

## Session 3: Cooperation in the New Energy and Environmental Sectors

### Keynote Report

# *The Interests of the Far East in the Energy Conservation Sector*

GULKOV, Aleksandr

Director, Institute of Oil and Gas, Far Eastern Federal University

Via the development of electricity generation facilities utilizing renewable energy sources over the coming 5-10 years, there will probably be a stabilizing of the global demand for fossil fuels. Currently, the share of renewable energy sources has reached 20% in the developed nations. As this leap has occurred in the last 15 years, over the next 10 years it is expected that the share of renewable energy will grow to 35-40%.

As electricity generation facilities from renewable energy there are small hydro, marine power, geothermal, wind, photovoltaic, solar thermal, heat pump, and cogeneration systems.

In Russia there is a federal law on energy conservation. It is the Federal Law "Concerning Energy Saving and Enhanced Energy Efficiency as Well as Amendments to Certain Legislative Acts of the Russian Federation" (23 November 2009). In addition to that there is the 2008 presidential decree "On Measures to Raise Energy Efficiency and Foster Environmental Stability in Russia's Economy". Furthermore there is the State Program on "Energy Saving and Enhanced Energy Efficiency up to 2020" which was approved by an order of the government in 2009.

Having a background of such laws and regulations,

Russia must expend great effort for the enhancement of energy efficiency. It is held that at least approximately 40% of consumed energy can be saved via improvement of energy efficiency. That is 403 million tonnes of oil equivalent, and adding on the portion from reducing the flaring of the gas associated with crude oil, it becomes 420 million tonnes.

It is no exaggeration to say that the great ideal picture for the growth of the Russian economy lies in the improvement of energy efficiency. Therefore the direction for investment is one of connecting up the whole of Russia to the gas supply, moving electricity generation plants over to gas, developing also refineries, petrochemicals, and LNG, and continuing to make advantage of that both for the satisfaction of domestic demand and for exports.

However, it is considered that it will take 10-20 years for large-scale electricity-generating facilities using renewable energy sources to enter Russia in earnest. In the meantime, small 20kW systems for self-consumption use will continue to be used, such as those for use in regions where the gas supply can't be connected. It is considered they will become combinatorial types. For example, there will be combinations such as: solar panels and wind power; solar water heaters and solar panels; gas cogeneration and

solar panels; diesel cogeneration and solar panels; and also diesel cogeneration and wind turbines.

Those places which will be able to introduce renewable energy in large-scale electricity generation will be limited to remote places, such as the Kamchatka Peninsula, for example. That is, they are regions where the costs end up high, because the procurement of fuel is a difficulty, and the bringing in of LNG is also difficult.

In the Russian Far East, beginning with Primorsky Krai, renewable energy sources (solar, and low-temperature geothermal, etc.) are present, and they have a modicum of experience in introducing and operating these.

Considering renewable energy sources from the aspect of cooperation with Japan, what attracts interest within Japanese technology are: solar panels; small 2-30kW units for wind; gas or LNG cogenerators (output of 30kW in electricity and 30-50kW with combined heat); and diesel cogenerators (30-50kW). Moreover, there is also cogeneration utilizing heavy fuel oil for ships and the like, and water heaters utilizing solar heat.

These renewable energy sources cannot exist as stand-alones, and at this time a backup is necessary. This is because otherwise they won't catch up in the sense of reliability and stable supply. That is necessary in particular, considering Russia's climate. However, under the present electricity pricing system, in Russia, because cogeneration can generate electricity at 50-75% of that cost, it is considered that self-use generation for factories and the like is exceedingly appropriate.

Returning to relations with Japan, the importing from Japan of manufactured products that use gas, and cogeneration type units for producing heat and electricity is hoped for. Mini-gas-turbines, cogenerators, and fuel cells which operate at low temperatures are desired. What would be best is joint production within Russia. Using the knock down method, in the form of assembly in Russia after importing the necessary components from Japan, the producing of heat pump, photovoltaic, and wind electricity-generating systems is hoped for. Additionally, within the Far Eastern Federal University an experimental energy-saving plant in cooperation with Japan has already been set up.

In Primorsky Krai joint production of small-scale wind electricity-generating systems is hoped for. Solar power is also possible, used on streetlights, with an output of 0.5-1kW. Moreover, self electricity-generation systems for residential or SME use of 2-10kW are conceivable. In that case, the main components will be imported from Japan to Russia, for example the revolving units, such as the gondolas and blades, and the components for streetlight solar panels also will be brought in from Japan. Meanwhile, Russia for its part will produce and supply such things as the material for the steel skeletons and poles, the rudders and the support columns, and assemble and install them in Russia. For marketing and sales also a form of cooperation where the Russian side takes part is conceivable.

Next, I recommend also the joint production in Primorsky Krai of small-scale solar power generating facilities. Currently, the ones manufactured in Germany, etc., have become quite low-priced, but in the Russian Far East 2-3kW ones are the most suitable. In terms of prices too, it would be good to bring in solar panels capable of electricity generation at less than US\$1 per watt from Japan to Russia. In that case, a cooperative relationship will be possible with the Russian side supplying the inverters, controllers and accumulators, etc., and doing the assembly and installation. It is a concept where the share of the burden of both sides would be made clear, costs would be kept down, marketing would be carried out, and the market would continue to be expanded.

The next recommendation is the joint production of small-scale cogeneration systems. They are cogeneration systems for use in detached houses, jointly providing electricity and heat. Also good would be 30kW diesel cogeneration, gas cogeneration, or fuel cells.

Considering the future Russian market, for renewable energy sources the small-scale types of facility will still be the mainstream. In particular, in remote areas away from urban areas, it is considered that the demand for such facilities will continue to increase. Meanwhile, in urban areas the facilities for the connecting up to the gas supply will continue being the core of the cooperation with Japan.

[Translated by ERINA]