1. Overview
   - Located in SE Asia, Country has a long shape and long coastline
   - Area: about 330,000 km², Population: more than 83 million people
   - Climate and topography: tropical in the south, and sub-tropical in north, Capital: Hanoi, Temperature: average low is 16°C, and average high is 29°C
   - Economy: Industry: 40%; Agriculture: 22%; Services: 38%, 30% of the population is considered to be below the poverty line
   - Energy sector accounted for (in 2000): 12% of the GDP, 25% of government revenues, 25% of exports and 13% of imports, US$261 million of the State budget

2. Current status of Vietnamese energy sector
   - Supply and Demand
     - Primary energy breakdown in 2002
       - Combustible 54% (renewable and waste), Oil 24%, Coal 13%, Hydropower 4%
     - Total energy demand
       - 20.8 MToe (million tons of oil equivalent)
       - Expected demand: about 32 MToe in 2010, and 60.3 MToe in 2020
   - Energy Resources
     - Coal: 3.88 billion tons, Oil: 2.3 billion tons, Gas: 1,207 million m³, Hydropower: 120 billion kWh
     - Other Resources: Geothermal, wind, solar energy, biomass, tidal and safe nuclear power
     - Coal
       - Reserves: 150 million tons
       - Yield
         - 2002
           - 11 million tons
           - Annual growth rate: 25% per year
         - 2005
           - 27 million tons
           - 1/3 for export
       - Export markets: Japan, China, Thailand, European Union, Mexico, Brazil
       - In 2010, production of 10 mil. tons coal per year is expected accounting for 25% of the total electricity production of the country
     - Oil
       - 600 million barrels
2004:
- Crude oil production: 400,000 bbl/d
- Net oil exports: 193,000 barrels per day
- Petroleum products are imported due to a lack of refineries
- The government has future plans for establishing refineries:
  - 2007: Dung Quat (central Vietnam)
  - 2010: Thanh Hoa
  - 2016: Vung Ro Phu Yen (southern central Vietnam)

Gas
- Reserves: 0.2 trillion m³
- Expect to harness: 0.28 trillion m³
- 2002: there was an agreement to pump and supply 130 Mcf/d
  - Resource field: Nam Con Son Basin

Renewable energy resources
- Geo-thermal resources: 200-400 MW
- Biomass energy:
  - Potential amount: 400 MW
  - Main sources: rice husks, wood, animal dung, agricultural residues
  - Productivity: 50 million tons/year
  - Only 30-40% used for electrical generation
- Uranium deposits: 300,000 million tons

Wind power
- Wind power potential is considered fair compared to East Asia, and weak compared to the world
- Mainly available on the islands and coastal areas
- Expected capacity of 400 MW
- Until now, exploited to generate electricity on islands such as Bach Long Vi and Phu Quoc, with a total capacity of 850 KWh

Solar energy
- High potential, especially in Center & South of Vietnam
- Solar radiation:
  - Winter: 3-4.5 KWh/m²/day
  - Summer: 4.5-6.5 KWh/m²/day
- Average hours of sun: 1600-2000 hrs/year
- Solar energy meets off-grid needs in remote areas
- Photovoltaic systems installed in some southern provinces

Electricity generation
- Average growth rate from 13.7% per year
  - 1995: 15.6 billion KWh
  - 2002: 35 billion KWh, of which 60% is from hydropower plants
Household coverage from 1996 to now has increased from 50% to 87%

The rural population receives low quality service - low voltage and poor reliability

In 2005, 100 million kWh of electricity was purchased from China

Energy generation by source (2002)

- Hydropower accounts for about 51% of total
- Oil: about 12%
- Coal: about 14%
- Gas: about 23%

Energy consumption by sector

- Split up into Industrial, Residential, Commercial/public service, Agricultural and Transport. Industrial sector uses the most energy.

Hydropower

- High potential exists
- 5 new hydropower plants are being constructed
  - e.g. Son La hydropower dam - expected to generate 2400 MW by 2012
- Mini-hydropower dams are suited to remote and mountainous areas, and provides a cheap source of energy for poor people, but quality and safety is a problem

Electricity development plan 2006-2010

- Electricity demand is growing
  - Until 2010, expected to grow at a rate of 15%-20% per year
- In 2008, there is a plan to purchase electricity from Laos

Target for 2010:

- Construct/expand 32 power stations
- Electricity household coverage: 80%
- Commission 16 hydropower plants
- Increase capacity coal-fired plants
- Construct 8 new coal-fired power plant
- Upgrade transmission lines surrounding Hanoi

Estimated load demand has shown a growth rate of about 12% per year from 2006 to 2010

Investment:

- Power generation
  - EVN (Electricity Authority of Vietnam) projects: about 8,000 MW
  - Other: about 2,000 MW
- Transmission lines
  - 9,300 miles of new high voltage lines
  - Other medium and low voltage lines also planned
3. Policies, projects and plans
   - Government Policy
     - Renewable Action Plan
       - Has a 10-year framework, 5 year phases of international assistance to promote the development and use of renewable energy or electricity generation
       - Jointly developed by the Electricity Authority of Vietnam and the World Bank

   - Barriers to implementing Renewable Energy Project:
     - Legislative
       - The current policy and legislative framework for encouraging the use of renewable energy is inadequate for providing the necessities to accelerate the development of Vietnam’s renewable energy
     - Technical
       - Insufficient awareness of available technology
       - Cost and performance
       - Lack of reliable data on biomass energy sources
       - Shortage of high-quality technology
       - High cost of biomass conservation technology
     - Financial
       - Lack of commercial businesses and infrastructure to provide renewable electricity equipment and service
       - High cost of biomass conversion technology and therefore the high cost of energy generation from biomass
       - Limited access to financial assistance for customers and project developers
     - Infrastructural

   - Vietnam has many projects supported by international organizations and countries
     - A demonstration project to provide assistance for new energy and industrial technology development by NEDO and supported by Japan
     - The International Finance Corporation (IFC) and the Danish Consultant Trust Fund provide resources for the master plan of rural electrification in Vietnam
     - Wind resource mapping with assistance from the Netherlands
     - Small-Hydro investment supported by New Zealand – assisting with the preparation of an investment pipeline for new small hydropower sites
     - World Bank support of the energy sector focuses on 4 teams, with a total investment amount of $1 billion
     - VN·GEF·Rural Energy II
Promotion of Renewable Energy, Energy Efficiency and Greenhouse Gas Abatement
Global Village Energy Partnership
Energy Efficient Public Lighting supported by UNDP
Large-scale hydropower project funded by the government

4. Summary
- Un-renewable energy sources in Vietnam and the world will be exhausted within the next several decades
- To ensure energy security in the future, research and cooperation development on energy should be undertaken actively
- Renewable energy exploitation is feasible in Vietnam
- However, costs for producing electricity is high
- The government should pay more attention and investment to meet the energy targets of the country

Question and Answer:
Q (Kuroki): In your presentation, you didn’t talk about nuclear power – what is the status of nuclear power and development? Can you talk about Vietnam’s nuclear plans?

A: The government has a plan to develop a nuclear power plant, but I don’t think it will be possible until 2020. Feasibility studies show that a feasible location is in Ninh Thuan Province, in the southern central region of Vietnam. This is quite a poor area – a semi-arid area with low rainfall, and the area has a low population density.

Initially, the public accepted the idea of constructing a new nuclear power plant here, because of incentives from the government – the area would become more developed with a nuclear power plant in the area. However, they are apprehensive about the safety of nuclear power, especially with relation to nuclear waste. The study does not show where the nuclear waste will be dumped, it only indicates that it is intended for the plant to be located here.

Q (Kuroki): I am a member of the board for the CDF in UNFCC. Brazil and China have been very proactive with relation to CDF, and have registered many projects. Vietnam has only 1 or 2 such projects already registered. What is the level of interest in CDM? Do you have any requests towards the CDM framework?

A: We also have a framework for CDM. Until now we have had a few projects in the area of hydropower in Vietnam. The process of approval for CDM projects is quite similar to
that of Thailand's. We have a structure for approval, and our minister is the chairman of the board for CDM in our country.

Q (Yokomizo): You mainly talked about the supply side, but what about the demand side (you have shown some statistics, but please explain in more detail)? Which sector is expected to show growth in power demand? And what are Vietnam's plans for energy conservation technologies?

A: Power demand in the country will increase a lot over the next few years, mostly in the industrial, agricultural sector. In the domestic sector, demand will not increase very much. The government also possesses an energy saving policy - following Japan's example, air conditioners are set to 28°C; compact light is used to replace conventional light sources; and, as mentioned in the presentation, Vietnam has some projects supported by other international agencies, to improve public lighting in order to reduce energy use.