

Bocconi University, Italy

I am very glad to be hosted at this forum also this year. Unfortunately, due to the pandemics, we cannot be in presence. It is a pity because this is always a great occasion of networking and exchange of opinions and scientific growth.

I think that the topic of this year which looks at investments for the future, and the proposals related to scientific cooperation for the recovery are very relevant.

Actually, it is obvious that the whole world, and not just Europe, is in a situation of great difficulty. The debt of most European and non-European countries is increasing a lot. Regarding Italy, yesterday statistics were published showing that we are basically at the same level of public debt as after the Second World War which was the maximum in the history for Italy.

But let me be optimistic about this. I think that this is also the time where the transition towards green economy is not something that we can postpone again.

This is not just a matter of social responsibility. This is something that really can change our way of production and consumption and should drive our investments towards a different model of development where Europe can really assume the leadership with respect to other parts of the world like America and China.

I think that the Green Deal and the Next Generation EU promoted by the European Commission provide the right stimulus to drive this transition.

There are some key aspects to consider. The first one is the decarbonization commitment with the ambitious goal of setting a 55 per sent reduction of emissions by year 2030. The second one is circular economy which is also a huge opportunity for a different model of development. The third one is natural capital preservation and the capability to fully develop and exploit the ecosystem services provided by natural capital. Beyond these sustainability aspects we also have to consider digitalization which is also relevant to modernize our economies. But I think that sustainability aspects are the key ones.

We also have in place ithe UN Agenda 2030 with 17 SDGs which in some way provide an even broader framework at the global level. And this has been translated into national plans and also into sub-national plans for regions and cities.

So, to summarize and conclude, I think that we have a clear framework of goals which is in place at both the international and European levels. I also think that the financial investments which are put at disposal by the European Commission in our case are very relevant to address the transition.

The purpose is not to use these resources just to subsidize industries and small business in this phase of crisis, but really to address the key topics of the green economy and environmental transition. So, the way these resources will be employed in the next years will be very relevant for us and for next generations.

The research system together with the industrial system can play a very relevant role in assessing experiences and cases, and in suggesting policies and evaluating them to support this transition.

Thank you

Short CV

Member of the Managing Committee and Senior Research Fellow at GREEN (Centre for Geography, Resources, Environment, Energy and Networks) at Bocconi University, where he coordinates the "Green Economy Observatory" and the "Smart City Observatory" and teaches "Carbon Markets and Carbon Management". Member of the Management Committee of the COST Action "Inogov - Innovations in Climate Governance: Sources, Patterns and Effects" and Supplent Member of the Management Committee of COST Action "Implementing Nature-Based Solutions for Creating a Resourceful Circular City". He is member of the Thematic Group on Goal 11 (Cities) of UN - SDSN. His main research area is related to sustainable policy at the urban level (environment, energy, mobility, climate). He has served as Milan City Councilor for Mobility, Transport and Environment, Administrator of the Agency for the Protection of the Environment of Lombardy Region, Vice President of FEDARENE (European Federation of Regional Energy and Environment Agency), and Vice President of Italian Agenda 21 Coordination association.

Intervention by Prof. Andonaq Londo LAMANI

Polytechnic University of Tirana, Albania

Good morning Ladies and Gentlemen,

I would like to start by thanking the organizer of this event and especially Prof. Mavrakis for the invitation to me to make an intervention in the 7th Green Energy Investments Forum.

It is a great honor to be among such distinguished personalities in such an important event. It really offers a great opportunity to discuss and be informed about developing projects and ways of investment that will assist the economies of the BSEC Member States to acquire a greener identity. This event besides its importance both for business and scientific world, it gives us the possibility of addressing an important subject, the climate change which is not treated any more like a national issue.

The energy and climate change subject found rapidly place in the agenda of all countries, regional and international organizations.

Briefly, I want to present here some objectives of the Albanian government regarding one of the main dimensions of the Energy Union, which are climate action, decarbonizing the economy and renewable energy. Certainly, the Albanian government is preparing all the legal documents and the other dimensions as energy security, internal energy market, energy efficiency and resource innovative competitiveness. Albania is working over the «Energy and Climate Plan». Albania is a country with low carbon economy. It is committed to reduce the carbon dioxide (CO_2) emissions by 11.5% as compared to the Business As Usual scenario for the period 2016-2030. Adoption measures that contribute to the decarbonization dimension are elaborated in the 3rd National Communication of the Republic of Albania under the United Nations Framework Convention for Climate Change.

Also, In Tirana in 2016 and in the Climate Change Strategy and in the Action Plan in Tirana in 2019. The national vision focuses strongly on the three main components of Climate Change in Albania: Mitigation measures, Adaptation policy and Sustainable Development.

Albania has a considerable potential of renewable energy source. Renewable energy source represents an important energy source of the label in Albania. The use of such source for energy production represents a long term objective for implementation of three objectives of energy policy of the country such as the support for the overall economy, the development and increase of the security of supply and the protection of the environment.

Implementation of the renewable energy source Strategy will increase the security of the Albanian energy supply and will begin to integrate the Albanian energy market into regional, the Energy Community and the European markets.

The government commitment to further develop renewable energy source is also expressed in the framework of the National Energy Strategy 2018-2030. The target by 2030 will be at least 45% of the total energy final consumption projected for this year.

The goal is very ambitious. This target was set in June 2018 and our government is hardly analyzing scenarios for the future. Consequently, there is a strong interest in the energy sector to attract new investments for local and for inner business/

Thank you and wish you the best for our conference

Thank you

Short CV

Full professor at the Energy Department since 1980. He teaches Energy Efficiency; Fluid Mechanics, Fluid Machinery; Internal Combustion Engines, Fluid Power. He is currently the Executive Director of the SEEIESD (South East Europe Institute for Energy and Sustainable Development). Starting from August 2019 he is the National Contact Point for HORIZON 2020 "Secure, clean and efficient energy". His main research interests are in the field of Energy and Climate Change etc. He was the leader of projects funded by the European Union (FP7; TEMPUS) in the field of renewable energies and energy efficiency as well as in projects funded by the Albanian government (Program for Water and Energy 2007 - 2017). Information at: http://www.seeiesd.org/.

Intervention by Dr. Anca POPESCU

Scientific adviser at the Institute for Studies and Power Engineering (ISPE), Design and Consulting, Romania

Good morning Ladies and Gentlemen,

I am very pleased to be here with you today, speaking at this international conference especially that I was a member of its Scientific Committee since the beginning.

As you know, the crisis caused by the coronavirus pandemic has profoundly affected the European and global economy. These radical changes have determined the European Union to react by proposing measures to mitigate the negative impact on EU Member States. Following the measures proposed by the EU in March and April, in order to minimize the financial and social impact caused by the pandemic, the European Commission presented on May 27 an ambitious recovery plan for Europe based on the full capitalization of the Union budget.

In order to mobilize the necessary investments, the Commission has presented both the new recovery instrument – Next Generation EU – with a budget of 750 billion Euro and the revised proposal of the long-term EU budget for 2021-2027, of 1100 billion Euro. Shortly, EC will provide the Member States with a total budget of 1850 billion Euro over the next 7 years.

Following the negotiations that took place at the level of the European Council between 17-21 July 2020, out of a total amount of 750 billion Euro, Romania will receive 30,4 billion Euro – of which 13,7 billion Euro are grants – money that we will have to be attracted by 2023 and EUR 16,6 billion will be loans.

Thus, about 28,2 billion Euro, which will be dedicated to investments and reforms in green and digital fields, will be accessible, in the form of grants and loans, through the Recovery and Resilience Mechanism and are including funds allocated through the REACT-EU instrument, regional development and human resources development. In addition, through the Just Transition Fund, Romania will receive additional 4.4 billion Euro, dedicated to the professional retraining of workers in fossil fuel-based industries, the creation of new opportunities for SMEs, as well as investments in the transition towards a clean energy and a circular economy.

In addition to the funds that Romania can receive from the Economic Recovery Plan, it will also benefit from over 40 billion Euro out of the amount of 1100 billion Euro allocated for the future EU budget (2021-2027).

Therefore, the Romanian Government enacted a Government Emergency Ordinance regarding measures for the elaboration of the National Recovery and Resilience Plan necessary for Romania to access the allocated funds within the Recovery and Resilience Mechanism. The first draft of the plan must be drawn up by October, in order to be negotiated with the European Commission by April 2021 for approval.

According to this GEO the following projects are planned:

- Infrastructure projects for adaptation to climate change;
- Infrastructure projects for urban mobility, urban regeneration, tourism and culture, greening of industrial platforms, construction / rehabilitation / modernization of public buildings, rehabilitation / modernization / extension of centralized thermal energy production and distribution systems;
- Rural infrastructure projects for rural localities adjacent to urban localities: water-sewerage, modernization / extension / rehabilitation / development of internal roads of localities, urban mobility in partnership with urban localities, urban regeneration, public lighting system, intelligent fuel distribution systems transition, centralized heat supply systems for rural areas adjacent to urban areas;
- Public health infrastructure projects;

- Infrastructure projects for research in the field of technology transfer in the food and agriculture industry as well as in the field of engineering such as electric machines and motors, microelectronics, advanced technologies, welding;
- Water-sewerage infrastructure projects for the extension, modernization, rehabilitation of existing water and sewerage networks;
- Infrastructure projects for increasing the resilience of communities in emergency situations by expanding the network of intervention subunits in the structure of emergency inspectorates;
- Infrastructure projects for the establishment of regional warehouses and the creation of materials and equipment - including medical – stocks;
- Infrastructure projects in the judiciary and defense system, public order and national security;
- Infrastructure projects in the field of communications and information technology and cyber security;
- Digital transformation / transition projects, including robot process automation, of central and local public administration services.

These are, shortly, some of the measures that the Romanian Government intends to address in the National Recovery and Resilience Plan.

I express my hope that we will find new means of cooperation in the future and I am convinced that this prestigious conference could be a good starting point.

So, I wish you great success and many interesting opportunities.

Thank you.

Short CV

Dr. A. Popescu is scientific adviser coordinating the Research & Innovation activity of ISPE, Design and Consulting and associate professor at the Power Engineering Faculty at the University Politehnica of Bucharest. She is member of Study Committee C1 System Development and Economics of the Council on Large Electric Systems (CIGRE), member of the Romanian National Committee of World Energy Council (WEC) and member of the Romanian National Committee of International Electrotechnical Commission. Dr. Popescu is also the Romanian contact point on Energy Scenarios for the European Environment Information and Observation Network (Eionet) of the European Environment Agency (EEA). Her areas of scientific work include power system analysis, least cost power and heat generation capacity, power market survey and tariff studies, evaluation of GHG emission reduction options, elaboration of national energy strategy, forecast of electricity and heat demand, electricity interconnections.

Intervention by Prof. Dejan IVEZIC

University of Belgrade, Serbia

Ladies and gentlemen,

First of all, I would like to thank the organizer for the opportunity to address this very interesting conference.

I prepared a very short presentation with messages to the policymakers, especially those of my country, Serbia. It is about the development of the energy sector after COVID crisis. I will share the screen to show you some slides.

Here are some messages for the further development of the energy sector. But before that, I would like to say that in Serbia, we are now at the very beginning of the energy transition process. There is still no clear decision about stopping using coal in the Serbian electricity sector.

Serbia is still a carbon very dependent country and most of the electricity is produced from coal. Of course, the potential of renewables is very significant, but still, there are no clear plans for their use. The Action Plan for renewable energy use is the only document that foresees the use of renewables in the electricity and heating sectors.

Another issue that is not still appointed clearly in the country is the just transition. The transition of the energy sector has consequences that can affect energy poverty, social circumstances, and so on. Therefore, I found, and I pointed out here in this slide a few things which I think very important for the further development of the energy and climate sector of the country.

The first one is SMART Recovery. This crisis should be used as a chance for new business models and new entrants to enter the energy market so as to help customers and allow them to rebuild the business.

The "embark on the change" is another important issue that means investing more in renewable energy and climate mitigation projects, and accelerating lending operations and/or repurposing to support reform. Investing in higher efficiency of buildings and public transport could bring economic benefits as well as social benefits like health, cleaner air, new jobs and so on…

Just before this crisis, before March we had a very urgent situation here in the country. Belgrade was one of the most polluted capitals in the world and a very interesting and very important report of World Health Organization proposed "A call to action", to reduce the pollution in Serbia. Pollution whose origin is in transport and mostly in the local heating systems.

I would like to appoint a positive sign which happened during this crisis. It concerns a very small project, but it is important because it is the very first project of organized energy cooperative in the country. It is the project of installed solar PVs on the top of the Public Utility Company (PUC) in the city of Šabac. This is the first PUC that started to produce electricity from renewables. I am speaking about the local public utility, concerning the local self-government and the local community, not large public utilities like Serbian Power Producer.

What is also important is that those people are using this experience to launch the first investment grant fund, because they have the idea to enlarge this production capacity. So, in my opinion, this is something like the spotlight. In this very dark situation, somebody shows that in the future Serbia could generate more green energy and develop green business.

Thank you

Covid 19 and Serbian energy&climate sector

- ***"SMART" Recovery***
  - The crisis is the chance to allow new business models and new entrants into more open and transparent energy markets, benefitting customers and allowing them to rebuild their business.

- "Embark on the change"
  - Invest more in renewable energy and climate mitigation projects and accelerate existing lending operations or re-purpose to support reform
  - **Investing in higher efficiency of buildings, public transport and the public sector will bring economic benefits as well as social benefits – health, jobs and cleaner air**

Just before COVID 19 crizis

Energy powerty ?!

Example of good practice during the COVID 19 crizis

- On August 13th, a small solar photovoltaic power plant of 3 kW installed on the roof of the administrative building of that company through the **Project of the Energy Cooperative "Sunny Roofs Šabac".**
- Public Utility Company (PUC) „Toplana-Šabac" is **the first PUC in Serbia to start producing electricity from renewable energy sources**.
- The cooperative will soon launch an investment crowdfunding campaign for the first project, the installation of an additional 17-kilowatt solar photovoltaic power plant.
- The energy produced from photovoltaic power plants, installed on the roofs of private homes and public buildings, generates revenue to members of cooperative from the sale of energy to entities engaged in electricity trading or savings if used for their own needs.

August 27, 2020

Short CV

Professor at the University of Belgrade – Faculty of Mining and Geology and Manager of Centre for Energy. where His teaching and research interests include energy modeling and control of energy processes, sustainable development, energy efficiency and renewable energy sources utilization and conservation of natural resources. He also, directed and cooperated in projects related to exploitation and maintenance of energy facilities, machines and equipment.

BSTDB: Promoting Regional Prosperity and Economic Growth

Mr. Aristotelis SPILIOTIS

Secretary General, Black Sea Trade and Development Bank

Short CV

Mr. Aristotelis Spiliotis was appointed Secretary General of the Black Sea Trade and Development Bank (BSTDB) as of 16 March 2019, for a period of four years.

Mr. Spiliotis is a national of Greece, born in 1965. He holds a Ph.D. degree from the University of York, UK, in Money, Finance and Banking and a B.Sc. degree in Economics from the University of Piraeus, Greece. He also holds a Certified Investment Portfolio Manager certificate from the Hellenic Capital Market Commission, Greece.

Mr. Spiliotis started his professional career in the private sector (1994), as an Investment Director of the mutual funds company DIETHNIKI S.A., NBG Group. In 1999, he co-founded and managed a venture capital fund, 4E. He has served as Vice President of the Hellenic Venture Capital Association. He was board member in several Greek companies and banks. He was Director of Investment Participations of Omega Bank and Proton Bank, Chairman of the Board of the Omega Mutual Fund Management Company, Board member and Chairman of the Investment Committee of the business incubator Thermi S.A. and Board member of Panellinia Bank. In 2012, he joined the Economic Analysis and Research Department of the Bank of Greece.

Before joining BSTDB, Mr. Spiliotis served as special Economic Advisor to the Deputy Prime Minister and Minister of Economy and Development of Greece. His areas of responsibility included the banking sector, financing tools, capital and money markets, investments and project financing, international economic relations.

He has taught in the universities of York and Leeds, U.K. and he is currently lecturing on banking and finance in Greek universities. He has published several articles in scientific and professional journals. Mr. Spiliotis is fluent in English and Greek. He is married and has two children.

BSTDB: Promoting Regional Prosperity and Economic Growth

Black Sea Trade & Development Bank

Thessaloniki, Greece
October 2020

BSTDB Offers a Wide Range of Investment Products Aligned with its Regional Development Mandate

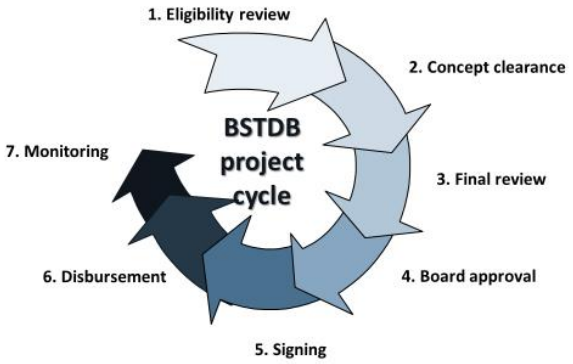
Black Sea Trade & Development Bank

Mandate	*Foster economic growth and regional cooperation through financing projects and trade activities and providing financial services to public and private entities in the Black Sea Region*
Target Borrowers and Projects	• Public and private companies with operations in one or more of the Member States • Transactions which benefit member states and have a positive development impact • Economically sustainable / financially viable so BSTDB's participation will be profitable and the undertaking will prove sustainable beyond the bank's involvement • Potential to promote regional cooperation
Products and Services	• Lending: Short to long-term loans, typically denominated in USD, EUR or local currency • Trade finance: Financing primarily for imports from member states and to regional exporters • SMEs: Financing through credit lines to local financial intermediaries • Equity / funds: Equity investments, BSTDB looks to take a stake of 5-25% • Guarantees • Co-financing
Pricing	• BSTDB is not a profit maximising organisation; operations are priced according to risk with reference to market pricing
Priority Sectors	• Energy • Manufacturing • Public utilities • Financial institutions • Telecommunications • Transport • Municipal services • Environnemental protection • SMEs

2

BSTDB: Project approval process

Black Sea Trade & Development Bank



3

Project and corporate finance: What are financing criteria

Black Sea Trade & Development Bank

Borrowers:

- ❑ Solid financial position (debts, revenues, liquidity, etc.).
- ❑ Ability to service current and foreseen debt.
- ❑ Strong commitment to the project (allocation of own financial and human resources for the project).
- ❑ Project management ability (solid track record, adequate organizational arrangements, etc.).

Projects:

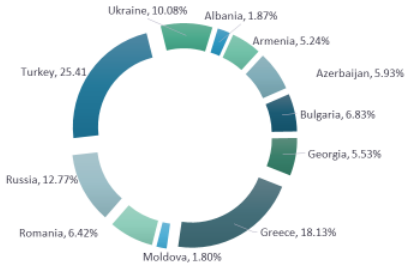
- ❑ Project "maturity" (feasibility study, environmental assessment, market analysis, etc.).
- ❑ Technical feasibility, financial soundness.
- ❑ Positive environment & development impacts.

4

BSTDB results

- Signed operations to the total amount of EUR 2.75 billion;
- Operational portfolio grew to EUR 1.97 billion, mainly in key sectors of manufacturing, infrastructure, energy, public utilities, and the financial sector;
- Non-performing loans account for less that 1% of the portfolio

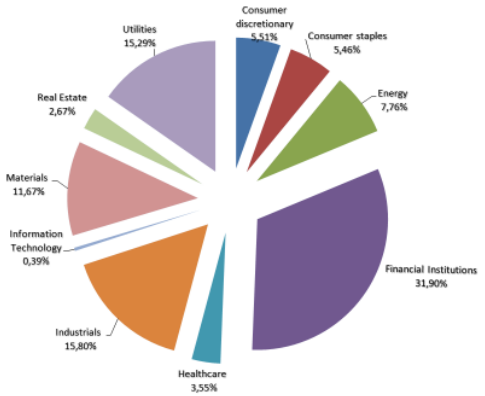
Loan Portfolio by Country
(outstanding amounts as of end-June 2020)



5

BSTDB Results

Portfolio per sector



6

BSTDB Role in the Energy Sector

- Cumulatively since the start of operations the Bank has approved 15 energy operations for a total of EUR 445 million (about 6.5 % of the total portfolio)
- The Bank considers both traditional and innovative ways to promote regional cooperation in the energy sector:

Facilitation of regional trade in energy, as trade balance and current account considerations are important for many member countries;

Promotion of interconnectivity and diversification of electricity production using local and alternative sources of energy;

7

BSTDB Role in Financing and Supporting Energy Projects

Prometheus Gas S.A

Sector	Energy
Signed on	10 March 2020
Maturity	14 months
Summary	Letter of Guarantee to Prometheus Gas for the supply of natural gas from Russia to Greece via pipeline.
BSTDB Signed Amount	Up to USD 52.6 Million

8

BSTDB Role in Financing and Supporting Energy Projects

- **Energean Oil and Gas**

Sector	Energy
Signed on	30 January 2018
Maturity	64 months
Summary	Reserves-Based Loan facility for financing the development of additional oil reserves in the Prinos and Epsilon oil fields, and in particular for capital expenditures pertaining to drilling and additional well platforms and consolidation of the company's existing debt.
BSTDB Signed Amount	EUR 44.734.151 (USD 52.500.000 as per the USD /EUR exchange rate of 31 July)

9

BSTDB Role in Financing and Supporting Energy Projects

- **Hellenic Petroleum Finance**

Sector	Energy
Signed on	25 July 2017
Maturity	51 months
Summary	Hellenic Petroleum Finance plc (Issuer, HPF), a wholly owned subsidiary of Hellenic Petroleum S.A. (Guarantor or Hellenic Petroleum), successfully priced EUR 74.5 million principal amount of new notes (New Notes) on 26 July 2017, to be consolidated and form a single series with HPF's existing EUR 375 million notes due October 2021. BSTDB subscribed to EUR 31.3 million in New Notes issued by HPF on 26 July 2017. Hellenic Petroleum will use the proceeds raised as a result of the bond purchase by BSTDB for the purpose of implementing various investment projects in connection to its capital expenditure program in 2017-2018 in Greece and Bulgaria.
BSTDB Signed Amount	EUR 50.000.00

10

BSTDB Role in Financing and Supporting Energy Projects

- **Terna Energy I & II**

Sector	Utilities
Signed on	29 February 2012
Maturity	97.5 months
Summary	Corporate loan to support the Company's capital expenditure program related to the construction of wind parks in Greece
BSTDB Signed Amount	EUR 6.000.000

Sector	Utilities
Signed on	3 July 2014
Maturity	78 months
Summary	Long-term corporate loan, with the use of proceeds earmarked for implementation of the Borrowers investment program involving the construction and operation of 8 biogas power plants in Greece
BSTDB Signed	EUR 8.500.000

11

BSTDB Role in Financing and Supporting Energy Projects

Public Power Corporation S.A. (PPC P.A)

Sector	Energy
Signed on	6 June 2019
Maturity	60 months
Summary	Corporate Loan for the company's Capex programme, comprising a large number of medium and low voltage electricity distribution schemes
BSTDB Signed Amount	EUR 160 million

12

Development Synergies

- 18 June 2020- Signing of a Memorandum of Cooperation with the Hellenic Development Bank initiating a new financing program aimed to support Greek SMEs (affected mostly by the Covid-19 pandemic. The program envisages the provision of up to EUR 100 million by the Greek Government to HDB to mainly issue guarantees and to co-finance BSTDB's lending to SMEs.
- Initiation of the development of a joint BSTDB – HDB Guarantee Programme (to be concluded by end-October) for project financing of medium to large sale projects, including in the energy sector

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14

Sustainable Recovery Plans –Outlining priorities

Mrs. Athina CHATZIPETROU

President, Hellenic Development Bank

Good afternoon

Thank you very much for the invitation to participate in this excellent event.

Actually, Hellenic Development Bank (HDB) is a bank owned by the state, so it is a development bank, not a commercial bank, but with regards to those two separations, yes, we belong to the part that is closer to the market.

I will start with the immense, negative, external cost caused by COVID-19 pandemic that requires strengthening of collaboration between public and private players so that to support the Greek economy today. In February 2020 when we started in HDB as new management, the agenda was purely towards the transformation of the former EDEAN and the creation of the new Hellenic Development Bank.

The economic framework in the country was also much different than after the pandemic. Greece was struggling as we all know for nearly a decade to recover the global financial crisis and for the past couple of years, the country was finally pass the recession and establish a healthy economy ready to grow again, ready to attract investors and to build a new business model focusing on local products and entrepreneurship.

When the pandemic of covid hit, the needs and priorities of the Greek economy and consequently HDB, had to readjust and change remarkably. From Day 1, the government set a single economic priority to restore the liquidity in the economy and we as HDB were called upon to act with any means and tools that were available at that moment and achieve the aforementioned goal.

The pandemic was for us in HDB a catalyst. We had to change our way of doing business and to accelerate our informed plan substantially. At the time, the main priority was to respond quickly, thus during the lockdown and despite having to deal with a very unstable - all of us - and quite unprecedent period, in less than three months HDB managed to design and roll out two innovative and effective financial instruments and the size of the stimulus in HDB from April to December, will be nine billion and is higher than ever before.

Now that the government is focusing all efforts to put forward a successful Sustainable Recovery Plan and the Greek banking system is to partner up this effort, we should as a financial institution concentrate all efforts to ensure that new financial instruments and policies are put in place to lead the country out of the current crisis and towards as the most important its sustainable recovery. Within this context at HDB we fully acknowledge the need to develop what we say a triple bottom up approach, profit, planet, people in our cooperative culture, in our operations and means of doing business.

Accordingly of course, we recognize and work to remove bottlenecks in key areas including but not limited to innovation, pre-provisions levelling up collateral, challenging of public funds and sustainable investments, which are some of our many priorities to contribute to our country's sustainable recovery.

On that note, we plan to launch new thematic, financial instruments related to Greek financial, energy efficient, renewable energy and sustainable growth in the coming months. Initiatives supporting the transition to a green low emission and climate resilient green economy by increasing our investments and sustainable infrastructure, energy efficient and renewable energy projects, while promoting a low energy consumption culture we will start within the bank.

In addition, HDB is planning to design dedicated green products including but not limited to products adjusted, green bonds which may be designed following best practices adopted by the World Bank, and dedicated Green Fund, marked for young start-ups, operating in the renewable energy

sector. Another aspect would be green guarantee schemes challenged by our partners, the Greek commercial banks to help Greek SMEs and mid-cup companies to go green. For example, loans that can be used to finance a range of projects in areas such as energy efficiency, green transport, sustainable food, waste management and green energy efficient mortgages or alternative energy venture capitals and Eco saving deposits are among those that we are designing while screening at the same time what our partners do.

For example, we are inspired by the recent loan program financed by European Investment Bank (EIB), in the area of water and waste management. This project is a six hundred million loan, provided to Spain through which millions of citizens will benefit. We give it as an example because we believe that this type of financing is something that Greek citizens deserve, and we should become able to provide in the most efficient manner.

As already said HDB is continuously discussing with others in industry including both international financial institutions and multilateral development banks such as the European Investment Bank, the Black Sea Trade Development Bank as my friend Aris just mentioned to identify our market gaps and build recovery instruments.

We strongly believe in partnerships and we look forward to work with development institutions, to launch products that target sustainable development in our country. We want to be the key development institution serving Greek enterprises to innovate and succeed fostering fair, inclusive and sustainable growth. We believe that this vision is in line with the country' s strategy for growth and among our mission we be first and far most to assist Greek enterprises being present throughout their entire life cycle, while at the same time promoting the Greek business environment.

We exist to serve not the interest of the financial sector, but rather those of the SMES needed our intervention and we want to support society as a whole. From our perspective and statue, the need to launch financial initiatives rear marked for the sustainable recovery is more pressing now than before in order to put a stable investment environment in Greece. Sustainable growth and Greek recovery are two of our major priorities as next steps and these priorities demand national, European and global partnerships which are areas of HDB focus.

We look forward in putting in place a promising sustainable recovery agenda and welcome collaborations as with the Black Sea and public and private partnerships to realize our goals. At present time though our bank with the Greek ministries, public entities, commercial banks is focusing on the support of the Sustainable Recovery of the Greek entrepreneurship through dedicated and interconnected activities with the size of the stimulus of 9 billion loans until the end of this year.

Thank you and will look forward for questions.

Short CV

Athina Chatzipetrou is an experienced CFO skilled in Strategy, Cash Flow, Business Planning, Risk and Internal Audit, ERP and Accounting. Before managing the newly established Hellenic Development Bank she was President of the Board of Directors and CEO of the Fund of Archaelogical Proceeds (ΤΑΠ).

She was Finance Advisor consulting with UNECE and RvO on Trade Facilitation. From 2007 to 2011 she has served as Group CFO for Inchcape Toyota Hellas. Before that she was Finance Director for BDF Hellas (Beiersdorf Hellas) and Region Finance Manager for Coca-Cola HBC.

Her academic skills focus in Finance and Operation Research.

The energy sector in Greece: A focus on renewable energy in the COVID-19

Dr. Foteini THOMAIDOU

Economic Research Division, Alpha Bank

Abstract

Energy chain mix in Greece has undergone various changes over the last decade. Renewable energy sources are powering a cleaner energy transition, with Greece seeing an impressive increase in their share in electricity generation. However, energy import dependence is still higher than the European average, implying that supply security remains a high priority for the country.

The implications of COVID-19 pandemic are still evolving. Following the large energy demand and price shocks and the reallocation of public funds and private investment to tackle the effects of the pandemic, the momentum of energy transition observed in the previous years could be threatened. Although the impact of lowering carbon dioxide emissions is credited to the positive implications of the current crisis, this effect will not be permanent, unless the policies and strategies adopted are in favor of a cleaner and greener energy future. To this respect, a clean energy transition must be at the center of recovery and stimulus plans. The current pandemic must be ultimately seen as an opportunity for an extensive use of low carbon technologies and sustainable energy systems. In Greece, the further exploitation of its renewable energy potential could result in a more balanced energy mix and contribute to the increase of the country's energy security.

Short CV

Dr. Thomaidou has a PhD in Economics and two master degrees in economics and finance (MSc in Applied Economics and Finance and MPhil in Economic theory). She was a fellow of the National Foundation Scholarship for postgraduate and doctoral studies. She has worked as the head of quality control and coordination of the e-learning program of the University of Athens (2001-2003). From 2007 until 2019 she worked as a research associate at the Department of Macroeconomic Analysis and Policy of the Foundation for Economic and Industrial Research (FEIR/IOBE). She currently holds a position as an Officer in the Economic Research Division of Alpha Bank since the beginning of 2019.

ALPHA BANK

The energy sector in Greece: A focus on renewable energy in the era of COVID-19

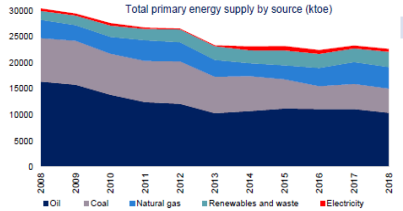
13th International Conference on Energy and Climate Change

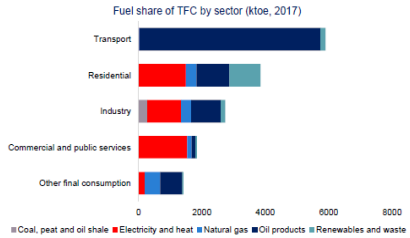
Foteini Thomaidou
Spyridoula Kati

Economic Research Division
Alpha Bank

October 2020

2 Energy production, supply and consumption mix



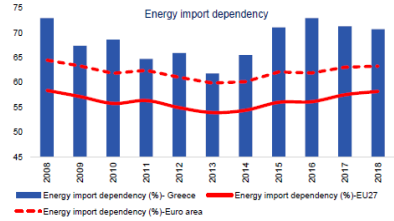


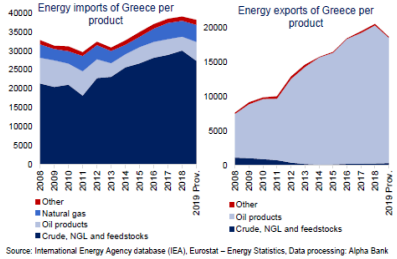
Source: International Energy Agency database (IEA), Data processing: Alpha Bank

Energy chain mix has undergone changes over the last decade.

- Energy mix: fossil fuels, RES and electricity.
- Domestic Energy Production, Total Primary Energy Supply (TPES) and Total Final Consumption (TFC).
- Domestic energy production uses mainly lignite and RES.
- TPES fell by c. 27% from 2008-2018.
- Oil in TPES accounted for c. 47% in 2018 (55% in 2008).
- Natural gas comprises 17% of TPES (2018), 3rd mostly used fuel, after lignite and oil.
- RES (including biomass) share 13% (2018) in TPES, over doubled since 2008.
- TFC of fuels by end users reduced by 26% (2008-2018).
- Transportation the largest energy consumer (37% of TFC)
  - Oil: 97% of transportation consumption, biofuels: 3%.
- RES in TFC: residential (72%), transport (12%), industry (11%)
  - Biofuels, biowaste, solar thermal collectors, commercial solar heating and cooling installations.
- Natural gas in TFC increased by 30% in decade 2008-2018.

3 Energy import dependence



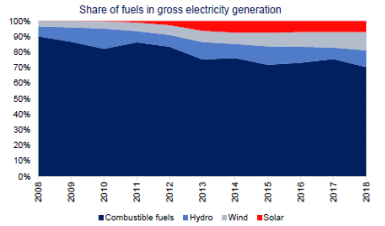


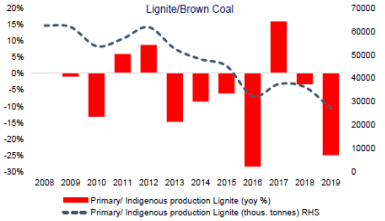
Source: International Energy Agency database (IEA), Eurostat – Energy Statistics, Data processing: Alpha Bank

Energy import dependence higher than the European average, implying that supply security remains a high priority.

- Energy import dependence of Greece at 71% (2018), 10th more dependent and above the Euro area average (63%), implying high dependency on imports.
- Malta, Luxemburg and Cyprus are the most energy dependent European countries and Norway and Estonia the least.
- Energy import dependence and energy security interconnected
  - higher dependence from sources outside a country's control, lower security, increasing possibility of energy flows disruption.
- Greek energy sector still largely dependent on fossil fuels, most of which are imported.
  - Greece imports almost all of its crude oil and natural gas, which account for c. 2/3 of TPES.
  - Crude oil and feedstocks are the main imported energy products, 72% of total energy imports (2019), increasing trend.
- However, energy exports have more than doubled (2008-2019), more than the increase of energy imports (in ktoe)
  - Greece exports mostly refined petroleum and oil products (c. 30% of total exports).

4 Gross electricity generation mix and RES





Source: Eurostat – Supply and transformation of solid fuels and Energy Statistics, Data processing: Alpha Bank

Wind, solar and hydro are powering a cleaner energy transition.

- Gross electricity generation by main activity producers in Greece went down by c. 17% in 2008-2018.
- Combustible fuels: c. 70% of electricity generation (2018).
- Electricity generation still uses lignite as dominant fuel, although shifted energy mix towards RES and natural gas.
- RES in gross electricity generation over doubled in 2008-2018, standing at c. 30% of production in 2018 (25% in 2017).
- The growth of RES in electricity production was due to the rapid growth in wind and solar installed capacity, with
  - Solar energy at 7% (2018), from c. zero in 2008.
  - Wind energy at 12%, being almost tripled since 2008.
  - Hydro power share at 11%, from 8% in 2008.
  - Before 2016, hydro accounted for the largest share of renewable electricity.
- Lignite production decreased by c. 55% from 2008 to 2019.
  - Largest reduction among the biggest European lignite producers, followed by Slovakia and Romania.
  - However, Greece ranks 5th (2018) in lignite production, implying still high carbon intensity.

5 Greenhouse gas emissions and energy transition to a low carbon economy

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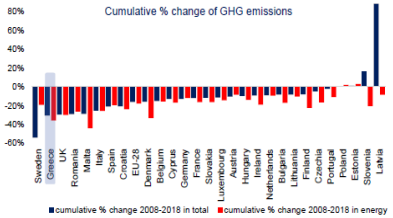

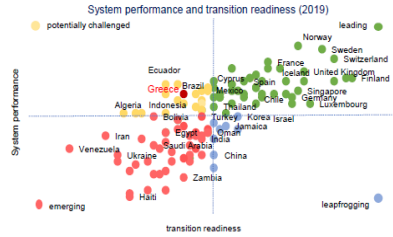

Significant transformation of the energy system the past decade worldwide, slower than required to achieve Paris Agreement objectives to combat climate change.

- Energy sector is the biggest source of human-caused GHG emissions, responsible for 73% worldwide.
- Within the energy sector, generation of heat and electricity, followed by transportation, is responsible for most emissions.
- The Greek energy sector's GHG emissions share in total is 75% and 83% in EU-28 (2018).
- In EU-28, although declined (-16%, 2008-2018), GHG emissions still fall short of long-term goals (-40% in 2030 and -80% in 2050).
- In Greece, GHG emissions fell by 31% in 2008-2018 (and -36% in energy), achieving national target of 20% reduction (from 1990).
- Energy Transition: Greece among potentially challenged countries, lagging most EU countries, ranking 54th/115 (2019).
- System performance: ranking 38th, 1st in electrification as % of population, but 101st in net energy imports as % of energy use.
- Transition readiness: below the global average, ranking 79th.
  - 1st in energy efficiency investment, 102nd in innovative business environment, 114th in policy stability.

Source: Eurostat – Energy Statistics, World Economic Forum, Energy Transition Index, Data processing: Alpha Bank

6 RES targets for 2020

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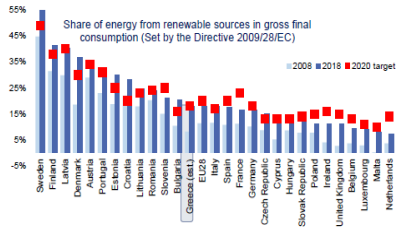
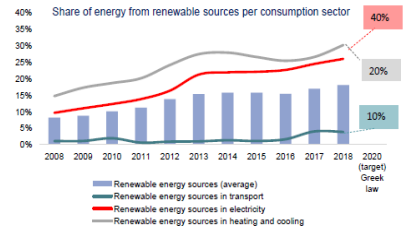




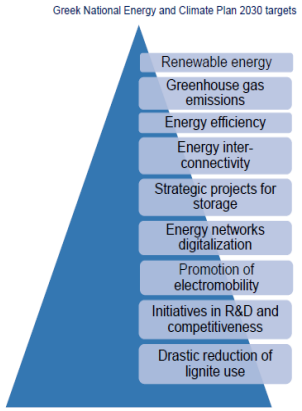
Greece has seen an impressive increase in the share of renewables in electricity generation.

- Renewable Energy Greek Law 3851/2010: accelerate RES deployment and combat climate change.
- To achieve the national target of 20% share of RES in gross final energy consumption by 2020, the law establishes the targets:
  - 40% share RES in electricity production
  - 20% share RES in heating and cooling
  - 10% share RES in transport
- Renewable energy share of gross final consumption in Greece was 18% in 2018, equal to that of EU-28.
  - Close to the 20% Greek target for 2020 and equal to the target set by Directive 2009/28/EC on the promotion of the use of energy from renewable sources.
- Greece stood at the EU-28 average in 2018, 13th in EU, higher by 10 p.p. in heating and cooling and lower by 4 p.p. in transport.
- Greece holds the 2nd higher share of solar PVs in total supply of IEA countries, after Spain (2016).
  - Showing a significant fall in PV prices, a small decrease in wind prices and a large increase in biomass prices from 2012 to 2019.

Source: Eurostat – Energy Statistics, LAGIE-DAPEEP, Data processing: Alpha Bank

7 Clean energy package and national energy and climate plan towards 2030

ALPHA BANK



Greece has set ambitious energy and climate targets in its NECP.

Clean energy for all Europeans package

- In 2019, the EU completed a new energy rulebook, significant step for the implementation of the energy union strategy.
- Aspiring that EU will become the first climate-neutral continent by 2050.
- It sets up a governance system for the EU: each member obliged to create national energy and climate plans and explain how targets will be achieved.
- Provides an 8 legislative acts framework to meet energy and climate targets aiming among others for
  - accelerating the clean energy transition and increase energy security
- In Greece adopted in 2019.

Greek National Energy and Climate Plan 2030 targets:

- Min. 35% RES share in energy consumption, >60% in electricity.
- Over -42% of GHG emissions compared to 1990.
- +38% energy efficiency– emphasis on buildings, transportation.
- Drastic reduction of lignite use in electricity production.
- Significant increase in electricity interconnectivity.
- A new model operation of electricity market and development of strategic projects for storage.
- Digitalisation of energy networks and promotion of electromobility.
- Initiatives in R&D and competitiveness.

Source: European Commission, National Energy and Climate plans, Data processing: Alpha Bank

8 Green priorities, projects and investments

ALPHA BANK

RES expected to be more resilient and sustainable in 2020 than other energy forms, although with expected lower investments due to pandemic crisis.

- Investments in energy: down by 20% globally in 2020, oil and gas by 32%, RES at a lower rate (10%) (IEA).
- Cost of RES installations decreased substantially over the years, RES technologies are getting cheaper compared .
  - Greater introduction of RES and technological development, benefits of mass production, market competition.
  - New investments in installation projects can prove more economic than those for fossil fuels.
- In April and May, the Ministry of Development approved licenses of 14 RES projects, centralised and fast procedures.
- The recent modernisation of environmental legislation includes measures for RES projects licensing simplification and reduction of licensing time.
- The Greek government has announced its plan to close down all lignite-fired units for electricity production by the end of 2028 in order to meet the EU targets for decarbonisation and green energy.
- Recovery and Resilience Facility, Next Generation EU' s central pillar amounting to EUR 672.5 bn, includes green and sustainable recovery targets
  - All national recovery and resilience plans must include a min. of 37% of climate related expenditure.
  - Countries encouraged to foster RES investments and use, modernise networks and increase interconnectivity.

9 The energy sector in the era of COVID-19

ALPHA BANK

Outbreak of COVID-19 pandemic an unprecedented crisis with compounded disruptions.

Worldwide

- COVID-19 pandemic had severe impacts, affecting energy and causing excessive supply and low demand.
- Demand for oil fell faster and further than any other time, but gas and secondarily electricity also impacted.
- Significant price reductions – especially Brent in oil sector – supply chains stretched, and labor shortages emerged.
- IEA estimates a fall of energy demand by 6% globally in 2020, 7 times larger than the 2008 financial crisis.
- RES expected to be more resilient renewable energy demand and increase by about 1%.
- Also negatively affected: hydrocarbon exploration, construction and maintenance of energy and industrial plants, electricity providers, manufacturers of PV panels and wind turbines, batteries producers for electric vehicles.
- Global CO_2 emissions expected to decline by 8%, to the levels of ten years ago, the largest ever yoy reduction (IEA).

Greece

- Largely affected oil sector, petroleum refineries' demand and exports of supply market.
- Demand for natural gas fell, prices and revenues affected in a milder way, due to seasonal retail market, mostly limited to heating in October-March.
- Significant reduction of electricity, decrease of energy-intensive industries and commercial consumption, with parallel increase of household consumption.
- Reduced liquidity and cancelled /delayed projects under construction, renovation and energy upgrade projects of buildings, major RES and energy storage projects and ongoing RES investments.

10 Conclusions

ALPHA BANK

- The momentum of energy transition could be impeded by the COVID-19 pandemic
  - after large energy demand and price shocks and reallocation of public funds and private investment to tackle the effects of the pandemic.
  - The implications of the pandemic for energy systems and clean energy transitions are still evolving.
- Energy security remains a cornerstone of economies, especially during these uneasy times.
- Clean energy transitions must be at the center of economic recovery and stimulus plans.
- Although a fall in CO_2 emissions is anticipated as of the slowdown of economic activity and transport, the effect will not be permanent, unless policies and strategies are adopted towards cleaner, green energy and RES.
- Governments across the world can make the most of the current crisis to push forward their green energy plans and adopt sustainable solutions backed by clean and green energy technologies.
- COVID-19: opportunity to further deploy and use low-carbon technologies to foster faster transition towards more resilient and sustainable energy systems.
- Greece: better exploitation of its renewable energy potential could result in a more balanced energy mix and contribute to increasing energy security.

Guidelines and Best Practices for MSMEs in delivering energy efficient products and in providing renewable energy equipment

Mr. Oleg DZIOUBINSKI

Regional Adviser on Energy, UNECE

Abstract

Micro-, small and medium enterprises (MSMEs) are among the worst hit financially by the COVID-19 pandemic. They represent over 90 percent of all companies in most countries in the UNECE region and are responsible for over half of GDP. Therefore, the economic recovery depends to a large extent on the ability of MSMEs to survive the crisis and improve their viability. UNECE is implementing UN Development Account project "Global Initiative towards post-Covid-19 resurgence of the MSME sector". The overall goal of the project is to strengthen the capacity and resilience of MSMEs in developing countries and economies in transition to mitigate the economic and social impact of the global COVID-19 crisis. As part of its contribution to the project, UNECE has developed Guidelines and Best Practices for MSMEs in delivering energy efficient products and in providing renewable energy equipment. The study contains an analysis of the environment the clean energy MSMEs face as a result of the COVID-19 crisis. It presents examples of best practices in the energy efficiency sector and in the area of renewable energy relevant for MSMEs' crisis response and recovery, as well as case studies on practical measures to help MSMEs access markets, financing, and advanced technologies. The study also provides recommendations to Governments for developing policy guidelines and establishing financial incentive schemes. Among these recommendations are clear guidance for companies on the available support at the local and national levels; use of public procurement procedures for targeted support of MSMEs; support through grants and low- or no-interest loans to the MSMEs working on low carbon technologies in the clean energy sector to facilitate green economic recovery; support of employee development programmes (e.g., for digitalization); and temporary tax breaks and tax waivers.

Short CV

Oleg Dzioubinski is the Regional Adviser at the Sustainable Energy Division (SED) of the United Nations Economic Commission for Europe (UNECE) in Geneva since 2018. He provides advisory services, capacity building activities and manages projects in the area of energy upon requests of countries with economies in transition. He was Energy Efficiency Programme Manager at SED since 2008. He coordinated UNECE work on energy efficiency in industry sector, managed projects on energy efficiency in buildings, and facilitated regulatory and policy dialogue on barriers to improve energy efficiency. He initiated organization of the International Forum on Energy for Sustainable Development in 2010. His previous experience at the United Nations includes work at the Department of Economic and Social Affairs on sustainable development issues, 1997-2000, New York; at the Department of Public Information on cooperation with a community of NGOs, 2000-2003, New York; and at the UNECE Environment Division on environmental performance reviews of the countries of South-Eastern and Eastern Europe, the Caucasus and Central Asia, 2003-2008, Geneva. Before joining the Unite Nations in 1997, he worked as a researcher at universities in Ukraine and in the United States; as a TV journalist; and as a programme officer at US non-profit foundations in Ukraine. Oleg Dzioubinski holds Master's degree in Mechanical Engineering from the National University of Shipbuilding, Ukraine (1986) and Master's degree in Diplomacy and International Commerce from the University of Kentucky, United States (1994).

UNECE

ENERGY

Guidelines and Best Practices for MSMEs in delivering energy efficient products and in providing renewable energy equipment

Oleg Dzioubinski
Regional Adviser
Sustainable Energy Division

7th Green Energy Investments Forum
Athens, 7 October 2020

Introduction
Objectives of the Study

ENERGY

United Nations Economic Commission for Europe (UNECE) is one of the partners implementing UNDA project "Global Initiative towards post-Covid-19 resurgence of the MSME sector." The overall goal of the project is to strengthen the capacity and resilience of micro-, small and medium enterprises (MSMEs) in developing countries and economies in transition to mitigate the economic and social impact of the global COVID-19 crisis.

UNECE 2

Introduction
Objectives of the Study

ENERGY

- UNECE has developed Guidelines and Best Practices for MSMEs in delivering energy efficient products and in providing renewable energy equipment after the COVID-19 crisis.
- MSMEs have an above average representation in the sectors most affected by the COVID-19. These sectors are transport, manufacturing, construction, wholesale and retail trade, air transport, accommodation and food services, real estate, professional services, and other personal services.

UNECE 3

General impact of COVID-19 crisis on MSMEs

ENERGY

✓ **Impact of the COVID-19 crisis:**

- Shutdown impacts
- Supply chain disruptions
- Demand depression

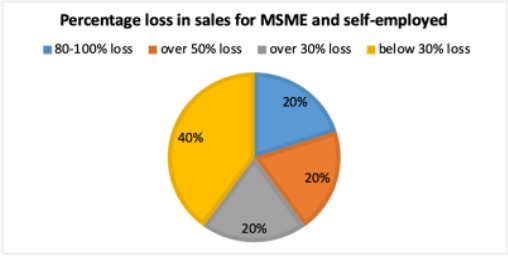
UNECE 4

Impact of working environment on MSMEs as a result of the COVID-19 crisis

ENERGY

✓ More than half of the MSMEs experienced over 30% loss in their sales mainly due to the government-imposed lockdowns preventing MSMEs from conducting business

Source: International Trade Council's (ITC) report "COVID-19: The Great Lockdown and its Impact on Small Business"



UNECE 5

Impact of working environment on MSMEs as a result of the COVID-19 crisis

ENERGY

- The manufacturing sector, which is more integrated in supply chains than the service sector, faced a decline of around 30% in output
- Manufacturers of building materials, metals and electrical equipment are among the most affected by breakdowns in supply links
- Service industries have been hit the hardest, with the strongest impact on travel, tourism, recreation, food services, arts, and retail trade

UNECE 6

IT-based solutions for equipment operations monitoring

Spain

ENERGY

- **Company: AEInnova**
- **Number of employees: 11-20**

AEInnova Alternative Energy Innovations

https://aeinnova.com

Background:

AEInnova company – based in Spain, founded in 2014. Currently involved in researching and developing Waste Heat Recovery (WHR) systems including thermoelectric energy generation offering cutting-edge technology capable of improving energy efficiency and reducing environmental impact

UNECE 7

IT-based solutions for equipment operations monitoring

Spain

ENERGY

- **Company: AEInnova**
- **Number of employees: 11-20**

Case study:

COVID-19 lockdown did not make strong impact in terms of R&D work. However, the production of new units of WHR systems was affected by lockdown because of the labour shortage and logistics problems. During this time, the company applied for funding under the Horizon 2020 programme and received over € 500 thousand for the project. Company also introduced IT-based solutions for monitoring the operation of ventilators used in the treatment of COVID-19.

UNECE 8

Wooden wind turbine tower

Sweden

ENERGY

- **Company : Modvion**
- **Number of employees: 11-50**

https://www.modvion.com

Background:

Gothenburg-based company Modvion develops large-scale applications in laminated wood. By replacing emission-intensive materials such as steel and concrete, wooden structures offer significant reductions in greenhouse gas emissions. The company's current focus is on wind turbine towers made from wood, where Modvion's patented module system offers reduced manufacturing costs and more efficient transportation of high towers to installation sites.

UNECE 9

Wooden wind turbine tower

Sweden

ENERGY

- **Company : Modvion**
- **Number of employees: 11-50**

Case study:

COVID-19 lockdown has impacted and delayed certain development and implementation projects of the company in the areas in and around Gothenberg. Logistics disruption has led to a situation where procurement of material has been hampered. However, the company secured a € 6.5 million investment from the European Investment Bank (EIB) through the EIC Accelerator Programme. This investment helped the company install its first Modvion wooden wind tower outside Gothenberg during the lockdown.

UNECE 10

Measures taken by MSMEs during the pandemic lockdown

ENERGY

No	Measures taken	Western Europe	Eastern and South-Eastern Europe	Russian Federation, Central Asia and the Caucasus
1	Communication through social media or other platforms on internet	(+)	(+)	(-)
2	Increase of on-line and sales	(+)	(+)	(+)
3	Provision of value-added services	(+)	(+)	(+)
4	Fixed growth strategy	(+)	(-)	(-)
5	Accessing only easier markets	(+)	(-)	(-)
6	Raising IPO	(-)	(-)	(-)
7	Work from home	(+)	(+)	(-)
8	Providing paid online training services	(+)	(+)	(+)
9	Strengthening R&D portfolio	(-)	(-)	(-)
10	Applying for International funding programs	(+)	(+)	(+)
11	Increasing focus on aligning with COVID related activities	(+)	(+)	(-)

UNECE 11

Selected Guidelines for MSMEs recovery strategy development

ENERGY

Possible components of the companies' post-pandemic recovery strategy actions:

- **Increased participation in various relevant on-line based platforms**
- **Participation in virtual trade fairs at local and international level**
- **Trainings and capacity building**
- **Access to local and international financing**

UNECE 12

Selected Conclusions

ENERGY

- Many MSMEs have adjusted to the new normal of remote working conditions and social distancing
- Various funding programmes are available – they can be used to financially stabilize MSMEs
- Delaying the non-essential and non-priority projects to some future date is a way for crisis mitigation
- Some MSMEs have repackaged their products and have rebranded themselves as health-tech companies aimed to fight the pandemic

UNECE 13

Recommendations

to Governments for developing policy measures

ENERGY

Selected financial incentives schemes:

- Temporary tax waivers and tax breaks for MSMEs
- National programmes to support MSMEs though loans, including soft loans, loan guarantees, deferment of loan repayment, wage subsidies, and special credit lines
- Support direct payments for MSMEs to improve cashflow and reduce delays in payments
- Support through grants and low- or no-interest loans to the MSMEs working on low carbon technologies in the clean energy sector to facilitate green economic recovery
- Establish a specialized clean energy financial institution to enable MSMEs as a driving force to a clean and green economic recovery

UNECE 14

Recommendations

to Governments for developing policy measures

ENERGY

Selected policy measures to avoid workforce layoffs:

- Offer employee development programmes (e.g., for digitalization)
- Support temporary downsizing (e.g., through wage subsidies)
- Provide financial support to laid-off workforce.

UNECE 15

Recommendations

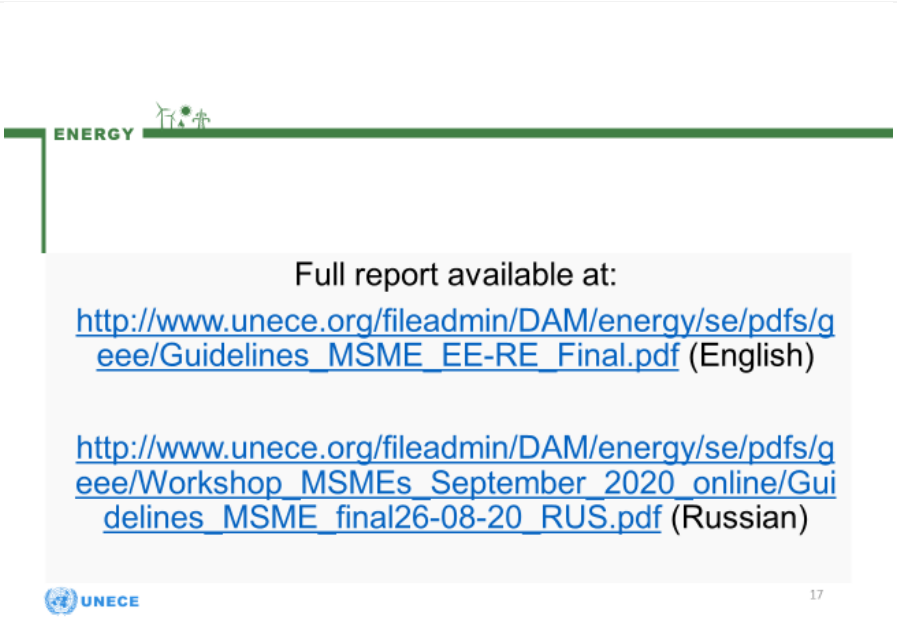
to Governments for developing policy measures

ENERGY

Selected policy measures to support new businesses:

- Secure future innovations through mid- and long-term policy measures linked to larger policy objectives (e.g., sustainability and/or digital transformation)
- Lay foundations for post-crisis recovery (e.g., incentivize investors to provide additional growth capital)
- Nurture knowledge diversity and entrepreneurial culture
- Boost positive business climate for consumption and innovation

UNECE 16


ENERGY
Full report available at:
http://www.unece.org/fileadmin/DAM/energy/se/pdfs/geee/Guidelines_MSME_EE-RE_Final.pdf (English)
http://www.unece.org/fileadmin/DAM/energy/se/pdfs/geee/Workshop_MSMEs_September_2020_online/Guidelines_MSME_final26-08-20_RUS.pdf (Russian)
UNECE
17


ENERGY
Thank you!
Oleg Dzioubinski
Regional Adviser
UNECE Sustainable Energy Division
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UNECE
18

Smart Island Initiative

Mr. Kostas KOMNINOS

General Director of Network of Sustainable Greek Islands (DAFNI)

Short CV

Kostas Komninos Dipl. Mechanical Engineer (National Technical University of Athens, NTUA 2006) with MSc studies on Wind Energy (Technical University of Denmark, DTU 2008) has significant experience in projects related to the exploitation of renewable energy sources, energy saving and energy planning at municipal level. In Copenhagen he was employed for a period of nine (9) months in the COWI A/S wind energy department. The last years he has been active in the field of local energy planning for island municipalities in the Aegean Sea in collaboration with the Network of Sustainable Aegean Islands (DAFNI) and the Aegean Energy Agency. Furthermore, as a project manager he has been involved in the maturing process of sustainable energy projects with interest for the local authorities both in the fields of energy efficiency and energy production from RES. He has also participated as an energy expert in different sustainable energy related EU funded projects (ISLE-PACT, PROMISE, SMILEGOV). In parallel he has acquired teaching experience in the field of "Local Energy Planning" in the framework of the "Energy Academy" (a collaboration of the Aegean Energy Agency and the Chemical Engineers Dept., NTUA) aiming to the training of employees working in the Aegean local authorities. Finally, he is a founding member of the Collective Planning & Design – CPD, an interdisciplinary engineers' consortium with horizontal organisation and cooperative structure working for the environmentally, socially and economically viable planning of the public space and infrastructures.

7th Green Energy Investments Forum

Sustainable Recovery Plans – Outlining priorities

7 OCTOBER 2020, Athens – Greece

Smart Islands Initiative

Activating circularity in islands

Kostas Komninos

General Director, DAFNI Network of Sustainable Greek Islands

Vice President for Smart and Sustainable Islands, FEDARENE

DAFNI Network of Sustainable Greek Islands

FEDARENE

Network of Sustainable Greek Islands DAFNI

DAFNI, a non-profit organization, is an **association** of island local and regional authorities. It's comprised of **48 Municipal and 4 Regional members.**

DAFNI **promotes sustainable development** in Greek islands through integrated actions in the fields of energy, environment and culture

DAFNI is **a founding member of the Pact of Islands** initiative promoting sustainability in European islands through local energy planning

DAFNI is the **coordinator of the Smart Islands Initiative** promoting islands as ideas areas for innovative projects in the fields of energy, environment, transport and mobility

DAFNI is **subcontractor of the Clean Energy for EU Islands Secretariat** to disseminate the initiative in the Greek islands

The Path towards the Clean Energy for EU Islands Initiative

1993	2011	2013	2016	2017	2019
ISLENET	**ISLEPACT**	**SMILEGOV**	**Smart Islands Initiative**	**Clean Energy for EU Islands**	**European Islands Facility**
EU Islands Network on Energy & Environment	Pact of Islands	Smart Islands Strategy	Smart Islands Declaration	CE4EUI Declaration	NESOI H2020 project

The Smart Islands Initiative

The Smart Islands Initiative is a bottom-up effort of European island authorities and communities which seeks to communicate the significant potential of islands to function as laboratories for technological, social, environmental, economic and political innovation.

Island Quadruple Helix Ecosystems

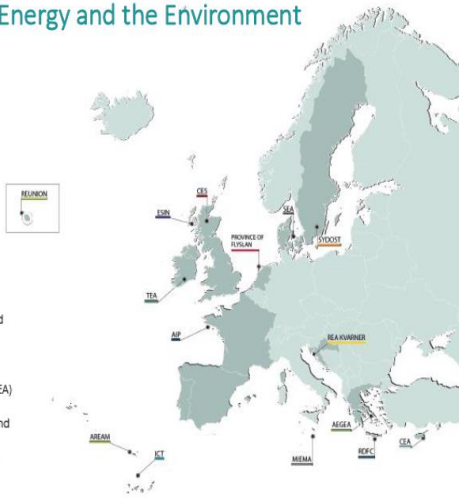
A collaborative process of setting the Smart Islands Initiative into motion.

FEDARENE

European Federation of Agencies and Regions for Energy and the Environment

Islands College

- EL | Aegean Energy & Environment Agency (AEGEA)
- PT | Madeira Regional Agency for Energy & Environment (AREAM)
- UK | European Small Islands Federation (ESIN)
- NL | Province of Fryslan
- HR | Regional Energy Agency Kvarner (REA KVARNER)
- CY | Cyprus Energy Agency (CEA)
- MT | Malta Intelligent Energy Management Agency (MIEMA)
- FR | Ponant Islands Association (AIP)
- FR | Reunion Island SLP Energies
- DK | Samso Energy Academy (SEA)
- EL | Regional Development Fund of Crete (RDFC)
- ES | Canary Islands Institute of Technology (ICT)
- IE | Tipperary Energy Agency (TEA)
- UK | Community Energy Scotland (CES)
- SE | Southeast Sweden Energy Academy (SYDOST)



The Smart Islands Initiative | Key areas of intervention

ENERGY TRANSPORT WATER WASTE

GOVERNANCE ICT ECONOMY

The Smart Islands Initiative | The commitments

We want to become smart, inclusive and thriving societies and to this end we will:

1. Take action to **mitigate and adapt to climate change** and **build resilience** at local level
2. Trigger the uptake of smart technologies to **ensure the optimal management** and use of our resources and infrastructures
3. **Move away from fossil fuels** by tapping our significant renewables and energy efficiency potential
4. Introduce sustainable island mobility including electric mobility
5. **Reduce water scarcity** by applying non-conventional and smart water resources management
6. Become **zero-waste territories** by moving to a **circular economy**
7. Preserve our distinctive **natural** and **cultural capital**
8. **Diversify our economies** by exploiting the intrinsic characteristics of our islands to create new and innovative jobs locally
9. Strengthen social inclusion, education and **citizens' empowerment**
10. Encourage the shift towards alternative, yearlong, **sustainable and responsible tourism**, inland, coastal and maritime

Smart Islands Initiative and UN SDSs

The Smart Islands Initiative | The 3 milestone events

Athens, June 2016

27 island representatives from **13 Member States** launch the Smart Islands Initiative and draft the Declaration

Brussels, March 2017

33 Local and Regional island authorities from **15 Member States** sign the Declaration on behalf of more than **200 EU islands** in a ceremony hosted by **12 MEPs**

Athens, September 2018

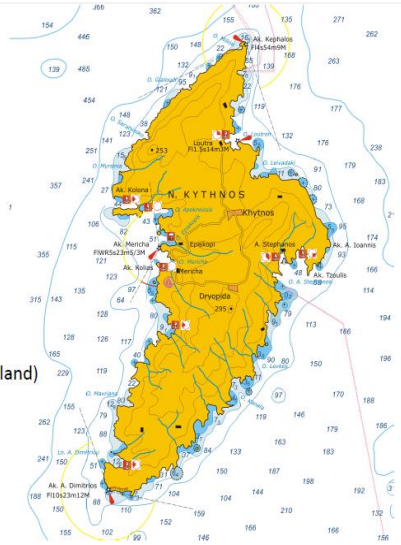
22 island representatives from **13 Member States** strengthen their cooperation and table proposals for the post 2020 era

Smart Islands Initiative – The Kythnos example

DAFNI

Kythnos Island

- ✓ 1608 inhabitants
- ✓ Easily accessible (1,5 hour from mainland)
- ✓ Non-interconnected
- ✓ Desalination for water production
- ✓ Not very touristic



DAFNI

Traditional dancing – Balos

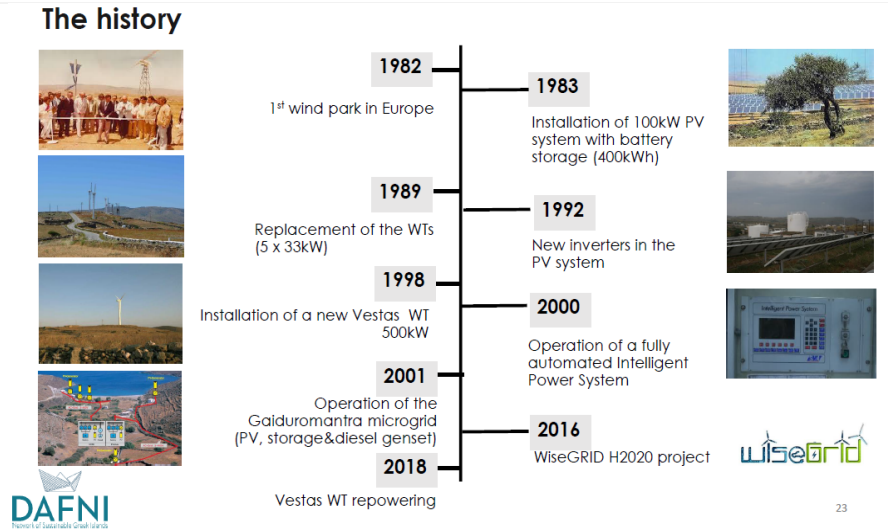
DAFNI

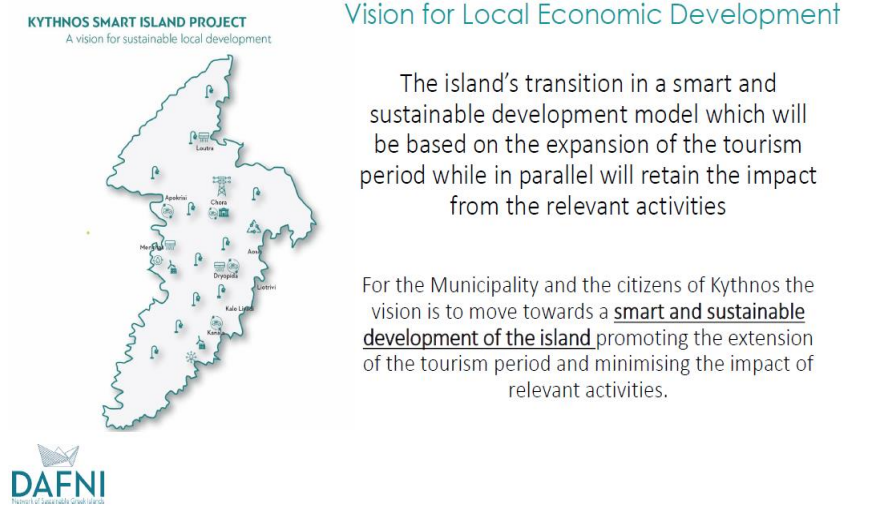
Honey

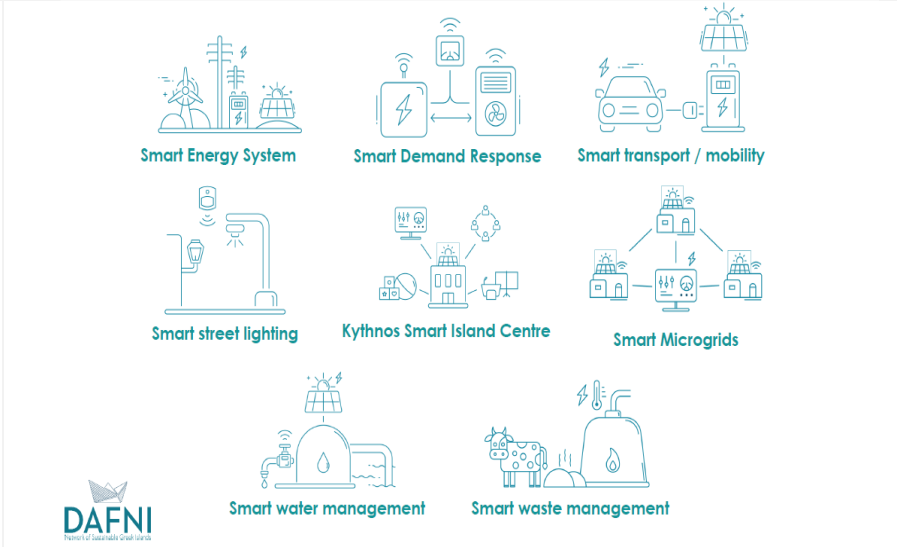
Gastronomy

Archeology


Moreover...
Kythnos has been a Living Lab of technological innovation on clean energy transition
22


The history
1982
1st wind park in Europe
1983
Installation of 100kW PV system with battery storage (400kWh)
1989
Replacement of the WTs (5 x 33kW)
1992
New inverters in the PV system
1998
Installation of a new Vestas WT 500kW
2000
Operation of a fully automated Intelligent Power System
2001
Operation of the Gaidouromantra microgrid (PV, storage&diesel genset)
2016
WiseGRID H2020 project
2018
Vestas WT repowering
DAFNI
23


KYTHNOS SMART ISLAND PROJECT
A vision for sustainable local development
Vision for Local Economic Development
The island's transition in a smart and sustainable development model which will be based on the expansion of the tourism period while in parallel will retain the impact from the relevant activities
For the Municipality and the citizens of Kythnos the vision is to move towards a smart and sustainable development of the island promoting the extension of the tourism period and minimising the impact of relevant activities.
DAFNI


Smart Energy System
Smart Demand Response
Smart transport / mobility
Smart street lighting
Kythnos Smart Island Centre
Smart Microgrids
Smart water management
Smart waste management
DAFNI

Thank you

More information

www.smartislandsinitiative.eu
www.dafninetwork.gr

info@smartislandsinitiative.eu
director@dafninetwork.gr

Covenant of Mayors for Climate and Energy

Pedro BIZARRO

Project Officer – Covenant of Mayors

Short CV

Pedro Bizarro is an urban planner with experience in the fields of urban governance, strategic planning and territorial indicators. Since 2020 he joined the Covenant of Mayors for Climate and Energy - Europe at the Council of European Municipalities and Regions (CEMR). From 2016 to 2020, he was Project Officer for the Reference Framework for Sustainable Cities (RFSC), following urban development policies in the EU and the localisation of the United Nations Sustainable Development Goals. He holds an academic degree in Urban and Territorial Planning from Lusófona University of Humanities and Technologies. He was also President of IEJ - European Youth Exchange for the period 2007-2013 and Vice President of the General Assembly of Portuguese National Youth Council for the period 2010-2012.

Covenant of Mayors for Climate & Energy EUROPE

COVENANT OF MAYORS FOR CLIMATE AND ENERGY

Part of the GLOBAL COVENANT OF MAYORS for CLIMATE & ENERGY

www.eumayors.eu

The Covenant of Mayors for Climate & Energy - Europe

As part of the European Covenant of Mayors movement, **cities and towns** are taking **climate and energy action** to secure a **better future** for their citizens.

www.eumayors.eu

Matching local objectives and EU policy

-40%

in CO_2 emissions by 2030

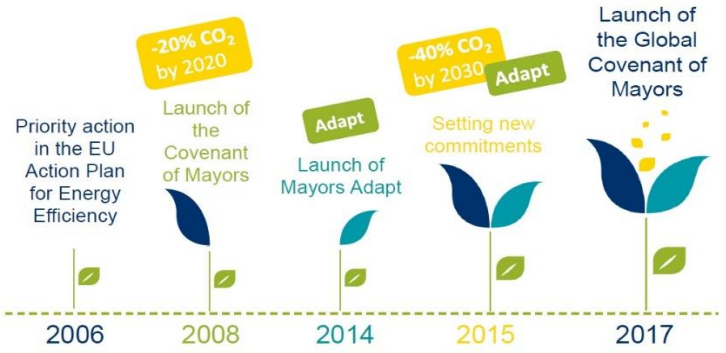
Contributing to:

The European Union Climate and Energy policy

The Paris Agreement
The 2030 Agenda for Sustainable Development

www.eumayors.eu

Evolution of the initiative



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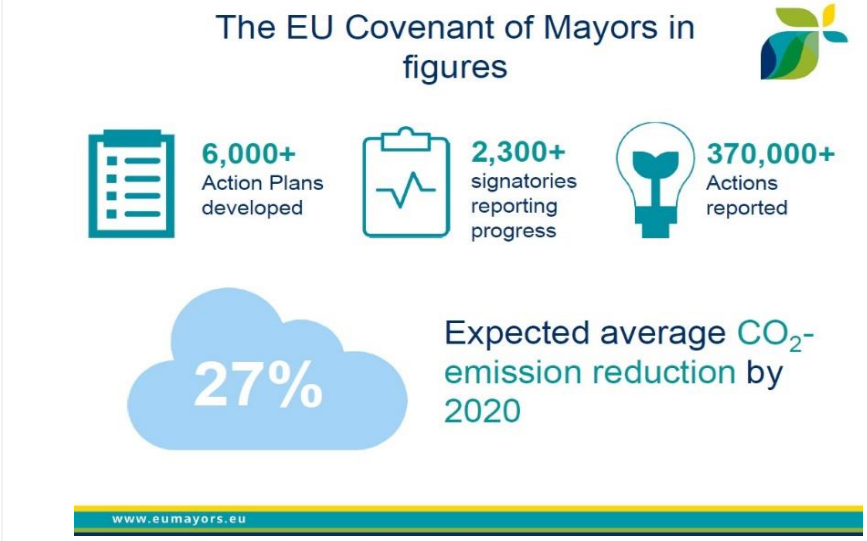
The Covenant of Mayors in the world
GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY
North America
EU and EFTA
Eastern-Europe & South Caucasus
South Mediterranean
China & South-East Asia
Japan
India
Sub-Saharan Africa
Latin America & the Caribbean
Oceania
www.eumayors.eu


The EU Covenant of Mayors Community
10284 signatories
villages, towns, cities, counties
324,496,569
Inhabitants
Already 3300+ committed
to the 2030 objectives
225+ Coordinators
regions, provinces, ministries, national funds & agencies
200+ Supporters
national and regional associations, networks, local and regional agencies, NGOs…
www.eumayors.eu


The EU Covenant of Mayors in figures
6,000+
Action Plans developed
2,300+
signatories reporting progress
370,000+
Actions reported
27%
Expected average CO2-emission reduction by 2020
www.eumayors.eu


The EU Covenant of Mayors in figures for Greece
220
Signatories
9
Supporters
6
Coordinators
1
Country
8,926,327
Inhabitants
127
Action Plans developed
27
signatories reporting progress
7,000+
Actions reported
www.eumayors.eu

The EU Covenant of Mayors in figures **for Greece**

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TECHNICAL CHAMBER OF GREECE

CENTRE FOR RENEWABLE ENERGY SOURCES AND SAVING (CRES)

REGION OF CENTRAL MACEDONIA

REGION OF CRETE-REGIONAL ENERGY AGENCY-REGIONAL DEVELOPMENT FUND

REGION OF WESTERN MACEDONIA

REGION OF ATTICA

Supporters

NETWORK OF CITIES WITH LAKES

NETWORK OF SUSTAINABLE GREEK ISLANDS

AEGEAN ENERGY AND ENVIRONMENT AGENCY

ANATOLIKI S.A/REACM (REGIONAL ENERGY AGENCY OF CENTRAL MACEDONIA)

REAC - REGIONAL ENERGY AGENCY OF CRETE

PEDA

ASSOCIATION FOR SUSTAINABLE DEVELOPMENT OF CITIES - SVAP

CENTRAL UNION OF MUNICIPALITIES OF GREECE (KEDE)

REGIONAL UNION OF MUNICIPALITIES OF CENTRAL GREECE

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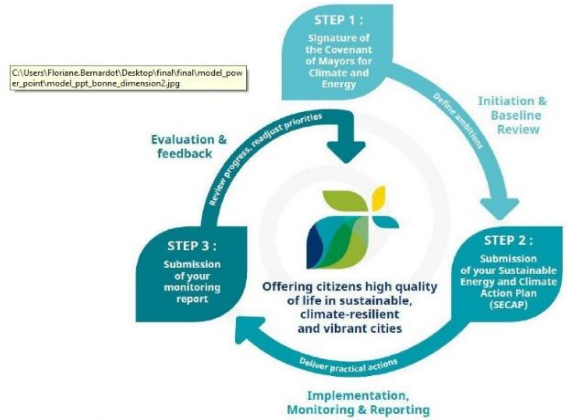
The Covenant step by step



www.eumayors.eu

A reference framework for action

- **Consistency and transparency** with common reporting framework for all
- **Flexibility and adjustability** to local realities
- **Feedback** of action plans by the European Commission Joint Research Centre
- **Promotion and exchange of experience**

www.eumayors.eu

Supporting signatories

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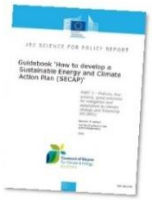
With specific methodological materials for **Energy and Climate Plans**



Guidance materials

Action Plan template & instructions

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Supporting signatories

With a dedicated online support tool for **adaptation**

Urban Adaptation Support Tool
Covenant of Mayors for Climate & Energy EUROPE

1. Preparing the ground for adaptation
2. Assessing climate change risks and vulnerabilities
3. Identifying adaptation options
4. Assessing and selecting adaptation options
5. Implementing adaptation
6. Monitoring and evaluating adaptation

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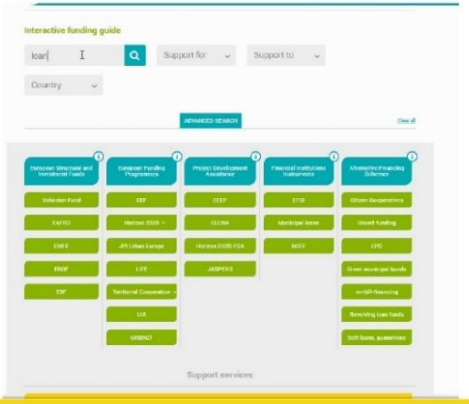
Supporting signatories

With an online interactive **funding guide**



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Supporting signatories

With a **capacity-sharing** platform:

- **Resource Library**
  - Search, add and rate among hundreds of resources, including good practices, case studies, handbooks, webinar recordings, etc.
- **Discussion Forums**
  - Exchange with your peers

www.eumayors.eu

MY COVENANT

www.eumayors.eu

Supporting signatories

With **capacity-building** events:

- Webinars
- Events
- Thematic coalitions
- City-twinning programme

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Supporting signatories

With specific helpdesks:

- General helpdesk
- Supporter helpdesk
- Coordinator helpdesk
- Country-specific helpdesks:
  - Italy
  - Spain
  - Germany
  - Austria

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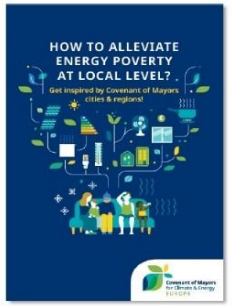
More local actions…



www.eumayors.eu

Part of the GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

Thank you!

pedro.bizarro@eumayors.eu

With the support of the European Union

More info:
www.eumayors.eu

www.eumayors.eu

Session: Regions and Municipalities

(conducted in Greek language)

Ομιλία του κ. Γεώργιου ΠΑΤΟΥΛΗ

Περιφερειάρχης Αττικής

Χαιρετίζω το 13ο Επιστημονικό Συνέδριο για την Ενέργεια και την Κλιματική Αλλαγή.

Ευχαριστώ για τα καλά σας λόγια, και τον Προεδρεύοντα, ο οποίος αναφέρθηκε για τις περιφέρειες και προσωπικά.

Το επιστημονικό αυτό Συνέδριο για την Ενέργεια και την Κλιματική Αλλαγή με επιμονή σε συνθήκες πανδημίας, πραγματοποιείται στην καρδιά της Αττικής μας με στόχο ένα πράσινο ζωογόνο μέλλον, που βασίζεται σε ένα αποφασιστικό παρόν.

Και χαίρομαι ιδιαίτερα για την συμμετοχή των Περιφερειών, αλλά και των Δήμων, όπως και της Κεντρικής Ένωσης Δήμων Ελλάδος, που είχα τη μεγάλη τιμή επί 5 χρόνια να βρίσκομαι στο τιμόνι.

Αυτό το Φόρουμ για τις επενδύσεις της πράσινης ανάπτυξης, καταγράφει την έμπρακτη δέσμευση μας από πλευράς τοπικής αυτοδιοίκησης να τιμήσουμε τον τόπο μας, τις πόλεις μας, για την βιώσιμη επιβίωση και ανάπτυξη τους στο μέλλον.

Αγαπητοί φίλοι,

Κυρίες και Κύριοι,

Θα έλεγα ότι πράγματι η αναχαίτιση της κλιματικής αλλαγής του πλανήτη ξεκινά από κάθε πόλη στην υδρόγειο και το κοινό συμπέρασμα στο οποίο οι τοπικές και κρατικές κυβερνήσεις του πλανήτη συγκλίνουν είναι ότι μόνο οι πόλεις διαθέτουν σήμερα τη δύναμη να αλλάξουν τον κόσμο. Να αλλάξουν τον κόσμο και το σήμερα.

Εδώ και χιλιάδες χρόνια οι πόλεις ήταν αυτές, που γέννησαν τις ιδέες, την καινοτομία, το εμπόριο, τον πολιτισμό, με τον αρχέγονο σταθμό αυτής της εξέλιξης την Αθήνα και την Αττική μας.

Οι πόλεις είναι αυτές, που μπορούν και τώρα - καταγράφουν οι διεθνείς μελετητές - σε αυτό το κρίσιμο σταυροδρόμι του χρόνου, την κλιματική κρίση, να παράξουν τις ιδέες, αλλά και να υλοποιήσουν τις αλλαγές, που χρειάζεται, για να υπάρχει ο κόσμος μας στο μέλλον.

Όμως οι ίδιες οι πόλεις όσο είναι δυνατές τόσο είναι και ευάλωτες απέναντι στην κρίση της κλιματικής αλλαγής. Το 70% των πόλεων του κόσμου αντιμετωπίζουν ήδη τις επιπτώσεις αυτής της κρίσης και σχεδόν όλες βρίσκονται σε κίνδυνο. Όσο μεγαλύτερες είναι οι πόλεις, τόσο πιο οργισμένη η όρεξη τους για κατανάλωση ενέργειας. Το 75% της κατανάλωσης φυσικών πόρων λαμβάνει χώρα στις πόλεις μας. Οι πόλεις παράγουν το 50% των παγκόσμιων αποβλήτων και το 60 με 80% των εκπομπών αερίων του θερμοκηπίου.

Την ίδια ώρα στην καρδιά των πόλεων, στην ίδια την αστική πυκνότητα, βρίσκεται και η ευκαιρία της υιοθέτησης ενός πιο πράσινου τρόπου ζωής και της μετάβασης στην κυκλική οικονομία όπου η αξία των πόρων παραμένει στην οικονομία και η παραγωγή αποβλήτων περιορίζεται στο ελάχιστο.

Αξιότιμοι συμμετέχοντες, επιστήμονες και επενδυτές,

Αγαπητοί εκπρόσωποι της τοπικής αυτοδιοίκησης,

έχω την τιμή να σας αναφέρω για τα διεθνή, αλλά και τα ευρωπαϊκά δίκτυα για τις πράσινες πόλεις, τις βιώσιμες πόλεις όπως και τα δίκτυα της υγείας των πολιτών, των Ηνωμένων Εθνών, της Ευρωπαϊκής Επιτροπής, αλλά και του ΠΟΥ.

Έχω παρακολουθήσει και προσωπικά έχω συνδεθεί με τις ενέργειες και τους στόχους της από κάθε θέση ευθύνης μου. Από το Δήμο Αμαρουσίου – οι πράσινες πρωτοβουλίες μας ξεκίνησαν από την αρχή της προηγούμενης δεκαετίας με την ενίσχυση του αστικού πρασίνου, την ενθάρρυνση των πράσινων μετακινήσεων και τη δημιουργία πεζοδρόμων και ποδηλατοδρόμων και την προώθηση

πρακτικών ανακύκλωσης, αλλά και επανάχρησης της εξοικονόμησης ενέργειας και τη βιοκλιματική ανάπλαση του ιστορικού εμπορικού κέντρου. Μάλιστα το Μαρούσι ήταν ο πρώτος δήμος της χώρας, που εφάρμοσε και πιστοποιήθηκε για το Ευρωπαϊκό πρότυπο της περιβαλλοντικής διαχείρισης, το EMAS, ενώ το 2013 εντάχθηκε στο Σύμφωνο των Δημάρχων, σήμερα πλέον παγκόσμιο Σύμφωνο των Δημάρχων για το Κλίμα και την Ενέργεια, το οποίο ενεργά υποστηρίξαμε και από την Κεντρική Ένωση των Δήμων Ελλάδος, αγαπητέ Πρόεδρε κ. Παπαστεργίου, κατά τη διάρκεια της θητείας μου απευθυνόμενοι σε όλους τους δήμους της επικράτειας.

Στο παγκόσμιο Σύμφωνο των Δημάρχων, που αριθμεί σήμερα παγκοσμίως περισσότερο από δέκα χιλιάδες πόλεις, Δήμους και Περιφέρειες με ενεργό δράση, η Περιφέρεια Αττικής συμμετέχει ως Εθνικός Συντονιστής και με ικανοποίηση αναφέρω ότι έχουν ενταχθεί σήμερα πολυάριθμοι από τους δήμους της Αττικής, τις δράσεις και τις πρωτοβουλίες των οποίων από κοινού θα συντονίζουμε.

Εδώ θέλω να τονίσω πριν απ' όλα ότι σε επίπεδο εθνικής στρατηγικής αισθάνομαι πραγματικά υπερήφανος για την αποφασιστικότητα της κυβέρνησης για το κλίμα και την ενέργεια καθώς και για την αειφορία και την κυκλική οικονομία. και αυτό παρά την ύφεση της πανδημίας και την παγκόσμια ύφεση των ενεργειακών επενδύσεων.

Η Ελλάδα σημειώνει πρωτοφανή ρεκόρ στην επίτευξη των πράσινων στόχων του 2020 έχοντας καταφέρει φέτος για πρώτη φορά μετά τη δεκαετία του 1950 να μην αντλούμε καθόλου ηλεκτρική ενέργεια από την καύση λιγνίτη. Ένα πολύ σημαντικό γεγονός, που πρέπει να τονισθεί και είναι τιμητικοί οι διεθνείς έπαινοι πως ως χώρα εισπράττουμε, όσο αποδεικνύουμε την προσήλωση της στην εφαρμογή της Συμφωνίας των Παρισίων και της αντζέντας των Ηνωμένων Εθνών για το 2030.

Ως Περιφερειάρχης Αττικής δεσμεύτηκα πρόσφατα για το θέμα της στενότερης συνεργασίας με τον Οργανισμό Ηνωμένων Εθνών κατά τη συνάντηση με τον Γκαεντάνο Λεόνε, Γενικό συντονιστή του Περιβαλλοντικού Προγράμματος των Ηνωμένων Εθνών, ο οποίος με επισκέφτηκε στην Περιφέρεια μου.

Η Πράσινη Ανάπτυξη και η διαδικασία μετασχηματισμού του ενεργειακού τομέα κατέχουν κεντρικό ρόλο στο πλαίσιο των προτάσεων της Περιφέρειας Αττικής για την αξιοποίηση των χρηματοδοτικών εργαλείων της περιόδου 2020 και ένθε.

Οι σχετικές προτεραιότητες περιλαμβάνουν πρωτοβουλίες και αύξηση της ενεργειακής απόδοσης, αύξηση της χρήσης ανανεώσιμων πηγών ενέργειας αλλά και τεχνολογιών συμπαραγωγής ηλεκτρικής ενέργειας και θερμότητας.

Κυρίες και κύριοι,

είναι χαρακτηριστικό ότι το Εθνικό Σχέδιο για την Ενέργεια και το Κλίμα προβλέπει ότι την περίοδο 2020-2030 για την επίτευξη των περιβαλλοντικών στόχων απαιτούνται επενδύσεις συνολικής αξίας 43,8 δισεκατομμυρίων ευρώ σε ανανεώσιμες πηγές ενέργειας, υποδομές και δίκτυα, ενεργειακή απόδοση, κυκλική οικονομία και άλλους σχετικούς τομείς.

Η Περιφέρεια Αττικής αναλαμβάνοντας την ευθύνη, που της αναλογεί, προετοιμάζει παρεμβάσεις στον τομέα της ενέργειας κατ' εφαρμογή του υπό έγκριση περιφερειακού σχεδίου για την προσαρμογή στην κλιματική αλλαγή, που έχει εκπονηθεί και ολοκληρωθεί. Και αποτελεί ουσιαστικά το Στρατηγικό Σχέδιο για τις παρεμβάσεις της Περιφέρειας.

Επιλεκτικά θα ήθελα, κύριε Πρόεδρε, να σας μεταφέρω μερικά μέτρα από τον τομέα του Δομημένου Περιβάλλοντος του Περιφερειακού Σχεδίου για την Προσαρμογή στην Κλιματική Αλλαγή, όπως χρήση καινοτόμων και ενεργειακά φιλικών υλικών τόσο στην ανακαίνιση παλαιών κτηρίων όσο και για τη δόμηση νέων μηδενικής ενεργειακής κατανάλωσης, καθώς και αξιοποίηση των ανανεώσιμων μορφών ενέργειας, αλλά και άλλων τεχνικών εξοικονόμησης, που θα πρέπει να συμπεριληφθούν στη σύγχρονη νομοθεσία.

Συνδυασμένη χρήση τεχνολογιών εξοικονόμησης ενέργειας, αποδοτικά συστήματα φωτισμού, αλλά και χρήση ανανεώσιμων πηγών ενέργειας. Τα παραπάνω προτεινόμενα μέτρα έχουν μακροπρόθεσμο ορίζοντα. Επίσης το Περιφερειακό Σχέδιο για την Προσαρμογή στην Κλιματική Αλλαγή στον τομέα των υποδομών, μεταφορών προτείνει τα παρακάτω μεσοπρόθεσμα μέτρα πράσινης ενέργειας:

- Επενδύσεις σε υποδομές ήπιων μέσων μετακίνησης,
- Διαχείριση της ζήτησης και στρατηγικό σχεδιασμό χρήσεων γης.

Όλα αυτά γενικότερα και οι παρεμβάσεις στον τομέα της ενέργειας του Περιφερειακού Σχεδίου για την Προσαρμογή στην Κλιματική Αλλαγή περιλαμβάνουν:

- Ειδική μελέτη τρωτότητας για υφιστάμενα δίκτυα μεταφοράς, διανομής ηλεκτρικής ενέργειας και κέντρα υψηλής τάσης και εκπόνηση προγράμματος επενδύσεων σε έργα προστασίας,
- Εξέταση αναγκαιότητας και τροποποίησης προγραμμάτων του ΑΔΜΗΕ και του ΔΕΔΔΗΕ για μελλοντικά έργα δικτύων ώστε αυτά να είναι προληπτικά προστατευμένα,
- Εκπόνηση προγράμματος μετεγκατάστασης διαδικτυακών διασυνδέσεων,
- Ειδική μελέτη τρωτότητας εγκαταστάσεων φυσικού αερίου περιλαμβανομένης της Ρεβυθούσας και εκπόνηση προγράμματος επενδύσεων σε έργα προστασίας,
- Εξέταση αναγκαιότητας τροποποίησης προγραμμάτων ΕΣΦΑ για μελλοντικά έργα φυσικού αερίου ώστε αυτά να είναι προληπτικά προστατευμένα και ειδική μελέτη τρωτότητας διυλιστηρίων και εγκαταστάσεων αποθήκευσης πετρελαίου και εκπόνηση προγράμματος επενδύσεων σε έργα προστασίας όπου τυχόν απαιτούνται,
- Ειδική μελέτη τρωτότητας σε υφιστάμενες μονάδες ηλεκτροπαραγωγής, που είναι παράκτιες εκτός νησιών και χρησιμοποιούν θαλασσινό νερό για ψύξη και εκπόνηση προγράμματος επενδύσεων σε έργα προστασίας τους,
- Εξέταση αναγκαιότητας τροποποίησης κανονισμού αδειών μονάδων ηλεκτροπαραγωγής, ώστε οι παράκτιες μονάδες να είναι προληπτικά προστατευμένες.

Ανάλογες προεκτάσεις στο θέμα της αλλαγής του παραγωγικού υποδείγματος έχουν και δράσεις για ενίσχυση της πράσινης επιχειρηματικότητας καθώς και πρωτοβουλίες για την ανάδειξη της προστασίας και αξιοποίησης της φυσικής κληρονομιάς.

Είναι σίγουρο ότι ανάγκες για προστασία του περιβάλλοντος δημιουργούν σημαντικές επιχειρηματικές ευκαιρίες. Αντίστοιχα η προστασία της φυσικής κληρονομιάς συνδέεται άμεσα με ανάπτυξη και προώθηση προϊόντων και διατροφικών, προώθηση τουριστικών προορισμών, φυτικά καλλυντικά και συναφή αντικείμενα.

Τέλος σημαντικές παρεμβάσεις, που μπορούν να προσδώσουν σημαντική προστιθέμενη αξία περιλαμβάνουν τη δημιουργία χρηματοδοτικών εργαλείων και ταμείων για προώθηση της κυκλικής οικονομίας, της πράσινης επιχειρηματικότητας και του ενεργειακού μετασχηματισμού. Επιλογές, που εξετάζουμε και αξιολογούμε εν όψη και της προετοιμασίας για την υποβολή του νέου ΠΕΠ Αττικής 2021-2027.

Αγαπητοί φίλοι η επιτομή της δυναμικής της παγκόσμιας μετάβασης στο πράσινο μέλλον της κυκλικής οικονομίας και της αειφόρου ανάπτυξης βρίσκεται στο συντονισμό των πόλεων και των περιφερειών του κόσμου μεταξύ τους.

Η τοπική αυτοδιοίκηση πρώτου και δευτέρου βαθμού έχει ευθύνη απέναντι των πόλεων και των πολιτών να αυξήσει την επίγνωση της βιώσιμης κατανάλωσης σε τοπικό επίπεδο και να επιλέξει όλους εκείνους τους τομείς είτε πρόκειται για την κοινωνία των πολιτών και για τις επιχειρήσεις για χρηματοδοτικούς οργανισμούς ή για κυβερνητικές αρχές.

Η τοπική αυτοδιοίκηση οφείλει επίσης να συντονίσει τη διεθνή συνεργασία μεταξύ των πόλεων κάτι, που ενδείκνυται για την από κοινού αγορά νέων τεχνολογιών όπως λύσεις ηλεκτρικής κινητικότητας μειώνοντας το κόστος και επιταχύνοντας τη μετάβαση στην κυκλική οικονομία. Τέτοιες λύσεις και ιδέες υιοθετούνται ή προσαρμόζονται από πόλη σε πόλη, ενώ μεταδίδονται μέσω των Ευρωπαϊκών και διεθνών δικτύων πόλεων όπως το EUROCITES, το σύστημα πληροφοριών SMART CITIES, καθώς και το παρατηρητήριο των βιώσιμων πόλεων του κόσμου, που καταγράφει και επιβραβεύει τις καλές πρακτικές για την επίτευξη των στάνταρς της βιώσιμης ανάπτυξης.

Είμαι σίγουρος ότι με προσήλωση στον αγώνα για την διάσωση και την επιβίωση των πολιτών στις δύσκολες ώρες της πανδημίας και την επιμονή στο όραμα μας για το πράσινο μέλλον να

παραδώσουμε βιώσιμη την Ελλάδα στις επόμενες γενιές σε ένα πλανήτη που από κοινού θα καταφέρουμε να σώσουμε.

Με αυτές τις σκέψεις θα ήθελα και πάλι να σας ευχαριστήσω για τη δυνατότητα να μιλήσω στο σημαντικό συνέδριο σας και με φυσικό και όποιον άλλο τρόπο να είμαστε κοντά σας.

Σύντομο βιογραφικό

Γεννήθηκε στην Αθήνα το 1961 με καταγωγή από την Κρήτη. Το 1981 εισάχθηκε στην Ιατρική Σχολή Αθηνών και ειδικεύτηκε ως ορθοπεδικός–χειρουργός στο Λαϊκό Νοσοκομείο Αθηνών, όπου και εκπόνησέ την διδακτορική του διατριβή. Εργάστηκε ως ιατρός και παράλληλα, την περίοδο 1998-2000, ειδικεύτηκεε στα Οικονομικά της Υγείας και αποφοίτησέε από την Εθνική Σχολή Δημόσιας Υγείας. Η συνδικαλιστική του δράση στο χώρο της Υγείας ξεκινά το 1996, ενώ από το 2011 μέχρι σήμερα είμαι Πρόεδρος του Ιατρικού Συλλόγου Αθηνών. Στο κομμάτι της Τοπικής Αυτοδιοίκησης δραστηριοποιείται από το 1998, οπότε και εκλέχτηκε για πρώτη φορά Δημοτικός Σύμβουλος στο Δήμο Πεύκης. Το 2006 εξελέγην Δήμαρχος Αμαρουσίου, θέτοντας τις βάσεις ώστε το Μαρούσι να ξαναγίνει βιώσιμη πόλη και βελτιώνοντας σημαντικά την εικόνα του. Στις Αυτοδιοικητικές Εκλογές Μαΐου 2019, εκλέχθηκε Περιφερειάρχης Αττικής με 66%.

Speech of Mr. Georgios PATOULIS

Regional Governor of Attiki, Hellas

My greetings to the 13th Scientific Conference on Energy and Climate Change.

Thank you for your kind words, and the Chairman who mentioned the regions and me personally.

This scientific Conference on Energy and Climate Change is persistently held in the heart of our Attica with the aim of a green and vibrant future, based on an active present.

And I am very happy for the participation of the Regions, but also of the Municipalities, as well as of the Central Union of Municipalities of Greece, where I had the great honor for 5 years to be in charge.

This Forum for the investments about the green development, records our practical commitment in terms of local government to honor our mainland, our cities, for their sustainable survival and development in the future.

Dear friends,

Ladies and gentlemen,

I would say that indeed the suppression of global climate change starts from every city on the globe and the common conclusion to which local and state governments of the planet converge is that only cities today have the power to change the world. To change the world and the today.

For thousands of years, the cities were the ones that gave birth to ideas, innovation, trade, culture, with the primordial station of this development, Athens and our Attica.

Cities are the ones that can and now - international scholars record - at this critical crossroads of time, the climate crisis, produce ideas, but also implement the needed changes so that our world exists in the future.

But the cities themselves are as powerful as they are also vulnerable against the climate change crisis. 70% of the world's cities are already facing the effects of this crisis and almost all are at risk. The bigger the cities, the angrier is their appetite for energy. 75% of natural resource consumption takes place in our cities. Cities produce 50% of the world's waste and 60 to 80% of the greenhouse gas emissions.

At the same time, in the heart of the cities, in the urban density itself, lies the opportunity to adopt a greener lifestyle and the transition to a circular economy where the value of resources remains in the economy and the waste production is kept to the minimum.

Dear participants, scientists and investors,

Dear representatives of the local governance,

I have the honor to mention the international and European networks for green cities, sustainable cities as well as the citizens' health networks, the United Nations, the European Commission, but also the WHO.

I have watched and personally was connected with the actions and the goals derived from every position of my responsibility. From the Municipality of Maroussi, our green initiatives started at the beginning of the last decade with the strengthening of urban greenery, the encouragement of green

movement and the creation of sidewalks and bike paths and the promotion of recycling practices, but also the reuse of energy saving and bio-energy saving of the historic mall. In fact, Maroussi was the first municipality in the country to implement and certify the European standard of environmental management, EMAS, while in 2013, it joined the Covenant of Mayors, now the global Covenant of Mayors for Climate and Energy, which we actively also supported from the Central Union of Greek Municipalities, dear President Mr. Papastergiou, during my term of office, addressing all the municipalities of the territory.

Under the global Covenant of Mayors, which currently accounts more than ten thousand cities, Municipalities and Regions with active action, the Attica Region participates as National Coordinator and I am pleased to say that numerous municipalities of the Attica region are included and their actions and initiatives are coordinated jointly by the region.

At this point, I would like to emphasize first of all, that regarding the level of the national strategy, I feel really proud of the government's determination concerning climate and energy, as well as about sustainability and circular economy. And this despite the recession of the pandemic and the global recession of the energy investments.

Greece marks unprecedented records in achieving the green targets of 2020, having managed this year for the first time since the 1950s not to produce any electricity from the burning of lignite. A very important fact, which must be emphasized, and the international praises - that we receive as a country - are honorable, as long as we prove its commitment to the implementation of the Paris Agreement and the United Nations agenda for 2030.

As Regional Governor of Attiki, I recently committed myself to the issue of closer cooperation with the United Nations during the meeting with Gaedano Leone, General Coordinator of the United Nations Environment Programme, who visited me in my Region.

Green Development and the process of transforming the energy sector play a central role in the context of the proposals of the Attica Region for the utilization of the financial tools during the period 2020 and forward.

Relevant priorities include initiatives and increase of energy efficiency, increase of the use of renewable energy sources but also increase of technologies for cogeneration of electricity and heat.

Ladies and gentlemen,

it is noteworthy that the National Action Plan for Energy and Climate estimates that for the achievement of the environmental objectives during the period 2020-2030, investments worth a total of 43.8 billion euros are required in renewable energy sources, infrastructure and networks, energy efficiency, circular economy and so on.

The Attica Region, undertaking its analogical responsibility, prepares interventions in the energy sector by implementing the under approvement regional plan for adaptation to climate change, which has been prepared and completed. And it is essentially the Strategic Plan for the interventions of the Region.

Selectively, Mr Chairman, I would like to present some of the measures from the area of the Structured Environment of the Regional Plan for Adaptation to Climate Change, such as the use of innovative and energy-friendly materials both in the renovation of old buildings and in the construction of new zero-energy consumption, but also exploitation of renewable energy sources and other energy saving techniques, which should be included in modern legislation.

Combined use of energy saving technologies, efficient lighting systems, but also the use of renewable energy sources. The above proposed measures have a long-term horizon. Also, the Regional Plan for Adaptation to Climate Change in the field of infrastructure, transport proposes the following medium-term green energy measures:

- Investments in soft transport infrastructure;
- Demand management and strategic land use planning.

All these in general and the interventions in the energy sector from the Regional Climate Change Adaptation Plan include:

- Special vulnerability study for existing transmission networks, electricity distribution and high voltage centers and preparation of an investment program in protection projects;
- Examination of necessity and modification of IPTO and HEDNO programs for future network projects so that they are precautionarily protected;
- The development of an internet connection migration program Special vulnerability study of natural gas installations including Revythousa and elaboration of investment program in protection projects;
- Examining the necessity of modifying NNGS programs for future gas projects so that they are preventively protected and a special vulnerability study of refineries and oil storage facilities and elaboration of an investment program in protection projects where they may be required;
- Special vulnerability study in existing offshore power plants that use offshore water for cooling and investment program in their protection projects Consideration of the need to amend the regulation of licenses of power plants so that the coastal units are precautionarily protected.

Actions to strengthen green entrepreneurship as well as initiatives to promote the protection and utilization of the natural heritage have similar implications for the change of the productive model.

It is certain that needs for environmental protection create important business opportunities. Respectively the protection of the natural heritage is directly related to the development and promotion of products and food, the promotion of tourist destinations, herbal cosmetics and related items.

Finally, important interventions that can add significant added value include the creation of financial instruments and funds to promote circular economy, green entrepreneurship, and energy transformation. We examine and evaluate these options in view of the preparation for the submission of the new 2021-2027 Regional Development Plan for Attica.

Dear friends,

the summary regarding the dynamics of the global transition to the green future of the circular economy and sustainable development lies in the coordination of cities and regions of the world with each other. Local governments of first- and second-tier have a responsibility towards cities and citizens to raise awareness for sustainable consumption at the local level and to select all those areas, whether it is civil society and business, financial institutions or government authorities. This local government must also coordinate international cooperation between cities, which is conducive to the joint purchase of new technologies such as electricity mobility solutions, reducing costs and accelerating the transition to a circular economy.

Such solutions and ideas are adopted or adapted from city to city while being transmitted through European and international city networks such as EUROCITES, the SMART CITIES information system as well as the Observatory of Sustainable Cities of the World which records and rewards good practices for achieving standards of sustainable development.

I am sure that by dedicating ourselves to the struggle for the rescue and survival of the citizens in these difficult hours of the pandemic and the persistence in our vision for the green future to deliver a Sustainable Greece to the next generations on a planet that together we will be able to save.

With these thoughts I would like to thank you again.

Short CV

He was born in Athens in 1961, while his family comes from Crete. In 1981 he was admitted to the Medical School of Athens and specialized as an orthopedic surgeon at the People's Hospital of Athens, where he prepared my doctoral dissertation. I worked as a doctor and at the same time, in the period 1998-2000, he specialized in Health Economics and graduated from the National School of Public Health. His activity in the field of Health begins in 1996, while from 2011 until today he is President of the Medical Association of Athens. He has been active in the field of Local Government since 1998, when he was elected for the first time Municipal Councilor in the Municipality of Pefki. In 2006 he was elected Mayor of Maroussi, laying the foundations for Maroussi to become a sustainable city again and significantly improving its image. In the Local Elections of May 2019, he was elected Governor of Attica with 66%.

Παρέμβαση από την Περιφέρεια Πελοποννήσου

Καλησπέρα σας και από την Τρίπολη, από την έδρα της Περιφέρειας Πελοποννήσου

Κύριε καθηγητά κ. Μαυράκη, αξιότιμοι συμμετέχοντες

Ονομάζομαι Μητρόπουλος Παναγιώτης, είμαι Μηχανολόγος Μηχανικός, συνεργάτης του Περιφερειάρχη Πελοποννήσου, του κ. Παναγιώτη Νίκα. Είμαι εδώ, για να τον εκπροσωπήσω.

Ο κ. Περιφερειάρχης δυστυχώς δεν μπορούσε να παρακολουθήσει το σύνολο των εργασιών του σημερινού Φόρουμ, καθώς συμμετέχει σε συνεχείς συσκέψεις με κυβερνητικά στελέχη, εκτός γραφείου σήμερα.

Εγώ όμως και η ομάδα των υπόλοιπων τεχνικών συνεργατών παρακολουθούμε τις εργασίες από το πρωί και θα θέλαμε να σας μεταφέρουμε την προσωπική, αλλά και την πολιτική βούληση του Περιφερειάρχη κ. Νίκα για την ανάπτυξη υποδομών πράσινης ενέργειας στην Περιφέρεια Πελοποννήσου και ειδικότερα του φυσικού αερίου.

Ήδη βρίσκεται αυτές τις ημέρες σε εξέλιξη δημόσια διαβούλευση για το σχέδιο της απεμπλοκής της περιοχής της Μεγαλόπολης από το κάψιμο του λιγνίτη και για την ανάπτυξη αυτής της περιοχής για την επόμενη ημέρα.

Επίσης γίνονται από την πλευρά του Περιφερειάρχη καθημερινά ενέργειες, ώστε τα επόμενα χρόνια η Πελοπόννησος να αποκτήσει ένα ολοκληρωμένο δίκτυο φυσικού αερίου εκμεταλλευόμενη και τους αγωγούς, που ήδη διασχίζουν το έδαφος μας, το έδαφος εδώ της Περιφέρειας. Κάτι το οποίο θεωρούμε ότι θα ωφελήσει τόσο τους ιδιώτες καταναλωτές όσο και την επιχειρηματική ανάπτυξη του τόπου.

Με αυτό το μικρό χαιρετισμό θα θέλαμε να σας ευχαριστήσουμε για το χρόνο, που μας δίνετε.

Ο κ. Περιφερειάρχης παραμένει στη διάθεση σας και θα χαρούμε να βοηθήσουμε όπως μας χρειαστείτε.

Intervention by the Regional Government of Peloponnese

Good evening from Tripoli, from the headquarters of the Peloponnese Region

Professor Mr. Mavrakis, honorable participants

My name is Mitropoulos Panagiotis, I am a Mechanical Engineer, collaborator of the Peloponnese Regional Governor, Mr. Panagiotis Nikas. I am here to represent him.

Unfortunately, the Governor could not attend the whole proceedings of today's Forum, as he participates in continuous meetings with government officials, outside the office.

However, I and the team of the other technical collaborators have been attending since this morning and we would like to convey to you the personal and political will of the Regional Governor Mr. Nikas for the development of green energy infrastructure in the Peloponnese Region and especially that for natural gas.

A public consultation is already underway these days regarding the plan to unblock the area of Megalopolis from the burning of lignite and for the development of this area for the future.

The Regional Governor also takes daily actions so that in the coming years the Peloponnese will have a complete natural gas network, taking advantage of the pipelines that already cross our territory, the territory here of the Region. This is something that we believe will benefit both private consumers and the business development of this region.

With this short greeting we would like to thank you for the time you gave us. Mr. Regional Governor remains at your disposal and we will be happy to help when you need us.

Ομιλία του κ. Αθανάσιου ΝΑΣΙΑΚΟΠΟΥΛΟΥ

Πρόεδρος Περιφερειακής Ένωσης Δήμων (ΠΕΔ) Θεσσαλίας

Καλησπέρα σε όλους τους παρευρισκόμενους στην τηλεδιάσκεψη, η οποία θεωρείται πάρα πολύ σημαντική για θέματα που απασχολούν το σύνολο της χώρας.

Ως πρόεδρος της ΠΕΔ και Δήμαρχος Κιλελέρ σας ομιλώ από το γνωστό Κιλελέρ, την έδρα του Δήμου μας και θα ήθελα να συγχαρώ τους διοργανωτές αυτής της τηλεδιάσκεψης.

Θέλω να σας ενημερώσω ότι η Θεσσαλία, μέσω της συνεργασίας βέβαια μεταξύ Περιφέρειας και ΠΕΔ, βρίσκεται σε ένα πολύ καλό δρόμο. Πάρα πολλές ενέργειες γίνονται και για τη λειτουργία του αερίου και αρκετές ενέργειες στοχεύουν προς την πράσινη ανάπτυξη.

Αλλά θα ήθελα να σας θέσω δύο τρία θέματα, για να μην αναφερόμαστε μόνο τα θετικά , δύο τρία θέματα που βρίσκονται στο αρχικό στάδιο.

Και ξεκινάω με ένα παράδειγμα που ξέρω ακριβώς τα νούμερα. Ο Δήμος Κιλελέρ έχει εννιακόσιες εξήντα χιλιάδες (960.000) στρέμματα από τα οποία τα εξακόσια πενήντα χιλιάδες (650.000) είναι καλλιεργήσιμα. Φανταστείτε πόσα είναι τα υπολείμματα των αγροτικών προϊόντων τα οποία προέρχονται από την καλλιέργεια αυτών των 650.000 στρεμμάτων . Αυτά τα υπολείμματα μέχρι σήμερα δυστυχώς δεν αξιοποιούνται. Έχουμε κάνει ήδη μια καταγραφή αυτής της δυναμικής σε συνεργασία με το Κέντρο Ανανεώσιμων Πηγών & Εξοικονόμησης Ενέργειας (ΚΑΠΕ) και βρισκόμαστε στο στάδιο της δημιουργίας μιας ολοκληρωμένης μελέτης, ψάχνοντας παράλληλα να βρούμε συνεργάτη για να δημιουργήσουμε μονάδα βιοαέριου με αγροτικά υπολείμματα.

Αυτό θέλουμε να ξεκινήσει κάποια στιγμή. Αυτά που σας είπα αφορούν στο Δήμο Κιλελέρ. Η Περιφερειακή Ενότητα Δήμων, που τυχαίνει να είμαι Πρόεδρος αποτελείται από 25 δήμους. Από τους 25 οι 15 είναι καθαρά γεωργικοί όπως το Κιλελέρ. Με ένα πρόχειρο υπολογισμό καταλαβαίνετε τη δυναμική που μπορεί να αναπτυχθεί σε αυτόν τον τομέα.

Ένα άλλο θέμα, για το οποίο έχουμε ραντεβού με τον Γενικό Γραμματέα στις 15 του μηνός, είναι η πραγματοποίηση ειδικής σύσκεψη με θέμα την αποκομιδή των κενών συσκευασιών των φυτοφαρμάκων. Δεν μπορείτε να διανοηθείτε πόσα φυτοφάρμακα χρησιμοποιούν οι αγρότες σε αυτή την περιοχή με τα καλλιεργούμενα στρέμματα που σας προανέφερα. Για τις κενές φιάλες φυτοπροστατευτικών προϊόντων δυστυχώς δεν υφίσταται ο κατάλληλος νόμος για να γίνεται η συγκέντρωση και η αποκομιδή. Τώρα προσπαθεί η κυβέρνηση, και προσπαθούμε από κοινού και εμείς (Περιφέρεια Θεσσαλίας και ΠΕΔ), να δώσουμε μια λύση, πιο ευέλικτη και να μην διασκορπίζονται οι κενές φιάλες στο περιβάλλον. Καταλαβαίνετε τη μόλυνση που δημιουργείται και τη ρύπανση που δημιουργούν αυτού του είδους οι συσκευασίες . Αυτά που σας ανέφερα είναι σε αρχικό στάδιο, αλλά και στα δύο όπως σας είπα προσπαθούμε να δώσουμε άμεση λύση.

Να σας ενημερώσω ότι γίνεται αντικατάσταση με λαμπτήρες LED στο σύνολο της Περιφέρειας, αλλά και χρήση κάδων ανακύκλωσης. Ένα άλλο σημείο όπου η συνεργασία Περιφέρειας και ΠΕΔ είναι αρκετά προχωρημένη αφορά στα «Πράσινα Σημεία» τα οποία θα μπορέσουν να βελτιώσουν την λεγόμενη «πράσινη ανάπτυξη» στην περιοχή.

Το δίκτυο φυσικού αεριού είναι σε πολύ καλό δρόμο. Σας φέρνω παράδειγμα τα κεντρικά χωρία, τους κεντρικούς οικισμούς του Δήμου Κιλελέρ που τροφοδοτούνται με αυτό. Στόχος βέβαια είναι να επεκταθεί περαιτέρω το δίκτυο.

Οι ενέργειες για την ενεργειακή αναβάθμιση στο σύνολο των δημοτικών κτηρίων αλλά και των κτηρίων της περιφέρειας, όπως για παράδειγμα σε σχολεία και γυμναστήρια έχουν προχωρήσει σε ικανοποιητικό βαθμό.

Το πρόγραμμα που άρχισε τώρα με την τηλεμετρία θα βοηθήσει στον έλεγχο της κατανάλωσης του νερού και κατ' επέκταση στην εξοικονόμησή του.

Οι αποχετεύσεις στη Θεσσαλία είναι σε πολύ καλό δρόμο. Υπάρχουν δέκα οικισμοί, οι τελευταίοι της Γ' κατηγορίας, που και σε αυτούς αυτή τη στιγμή εκτελούνται έργα.

Ένα μεγάλο πρόβλημα που αντιμετωπίζουμε είναι η πτώση του υπόγειου υδροφόρου ορίζοντα γεγονός που μας αναγκάζει να καταναλώνουμε τρομερά μεγάλη ενέργεια για την άντληση νερού σε βαθμό που είναι ασύμφορο τις περισσότερες φορές. Προσπαθούμε με σημαντικά έργα να εμπλουτίσουμε τον υπόγειο υδροφόρο ορίζοντα με νερό από τον ποταμό Πηνειό. Βέβαια υπάρχει και το χρόνιο πρόβλημα της μερικής μεταφοράς νερού από τον Αχελώο, ζήτημα που οφείλουν να λάβουν σοβαρά υπόψη τους τόσο η κυβέρνηση όσο και τα ανώτατα δικαστήρια. Η μερική μεταφορά νερού από τον Αχελώο είναι ένα έργο πνοής για το σύνολο της Ελλάδος και όχι μόνο για τη Θεσσαλία.

Εύχομαι να πραγματοποιηθούν όλες οι ενέργειες που σχεδιάζετε και θα ήταν χαρά μας να συμμετάσχουμε στην ομάδα σας και να καταθέσουμε ανάλογες προτάσεις για τη βελτίωση τόσο της Θεσσαλίας όσο και του συνόλου της χώρας. Σας ευχαριστώ πολύ.

Σύντομο βιογραφικό

Ο Θανάσης Νασιακόπουλος γεννήθηκε το 1954 στο Δίλοφο Λάρισας. Ασχολήθηκε με τις αγροτικές καλλιέργειες για αρκετά χρόνια. Στη συνέχεια εργάστηκε ως υπάλληλος σε διάφορες επιχειρήσεις. Το 1980 ιδρύει την πρώτη δική του επιχείρηση με αντικείμενο την εμπορία γεωργικών μηχανημάτων. Το 1989 μετέφερε την έδρα της επιχείρησής του σε ιδιόκτητες πλέον εγκαταστάσεις αλλάζοντας το αντικείμενο της σε εμπορία αυτοκινήτων. Με συνεχείς επεκτάσεις, σε τακτά χρονικά διαστήματα, η επιχείρηση από το 2002 λειτουργεί με τη σημερινή της μορφή.

Παράλληλα με τις συγκεκριμένες ασχολίες δραστηριοποιούνταν με επιτυχία και με άλλες επαγγελματικές δραστηριότητες, προσφέροντας, μέσα στη δύσκολη οικονομική συγκυρία που βιώνει η χώρα, δεκάδες θέσεις εργασίας στην ευρύτερη περιοχή.

Καθ' όλη τη διάρκεια της επαγγελματικής του σταδιοδρομίας ασχολούνταν και με τα κοινά. Λόγω της ιδιαίτερης αγάπης του για το χωριό του σε συνεργασία με ομάδα φίλων ιδρύουν τον αθλητικό σύλλογο τον Αετό Διλόφου, πρότυπο της περιοχής σε σχέση με τον αριθμό των κατοίκων. Το 2004, με ιδιαίτερη προσπάθεια και σε συνεργασία με τους αθλητικούς συλλόγους των Νέων Καρυών και της Νίκαιας ιδρύεται η ΑΕΔ Νίκαιας, σύλλογος σύμβολο της Ενότητας. Ήταν αρωγός και συμπαραστάτης σε όλους τους συλλόγους της περιοχής, πολιτιστικούς, μορφωτικούς και άλλους.

Εδώ και αρκετά χρόνια με την παρότρυνση των κατοίκων της ευρύτερης περιοχής και για το λόγο ότι τα παιδιά του μπορούν να διοικούν τις επιχειρήσεις του αποφάσισε να ασχοληθεί με τα δημοτικά πράγματα. Κατάφερε σε λίγο χρονικό διάστημα να ενώσει μεγάλο μέρος των κατοίκων του Δήμου και να συγκεράσει διαφορετικές αντιλήψεις, ιδρύοντας το συνδυασμό «Νέο Κιλελέρ». Έθεσε για πρώτη φορά υποψηφιότητα στο Δήμο Κιλελέρ και εκλέχθηκε, στις εκλογές του Μαΐου 2014, ως δήμαρχος. Είναι παντρεμένος με τη Μαρία Κιάφα και έχει τρία παιδιά, τη Βάγια, το Γιώργο και την Κατερίνα.

Speech of Mr. Athanasios NASIAKOPOULOS

President of the Regional union of Thessaly, Hellas

Good evening to all the participants of this teleconference which is very important for issues that concern the whole country.

As President of PED (Regional Union of Municipalities) Thessalias and Mayor of Killerer, I welcome you from the well-known Killerer, from the headquarters of our Municipality and I would like to congratulate the organizers of this tele-conference.

I would like to inform you that Thessaly, through the cooperation between the Region and the PED is in a very good path. Many actions are done for the gas operation and several actions are done to go towards the green development.

But I would like to present you two - three issues, so that I do not mention only the positive ones, but 2-3 issues, which are essential and at an early stage.

I will present you an example, for which I know exactly the numbers. The Municipality of Killerer has nine hundred and sixty thousand (960,000) acres out of which six hundred and fifty thousand (650,000) are arable.

Imagine how much are the remnants of agricultural products coming from these 650,000 acres. Unfortunately, these remnants are currently being burned. We have already recorded this dynamic in energy with the assistance of the Center of Renewable Energy Sources & Saving (CRES) and we have a comprehensive study for which we are looking to find a partner so as to create a biogas plant with agricultural residues.

We would like this to start at some point. What I just told you is about the Municipality of Killerer. The Regional Union of Municipalities of Thessaly to which I happen to be President has 25 municipalities. Out of these 25 municipalities, the 15 are purely agricultural like Killerer. With a rough estimation you can understand where we stand for this situation.

Another very big issue that we have, and for which we have an appointment with the Secretary General on the 15th of this month, so as to organize a specific meeting, is the collection of drug packages. You cannot imagine how many drugs fall in this area with the numbers, I have just told you. Unfortunately, there is no proper law to collect the empty packaging bottles. Now the government is trying and together with us, we are trying to give a solution, more flexible so that they can be gathered and not scattered outside. You understand the contamination, created by the pollution, that this kind of packaging can create. On the other hand, a lot of actions are taken both by the Region and the PED for improvement.

These, which I mentioned to you are some issues at initial stage, but I told you that for all we try to give an immediate solution.

There is definitely replacement of light bulbs in the whole Region, and usage of recycling bins. Another point for which the Region in cooperation with us is quite advanced is the green points. The green points will be able to greatly improve the green growth in the region.

The gas network is on a very good path. I bring you for example, the central villages, the central settlements such as the Municipality of Killerer. It is on a good path since we have natural gas and the goal is to expand the network.

Actions for all buildings, those that belong to the municipality and the region, gyms, etc. aim to have the best possible insulation, so as to reach the level at which we need to be. The program, which now started for the telemetry, will reduce greatly the energy in all municipalities.

The sewers in Thessaly are on a very good stage. There are ten settlements, the last ones that belong at category C for which projects are also being currently carried out.

A big problem that we have here is the fall of the underground aquifer, which forces us to consume a lot of energy to the point that it is unprofitable most of the time. We are trying with some projects to raise the underground aquifer by recycling the water of the existing river Pineios, because of the non-completion of the Acheloos diversion. We are trying to recycle the water of Pineios, to raise the underground aquifer. The government and the courts should take seriously into consideration that it is a breath-taking project for whole Greece and not only for Thessaly.

We have recorded with the CRES the potential of the Municipalities and similar studies are conducted about the energy, which we can create with the agricultural remnants and the residuals, which can create energy.

All these in collaboration with our President of KEDE who comes from Trikala. Let all these actions be done and we would be happy to participate in your team and to have similar proposals for further improvement in Thessaly and the whole country.

Thank you very much

Short CV

Thanasis Nasiakopoulos was born in 1954 in Dilofo, Larissa. He was involved in agricultural crops for several years. He then worked as an employee in various companies. In 1980 he founded his first business in the field of marketing of agricultural machinery. In 1989, it moved its business headquarters to privately owned facilities, changing its focus to car dealerships. With continuous expansions, at regular intervals, the company since 2002 operates in its current form.

In parallel with these specific occupations, he was successful in other professional activities, offering, in the difficult economic situation that the country is experiencing, dozens of jobs in the wider region.

During his professional career, he also dealt with the public. Due to his special love for his village in collaboration with a group of friends, they founded the sports club Aetos Dilofos, a model of the area in relation to the number of inhabitants.

In 2004, with a special effort and in collaboration with the sports clubs of Nea Karya and Nikaia, AED Nikaia was founded, a club symbol of Unity. He was a helper and supporter in all the clubs in the area, cultural, educational and others.

For several years, the encouragement of the residents of the wider area and the fact that his children could run his businesses, he decided to get involved with municipal affairs. In a short time, he managed to unite a large part of the inhabitants of the Municipality and to unite different perceptions, founding the "New Killerer" combination. He ran for the first time in the Municipality of Killerer and was elected, in the elections of May 2014, as mayor. He is married to Maria Kiafa and has three children, Vagia, George and Katerina.

Conclusions

13th International Conference on "Energy and Climate Change"
7th Green Energy Investments Forum

The 7th Green Energy Investments Forum was organized in Athens (7 October 2020) by the Energy Policy and Development Centre (KEPA) under the auspices of the Black Sea Economic Cooperation Organization (BSEC).

The Forum under the title "Sustainable Recovery Plans – Outlining priorities" offered the ground to Ministers of the Greek Government, High level officials of BSEC – PERMIS and PABSEC, multilateral and commercial Banks, Ambassadors of BSEC Member States, distinguished scientists and EU experts to be informed and exchange views on a set of possible priorities in the frame of the global efforts to bring about an economic recovery that repairs the damage inflicted by the COVID – 19 crisis while putting the world on a stronger footing for the future.

KEPA has proposed five priorities that could be included in the Sustainable Recovery Plans (SRP) of the BSEC – MS, targeting to: i) Improve energy efficiency of the building sector up to the level of "Smart Zero Energy Buildings" combining "Smart Finance" procedures, ii) confront "Energy Poverty" by aggregating and transforming energy – poor consumers into prosumers with the active involvement of their municipalities including Smart Finance procedures, iii) intensifying the penetration of RES, bio-fuels, bio-gas, geothermic energy and hydrogen into national markets, iv) combine RES production and electrification of short-medium maritime routes, v) introduction of LNG in maritime and heavy road transportation.

Participants reaffirmed the commitment of their respective governments and institutions to the United Nations Sustainable Development Goal 7 – ensuring access to affordable, reliable, sustainable and modern energy for all.

It was underlined that the Energy sector was seriously affected by the current Coronavirus pandemic, causing excessive supply and low demand, and in order to adequately manage the negative impact, regional cooperation and coordination mechanisms are essential.
Investments in Green Energy are crucial for the modernization of the energy sector in a resilient dimension and for achieving SDG 7 and, more generally, for economic growth, job creation and increasing energy security.

The BSEC Member States should create an appropriate administrative and legal framework for facilitating similar investments.

Investments in Renewable Energy Sources require the development of adequate financial tools and a regulatory framework by the BSEC Member States; some of the latter expressed their readiness to extend state assistance and oversight to large investment projects, by offering state guarantees for foreign investments.

The usefulness to create the necessary legal ground for the encouragement, promotion and consumption of energy from renewable sources was also emphasized.

BSEC Member States, including those with a great potential in terms of energy supply, should focus on Energy Poverty and on how to improve the Energy Efficiency of Households and other buildings.

Research and Development of Clean Energy technologies in the BSEC Member States have to be further encouraged and, to this effect, advantage should be taken of the possibilities of communication and of sharing professional expertise, available through the BSEC Green Energy Network.

The introduction of green economy principles supports the modernization of the economies of the BSEC Member States, creating the base for sustainable development.

The participants highly appreciated the Initiative "75 UN – 75 trees UNAI SDG 7", proposed by KEPA, in its capacity as Coordinator of the BSEC - GEN and as the UN Academic Impact Hub for the 7th Sustainable Development Goal, implemented by eight (8) BSEC Member States, as a concrete contribution to the combat against the negative effects of climate change.

There is need to elaborate more projects promoting energy saving, energy efficiency and renewable energy in the BSEC Region and both the governments of BSEC Member States and the International Secretariat of the Organization should intensify their efforts to explore possibilities offered by the International Financial Institutions and by other sources ready to finance similar projects.

DAY 2: Scientific sessions

Day 2 did not take place due to the participation of KEPA at the UNAI Webinar. All sessions for Scientific papers were transferred for Day 3.

DAY 3: Brokerage event

Opening by Prof. Dimitrios MAVRAKIS

Director of KEPA, National and Kapodistrian University of Athens, Hellas

Ladies and Gentlemen,

It is with great pleasure and honour to welcome Dr. Christos Dimas, Deputy Minister of Development and Investments, in charge of Research, Innovation and Technology to the "Brokerage event" session of the 13th International Scientific Conference on Energy and Climate Change.

Dr. Christos Dimas graduated from the Law School of the National and Kapodistrian University of Athens and Queen Mary University in London. He completed his Master Degree in Comparative Politics and received his PhD in European Political Economy at the London School of Economics and Political Science (LSE).

Deputy Minister Dr. Christos Dimas has undertaken the crucial role of inspiring the scientific and research community of Greece to participate in the national efforts to overcome the pandemic crisis and contribute efficiently in the efforts to develop and implement resilient and sustainable recovery plans, in timeslot of the next three years.

Facilitation of international scientific cooperation in the frame of the EU financing instruments can be crucial in developing and disseminating innovative solutions in the perspective of the aforementioned resilient and sustainable development of economy in the coming critical years.

Here in KEPA and in my dual capacity as coordinator of the Green Energy Network of the Black Sea Economic Cooperation Organization and the global Academic Hub of the United Nations for the 7th Sustainable Development Goal we will be delighted ready to promote regionally and internationally activities relevant to Green Economy and the development of Sustainable Recovery Plans.

It is with these thoughts that I welcome him and pass the floor to him.

Mr. Deputy Minister, you have the floor.

Speech of Dr. Christos DIMAS

Deputy Minister for Research and Technology, Hellas

Short CV

Dr. Christos Dimas is a lawyer and a Member of the Hellenic Parliament, representing Nea Demokratia in the district of Korinthia. He was born on the 29th of May 1980 and graduated from Athens College. Christos obtained his LLB degrees from the Law School of the National and Kapodistrian University of Athens and from Queen Mary University of London. He completed his Masters Degree in Comparative Politics at the London School of Economics and Political Science (LSE). At the LSE, he finished his PhD in European Political Economy, as a scholar of the Alexander Onassis Public Benefit Foundation. His thesis title was «National institutional contexts and domestic discourse during proposed transformative policy change. The case of the telecoms privatization in Greece and the Republic of Ireland».

During his studies, he worked as the London correspondent of Apogevmatini newspaper and practiced journalism at the BBC.

At the age of 25, Christos taught the course «Introduction to Comparative Politics» at the LSE Government Department. He has also taught the course «Mass Media and Social Regulation» at ICON College, University of Leicester and worked as a research associate at the European Centre of Excellence «Jean Monnet». He has published many articles in Greek and international journals.

Before entering politics, he worked in the private sector as a business consultant for the Boston Consulting Group (BCG).

Since 2012, Mr Dimas serves as Member of Hellenic Parliament for Corinthia and from July 2019 he is Deputy Minister for Research and Technology.

In his spare time, he enjoys playing football and basketball and reading history books.

He is married to Nikoleta Syrengela and they have one daughter and one son.

HELLENIC REPUBLIC
MINISTRY OF
DEVELOPMENT AND INVESTMENTS

13th International Scientific Conference on Energy & Climate Change

Friday, October 9, 2020

Dr. Christos Dimas
Deputy Minister of Development and Investments

EU leadership on climate change mitigation

"The Paris Agreement is the major multilateral deal of the 21st century. But Paris is much more than the deal. Paris is also about diplomacy, geopolitics and influence. And in this context, Paris is a major win for Europe and its allies.

Miguel Arias Cañete
Former European Commissioner for Energy and Climate Action (2014-2019)

"The Green Deal is Europe's new growth strategy. A strategy where environmental, economic and social sustainability go hand-in-hand. For too long, different policies to boost sustainability had been uncoordinated or worse: at odds with each other. After working on this for quite some time now my main conclusion is that the green deal will be social or it will not happen

Frans Timmermans
Executive Vice-President on the European Green Deal

CLIMATE

The EU led the global response to climate change: 20-20-20 targets

2007

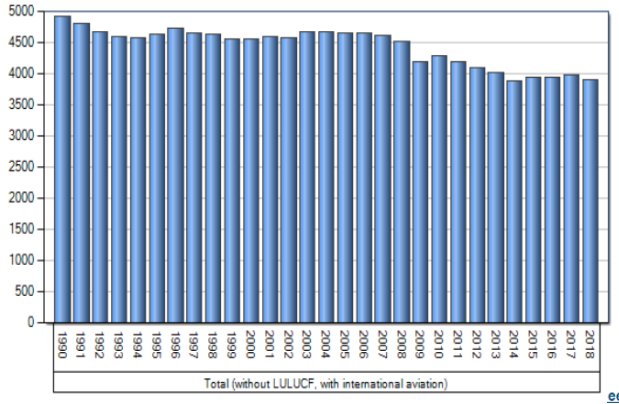
3 Key Targets

- 20% cut in greenhouse gas emissions (from 1990 levels)
- 20% of EU energy from renewables
- 20% improvement in energy efficiency

Stavros Dimas
European Commissioner for the Environment (2004-2009)

Data viewer on greenhouse gas emissions and removals, sent by countries to UNFCCC and the EU Greenhouse Gas Monitoring Mechanism

1)

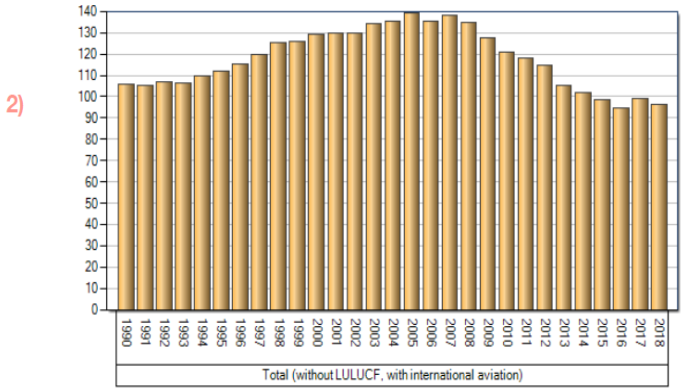


eea.europa.eu
European Environment Agency data viewer

13th International Scientific Conference on Energy and Climate Change

Greece

2)



eea.europa.eu
European Environment Agency data viewer

Dr. Christos Dimas
Deputy Minister of Development and Investments

13th International Scientific Conference on Energy and Climate Change

2 Main Priorities

- Research and development of innovative environmental actions & solutions
- 35% of the new Horizon for climate change mitigation actions

Dr. Christos Dimas
Deputy Minister of Development and Investments

13th International Scientific Conference on Energy and Climate Change

Research Centers and Environmental Action

Dr. Christos Dimas
Deputy Minister of Development and Investments

13th International Scientific Conference on Energy and Climate Change

CLIMPACT, National Network on Climate Change and its Impacts

- Flagship Initiative, coordinated by the National Observatory of Athens
  With the participation of 11 research centres and institutions
- Valid expertise & advisory body for the Greek State
  on climate change mitigation issues

CLIMPACT

Dr. Christos Dimas
Deputy Minister of Development and Investments

13th International Scientific Conference on Energy and Climate Change

ATHENA, Research & Innovation

- Development of innovative solutions and applications in a wide range of fields such as the rational use of energy, alternative forms of development, the management of natural resources & environmental risks
- Use of Digital Technologies and Computer Science

ATHENA Research & Innovation Information Technologies

Dr. Christos Dimas
Deputy Minister of Development and Investments

13th International Scientific Conference on Energy and Climate Change

National Hellenic Research Foundation

- Utilisation of food processing waste components for the development of potentially new medicines and green selective catalysis for recycling and reuse of the catalyst.

ΕΘΝΙΚΟ ΙΔΡΥΜΑ ΕΡΕΥΝΩΝ
National Hellenic Research Foundation

Dr. Christos Dimas
Deputy Minister of Development and Investments

13th International Scientific Conference on Energy and Climate Change

NCSR Demokritos, Centre for Research & Technology, Foundation for Research & Technology

- Research on Green Hydrogen

CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

ΙΤΕ ΙΔΡΥΜΑ ΤΕΧΝΟΛΟΓΙΑΣ ΚΑΙ ΕΡΕΥΝΑΣ

Dr. Christos Dimas
Deputy Minister of Development and Investments

13th International Scientific Conference on Energy and Climate Change

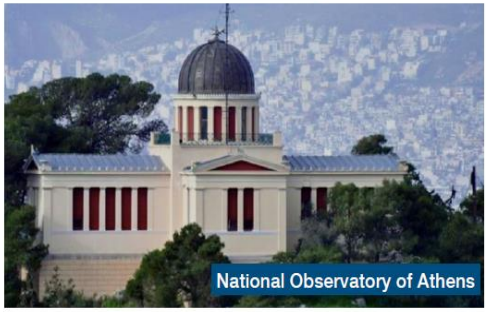
I) Agreements with the European Investment Bank

- Design and construction of new, modern and fully equipped Oceanographic vessel, "Hellenic Centre for Marine Research" (HCMR)
- Research and Environmental study in Greek territorial waters and beyond
- 55.180.000 EUR

Dr. Christos Dimas
Deputy Minister of Development and Investments

13th International Scientific Conference on Energy and Climate Change

II) Agreements with the European Investment Bank



- Establishment of a National Research Structure, Antikythera Geosciences & Climate Change Observatory- PANGEA NOA
- Reference station for monitoring climatic and geophysical background parameters

22.600.000 EUR

Dr. Christos Dimas
Deputy Minister of Development and Investments

HELLENIC REPUBLIC
MINISTRY OF
DEVELOPMENT AND INVESTMENTS

Thank you!

Christos Dimas
@ChristosDimas_
Christos Dimas
Christos_dimas_

Dr. Christos Dimas
Deputy Minister of Development and Investments

13th International Scientific Conference on Energy and Climate Change

Linking Scientific Research with Agricultural Production

- 3 Flagship Actions: creation of National Research Networks in the value chain of Honey (3.1 million EUR), Vineyard (2.5 million EUR) & Olive (1.4 million EUR).
- 1 Flagship Action in the field of Agri-food of the Region of Crete with a budget of 850,000 EUR.
- Monitoring of 185 integrated projects for Agri-food (84.7 million EUR and 1.1 million EUR total expenditure) in the Action "Research-Create-Innovate" (551 bodies).
- 7 funding applications for Innovation Clusters of Agri-Food with a budget of 1.4 million EUR
- Annual certification of R&D expenses by companies & the Agri-Food Sector. In 2017: 6 requests (total cost: 1.17 m. EUR).

Dr. Christos Dimas
Deputy Minister of Development and Investments

Missions in Horizon Europe

Ms. Vaya PITELI

MSc, Technology Transfer Consultant, PRAXI Network/FORTH, Hellas

Short CV

Ms. Vaya Piteli holds a Physics degree and M.Sc. in Art Conservation Science from Aristotle University of Thessaloniki. Since 2013, Vaya has been working at PRAXI Network / FORTH as a technology transfer consultant. Vaya deals with matters of innovation, competitiveness and internationalization of enterprises and research units and commercialization of research results as well. She also provides advisory services on research programmes. She has been appointed as National Contact Point (NCP) for Horizon 2020 Climate Action, Secure Societies and Transport and she is Enterprise Europe Network advisor. Moreover, Vaya has experience in management and technical implementation of EU-funded projects dealing with NCP networks, international cooperation and more.

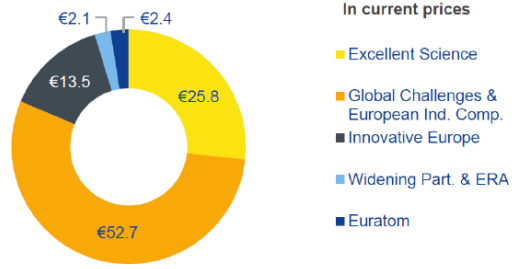
praxi
help-forward network

Missions in Horizon Europe

A Climate Resilient Europe &

100 climate-neutral cities by 2030

Commission proposal for budget: €100 billion* (2021-2027)

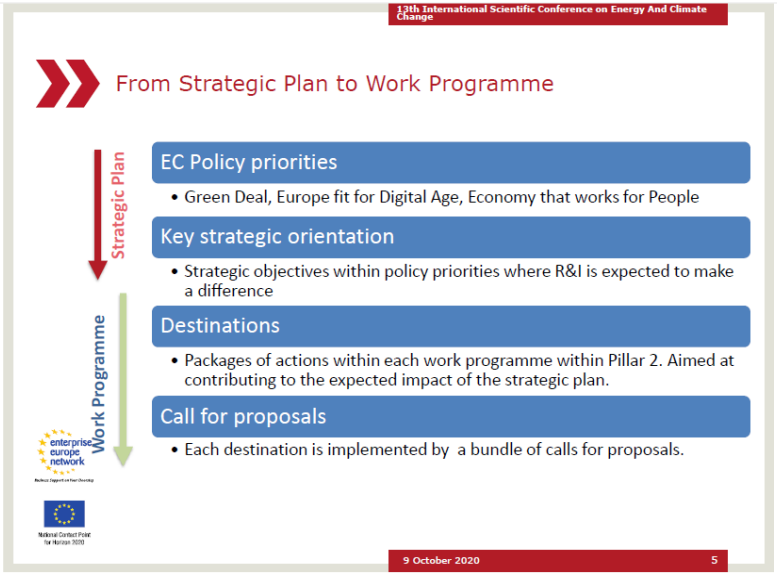


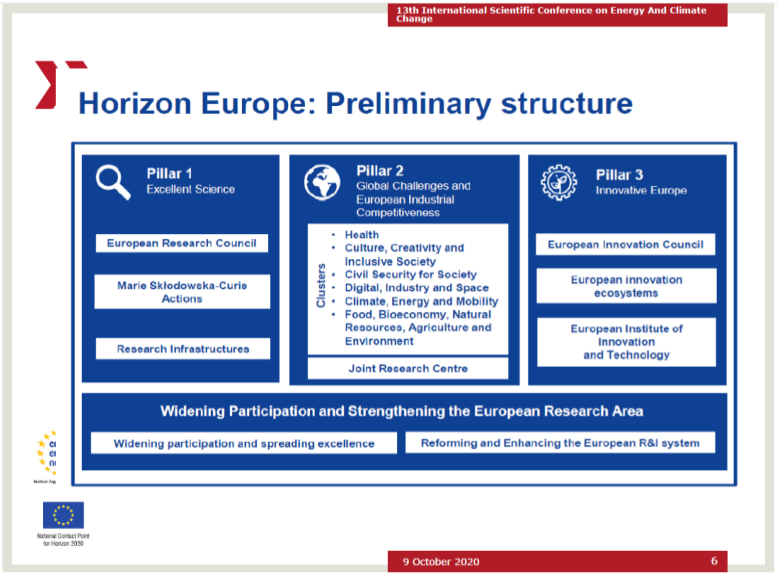
* This envelope includes EUR 3.5 billion allocated under the InvestEU Fund.

Strategic plan gives direction to the work programme

Main Features

Early involvement and extensive exchanges with Member States
Extensive exchanges with the European Parliament
Consultations with stakeholders and public at large


13th International Scientific Conference on Energy And Climate Change
From Strategic Plan to Work Programme
Strategic Plan
Work Programme
EC Policy priorities
• Green Deal, Europe fit for Digital Age, Economy that works for People
Key strategic orientation
• Strategic objectives within policy priorities where R&I is expected to make a difference
Destinations
• Packages of actions within each work programme within Pillar 2. Aimed at contributing to the expected impact of the strategic plan.
Call for proposals
• Each destination is implemented by a bundle of calls for proposals.
9 October 2020
5


13th International Scientific Conference on Energy And Climate Change
Horizon Europe: Preliminary structure
Pillar 1
Excellent Science
European Research Council
Marie Skłodowska-Curie Actions
Research Infrastructures
Pillar 2
Global Challenges and European Industrial Competitiveness
Clusters
Health
Culture, Creativity and Inclusive Society
Civil Security for Society
Digital, Industry and Space
Climate, Energy and Mobility
Food, Bioeconomy, Natural Resources, Agriculture and Environment
Joint Research Centre
Pillar 3
Innovative Europe
European Innovation Council
European innovation ecosystems
European Institute of Innovation and Technology
Widening Participation and Strengthening the European Research Area
Widening participation and spreading excellence
Reforming and Enhancing the European R&I system
9 October 2020
6


13th International Scientific Conference on Energy And Climate Change
Missions in Horizon Europe
Partly inspired by the Apollo 11 mission to put a man on the moon, European research and innovation missions aim to deliver solutions to some of the greatest challenges facing our world.
They are an integral part of the Horizon Europe framework programme beginning in 2021.
Each mission is a mandate to solve a pressing challenge in society within a certain timeframe and budget.
✓ 5 missions proposed by the mission boards
9 October 2020
7


13th International Scientific Conference on Energy And Climate Change
Adaptation to climate change, including societal transformation
Healthy oceans, seas, coastal and inland waters
Mission areas
Cancer
Climate-neutral and smart cities
Soil health and food
9 October 2020
8


13th International Scientific Conference on Energy And Climate Change
EUROPEAN RESEARCH &INNOVATION DAYS
22→24 SEPTEMBER 2020
VIRTUAL EVENT
Each mission board presented their proposals to the European Commission for possible EU missions
https://research-innovation-days.ec.europa.eu/
CEREMONY: HANDOVER OF THE EU MISSIONS FINAL REPORTS
9 October 2020
9


13th International Scientific Conference on Energy And Climate Change
Next steps
The Commission will announce its final selected missions at the end of 2020.
The missions will launch in 2021 as part of Horizon Europe.
Europeans will continue to be engaged in all phases of their implementation.
Information and Reports:
https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme/missions-horizon-europe_en
9 October 2020
10


13th International Scientific Conference on Energy And Climate Change
Policies, Strategies and Priorities
Paris Agreement
UN Sustainable Development Goal
European Green Deal
European Climate Law
more...
9 October 2020
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13th International Scientific Conference on Energy And Climate Change
A Climate Resilient Europe
Prepare Europe for climate disruptions and accelerate the transformation to a climate resilient and just Europe by 2030
EU missions – Adaptation to climate change
CHALLENGES FOR HUMANITY
9 October 2020
12

A Climate Resilient Europe

Vision

1. **Prepare Europe to deal with climate disruptions**, and assist **all citizens**, communities and regions in better understanding, preparing for and managing climate risks;
2. **Accelerate the transformation to a climate resilient future**, supporting **200 European communities and regions** in co-creating a vision, innovation pathways, and developing solutions for transformative adaptation within safe planetary boundaries;
3. **Build deep resilience by scaling up actionable solutions triggering societal transformations** through **100 deep demonstrations** of resilience across a number of European communities and regions, with emphasis on cross-border cooperation and cohesion.

A Climate Resilient Europe: Vision and objectives

A Climate Resilient Europe

Objective 1

By 2030, the Mission will

Prepare Europe to deal with climate disruptions, assisting citizens, communities and regions in better understanding, preparing for and managing climate risks such as heatwaves, forest fires, droughts, floods, storms, and diseases.

Target: By 2030, all local administrative units (LAU) and regions (NUTS) will have access to climate risk profiles and enhanced early warning systems for all relevant risks, will have adopted comprehensive climate risk management plans, and will have community infrastructure and services that are safe and operable and accessible under critical conditions

A Climate Resilient Europe

Objective 2

By 2030, the Mission will

Accelerate the transition to a climate resilient future, supporting 200 European communities and regions that reflect the diversity in climate and approaches to addressing climate risk in Europe, in co-creating a vision, innovation pathways and enabling conditions for transformative adaptation within safe planetary boundaries.

Target: By 2030, 200 European communities and regions will have developed their own transformative vision; co-created adaptation pathways; co-designed and tested actionable solutions; and created favourable conditions for societal transformations towards climate resilience.

A Climate Resilient Europe

Objective 3

By 2030, the Mission will

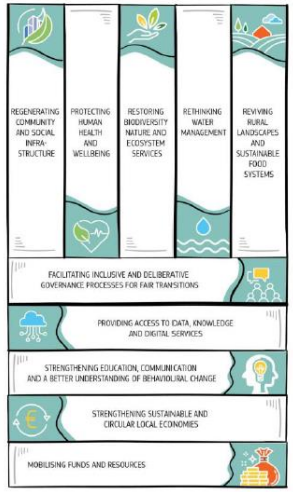
Build deep resilience, scaling up actionable solutions triggering societal transformations through 100 deep demonstrations of climate resilience across a number of European communities and regions.

Target: By 2030, 100 deep demonstrations have scaled-up actionable solutions that have triggered societal transformation, building deep climate-resilience and creating value shared across borders.

A Climate Resilient Europe

- The portfolio of the Mission

Areas of research of and innovation for transformation



A Climate Resilient Europe - Timeline

Activities from 2021 until 2030

- Co-design and preparatory phase until 2023
  - Picking the partners of the mission
  - Establishing mission governance and support structures
  - Co-designing mission
- Co-implementation phase until 2030
  - Prepare Europe to deal with climate disruptions
  - Accelerate the transition to a climate resilient future
  - Build deep resilience
- Co-evaluation phase until 2030

100 climate-neutral cities by 2030

- by and for the citizens


13th International Scientific Conference on Energy And Climate Change
100 climate-neutral cities by 2030
The aim of the mission is to:
Support, promote and showcase 100 European cities in their systemic transformation towards climate neutrality by 2030 and make these cities into experimentation and innovation hubs for all cities, thus leading on the European Green Deal and on Europe's efforts to become climate neutral by 2050.
enterprise europe network
9 October 2020
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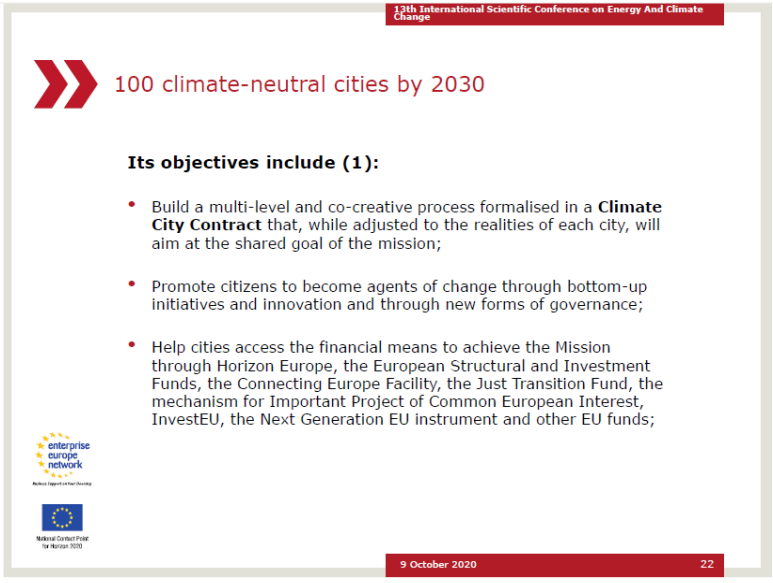
13th International Scientific Conference on Energy And Climate Change
100 climate-neutral cities by 2030
Its objectives include (1):
Build a multi-level and co-creative process formalised in a Climate City Contract that, while adjusted to the realities of each city, will aim at the shared goal of the mission;
Promote citizens to become agents of change through bottom-up initiatives and innovation and through new forms of governance;
Help cities access the financial means to achieve the Mission through Horizon Europe, the European Structural and Investment Funds, the Connecting Europe Facility, the Just Transition Fund, the mechanism for Important Project of Common European Interest, InvestEU, the Next Generation EU instrument and other EU funds;
enterprise europe network
9 October 2020
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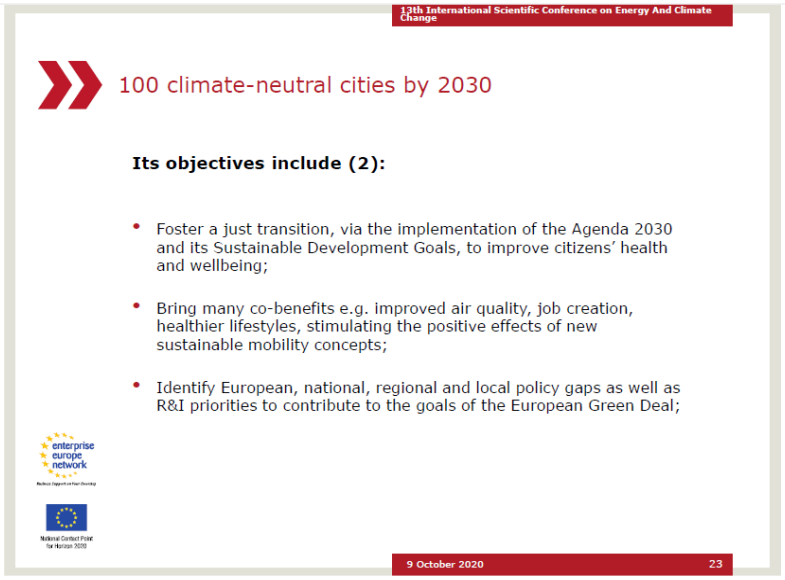
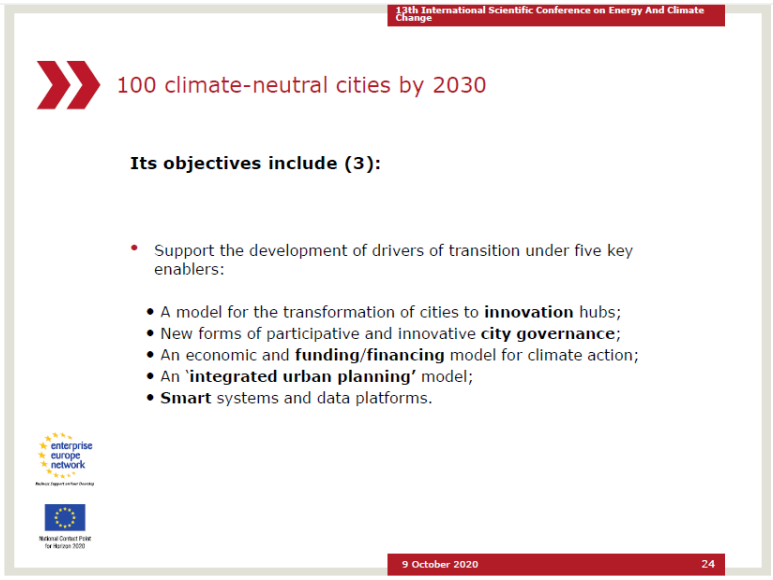

13th International Scientific Conference on Energy And Climate Change
100 climate-neutral cities by 2030
Its objectives include (2):
Foster a just transition, via the implementation of the Agenda 2030 and its Sustainable Development Goals, to improve citizens' health and wellbeing;
Bring many co-benefits e.g. improved air quality, job creation, healthier lifestyles, stimulating the positive effects of new sustainable mobility concepts;
Identify European, national, regional and local policy gaps as well as R&I priorities to contribute to the goals of the European Green Deal;
enterprise europe network
9 October 2020
23


13th International Scientific Conference on Energy And Climate Change
100 climate-neutral cities by 2030
Its objectives include (3):
Support the development of drivers of transition under five key enablers:
A model for the transformation of cities to innovation hubs;
New forms of participative and innovative city governance;
An economic and funding/financing model for climate action;
An 'integrated urban planning' model;
Smart systems and data platforms.
enterprise europe network
9 October 2020
24

100 climate-neutral cities by 2030

Its objectives include (4):

- Create synergies with and between existing European climate initiatives and stakeholders such as the Covenant of Mayors, the EIT and its relevant KICs, the Green City Accord, the European Green Capital Cities, the SET-plan and the 100 PEDs initiative, the EIP-SCC and the lighthouse projects, CIVITAS;
- Align with other missions and initiatives that support the Green Deal to ensure complementarity, in particular with the mission on *climate adaptation* and its work to adapt Europe – and its urban areas – to the actual or expected climate and its effects;
- Collaborate on innovation with the European business to enhance the competitiveness of European industry in the global markets.

100 climate-neutral cities by 2030

The Climate City Contract

To address the challenge of climate neutrality and help better deliver EU policies, the Mission proposes **a multi-level co-creation process** through the introduction of a **Climate City Contract**. The purpose is to:

a) express the ambition and commitment of all involved parties to the Mission objectives;
b) identify the policy and implementation gaps as a basis for a strategy for transition;
c) coordinate stakeholders and empower citizens in the city around a common climate goal;
d) coordinate the national/regional and EU authorities to deliver the necessary legal, governance and financial framework conditions to support each city;
e) create a one-stop-shop for multi-level negotiations to facilitate city action for transition.

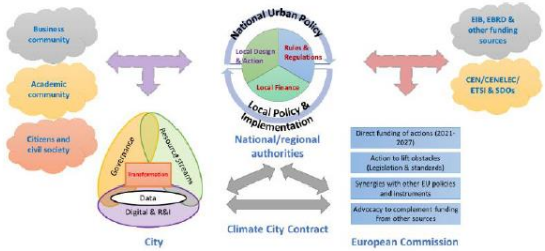
100 climate-neutral cities by 2030

The Partnerships under the Climate City Contract

The Climate City Contract will be a politically binding document that covers all the elements of the mission. Since multi-level governance is an indispensable ingredient for the mission's success, the Contract will be signed ideally by:

- the city/metropolitan government
- the European Commission
- the respective national or regional authorities

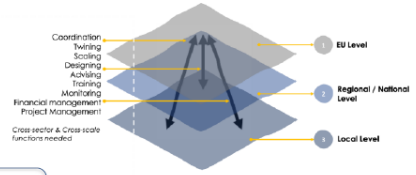
100 climate-neutral cities by 2030



100 climate-neutral cities by 2030

Towards a new city governance – by and for the citizens

The Mission proposes a systemic transformation that goes beyond the usual top-down approach. Instead, it uses a horizontal coordination of the stakeholders and citizens in a city who jointly agree on a vision, targets, interventions and synergies to share and reduce their climate impact.



Multi-governance approach for the cities mission

100 climate-neutral cities by 2030 - Timeline

Overall timeline with three phases:

- An **early delivery phase in 2020-2022** that will set the foundations of the Mission and of its facilities to help the participating cities;
- The **main phase in 2022-2030** during which the main body of cities will implement their strategy towards transformation and climate neutrality;
- The **period after 2030 and up to 2050** when the Mission will have hopefully created the momentum for a climate neutral Europe.

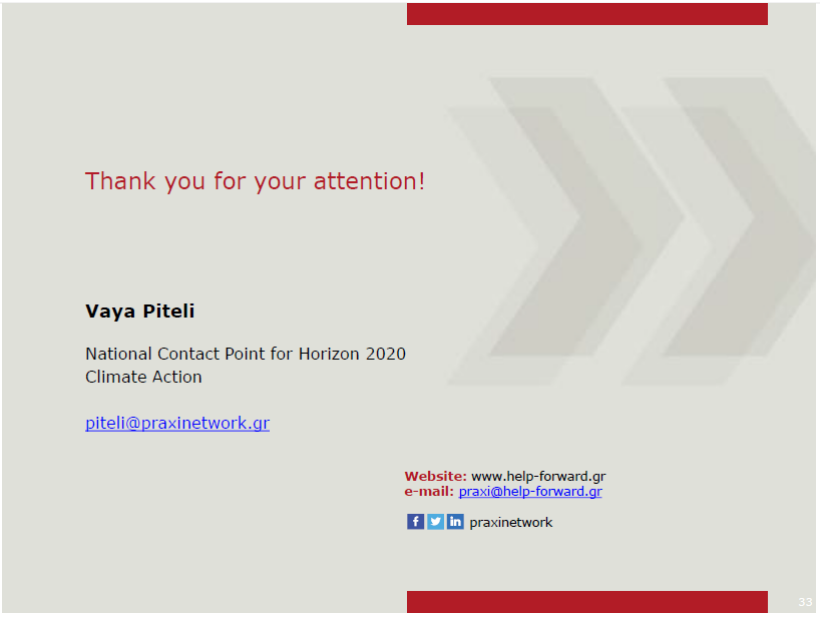
Citizen engagement

Useful links

✓ Horizon Europe – The next FP
https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme_en#documents

✓ Missions in Horizon Europe
https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme/missions-horizon-europe_en

✓ Research and Innovation Days 2020
https://research-innovation-days.ec.europa.eu/


Thank you for your attention!
Vaya Piteli
National Contact Point for Horizon 2020
Climate Action
piteli@praxinetwork.gr
Website: www.help-forward.gr
e-mail: praxi@help-forward.gr
praxinetwork
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COST – European Cooperation in Science and Technology

Prof. John G. BARTZIS

COST CSO Representative, Hellas

Short CV

Professor John G. Bartzis was born in 1947 in Almiri Korinthias, Greece. He obtained his Diploma in Mechanical and Electrical Engineering from the National Technical University of Athens, Greece (1970), his M.S. in Nuclear Engineering from the MIT, USA (1975), and his Ph.D. in Nuclear Engineering from the MIT, USA (1977).

He has worked as Research Assistant at the MIT, USA (1974-1977), Quality Engineer at the Public Power Corporation, Athens (1977-1978), Visiting Assistant Professor, at the Nuclear Engineering Department, Purdue University, USA (1979), Assistant Professor of Mechanical Engineering, at the Midwest College of Engineering (Chicago, USA) (1979-1980), Research Engineer, at the Argonne National Laboratory, USA (1979-1980) and Researcher in NCSR "Demokritos" (1980-2001).

He has also worked as a Professor, Director of Environmental Technology Laboratory of the AUTH, Head of Department of Engineering & Management of Energy Resources AUTH, Scientific Advisor of the Environmental Research Laboratory/INT-RP, NCSR "Demokritos" and Head of Department of Engineering & Management of Energy Resources, University of Western Macedonia (U.O.W.M).

He was also Elected Vice-Chairman of COST Senior Officials Committee, Chairman of the COST Strategy Issues Group, Member of JAF Committee of COST, National Representative of COST Senior Official Committee and National representative in several EU and OECD Committees in the field of Nuclear Energy.

His current employment is Professor, Director of Energy and Environment Sector and Director of Environmental Technology Laboratory UOWM. He is also Elected Vice-President of COST Senior Officials Committee and Member of the Safety Committee of Greek Research Nuclear Reactor.

His field of scientific activities includes environmental computational fluid dynamics, atmospheric dispersion with emphasis on terrains of high complexity, air dispersion of chemical/toxic substances, environmental impact of energy production in use, hydrogen technology and safety, urban air pollution, anthropogenic and biogenic emission inventories, measurements of volatile and persistent organic pollutants in the atmosphere and soil. He has participated in or coordinated numerous European Research Projects in the field of environment and radiation protection. He participates in several international scientific committees. He has authored or co-authored over 300 publications in journals, conference proceedings, books, reports, etc.


COST- European Cooperation in Science and Technology
Introduction to the COST Framework Programme
John G Bartzis
Executive Board Member
National Representantive CSO COST
13TH INTERNATIONAL SCIENTIFIC CONFERENCE ON ENERGY AND CLIMATE CHANGE, 7- 9 October 2020, Athens
cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY


Contents
SESSION I
What is COST and how to participate in a COST Action?
SESSION II
Which activities are funded?
SESSION III
How to submit an application?
SESSION IV
The Greek Experience
cost
2


Growing ideas through networks
Session I
What is COST?
cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY


What is COST (CO-operation in Science &Technology)?
Set up in 1971
Longest-running pan-European intergovernmental framework
dedicated to networking activities for European researchers across all scientific disciplines
38 (+1) COST Countries (from 19 COST Countries in 1971) and beyond
cost
4

COST – European Cooperation in Science and Technology

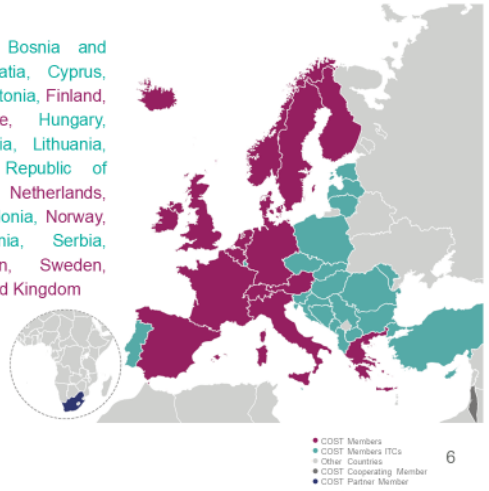
- COST **mission**: **Enabling breakthrough scientific developments** leading to new concepts and products and thereby contributing to strengthening Europe's research and innovation capacities
- **EUR 300 million budget** for 7 years drawn from two Horizon 2020 priorities:
  - Challenge 6 "Europe in a changing world - inclusive, innovative and reflective Societies"
  - "Spreading Excellence and Widening Participation"
- The **COST Association** integrates: COST governance, management and implementation functions

5

COST Member Countries

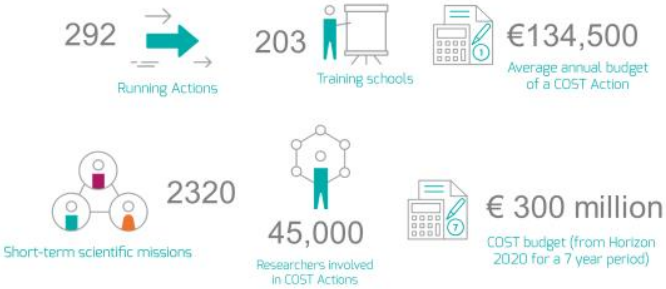
- 38 COST Members

  Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Republic of Moldova, Montenegro, The Netherlands, The Republic of North Macedonia, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, and United Kingdom
- 1 Cooperating Member
  Israel
- 1 Partner Member
  South Africa



6

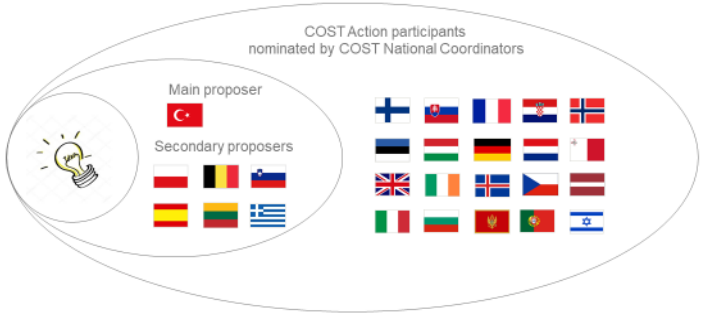
COST Actions : The COST scientific Networks Key figures of 2019



COST: The networking tool in the ERA and the pre-portal to other ERA funding schemes

7

COST Action : How it works?



8

COST Action Features

- Bottom-up approach
- Open and expandable participation

Open to all stakeholders, type of institutions, career levels, countries, at any time

- Flexible and light administration

Adaptable research and activities, light reporting

- Output and impact oriented

Open science, wide sharing of knowledge and results, open access, open innovation

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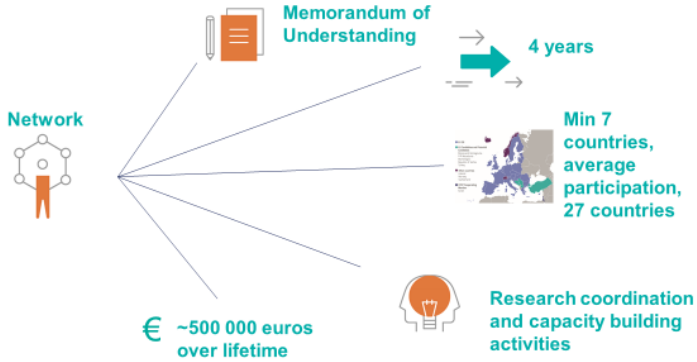
COST Actions



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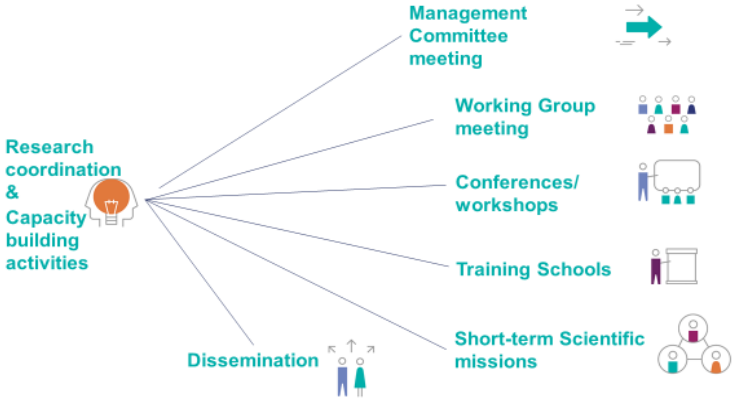
Networking tools



Financial rules: see COST Vademecum

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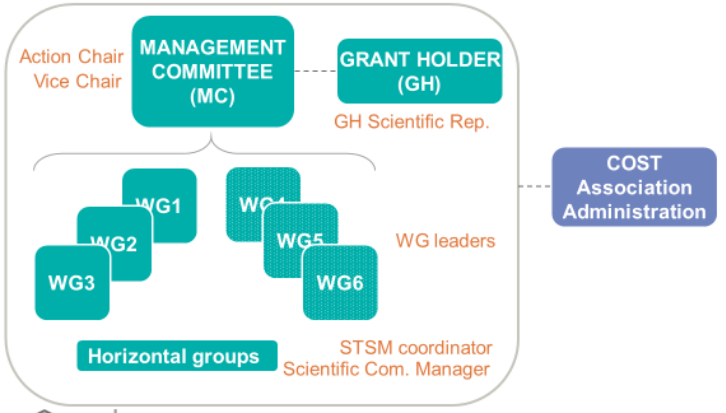
COST Action Structure

Leadership Positions



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How to engage with COST?

1. As **participant** of a running COST Action
2. As **proposer** of a COST Action
3. As **expert** to evaluate submitted proposals

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Engaging as participant of a running COST Action

- Find the Action in your field of interest on the COST website
- Read the project plan (MoU) – identify your potential contribution
- Browse the Action's own website – check their activities
- Identify the opportunities to join the Action and your contact person

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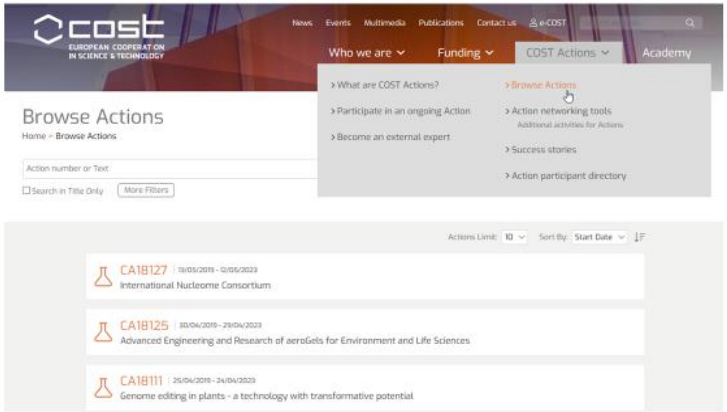
How to find the relevant COST Action?



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Join an Action as…

- As a Management Committee (MC) member (contact the COST National Coordinator)
- As a Working Group (WG) participant (contact the WG leader)
- As a participant in Action activities:
  Short Term Scientific Mission, ITC Conference grant, Training school, Workshop/Conference,…
  (Check the Action's website, contact the national MC member)

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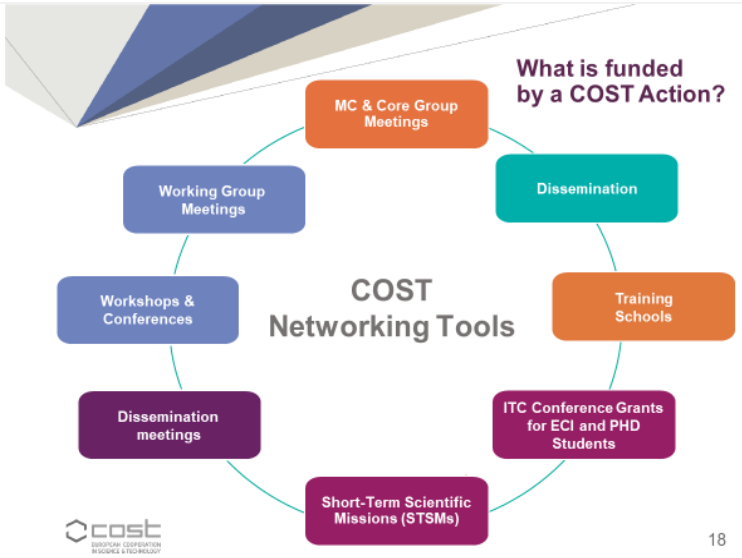
Growing
ideas
through
networks
Session II
Which activities are funded?
cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY


What is funded by a COST Action?
MC & Core Group Meetings
Working Group Meetings
Dissemination
Workshops & Conferences
COST Networking Tools
Training Schools
Dissemination meetings
ITC Conference Grants for ECI and PHD Students
Short-Term Scientific Missions (STSMs)
cost
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Growing
ideas
through
networks
Session III
How to submit an application?
cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY


COST Open Call
Open to all scientific and technological (S&T) fields (bottom-up)
Promoting scientific, technological, economic, cultural and societal innovation in Europe
Reducing the gap between scientists, policy makers and society in Europe and beyond
COST Actions aim at:
Promoting the creation, exchange and application of scientific knowledge
Being open and output oriented
Responding to COST Excellence and Inclusiveness Policy
cost
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COST Open Call

When? Collection every 9 months
Next: 29 October 2020 – 12:00 CET

What? One stage online submission of proposals
e-COST account

Who? Main proposer
(and secondary proposers)

How many? 40 – 45 Actions approved
per collection

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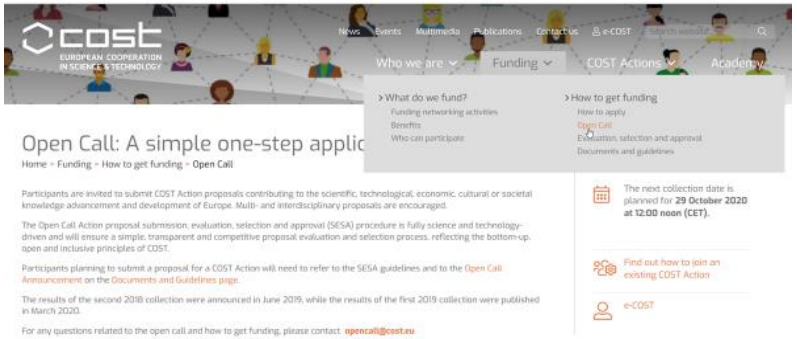
COST Open Call

https://www.cost.eu



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Open Call for proposals – how to apply

- Read the official announcement
- Read the SESA Guidelines
- Online registration and submission (e-COST)
- Technical Annex template
- Helpdesk: opencall@cost.eu

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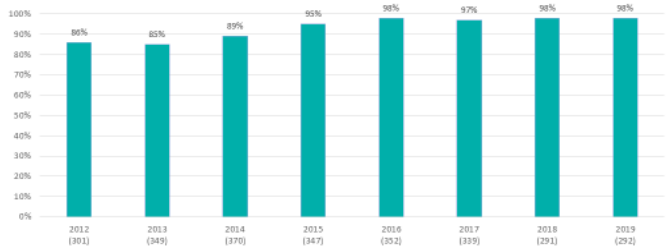
Growing ideas through networks

Session IV
The Greek Experience

Funded by the Horizon 2020 Framework Programme of the European Union

Greek national participation in running Actions % (total number of running Actions in bracket)



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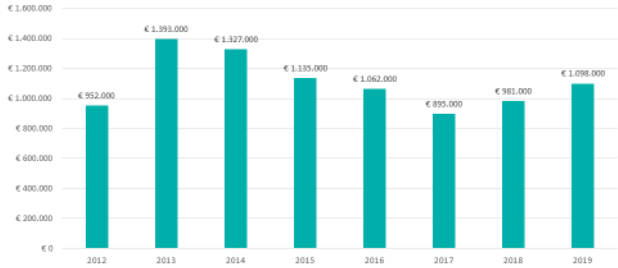
COST Actions' budget transferred to Greece



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Greek Scientists vs COST

- European Networking
- An important gate for entering EU Framework Projects
- Added value on innovative R&D
- Sharing experiences in the field of interest
- Access to new data/processes/infrastructures
- Establishing long term links with qualified research Institutions
- Improve competitiveness on national level and beyond

For specific questions contact:
COST CSO NATIONAL REPRESENTATIVES

Name	Institution	Representation	E-mail
John G. Bartzis	UOWM	National Representative	bartzis@uowm.gr
Georgia Kostopoulou	GSRT	National Coordinator	g.kostopoulou@gsrt.gr

Acknowledgement

The key material kindly provided by the COST Administration

The LIFE Programme

Mr. Nikos PSIMMENOS

Climate Change Officer at Greek LIFE Task Force, Green Fund, Hellas

Short CV

Nikos Psimmenos is an Environmentalist and holds a MSc in Energy Management Systems. He has worked as an environmental consultant in development projects for private companies and NGOs and has experience in carbon footprint calculation for products and services. He is a member of the International Sustainability Commission of the International Motorcycling Federation (FIM).

The LIFE Programme

Nikos Psimmenos
GREEN FUND
Climate change officer
Greek LIFE Task Force

13th International Conference on Energy and Climate Change

Athens, 9 October 2020

LIFE Programme

- The LIFE Programme is the EU's funding instrument for the **environment and climate action.**
  - ✓ 4500 projects in the EU, EU contribution €5.9 B,
  - ✓ 10.000 new jobs in the EU per year
- It contributes to the implementation, updating and development of EU **environmental and climate policy and legislation** by co-financing projects.

EASME
Executive Agency for Small and Medium-sized Enterprises

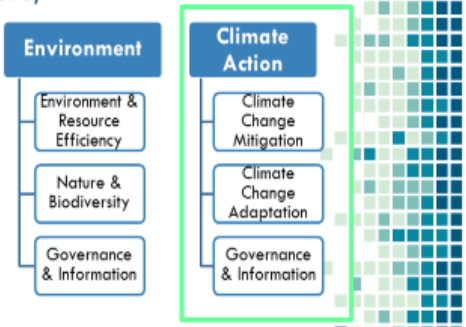
LIFE Programme: **Structure**

Total budget: 3,456.7 million € (2014-2020)

2 sub-programmes:

Environment (75%)
Nature/Biodiversity
55% (2017-2020)
60.5% (2018-2020)

Climate Action (25%)
≈ 450 million € (2014-2017)
> 413 million € (2018-2020)



Some general characteristics

- It does **not** focus on **research** (≠ H2020)
- It does **not** finance **large infrastructure** (≠ ESI Funds)
- Strong emphasis on:
  1. Long-term **sustainability**
  2. **Replicability** and **transferability**
  3. **Impact** (quantified 'impact indicators')
- **Eligible are public entities, NGOs, SMEs**
- Average number of beneficiaries per project: 4-5 (**all contribute financially**)
- Possibility to implement actions/include beneficiaries in **non-EU countries** under certain conditions
- Average eligible budget: **1,5 - 2,5 million €**
- General and specific objectives & **thematic priorities**
- **Types of projects** - pilot, demonstration, best practice, information

Climate Action in the MAWP 2018-2020

- 3 priority areas: CCM, CCA, GIC (specific objectives set out in Article 14, 15 and 16 or LIFE Regulation)
- Indicative budget:
  - Climate Change Mitigation (230,5 M€) – 35,9 M€ for 2020
  - Climate Change Adaptation (123,85 M€) – 30,2 M€ for 2020
  - Climate Governance and Information(47,6 M€) – 8M€ for 2020
- Each PA includes a number of policy areas of particular interest for the Union; these remain the same throughout the period 2019-2020
- Annual calls contain more detailed work areas

Policy Areas 2018-2020

Climate Change Mitigation
- Non-ETS sectors (including transportation)
- GHGs accounting in LULUCF
- Energy Intensive Industries (ETS)
- Land management practices with mitigation potential
- F-gases
- GHG monitoring and reporting

Climate Change Adaptation
- Urban adaptation and land planning
- Resilience of infrastructure
- Sustainable management of water in drought prone areas, Flood and Coastal management
- Resilience of Agriculture, Forestry & Tourism
- EU's Outermost regions

Climate Governance and Information
- National 2030 climate & energy strategies
- Behavioural change
- Assessment of the ETS functioning
- End-users
- Climate policy monitoring
- Best practices and awareness raising on CCA

Climate-Action 2020 Call

EU Contribution
55% of eligible budget

Award Criteria
10 'bonus' points for proposals referring to the annual work areas

Submission process
1-stage submission of full proposal
6 October 2020

EXPIRED

LIFE Programme in Greece (1992-2019)

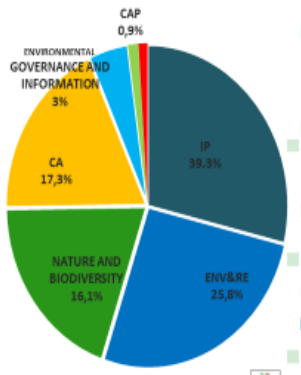
Sub-Programme	Number of projects	Percent of total	Total budget	EU contribution
ENVIRONMENT AND RESOURCE EFFICIENCY	143	55.0%	195,295,241	92,090,151
NATURE/BIODIVERSITY	75	28.8%	112,105,745	75,977,748
CLIMATE ACTION	26	10.0%	50,629,999	26,539,749
ENVIRONMENTAL GOVERNANCE AND INFORMATION	11	4.2%	11,663,921	6,347,958
INTEGRATED PROJECTS	**3**	**1.2%**	**47,123,458**	**28,093,008**
CAPACITY BUILDING	1	0.4%	1,304,708	953,600
NGO	1	0.4%	1,120,000	672,000
TOTAL	**260**	**100%**	**419,243,072**	**230,674,214**

Source: Database of LIFE projects - European Commission, interpreted by the GR LTF

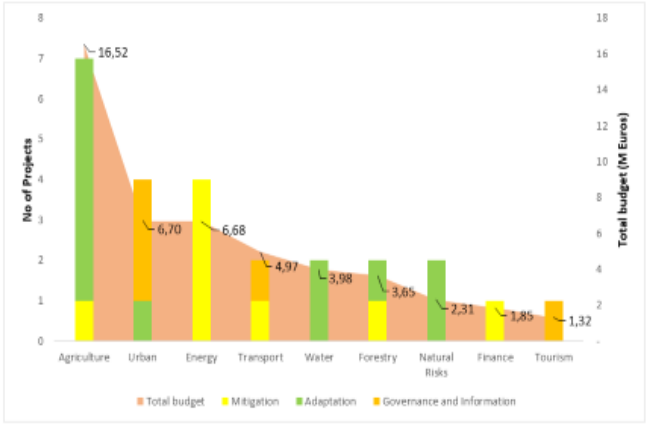
Greek Projects in progress

There are **35 projects** with Greek beneficiaries as coordinators that are **in progress** with a total budget of **€ 120.0 million,** of which the EU's contribution is € 72.6 million.

Sub-Programme	No. of projects	Total budget
IP*	3	47,123,458
ENV & RE	10	26,693,933
NAT/BIO	9	19,300,971
CA*	10	22,671,527
GIE	2	2,938,687
CAP	1	1,304,708
TOTAL	35	120,034,184



Main topics of Climate Action



The Life Programme 2021-2027

Sub-Programmes:

- ✓ Nature and Biodiversity
- ✓ Circular economy and quality of life
- ✓ Climate mitigation & adaptation
- ✓ Clean energy transition (new)

Objectives: Building policy and regulatory framework, Rolling out technology services and business models, Unlocking financial flows, Mobilizing local and regional investments, Engaging and empowering consumers.

Activities: developing and spreading best practice, mobilizing investments, removing market barriers, raising awareness, educating, empowering, improving skills

Green Fund & LIFE Programme

- Coordinator in Capacity Building Project:
  GREEK LIFE TASK FORCE (GR LTF)
- Associated Beneficiary of Integrated LIFE Projects:
  LIFE-IP 4 NATURA
  LIFE-IP CEI Greece (Circular economy)
  → **LIFE-IP AdaptInGR**
- Associated Beneficiary in traditional LIFE Projects:
  LIFE REWEEE
  → **LIFE TERRACESCAPE**
  LIFE GRECABAT
- **Provider of state co-funding** in on-going LIFE projects

LIFE-IP AdaptInGR: Boosting the implementation of adaptation policy across Greece (2019-2027)

adaptivgreece

Acronym: LIFE-IP AdaptInGR
Title: Boosting the implementation of adaptation policy across Greece
Project Ref.: LIFE17 IPC/GR/000006
Duration: **January 2019 – December 2026** (8 years)
Total Budget: **€ 14.189.548,00** (EU contribution 58,73%)

The project consortium

National Climate Change Adaptation Committee

National administration
- **Ministry of Environment & Energy (MEEN)**
- Green Fund (GRFU)
- National Center for Environment and Sustainable Development (NCESD)

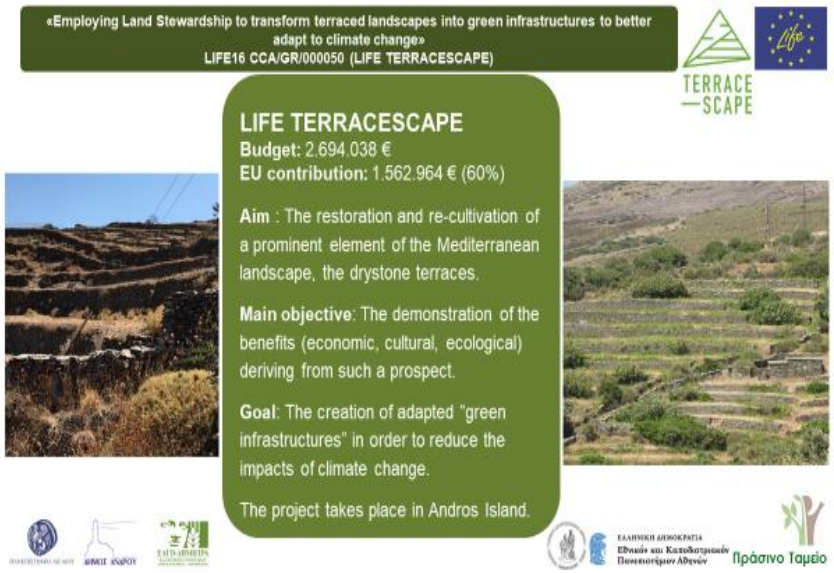
Regional administration
- **Union of Greek Regions (UGR)**
- Region of Central Greece (Sterea Ellada) (RSE)
- Region of Western Greece (RWC)
- Region of Ionian Islands (RII)

Local administration
- **Central Union of Municipalities of Greece (KEDE)**
- Municipality of Katerini
- Mun. Supply &Sewage Company of Komotini
- Municipality of Larissa
- Municipality of Agii Anargyroi – Kamatero
- Municipality of Rhodes

Academic community
- National Technical University of Athens (NTUA)
- Bank of Greece (BoG)
- Academy of Athens (AA)
- National Observatory of Athens (NOA)

Non Governmental Organisations
- ELLINIKI ETAIRIA Society for the Environment and Cultural Heritage (ELLET)
- Mariolopoulos-Kanaginis Foundation for the Environmental Sciences (MKF)

12 pilot CCA projects &
14 CCA case studies
across 7 priority sectors


«Employing Land Stewardship to transform terraced landscapes into green infrastructures to better adapt to climate change»
LIFE16 CCA/GR/000050 (LIFE TERRACESCAPE)
TERRACE SCAPE
LIFE TERRACESCAPE
Budget: 2.694.038 €
EU contribution: 1.562.964 € (60%)
Aim : The restoration and re-cultivation of a prominent element of the Mediterranean landscape, the drystone terraces.
Main objective: The demonstration of the benefits (economic, cultural, ecological) deriving from such a prospect.
Goal: The creation of adapted "green infrastructures" in order to reduce the impacts of climate change.
The project takes place in Andros Island.
Πράσινο Ταμείο


«Employing Land Stewardship to transform terraced landscapes into green infrastructures to better adapt to climate change»
LIFE16 CCA/GR/000050 (LIFE TERRACESCAPE)
TERRACE SCAPE
Project Objectives
✓ Demonstrate climate adaptation of island landscapes using practical and smart farming methods to highlight the significance of terraces as key green infrastructure elements.
✓ Establish an operational Land Stewardship scheme, developed for the first time in Greece, involving multiple stakeholders.
✓ Demonstrate the feasibility of large-scale restoration and re-cultivation of abandoned terraces in Andros.
✓ Produce climate-smart added-value products, by establishing a smart local cluster of farmers, food and tourism businesses, to contribute to the sustainability and continuation of the approach.
✓ Increase awareness of target groups and stimulate behavioral changes towards climate responsible attitudes.
Πράσινο Ταμείο


Thank you for your attention!
Greek LIFE Task Force
Site: www.lifetaskforce.gr
support.lifetaskforce.gr
E-mail: life@prasinotameio.gr
Tel: 210 5241903
Vila Kazouli , Kifissias Avenue 241
www.prasinotameio.gr

Funding opportunities - Green Fund

Ms. Konstantina AGRA

Project Manager, Green Fund, Ministry of Environment and Energy, Hellas

Short CV

Ms. Agra has a BSc in Civil Engineering from the National Technical University of Athens. Her MSc is in "Environmental Design of Buildings and Cities" from the Hellenic Open University. She has worked as Consulting Engineer and as Engineer for DENCO – Structural Engineering, the Ministry of Culture and the Ministry of Mercantile Marine, Aegean & Island Policy. She is Project manager at the Green Fund of the Ministry of Environment and Energy since 2012.


7nth Green Energy Investments Forum
Green Fund
GREECE
Public Body, supervised by the Ministry of Environment and Energy
founded in 2010
Konstantina Agra
MSc Environmental Design
of Cities and Buildings, Civil Engineer NTUA


Green Fund is
a Funding Organisation


Green Fund scope is to:
✓ enhance development through environmental protection,
✓ support the country's environmental and energy policy
✓ serve public and social interests through the management of GF resources


Green Fund Resources
• fines from environmental offences in the urban, rural & marine areas
• revenues e.g. from Special Forest Entities
• GF Resources: M.D. 4503/2012

Green Fund Resources are made available through planning and implementation of **Funding Programs** for the:

- **protection**
- **enhancement &**
- **restoration**

of the natural and urban environment

in the framework of the National Environmental Strategy priorities



Funding Programs

- are structured in
  - Priority Pilons
  - Measures
  - Actions
- define
  - the Beneficiaries
  - the Funding Amount
  - the Eligibility Criteria

in order to ensure the transparency of the procedure



2020 Budget

129,5 million €

Due to crisis - Utilization per year:

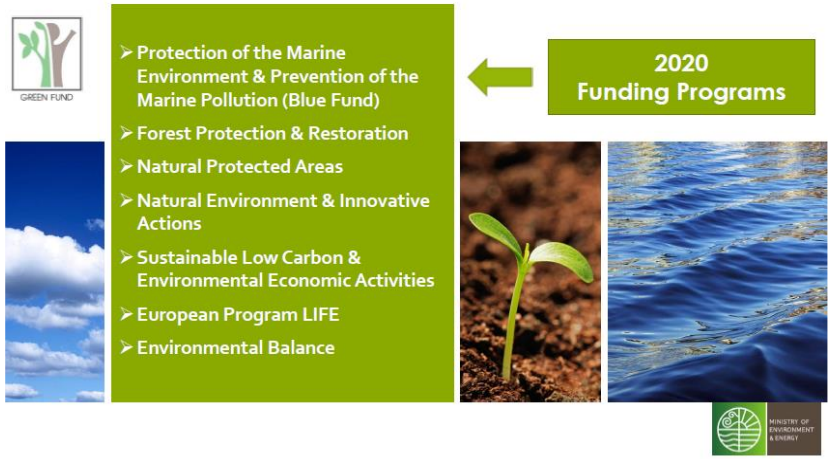
only the 2.5% of the available balance is permitted (over 3 billion)



Beneficiaries

- Ministry of Environment and Energy, supervised bodies or other Ministries
- Greek Administrative regions
- Municipalities
- Legal Entities – public sector whose their purpose is the protection, upgrade and restoration of the environment




GREEN FUND
➢ Protection of the Marine Environment & Prevention of the Marine Pollution (Blue Fund)
➢ Forest Protection & Restoration
➢ Natural Protected Areas
➢ Natural Environment & Innovative Actions
➢ Sustainable Low Carbon & Environmental Economic Activities
➢ European Program LIFE
➢ Environmental Balance
2020 Funding Programs
MINISTRY OF ENVIRONMENT & ENERGY


GREEN FUND
➢ Environmental Balance
30,27 m € (2020) (review 37,77)
Actions taken on improving Urban Environment
▪ Urban Spaces / Restoration / Renovation - Sustainable design
▪ Pedestrians routes
▪ Public outdoor playgrounds
▪ Green parks
▪ Renewable energy projects in schools - energy saving upgrades
▪ Architectural competition awards
Beneficiaries : Greek Municipalities
▪ Actions addressing to Urban & Rural abnormalities / deviations
Beneficiaries : Regional Administrations
MINISTRY OF ENVIRONMENT & ENERGY


Renovation of Urban Spaces and Playgrounds
Municipality of Chalkidas
GREEN FUND
MINISTRY OF ENVIRONMENT & ENERGY


Renovation of Urban Spaces and Playgrounds
GREEN FUND
MINISTRY OF ENVIRONMENT & ENERGY


Renovation of Urban Spaces and Playgrounds
Municipality of Pogoni
GREEN FUND
MINISTRY OF ENVIRONMENT & ENERGY


Renovation of Urban Spaces and Playgrounds
Municipality of Kissamos
GREEN FUND
MINISTRY OF ENVIRONMENT & ENERGY


School Energy Saving Upgrades and Restoration of School Yards
Municipality of Lemnos
GREEN FUND


School Energy Saving Upgrades and Restoration of School Yards
Photovoltaic &
Heating system
Municipality of Paggaio
GREEN FUND
MINISTRY OF ENVIRONMENT & ENERGY

School Energy Saving Upgrades and Restoration of School Yards

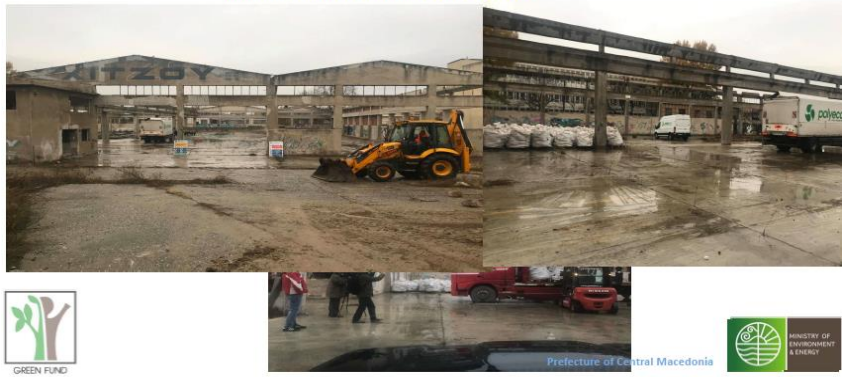
School Energy Saving Upgrades and Restoration of School Yards

Demolition of Illegal Buildings

Beneficiary: Greek Administrative regions

Environmental Hazardous Waste Management

Beneficiary: Greek Administrative regions




Environmental Hazardous Waste Management
Beneficiary: Greek Administrative regions
Prefecture of East Macedonia


LIFE 3,5 m € 2020
European Program
GF as Coordinator – Capacity Building
GF as Beneficiary for LIFE Programs
Part of National Contribution in E.U. approved projects


LIFE European Program
GREEK LIFE TASK FORCE (GR LTF) as Coordinator – Capacity Building
GF as Beneficiary for Integrated LIFE Programs:
LIFE-IP 4 NATURA
LIFE-IP Adapt In GR
LIFE-IP CEI Greece
in traditional LIFE Programs:
LIFE REWEEE
LIFE TERRACESCAPE
LIFE GRECABAT
LIFE PROWHIBIT


Thank you
Konstantina Agra
www.prasinotameio.gr
info@prasinotameio.gr
kagra@prasinotameio.gr

European Climate Initiative

Mr. Benjamin STRUSS

Head of EUKI Academy, Secretariat of the European Climate Initiative (EUKI), Germany

Short CV

Benjamin holds a master's degree in international Relations from the University of Tübingen, a master's degree in Adult Education from the University of Kaiserslautern and a diploma in Energy Economics from the Karlsruhe Institute of Technology.

He has been coordinating various research and international consultancy projects funded by the EU, German government and other international donors over the past 15 years and worked as a residential advisor on the Western Balkans and in Central Asia.

Benjamin has been part of the founding team of the European Climate Initiative (EUKI) and is currently coordinating the Capacity Development, Networking and Dissemination Activities within the EUKI Secretariat.

On behalf of: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany; European Climate Initiative EUKI

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

European Climate Initiative (EUKI)

Benjamin Struss, Head of EUKI Academy

09/10/2020

EUKI at a glance

Financing instrument by the German Federal Environment Ministry (BMU) established in 2017

Objective is to support an inner-European dialogue, exchange of good practices and creating networks of climate pioneers

Taget groups are civil society, governments, businesses, and consumers

Geographic focus is on Central, Eastern, and Southern Europe as well as the Baltic States

... creating awareness and pooling knowledge

... establishing networks and exchanging successful models

... capacity development and building a bridge for EU funding

2

Project funding + Capacity development

Funding	EUKI Academy
Call for project ideas (~90 projects)	Dissemination of results
Call for tenders (BMU, ~20 projects)	Networking
	Competence development

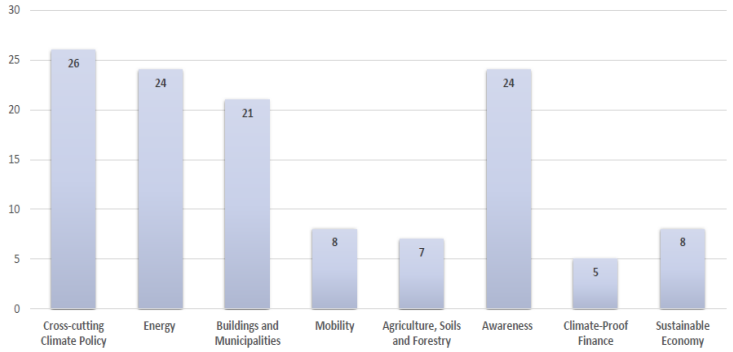
3

Outreach

- >120 ongoing projects in 26 EU Member States & 5 Western Balkan countries
- involving >240 project partners

4

Thematic areas



Funding opportunities

Application procedure

- Annual calls for project ideas (5th call to be published end of November 2020)
- 2-stage selection procedure
  - 1st stage: project outlines (submisson deadline mid-January 2021)
  - 2nd stage: full project proposal (invitation to be sent to pre-selected projects in June 2021)
- Proposal language: English

https://www.euki.de/en/selection-procedure/

Available funding

- Project volumes from 50.000 – 1.000.000 Mio. EUR
- Duration from 4 – 30 months
- Project partnerships up to 5 partners (lead + 4 implementing partners)
- Own and/or third party contribution is mandatory (no in kind contribution!)

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Eligiblity criteria

- Legal entities officially registered in an EU MS
- Institutions from candidate countries (AL, BA, KS, MK, MN, RS, TR) may participate as implementing partners
- Non-profit organisations belonging to one of the following categories:
  - Non-governmental organisations
  - National/regional/local authorities
  - Non-profit enterprises
  - Academic and educational institutions

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Eligible activities

- Capacity development
- Creation of networks
- Implementing policies and measures, developing strategies and conducting feasibility studies
- Dialogue formats, dissemination projects, education

Strong focus on implementation is expected!

10

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Topics covered

- Energy
- Buildings
- Mobility
- Agriculture, soils and forests
- Industry
- Private households
- Commerce, trade and services
- Waste

11

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Evaluation criteria

- Relevance
- Quality of project concept
- Networking an synergies
- Sustainability
- Efficiency

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Project examples

Just Transition Eastern and Southern Europe

Duration: October 2017– February 2020
Countries: Bulgaria, Germany, Greece, Poland
Implementers: WWF Bulgaria, WWF Germany, WWF Greece, WWF Poland

Objective: Developing transition strategies for the economic transformation of coal regions

Measures:
- Modelling of transition pathways as a basis for regional Just Transition strategies
- Initiating multi-level dialogues with state actors, trade unions, journalists, civil society
- Study trips to DE, BG, RO, PL
- Initiating and support to a new Forum of progressive mayors from coal regions

View from the "Turm am Schweren Berg" in Lusatia. Photo: GIZ/EUKI Benjamin Struss

South East Europe Energy Transition Dialogue

Duration: January 2018 – June 2021
Countries: Bulgaria, Croatia, Greece, Romania
Implementers: Agora Energiewende, Centre for the Study of Democracy, Energy Policy Support Group, National Observatory of Athens, Uni Zagreb

Objective: Advancing progressive thinking and action about decarbonisation and national/regional energy transition strategies in SEE

Measures:
- Building an SEE think tank network working on decarbonisation and strengthen its capacity
- Developing science-based, cost-effective, politically feasible solutions to power system transition maximizing opportunities from regional cooperation & EU-level support

Project study by Agora Energiewende

CLIMATE RECON 2050

Intra-EU Exchange to Raise Awareness and Build Capacity on Long-Term Climate Strategies

Duration: November 2017– October 2019
Countries: Czech Republic, Estonia, France, Germany, Italy, Poland
Implementers: Ecologic Institut, négaWatt, Technical University of Denmark, ENEA, Energiaklub, Fraunhofer-ISI, IDDRI, Öko-Institut, WiseEuropa

Objective: Building a policy maker platform to exchange experiences on long-term climate strategies

Measures:
- Technical dialogues with governmental representatives, modelers, researchers
- Generation and exchange of knowledge on decarbonisation scenarios development, analytical approaches and results presentation

Meeting of the technical dialogue in April 2018. Photo: Ecologic

On behalf of: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany; European Climate Initiative EUKI

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Enterprise-Level GHG Reduction Initiative, Business4Climate+

Duration: September 2018 – April 2019
Countries: Cyprus
Implementers: adelphi research gGmbH, Cyprus Employers & Industrialists Federation (OEB)

Objective: Developing tools for enterprise-level solutions to reduce GHG emissions

Group picture at a Business4Climate workshop. Photo: OEB

Measures:

- Involving non-ETS enterprises in Cyprus in climate action, with a focus on financing energy efficiency projects
- Committing enterprises to reduce GHG emissions by at least 8 percent
- Identifying financing models most suitable for Cyprus, based on European experiences, and make an online tool available for use by interested enterprises

On behalf of: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany; European Climate Initiative EUKI

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Thank you!

Benjamin Struss
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www.giz.de

European Climate Research Alliance

Prof. Peter BRAESICKE

Chair of ECRA Executive Committee

Karlsruhe Institute of Technology, Germany

Short CV

His main scientific interest is in the area of interactions and feedbacks between atmospheric composition and climate. While at the University of Cambridge, he contributed significantly to the development and exploitation of the UM UKCA chemistry-climate model. At KIT, he joined the ICON-ART community and together with his section, they delivered critical contributions to the ICON-ART development and use. Questions regarding climate change and the development of their protective ozone layer are key motivators for his work and answers require the combination of observations and simulations. In addition, he has a keen interest in some fundamental IT questions, e.g. data compression.

He is scientific coordinator of the Helmholtz-Climate-Initiative Regional Climate Change (REKLIM, https://www.reklim.de/en) and chair of the European Climate Research Alliance (ECRA, http://www.ecra-climate.eu/). For the KIT he is contributing to an initiative that aims at creating a national research data infrastructure for Earth system sciences (NFDI4Earth, https://www.nfdi4earth.de/).

He is teaching courses in "Theoretical Meteorology" and "Climatology" and supervising students and young researcher for their Bachelor-, Master- and PhD-theses in meteorology.

ECRA

European Climate Research Alliance

Energy Policy and Development Centre – Scientific Session

Presentation by Prof. Peter Braesicke, Chair of ECRA

9th October 2020

Online, from Eggenstein-Leopoldshafen, Germany

ECRA

Who I am

Introducing myself

KIT Karlsruhe Institute of Technology

https://www.imk-asf.kit.edu/english/staff_1638.php

- Diploma in Meteorology (TU/FU Berlin)
- PhD in Meteorology (Research campaigns in Sweden)
- PostDoc in Cambridge/UK
- Senior Research Associate
- Professor in Karlsruhe (KIT)
  - Theoretical atmospheric physics
  - Section head modelling / acting head IMK-ASF
  - Scientific coordinator REKLIM: https://www.reklim.de/
  - ECRA Chair: http://www.ecra-climate.eu/
  - Co-Coordinator: Helmholtz RF E&E DataHub

https://www.helmholtz.de/en/research/earth_and_environment/initiatives/

National Centre for Atmospheric Science

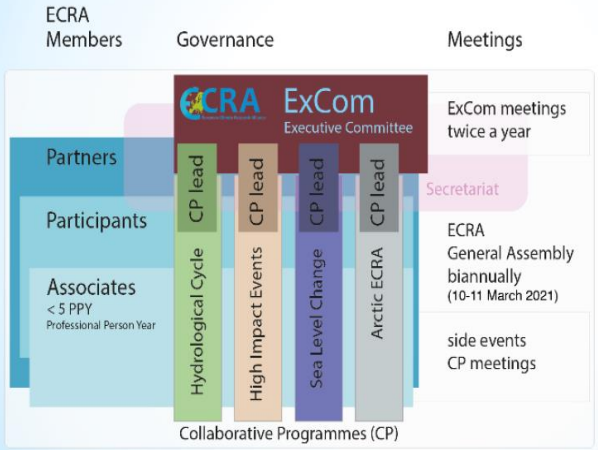
Ozone research

2 19th October 2020 Peter Braesicke – Stratospheric Ozone and Climate IMK-ASF, Division IV

slide 2 | 9th Oct 2020

ECRA

Who we are



We are

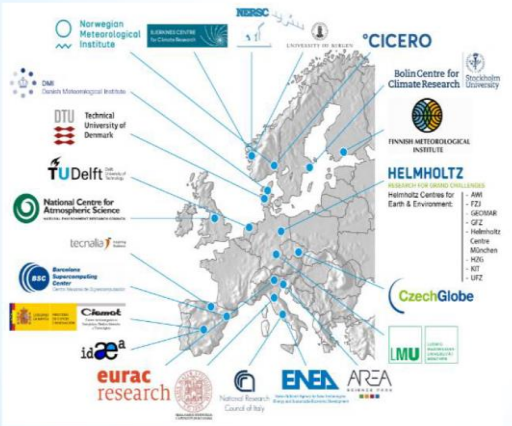
- A bottom-up
- Network of
- Research performing organizations

slide 2 | 9th Oct 2020

Graphic from Hoke, W. et al.: The European Climate Research Alliance (ECRA): Collaboration from bottom-up, Adv. Geosci., 46, 1-10, https://doi.org/10.5194/adgeo-46-1-2019, 2019.

ECRA

Where we are



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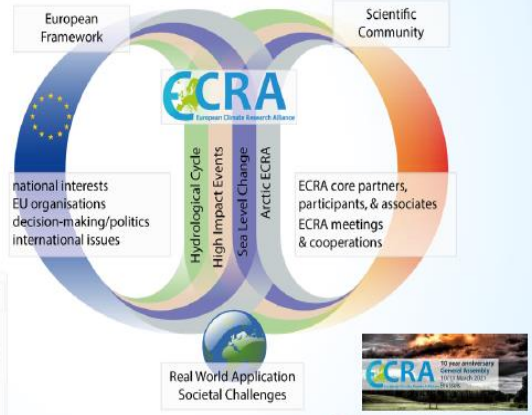
What we are

ECRA is structured by Collaborative Programs

- Arctic (Polar) ECRA
- Sea Level Change
- High Impact Events
- Hydrological Cycle



slide 2 | 9th Oct 2020

Graphic from Hoke, W. et al.: The European Climate Research Alliance (ECRA): Collaboration from bottom-up, Adv. Geosci., 46, 1-10, https://doi.org/10.5194/adgeo-46-1-2019, 2019.

Thematic perspective

- Shaped through Partners, Participants and Associates (Who)
- Shaped through the structure of ECRA – currently four CPs and the ExCom / Secretariat (What)
- Pillar 1: Infrastructures
- Pillar 2a: Global Challenges and
- Pillar 2b: European Industrial Competitiveness
- Pillar 3: Curiosity Driven Blue Skies Research

https://en.wikipedia.org/wiki/Athenian_Treasury

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Infrastructures

- Multidisciplinary Observatories (MOs) linking Atmosphere, Ocean, Land and Ecosystems in Climate Hot Spots
  - Mediterranean Region
  - Mountain Regions
  - Coastal Regions
  - Tropical/Polar Regions
  - Many more ...
- Remote Sensing from Space („limb sounding gap")
  - Also a kind of observatory ...
  - Spatial coverage in conjunction to comprehensive local MOs
- Simulation Environments (models and data on HPC)

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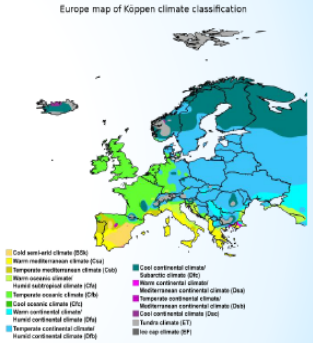
Global Challenges

- Climate(1) , Energy(2) and Mobility(3) - monitoring, process understanding, (regional) projections and how changes in 2 and 3 benefit 1
- Food, Bioeconomy, Natural Resources, Agriculture and Environment - in a changing climate
- Health - in a changing climate, including AQ and handling of extreme events



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Competitiveness

- Digital, Industry and Space - for climate change
  - Monitoring (see infrastructures)
  - Simulations (see infrastructures)
  - Merging Data and Models
  - Prerequisite: HPC and storage
    - Data specialists
    - Software as infrastructure

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Blue Skies

Earth System Science Data Science (ESS DS)

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Outreach and Societal Relevance

- H2020 Proposal ASTERISKS
  - Lead by FMI
  - Focus on AI for climate srevices
  - Outreach component via ECRA
- Outreach by partners
  - E.g. REKLIM in Germany (Helmholtz)

https://www.reklim.de/en/knowledge-transfer/information-products/reklim-anniversary-magazin/

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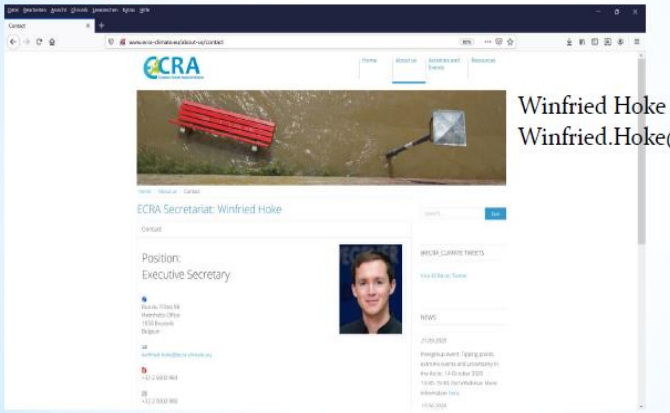
Contact



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10 year anniversary
General Assembly
10/11 March 2021
Brussels
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Towards a Modular Energy Systems Framework for Neural Energy Islands

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Abstract

Decentralization of electricity generation can trigger the integration of renewable energy sources and battery systems to increase security of supply, reduce energy imports and decarbonize the energy future. Despite their obvious benefits for the energy system as a whole, the grid integration of Variable and intermittent Renewable Energy Sources (VRES) presents major challenges in matching their non-deterministic output to electricity demand (Srivatchan, N. S. & Partha R., 2015; Ardeshna N., Chowdhury B., 2008). On the other hand, to fully realize the vision of affordable distributed solutions in the distribution grid, novel business models are required.

In response to these challenges we propose an innovative district level energy management framework for areas where the presence of high shares of distributed renewable energy sources and battery systems mandates for fine grained optimization. More specifically, through combining battery energy storage systems, demand response, electric vehicle charging optimization, and other flexibility sources at the local level, the proposed solution can offer a cost-efficient pathway for local energy system optimization in the presence of high volumes of variable and intermittent renewable energy sources. In addition, we present novel business models, allowing local energy communities to participate in local flexibility markets while paving the way for the realization of novel microgrid-as-a-service models, assigning the local energy communities the role of "aggregator of aggregators" for the provision of added value services to the wider transmission and distribution system.

Keywords: Energy systems, renewable energy systems.

1. An integrated modular local energy management framework for the holistic operational optimization of local energy systems

At first, the details of the innovative energy management framework which brings together a wide range of mature and proven technologies and integrates them in a holistic and interoperable framework are presented with the focus on the different operational layers considered for the whole solution. As the focus of the paper is at the specific functionalities as presented in the abstract, the analysis remains at a conceptual level as depicted in Figure 1.

The different components comprising the integrated solution are briefly described below (following a bottom-up approach and starting from the different physical assets). In the field layer, the different Distributed Energy Resources (DER) connectors are defined and further segmented to the different categories as considered for the proposed framework:

- The **Building Connector**, which includes the provision of a building gateway that will be installed in order for achieving data acquisition of devices' operation monitoring, indoor environmental conditions monitoring, devices and total building consumption monitoring towards the management of the different smart

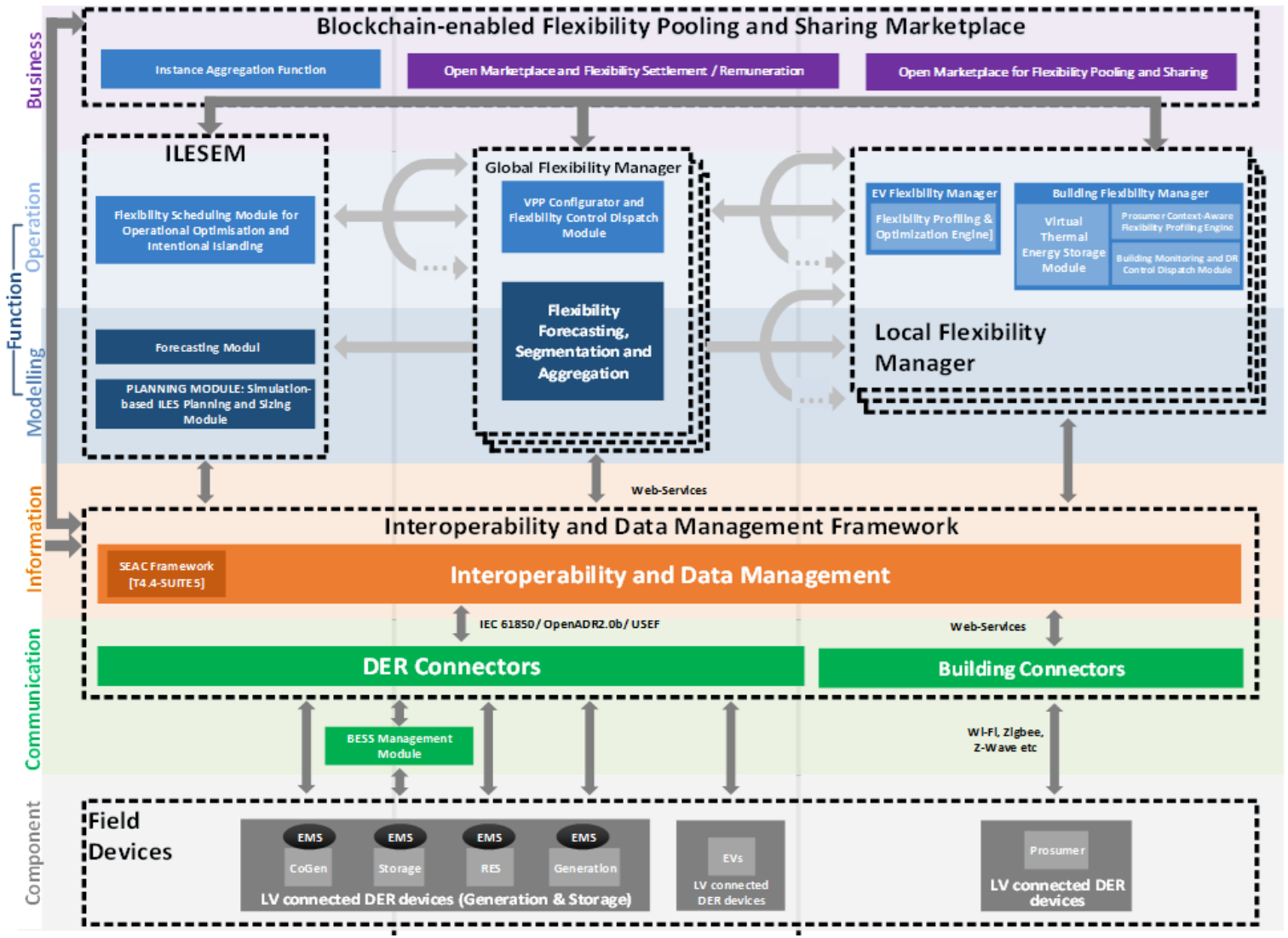

Figure 1: Logical architecture for the integrated modular local energy management framework.

appliances and propagating the necessary control actions to the corresponding devices.

- **DER Connectors** comprising Battery, Photovoltaics (PVs) and Electric Vehicles (EVs) connectors for the integration of different asset types. For PVs and Batteries, an inverter-based integration is considered with focus on SunSpec (SunSpec Alliance, 2015) protocol integration as the dominant protocol in the field. The most common standard for EV Charging points monitoring and control is the open charge point protocol 2.0 focusing on metering and smart charging processes as defined in the Open Charge Point Protocol (OCPP) (OCPP Alliance, 2018) specifications.

At the operation layer we have an **interoperability and data management framework** that comprise a message-oriented-middleware infrastructure which facilitates the information exchange between different components with heterogeneous interfaces and communication protocols. Its architecture enables loose coupling of heterogeneous components and interfaces for increased interoperability and scalability. More details about this component are presented in the following section.

At the business layer, addressing the needs of the different actors, there are different components considered. At first the **Local Flexibility Managers** responsible for quantification of flexibility from sources at prosumer level. Considering the device typology, we have: (a) the Building Flexibility Manager, which acts as the central node for the deployment of human-centric automated Demand Response (DR) strategies through personalized flexibility-based controls of DER devices. The module continuously monitors the evolution of each DR event at the prosumer level, to identify overrides or failures and will revise the initially defined strategies in an optimal way. (b) The EV Flexibility Manager to provide individual EV flexibility profiles based on mobility and driving preferences of the drivers. The profiles are based on EV characteristics (e.g. charge rate) combined with consumer driving needs (e.g. distance to be covered, plug and unplug time, state-of-charge) thereby enabling participation in Grid to Vehicle (G2V) and Vehicle to Grid (V2G) programs.

The **Global Flexibility Manager(s)** which formulate dynamic Virtual Power Plants (VPPs) and optimally dispatch and manage available resources for participating in demand response programs. These modules dispatch appropriate fully automated DR control signals to Local Flexibility Managers to use their flexibility while maximizing the benefits for all the actors involved. At aggregation level, the module continuously monitors the evolution of each DR to identify overrides or failures and will revise the initially defined strategies in an optimal way.

Last but not least the, the **Integrated Local Energy Management System (ILESEM)** comprising: (a) an Instance Aggregation Function module to manage the full microgrid operation as an integral part of the Distribution System Operator's (DSO's) control systems. (b) a forecasting module to provide the baseline loading conditions at the Point of Common Coupling (PCC) between microgrid and the upstream distribution network (c) a planning module which defines the schedule of each flexible resource within the Integrated Local Energy Management System (ILES) at district level (such as a storage system and/or an aggregator as a single point of DER flexibility). To do so, it takes into account environmental parameters and islanding requirement probabilities based on planned or unplanned events.

At the market layer, a **blockchain-enabled flexibility marketplace** for settlement and remuneration in an energy community is provided. The focus is on the contractual process among aggregators and prosumers and the specifications are delivered in line with the most recent regulation in the field. Details about the functionalities of this component are presented in the following sections.

The different layers of the proposed energy management framework were presented above. While there are many functionalities provided by the different components, the focus of the paper is on the details of the horizontal components, namely the interoperability and data management framework and the marketplace.

2. A semantically enhanced interoperability and data management framework

The scope of this section is to provide the details for the proposed Interoperability and Data Management Platform to act as the message-oriented-middleware infrastructure of the project, to facilitate the information exchange between all components of the integrated system enabling that way the open standards-based communication along the local energy system optimization value chain. In addition, the Data Management platform enables data storage and processing of big data volumes in a highly efficient and effective manner, following a Common Information Model to enforce semantic and syntactic interoperability across the system. This is a complex task and thus design of a modular microservices based solution is considered in order to ensure the full requirements coverage. The high-level architecture of the proposed Interoperability & Data Management Platform is presented in Figure 2.

Overall, the Interoperability & Data Management component is responsible for performing the collection, manipulation and storage of the energy-related data in order to be eventually available to the responsible business actors of the project. In addition, the Interoperability and Data Management is acting as the message exchange middleware for data exchange among the different system (business and asset) components. The Interoperability & Data Management component is composed of the following subcomponents:

- The **Data Ingestion Manager** which is responsible to collect data from the different DER connectors (and other data sources), in a timely and efficient manner from various data sources. Such data can be directly retrieved via Application Programming Interfaces (APIs) exposed by business entities, APIs for their application data, or third-party APIs, according to a user-defined schedule. During the data configuration process, the user of the tool (admin) is able to define the configuration parameters according to his/her requirements e.g. retrieval modes, the schedule process etc.
- The **Data Handler Manager**, which is responsible for performing the data mapping and data transformation functions over the input data from their data model and format to the unified Common Information Model. Since the data transformation is performed as a sequence process of the data ingestion, the Data Handler retrieves (via the Data Management Platform Orchestrator that is described in the following) the configuration file for each data collection task in order to proceed with the execution of the respective transformations. The transformed model data are then stored in the Data Storage & Indexing module
- The **Data Storage**, which is responsible for storing and indexing the energy related data along with their accompanying metadata. The No SQL database (NoSQL) approach has been preferred over a relational database, as it is scalable by default and thus allows optimized management of heterogeneous datasets. In addition to the permanent data storage, a data indexing engine is put into use in order to facilitate search and data retrieval. After storing the data in the NoSQL database, the Data Storage is complemented by indexing to create appropriate indexes in a search engine and enable faster data queries in a highly scalable manner.
- The **Real-time Data Messaging Pipeline** that handles real-time events at scale and allows for the exchange of real-time data between the applications in different formats. A message broker stands as the basis for the implementation where data producers publish information in a specific topic and data consumers are subscribing to the specific topics defined in order to exchange the real time information.
- The **Data Search Manager** responsible for searchability of the data stored in the platform. The end user of the tool may search for specific datasets with specific criteria following the definition of the appropriate metadata which facilitate the search process. Searching functionality is further complemented by the establishment of a role-based access control framework where specific data entities and data attributes are accessible by the end users of the platform.
- The **API-Based Data Secure Provisioning** which is the module responsible for defining the appropriate queries to facilitate data

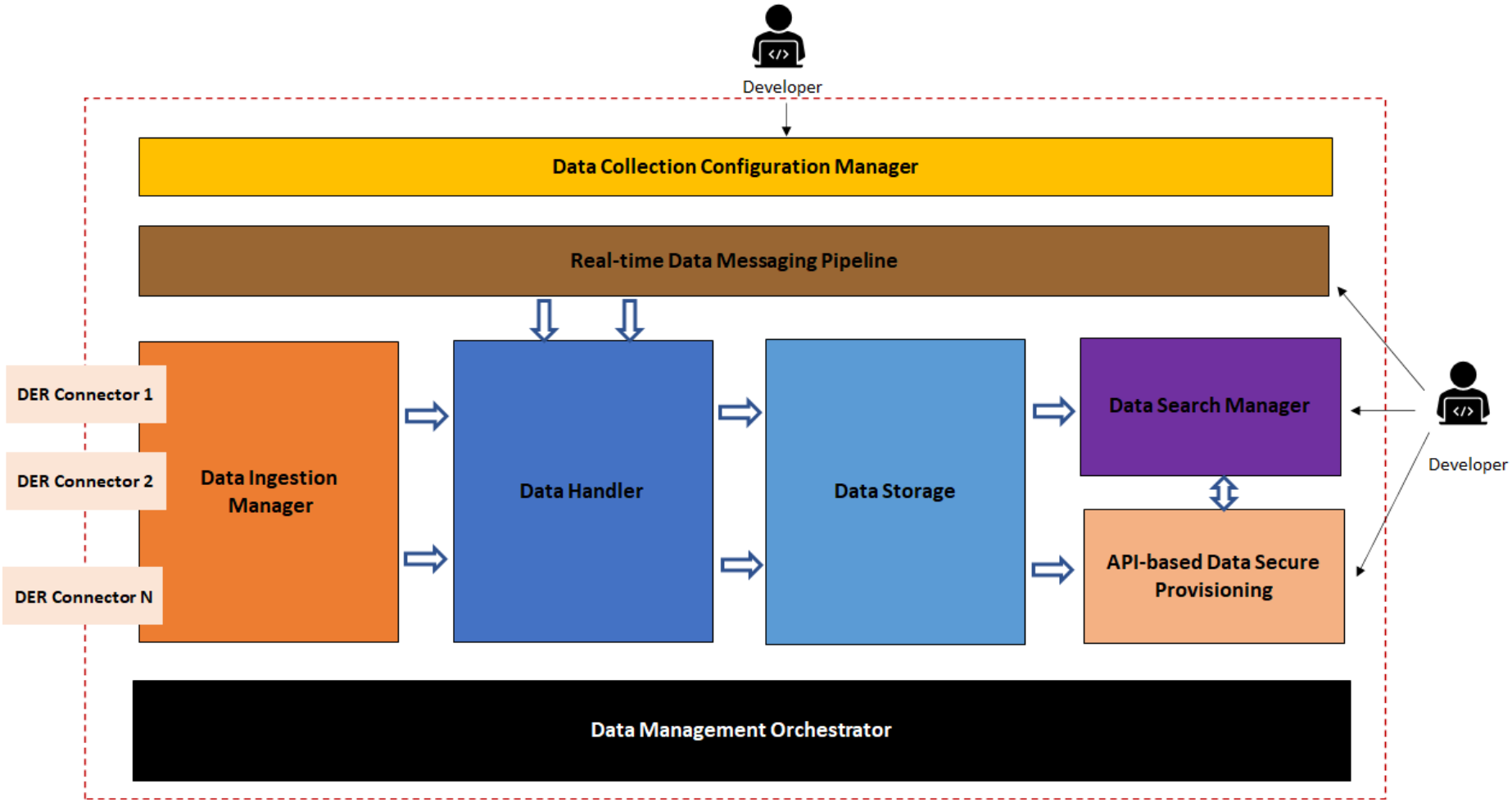

Figure 1: The Interoperability & Data Management Platform Architecture.

access and retrieval. The main innovation is that a fully dynamic query definition is supported and thus enabling a plug and play definition of APIs to facilitate development work. A development playground is also provided to facilitate the developers on the integration activities.

- The **Data Management Orchestrator,** which aims to support the orchestration and scheduling of the different tasks performed in the platform: data ingestion, data handling and data storage. In parallel, the orchestrator is responsible to ensure that the data processes are allocated with enough resources for their execution. Last but not least, the Orchestrator is tracking the operational status of each module; acting that way as a logging system for the different states of the Interoperability & Data Management Platform.

The complexity of the functionality provided by the Interoperability and Data Management mandates for the incorporation of different development tools considered for each of the different services. In brief, the different technologies are provided:

- At the storage level: MongoDB, Elasticsearch, MinIO, PostgreSQL are the different storage tools considered during the development
- At the application layer: Nest NodeJS Web Framework, Flask, Panda, Pika, NumPy as the JavaScript and Python based tools considered for the development. Also, Apache Kafka/ ZooKeeper for the real time message broker
- At the visualization layer: Vue.js is the main JavaScript framework considered for data and services presentation

Last but not least, the overall development is using Kubernetes for the Orchestration Engine, for automating deployment, scaling, and management of services for data ingestion, data handling and data storage. In addition, the Business Logic Layer focusing on task and event management based in Nest (NodeJS) web framework and implements the scheduling functionality which is facilitated through a RabbitMQ message broker. TypeORM is used for the development of the connectors with the Data Storage.

3. A blockchain – enabled flexibility marketplace

Following the definition of the data management layer, the description of the flexibility marketplace is provided to cover also the business and market part of the holistic energy management framework. The scope of this market related application is twofold: (a) to allow prosumers to publish their flexibility assets. Through the marketplace prosumers will be given the opportunity to negotiate flexibility agreements with the DER Aggregators and (b) to allow aggregators to publish standardized contract templates and negotiate them on-the-fly with individual prosumers. Through the marketplace aggregators will be given the opportunity to discover and select DERs with desired characteristics to address their flexibility requirements. On the other hand, DSOs as energy data managers are assigned with the responsibility of market arbitrage and thus are offered a Flexibility Settlement and Remuneration application to ensure the proper and fair management of all transactions performed under a contract.

The summary of the steps and processes are presented in Table 1, split in three distinctive parts, where the main actors and triggering conditions are defined (see Table 1).

As stated above, the overall definition is not delivered from scratch.; rather it relies on the work performed in the regulation. The Universal Smart Energy Framework (USEF) stands as the sound basis for the specifications of the proposed flexibility solution and thus the main design specifications are incorporated in the proposed solution.

Namely, at the contract phase the overall deployment is provided to support ***Long-term flexibility options*** where activation of flexibility in prearranged bilateral contracts. This product guarantees a certain regular availability of flexibility but the price (model) has to be arranged in advance. This method is comparable to the way in which national TSOs contract balancing services and a tender or auction procedure can be implemented to manage it, alongside long-term flexibility options subject to prearranged specific conditions; e.g. which include a maximum or fixed price for the activation of the flexibility. The indicative parameters for the contractual process are presented in Table 2.

Following the definition of the terms for the contractual process, a major step in the overall design process is the settlement and remuneration. Considering the regulation as drafted in USEF (USEF Alliance, 2020) protocol, settlement is performed on the basis of baseline vs. actual conditions to ensure that the procured flexibility was actually delivered. A penalty may be applied when there is a mismatch between the baseline and the actual profile. We assume that different parties have all the information to make these calculations and thus the DSO acting as market facilitator is responsible to present this information to the different business entities as depicted in Figure 3.

Table 1: Flexibility Marketplace steps and processes.

No.	Scenario Name	Primary Actor	Triggering Event	Pre-Condition	Post-Condition
S01	Flexibility Availability Visibility	Prosumer	Noticing Flexibility Potential to the marketplace	Flexible DERs, Local Flexibility Manager	Assets registration with the parameters about flexibility potential along with user settings for the flexible assets
S02	Contractual Negotiation & Agreement	Aggregator	Requesting for customers to provide demand flexibility	Local Flexibility Availability	Contractual Agreements among partners to be stored in the ledger
S03	Verification, Settlement & Remuneration	DSO	Performance and verification post flexibility activation	DER Flexibility Activation in flex services	Asset managers and business managers to be able to get information about flexibility activation and the associated remuneration.

Table 2: Flexibility Marketplace Contractual Parameters.

Parameters		Description
Time Related	Start Date	Start date of the contract
	End Date	End date of the contract
	ISPs and duration	The selection of days of the week and hours of the day where the contract will get activated.
Flex Related	Elements	Specific devices/portfolio subsets to be considered under each contractual agreement. Each Element should support measurement of energy and flexibility (forecast/offer/order)
	Amount	The amount of flexibility to be offered specified as a delta to the baseline
	Max number of activations	Number of DR activations
	Max runtime per activation	Max duration for each activation (in ISP numbers)
	Recovery time	Minimum time between activations
Monetary Related	Penalties for no delivery	Amount to be paid based on the utilization
	Capacity Remuneration/	Amount to be paid based on the availability
	Volume Remuneration	Amount to be paid based on the utilization

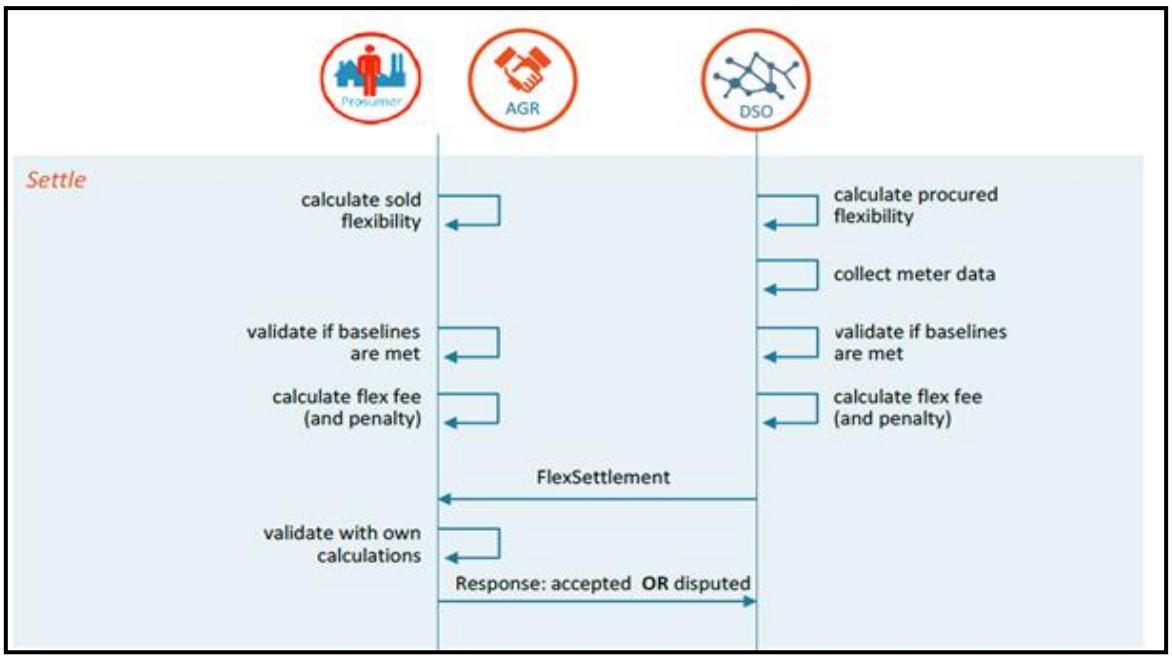

Figure 2: Settlement & Remuneration Process.

Following the regulation that apply for the marketplace, the DSO will calculate periodically the flexibility settlement volumes and prices for each entity to the steps below.

- Calculate procured flexibility. For each congestion point and market time step (ISP), both the volumes and prices of the acquired flexibility are collected.
- Validate if baselines are met. The deviation between the final forecast (taking into account all procured flexibility) and the realized profile is calculated.
- Calculate flex settlement volumes and prices. The settlement volumes and prices are calculated following contractual details definition.
- Send settlement message to the different market entities. This shows the accumulated settlement volume, accumulated deviation from the agreed baselines, and accumulated settlement price.

The market entities (prosumers, aggregators) will have access on its own information to do the same calculations: Calculate sold flexibility, validate if baselines are met and perform Plausibility check. The results are compared to the settlement message received from the DSO as the market operator.

Overall, the processes defined for the flexibility marketplace ensure full transparency and reliability of the transactions performed, ensuring that way the active participation of prosumers in new market schemas.

4. Test activities & demonstration

The overall solution and integrated optimization framework will be demonstrated and validated until 2022 in two local energy system pilot sites, located in Austria and Spain. The two pilot sites are characterized as "energy islands" in a non-geographical way, in the region of Güssing/Strem (Austria) and Alicante (Spain) showing a massive increase in RES which lead to technical issues in the electricity distribution grid, including curtailment of RES production, voltage violations, and other power quality issues.

Towards this direction, a large-scale BESS has been designed and installed at each demonstration site using bespoke planning and sizing algorithms. In addition, residential, commercial, and industrial facilities are integrated in the testbed, alongside Combined Heat Power (CHP) generators, renewable energy generation plants, and electric vehicle infrastructure on the way to tackle existing challenges and enable the extraction of valuable conclusions, policy recommendations and market reform requirements addressing diverse political, business, and demographic and cultural contexts.

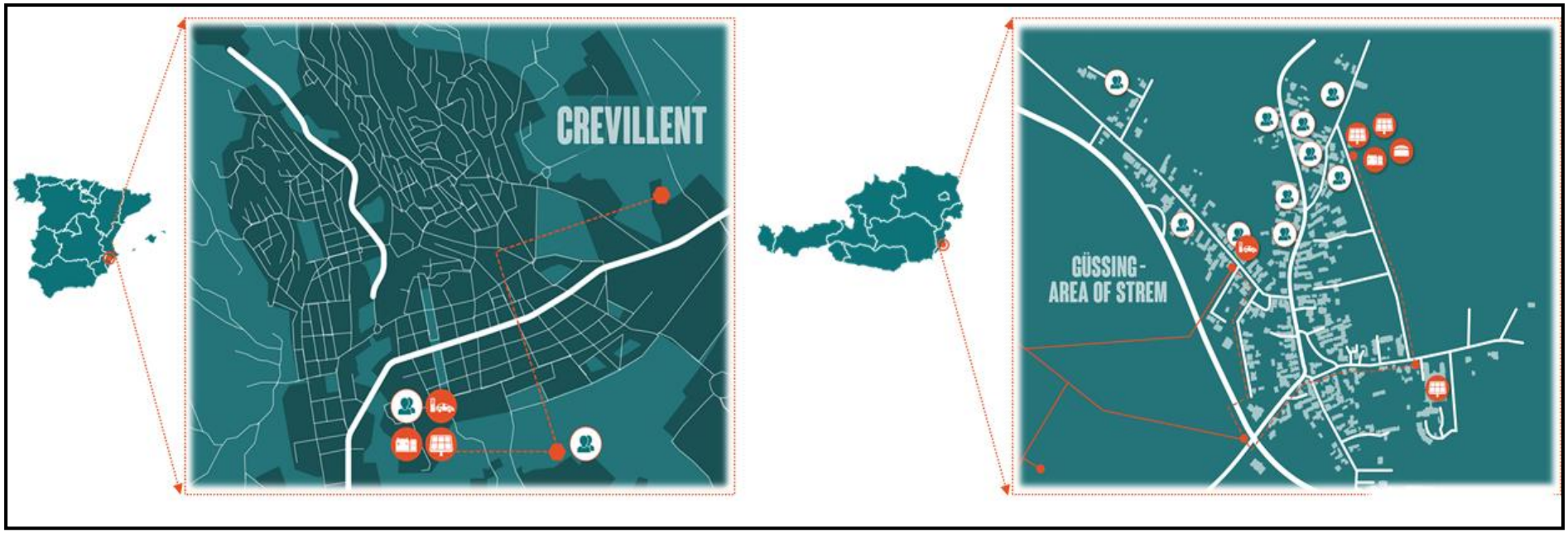

Figure 3: Pilot Areas for integrated optimization framework.

Table 3: List of DERs at demo sites (MERLON Project).

Austria		**Spain**	
Type	Characteristics	Type	Characteristics
Residential PVs	6 PVs, 70 KW	Smart Lighting	500 KW
Large Scale PVs	2 PVs, 1500 KW	Large Scale PVs	1 PV, 100 KW
Battery System	250KW, 250 KWh	Battery System	100KW, 250 KWh
EV Charging Point	2 CPs, Type 2	EV Charging Point	2 CPs, Type 2
Residential Premises	10 Smart Customers	Residential Premises	10 Smart Customers
CHP Plant	500 KW	Residential Batteries	15KWh

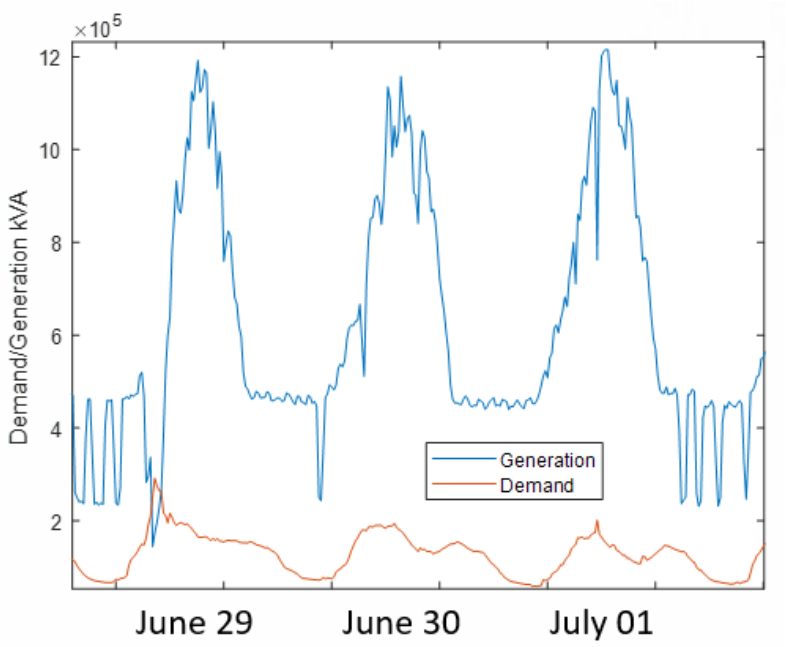

Figure 4: Typical demand and generation profile in Austria demo site.

Focusing on the integration of the different assets at the premises, these are presented in the following table, highlighting the different nominal characteristics considered for the analysis.

It is evident that a diverse list of assets has been considered for integration. Local RES, Utility Battery Systems and active demand are combined together in order to evaluate the integrated energy management framework in reality. Different demonstration scenarios have been selected for testing spanning from self-consumption optimization, local distribution congestion management, grid support in case of islanding, participation in energy markets etc… At, the current state, baseline data are considered for the analysis and the typical load profiles are extracted on the way to better implement the optimization techniques following the integration of the diverse DER types.

At the next stage, a long evaluation period will follow where different simulation scenarios will be examined following the installation of the battery system in the demo regions. In addition, a scalability analysis will take place in order to ensure the integrity of the solution in large scale penetration of different DERs in the future.

5. Conclusions

The issues arising from connecting large scale RES at low voltage levels of "energy islands", pose challenges, but also offer opportunities for new actors to influence energy markets. The proposed solution aims to facilitate the elimination of voltage and power quality issues and the reduction of RES curtailment, whilst enabling the operation of a local flexibility market which empowers consumers and cooperatives into becoming active players in the energy market. More specifically, a business and operational layer are defined and explained in this paper to open participation of currently excluded flexibility sources and promote transparent and fair distribution of the benefits achieved through flexibility sharing and utilization. Through this optimal orchestration of heterogeneous electricity assets, the proposed framework aims to significantly contribute to the short-, mid- and long-term EU and global energy policy targets, and facilitate the realization of multiple benefits spanning on: reduction of GHG emissions, decrease of electricity prices, enhanced security of supply and independence from energy imports, democratized energy markets, enabling proportional and fair sharing of benefits between all stakeholders.

Acknowledgement

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Abbreviations

API	Application Programming Interface
BESS	Battery Energy System
CHP	Combined Heat Power
DER	Distributed Energy Resources
DR	Demand Response
EU	European Union
EVs	Electric Vehicles
G2V	Grid to Vehicle
GHG	Green House Gas Emissions
ILES	Integrated Local Energy Management System
ILESEM	Integrated Local Energy Management System
ISP	Imbalance Settlement Period
NoSQL	No SQL database
OCPP	Open Charge Point Protocol
PCC	Point of Common Coupling
PV	Photovoltaic
RES	Renewable Energy Sources
T/DSO	Transmission/Distribution System Operator
USEF	Universal Smart Energy Framework
VRES	Variable Renewable Energy Sources
V2G	Vehicle to Grid
VPPs	Virtual Power Plant

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A utility-oriented framework towards an Energy -as-a-Service model transformation

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Abstract

There is clear evidence that Information and Communication Technologies (ICT) can play a critical role in enabling consumer active participation in future Internet of Grid business models - through technology assisted behavioural change. Several experiments and studies conducted around the globe, have concluded that consumer feedback (especially personalized and human-centric) supported by sophisticated ICT applications and intelligent controls can effectively alter consumer behaviour and empower them to achieve significant benefits through energy and cost savings (smartEN, 2020). Towards this direction, we present in this paper an innovative energy management framework for residential and tertiary buildings focusing on the identification of the energy-hungry behaviours for building further aiming to trigger appropriate energy-use feedback to occupants and engage them into a continuous behavioural based energy efficiency framework. The proposed energy management framework is validated in real-life conditions by a large population of residential and commercial consumers in five dispersed geographical areas and the early results are presented in this paper. In addition, the evaluation of innovative business plans is examined in this paper.

Keywords: Behavioral change, energy transformation

1. A Service oriented energy management framework

At first, the details of the innovative retailer-oriented energy change framework are presented with the focus on the quantification and revelation of energy-savvy customers on the way to convey meaningful real time energy-use feedback and engage them into a continuous process of learning and improvement. The overall behavioural based personalized energy efficiency framework is further complemented with a light-weight, human-centric, control framework so as to minimize energy waste, but fully preserving occupants comfort boundaries into indoor environmental conditions. On the way to ensure accuracy and reliability on the provision of energy management services, we adopt the Internet of Things/Services principles to set the first and backbone data layer of the proposed framework; responsible to collects all necessary information required for the analysis. Live information streams captured from low-cost off-the-shelf smart devices spanning from smart meters, sensors deployed for monitoring ambient/ hygienic conditions and smart controllers, are continuously processed and further incorporated in a semantically unified **Sensing and Data Management Layer** (UtilitEE Project – D3.1). This data management layer establishes an easy to deploy, flexible & scalable middleware layer to enable secure integration with a diverse typology of building networks and also integrate data from external sources (weather data, energy pricing data, consumer

demographics); data to be further utilized by several energy business applications.

The **Internal Core Services layer** stand as the knowledge intensive layer of the system towards the extraction of information from the raw data. Different types of applications are designed and developed following a microservices based approach. The **Context Aware Profiling** layer comprises the heart of the System and includes readings from sensing and energy measurement data to transform raw energy data into accurate, intuitive and context-aware Behavioural Profiles. These enhanced and integrated profiles incorporate all personalized and contextual (environmental, temporal) aspects of (energy related) behaviour, dynamically constructed and continuously updated based on real-time data streams from the installations available in end customers premises. The **Baseline and Energy Waste Layer** in parallel to the Context Aware Profiling layer generates objective and normalized energy baselines taking into account socio-demographic and building operational characteristics as well as energy related data to apply International Performance Measurement and Verification Protocol (IPMVP) based normalization methodologies. The definition of accurate energy baselines that incorporate building operational aspects can be further analyzed to reveal major energy related patterns (most often of habitual and unconscious nature) and allow for systematic classification of consumers into clusters of consistent behaviour as well as the formulation of norms - behavioural profile patterns that can be used as points of reference for specific user groups. Such consumer clusters stand as the basis for the automatic detection of energy waste outliers; deviations from baseline/typical operation. The extraction of normative and outlier values may be considered as useful knowledge for the definition of personalized energy efficiency guidance and recommendation. Last but not least, the **disaggregation layer** acts as a complement analytics layer to allow whole energy consumption data distinction to separate building appliances. By decomposing the energy consumption profile, it is possible to extract specific information about the use of individual appliances, information which is more useful for the customers than reporting the total electricity usage by using a single sensor for the entire zone. The energy footprint of specific devices will then enable the creation of bespoke behavioural profiles that may be considered as reference point for further analysis.

The End User Application layer stand as the business application layer of the holistic framework, setting a pool of business applications for the end users, targeting mainly the customers of the utilities but providing also energy services to the retailer stakeholders.

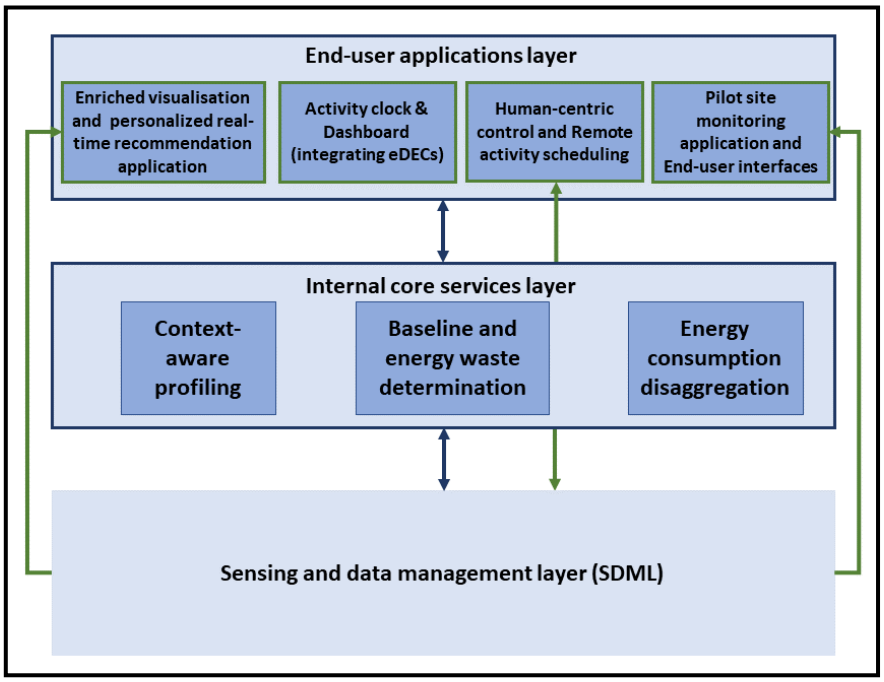

Figure 1: A retailer-oriented energy change framework.

Following the microservices concept adopted in the overall architecture, a non-exhaustive list of energy apps is delivered, fully exploiting the raw data and the knowledge extracted from the aforementioned pillars. The enriched visualization and recommendations layer is the main customers' application towards the enriched visualization of personalized information. The Systemic and **Enhanced Building Performance Rating** establishes a robust framework of energy performance indicators on various spatio-temporal levels and a macroscopic and systemic view on building energy performance. The normalization process adopted on Enhanced Display Energy Certificate (eDECs) visualization mitigates asymmetries caused by different building characteristics (envelope, insulation, window types), or climate/micro-climate conditions and occupancy, ensuring that way a fair performance benchmarking among consumers with similar behaviours and characteristics. The eDECs as the focal visualization layer constitute also the point of reference and interaction with individual consumers as part of the behavioural engagement process; by allowing energy consumers to understand their energy waste sources, compare themselves against peers and ultimately, receive appropriate, personalized and tailor-made feedback and guidance towards improving their overall energy performance.

The **Activity Clock** is a view of the system focusing mainly on residential customers to provide the user with a visual feedback on their energy consumption and overall performance (on the basis of the Systemic & Enhanced Building Performance Rating Layer and the associated Key Performance Indicators (KPIs). The association of consumption patterns with daily activities and profiles is a main feature of the application. The Activity Dashboard on the other hand is defined as the view of the system for tertiary buildings and users including peer performance views and insight about detailed energy use down to appliance level.

The human centric automation and remote-control layer incorporates two distinct services. Based on the Context-Aware Profiles, the **Human-Centric Automation** Module intelligently adjusts lights and Heating, Ventilation and Air Conditioning (HVAC) set points according to individual consumer comfort preferences and on the way to conserve energy. To further ensure compliance of control with end customer's needs, automated actions are followed by discrete notifications informing them about the alteration in lights or HVAC operation and the benefits of the corrective control actions. On the other hand, the **remote control and scheduling application** complement the recommendation process and enable consumers to remotely accept and authorize automatic, recommended energy efficiency preserving actions or operational schedules for individual appliances and equipment through intuitive user interfaces focusing on eliminating energy waste and improving energy footprint.

Along with the applications for the end customers, business applications for the retailer stakeholders are developed. The **Pilot Site Monitoring Application** offers a variety of services to the utilities addressing their needs for the continuous analysis of consumer behavioural dynamics and further the coordination of the behavioural change services through the configuration, planning and roll-out of efficient behavioural change strategies on the basis of the business models of the utilities. Related to the latter, the scope of the application is twofold: to first enable the utilities to set their parameters associated with their business domain and perspective and further to ensure that continuous impact & performance evaluation of the different strategies is performed as well as necessary re-design and corrective actions in order to meet the goals as set by the actors of the tool.

We presented above the different layers of the holistic energy management framework as an ICT application focusing on the provision of energy analytics and business applications to the retailer stakeholders. Special focus is delivered on the different business applications and services developed in the context of knowledge extracted from the raw data and in line with the business models of interest for the utilities. This is a focal point for the proposed framework as the key objective is to provide energy business applications to meet practical needs and emerging demands of the radically transforming energy utilities. Some key points of the different business applications and the linkage to the different business models is presented in the following section.

2. Behaviour driven energy business applications

Along with the presentation of the whole picture for the ICT driven energy management framework, details and insights about the usability of the key business applications is delivered in this section. The business perspective of the proposed framework is presented as a circular process, where the business needs trigger the design and functionality of the energy apps, while the results from the demonstration of the services trigger utilities to reform their traditional busines models on the way to refine new and more focused business concepts. The business-centric approach as considered for the design of the platform is presented in the following schema (UtilitEE Project – D1.2).

As an anchor point of the overall concept is the identification of new business needs from the utilities. As stated above, there is an emerging need for traditional utilities to transform their business operations and start providing new products and energy services to their customers. New service-oriented business model should build upon their baseline offering including energy use analytics and tailor-made guidance for improving energy behaviours and overall energy and cost performance. The emerging concepts of "Utility as an Energy Service Company (ESCO)" that allows utilities to balance and hedge losses from energy savings (reduced energy sales) through a novel energy efficiency services concept and "Utility as Aggregator" model which enables retailers/utilities to counterbalance losses from energy savings (less energy sold) by bidding consumer flexibility in energy markets (through accumulation/aggregation of their clientele's demand flexibility) is a starting point for the work.

More specifically, business models in the field of energy services focus mainly on the increased Energy Performance Certificate (EPC) and the associated certificates or towards the provision of comfort preserving home automation services. On the other hand, the participation in flexibility services seems more profitable for the utilities with demand side management focusing on: (a) Distribution System Operator (DSO) costs minimization by eliminating the network costs of the energy bill (b) community Virtual Power Plant (VPPs) in order to perform changes in the consumption patterns according on what market is going to be traded the aggregated flexibility through a real-time remote load control. (c) dynamic retailer pricing based on regulation forcing for dynamic pricing. (d) supply/demand imbalance management on the way to increase self-consumption at local level and thus ensure the active transformation of consumers to prosumer

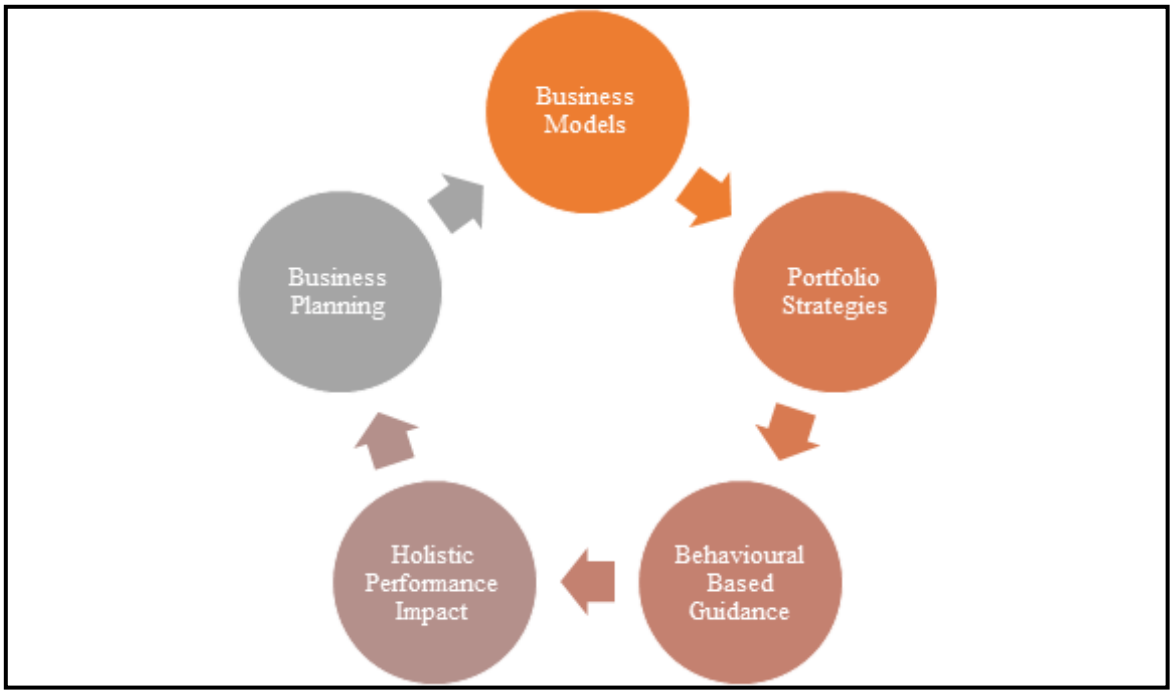

Figure 2: A business-centric approach for the energy as a service framework.

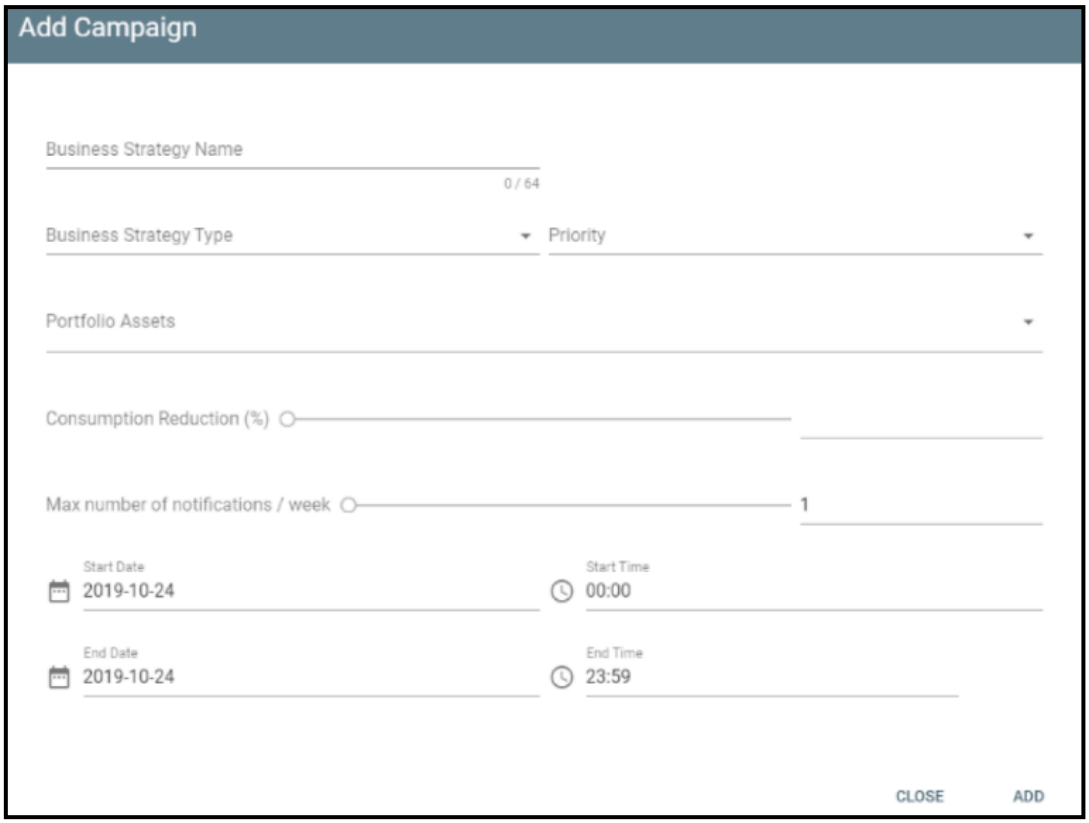

Figure 3: A business strategies settings viewpoint.

The next step of the holistic business concept is the transformation of the business needs to operational strategies. The business models as high-level objectives can be further translated into operational settings, either associated with long term demand shed strategies where the focus is on energy efficiency or short-term demand shifting strategies towards addressing the dynamic volatility on energy and ancillary services markets. By combining short term automation with long term end user's engagement, the proposed framework targets to achieve significant energy savings while enabling their participation in innovative demand response schemas. The key model parameters for the portfolio strategies are related to the start and end date of each business strategy, the time schedule, the associated location, the goal target and the severity of each busines campaign. The retailers should be able to accordingly set or modify the respective parameters required for the business context of their operation. For that reason, a dedicated view of the pilot site monitoring application is available to set dynamically the constrains of the operational framework.

By defining the respective parameters, an optimization process is performed towards allocating personalized strategies to the customers that consist of the selected portfolio. The selection is performed taking into account building energy related parameters (e.g. baseline and waste outliers) and the segmentation of their portfolio to the different clusters (norms- three different clusters are defined). Following this high-level segmentation, the appropriate triggering messages are delivered to the customers applications. The delivery of the personalized messages is following a user oriented behavioural segmentation methodology that has been adopted in the holistic framework.; a bottom up approach where the different customers are clustered to specific groups based on their inherent characteristics (e.g. interest to participate, focus on cost/energy/environmental conditions etc.…). Along with the customers classification to the different groups, additional parameters like the timeframe for the different campaigns, waste outlier's detection etc… are considered in the holistic behavioural based triggering framework (UtilitEE Project – D1.4) as depicted in the figure 3.

The guidance framework is further complemented by intuitive applications for the utility customers. Through the activity clock, the customers may get a quick but comprehensive snapshot of their daily activities, breaking down the day into activity-filled timeslots and revealing their impact on overall energy footprint using color-coding to highlight the energy hungry activities. Direct, personalized, normative and comparative feedback at individual level is available to the residential customers. On the other hand, the Activity Dashboard is defined as an extension of the Activity Clock to provide multiple analytical functions, ranging from ranking energy related parameters to drilling into specific activities at variable spatio-temporal granularity for further insights on energy-related specificities of the energy performance. Screenshots from the different views of these two applications are presented in the Figure 4.

Following the demonstration of the customer applications and the long-term deployment of the different business strategies, the impact in terms of energy savings is depicted in the final results. The business stakeholders (retailers) should be provided with tools in order to get quick insights about portfolio performance either at individual level or through groups that are linked to specific business campaigns.

By getting quick insights about customers performance, the business stakeholders can act accordingly and modify or reshape the different business models to be considered for their business (e.g. active participation of consumers in time shifting demand side management strategies is an indicator for promotion of time varying pricing schemas to their customers).

The focus in this section is to link the ICT-based energy management framework as presented in the previous section to the business context of the utilities. An in the loop approach has been considered for the analysis where the different business needs are transformed to business strategies and then to control models for the utilities and their customers. Through a trial and error process, the impact of the demonstration of the different tools can be very useful for the reconfiguration of the business planning of the utilities; very critical aspect in the deregulated and rapidly transforming energy market framework.

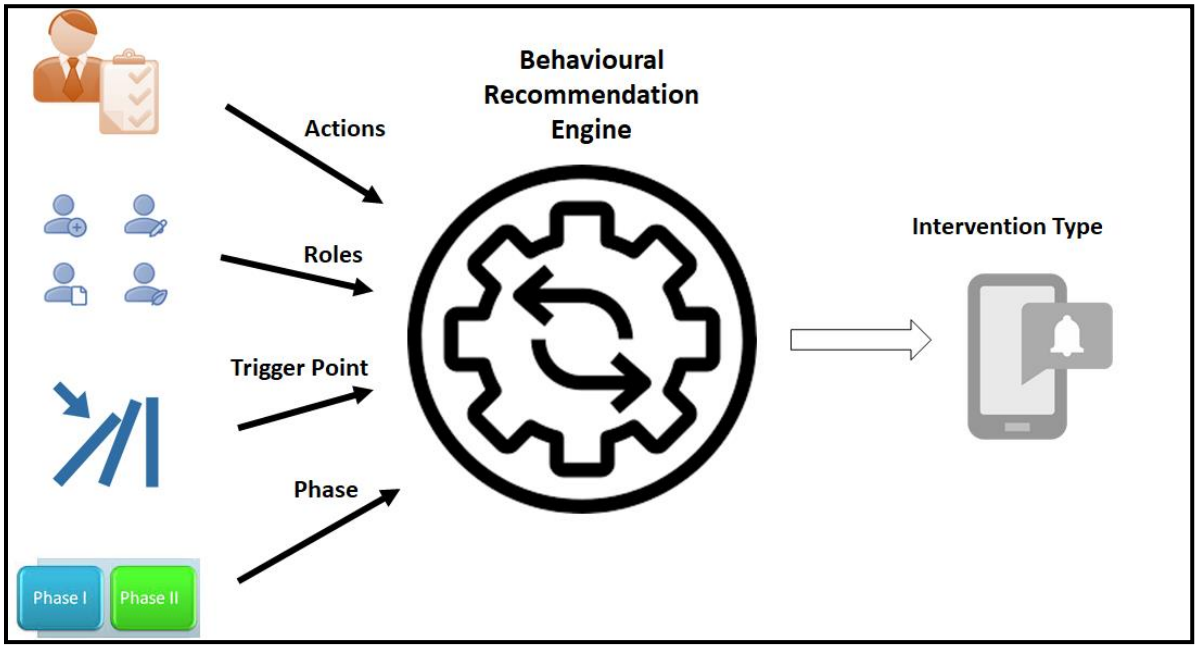

Figure 4: The behavioural based triggering framework and engine.

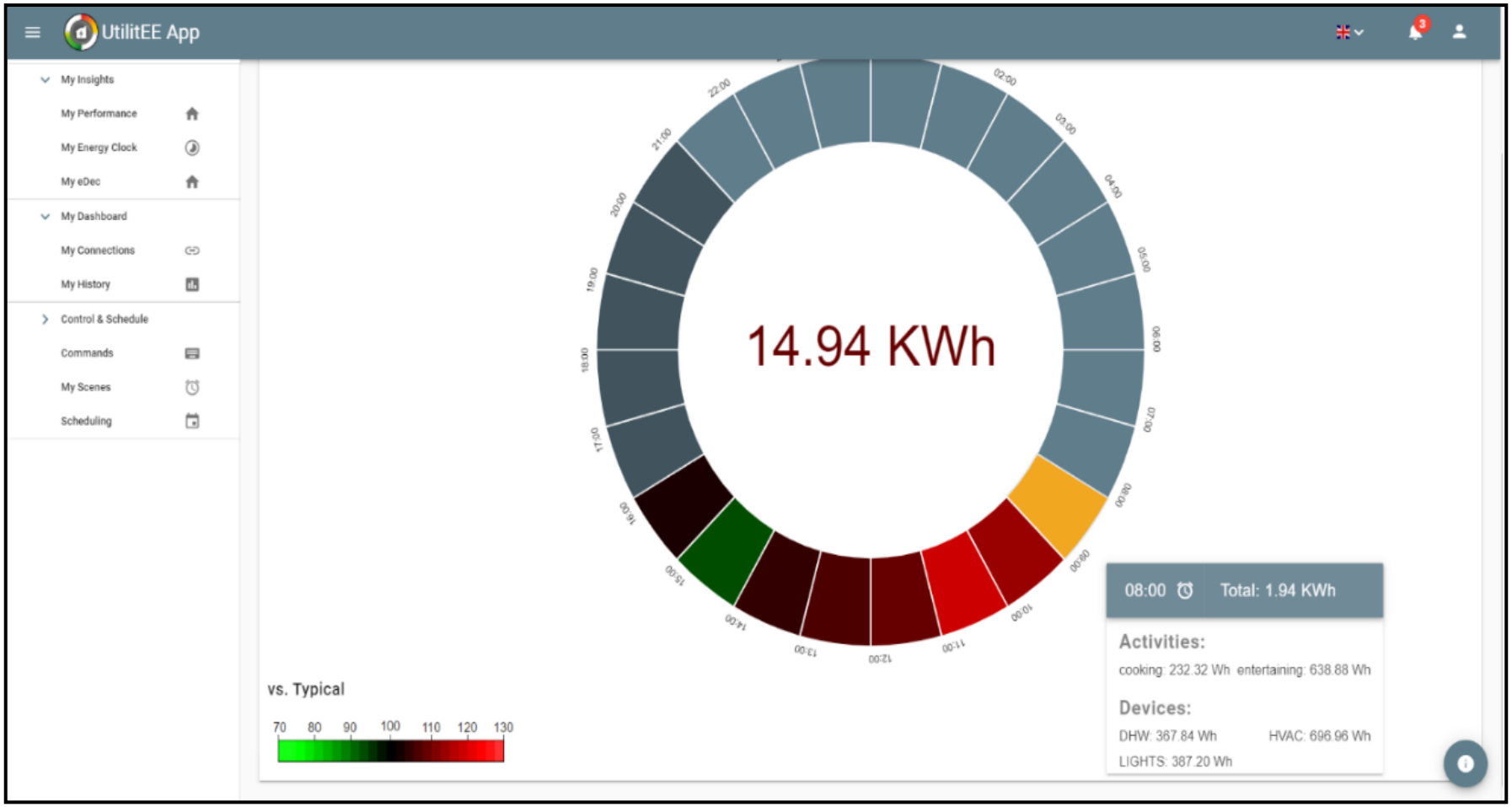

Figure 5: The Activity Clock Application view.

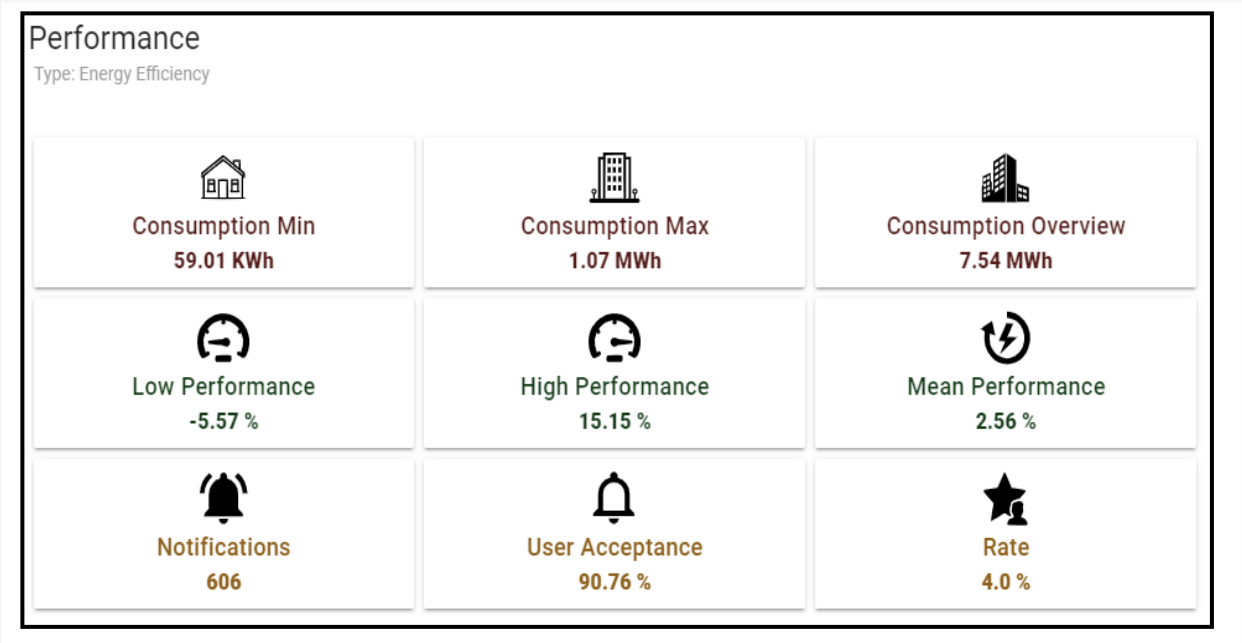

Figure 6: The business strategies performance monitoring viewpoint.

Figure 7: Pilot Buildings and installation of smart equipment.

Table 1: Impact Assessment – Energy Savings at demo sites.

	Residential	Commercial
Spain	-5.38%	-2.55%
Germany	-6.12%	-3.15%

3. Life validation and evaluation

The Holistic Energy Management framework as presented above is extensively validated in real-life conditions by a large and diverse population of residential and commercial consumers in five dispersed geographical areas (customers of energy retailers in Greece, France, Poland, Germany and Spain respectively) for a period of 18 months. Prior to any validation action, preparatory activities took place associated with the installation of the equipment required for data gathering and further configuration and baseline calculations to meet retailer specific needs and requirements.

The equipment installation is a complex task and a key boundary for the mass penetration of real time building energy management systems. Heterogeneous device types spanning from smart meters, environmental sensors, HVAC controllers, smart dimmers and lamps were installed in

premises in order to ensure connectivity and control of energy savvy devices. The lack of standardization in the field of home automation is a key bottleneck and thus a case by case analysis and further deployment is required. Following equipment installation and system deployment, baseline activities are performed focusing on benchmarking and Energy Waste determination Layer. An innovative benchmark analysis is performed taking into account socio-demographic characteristics (geographical location & climate conditions, occupancy density, lifestyle issues, etc.) as well as energy related building characteristics (age, size, appliances, energy data, etc.) to apply well proven normalization methodologies (drawn mainly from Building Energy Rating as well as Operational Rating standardized methodologies) on the way to extract accurate baselines. Benchmarking is a critical preliminary step on the way to determine energy wastes and further design the appropriate energy efficiency guidance and strategies.

Following system deployment and baselining, the pilot evaluation aims to perform an overall analysis and evaluation of the operation phase divided into three sections: (i) technical evaluation, and adoption of the ICT solution (ii) user engagement of the different focus groups towards energy efficiency, and (iii) business evaluation and overall economic performance. The focus of the preliminary evaluation analysis is on the two latter points.

From the point of view of the portfolio energy performance, major energy consumption differences are observed between the groups in which the portfolios have been segmented. Moreover, it is also interesting to mention that significant differences between countries are evident given not only their climate conditions, but also their energy consumption (also implying energy generation, and thus GHG emissions). Such differences can be a result of multiple factors including the environmental awareness per country, the energy consumption habits of the inhabitants and the climate conditions etc. The impact of the preliminary evaluation at two demo sites for a short period of time (01/07/2020 – 20/09/2020) is presented in Table 1 (per building type).

Overall, the percentage reduction of consumption is not that high, mainly due to the phase of the project and the early phase of validation. In addition, we can point out that the consumption is much higher for residential users mainly due to their interest for their consumption and further mainly due to the activation of campaigns with focus on residential customers. Parameters as the synthesis of the users, the timeframe for evaluation and the level of engagement of the users should be thoroughly considered in the next phase.

The impact assessment results reported in this version are not the final as still pending the deployment and evaluation of the full set of services and business applications to the different demo sites. Moreover, due to COVID-19 restrictions, insights will be extracted from the data in order to show the impact of the new situation in the energy field. Some indicative results are presented in Figure 8.

The analysis is performed in the Spanish demo side for the period (1/2/2020 -30/6/2020). The data presented reflect a selection of 30 residential and 4 commercial buildings while for activity related analysis, data from 3 users have been selected for visualization.

As it is evident from the analysis, there is an increase of the consumption at residential level with a subsequent decrease of consumption at commercial buildings. In addition, impact is derived at the different activities considered in the project; focusing on the residential activities performed in premises.

4. Business Models Validation

With regards to the economic results, it is foreseen that the defined business models are cost-effective as it can be inferred from the results of the cost-benefit analysis performed at the different demo sites. A preliminary cost benefit analysis of the different business models defined in the project and the results are presented. In order to perform the analysis a user driven business modeling methodology was adopted.

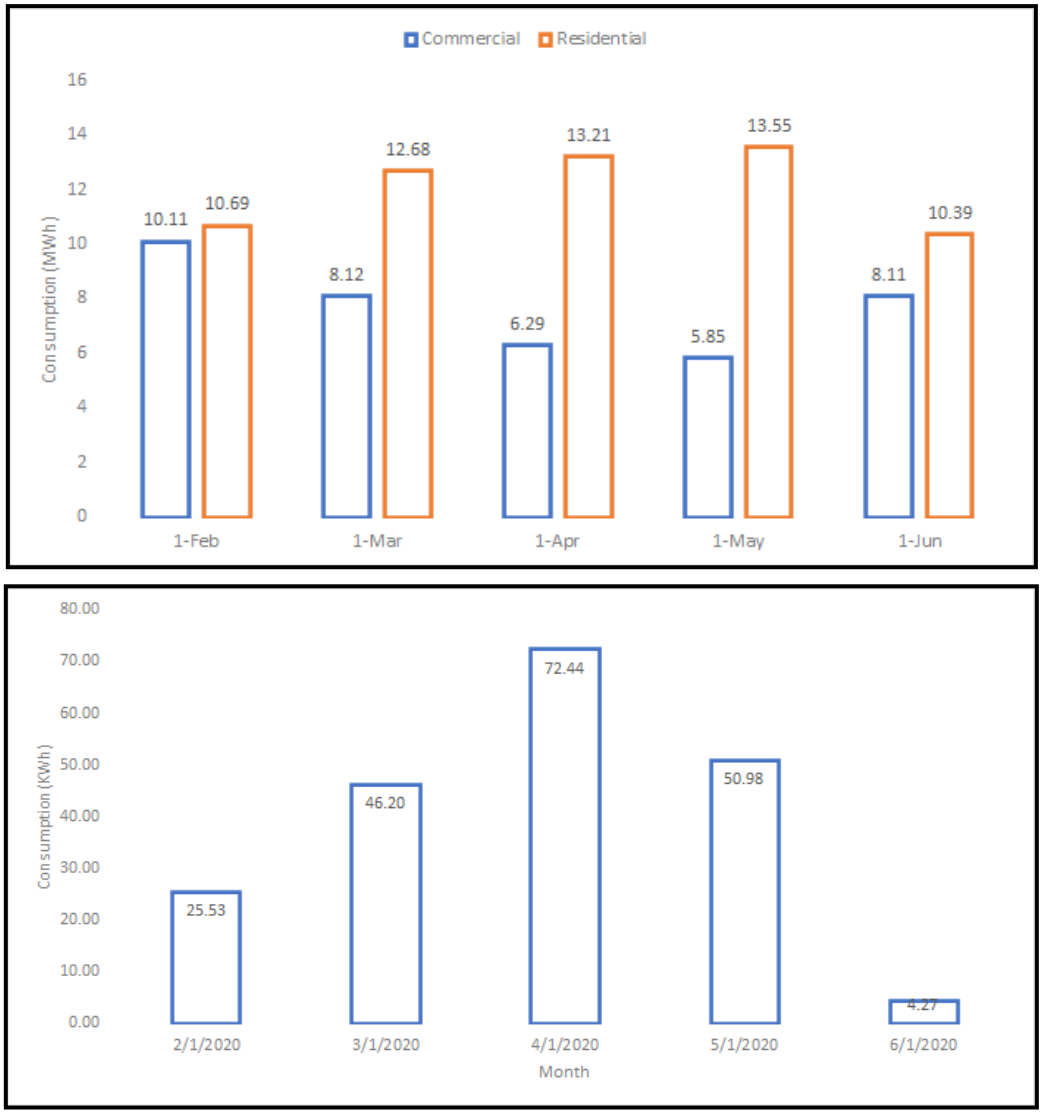

Figure 8: COVID-19 Impact (a) residential vs. commercial (b) cooking activity consumption.

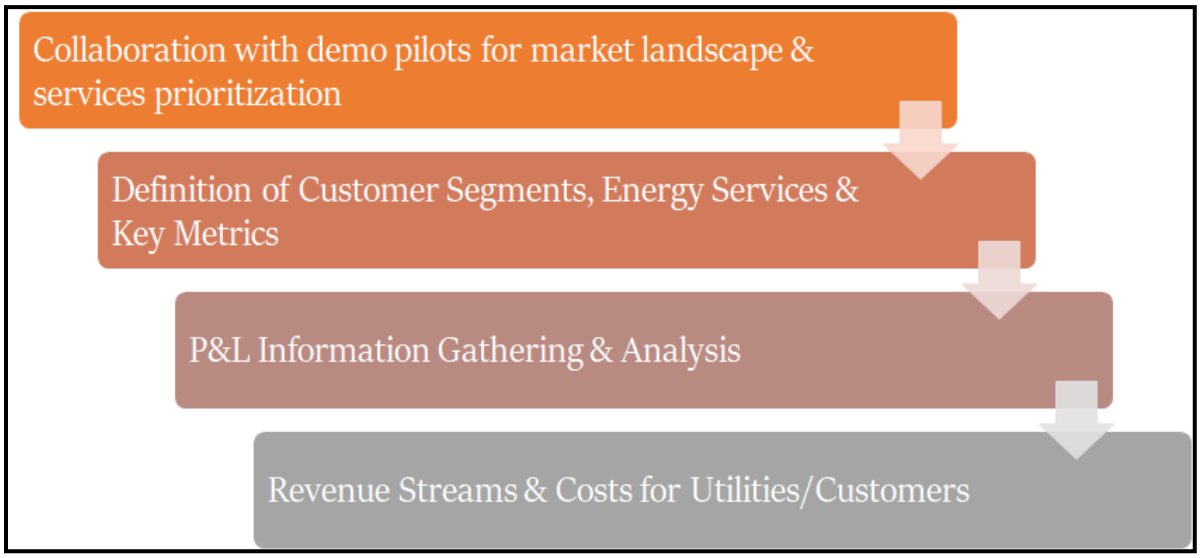

Figure 9: A user driven business modeling methodology.

At first, the analysis of the market environment was performed in order to see the market dynamics to be considered for the synthesis of the country level business models. Following, collaboration with the business stakeholders is considered in order to extract the figures and the internal business parameters to be incorporated in the analysis. The market and business parameters are presented for the case of the Spanish Demo Site in Table 2.

Details about the penetration of services (BS-behavioural, AU- automation) at portfolio level, the impact potential, the consumption profile (RU-residential, CU-commercial), the pricing policy, the market conditions, the installation and software costs are considered in the analysis.

By having a clear understanding of the internal and external market environment, the profit/loss analysis is performed showing the economic impact for the Energy as a service framework examined in this paper. The results are provided for the case scenario considered for presentation in this section, focusing on revenues and costs, presented in the following table. The analysis covers both the customer side and the stakeholder side in order to ensure a win-win situation.

From a customer viewpoint, an on-average 7% reduction of electricity costs are considered through the penetration of the proposed framework. The analysis is performed for the utility side and for a 7-year business analysis, a positive IRR is reported, associated with a 65% increase on the profit of the utility for the engagement in innovative business schemas.

We have to point out that a sensitivity analysis is required in order to properly quantify the business impact of the proposed framework under different market conditions. In the following table, the results of the sensitivity analysis for the Spanish case are presented.

The economic analysis complements the impact assessment analysis as reported in previous section. The demonstration and validation of the overall framework is in progress and the updated results will be available for further evaluation in the following months.

5. Conclusions

We presented a holistic energy management framework for utilities with focus on design of innovative applications and services for revealing, changing and re-freezing sustainable energy behaviour through accurate behavioural profiling, benchmarking, energy waste quantification and root cause definition, intelligent control, human-centric automation and energy performance certification. Along with the extensive technical description of the different applications, the validation activities performed in real life conditions are presented highlighting the impact of the innovative

Table 2: Business and Market parameters for business planning.

Cystomer Type	Energy Savings %		Energy consumption MWh/year	Energy costs €/kWh	Energy costs reduction due to load shift	Utility profit Energy €/MWh	Utility profit shifted €/MWh	Demand shifted %
	Behavioural	Automation						
Residential	12%	18%	3.6	0.2	0.1	10	9	25%
Commercial	12%	18%	49.56	0.15	0.1	10	9	25%
Cystomer Type	New clients %	Churn rate reduction %	Devices Costs		Installation costs		Software License	
			Behavioural	Automation	Behavioural	Automation	Behavioural	Automation
Residential	10%	5%	90 €	200 €	30 €	40 €	10.0 €	12 €
Commercial	0%	5%	500 €	1,000 €	90 €	200 €	10.0 €	12 €

Table 3: A win – win approach for customers and utilities.

	RU	CU
BS	5.33%	6.62%
AU	8.00%	9.93%

Discount rate	7%
NPV	**55,493.87 €**
ROI	**24%**
IRR	**49.36%**
Increased Profit vs. Baseline	**64.65%**

Table 4: Business Model evaluation – Sensitivity analysis.

Parameters	Discount Rate: 10%	ElecPrice Increase: 10%	CostsGoods Reduction : 15%	Savings Increase: 10%
NPV	27,219.57 €	97,840.52 €	81,644.20 €	111,798.26 €
ROI	24.05%	39.25%	37.54%	46.43%
IRR	39.66%	81.25%	73.17%	94.73%

framework in energy related key performance indicators.

From the business point of view, we complement the technical framework with first-of-a-kind business models for future-looking retailers interested to transform their busines them from commodity to energy services providers.

As a next step of the work, the detailed evaluation of the proposed framework will take place considering also user acceptance and engagement, behavioural change, energy efficiency and overall ICT ecosystem performance, along with its cost-efficiency. On the other hand, the design of fine-grained applications on top of the existing ones will be considered on the way to provide a full suite of energy services aiming to address the new business needs and demands in the deregulated energy market environment. The upper aim is to ensure the scaling up and replication potential of the proposed energy management framework that will further ensure the marketization of the proposed framework in the current and future energy markets.

Acknowledgement

The work presented in this paper is co-funded by the EU HORIZON 2020 Programme (topic: "EE-07-2016-2017 - Behavioural change toward energy efficiency through ICT") under grant agreement no. 768600 (project title: "UtilitEE - Utility Business Model Transformation through human-centric behavioural interventions and ICT tools for Energy Efficiency URL: http://utilitee.eu/).

Abbreviations

ICT	Information and Communication Technologies
IPMVP	International Performance Measurement and Verification Protocol
eDECs	Enhanced Display Energy Certificates
KPIs	Key Performance Indicators
HVAC	Heating Ventilation and Air Conditioning
ESCO	Energy Service Company
EPC	Energy Performance Certificate
VPPs	Virtual Power Plant
DSO	Distribution System Operator

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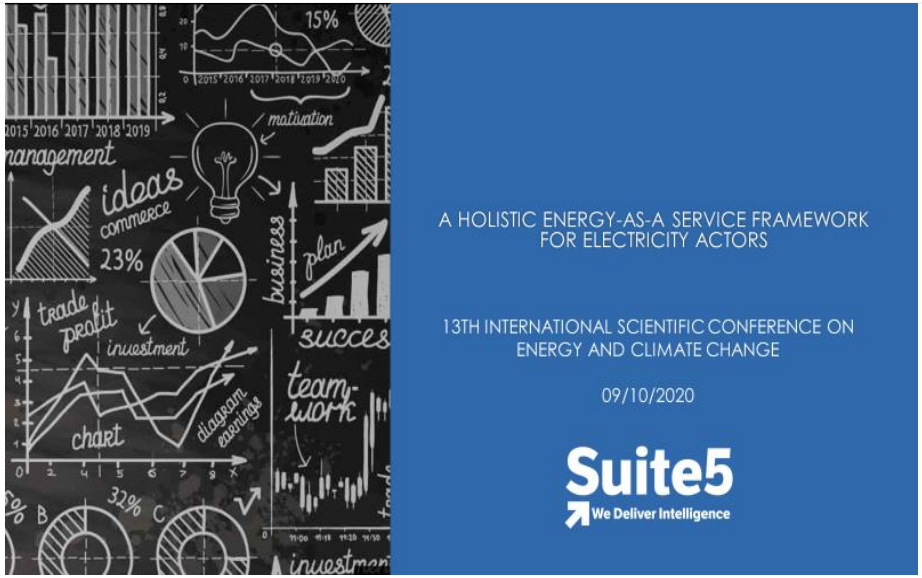
Mr. Konstantinos TSATSAKIS

R & D Manager

Short CV

Kostas TSATSAKIS (male) is an Electrical and Computer Engineer, holding an MSc in the field of Energy and Environmental Management, both from the National Technical University of Athens. He has considerable experience in energy saving related topics through the use of IT applications, data and systems interoperability, standardization of automated operation of energy systems and active network management. Through his participation in the FP7 and H2020 projects MERGE , BESOS, NOBEL GRID, ORBEET, MOEEBIUS, WiseGRID, Heat4Cool, INERTIA, FLEXCoop , UTILITEE, MERLON, BIM4EEB, BIMERR he has specialized in developing techniques for user modelling and profiling for understanding energy behaviors of consumers and shaping optimal control strategies and energy management to ensure the smooth operation of power networks and its undisturbed and uninterrupted power supply.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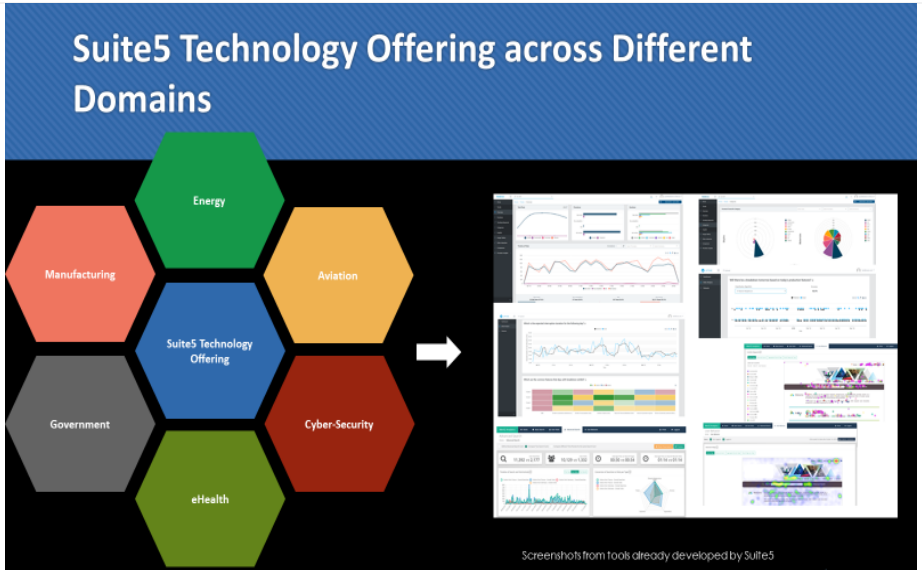
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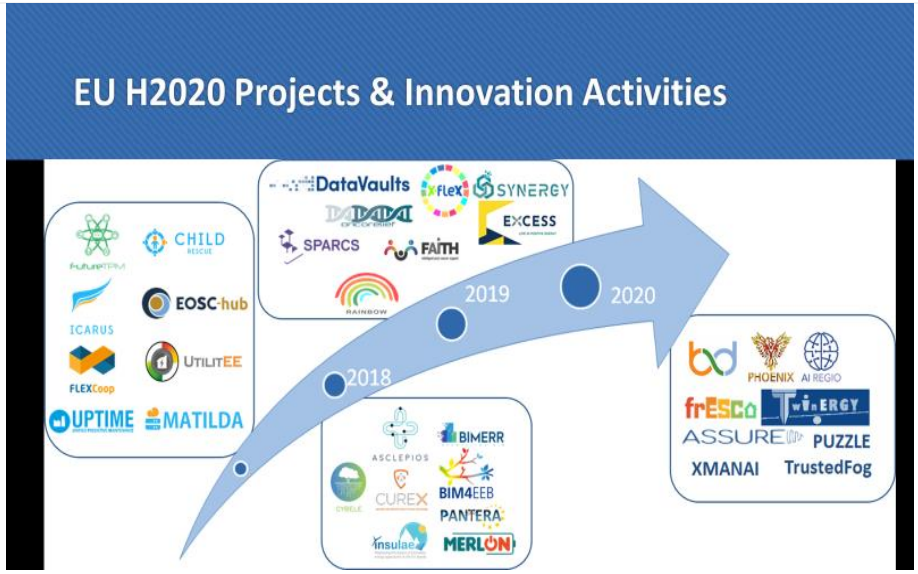
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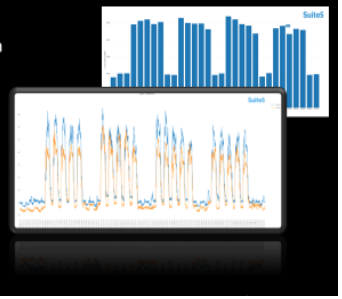

Relevant Research & Innovation Projects

- MERLON - Integrated Modular Energy Systems and Local Flexibility Trading for Neural Energy Islands
- https://www.merlon-project.eu/

H2020 – ES – 03 – 2018, GA No: 824386

MERLON introduces an Integrated Modular Local Energy Management Framework for the Holistic Operational Optimization of Local Energy Systems in presence of high shares of volatile distributed RES. Optimization in MERLON applies to multiple levels spanning optimal coordination of local generation, with demand and storage flexibility, as well as flexibility offered by EVs and CHP Plants to facilitate maximum RES integration, avoidance of curtailment and satisfaction of balancing/ ancillary grid needs. MERLON will enable the realization of novel business models, allowing local energy communities to introduce themselves in local flexibility markets, while paving the way for the realization of novel Microgrid-as-a-Service models, assigning to local DSOs the role of "Aggregator of Aggregators" for the provision of added value services to the overlay distribution grid.

- UTILITEE - Utility Business Model Transformation through human-centric behavioural interventions and ICT tools for Energy Efficiency
- https://www.utilitee.eu/

H2020 – EE – 07 – 2017, GA No: 768600

The UtilitEE project will provide a customer-oriented Behavioural Change Framework (Energy-as-a-Service delivery approach via an open ICT ecosystem integrated into the building with off-the-shelf sensors). UtilitEE will leverage well-known behavioural models/ theories and standardized operational rating/ certification methods. It will also incorporate human-centric intelligent control features that use occupant comfort profiles and supportively control HVAC and lights so as to minimize energy waste, while always keeping occupants comfortable and preserving a healthy indoor environment.


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PROSUMER
AUTOMATED DEMAND RESPONSE OPTIMISATION
DISTRIBUTED ENERGY RESOURCES


Energy-as-A-Service solutions for Local Communities & Aggregators
Aggregator Portfolio
MERLON ILES


Energy-as-A-Service solutions for Local Communities & Aggregators
Aggregator Portfolio
Local Community takes the role of aggregator
Local Community takes the role of DSO
Battery sizing & Planning
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Energy-as-A-Service solutions for Local Communities & Aggregators
Intra-ILES Aggregator
Central Flexibility Management
HOW..?
Prosumer 1
Prosumer 2
Prosumer 3
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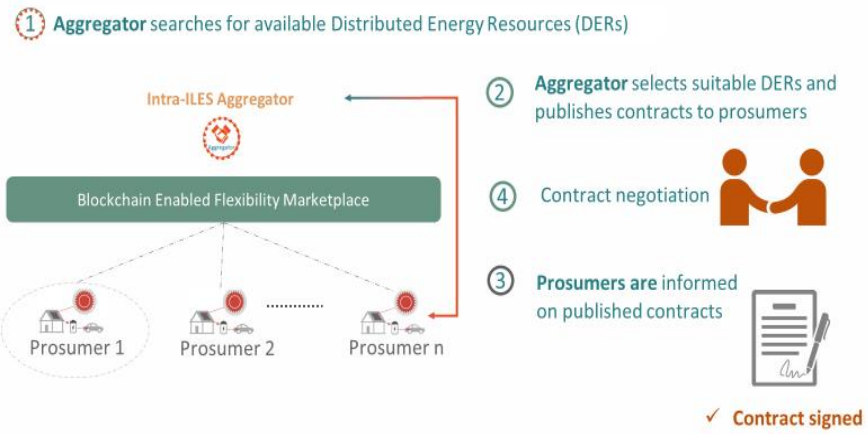
12

Energy-as-A-Service solutions for Local Communities & Aggregators



Energy-as-A-Service solutions for Local Communities & Aggregators

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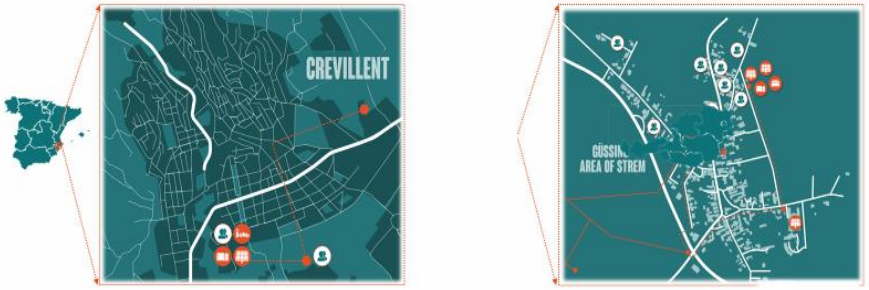


Technological solutions for Retailers & Energy Consumers

From Sensor data to innovative business models

Retailer as an ESCO

Comfort preserving energy efficiency

Energy Efficiency Audits towards Near Zero Energy Building

Retailer as an Aggregator

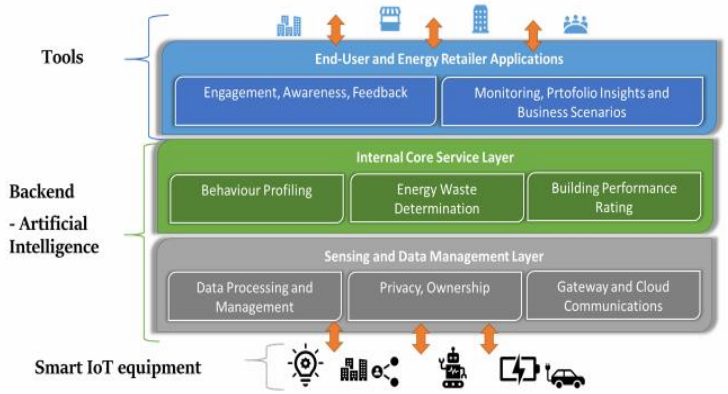
Supply-demand / Imbalance management

Community VPPs

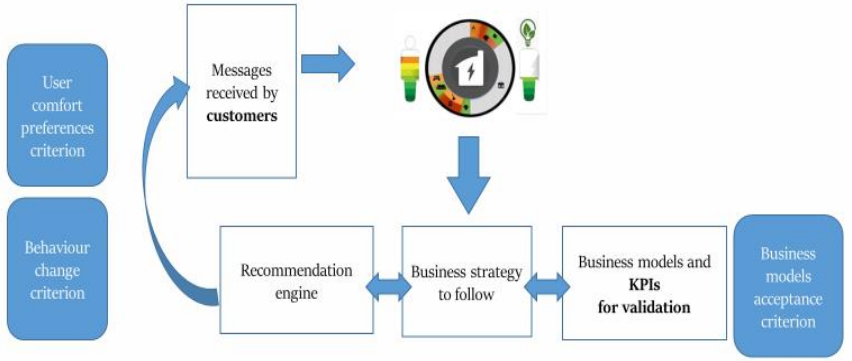
DSO Costs Minimization

Dynamic Retailer Pricing Schemas

Technological solutions for Retailers & Energy Consumers



Technological solutions for Retailers & Energy Consumers



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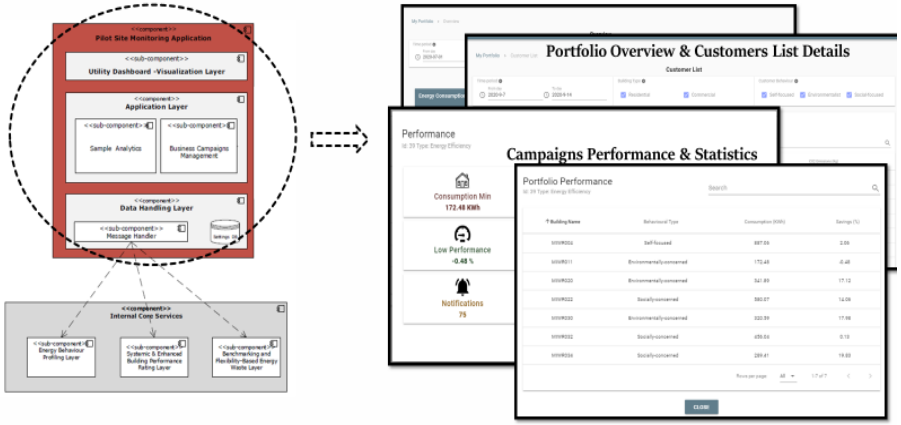

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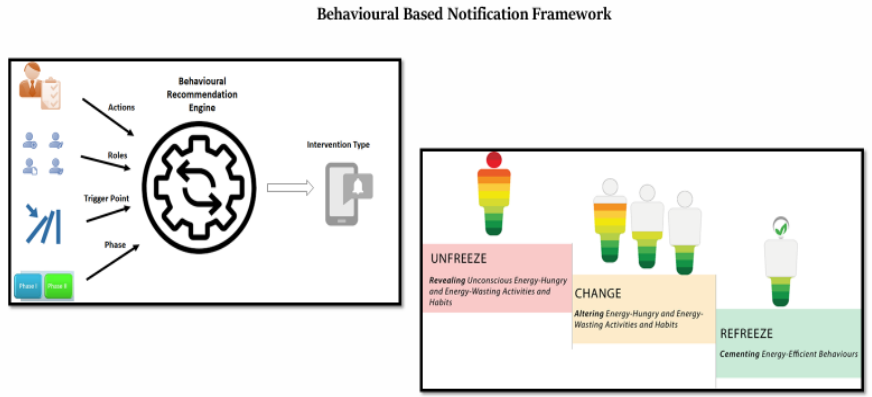
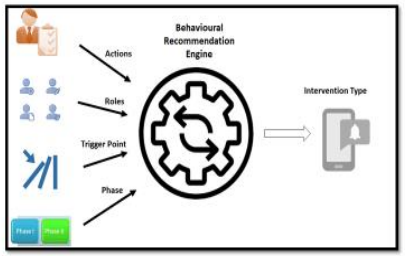
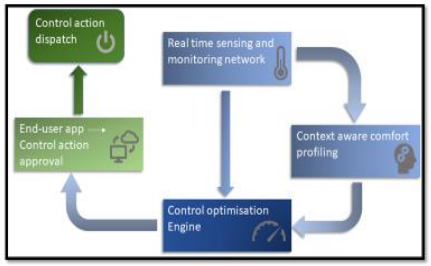


Technological solutions for Retailers & Energy Consumers

Human Centric Control & Automation





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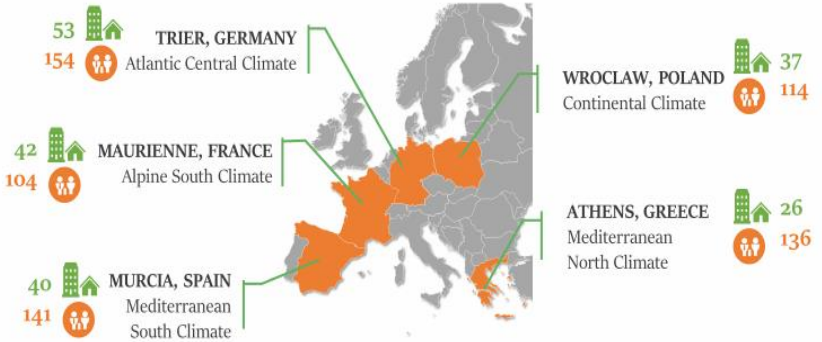

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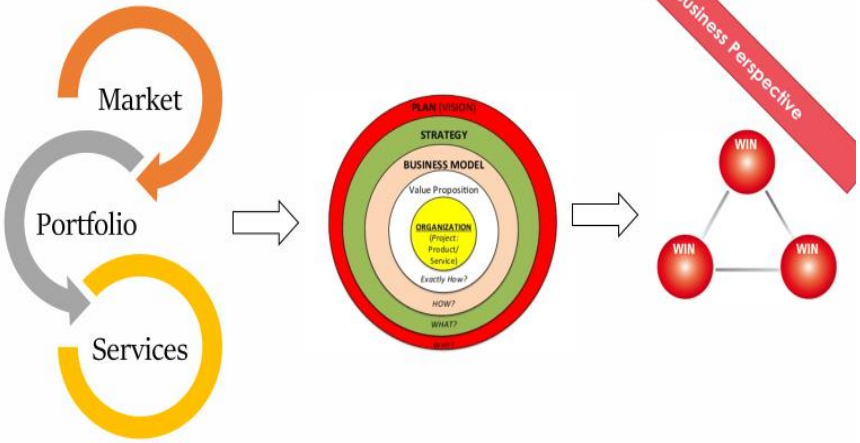
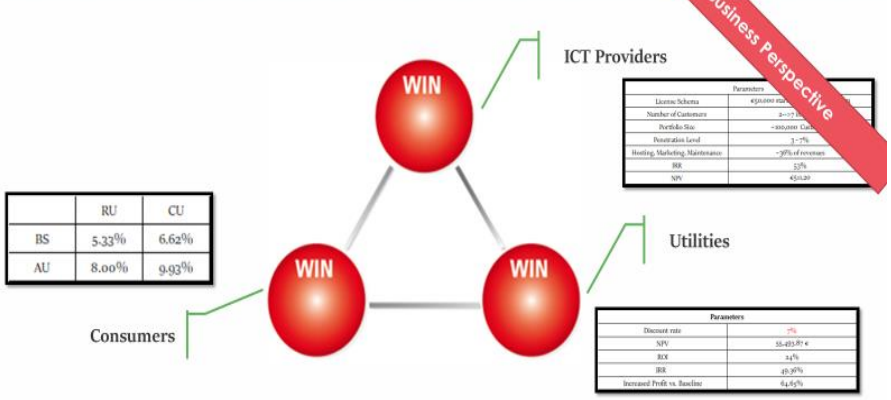


Technological solutions for Retailers & Energy Cons rs



Energy-as-A-Service solutions – Critical Barriers

Questions

The work detailed in this paper was carried out within the UtilitEE and MERLON projects. The research has received funding under the European Union's Horizon 2020 research and innovation programme, under grant agreement No. 768600 and No. 824386 respectively

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Energy upgrade of a listed building that will host an Art Museum into a Nearly Zero Energy Building

Prof. Argyro DIMOUDI

Professor of the Democritus University of Thrace, Hellas

Short CV

Associate Professor at the Department of Environmental Engineering, Democritus University of Thrace and the Director of the "Environmental and Energy Design of Buildings and Settlements" Laboratory. She has extensive experience on aspects of energy conservation and RES in buildings and settlements, environmental friendly materials, energy regulations, microclimate and outdoor spaces bioclimatic design.

Ongoing research includes co-ordination of the Interreg Balkan-Med project "ZenH Balkan – Towards Zero energy Hospitals in the Balkan region" and scientific responsible for DUTH at the Interreg Greece–Bulgaria project "Culture Dipole" for renovation of a listed building into a nearly zero energy (NZEB) Art Gallery. Energy consultant at designs and construction of open spaces in Greece with bioclimatic criteria.

Author in several books and papers in international scientific journals and conferences.

13th International Conference on Energy and Climate Change
7-9 October 2020
Athens, Greece

Energy upgrade of a listed building that will host an Art Museum into a Nearly Zero Energy Buildings

DIMOUDI Argiro, Professor,
VAVALOS Paschalis, PhD Candidate,
ZORAS Stamatis, Assoc. Professor

Department of Environmental Engineering,
Democritus University of Thrace (Xanthi, Greece)

Buildings that host **museums** or **exhibition spaces** receive a significant number of visitors and also accommodate objects of valuable cultural, historical and scientific value, **demanding appropriate conditions** in respect to **space temperature, relative humidity** and **other environmental parameters.**

Acropolis Museum

In many cases buildings such as the aforementioned are **listed** ones, where energy saving and renewable energy sources (RES) techniques are on the one hand rarely applied and on the other, if applied present special difficulties.

Listed buildings have various architectural restrictions that in turn impose restrictions on their energy refurbishment, thus it is a challenge for the engineering team to achieve the goals of the **"Near Zero Energy Building" (NZEB),** within these restrictions.

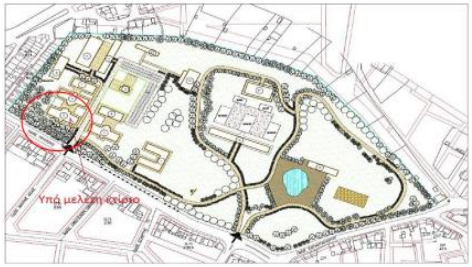
Delphi Museum

CONSTANTIN XENAKIS ART MUSEUM

An Art Museum dedicated to the internationally known Greek artist Constantin Xenakis will be created in Greece with permanent exhibition of pieces of his art.

Location

The museum will be located in an existing building of the former camp "Papalouka" in Serres, a city in Northern Greece, where the whole area according to the General Urban Plan is intended for cultural and recreational activities.



Aim of the energy upgrade of building

The proposed interventions aim to energy upgrading of the building to achieve the goal of the **"Nearly Zero Energy Building (NZEB)"** (primary energy consumption <60 kWh / m^2 as defined by CRES*).

The interventions concern:

Energy savings - Energy consumption reduction
- Interventions in the building shell
  - Thermal insulation
  - Low thermal characteristics windows

Implementation of RES - for achieving the NZEB objective
- Interventions in electromechanical equipment

The energy upgrade of the building is funded by the INTERREG Greece – Bulgaria programme.

* Centre for Renewable Energy Sources (CRES)

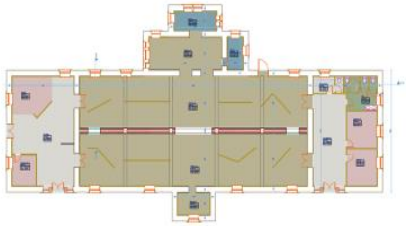
Building Description

It is a listed building, built in the early 20th century, during the Ottoman period and is of eclectic architecture.

It is an elongated, one-storey building with the longitudinal side on the N – S axis

- Total area: 652 m^2.
- Height: about 5.00 m (internal height 4.70 m)

Panoramic view of the interior



N & W Façade
(prior refurbishment)

W Façade
(prior refurbishment)

Building Envelope Characteristics

The envelope of the building is:

- Not insulated ,
- Masonry wall, total thickness 60 cm,
- Flat roof made of composite slabs with concrete and iron reinforcements
- Ground floor on soil with concrete slab.
- All walls are coated with plaster internally and externally
- There are decorative elements around the openings and at the corners of the walls.
- Wooden framed openings (doors and windows), with single glazing and upholstered skylight.

Façade prior refurbishment

Façade after refurbishment

Building's Energy Features

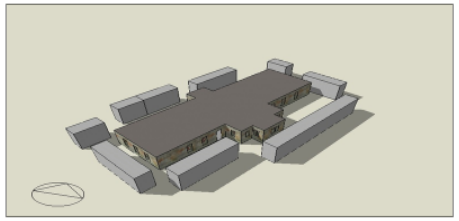
Shading

- Building's shading is mainly obtained by natural obstacles, since on its eastern side there is a building of the same height as the building under study, and around its sides there are planted trees with a height bigger than the building.

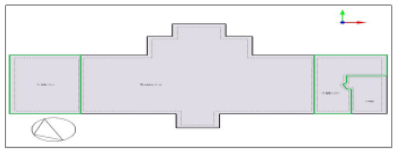
Energy Modelling

In order to calculate the heating and cooling loads of the building, to create the three-dimensional model, to implement all different construction materials and geometrical features, an **Energy Plus** based software was used named **DesignBuilder**. DesignBuilder, is a program able to create a graphical interface to Energy Plus dynamic thermal simulation engine.

The building was separated in 3 different **thermal zones**, spaces according to similar usage profiles, similar operational schedules and similar HVAC systems



Panoramic view of the building designed in the software DesignBuilder



Floor plan of the building and thermal zones

Existing condition

The energy consumption of the building before interventions (assuming a heat pump with thermal and cooling coefficient of efficiency COP = 3,5 and EER = 3,0 respectively) is :

Maximum thermal power (kW)	Maximum cooling power(kW)	Energy consumption (kWh)	Energy needs (kWh)
80,8	64,6	40.233	124.642

The specific energy consumption (EC) and primary energy consumption (PEC) of the building (in kWh/m²) before interventions are:

EC = 61,71 kWh/m² και

PEC = 178,04 kWh/m²

Proposed Energy Efficiency Interventions

The overriding **priority** is to **reduce energy losses**. Suggested measures :

- **Thermal insulation** of building envelope
  - Walls: 8 cm thick rockwool, positioned on the inner side
  - Roof: thermal insulation and waterproofing with 10 cm thick extruded polystyrene insulation on the external roof side
  - Floor: Extruded polystyrene, 5 cm thick.
- Replacement of **windows** with new ones with low thermal characteristics (double glazing, with one low-e glass sheet and inert gas in the gap).
  - The windows will be opened, with a reclining skylight.
  - The new frames will be wooden and will faithfully follow the design of the existing frames (horizontal and vertical beams)

Interreg Greece-Bulgaria

Energy consumption - Interventions in the envelope

The energy consumption of the building after thermal insulation (assuming a heat pump with thermal and cooling coefficient of efficiency COP = 3,5 and EER = 3,0 respectively, the same as the non-insulated building)

Maximum thermal power (kW)	Maximum cooling power(kW)	Energy consumption (kWh)	Energy needs (kWh)
49,1	53,1	12.961	39.609

The specific energy consumption (EC) and primary energy consumption (PEC) of the building (in kWh/m²) after the interventions in the building envelope (thermal insulation, windows) are:

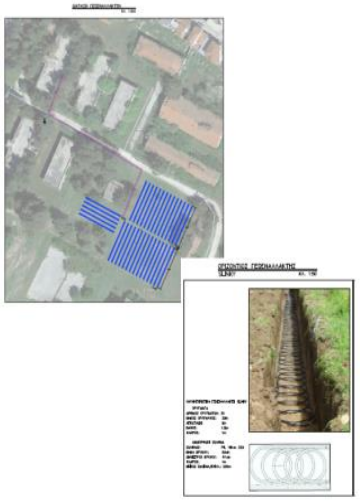
EC = 19,88 kWh/m² και
PEC = 57,65 kWh/m²

Interreg Greece-Bulgaria

The primary energy consumption of the building, taking into account the overall lighting load (7.8 kWh / m²), remains above 60 kWh / m².

Proposed Interventions – RES use

Proposed interventions:



- Installation of a closed, horizontal layout, geothermal heating and cooling system with fan coil units in the office zone and vendor zone and Central Air Conditioning Unit (CCS) in the exhibition area.
- The proposed geothermal heat pump (GHG) has:
  - thermal capacity 58,22 kW with a power factor of 3.8 and a total consumption of 15.9 kW
  - cooling capacity of 52.6 kW with a power factor of 3.8 and a total consumption of 11.55 kW.

Energy Consumption – Geothermal Energy

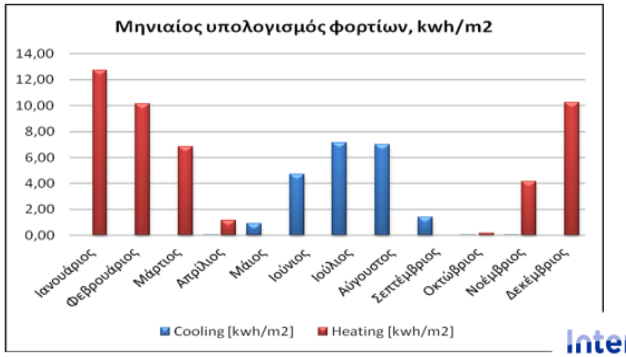
Maximum thermal power (kW)	Maximum cooling power (kW)	Energy consumption (kWh)	Energy load (kWh)
49,1	53,1	10.235	39.609

The specific energy consumption (EC) and primary energy consumption (PEC) of the building (in kWh/m2) after the integration of the geothermal heat pump is:

EC = 15,70 kWh / m²
PEC = 45,52 kWh / m²

Taking into account the consumption of general lighting in public areas (7.8 kWh / m²), **the primary energy consumption is 53.33 kWh / m²**.

Interreg Greece-Bulgaria



Monthly energy loads after building's energy upgrade

Conclusions

- The total energy savings achieved in the heating and cooling load as a whole due to energy upgrade of the building envelope are 68,22%, which corresponds to savings of 69,29% for heating and 66,63% for cooling.
- The total reduction is estimated at 130,42 kWh / m^2, which corresponds to 79,32 kWh / m^2 in thermal loads and 51,10 kWh / m^2 to cooling loads.
- With regard to energy consumption, energy savings are 74,94%.
- Energy efficiency measures and RES systems applied in the building can transform it into a **NEARLY ZERO ENERGY BUILDING**.

Thank you for your attention

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The project is co-funded by the European Regional Development Fund and by national funds of the countries participating in the Interreg V-A "Greece- Bulgaria 2014-2020" Cooperation Programme.

Assessing the trends in global reporting initiative standards

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Short CV

Professor in Economics of Natural Resources in the Department of Economics at the University of Thessaly. He is the Director of the Laboratory of Operations Research. His research interests are in the fields of Environmental Economics, Applied Statistics and Econometrics, Simulations of Economic Modelling, Applied Micro-economics, Air Pollution, Game Theory, Mathematical Models.

Business concerns regarding environmental responsibility

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Introduction

Each enterprise should be more than a profitable tool: it should be a tool with responsibility to protect and promote benefits of other actors and society in general.

Lately, more and more large companies, such as oil or chemical industries, are linked to human rights violations or environmental pollution and damage.

To compensate their negative consequences and restore their fame, these enterprises have started to integrate positive and responsible practices, so that they can contribute positively to the whole society.

Business actions addressing environmental and social issues are referred to as Corporate Social Responsibility (CSR).

This conscientiousness of companies has attracted attention with CSR connecting and balancing environmental, social and economic factors.

Although there is not an established definition of CRS, the European Commission refers to CSR as responsibility enterprises face for their effects on societies emphasizing that CSR is necessary and important factor for attainment of sustainability, innovation but also competitiveness among EU companies.

Similarly, International Labor Organization defines CSR as a way in which enterprises, through their internal processes as well as through their interactions with other actors (people, communities, environment, etc.) affirm their values and principles.

The concept of CSR has become more and more popular among large and smaller companies, which feature and promote CSR projects and practices to prove that they function in a fair and legit way, to survive and prosper.

Firms now integrate social responsibility and environmental sustainability in their business practices, gaining benefits that are not reflected in traditional economic terms, for instance customer base increase.

Recent trends of economic globalization lead to increasing uncertainties and risks. At the same time poverty, inequalities and climate change increase these risks. Coping with these issues may help corporations ensuring sustainable supply chains and markets for further development. In these lines CSR may help as the main business initiative in dealing with these risks.

Obviously energy produced using fossil fuels is closely related to many serious environmental problems. Corporations may consume energy either directly using fossil fuels like coal, diesel and natural gas or indirectly by buying electricity and other imported energy forms.

Apparently energy efficiency has to be associated with the minimization of the effects on the environment. This requires appropriate monitoring of energy use by various different sources and recording of the achieved reduction levels.

Energy utilities provide energy to households, firms etc. Energy utilities industry face challenges associated with social and environmental matters. Social, economic, environmental, health and safety risks are related to LR development of energy sector. Nowadays, energy utilities face serious alterations from power generation to trading, influencing all activities from transmission to distribution within the supply chain.

CSR of energy utilities with increased renewable energy use may offer a number of benefits to societies. Increased energy efficiency, more RES use and decrease in GHG emissions.

CSR in the energy sector

When it comes to the energy sector, CSR practices are again categorized into the three main pillars: economic issues, social issues and environmental issues.

The economic pillar refers not only to the profitability of the company and its financial issues, but to all the economic impacts that the company has on the community. Therefore, it is expected that the company invests in R&D of new technologies and improves infrastructures, while paying appropriate taxes and operating in a fair and transparent way.

Respectively, regarding the social pillar, energy companies should adopt socially responsible practices that affect people inside and outside the company. These practices include actions that contribute to social development and welfare, such as health and safety, equity and diversity, community relations and relations with NGOs, employee participation and satisfaction, etc.

Focusing on the environmental pillar, CSR plays a key role in the energy sector, particularly because climate change is an extremely important issue that has to be addressed and companies in the industry sector have a huge negative impact on the environment, especially during exploration and production.

The energy sector is possibly the main industrial sector that can have such a positive economic and social impact and contribute to welfare and development, while having a huge negative impact on the environment.

Energy companies are now in a more sustainable route and they are trying to be environmentally responsible, whilst being profitable. Energy demand is increasing rapidly and, due to population growth and the new, modern, energy-intensive way of life, is expected to increase even more.

Because of that, energy companies have to reduce their negative impacts to the environment and respond to social expectations and international agreements, like the Sustainable Development Goals.

Recent trends in CSR reporting

The European Commission underlines the existence of many international reporting frameworks for presenting non-financial information, available to be used by firms. Among them with precise information are the UNGC framework, the ISO 26000 and the GRI- Global Reporting Initiative.

Global Reporting Initiative was founded in 1997 and has become the leading guideline for voluntary reporting having as main task to augment the quality of information provided to stakeholders and creating many more benefits for the firm. In addition, it assists firms to state both positive and negative contributions in their tasks for sustainable growth.

In these lines, relying on GRI, organizations are classified as

-large (small, SME) if they have more (less) than 250 employees and more (less) than €50 million turnover or more (less) than € 43 million total balance sheet

while they are

- MNE if they are large and multinational.

Due to Standard Report Registration the availability of data refers to the period 1999-2017.

Following GRI we have extracted time trend for corporations in all continents. Trend analysis is performed for the large, MNE and SME corporations with reporting activities as shown in (1) for the linear specification, in (2) for the quadratic, in (3) for the exponential and in (4) for the Pearl-Reed logistic trend model

$$Y_t = \beta_o + \beta_1 t + \varepsilon_t \quad (1) \qquad Y_t = \beta_o + \beta_1 t + \beta_2 t^2 + \varepsilon_t \quad (2)$$

$$Y_t = \beta_o \beta_1^t + \varepsilon_t \quad (3) \qquad Y_t = \frac{10^a}{\beta_o + \beta_1 (\beta_2^t)} \quad (4)$$

The linear trend specification selection was justified relying on the accuracy measures of mean absolute percentage errors (MAPE), mean standard deviations (MSD) and mean absolute deviations (MAD).

Even more, we have included a number of variables related to potential factors able to affect a corporation's social behavior like

- Gross National Income (GNI) growth (annual %),
- Particulate emission damage (% of GNI) as damage due to exposure of a country's population to PM2.5, ambient ozone pollution and indoor concentrations,
- carbon dioxide damage (% of GNI) due to emissions form fossil fuels combustion, cement manufacturing,
- energy depletion (% of GNI) as the value of energy resources stock to the lifetime reserves,
- education expenditures (% of GNI) and
- exports of goods and services (annual % growth).

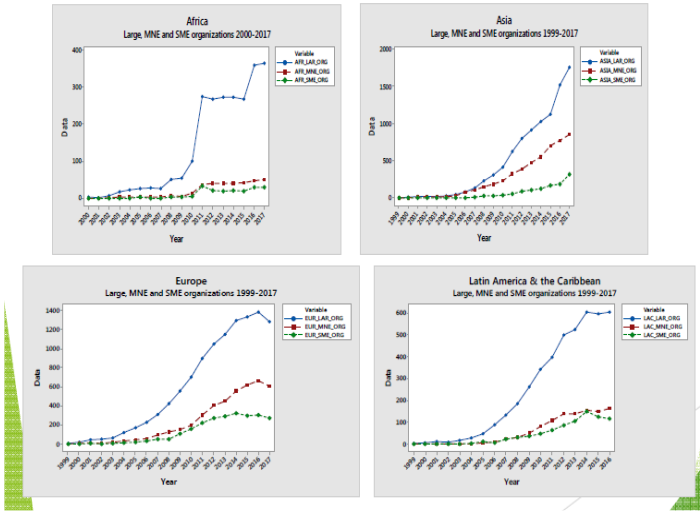
Table 1: Time trend for corporations worldwide

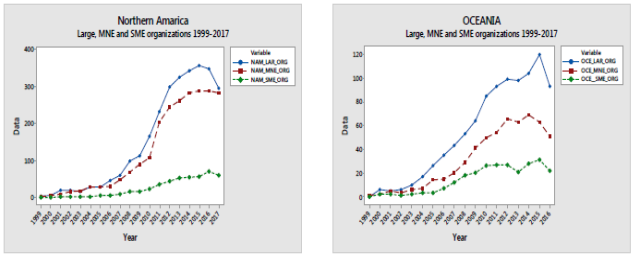
Continents	Size				Energy Sector	
	Large	MNE	SME	Total	Energy	Utilities
Africa	23.80	3.385	1.925	29.11	0.5053	0.507
Asia	90.79	47.35	12.85	151.0	9.168	3.77
Europe	90.31	40.54	21,48	152.3	9.139	5.328
Latin America &Caribbean	42,94	11,43	8.744	63.11	5.058	2.756
Northern America	23.14	19.55	4.133	46.83	3.072	2.318
Oceania	7.549	4.534	1.981	14.09	0.953	0.716

Table 2: Correlation coefficients of CSR with some possible influential variables

	Greece	UK	World
GNI growth	-0,582 (0,009)	-0,105 (0,668)	-0,142 (0,561)
Particulate emission damage	-0,600 (0,007)	-0,105 (0,668)	-0,063 (0,798)
Energy depletion	-0,012 (0,960)	-0,581 (0,009)	0,115 (0,640)
Carbon dioxide damage	0,241 (0,321)	0,336 (0,160)	0,896 (0,000)
Education Expenditure	0,632 (0,004)	0,863 (0,000)	-0,518 (0,023)
Exports	-0,261 (0,281)	-0,095 (0,698)	-0,179 (0,462)

Figure 1: Evolution of CSR worldwide





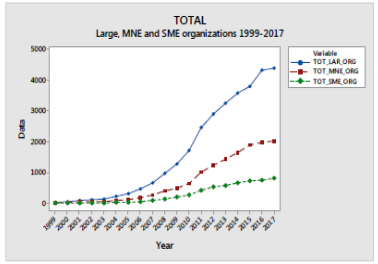
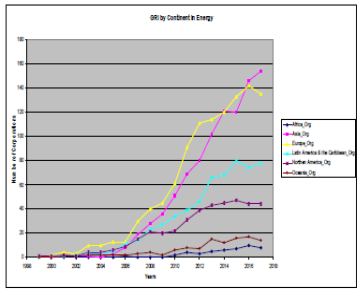


Figure 2: Evolution of CSR in Energy and utilities worldwide



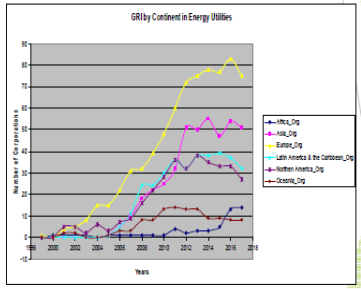


Figure 3: CSR evolution in the case of Greece

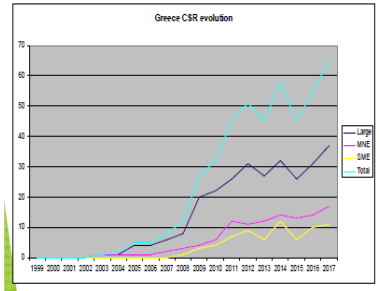
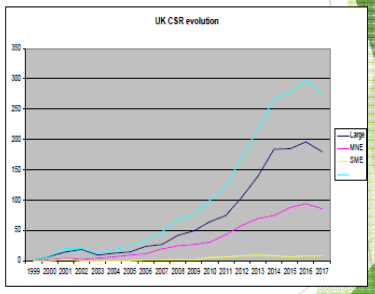


Figure 4: CSR evolution in the case of UK



Turning points	Only Income	Static	Dynamic
Total	48347.82	61416.31	38812.3
OECD	70903.22	77264.43	22609.6
In Transition	17089.93		

National CSR Index

To calculate a national CSR index various proxies of CSR diffusion have to be considered.

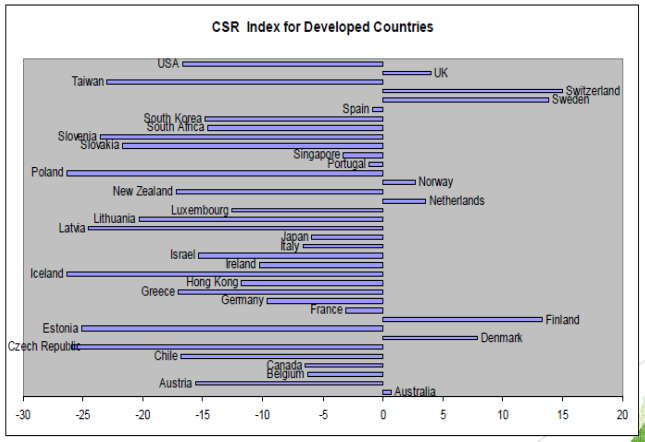
These are treated as 'variables' that comprise a consistent national index, which represents the total number of corporations certified or formally endorsing this precise CSR scheme.

We propose here the construction of such an index inspired but significantly differing from the ones calculated in the rationale and structure of Gjølberg [103] as well as Skouloudis et al. [104].

The idea is to rely on country data relevant to various international CSR initiatives, together with environmental and social standards.

To see the way such an analysis is performed, Figure 5 presents the CSR index in the case of the developed countries (modified from Halkos and Skouloudis [105]).

Figure 5: CSR index for developed countries



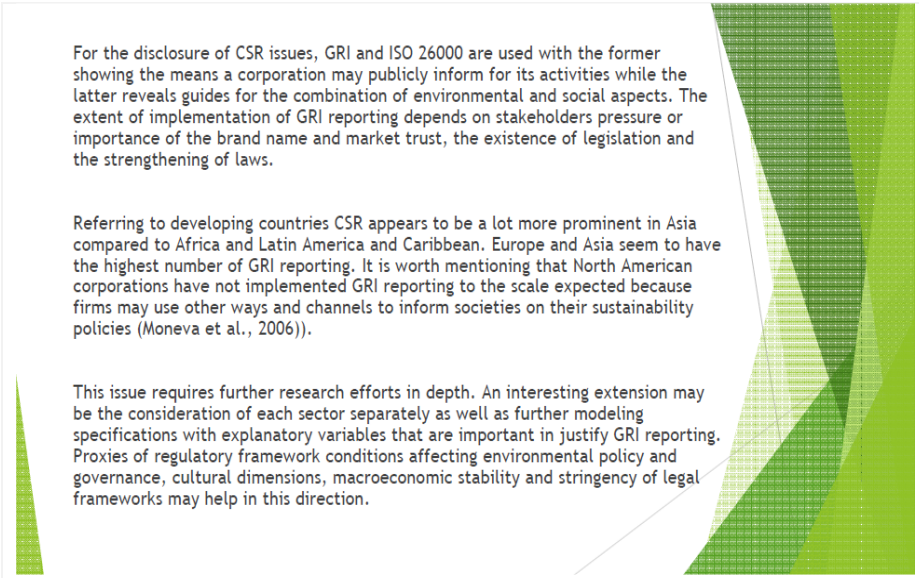
Conclusions

Industrial pollution has caused concern to government regulators and the general public in developed and developing economies. Consumers nowadays seem to pay much attention to social and environmental problems and demand from companies to take relevant measures. Social and environmental challenges have become so complex that governments, non-profit organizations and firms should work together for the best possible results.

Here we consider the diffusion of the GRI worldwide identifying the trends in the period 1999-2017 per continent. Specifically, we perform a trend analysis of corporations with reporting initiatives distinguishing them as large, multinational and small-medium. Observing the trends in this time period we discover that Asia and Europe behave in the same way in their growing in reporting initiatives followed by Latin America and Caribbean and Northern America.

It is worth mentioning that Europe seems to have passed from a full-grown to a downturn stage in the recent years. To a much smaller magnitude this is also the case for Oceania and Northern America with the later having a full-grown stage for the multinational enterprises. On the other hand, Asia is still in the spreading out stage showing a steady expansion and Latin America and Caribbean and Africa having reached the full grown stage.

Our findings may show future trends and reasons to implement GRI reporting. The GRI facilitates the diffusion of sustainability performance containing information on environmental, economic and social features of an enterprise. It seems that governments have been the leading power in pressing for the implementation of GRI in developed countries but this is not the case in developing countries where attention is paid in attracting FDI rather than coping with corruption or legislating environmental and labor market conditions.


For the disclosure of CSR issues, GRI and ISO 26000 are used with the former showing the means a corporation may publicly inform for its activities while the latter reveals guides for the combination of environmental and social aspects. The extent of implementation of GRI reporting depends on stakeholders pressure or importance of the brand name and market trust, the existence of legislation and the strengthening of laws.
Referring to developing countries CSR appears to be a lot more prominent in Asia compared to Africa and Latin America and Caribbean. Europe and Asia seem to have the highest number of GRI reporting. It is worth mentioning that North American corporations have not implemented GRI reporting to the scale expected because firms may use other ways and channels to inform societies on their sustainability policies (Moneva et al., 2006)).
This issue requires further research efforts in depth. An interesting extension may be the consideration of each sector separately as well as further modeling specifications with explanatory variables that are important in justify GRI reporting. Proxies of regulatory framework conditions affecting environmental policy and governance, cultural dimensions, macroeconomic stability and stringency of legal frameworks may help in this direction.

Energy poverty in Greece 2.0
Policy developments and social innovation: proposals for combatting it

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Abstract

The policy report "Energy Poverty in Greece 2.0", aims to highlight the pressing challenge of energy poverty mitigation and trigger a public debate on the need for a systematic treatment. The report pinpoints the link between just energy transition and energy poverty tackling efforts. A series of developments in European and national energy and climate change policies highlight the pivotal role of citizens and the urgency to safeguard them through an energy model that shifts from fuel dependency to decentralised clean energy generation. Hence, empowering citizens and encouraging their active participation in collective schemes, raising awareness about sensible energy use and clean energy are of the utmost importance. Finally, a crucial parameter guiding all policy proposals of the report is the development of stakeholders' synergies that will drive European and national financing to achieve residential buildings' energy upgrade. The report highlights policy proposals to tackle energy poverty in Greece by targeting the root causes of the phenomenon in a cross-cutting and socially innovative way, on the basis of recent political developments in Greece and the rest of Europe while bearing in mind the views and needs of citizens. It comprises bibliographical research, interviews from representatives of relevant stakeholders, as a means of early engagement, and an opinion survey (online/phone, 691 households from all across Greece). We trust that the proposals of the study will prompt public debate and will influence the process of drawing up the National Energy Poverty Action Plan.

Keywords: Energy poverty, policy recommendations, social innovation, energy vulnerability.

1. Introduction

It is estimated that more than 34 million households (European Commission, 2020) across Europe are affected by energy poverty. The effects of the phenomenon manifest as limited or complete lack of access to essential energy services for households unable to adequately heat cool or secure basic energy services in their residencies at an affordable cost. Consequently, detrimental repercussions on citizens' health and wellbeing as well as on the environment are brought on.

Energy poverty is prevalent not only in less financially prosperous countries like Greece, but it is also becoming progressively noticeable in more affluent ones (EU Energy Poverty Observatory, 2019). Though partially driven by and connected to income poverty, the phenomenon of energy poverty is recognised as a problem in its own right and as a distinct type of poverty affected by multiple factors like the

adequate warmth, cooling, lighting, and energy to power appliances are essential services that underpin a decent standard of living and health. Indicative of this awakening is the fact that for the first time most of the National Energy and Climate Plans submitted by the Member States of the European Union in 2018 raise energy poverty to the status of a challenge that needs to be addressed. It is worth mentioning however that Greece is the first country to include such ambitious quantitative targets in its National Energy and Climate Plan and aims for achieving 50% decrease in energy poverty rates by 2025 and 75% decrease by 2030 (Right to Energy Coalition, 2020). Nevertheless, the country is lacking an official definition on energy poverty and the National Action Plan on Energy Poverty is pending since 2015. It is expected in autumn 2021.

In parallel with energy poverty, a new term has emerged as a new interdisciplinary research field into the Social Sciences, Energy justice. Energy justice strives to develop and apply principles of justice on energy policy, energy generation, energy consumption, energy safety and climate change (Jenkins K. et al., 2016). In line with efforts to curb climate change, it seeks to abolish conventional fuels and to "democratise" the sector by advocating citizens' active participation in the energy sector which is deemed a prerequisite to a socially just energy transition (Center for Earth, Energy and Democracy, 2015).

Another technical term and terminology for a more comprehensive understanding of energy poverty is energy democracy. Energy democracy is an emerging social trend that seeks to offset the extraction of fossil fuels by making the transition from fossil fuels to more human-friendly and environmental-friendly forms of energy. The integration of technological advances is paramount to linking social justice and social equity to energy innovation (Burke M.J., Stephens J.C., 2017). In essence, energy democracy secures active participation of citizens, of municipal authorities and small and mid-sized businesses in a consortium guided by the principles of social justice.

On this basis, the report highlights policy proposals to tackle energy poverty in Greece by targeting the root causes of the phenomenon in a cross-cutting and socially innovative way, taking into account recent political developments in Greece and the rest of Europe while bearing in mind the views and needs of citizens. The first part comprises bibliographical research on energy poverty and related emerging concepts. The second part of the study critically presents existing energy poverty tackling policies and measures on the basis of the interviews from representatives of relevant stakeholders. These also serve, as a means of early engagement and shared ownership of the study. The third part is composed of the results of an opinion survey providing insight on the level of awareness of Greek citizens over energy poverty and, their needs and perspectives on possible mitigation solutions. Finally, policy proposals complemented by best practices and a set of presuppositions for their effective implementation are included in the fourth and last part of the study. The proposals provide policy implications for public debate and the process of drawing up the National Energy Poverty Action Plan.

2. Literature review

Energy poverty is a key concept consolidated in the legislative package entitled "Clean Energy for All Europeans", which is designed to facilitate a just energy transition. Much progress has been made since in achieving a just energy transition and most importantly in pointing out the threats energy poverty entails to public health and wellbeing along with developing appropriate remedies.

Across Europe governments are working to implement more policies to promote energy efficiency in homes to alleviate energy poverty. But the lack of knowledge on the impact of the transition process on the local communities is a major issue that affects the formulation of effective policies toward mitigation strategies negatively. Although Regional Governments are aware of the operational plans that municipalities will follow to fulfil their obligations to the citizens, there is no clear knowledge on how the transition will affect these plans in terms of public works, municipal decisions and, municipal investments.

Policy organisations and advocacy groups have emphasised the existence of a social "energy divide" across the EU. Also, substantial differences have been detected among the EU Member States. Generally, Southern and Eastern European countries report a higher incidence of energy poverty. The vulnerability of citizens in countries, such as Bulgaria, Croatia, Estonia,

Greece, Hungary and Latvia can be associated with the legacies of the building stock which is associated with poor thermal insulation and the predominance of an unsustainable supply mix. Also, in post-communist countries, such as the Czech Republic, Poland and Serbia, the number of inadequately heated homes has seen a dramatic increase during the past two decades mainly due to the combination of rapid price rises, inadequate social protection and low residential energy efficiency (Bouzarovski S. & Herrero S.T, 2015).

Fortunately, a crucial driver to combat energy poverty will be the push for renewable energy when accompanied by energy efficiency improvements in a household (CEB, 2019). Renewable energy has become more common as a household energy source. With the pledge to "leave no one behind" the European Green Deal sets a massive challenge, particularly concerning the production and consumption of energy. In fact, the European Green Deal, proposed by the Commission in December 2019, promotes a fair transition towards a climate-neutral Union by 2050. Centrepiece of the Green Deal is the Renovation Wave. The Renovation Wave is a major initiative planned to boost structural renovation of private and public buildings, and therefore reduce emissions, boost recovery and address energy poverty Such structural changes and direct measures to reduce energy poverty as an increase of energy efficiency, provide better conditions for living, decreasing negative impacts of energy poverty on health and environment, provides better indoor environmental quality, higher economic and social security of the population and provides further development.

Energy poverty was mentioned at the European Legislation for the first time with the third package of legislative proposals for common rules for the internal electricity and gas markets, which was adopted and entered into force in 2009 with the Directives 2009/72/EC and 2009/73/EC. It is stated that energy poverty is a growing problem in the EU. Thus, the Member States should develop a national action plan to tackle it and to ensure the necessary energy supply for vulnerable customers (Boemi S., Papadopoulos A., 2017). Along the way, the EU created a set of priorities and proposals to tackle energy poverty effectively, with the most important being the following:

- The recast Electricity Directive in which the Member States have to adopt appropriate measures to address energy poverty wherever it is identified, including measures addressing the broader context of poverty.
- The Energy Efficiency Directive 2012/27/EU, as amended by Directive 2018/2002/EU, in which the Member States have to take account of the need to reduce energy poverty in the context of their energy efficiency obligations.
- The revised version of Energy Performance of Buildings Directive 2018/844/EU that outlines relevant national measures to help alleviate energy poverty, as part of their long-term renovation strategies to support the renovation of the national stock of residential and non-residential buildings.

The EU legislative framework also contains safeguards to ensure that measures taken to address energy poverty do not impede the opening up or the operation of the market. The most recent recommendation is the one published in the 14 October 2020 and concerts only energy poverty. It is part of the Renovation Wave mentioned above. Its main proposal is the development of a systematic approach and guidance on indicators on energy poverty, which will not be common for all EU but it will be based on national particularities as the one mentioned in the NCEPs. Also, it proposes to develop policies to tackle energy poverty based on meaningful and accountable processes of public participation and broad stakeholder engagement especially in close cooperation between all levels of administration.

Concluding, given the current financial recession, the need for near-zero energy buildings as well as the Covid-19 crisis the urgency of addressing energy poverty it is evident more than ever. Energy poverty is in the spotlight as more Europeans may struggle to afford access to essential energy, particularly with rising unemployment and new trends (remote working, education etc.). So it is time for radical changes in energy generation and its usage, and particularly in the manner in which society regards energy (for example as a public good) and in the role that citizens themselves are called to play (energy cooperatives). It is of the utmost importance to form effective policies, especially those associated with national energy and climate plans ('NECPs') and with long-term renovation strategies, considering things from

their social, financial as well as environmental perspectives since these changes must be implemented in a way that will cater to the needs of the most vulnerable citizens.

3. Data description

In order to reach a better understanding of the awareness status among citizens living in Greece on energy poverty and to identify challenges and citizens' needs and priorities, a survey was conducted. The quantitative and qualitative survey was a result of the collaboration between INZEB and the Heinrich Böll Stiftung Office Thessaloniki. It was realised in the period July to October 2018 and part of the findings were included in the study.

In total 691 households participated in the survey; 391 through the online form and 300 via phone interviews. Particular emphasis was laid on registering responses and opinions across the country while attempts were made to retain the representative sample of each periphery in proportion to the overall population. For instance, the findings gathered in the Attica region equate to 39% of the overall responses while according to the 2011 population census 35% of the overall population resides in Attica. Correspondingly, findings from central Macedonia equate to 16% of the overall responses while 17.4% of the overall population resides in the region. The same process was applied nation-wide. More details about the demographics of the sample can be found in Table 1.

4. Methodology

The citizens that took part in the survey were reached initially online. An online form was used that required no more than 15 minutes of their time, and was structured in four sections:

1. Demographics,
2. questions regarding technical-financial information,
3. questions regarding citizens' familiarisation with the energy poverty phenomenon,
4. citizens' opinion on tackling the phenomenon and their intention to participate in the process.

The online form was disseminated by email, posts on partners' website/social media, newsletters, press release on Greek media specialising on energy issues. Phone interviews were conducted, in parallel to the use of the online tools mentioned above, in collaboration with an independent communication agency. The geographical distribution of the online responses was considered in the planning of this phase, in order to ensure that a representative sample of each periphery, proportional to the overall population, will be reached. The responses received via the online form and through phone interviews were unified, as the same set of questions was used. Lastly, the information provided by the citizens was analysed and key-conclusions were reached and included in the study. A more comprehensive report with all the results will be available in a separate publication.

5. Results and discussion

The key results of the survey are presented below:

20% of survey participants admitted that they are not familiar with the term energy poverty, while 4 out of 5 citizens had in some way or another become acquainted with it.

68.8% of the respondents believe that energy poverty has repercussions on citizens' health and wellbeing while only 2.7% believe there is no direct link between the two.

30.2% replied that they frequently or very frequently experienced heating or cooling discomforts.

56.2% replied that they did not possess an Efficiency Performance Certificate.

48.3% of the respondents use heating oil while 13% use natural gas. Across the Ionian Islands the main heating source is oil.

90% of the respondents believe that the energy cost in Greece is high or very high while 6.9% deem the energy cost affordable.

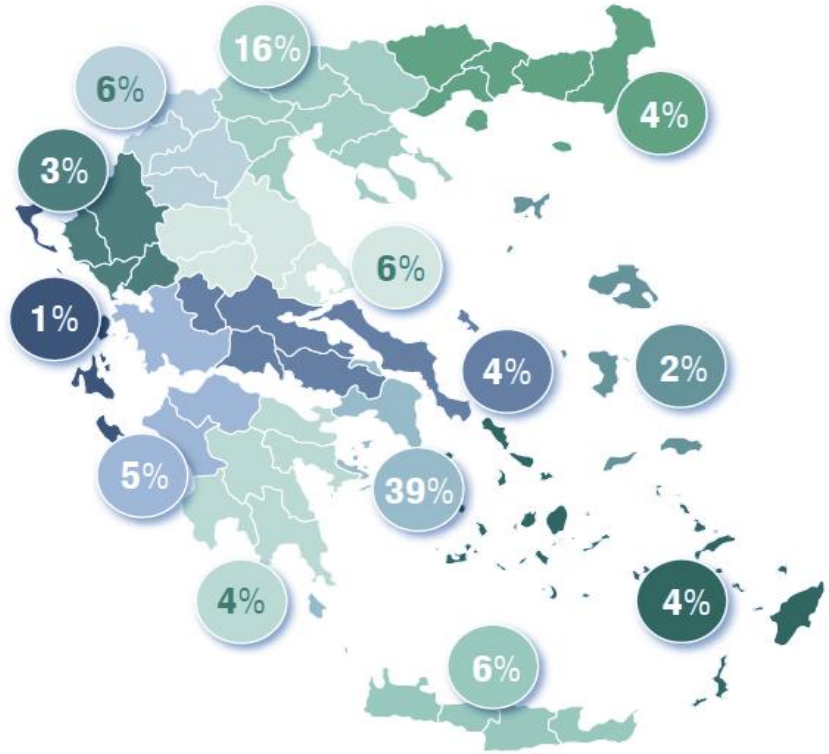
55.6% of the respondents spend 11-30% of their income on energy needs while 18.1% spend less than 10%.

24.8% replied that they would trust a local authority to act as a focal point for advice and consultation, followed by a consumer union (16%) and an energy cooperative (14.6%).

63% of respondents would welcome free advice and 47.5% is willing to contribute to forums and collective actions in their neighbourhood/city.

55.7% of the survey participants proposed combined measures (shift in energy habits, use of smart, efficient appliances, amelioration of buildings' energy performance, RES utilisation etc.) for effectively combating energy poverty.

Table 1: Regional distribution of responses and sample demographics.

<table>
<tr><td colspan="3"> 
</td><td>REGIONAL DISTRIBUTION OF RESPONSES

SAMPLE DEMOGRPAHICS
GENDER
Men: 50.4%
Women: 49.6%
AGE
18-24: 5%
25-34: 18,9%
35-44: 29.4%
44-54: 20.8%
55-64: 16.9%
65-74: 8%
75+: 1%</td></tr>
<tr><td>MARITAL STATUS
Married-in relationship living together: 64.2%
Non married-living alone: 21.6%
Other like cohabitants, sharing a house, living with parents: 14.2%</td><td>CHILDREN
No children in household: 59.3%
1 child: 16.9%
2 children: 17.6%
3 children: 3.2%
4+ children: 1.6%
no answer: 1.4%</td><td>EDUCATION
High-school: 18.2%
University (and Masters & PhD): 61.3%
College (IEK or similar): 13%
Education not completed: 7.5%</td><td>WORKING STATUS
unemployed: 9.7%
students: 4.3%
pensioners: 15.3%
self-employed - business owners: 25.9%
employed: 43.2%
other - n/a: 1.6%</td></tr>
</table>

The responses of the survey participants reveal the extent of energy poverty in Greece and the symptoms of its prevalence. Moreover, certain conclusions can be drawn from these results that can be translated into proposals and measures to address the issue:

- Approximately half of the participants' residencies did not possess an EPC. Beyond the apparent lack of data on the energy characteristics of the building stock, this fact also implies lost energy saving opportunities, especially since it is highly probable that the owners of these residencies have not proceeded to any energy renovation to date and conditions in these residencies remain sub-standard.
- 90% of participants deemed the energy cost in Greece as high or very high while 55.6% disclosed that 11%-30% of their income is spent on energy needs. 48.3% relied on heating oil to reach thermal comfort in their residencies with oil being the only heating source on islands. Promoting RES electricity generation is likely to decrease energy cost significantly via reduced demand for oil and other fossil fuel imports and to decrease electricity cost by applying cost sharing techniques via utility services for all island residents.
- 20% admitted that they are not familiar with the term energy poverty while 4 out of 5 citizens had in some way or another become acquainted with it. 68.9% believed that energy poverty has repercussions on citizens' health and wellbeing while 53.4% connected the issue to air quality in urban regions. The conclusions noted above are encouraging as regards citizens' familiarisation with the issue of energy poverty and especially its multifaceted nature and multiple repercussions – though inconspicuous at first glance - on citizens' health and wellbeing and on the environment. Complementary to that 55.7% of the survey participants proposed combined measures (shift in energy habits, use of smart, efficient appliances, amelioration of buildings' energy performance, RES utilisation etc.) for effective combating of energy poverty.

5. Conclusions and policy implications

The proposals described in this section for addressing energy poverty are instigated by the phenomenon's multifaceted nature which is intrinsically linked to the financial status of vulnerable population groups, to excess energy consumption attributed to residencies' poor energy performance and to high energy and fuel costs. It is therefore evident that energy poverty causes should be combated simultaneously through a "holistic approach" encompassing a blend of social, energy and environmental policies (Figure 1). Moreover, the proposed policies stress the urgency to tackle the issue through strategies and measures characterised by sustainable social innovation, pre-suppose closer collaboration between stakeholders, set long-term targets and most importantly, transfer citizens from the passive status of the recipient to the heart of developments and resolutions.

1. New policy lines

Drawing up a National Strategy – a Roadmap to Energy Poverty Eradication

There is no integrated, coherent energy poverty policy in institutional terms to date in Greece. A national strategy that will address the phenomenon holistically should be aligned with European policies, should adjust accordingly to the particularities of each region and work towards achieving cross-sectoral targets set in environmental, social and energy policy plans. The Roadmap to Energy Poverty Eradication should describe the actions needed to tackle energy poverty at national, municipal and local levels and ought to be aligned with national energy policy strategies such as smart specialisation sector for each periphery. It should mark gradual transition from social allowance-based policies towards innovative green policy driven by multiple investments.
At the same time it ought to be consistent with the objectives and the commitments of Greece as Member State of the European Union on climate change and to advocate citizens' active participation while considering vulnerable households' particularities.

Defining monitoring indicators/ statistical data collection

As stated in the "Clean energy package for all Europeans" it is obligatory for all Member States of the European Union to set quantifiable indicators-based targets on energy poverty mitigation at national level. The political commitment required is also highlighted.

Defining specific monitoring indicators and data collection to support progress measuring will result in effective implementation of the measures as described in the National Energy Poverty Action Plan. Progress rates can be monitored by a specified body (for example the National Energy Poverty Observatory) modelled on the English energy poverty strategy.

Empowering the National Energy Poverty Observatory's role and establishing collaboration with its European counterpart

The National Energy Poverty Observatory has the capacity to become medium of coordination, information dissemination and guidance on energy poverty related issues.

An empowered Observatory could disperse more explicit information and guidance to local bodies, authorities and partnerships that have assumed the task of drafting local action plans (always in accordance with general guidelines outlined in the National Energy Poverty Action Plan and the Commission's Recommendation on Energy Poverty).

Consequently, that would lead to more effective management and utilisation of available European funds on the sectors of energy, climate-change and social inequity that take the lion's share in European funding. By capitalising on the close collaboration between the National Energy Poverty Observatory and its European counterpart, valuable expertise and successful practices can revolutionise the implementation of measures addressing energy poverty in Greece.

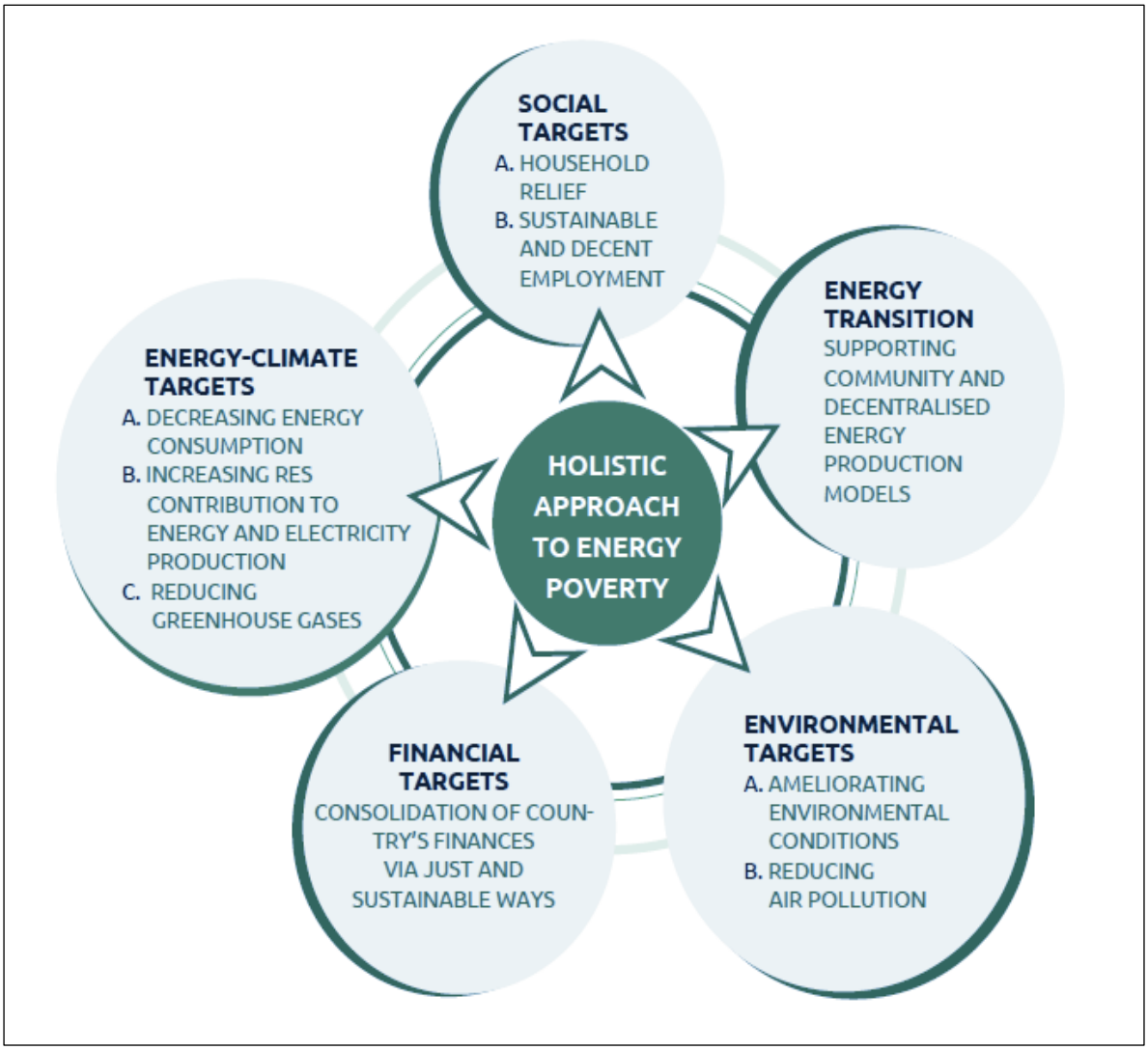


Figure 1: The National strategic holistic approach to energy poverty mitigation.

2. Public awareness and training

Interventions on the buildings' envelope, systems and equipment as well as changes in consumers' behaviour are key-steps in saving energy. Consumers' behaviour may affect a building's total energy consumption up to 25% - 30% (Delzendeh El. et al., 2017 and Paone A., Bacher J., 2018), either in a positive way following the application of suitable techniques that reduce energy consumption, or negatively by excess energy demand in cases when residents lack adequate practical knowledge or training. Deeply comprehending the concept of energy poverty is the keystone of enhancing public awareness of the phenomenon. Information on how this predicament came about, what and whom it concerns, how consumers are immediately affected and which actions can aid in tackling it, should become public knowledge. Enhancing public awareness is also fundamental in ameliorating citizens' living conditions (reduction in energy bills, generating financial saving) and in achieving long-term objectives set by the European Union.

Awareness – raising campaigns addressed to schools

It is essential that efforts to shape energy behaviour start from a young age. Implementation of an adequately structured and age-fitting informative and educational programme in primary and secondary education will be instrumental in acquainting students with the concept of energy poverty along with the ways in which the phenomenon affects their homes, their city, their country and in promoting habits they may adopt in order to contribute to energy saving and energy bills reduction at home and at school. Collaboration among all stakeholders such as educators, researchers and environmental associations is prerequisite to developing an integrated educational programme. By utilising and enriching existing educational material, concerted actions from the stakeholders' part will be successful in enhancing awareness. Following approval by the Ministry of Education and Religious Affairs and the Institute of Educational Policy, the programme should be addressed directly to students and members of the entire school community. For successful promotion and the schools' admission to the programme, it is essential to secure support of local bodies like the local Directorate of Primary Education and the local Directorate of Secondary Education. This outcome-oriented programme presupposes adjustment to the various age-groups in the school community which will generate development of tailored projects for primary education students and secondary education students.

Energy Consultants' Team and smart meters installation

Adequate training and effective coordination of the "Energy Consultants Team" is a proposal that can benefit population groups already struggling with energy poverty but can also integrate – or re-integrate – the unemployed into the job market. This proposal puts forward the development of an academic and vocational education training programme that will appeal to unemployed university graduates and scientists of multiple disciplines: engineers, economists, energy specialists (energy researchers, RES technology researchers, automation technology experts, energy saving and building applications technicians etc.). Through adequate training the prospective energy consultants will obtain the necessary background knowledge and expertise to provide assistance – mainly but not solely – to vulnerable population groups. Applying the methodology of home visits will enable them to inform and advise members of each household on ways to save energy and reduce energy bills, to conduct energy evaluation of the residencies' status and to suggest simple low-cost energy saving interventions like replacing light bulbs with LED, covering cracks in frames or doors, reducing heat loss, installing shading systems etc. More profound and efficient interventions could also be implied however costly these may be. In those cases energy consultants trained on energy investments could assess the potential of an integrated proposal for each household by demonstrating comparative data for the proposed interventions and the results of their assessment via market research. Another important aspect of the project will be simultaneous appraisal of each household's financial capacity in order to secure financial sustainability for the "energy interventions scheme". This way, it is ensured that property owners will have the means to fund the project and accommodate their energy needs. In a nutshell, financial sustainability of the "energy interventions scheme" relies heavily on

informing citizens about the perks of being a prosumer. Following consultation, smart meters should be installed in the residencies. This way, residents will become aware of their energy consumption and the impact these small changes can have on their energy consumption levels (e.g. setting the thermostat 1°C lower, switching off the lights, etc.) After the smart meters are installed, the residencies will be visited by an energy consultant who will monitor and collect the outcomes and will further consult the residents on practical matters regarding energy saving. A visit by the entire energy team will undertake a full presentation of the financial and energy benefits, will propose further actions, assess the household's financial status and via market research present also a financial assessment of the energy saving proposals. By considering each household's needs and the accomplishments of the energy consultants, a common "energy interventions plan" can be drawn up that will be enriched by proposed interventions on the building's envelope and equipment, by recommendations suggesting a shift in habits, by illustrating the perks of being producer-consumer thus assisting financially the households.

Energy Poverty Information Desk

An Energy Poverty Information Desk operating at municipal or regional level and coordinated by local governments is proposed. Organisation and coordination of the project can materialise in liaison with local/regional bodies, associations and non-governmental organisations, social enterprises and/or local Energy Communities. Information and advice on techniques that save energy and reduce energy bills will be provided directly to citizens, especially to those who find accessing the Internet or handling smart technology challenging. At the same time, the Information Desk will respond to young people's and students' needs via its informative, continuously updated webpage and via telephone support for instant response to their queries. Finally, the Information Desk could also hold information events independently or in liaison with other bodies as well as welcome similar initiatives by other stakeholders.

Awareness initiatives/events addressed to citizens

Energy poverty awareness-raising events and actions should be addressed to all citizens: young people, students, parents, entrepreneurs, the elderly etc. Those initiatives can be organised either by the Energy Poverty Information Desk mentioned above in liaison with various bodies, or independently for dissemination of targeted information. Municipal authorities in collaboration with local entrepreneurs, associations and organisations will be able to provide information on current energy prices and available new technologies and also demonstrate the current conditions in the energy sector. This way, citizens will be enabled to examine available options and compare alternative solutions. In addition, they will be informed about the potential to generate energy at home or in their district/community etc. The aforementioned collaboration could be based on a quid pro quo relation. Local governments can assume the development of the projects and campaigns by adopting techniques applied previously in successful practices, by securing the Energy Poverty Observatory's technical assistance, by capitalising on their collaboration with local bodies and finally by integrating their targets into the Action Plan of the Covenant of Mayors for Climate and Energy. Universities may also prove invaluable in organising and conducting promotional, awareness campaigns and actions nationwide. Informing and integrating the entire academic community (students, professors, and personnel) in the project and holding public events jointly with municipal authorities in the presence of stakeholders, is deemed vital. Concurrently, interdisciplinary and inter-scientific collaboration between university departments would attribute value to an existing and successful project and run it at national scale.

3. <u>Increase buildings' energy efficiency</u>

Several studies have confirmed that energy renovations in vulnerable households' residencies when compared to allowance-based relief measures are proven a most effective energy poverty tackling medium. At the same time residencies' inner thermal comfort improves on short amortisation period – especially in cold-climate zones – and major wider benefits are generated for people's safety, for sound insulation and aesthetics, for health and productivity etc. Finally, sectors pertaining to construction which have been experiencing the effects of the latest recession could boost

productivity through energy-saving renovations performed on residencies.

An integrated service (one-stop-shop) for consultation

Evidently regional administration in joint efforts with municipal authorities, are most conducive to developing synergy projects for locating vulnerable households and achieving economies of scale. Through integrated action plans, synergies have the potential to secure benefits for all stakeholders, increase risk-sharing and secure European funding. The new framework for energy cooperatives and obligation schemes can drive energy poverty tackling efforts by mobilising capital to be allocated to vulnerable households. Therefore, in collaboration with the empowered National Energy Poverty Observatory, regional authorities could stimulate residential buildings' energy upgrade interventions financed by European funds. Insights gained by previously applied practices may offer guidance on financing matters, on techniques, on designing etc. Development of an integrated energy upgrade/renovation service (one-stop-shop) to serve as consultation and guidance hub throughout the renovation process is a decisive step towards successfully implementing the above-mentioned practice. This service will be equipped with the means to provide citizens with tailored information on the wider benefits of energy retrofit (environmental benefits, financial benefits, improved quality of life etc.) and guidance on prioritised implementation of the most effective energy saving practices, utilisation of funds and available programmes etc. Parallel to this, an innovative tool like the "Individual Building Renovation Roadmaps" can assist in drafting a customised energy upgrade "business plan" for citizens who express interest.

Synergies and collectives to secure initial capital

Combining various stakeholders in a collective scheme may prove essential in developing energy upgrade projects for vulnerable households. To guarantee success, Public-Private Partnerships (PPP) could be formed by local governments' agents, citizens' associations, construction – or pertaining to construction – companies, energy service companies, energy providers operating in the obligation schemes, banks, non-governmental organisations etc. The new legal framework for Energy Communities drives and facilitates development of such schemes inspired by successful practices like the Energie Solidaire project (Énergies Solidaires, 2020). Considering the successful example of LABEEF (Latvian Baltic Energy Efficiency Facility) it is assumed that de-risking of investments upon task completion by an agent collaborating with a banking institution, is the keystone of such project's success. This way, the energy service companies (ESCOS) do not carry the full burden of the investments' credit risk and are thus permitted to proceed to new projects.

Adopting policies guided by the framework which stipulates obligation schemes' operation, sets municipal and regional targets, clarifies businesses' social responsibility and reduces prices due to feasible economies of scale, is of paramount importance. Concurrently, developing residencies' energy retrofit projects could assume collective characteristics and be applied on blocks of flats or districts. Admittedly, radical energy upgrade interventions on a building as a whole are more energy and cost-efficient compared to mild upgrade interventions on buildings' envelopes concentrating mainly on flats. Interventions on the building's envelope (thermal insulation, replacing frames) reduce heat loss and increasingly utilise RES while taking advantage of conventional fossil fuels' heating systems (e.g. solar panels connected to central heating system for thermal comfort and domestic hot water). The benefits of flat owners' collectives cooperative at neighborhood or district level (e.g. Carbon Co-op) have been verified by good practices worldwide. Collective management allows for the emergence of economies of scale while facilitated access to financing sources leads to widespread implementation of energy upgrade projects.

In Greece, development and effective operation of schemes with such institutional and technical characteristics encounter obstacles due to lack of incentives and limited collective solidarity-based mentality. The below-mentioned suggestions aim to assist in overcoming these obstacles:

- Actions on blocks of flats. Awareness actions can inform owners and leaseholders about the financial and environmental benefits deriving from a joint, well-organised energy upgrade and improve the

quality of their cooperation. These actions could be held by the Energy Poverty Information Desk jointly with various agents such as Energy Communities, engineers' social enterprises, shared utility bills management companies, technical construction companies, electricity providers (as stipulated in the Energy Efficiency Obligation Schemes) etc. An awareness-raising campaign of such scale could form a sound foundation upon which to build bonds of trust between tenants and stakeholders who could undertake coordination and management of bureaucracy spawned from a building's deep energy retrofit. The particular need becomes clearer when the high percentage of smallholders in Greece is considered.

- Actions at the neighbourhood/district level. Participation in energy cooperatives generates many financial benefits for citizens, shop-owners etc. in any district. These benefits include the supply of construction materials or energy saving interventions services (economies of scale), competitive prices on energy supply, production, storage or even exchange of energy generated from renewable sources. Additionally, members of the cooperative could offer consulting services, encourage purchasing and retrofitting of bankrupt or vacant residencies etc. Local agents and social enterprises of various professional fields (engineers, construction technicians, etc.) could join these initiatives in order to encourage tax incentives and attract European funding. By attributing value to experience gained by the former "Workers' Housing Organisation" programme and the European Federation of Public, Cooperative and Social Housing, Housing Europe network (Housing 4all, LEMON project, Transition Zero etc.), collective schemes could significantly affect social housing policy. Finally, through interaction with local agents and local communities and by encouraging cooperation and autonomous organisation of social enterprises, the schemes could be admitted to the "local ecosystems" of social solidarity-based economies. Thus, they would be able to plan and develop common services and capitalise on local resources for the benefit of local communities.

Tax-reliefs for energy upgrade products and services

Tax-reliefs on energy products and services could be enacted as a substitute measure for allowance-based policies to provide owners with an extra incentive for radical renovations and at the same time, increase public revenue by terminating irregular activities (European Climate Foundation, 2019). Appended to the Energy Poverty National Strategy, these tax-reliefs should adhere to certain criteria to assess vulnerable households' eligibility.

Linking mortgages to energy renovation schemes

Several "risk analyses" conclude that energy efficiency interventions in residencies have a mitigating risk effect for banks as a result of the impact on a borrower's ability to dispose income in their household and service their loan (European Mortgage Federation, 2016). In the case of non-performing mortgages, a correlation between energy upgrade and lower interest rate plus reduced monthly instalments rate could be fostered. This will guarantee a bonus for the borrower and risk mitigation for the bank. Along with primary residence protection measures and small loans approval from cooperative banks, the aforementioned measure has the potential to decrease the rate of vulnerable households that cannot afford energy retrofit investments on their residencies due to lack of capital along with a certain degree of reticence towards the banking sector.

Framework for energy renovation studies and vulnerable households' Energy Performance Certificates

Based on insight gained from previous projects, this final proposal highlights the need to improve energy upgrade/renovation studies and buildings' certification process, to empower energy auditors and to process the BuilingCert's database so as to integrate facts and conditions pertinent to energy poverty and the users' particular profiles. It is also suggested that Energy Performance Certificates be upgraded and evolve into information mediums via which owners could plan radical energy upgrades and access financing sources. The European Union funded iBRoad project (iBRoad, 2020) contains an updated description of such a model.

4. Renewable energy sources utilisation

Apart from the desired transition from consumers to prosumers, energy bills reduction and energy poverty mitigation, the below-mentioned proposals will facilitate the release of adequate funds to accommodate energy needs and settle pending energy issues such as energy import, greenhouse gas emission fees etc. By adhering to the guidelines on buildings' energy upgrade programmes and social policies for financial and energy poor citizens, these funds will be allocated accordingly nationwide.

Empowering energy self-generation – self-consumption in households

An integrated national policy should stipulate provisions for RES systems installation in residencies and facilitate access to financing. These actions will prove instrumental in utilising green energy generation, in increasing RES contribution rates to final consumption and in curtailing energy poverty. The publication of the Ministerial Order on developing Energy Community power plants with the application of virtual net metering renders the particular legal framework more favourable for such ventures. However, radical transformation is mandatory if we wish all citizens to be empowered – especially vulnerable population groups facing challenges pertaining to low-income and inadequate access to financing or energy loans. To this end, a set of proposals is described:

- Introduction of tax-reliefs for in-depth study, supply and installation of RES systems for citizens belonging to vulnerable population groups.
- Development of adequate financial products for RES systems' installation in vulnerable households with European funds utilisation to mitigate credit-risk on behalf of credit institutions. Also, loan repayment should be linked to financial benefits deriving from self-consumption and energy saving from deep energy upgrades in the form of Energy Performance Contracting.
- Designing a special "Saving at Home" programme addressed to members of vulnerable population groups will allow no-cost RES systems installation.

Establishing Energy Communities

Establishing Energy Communities can contribute most effectively to energy poverty tackling locally since one of its fundamental principles is channeling generated benefits to their members and the local community. Primary activities of an Energy Community – production, storage, self-consumption or energy sale – as well as secondary ones – smart meters supply and consultation on energy saving – are contingent upon the involvement of local actors and collaboration with the local community. The legal framework makes a clear distinction between profitable Energy Communities and non-profitable ones. The distinction is based upon their constituent members and their capacity to supply excess energy. Profitable Energy Communities constitute large collective schemes whose members are mostly individuals, entitled to excess energy distribution. The number of shares in the cooperative is crucial for the admission of low-income individuals and might occasionally prove discouraging. This barrier has been surpassed by cooperative schemes in Greece and abroad via micro-lending to prospective Community members and gradual loan repayment either in set instalments or by the provision of services to the cooperative. On the other hand, non-profitable Energy Communities are established by public or private law legal entities not entitled to excess energy distribution. Vulnerable population groups affected by energy poverty could benefit from both types of Energy Communities. For example, an Energy Community created by municipal and/or regional authorities in collaboration with local entrepreneurs or businesses for RES systems installation will have the means to provide affordable or free energy to low-income households. Likewise, in Communities operating in blocks of flats or at district/neighborhood level, the entirety of citizens may benefit from self-generation – self-consumption and by extension from reduced energy bills. Some examples of Energy Communities that could be established in cities and their corresponding benefits for citizens are illustrated in Table 2.

Renewable Energy Sources energy supply in the network at more affordable prices, "Energy Contract."

Final energy prices can hardly be reduced on account of obstacles which consumers encounter in making the transition to energy prosumers, due to lack of transparency

regarding the origins of consumed energy and finally because of high levies and fees that increment energy bills.

It is recommended that in order to surpass these impediments, the percentage of RES contribution to the energy network be increased. In addition, upgrading and promoting capacity for electricity self-generation – self-consumption in residencies via net metering is equally vital. As pointed out above, Energy Communities have the means to empower consumers to this end. At the same time though, consumers must be informed about the energy's origins and be granted access to knowledge and possibilities such as eased process for switching suppliers, smart meters' installation to monitor consumption, safeguarding against irregular market practices etc.

A statutory "Consumer's Energy Contract" ought to contain these practices that first and foremost safeguard consumers who are called to assume a vital role in energy plans implementation and the system's management to make full use of their capacity as consumers and benefit from the energy transition.

Table 2: Energy Communities at city level.

ENERGY COMMUNITY AND MEMBERS	SYSTEM IMPLEMENTATION	BENEFITS
House/flat owners or in neighbourhoods/districts	Photovoltaics/small wind power system installation with net metering or virtual net metering if the installation can be established on the outskirts of the city Offsetting between energy generated and energy consumed for households participating in the Energy Community or feed excess energy to electricity network	Reduced energy bills for all Member Households of the Energy Community
Local businesses (e.g. 3 hotels or 5 stores)	Photovoltaics/small wind power system installation with net metering or virtual net metering if the installation can be established on the outskirts of the city Offsetting between energy generated and energy consumed by businesses/stores participating in the Energy Community or feed excess energy to the electricity network	Reduced energy bills for all businesses/stores participating in the Energy Community
Local Governments (e.g. 4 distinct local governments)	Photovoltaics/small wind power system installation with virtual net metering Offsetting between energy generated and energy consumed by low-income vulnerable households/vulnerable groups	Reduced energy bills or/and no-cost energy supply to low-income vulnerable population groups
Local synergies (citizens, 2 local businesses, municipality)	Thermal energy production units installation for members' or vulnerable households' heating needs via distant heating	Reduced energy bills for all Energy Community Members and/or no-cost heat distribution to vulnerable households via district heating

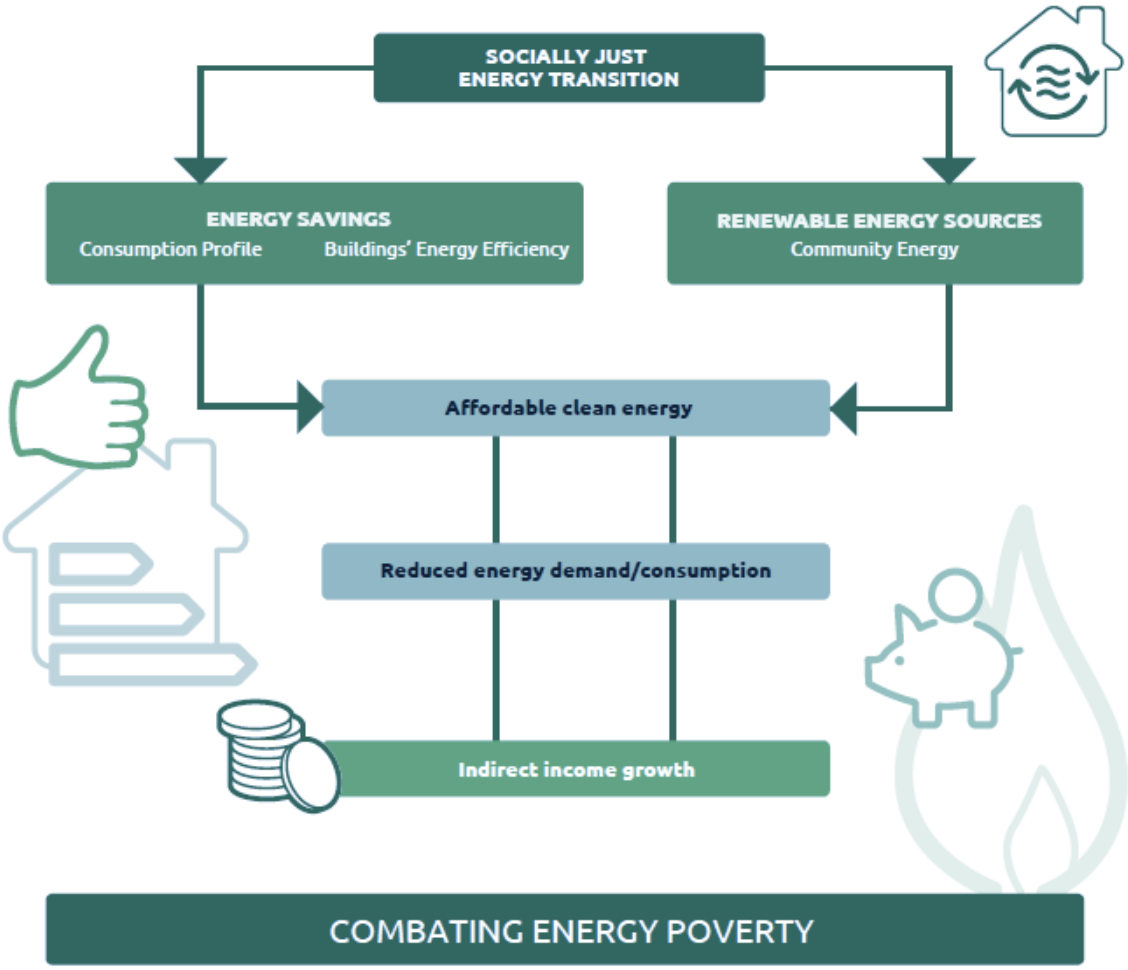


Figure 2: Just energy transition pillar.

Socially just energy transition presents opportunities for combating energy poverty since it stands on two pillars; energy efficiency and community energy. By reducing the energy consumption/demand and indirectly increasing the income of energy vulnerable citizens, while at the same time upgrading their properties, the risk of experiencing energy poverty is eradicated (Figure 2). A number of underlying conditions are required for the effective implementation of the proposals included in the study:

- Although energy poverty is acknowledged as serious and complex and its impacts are more than apparent in Greek society, there is still room for deepening the knowledge over its multifaceted nature besides clarifying the difference between income poverty and energy poverty. Educational programs, trainings, public events etc. could be employed to this end, in order to plan policies and implement pilots effectively.
- The national strategy needs to emphasise on combined, socially innovative measures aiming at environmental, social and energy targets (Corovessi A., Touloupaki E., Chrysogelos N., Metaxa K., 2017). It is essential to address the issue of defining and measuring energy poverty. In addition, it needs to be planned under the supervision and consultation of multiple stakeholders (citizens, social and solidarity-based economy bodies, local authorities, traditional market operators, universities, public health bodies, property owners, public welfare etc.) since the majority of previously applied measures and indirect relief policies were in essence fragmented, inefficient and non-targeted.
- Synergies between actors at all levels are required; policy makers (local, regional, state level), business actors (electricity providers, construction companies etc.), collective/cooperative schemes, civil society

organisations, school communities, academia etc, in order to a) raise awareness, b) target energy vulnerable citizens, c) utilise European funds to de-risk investments, d) overcome initial capital barrier, split-incentives etc.

- Energy efficiency as an evaluation criterion may render an investment sustainable. Furthermore, energy efficiency loans have the capacity to generate minor benefits for all stakeholders – loan borrowers, mortgage lenders, investors and governments while they might also guarantee wealth preservation, risk mitigation of likely loan defaults as well as the safeguarding of capital and energy savings. Credit risk-sharing with other credit institutions and actors could be a viable alternative till the banking sector becomes convinced of the low credit risk entailed in energy efficiency loans.
- A pan-European policy to empower vulnerable households in such a way as to generate energy via RES and reduce energy bills should be developed in an integrated manner that will secure adequate financing tools and funding. The policy should adjust accordingly to each Member State's legislation.
- Instructing citizens on the basic principles of RES systems is the keystone of successful inception of the Energy Communities venture. Member-citizens should comprehend the positive impact of RES integration on the local economy, on energy saving and de-carbonisation. Sufficient understanding will reinforce their trust in collective ventures and encourage them in assuming a more active role in the energy system.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Mrs. Kyriaki METAXA [1]

Programme Coordinator Heinrich Boell Foundation Office Thessaloniki, Hellas

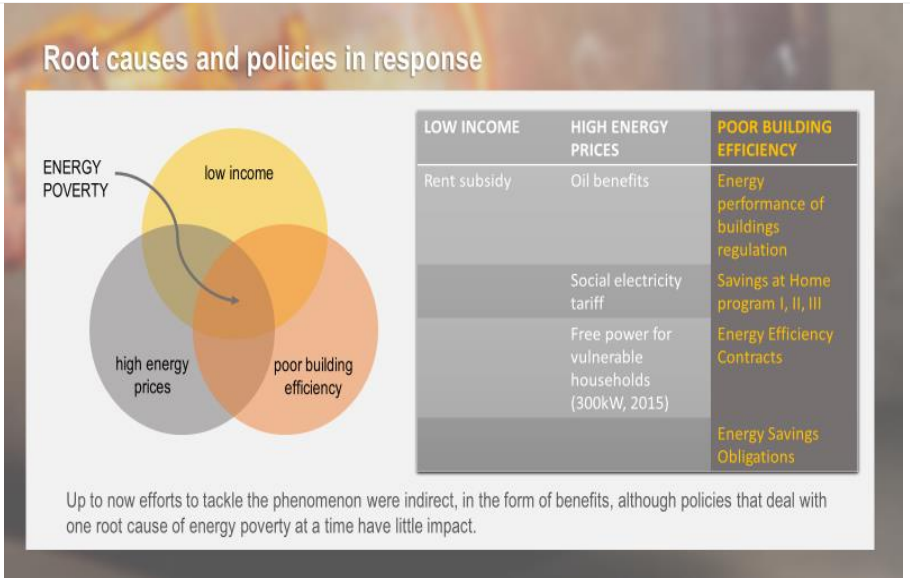
Short CV

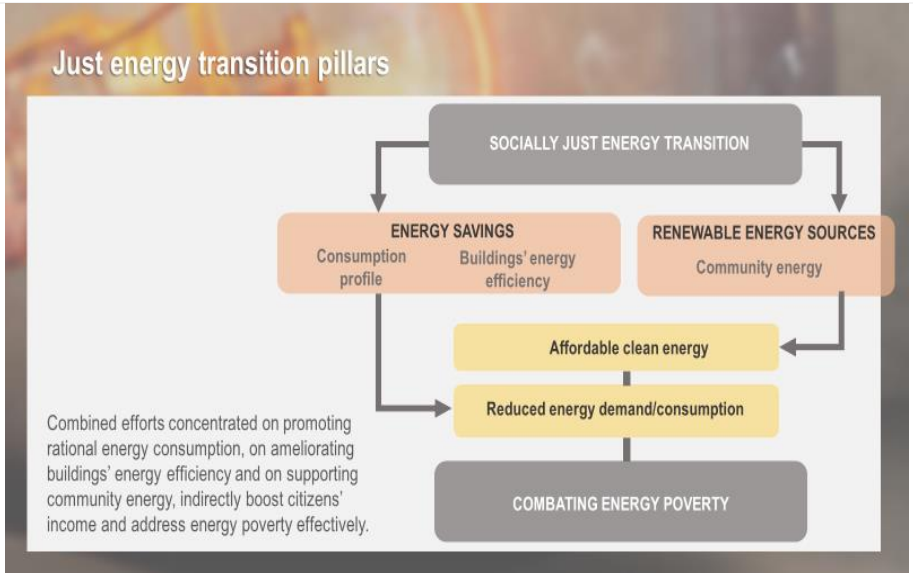
Kyriaki Metaxa works as a Program Coordinator Ecology at the office of Heinrich Böll Foundation Greece in Thessaloniki. The focus of her work revolves around environmental sustainability and just energy transition, especially energy efficiency, community energy and energy poverty. She is responsible for conceptualizing and coordinating activities and in the process fostering collaborations with and among keystakeholders, with the goal to encourage decision makers to establish policies and measures as well as to empower civil society to advocate and engage in activities for a democratic, socio-ecological transformation in Greece. She has a degree in Architecture with professional experience as a self-employed architect and building energy auditor. She also holds an MSc in Energy Systems by the International Hellenic University. In her thesis, she explored the benefits of the collective approach with regard to the energy retrofit of working-class multiapartment buildings, built by the Workers' Housing Organisation (OEK) in the '60s. In 2017, she was among the four authors of the policy report "Energy Poverty in Greece; Social Innovation Proposal to address the Phenomenon", published by the Heinrich Böll Foundation Greece.


ENERGY POVERTY IN GREECE 2.0
Policy developments and social innovation: proposals for combatting it
Kyriaki Metaxa, Program Coordinator
Heinrich Boell Stiftung Thessaloniki Greece
13th International Scientific Conference on Energy and Climate Change
PROMITHEASnet – the Energy and Climate Change network
7-9 October 2020 - Athens

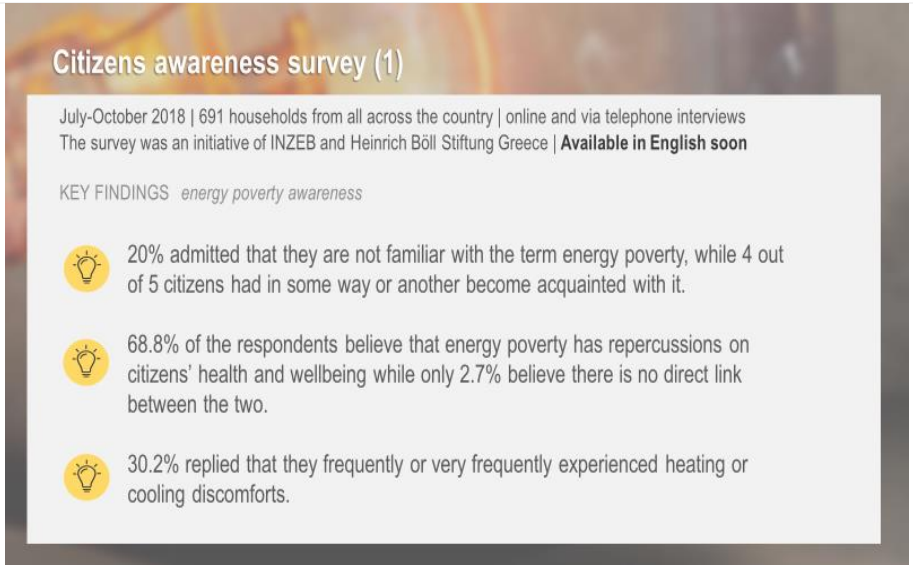

STRUCTURE
Starting point
Root causes
Just energy transition
Political developments
Citizens' awareness survey
Holistic approach
Proposals
Energy Communities
Conclusions

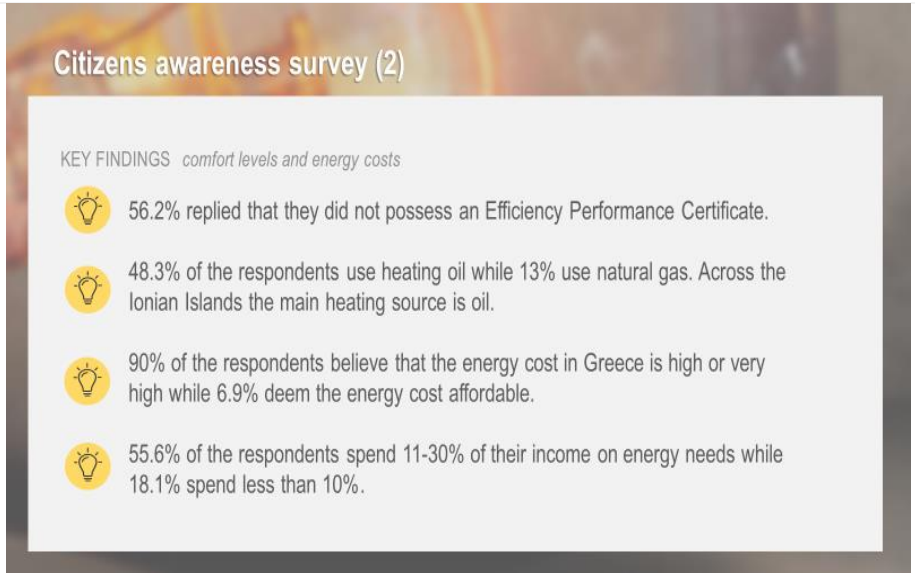

ENERGY POVERTY IN GREECE 2.0 (2019)
Policy developments and social innovation: proposals for combatting it
2017: Systematic review of available knowledge on energy poverty, highlights its multifaceted nature, emphasizes the need to shift from short-relief allowance based policies to a holistic one.
2019: Builds on the above, pinpoints the link between just energy transition and energy poverty tackling efforts, the key-role of citizens and opportunities that arise from recent political developments in Greece and the EU for its mitigation in a cross-sectoral and socially innovative way.
HEINRICH BÖLL STIFTUNG
THESSALONIKI
Greece
INZEB
INSTITUTE OF ZERO ENERGY BUILDINGS
ΠΟΛΥΤΕΧΝΕΙΟ ΚΡΗΤΗΣ

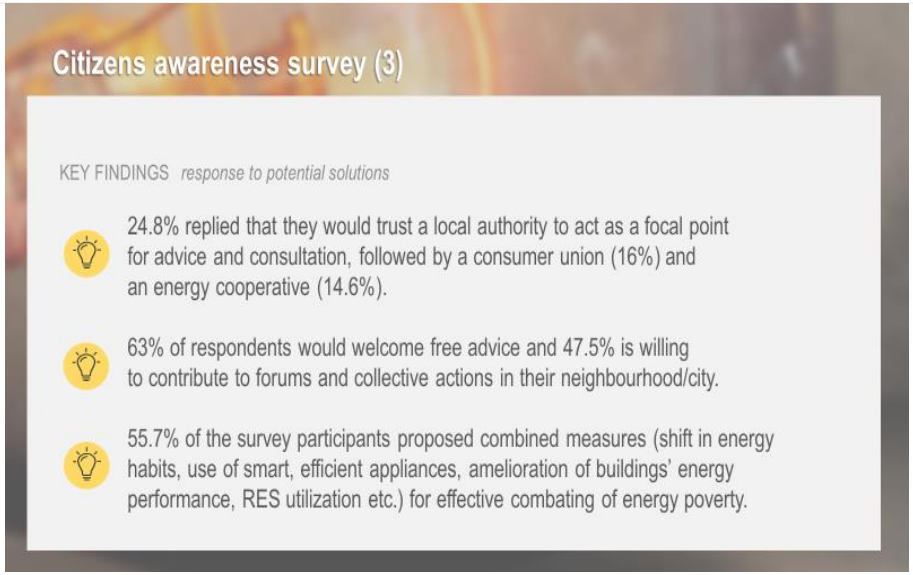

Root causes and policies in response
ENERGY POVERTY
low income
high energy prices
poor building efficiency
LOW INCOME
HIGH ENERGY PRICES
POOR BUILDING EFFICIENCY
Rent subsidy
Oil benefits
Energy performance of buildings regulation
Social electricity tariff
Savings at Home program I, II, III
Free power for vulnerable households (300kW, 2015)
Energy Efficiency Contracts
Energy Savings Obligations
Up to now efforts to tackle the phenomenon were indirect, in the form of benefits, although policies that deal with one root cause of energy poverty at a time have little impact.

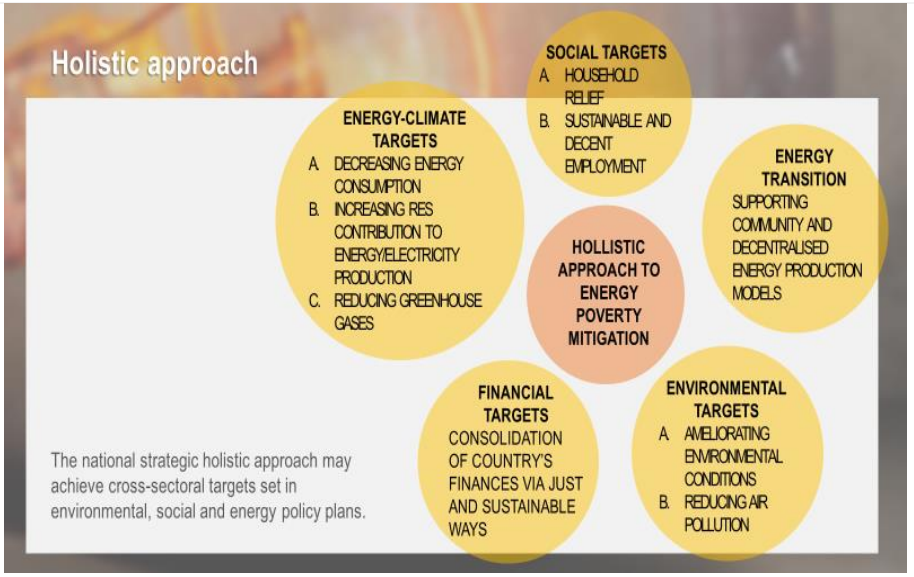

Just energy transition pillars
SOCIALLY JUST ENERGY TRANSITION
ENERGY SAVINGS
Consumption profile
Buildings' energy efficiency
RENEWABLE ENERGY SOURCES
Community energy
Affordable clean energy
Reduced energy demand/consumption
COMBATING ENERGY POVERTY
Combined efforts concentrated on promoting rational energy consumption, on ameliorating buildings' energy efficiency and on supporting community energy, indirectly boost citizens' income and address energy poverty effectively.


Related political developments
• Clean energy package for all Europeans
• EU Energy Poverty Observatory
• National Energy Poverty Observatory
• Law 4513/18 on Energy Communities
• "Saving at Home II" programme
• Market-based instruments


Citizens awareness survey (1)
July-October 2018 | 691 households from all across the country | online and via telephone interviews
The survey was an initiative of INZEB and Heinrich Böll Stiftung Greece | Available in English soon
KEY FINDINGS energy poverty awareness
20% admitted that they are not familiar with the term energy poverty, while 4 out of 5 citizens had in some way or another become acquainted with it.
68.8% of the respondents believe that energy poverty has repercussions on citizens' health and wellbeing while only 2.7% believe there is no direct link between the two.
30.2% replied that they frequently or very frequently experienced heating or cooling discomforts.


Citizens awareness survey (2)
KEY FINDINGS comfort levels and energy costs
56.2% replied that they did not possess an Efficiency Performance Certificate.
48.3% of the respondents use heating oil while 13% use natural gas. Across the Ionian Islands the main heating source is oil.
90% of the respondents believe that the energy cost in Greece is high or very high while 6.9% deem the energy cost affordable.
55.6% of the respondents spend 11-30% of their income on energy needs while 18.1% spend less than 10%.

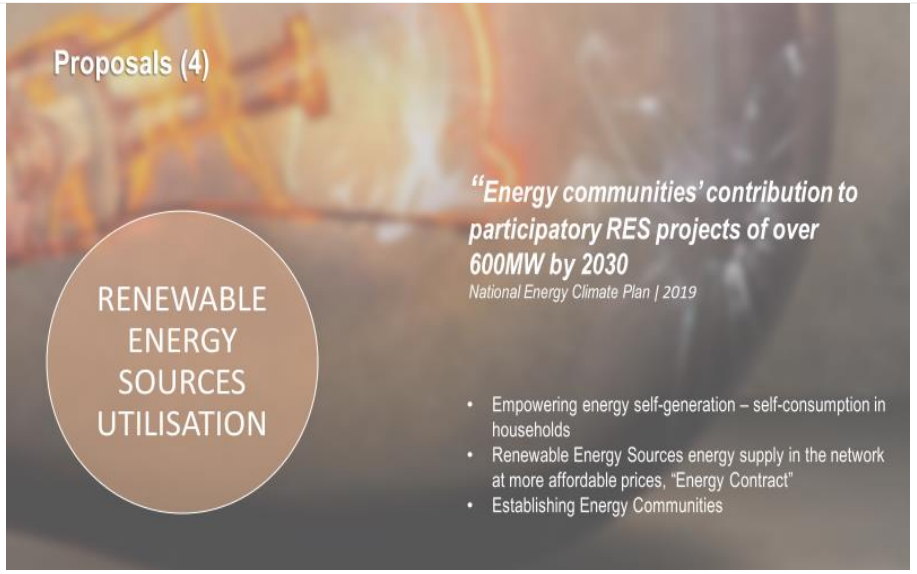

Citizens awareness survey (3)
KEY FINDINGS response to potential solutions
24.8% replied that they would trust a local authority to act as a focal point for advice and consultation, followed by a consumer union (16%) and an energy cooperative (14.6%).
63% of respondents would welcome free advice and 47.5% is willing to contribute to forums and collective actions in their neighbourhood/city.
55.7% of the survey participants proposed combined measures (shift in energy habits, use of smart, efficient appliances, amelioration of buildings' energy performance, RES utilization etc.) for effective combating of energy poverty.


Holistic approach
SOCIAL TARGETS
A. HOUSEHOLD RELIEF
B. SUSTAINABLE AND DECENT EMPLOYMENT
ENERGY-CLIMATE TARGETS
A. DECREASING ENERGY CONSUMPTION
B. INCREASING RES CONTRIBUTION TO ENERGY/ELECTRICITY PRODUCTION
C. REDUCING GREENHOUSE GASES
ENERGY TRANSITION
SUPPORTING COMMUNITY AND DECENTRALISED ENERGY PRODUCTION MODELS
HOLLISTIC APPROACH TO ENERGY POVERTY MITIGATION
FINANCIAL TARGETS
CONSOLIDATION OF COUNTRY'S FINANCES VIA JUST AND SUSTAINABLE WAYS
ENVIRONMENTAL TARGETS
A. AMELIORATING ENVIRONMENTAL CONDITIONS
B. REDUCING AIR POLLUTION
The national strategic holistic approach may achieve cross-sectoral targets set in environmental, social and energy policy plans.

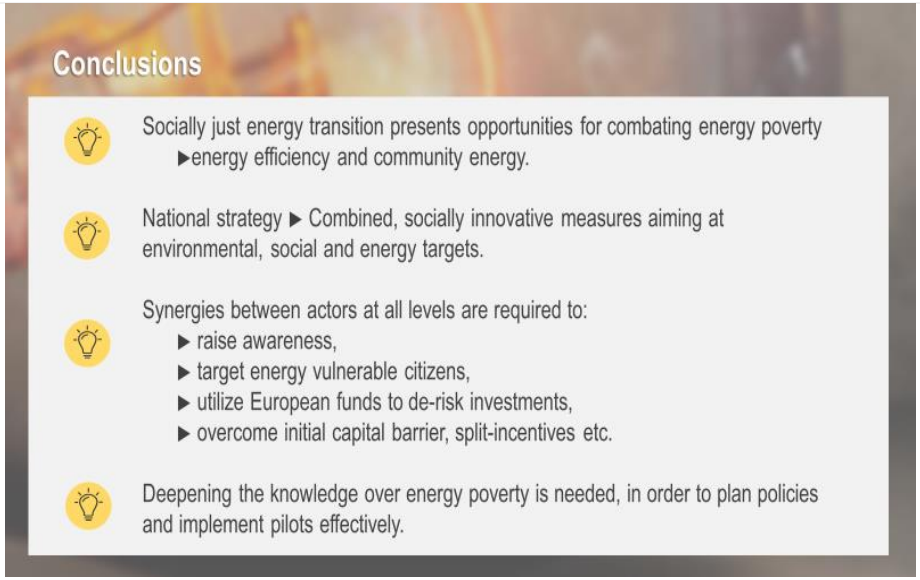

Proposals (1)
NEW POLICY LINES
"A reduction in energy poverty indicators by 50% by 2025, and by 75% by 2030
National Energy Climate Plan | 2019
Drawing up a National Strategy – a Roadmap to Energy Poverty Eradication
Defining monitoring indicators/ statistical data collection
Empowering the National Energy Poverty Observatory's role and establishing collaboration with its European counterpart

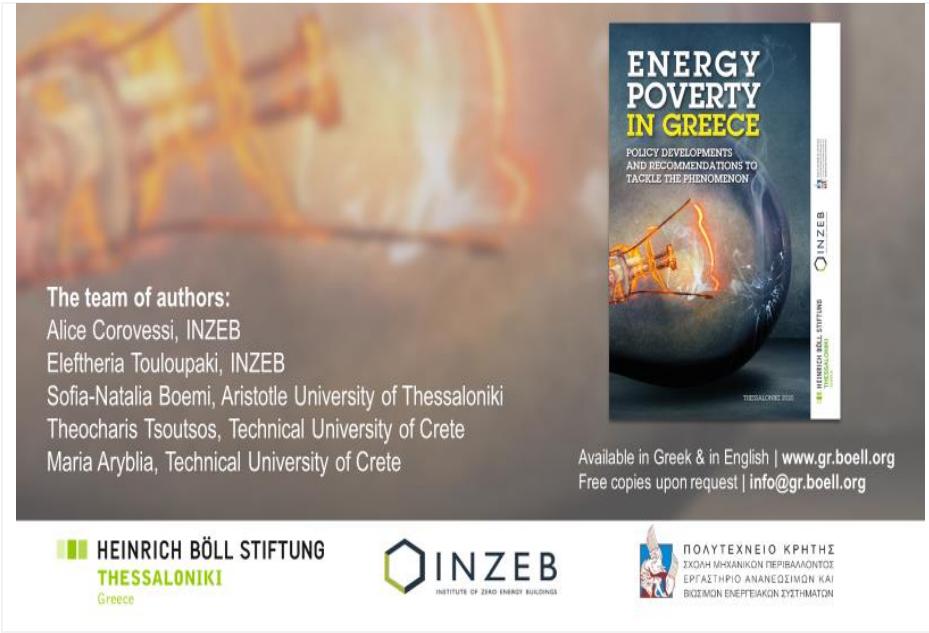

Proposals (2)
PUBLIC AWARENESS & TRAINING
"Consumers' behaviour may affect a building's total energy consumption up to 25% - 30%
Paone, A.; Bacher, J.-P. The Impact of Building Occupant Behavior on Energy Efficiency and Methods to Influence It: A Review of the State of the Art. Energies 2018, 11, 953.
Awareness – raising campaigns addressed to schools
Energy Consultants' Team and smart meters installation
Energy Poverty Information Desk
Awareness initiatives/events addressed to citizens


Proposals (3)
INCREASE BUILDINGS' ENERGY EFFICIENCY
"55% of residencies in Greece had been built prior to 1980
Hellenic Statistical Authority | 2011 census
• An integrated service (one-stop-shop) for consultation
• Synergies and collectives to secure initial capital
• Tax-reliefs for energy upgrade products and services
• Linking mortgages to energy renovation schemes
• Framework for energy renovation studies and vulnerable households' Energy Performance Certificates


Proposals (4)
RENEWABLE ENERGY SOURCES UTILISATION
"Energy communities' contribution to participatory RES projects of over 600MW by 2030
National Energy Climate Plan | 2019
• Empowering energy self-generation – self-consumption in households
• Renewable Energy Sources energy supply in the network at more affordable prices, "Energy Contract"
• Establishing Energy Communities


Energy Communities at city level
ENERGY COMMUNITY MEMBERS
House/flat owners or in neighbourhoods/ districts
Local businesses (e.g. 3 hotels or 5 stores)
Local Governments (e.g. 4 distinct local governments)
Local synergies (e.g. citizens, 2 local businesses, municipality)
SYSTEM APPLIED
Photovoltaics/small wind power system installation with net metering or virtual net metering
Photovoltaics/small wind power system installation with net metering or virtual net metering
Photovoltaics/small wind power system installation with virtual net metering
Thermal energy production units installation for members' or vulnerable households' heating needs via distant heating
BENEFITS
Reduced energy bills for all member households of the Energy Community
Reduced energy bills for all businesses participating in the Energy Community
Reduced energy bills and/or no-cost energy supply to low income vulnerable groups
Reduced energy bills for all Energy Community members and/or no-cost heat distribution to vulnerable households via district heating


Conclusions
Socially just energy transition presents opportunities for combating energy poverty
▶energy efficiency and community energy.
National strategy ▶ Combined, socially innovative measures aiming at environmental, social and energy targets.
Synergies between actors at all levels are required to:
▶ raise awareness,
▶ target energy vulnerable citizens,
▶ utilize European funds to de-risk investments,
▶ overcome initial capital barrier, split-incentives etc.
Deepening the knowledge over energy poverty is needed, in order to plan policies and implement pilots effectively.



Thank you for your attention ☺

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RESCoop

Mr. Dimitris KITSIKOPOULOS

Electra Energy Cooperative, Hellas

Short CV

Mr. Dimitris Kitsikopoulos is vice president and co-founder of the social enterprise ELECTRA energy which was founded in 2016 in order to contribute to the promotion of energy democracy and the support and development of Energy Communities in Greece. He has a degree in electrical engineering and many years of experience in the field of industry, RES. and the social economy.

ELECTRA ENERGY.
Social enterprise

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ΚΑΛΟ ΕΛΕΤΑΕΝ ΕΚΠΑΙΔΕΥΤΙΚΗ ΠΛΑΤΦΟΡΜΑ ΚΑΛΟ RESCOOP.EU cooperative enterprises build a better world COOP

1. Who we are

We work for the development of COMMUNITY ENERGY in Greece

ELECTRA ENERGY.

- *Raise awareness*
- *Capacity building*
- *Advocacy*
- *Consulting*
- *Project Development*
- *Research*

Who we are

We work for the development of ENERGY DEMOCRACY in Greece

ELECTRA ENERGY.

COOP

2. The context

ELECTRA ENERGY.

Directive RED II
(2018 / Clean energy package)

Law 4513/2018
(Energy communities)

COOP

2. The context

ELECTRA ENERGY.

CHARACTERISTICS

- It is a cooperative (based on law 1986) / 7 cooperative principles
- Focus on citizens, RES, social innovation, social and solidarity economy
- Democratic control by members - One member / One vote
- Maximum allowed shares 20%
- Surpluses are not distributed (*)
- Natural persons (citizens), Legal entities, Municipalities
- Active within the Region (except for Attica)
- Minimum 5 members

2. The context

ELECTRA ENERGY.

ACTIVITIES

- Production (RES)
- Storage
- Self consumption
- Sale of energy
- Distribution
- Supply (electricity provider)
- Electric mobility
- Demand-response to reduce end use of electricity
- Energy saving and energy efficiency solutions and products
- Consulting, capacity building, education, etc…

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2. The context

ELECTRA ENERGY.

Social acceptance	Social Innovation	Synergies
Holistic approach	Democracy	Local Development

RESCOOP.EU

2. The context

ELECTRA ENERGY.

over 410 in 24 months!

RESCOOP.EU

2. The context

ELECTRA ENERGY.

2. The context

ELECTRA ENERGY.

Current situation

- A lot of enthusiasm / promotion by the media / a new trend… (?)
- Citizens interested but also municipalities and companies
- Over 410 registered (August 20')

3. Challenges - Layer I

ELECTRA ENERGY.

- *Financing*
- *Access to land*
- *Connection to the grid*
- *Public reluctance to cooperative models*

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3. Challenges – Layer II

ELECTRA ENERGY.

- Lack of representative bodies (networking, training, advocacy, research, monitoring and many more…)
- Education / Training / Capacity building
- Lack of expertise and experts
- Governance (decision making, voting, ease of joining and leaving, billing, transparency)
- The current energy model is not designed by having community energy in mind…

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building a VNM ENERGY COMMUNITY in Athens

-PV
- Virtual Net Metering
- Attica + Central Greece
- 180kw
- 45 Households and social enterprises

ELECTRA ENERGY.

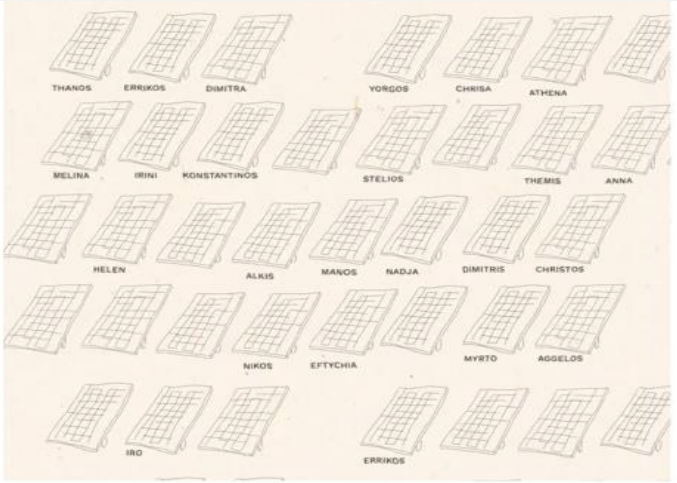
The first collective self-consumption Energy Community in Athens

HYPERION
SOLAR COMMUNITY

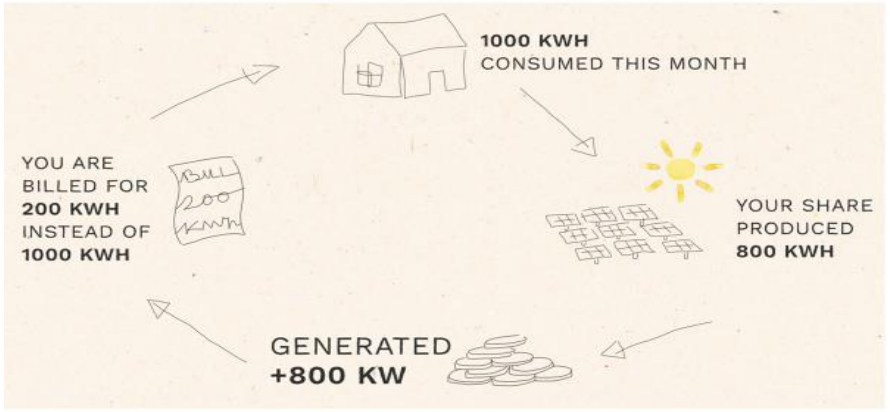
-PV
- Virtual Net Metering
- Attica + Central Greece

PHASE 1: 100KW / PILOT PHASE / To be completed by Feb. 21'
PHASE 2: 1MW / To be completed by mid 22'
PHASE 3: Replicate / To start in 22'

ELECTRA ENERGY.



ELECTRA ENERGY.



coop

ELECTRA ENERGY.

Project targets:

- CLEAN & AFFORDABLE ENERGY: Provide clean and affordable electricity to members
- ENERGY EFFICIENCY: Provide energy efficiency and energy saving solutions to members
- REPLICATE: Learning, expertise, and capacity building in order for the project to be succesfully replicated in other places and locations across Greece, the Balkans, and Europe
- RAISE AWARENESS: Raise awareness by developing a best practice. Disseminate and share information, data, and expertise
- ENERGY POVERTY: Develop and test solutions and models to tackle and mitigate energy poverty in urban areas

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Benchmarking of European electricity supply resilience: the case of interacting criteria

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Abstract

The resilience of the energy system and especially the national electricity supply is a complex and multidimensional concept, which is receiving growing attention at a European level. In particular, the increasing risks of extended electricity supply disruptions and/or severe electricity price fluctuations are stressing the need for an assessment of the European countries' electricity supply resilience. Hence, this paper proposes an elaborative multicriteria decision support methodological framework, based on three major resilience dimensions: resist, restabilize and recover. 35 European countries are evaluated and ranked according to their performance on 17 criteria, through a synergy of analytical MCDA methods. The assessment framework has been extended to incorporate the Choquet Integral value system, in order to accommodate interacting criteria and negate their arbitrary effects on the final benchmark. The preferential information required for the implementation of the MCDA framework has been elicited from an energy and climate expert. The overall objective of this research work is to support energy policy decision making in Europe and provide guidelines and areas for improvement at a country level.

Keywords: Resilience assessment, Security of electricity supply, Multicriteria decision support, Interacting criteria, Choquet integral

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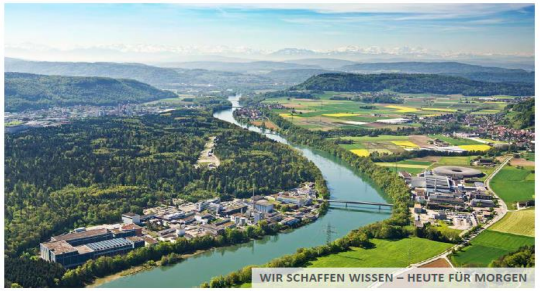


Eleftherios Siskos :: Post Doctoral Researcher :: Paul Scherrer Institute

Benchmarking of European electricity supply resilience: the case of interacting criteria

13th International Conference on Energy and Climate Change,

October 9th, 2020

Presentation Overview

1. Introduction and scope
2. Basic concepts
3. Problem description and modelling
4. Methodological framework
5. Electricity supply resilience in Europe
6. Conclusions

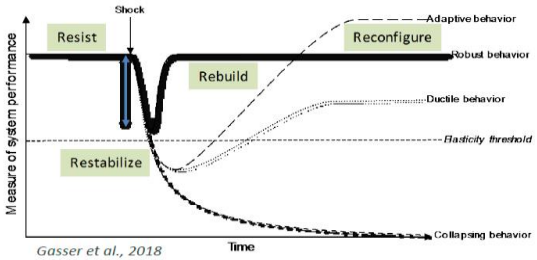
Resilience and energy security definitions

Energy security: *The uninterrupted availability of energy sources at an affordable price (IEA, 2014)*

Energy Resilience: *The ability to prepare and plan for, absorb, respond, recover from, and more successfully adapt to adverse events (US Academies of Sciences)*

Classic Resilience Dimensions:

1. Resist
2. Restabilize
3. Rebuild
4. Reconfigure



Gasser et al., 2018

Rationale and research scope

✓ Reliable and secure supply of electricity is critical for modern societies

- *Energy needs are increasing*
- *Electricity represents a substantial growing share of EU's total final energy consumption*
- *Most EU countries are net energy importers while certain strongly rely on a single fuel source or technology for electricity production*

✓ *Severe disruptions, as well as minor ones, do occur due to either exogenous or endogenous factors*

- ❑ *Develop a comprehensive decision support model to evaluate the resilience of electricity supply*
- ❑ *Address the potential interactions between the indicators*
- ❑ *Evaluate and rank the 35 ENTSO-E countries*

Problem description

Evaluation of the electricity supply resilience in Europe

- Development of an evaluation model at a country level, based on a consistent and exhaustive set of evaluation criteria
- 35 European ENTSO-E countries under evaluation
- Ranking of the countries in descending order of resilience
- Incorporation to the evaluation system of the preferential parameters of an energy expert (Decision Maker)

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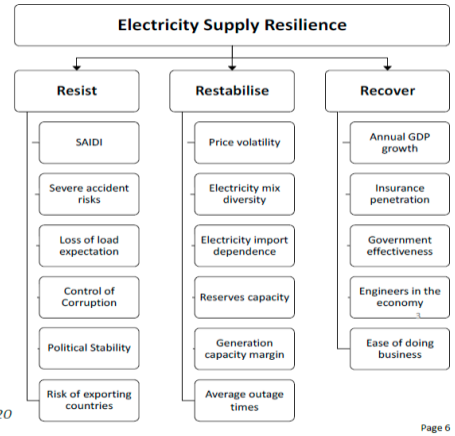
Electricity Supply Resilience evaluation system

35 ENTSO-E European Countries

1. Albania	19. Latvia
2. Austria	20. Lithuania
3. Belgium	21. Luxembourg
4. Bosnia and Herzegovina	22. Montenegro
5. Bulgaria	23. Netherlands
6. Croatia	24. North Macedonia
7. Cyprus	25. Norway
8. Czech Republic	26. Poland
9. Denmark	27. Portugal
10. Estonia	28. Romania
11. Finland	29. Serbia
12. France	30. Slovak Republic
13. Germany	31. Slovenia
14. Greece	32. Spain
15. Hungary	33. Sweden
16. Iceland	34. Switzerland
17. Ireland	35. United Kingdom
18. Italy	



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Consistent family of criteria

#	Criterion	Worst country	Best country	Normalization Range	Measurement unit
1	SAIDI	40.3	0.1	[5, 0]	h/year
2	Severe accident risks	4.92	0.008	[2, 0]	# of fatalities / GWeyr
3	Loss of Load expectation	76.5	0	[5, 0]	h/year
4	Control of Corruption	-0.6	2.2	[-0.6, 2.3]	Composite indicator
5	Political stability	-0.39	1.41	[-0.40, 1.42]	Composite indicator
6	Risk of exporting countries	0.43	0	[1, 0]	0-1 indicator
7	Volatility of prices	0.187	0.024	[0.2, 0.0]	% index
8	Electricity mix diversity	0	0.84	[0, 1]	0-1 indicator
9	Electricity import dependence	3.67	0.79	[2, 0.5]	% dimensionless indicator
10	Reserves capacity	2	20	[2, 20]	% index
11	Generation capacity margin	0.04	0.76	[0, 1]	% index
12	Average outage time	4.40	0.33	[0, 4]	hours
13	Annual GDP growth	0.73	9.45	[-1, 5]	% index
14	Insurance penetration	0.70	7.50	[0, 5]	Composite indicator
15	Government effectiveness	-0.62	2.04	[-0.6, 2.0]	Composite indicator
16	Engineers in the economy	0.06	0.32	[0, 0.3]	% index
17	Ease of doing business	65.4	85.3	[60, 100]	Composite indicator

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Methodological framework (1/6)

The development of the evaluation system for the ranking of the countries is based on a synergy of MCDA methods and techniques;

- ✓ The Simos procedure (method of the cards) for the elicitation of the criteria weights
- ✓ A heuristic framework for the elicitation and quantification of interactions between the criteria
- ✓ Implementation of the Choquet integral for the calculation of the resilience score of each country

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Methodological framework (2/6)

- Simos method
  - *Criteria cards*
  - *White cards*
  - *Fasteners*

→ Hierarchy given by the Decision Maker

- Calculation of the criteria weights by the analyst, based on the hierarchy information given by the DM

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Methodological framework (3/6)

Implementation of the Simos procedure with the DM

1. The procedure begins with the categorization of the 17 criteria to three categories; **low importance, medium importance and high importance** by the DM.
2. The DM, after confirming his categorization, ranks the criteria in each group **from the most important to the least important one**. For the case of criteria with equal importance, he can clip the corresponding cards with a clipper.
3. The DM is finally asked to indicate the number of **white cards** to be inserted between consecutive criteria and the different importance groups, to indicate a greater importance gap.

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Methodological framework (4/6)

The Choquet Integral for the consideration of interacting pairs of criteria

The Choquet integral is a score assigning function, built with the rationale to assign **a bonus** in the case of positive interaction or **a penalty** in the case of negative interaction, incurred for interaction between some pairs of criteria.

- **Positively interacting criteria:** a pair of criteria that must be simultaneously satisfied so that they can impact the aggregation result (complementary effect)
- **Negatively interacting criteria:** a pair of criteria, for which a high aggregation value can be obtained even when only one of the criteria presents a good score (redundancy effect)

$$C_\mu(a) = \sum_{i \in G} m_i \; g_i(a) + \sum_{\{i,j\} \in G} m_{i,j} \; min\{g_i(a), g_j(a)\}$$

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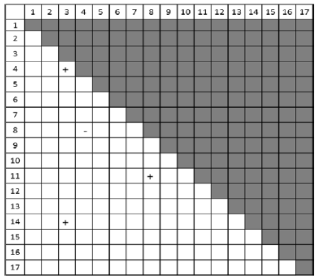
Methodological framework (5/6)

Completion of the interaction table by the DM. (+) for positive interactions (-) for negative interactions

- Guidance and dialogue with the analyst for the completion
- Data correlations can also guide the completion. In general:
  - ✓ Positive correlation indicates a potential negative interaction
  - ✓ Negative correlation indicates a potential positive interaction
- Just a small number of interacting pairs is usually the case, and needs to be identified



An example of a completed interactions table

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Methodological framework (6/6)

Quantification of interactions

1. The DM is asked to **categorize the interacting pairs** in two categories, based on the **intensity** of these interactions
2. The DM provides some simple additional information, such as pairwise comparisons, most and least intense interactions, etc.

The analyst then, builds an equations and inequalities system, based on the DM's input, in order to estimate the intensity of the interactions and feed the Choquet integral

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ESR evaluation
Implementation of the Simos procedure

Categorization of the 17 criteria to three importance categories/priorities by the DM

High Importance	Medium Importance	Low Importance
g_1. SAIDI	g_3. Loss of load expectation	g_7. Volatility of electricity prices
g_2. Severe accident risks	g_4. Control of corruption	g_{11}. Generation capacity margin
g_5. Political stability and absence of violence/ terrorism	g_6. Risk of exporting countries	g_{12}. Average outage times
g_8. Electricity mix diversity	g_{13}. Average GDP growth	g_{14}. Insurance penetration
g_9. Electricity import dependence	g_{15}. Government effectiveness	g_{16}. Engineers in the economy
g_{10}. Reserves capacity		g_{17}. Ease of doing business

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ESR evaluation
Implementation of the Simos procedure

Rank-ordering of the criteria in each category from the most important to the least important one

Descending Priority

High Importance	Medium Importance	Low Importance
g_1. SAIDI	g_6. Risk of exporting countries	g_{11}. Generation capacity margin
g_8. Electricity mix diversity	g_3. Loss of load expectation, g_{15}. Government effectiveness	g_{12}. Average outage times
g_9. Electricity import dependence	g_{13}. Average GDP growth	g_{17}. Ease of doing business, g_{14}. Insurance penetration
g_5. Political stability and absence of violence/ terrorism	g_4. Control of corruption	g_7. Volatility of electricity prices
g_{10}. Reserves capacity, g_2. Severe accident risks		g_{16}. Engineers in the economy

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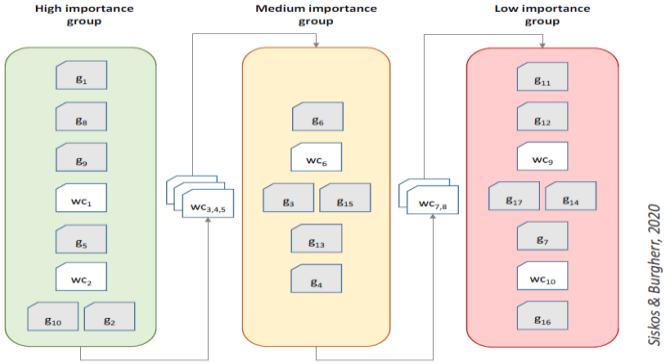
ESR evaluation
Implementation of the Simos procedure

Insertion of white cards between subsequent criteria and importance groups



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ESR evaluation
Identification of interacting criteria pairs

Completion of the interactions chart by the DM

Partial guidance by the correlations chart, provided by the analyst

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1																	
2																	
3	-																
4		-															
5																	
6																	
7																	
8						+											
9								+									
10																	
11									+	-							
12																	
13																	
14																	
15				-													
16																	
17															-		

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ESR evaluation
Quantification of interactions

Categorization of the interacting pairs in two categories; weak and strong interactions

Positive and negative interactions are treated equally here

	Strong interactions		Weak interactions
$m_{4,15}$	g_4 & g_{15} Control of Corruption & Government effectiveness	$m_{2,4}$	g_2 & g_4 Severe accident risks & Control of Corruption
$m_{1,3}$	g_1 & g_3 SAIDI & Loss of Load expectation	$m_{10,11}$	g_{10} & g_{11} Reserves capacity & Generation capacity margin
$m_{15,17}$	g_{15} & g_{17} Government effectiveness & Ease of doing business	$m_{8,9}$	g_8 & g_9 Electricity mix diversity & Electricity import dependence
$m_{6,8}$	g_6 & g_8 Risk of exporting countries & Electricity mix diversity		
$m_{9,11}$	g_9 & g_{11} Electricity import dependence & Generation capacity margin		

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ESR evaluation
Quantification of interactions

Additional information are provided by the DM, with a view to quantifying the defined interactions:

- $m_{4,15}$ is the most intense interaction of all 8
- $m_{15,17}$ is the second most intense interaction
- $m_{2,4}$ is the least intense interaction of all 8
- $m_{10,11}$ is the second least intense interaction
- $m_{4,15}$ is 4 to 5 times more intense than $m_{2,4}$

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ESR evaluation
Calculation of the model parameters

- The transformation of the criteria hierarchy to mathematical equations and inequalities leads to a system, the solution of which generates the criteria weights, m_i
- Accordingly, the solution of the interactions equations and inequalities system results in the quantification of the interactions, $m_{i,j}$

Criteria weights

$m_1 = 0.133,\ m_2 = 0.112,\ m_3 = 0.104,$
$m_4 = 0.114,\ m_5 = 0.094,\ m_6 = 0.098,$
$m_7 = 0.068,$

$m_8 = 0.057,\ m_9 = 0.036,\ m_{10} = 0.062,$
$m_{11} = 0.033,\ m_{12} = 0.019,\ m_{13} = 0.034,$
$m_{14} = 0.015,$

$m_{15} = 0.029,\ m_{16} = 0.012,\ m_{17} = 0.001$

Negative interactions

$m_{4,15} = -0.019$
$m_{1,3} = -0.012$
$m_{15,17} = -0.014$
$m_{2,4} = -0.004$
$m_{10,11} = -0.008$

Positive interactions

$m_{9,11} = 0.012$
$m_{6,8} = 0.012$
$m_{8,9} = 0.010$

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ESR evaluation
Choquet Integral implementation

Calculation of the Choquet Integral and ranking of the countries

Rank	Countries	Score
1	Denmark	0.802
2	Switzerland	0.794
3	Iceland	0.768
4	Sweden	0.765
5	Germany	0.743
6	Ireland	0.731
7	Slovenia	0.728
8	Austria	0.728
9	Netherlands	0.727
10	Slovak Republic	0.699
11	Lithuania	0.698
12	Finland	0.698
13	Luxembourg	0.698
14	Czech Republic	0.695
15	Belgium	0.694
16	Estonia	0.693
17	Portugal	0.690
18	Norway	0.677
19	Spain	0.650
20	France	0.640
21	Poland	0.621
22	United Kingdom	0.617
23	Latvia	0.617
24	Croatia	0.601
25	Hungary	0.601
26	Cyprus	0.586
27	Romania	0.581
28	Italy	0.532
29	Greece	0.482
30	Montenegro	0.467
31	Bosnia and Herzegovina	0.466
32	North Macedonia	0.410
33	Serbia	0.409
34	Bulgaria	0.408
35	Albania	0.361

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Conclusions

- ✓ The importance and need for measuring and benchmarking national electricity supply resilience is highlighted.
- ✓ The incorporation of interacting criteria in a large scale real decision problem constitutes a novelty in the field of Decision Theory and Operational Research
- ✓ A generalized MCDA methodology is proposed, in order to aggregate the evaluation indicators and soundly accommodate interacting criteria.
- ✓ Big winners of the benchmark the interconnected northern EU countries, Balkans still lack behind and more susceptible to electricity disruptions
- ✓ This research work aims to support energy policy decision making in Europe and provide guidelines and areas for improvement at a country level

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Wir schaffen Wissen – heute für morgen

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