

Energy Conservation Measures in context of Climate Change in Kazakhstan

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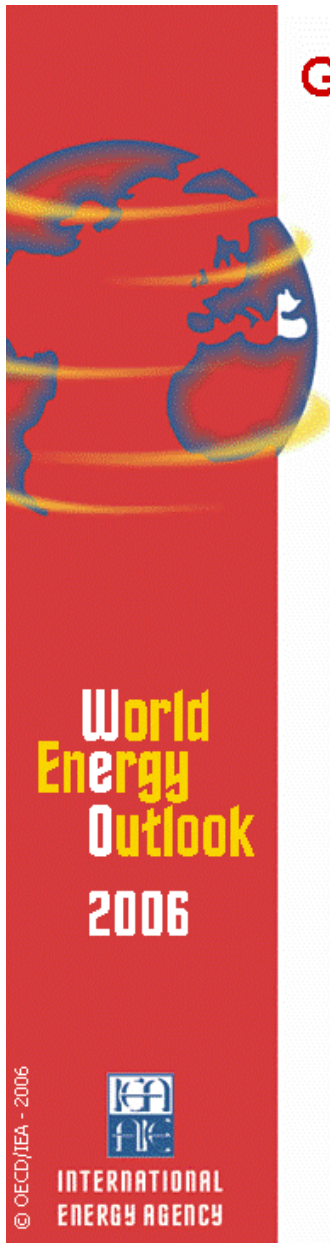
Context

- Climate Change- global prospect
- Kazakhstan indicators
- Main results of investigation
- Potential for Energy Saving
- EE P&M measures
- Conclusions & further actions

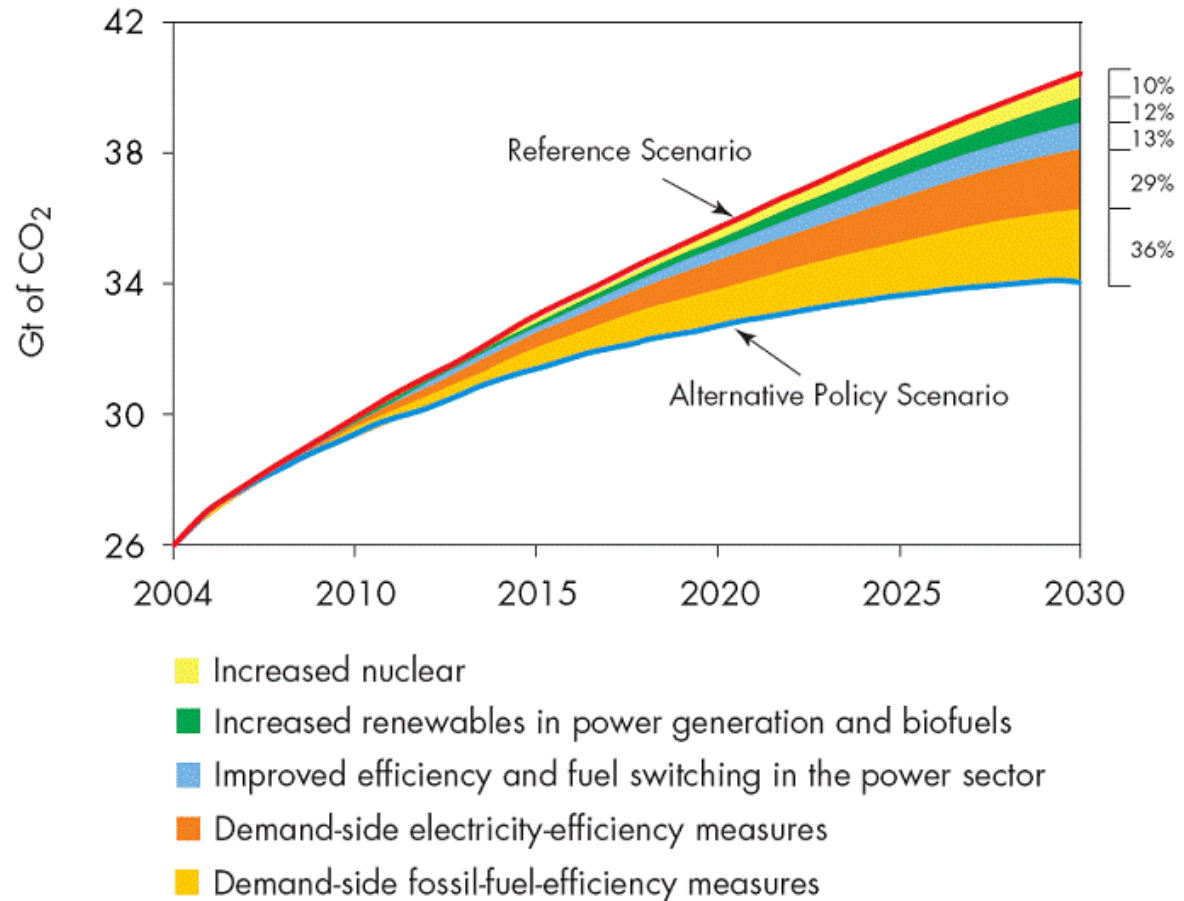


Global prospect: Energy Saving and Climate Change

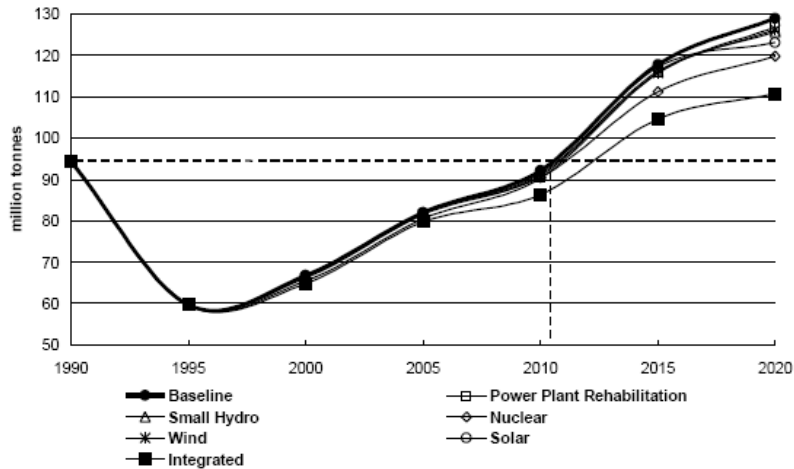
- Concentration 850-1130 ppm CO₂/year
- 3,2-4° C to peak the next 55 years; 2,8-3,3° C - 25 years; 2-2,4° C -15 years
- GHG emissions reduce 50-85% by 2050
- Sectoral opportunities-mitigation potential
- Gt CO₂/yr – USD/CO₂ function of mitigation cost
- up to 2030 low cost measures –high potential (EE potential in Buildings is 38% of emissions 2030 under costs <0 according to IPCC,AR4: www.ipcc.ch)
- 3,5Gt from 12,6 Gt baseline- only found in Buildings
- 29% CO₂ could be avoided by 2030(IPCC,2007)
- 40% CO₂ decrease during 2005-2050 (IEA)
- Retrofit rate from 1,4-2% increase global energy saving from 40%-74% (2005/2050)
- Policy: high performance retrofit & public financing



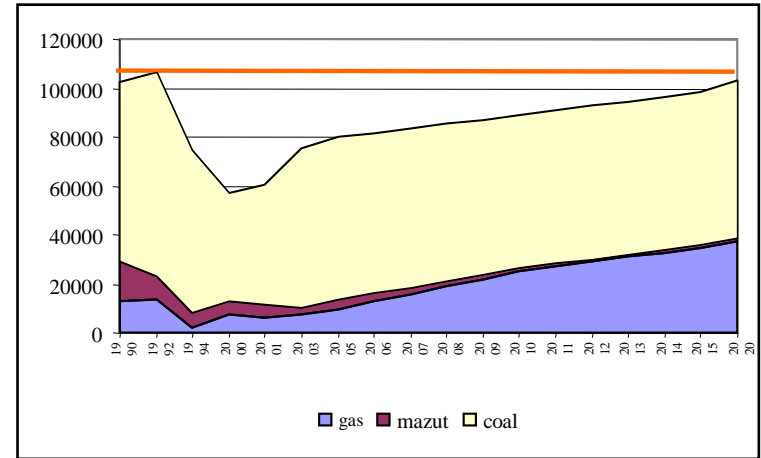
Global Savings in CO₂ Emissions in the Alternative Scenario Compared to the Reference Scenario



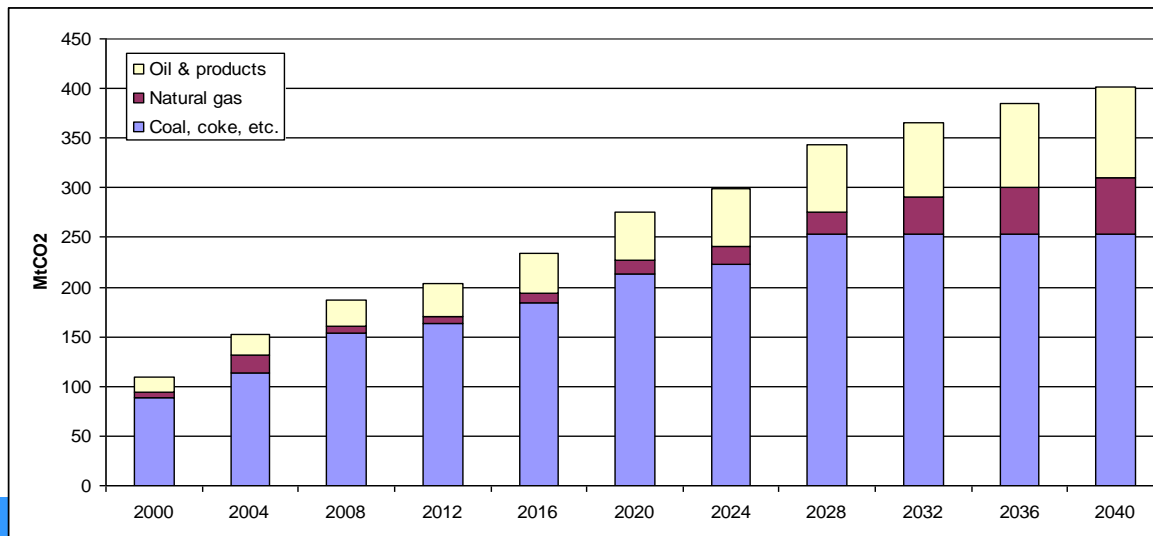
Dynamics of projections in Kazakhstan



CO2 emissions for the baseline and mitigation scenarios, First National Communication RK (1998)



CO2 emissions structure from different types of fuel in 1990-2020, scenario 2A "self-balance", Institute of Energy RK (2004)



CO2 emissions by fuel in the baseline scenario (A-MK-BAU) with MARKAL KZ model, energy sector of the RK (2006)

The 1992(base year) level of 252.9 MtCO2 is pushed back to 2020 by using new technologies with the cost

below US\$'2000/tCO2

Climate Change & SD, Energy Saving in policy focus

- **Kazakhstan is a Party of the UNFCCC since 1995**
- **Kazakhstan has signed the Kyoto Protocol in 1999, ratified in March 2009 (becomes a Party of the Annex I for the purpose of the Protocol in accordance with Article 1, paragraph 7 of the Protocol)**
- **1992 has been defined as the base year (Nairobi decision)**
- **The voluntary quantitative obligations not to exceed emissions level of 1992 during report period of 2008-2012 (Poznan)**
- **FNC (1998); SNC (2009)**
- **"Ecological code" (2007), including Art.45**
- **"Concept on SD for a period of 2007-2024" (2006)**
- **the "Strategy of Efficient energy and renewable resources use in the Republic of Kazakhstan in conjunction of SD up to 2024" under approval**
- **The law "On development of renewable energy sources" passed (2009)**
(Increasing the share of renewable energy in the fuel and energy balance 5% in 2024)
- **A new law "On energy saving" (2009) under approval of the Parliament**
- **Law on Natural monopolies (upd.2009: differential rates in electricity; heat metering)**
- **The Strategy of industrial-innovative development of the Republic of Kazakhstan for 2003 – 2030**
- **Programmes, EE road-maps, normative (2009)**

EE characteristics & Categories of P&M

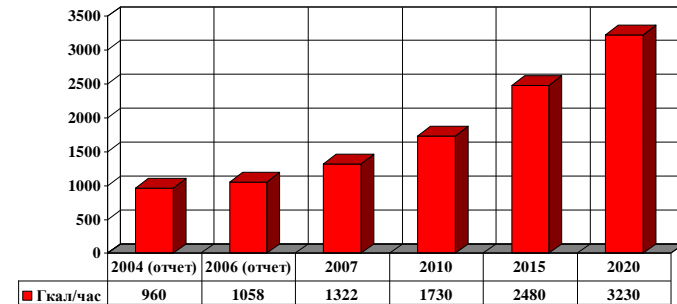
Kazakhstan: EE characteristics

- Depreciation of plants (40-60%)
- Increase of power system load and capacity deficit
- High losses in pipelines (about 50%)
- High GDP Energy intensity: 2,8 USD/kWh
- CO2 emissions from the category of "Energy activities (firing)" is 41,3 % of total emissions,
- *GHG emissions in 2006 73,5 % from 1992 level*

Categories of P&M

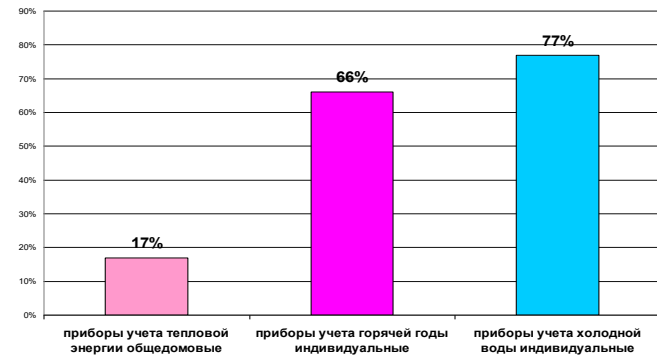
- Regulation (prescriptive; performance)
- Stimulation (fiscal stimulus; taxes)
- Education (consumer information)
- Voluntary codes/laws
- Voluntary codes with underlying legislation

Forecast of heat consumption increase in CHP up to 2020 in Astana



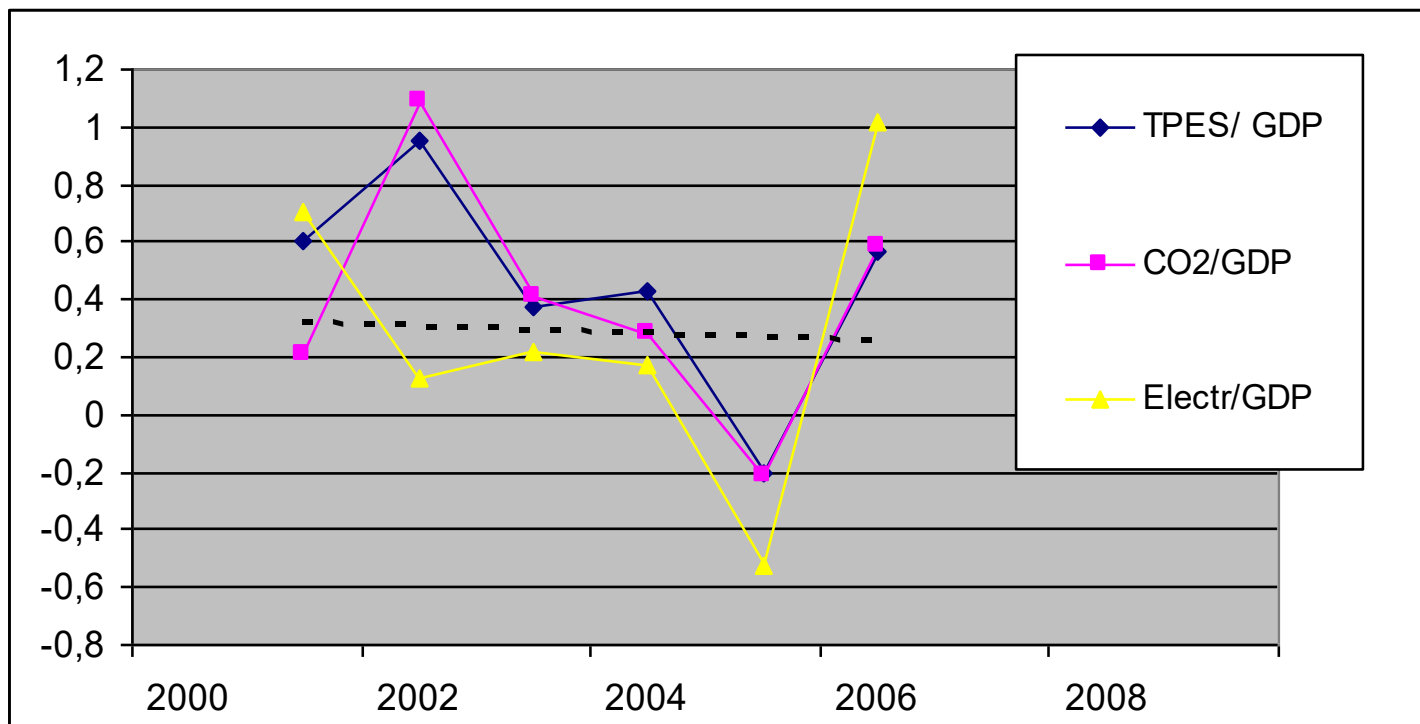
Source: Institute of Energy, 2007

Metering equipment on 1Sept.2008



Source: Agency of Natural Monopolies, 2009

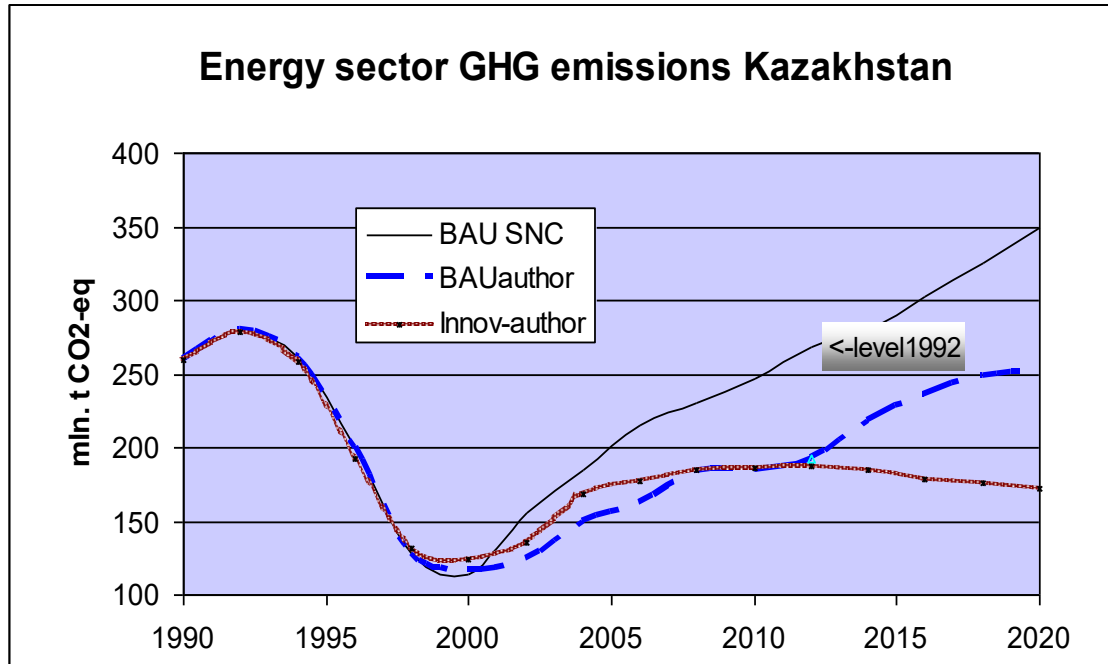
Dynamics of indicators in Kazakhstan



Dynamics of changes of energy consumption growth rates to GDP (TPES/GDP), electric energy consumption growth rates (Electr./GDP), emissions growth rates (CO2/GDP), results of the authors.

Source: GDP – Data of the Statistics Agency of Kazakhstan, CO2, TPES, Electr. - IEA

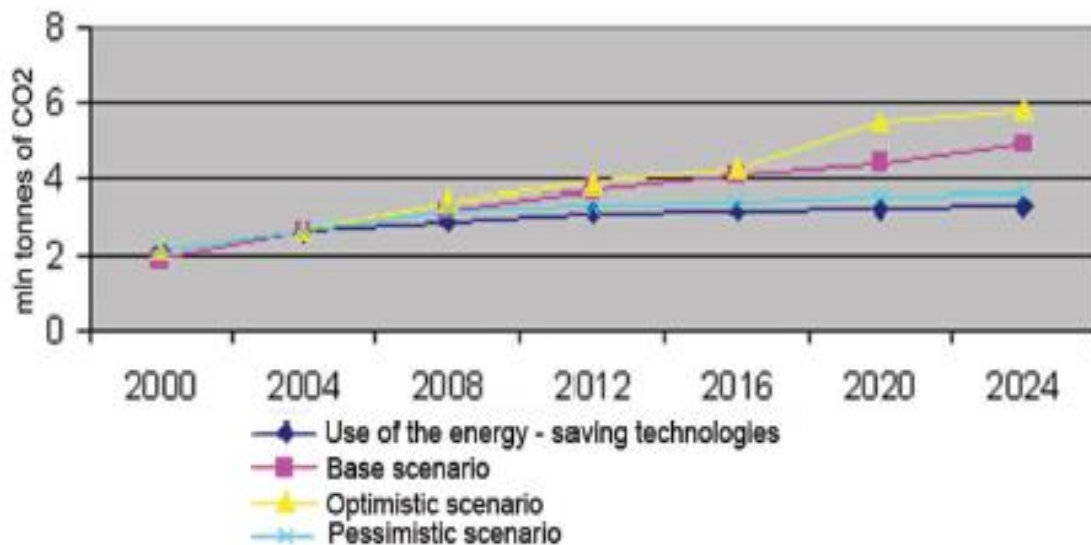
Innovative development is a key factor in the policy of Kazakhstan



Source: Authors' calculations using MARKAL Kz model

Analysis of GHG emissions scenarios in RK taking into account innovative cycles and the crisis phenomena in the economy of PK: stabilization 2016-2019, moderate growth by 0.5%/yr by 2030. While calculating in the case of innovative scenario the resilience factor $e = 0,2$ is used.

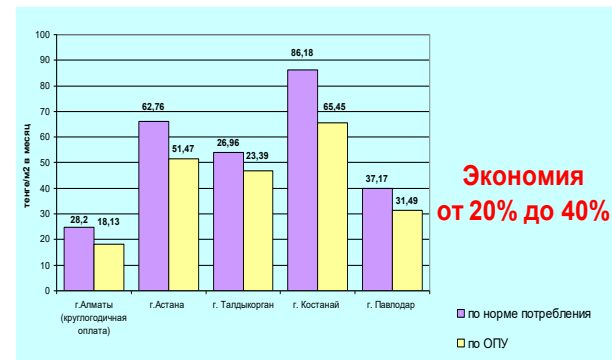
Sectoral opportunities for Energy Saving (municipal housing sector)



Example of EE measures: installation of heat metering in Kaz cities, 2008: Effect: economy of payment 20-40% in comparison to norms

ES potential estimates: in district heat supply systems (DHS) 4,2-4,9 million t.o.e.(approx. 35% of actual fuel consumption at DHS)

GHG emissions reduction potential: 1,0 million tons of CO2 in 2020 because of use of energy saving technologies.



Экономия от 20% до 40%

Source: Anty Monopoly Committee, 2009

The potential of overall reduction of greenhouse gas emissions in the energy sector by 2020

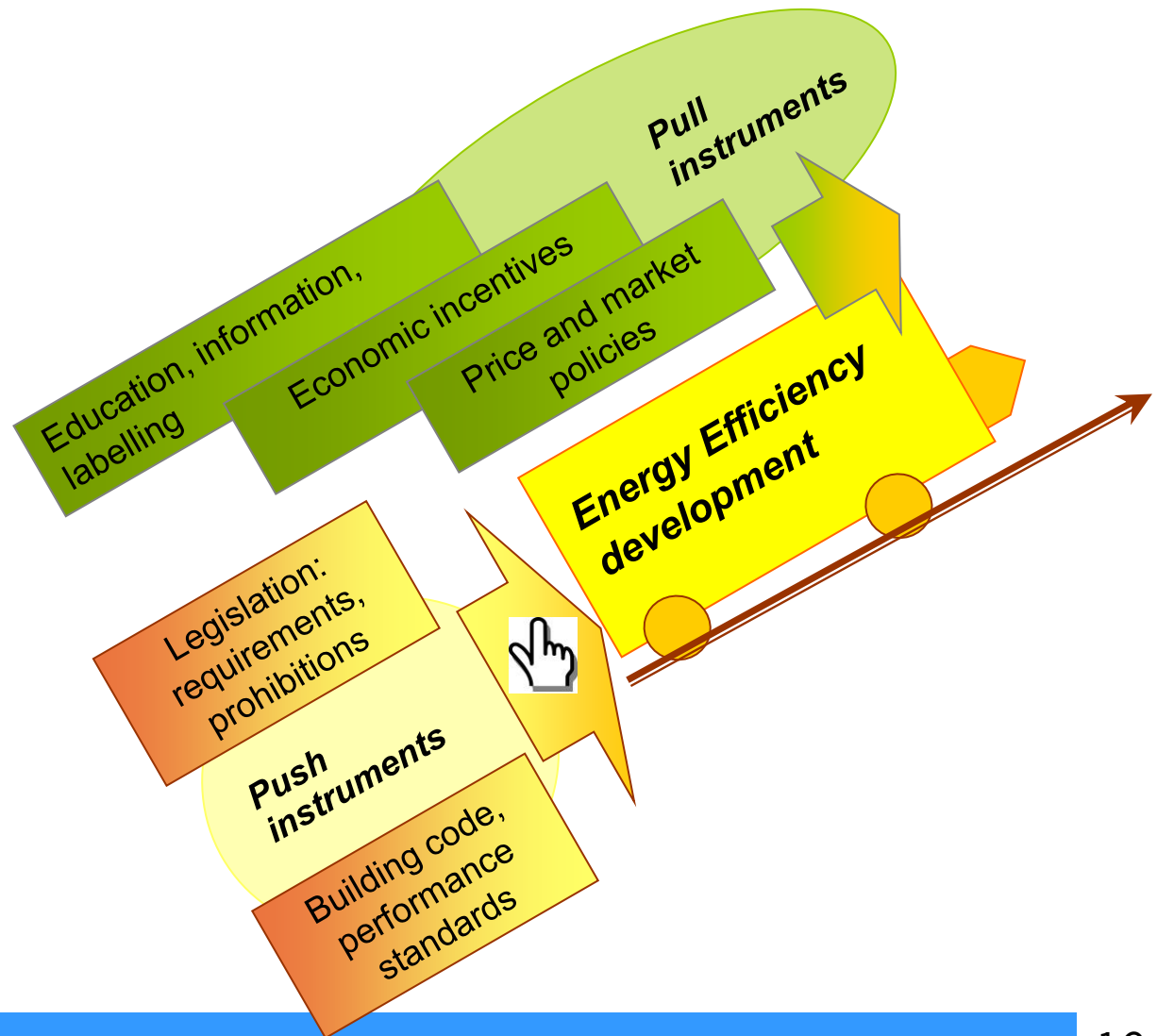
№	Measures on emissions reduction	The reduction of GHG emissions from today's level		
		2010 г	2015 г	2020 г
1	Restoring the existing CHP capacity, increase production on heat consumption	3,2 %	5 %	7 %
2.	Pursuing energy conservation policy (for example, replacement of pipes of heat networks to secured)	2 %	4 %	9 %
3.	Construction of gas turbine and vapor - gas power plants:			
	- gas turbine power plant	0 %	3 %	8 %
	- vapor – gas power plants	0 %	5 %	7 %
4.	The development of renewable energy			
	- small hydroelectric power plants	5 %	7 %	12 %
	- Wind farm	4,3 %	8 %	12 %
Total :		14,5 %	32 %	55 %

Why do we need policies for Energy Efficiency?

To overcome key barriers:

- Lack of information or
 - Even wrong information including the
 - Missing skills and knowledge
- Misplaced incentives
- Lack of finance for EE
- Lack of market mechanisms (ESCOs, guarantees)

Careful choice, design, implementation and enforcement of policy support measures



Key outcomes

- A considerable part of Kazakhstan quota for emissions, according to different forecasts, from 75 to 90% is used by Kazakhstan for its own needs. The remained part may be sold at the world quota market or preserved for use in post-Kyoto. Efficient management of Kyoto quota requires reliable emission forecast.
- According to scenario “BAU-utor” emissions from energy will reach 90% of the base level by 2024 only. Therefore we propose to define an indicative goal as follows: - the level of GHG emissions by 2020 - 12% below the level of the base year.
- Integrated introduction of legislative and economic mechanisms and innovative technology will allow realizing the existing potential on energy saving, which is evaluated as 30% in the sector of energy generation and transmission, and not less than 20% in housing-public sector. This may be reached only at introduction of corresponding policy and removal of barriers.

The complex approach and portfolio of measures which will allow to realize effectively an available potential is necessary for realization of the problem put by, the more so as implementation of energy efficient measures brings co-benefits and ancillary benefits.

- Improvement and implementation legal framework will allow reducing GHG emissions in atmosphere for the period 2010-2024 approximately by 75 million tons in CO₂ equivalent substituting power energy from coal stations.

Conclusions

- Sufficient resources available (fossil, renewables and uranium), some of them are huge!
- Enforcement of P&M must be effective (random verification important; adequate financing of enforcement and monitoring), must be implemented (integrated) nationally, as higher emissions cuts are needed;
- Enforcers must be motivated and well-trained (building inspectors concerned with fire/electrical safety can also enforce energy codes)
- Investment in EE often economically feasible
- Portfolio of options is necessary to keep cost low, now silver bullet
- Which technologies will make it?
 - Technical and commercial availability
 - Public acceptance
 - Intensified RD&D accelerates development and market deployment
 - Appropriate framework conditions
 - Low CO₂ emitting products will have market advantages
- Without continuous involvement ,stagnation is possible
- More human capacity will be needed
- More financial recourses for CC activities must be envisaged.

Further Actions in context of CC Policy

- **Take Kazakhstan's stand in the world economy and politics in the new conditions (Copenhagen 2009).**
- **Determine priorities for the coming period, for example until 2020 and the next decade. Create regime for function of carbon market thereby protecting national interests.**
- **Define the role of economic sectors and challenges for the country in the post-Kyoto regime.**
- **State authorities should play a vital role in formulating rules for internal and external carbon market: the role of the state, business and society.**
- **The society participation in the formulation of low-carbon strategy is vital.**

Thank You for attention!

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