

Business planning of Renewable Energy and Energy Efficiency Projects in Ukraine and Eastern Europe

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Promotion of energy efficiency and renewable energy – experiences from Norway



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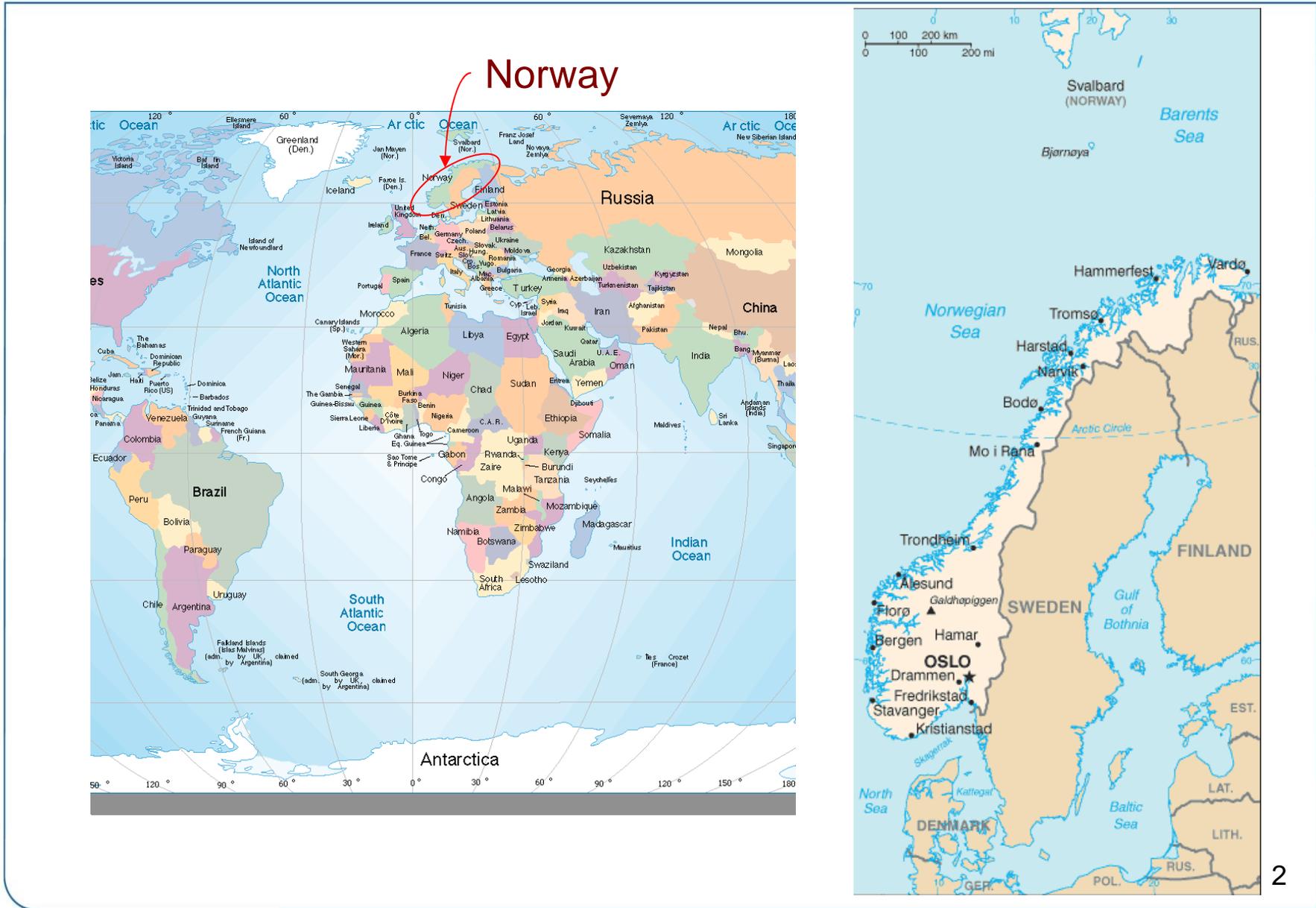
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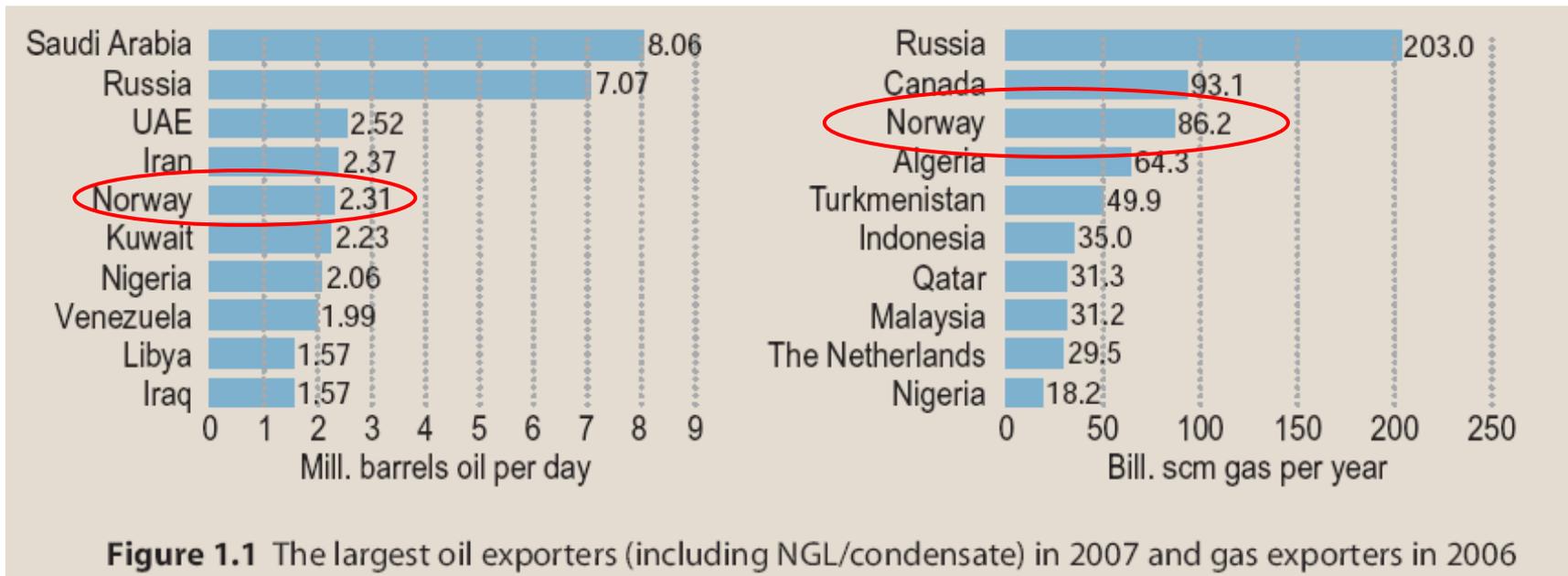
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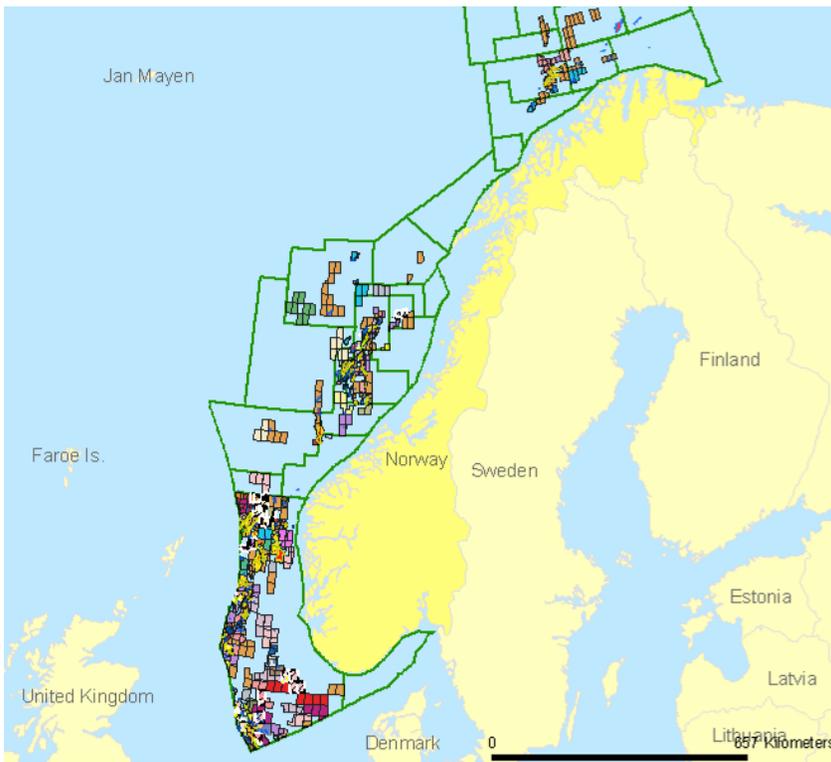
Norway is an energy nation

Oil

gas



Oil production



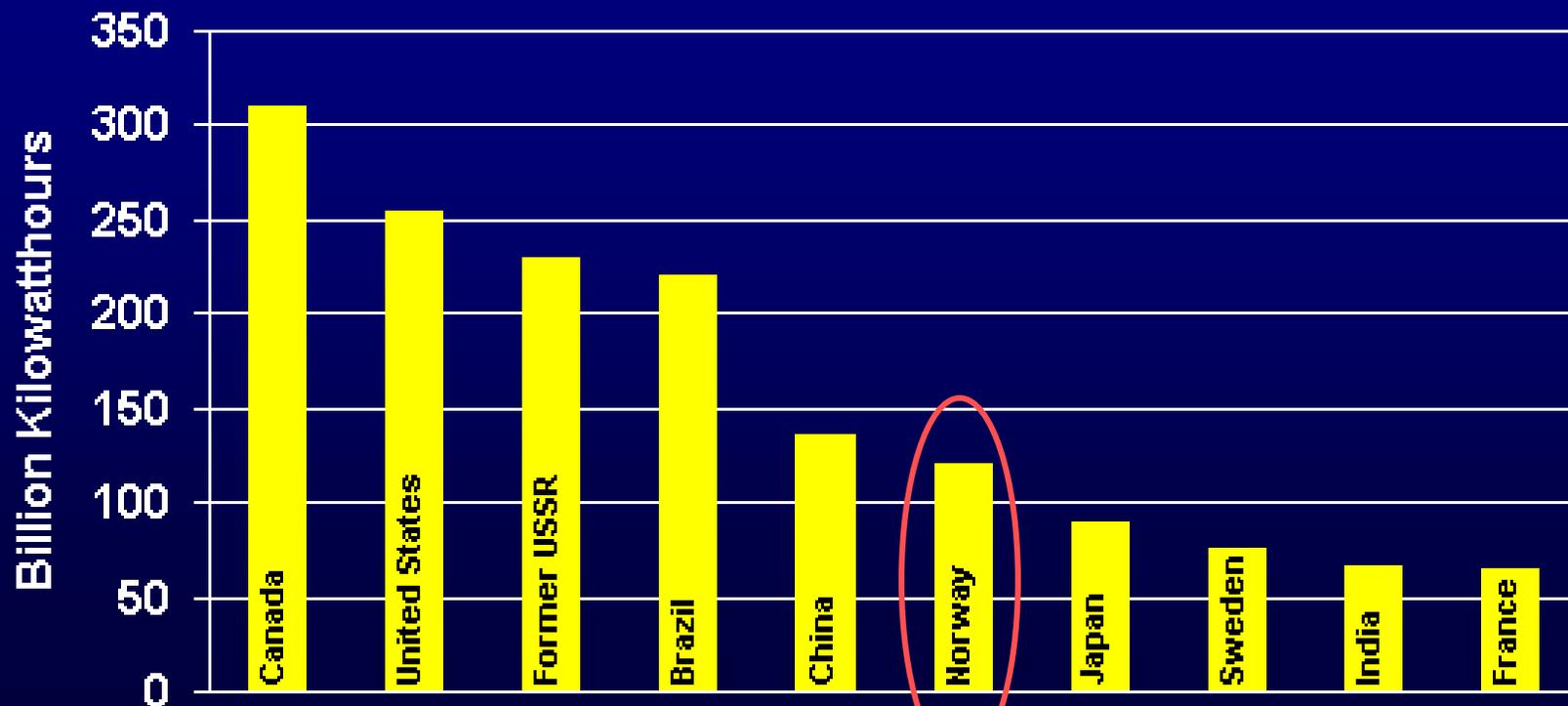
Natural gas production



Hydropower

Norway is No 6 in the world

Top Hydroelectric Generating Countries



Norwegian Climate Change Targets

- Norway will over-fulfil its commitment under the Kyoto Protocol by 10 per cent, corresponding to 5 million tons of CO₂-equivalents annually in the period 2008-2012
- By 2020 Norway will cut its emissions by 30 per cent
- Norway is ready to become carbon neutral by 2030 as part of an ambitious agreement, where other industrial nations make substantial commitments

Norwegian Ministries involved in Climate Change Policy

GHG emissions is today exceeding the Kyoto target. Norway will fulfill the Kyoto targets by cutting Norwegian emissions, + cutting emissions abroad through emission trading, CDM and JI.

- **Ministry of Environment** is responsible for climate change strategy and international climate change negotiations.
- **Ministry of Petroleum and Energy** allocate funds to ENOVA for promotion of energy efficiency and renewable energy in Norway.
- **Ministry of Finance** allocates funds for purchase of carbon credits through emission trading, CDM and JI. The Ministry plans to buy 30 - 35 million tons CO₂e for delivery 2008-2012.
- **Ministry of Foreign Affairs** support capacity building programs in Ukraine and many other countries to promote development of climate change mitigation projects.

Policies for promotion of energy efficiency and renewable energy

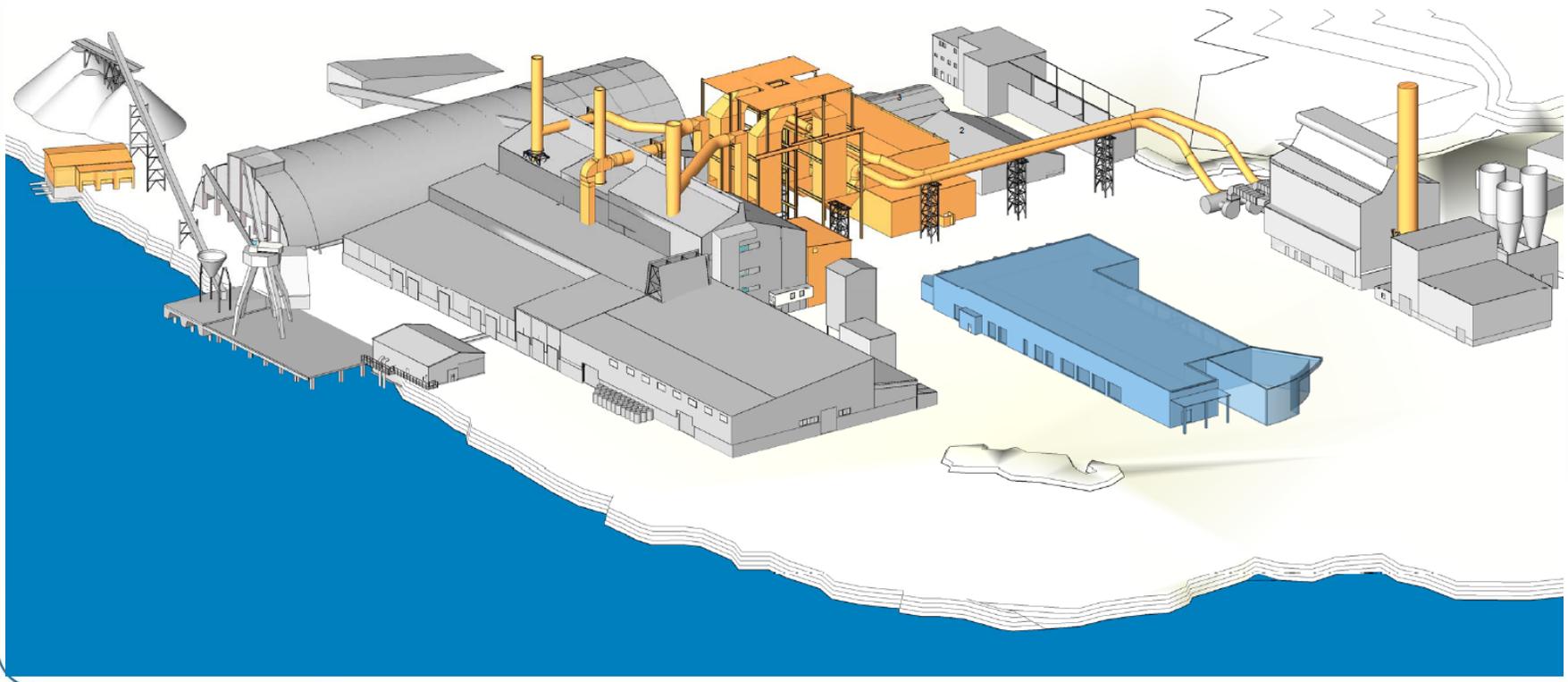
1. **Investment support:** The government has established a fund, which gives investment support to EE & RES. The fund is administered by the state owned company Enova. Normally 20 % investment support for accepted projects.
2. **Feed-in tariff:** The government decides the price for produced electricity from renewable sources, and hope that the result will be increased production of renewable electricity.
3. **Green certificates:** The government decide the production of renewable electricity, and the price is set by supply and demand in the free market.
4. **CO2 tax on fuel oil, diesel and gasoline:** Oil and gas sector pay high CO2 tax, others pay less, companies under the emission trading scheme do not pay.
5. **R&D:** Norwegian Research Council and EU FP7 support research on EE, RES and CCS.

Investment support

- The Norwegian government established in 2001 a fund for investment support to EE&RES projects.
- The fund is operated by the state owned company Enova.
- Approved EE&RES projects are given an investment support in average 20 % of total investments.
- During 10 years (2001-2011), Enova funded projects represent 15,5 TWh/year (sum of EE and RES).
- The energy saving end switch from fossil fuels to renewables correspond to a GHG emission reduction of 5,3 mill tons CO₂e/year.

Example of Enova funded projects

- Waste heat recovery at Finnfjord ferroalloy company
- Investment 80 mill EUR
- State investment support 22 mill EUR
- Electricity recovered = 340 GWh/year



Green certificates

- The purpose of green certificates is to promote increased production of electricity from renewable energy sources (small hydropower, wind, bio etc.)
- Sweden introduces green certificates in 2003.
- Norway joined the market in 2010

Green certificates

This is how it works:

- The government requires that all buyers of electricity must buy a certain share of renewables.
- The producers of renewable electricity receive green certificates for every kWh they produce.
- This creates a market with demand and supply of green certificates, and the price for the green certificates will be set in this market.

Price example

- Average electricity price in 2010 was 4,5 Eurocent/kWh
- The average price for green certificates in 2010 was 3,1 Eurocent/kWh
- Producers of renewable electricity get $4,5+3,1=7,6$ Eurocent/kWh.
- The certificate system shall finance 1,3 TWh new renewable energy in 2012 (of total 80 TWh). The average el-consumer must pay 0,06 Eurocent/kWh in addition to the el price.
- The average el-consumer use 20.000 kWh/year, and will pay 12 Euro in 2012 for green certificates.
- The share of new renewable energy in the certificate market will increase year by year. In 2020, the average el-consumer will pay 0,55 Eurocent/kWh, total 110 Euro.

Source: Norwegian Ministry of Petroleum and Energy

Conclusions

- in Norway promote domestic EE&RES projects by a policy mix of 20 % investment support, green certificates, CO₂ tax and funding of research and development projects.
- Norway do not have feed-in tariff.
- To achieve the climate change mitigation targets, Norway supplements domestic actions by purchase of ERUs and CERs.