

ENERGY SYSTEMS MODELING OF KAZAKHSTAN ON A COUNTRY AND REGIONS LEVEL

A. Kerimray^{1*}, I. Kolyagin¹, B. Suleimenov¹, R. De Miglio², G. C. Tosato³

1) NURIS, Nazarbayev University, Astana, Kazakhstan; *aismgul.kerimray@nu.edu.kz; 2) E4SMA, Turin, Italy; 3) ASATREM, Rome, Italy

Introduction. Climate change, energy safety, energy resources scarcity issues require policies and measures which are based quantitative and qualitative assessment of the whole chain of the energy system starting from extraction to transformation, distribution and consumption. TIMES modeling instrument allows to produce long term scenarios to conduct in-depth energy and environmental analyses.

Methodology. TIMES is a technology rich, bottom-up model generator, which uses linear-programming to produce a least-cost energy system, optimized according to a number of user constraints, over medium to long-term time horizons.

Results. On a country level, scenarios with a target for the energy intensity of GDP reduction and with an incentive of 20USD dollars in 2000 prices were compared with a base case (BaU) (Figure 1-left). On a regional level, fuel-energy balances of regions were reclassified and analyzed (Figure 1 – right). Modeling results at regions level is expected to be in 2015.

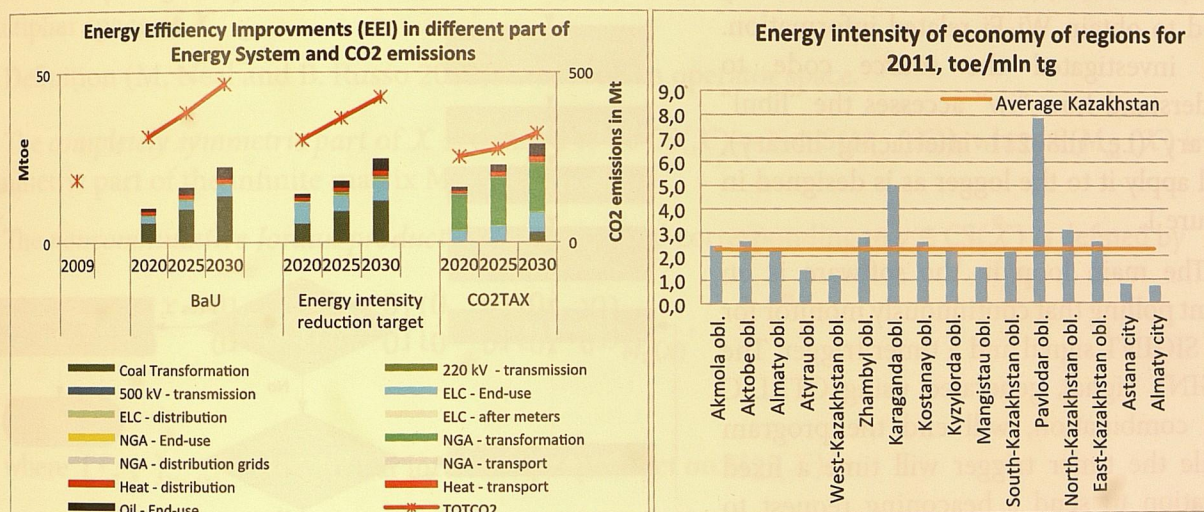


Figure 1. Energy efficiency improvement potential and energy intensity of regions

Conclusions. On a country level, assessment of energy efficiency potential showed that even the BaU case suggests significant energy efficiency improvements, meaning some significant cost-effective improvements (in particular in the generation side) can be gained even without a specific energy policy in case of reduction (elimination) of the market barriers..

Analysis of fuel-energy balances of regions showed that regions differ significantly by energy production and consumption modes as well as by fuel mix. Industrial, coal based regions have a significantly higher energy intensities of the economies.

References.

1. Y. Sarbassov, A. Kerimray, D. Tokmurzin, G. C. Tosato, R. De Miglio (2013) Electricity and heating system in Kazakhstan: Exploring energy efficiency improvement paths. *Energy Policy* 60:, 431–44
2. A. Kerimray, K. Baigarin, A. Bakdolotov, R. De Miglio and G. C. Tosato (2015), Potential Efficiency Improvement path in the Energy System of Kazakhstan, "Informing energy and climate policies using energy systems models", Springer Series "Energy Systems".