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***Potential and opportunities of renewable
electricity in the Republic of Kazakhstan***

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(presented by GianCarlo Tosato)

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1. Introduction

Kazakhstan has huge reserves of crude oil and of cheap coal. Foreign interests concentrate their investments in the development of the resources for export. Domestically the situation looks different.

In Kazakhstan most infrastructures of the domestic energy system have been built in the fifties. The government plans to invest part of the oil revenues for renovating them and building new plants, grids, etc.

Relatively small increase in investment can satisfy the growing demand of energy with more efficient technologies and far less emissions of local as well as global pollutants.

2. Objective and methodology

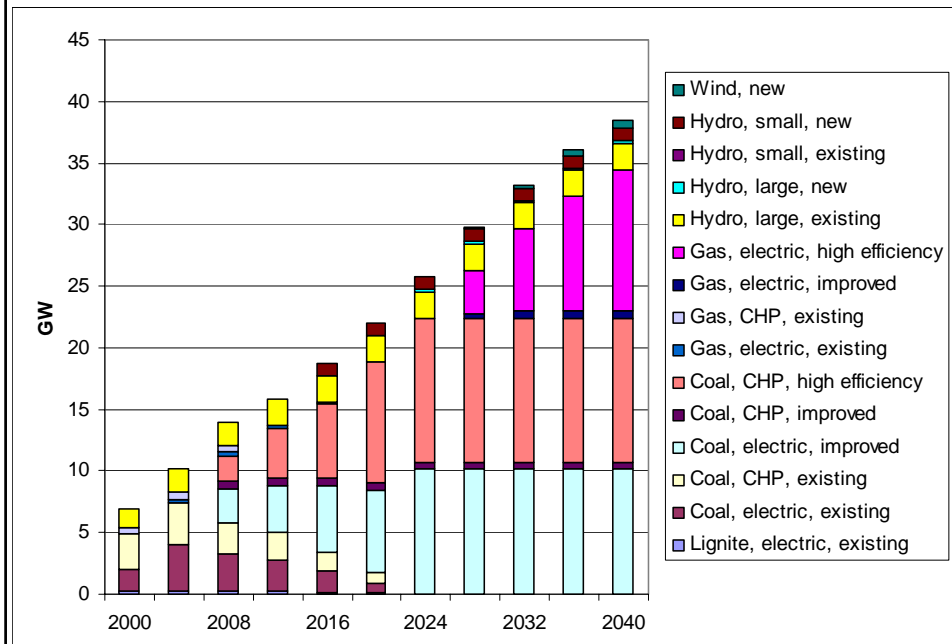
This research aims at assessing the potential of renewable energy sources for electric generation (RES) in Kazakhstan, in particular wind and small hydropower plants.

The problem has been analyzed making use of the MARKAL – Kazakhstan model developed last year in the frame of a TACIS project (see presentation at IEW2007).

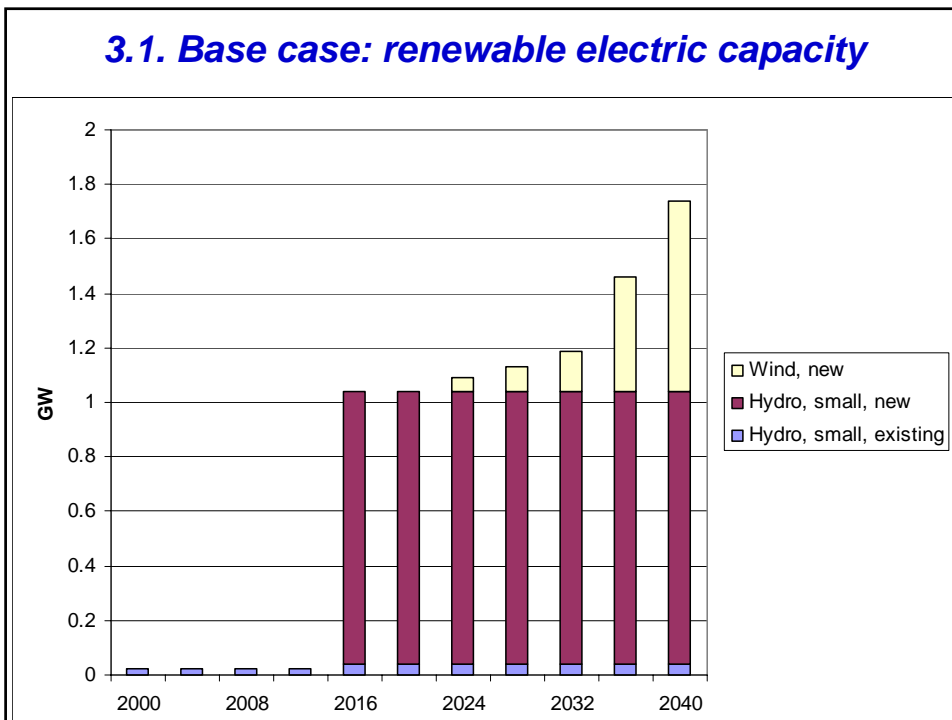
Three main scenarios have been compiled and compared:

1. Base case scenario
2. Renewable scenario, and
3. Subsidy scenario.

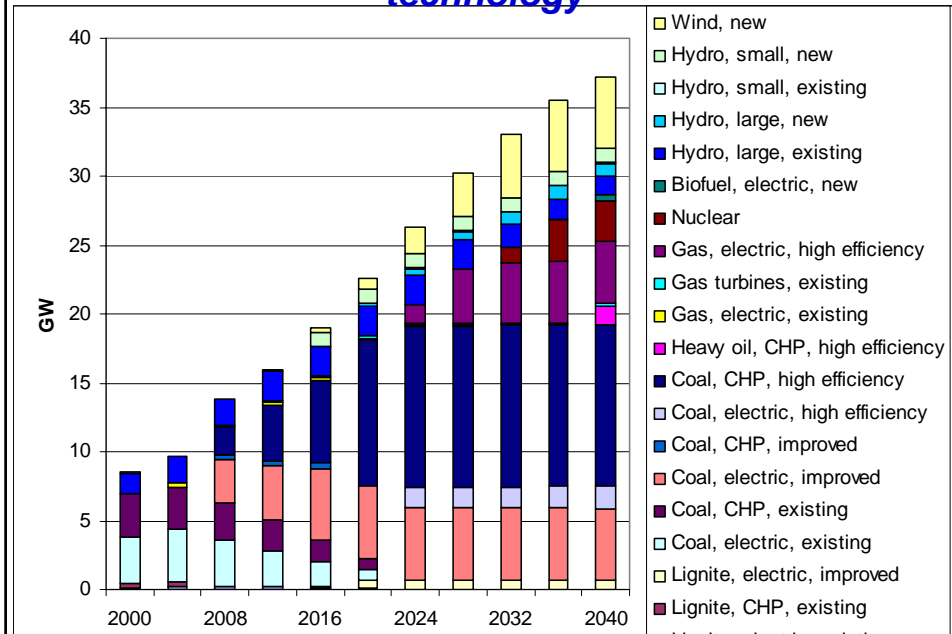
3.1. Base case: electric capacity by technology



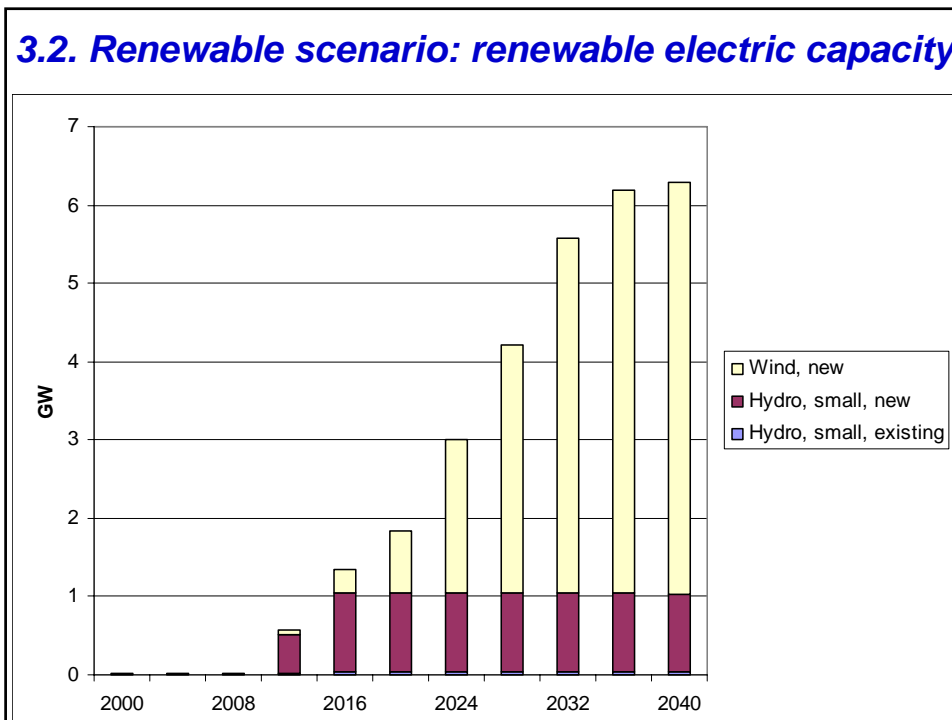
3.1. Base case: renewable electric capacity



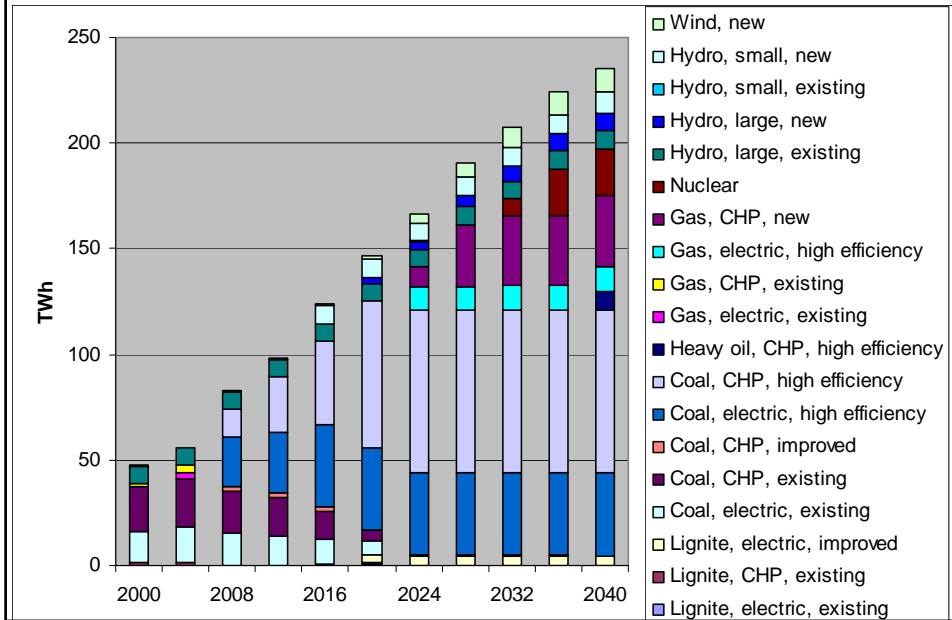
3.2. Renewable scenario: electric capacity by technology



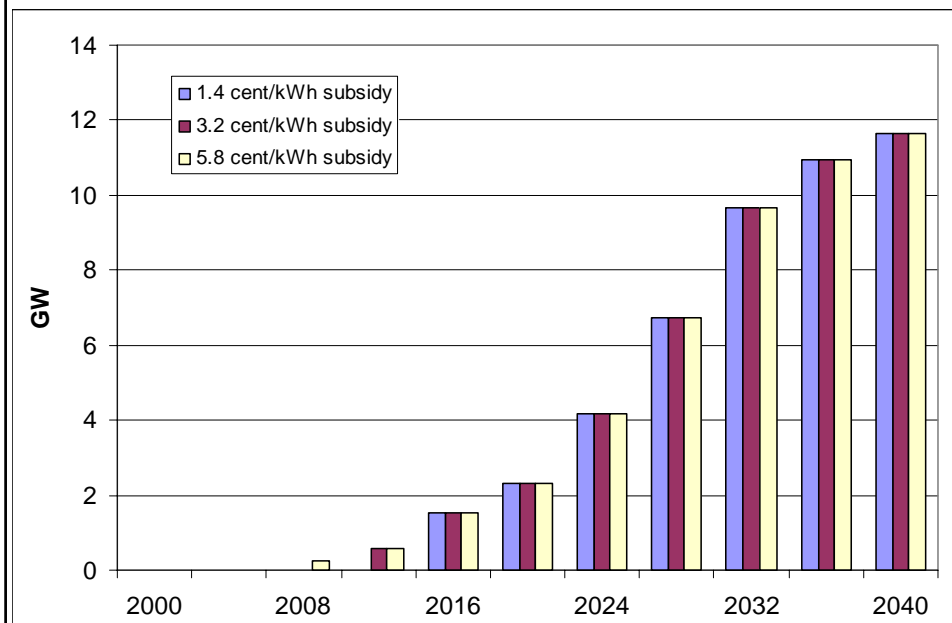
3.2. Renewable scenario: renewable electric capacity



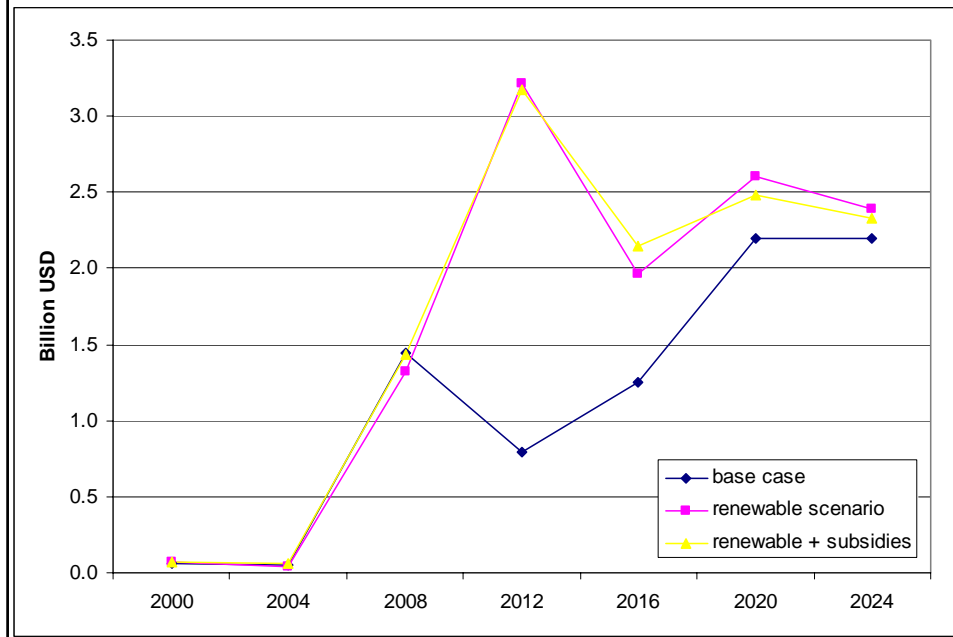
3.2. Renewable scenario: electric output by technology



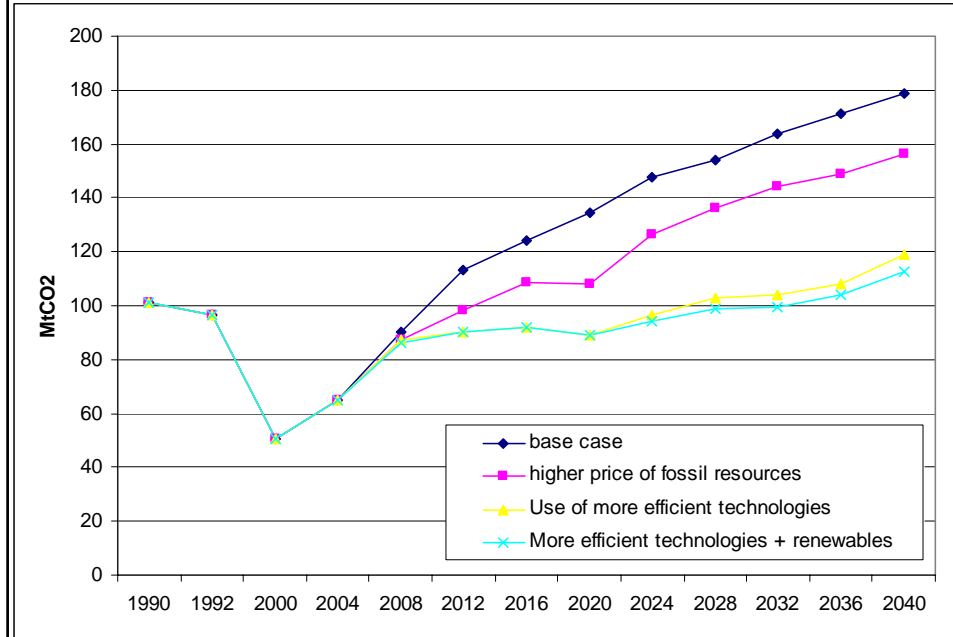
3.3. Subsidy scenarios: effect of subsidies in the early development of wind power



4.1. Cost of the power sector by scenario



4.2. CO2 emissions of the power sector by scenario



5. Conclusion

Part of the growing demand for electricity and the abundant availability of windy sites offers very good conditions for the use of wind power in Kazakhstan.

The development will depend appreciably on the change of energy prices from the present domestic level (very low) to the international level and restrictions to the amount, efficiency and type of new power plants. An early development is possible if subsidies are granted to wind electricity till 2016.

The development of wind and small hydro can stabilize CO₂ emissions of the power sector to the 1992 level till 2030.