Funded by the Horizon 2020 Framework Programme of the European Union

HERON GA 649690

A FORWARD-LOOKING SOCIO-ECONOMIC RESEARCH ON ENERGY EFFICIENCY IN EU COUNTRIES

Eleni – Danai MAVRAKI MSc.

NKUA – KEPA

THE CHALLENGE

*Understand the **behavioral** obstacles of **end-users** that hinder the implementation of effective energy efficiency policies.*

ABOUT ENERGY EFFICIENCY…

"…the Stone Age did not end because we ran out of stones; we transitioned to better solutions.

The same opportunity lies before us with energy efficiency and clean energy."

Dr. Stephen Chu, Former Secretary of Energy and Nobel Laureate

THE PROJECT

- Title: "*A forward-looking socio-economic research on Energy Efficiency in EU countries*"
- Funding Mechanism: HORIZON 2020, RIA
- Total Budget: €958,750.00 – 100% EC Contribution
- Duration: 31 months
- Start Date: 1st May 2015
- Consortium: 7 partners: 6 from 6 EU countries and 1 partner from EU candidate country
- Project Coordinator: NKUA-KEPA
- Web-sites:
  - www.heron-project.eu
  - www.heron2017.wordpress.com

OBJECTIVES

1. Impact of socio-economic and institutional factors on implementing energy efficiency policies and measures.
2. Development of energy efficiency pathways to the horizon 2030 and beyond, taking into account the socio-economic drivers and the updated energy efficiency measures.
3. Contribution to improving energy modeling by incorporating social, educational and cultural factors so as to reflect the end-user behavior.
4. Establishment of communication channels between researchers, decision makers of different governance levels and social and market stakeholders.

METHODOLOGY

Actions to achieve the objectives:

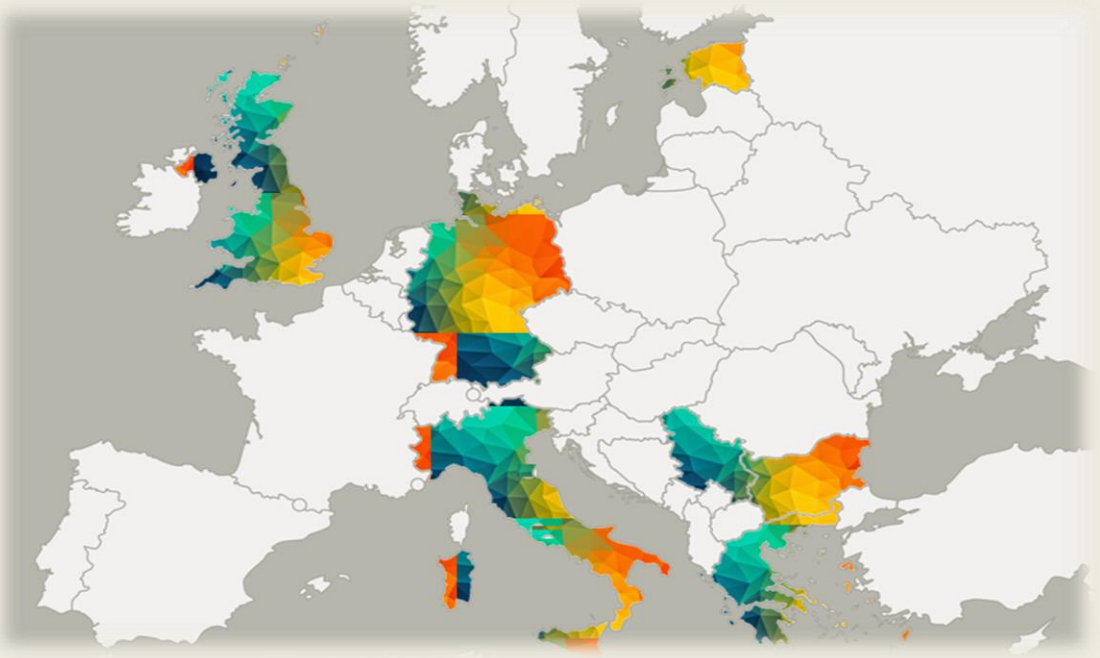
1. **Mapping** of energy efficiency policy instruments, available technologies and social, economic, cultural and educational barriers in transport and buildings
2. **Assessment** of the evidenced barriers and the main driving factors, in order to **define their weight/importance** for the implementation of energy efficiency policies
3. **Determination of linkages** between the factors and the energy efficiency
4. Forward-looking **scenario analysis**, focusing on macro- and micro-economic impacts of energy efficiency policy options
5. **Policy recommendations** through multi-criteria evaluation and feedback mechanisms with policy makers and market stakeholders from EU

CONSORTIUM

1. National and Kapodistrian University of Athens – Energy Policy and Development Centre (**KEPA**) – **Hellas**
2. University of Bocconi, Centre for Research on Energy and Environmental Economics and Policy (**UB-IEFE**) – **Italy**
3. Black Sea Energy Research Centre (**BSREC**) – **Bulgaria**
4. Oxford Brookes University (**OBU**)– **United Kingdom**
5. Wuppertal Institute for Climate, Environment and Energy (**WI**) – **Germany**
6. University of Belgrade – Faculty of Mining and Geology (U**B-FMG**) – **Serbia**
7. Estonian Institute for Sustainable Development, Stockholm Environment Institute Tallinn Centre (**SEI-T**) – **Estonia**

EXPECTED RESULT

*To empower policy makers and market players by **providing them an innovative policy tool** allowing them to select and implement the most effective policy instruments for energy efficiency in building and transport sector incorporating the end-users behavior.*



1 month before project closure

TODAY

OUTCOMES

1. Barriers and technologies in Buildings and Transport **mapping**
2. Developed Decision Support Tool (**HERON DST**) converting quantitative information to qualitative data.
3. Developed **scenarios** with HERON DST incorporated data
4. Concluded **preferable scenarios** per sector for each case study country
5. Developed **policy dialogue** on national and EU level

OUTCOMES: MAPPING

- Mapping of **technologies** in Buildings and Transport sectors (WI)
- Mapping of **barriers** based on data and literature (OBU)
- **Survey** for non numerical barriers mapping (UB-IEFE)

OUTCOMES: INNOVATIVE TOOL

Decision support **Tool** (HERON DST)converting qualitative information into quantitative, allowing the **incorporation** in energy modeling and scenarios development (UoA-KEPA)

OUTCOMES: EE DEVELOPED SCENARIOS

- **6 developed scenarios per sector** in LEAP energy tool for each country (84 scenarios in total) (SEI-T)
- **1 optimum scenario per sector** for each country (14 optimum scenarios) (Consortium)

THE EE DEVELOPED SCENARIOS

1. BAU: Business as Usual
2. EE0: Scenario ***without barriers***
3. EE1: Scenario considering ***all*** barriers
4. EE2: Scenario with a HERON DST suggested minimized barriers **mixture (1)**
5. EE3: Scenario with a different HERON DST suggested minimized barriers **mixture (2)**
6. EE4: Scenario with a different HERON DST suggested minimized barriers **mixture (3)**

6 scenarios per sector developed into LEAP tool, with incorporated the HERON DST outcomes.

OUTCOMES: EVALUATION

- Evaluation of scenarios per sector for each country (UoA-KEPA)
- **1 concluded preferable scenario** per sector for each country (14 optimum scenarios) (UoA-KEPA)

EVALUATION REASONS

After the incorporation of HERON DST outcomes into LEAP developed scenarios, we have results pointing an **optimum** scenario

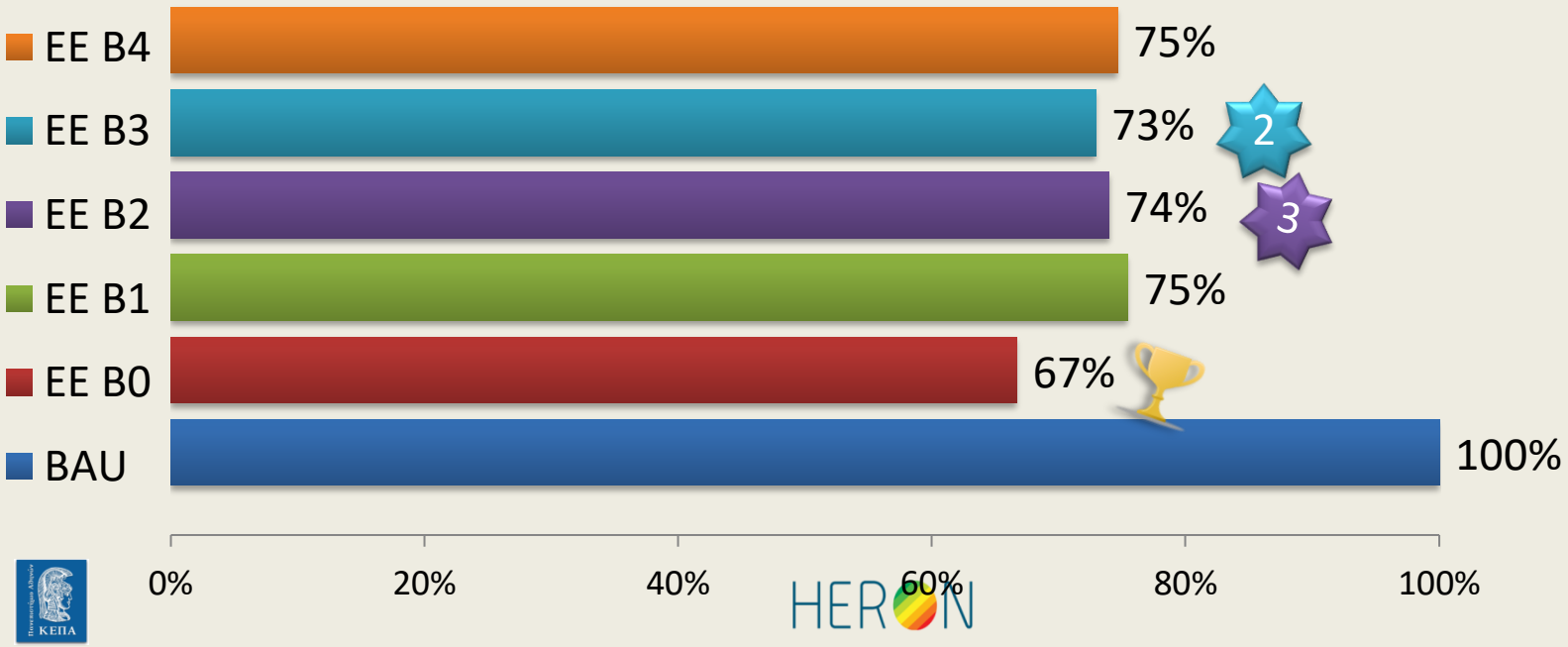
LEAP

is that enough?

Case: Greece, Transport sector

Final energy consumption in year 2030, compared to BAU

Source



HERON

EVALUATION REASONS

Initial criteria: Incorporate the end-users behavior
Present the most Energy Efficient scenario

How to conclude to a **preferable** scenario?

by adding criteria

Additional criteria, supported by the selected evaluation method (AMS)

A – Environmental performance
B – Political acceptability
C – Feasibility of implementation

THE SELECTED EVALUATION METHOD

Integrated multi-criteria analysis method for quantitative evaluation of climate change mitigation policy instruments.

Consists of:

1. a set of criteria supported by sub-criteria, all of which describe the complex framework under which these instruments are selected by policy makers and implemented
2. an Analytical Hierarchy Process (**AHP**) process for defining weight coefficients for criteria and sub-criteria according to the preferences of three stakeholders groups and
3. a Multi-Attribute Theory (**MAUT**)/Simple Multi-Attribute Ranking Technique (**SMART**) process for assigning grades to each instrument that is evaluated for its performance under a specific sub-criterion

*The method was named **AMS** from the initials of the combined processes and techniques.*

http://www.sciencedirect.com/science/article/pii/S0301421507003229

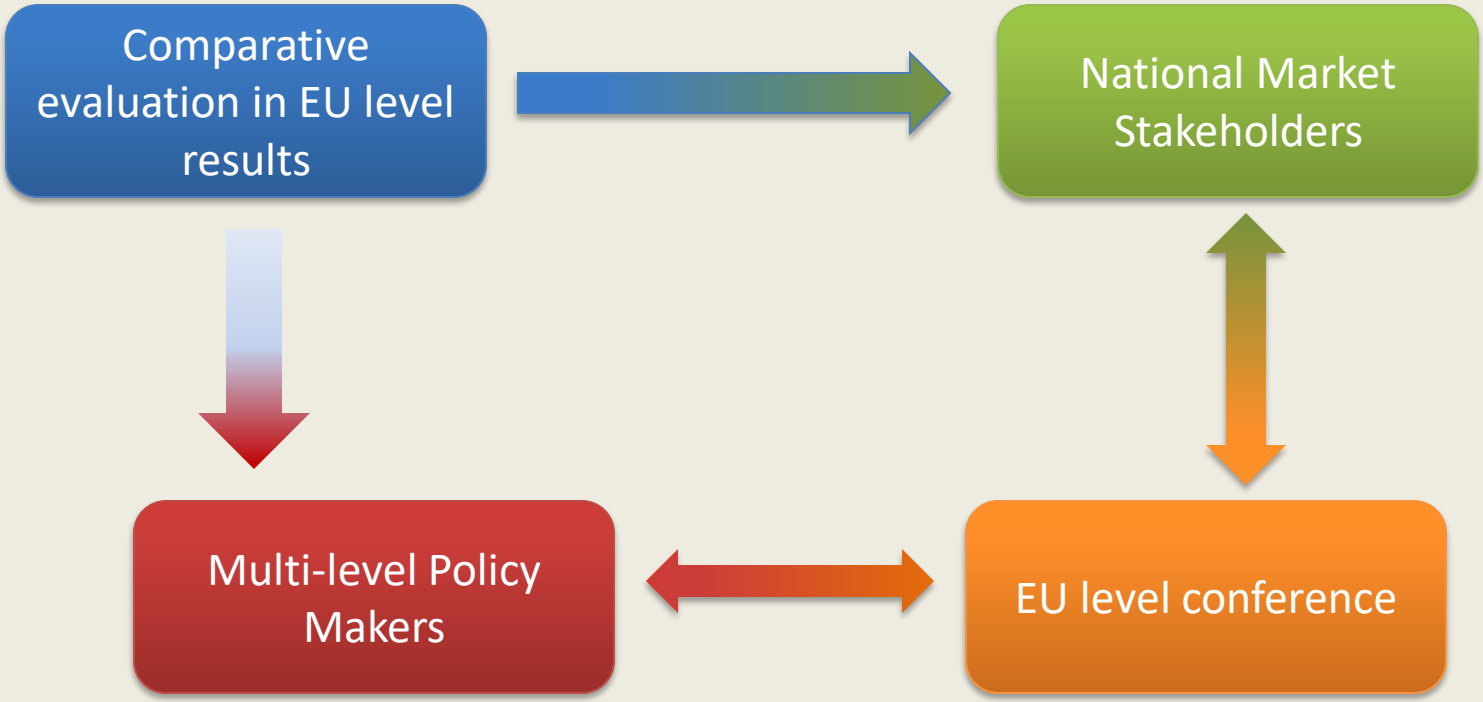
AMS CRITERIA

Criterion Subcriteria	Weight coefficients
Environmental performance - A	**0,168**
Direct contribution to GHG emission reductions	0,833
Indirect environmental effects	0,167

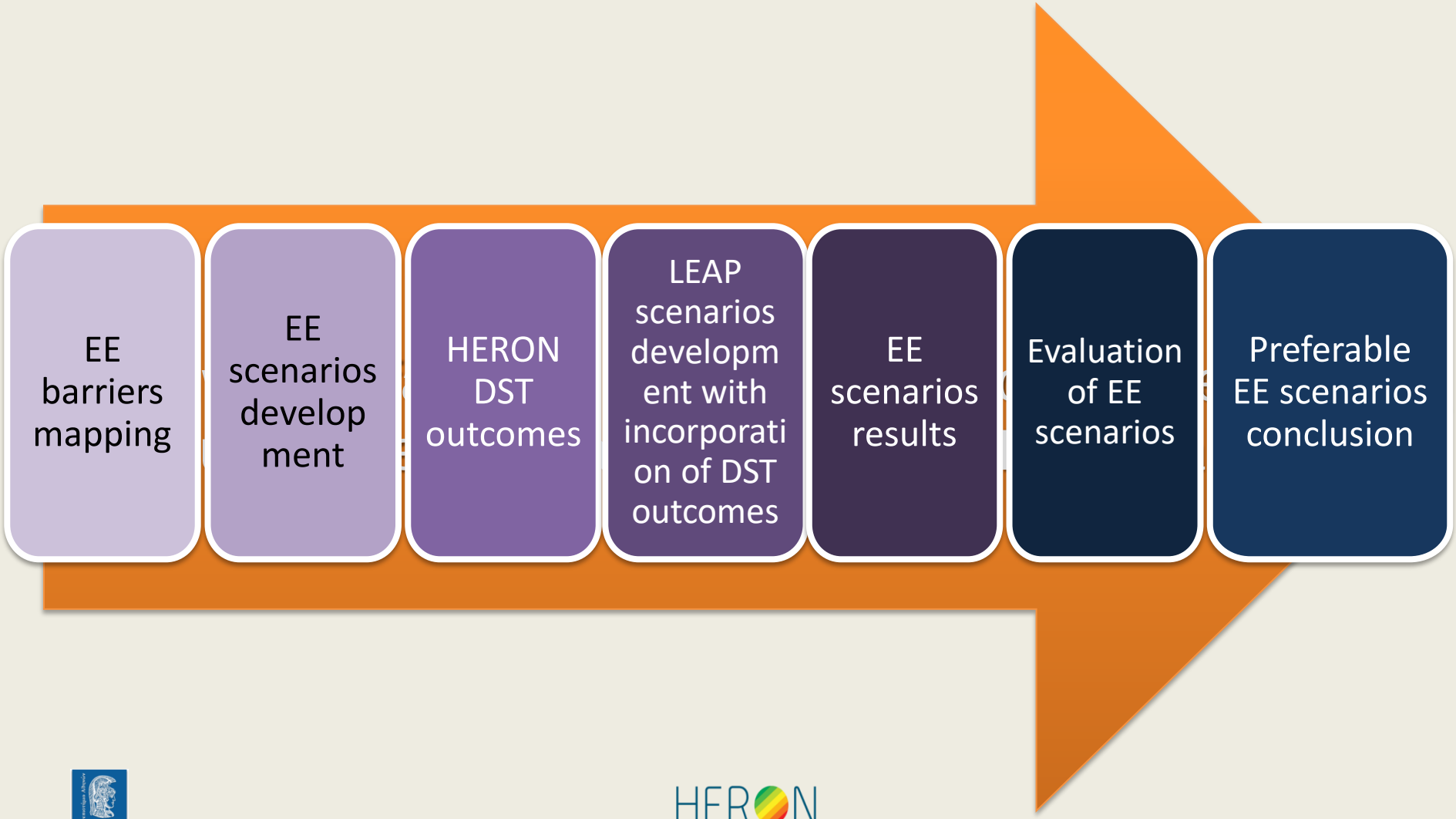
Criterion Subcriteria	Weight coefficients
Political acceptability - B	**0,738**
Cost efficiency	0,474
Dynamic cost efficiency	0,183
Competitiveness	0,085
Equity	0,175
Flexibility	0,051
Stringency for non-compliance	0,032

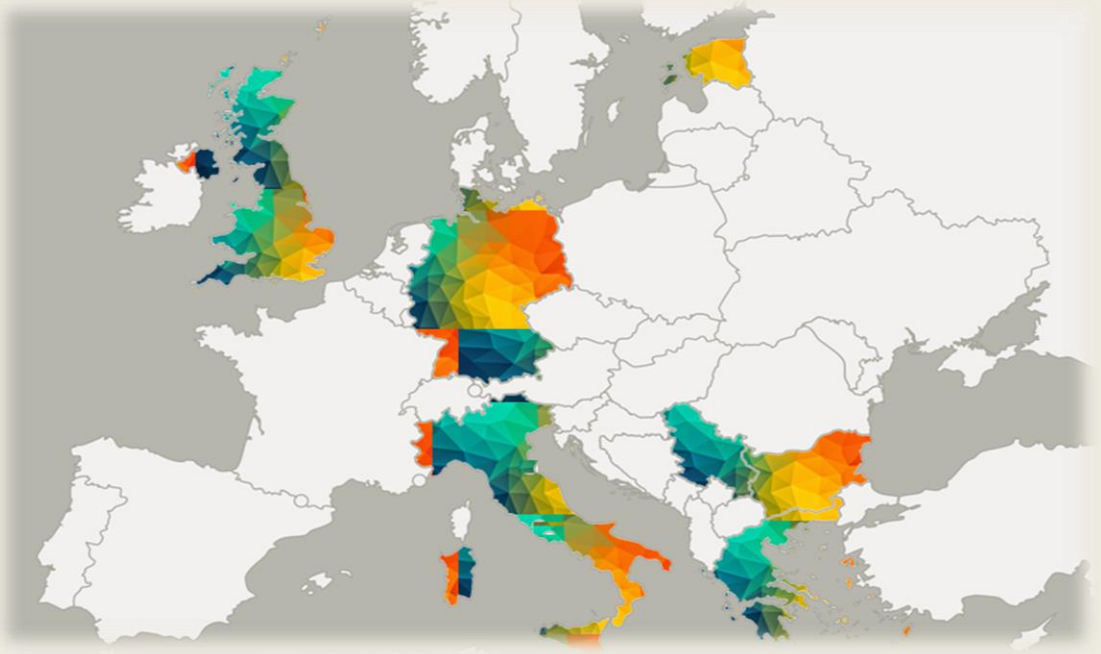
Criterion Subcriteria	Weight coefficients
Feasibility of implementation - C	**0,094**
Implementation network capacity	0,309
Administrative feasibility	0,581
Financial feasibility	0,11

OUTCOMES: POLICY DIALOGUE

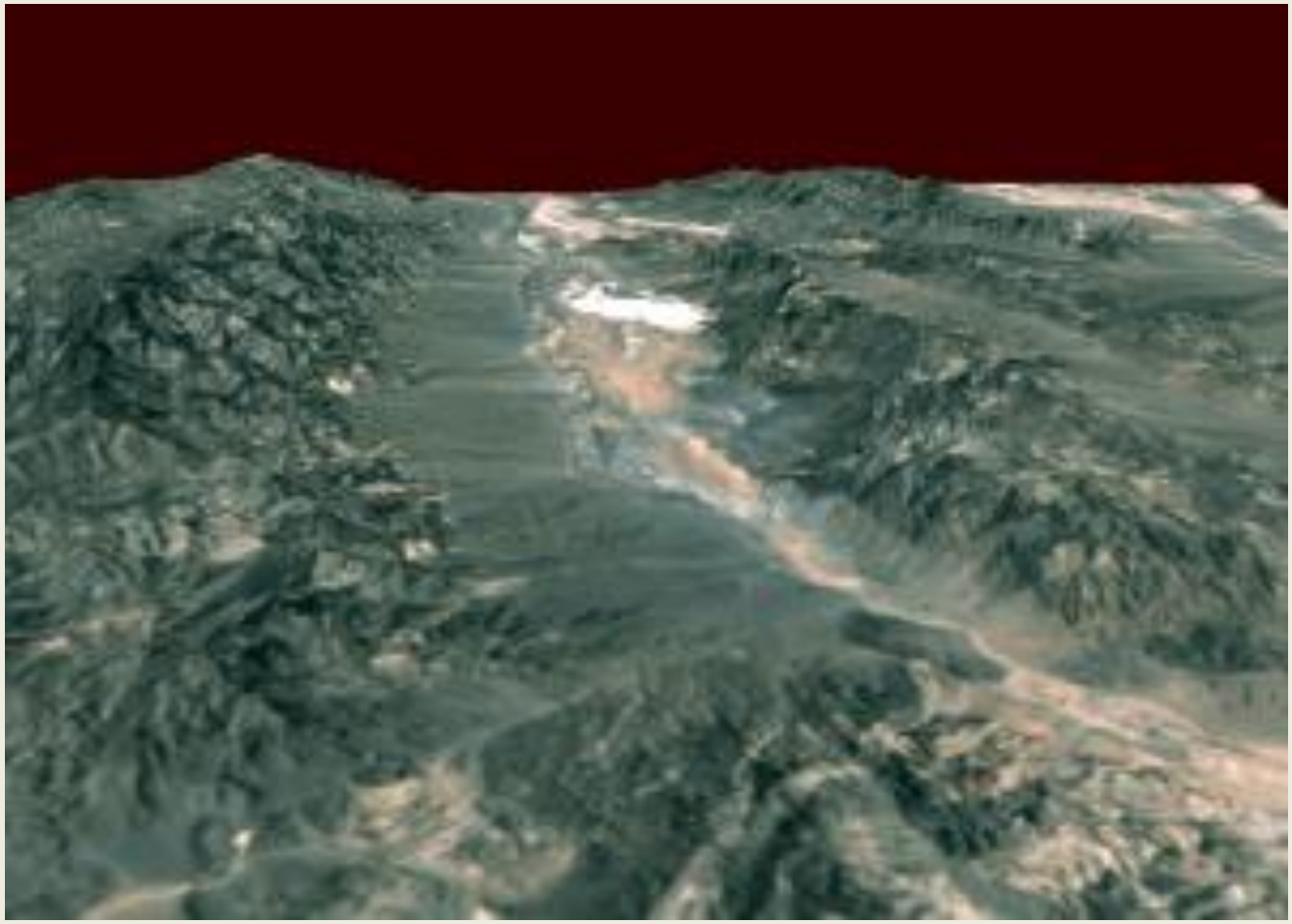


OUTCOMES: HERON PROCESS





WHAT'S NEXT?

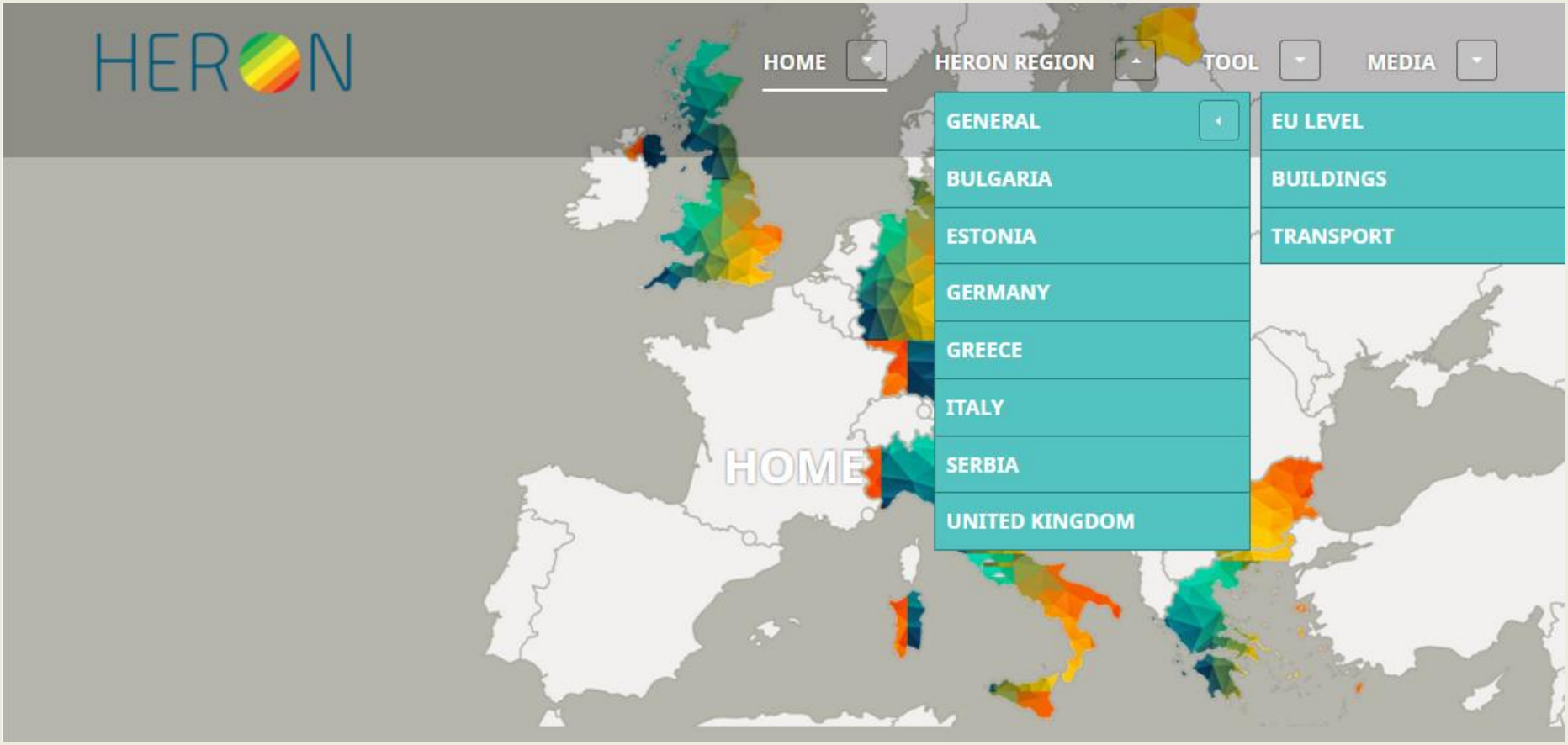


Death Valley (Romania): NASA 3D representation

DEATH VALLEY

- New research area → publications, articles, papers
- HERON DST training seminars
- HERON process dissemination → Conferences, seminars, reports
- HERON DST linkage to energy tools
- Feedback based improvement of the tool

https://heron2017.wordpress.com

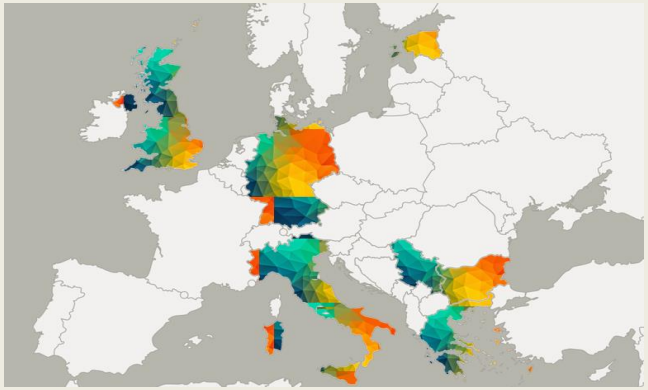


HERON project received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 649690

ΚΕΠΑ

HERON

THANK YOU



Eleni-Danai MAVRAKI MSc.

HERON Project manager

Energy Policy and Development Centre (KEPA)

National and Kapodistrian University of Athens

edmavraki@uoa.gr

ΚΕΠΑ

HERON