

Sustainable Energy Policy and Development

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Outlines

- (1) Overviews of policies
- (2) Energy policies in Vietnam
- (3) Overviews of renewable energy in the world
- (4) Potential and exploitation of renewable energy sources in Vietnam
- (5) Policies for renewable energy development in Vietnam

I. Overviews of Policies

1. Concept of Policy:

- **Policy** is a course of decisions and solutions and encouragement towards the policy-depended objects in order to achieve certain goals
- **Policy** is a plan or course of action, as of a government, political party, or business, intended to influence and determine decisions, actions, and other matters

2. Process of policy management

➤ Policy study

- In theory
- In practice
- Comparison

➤ Policy making

- Determine objects that have benefits from policy
- Encouraged/limited objects
- Decisions and solutions
- Determine purposes of policy

3. Policy promulgation

- Forecast social reaction
- Having necessary and sufficient conditions to effectuate the policy
- Choose a suitable moment to promulgate the policy

4. Policy analysis and evaluation

- Logical analysis
- Science analysis
- Advantages
- Disadvantages
- Solutions proposal

5. Policy classification

➤ Specific policy

- Policy
- Circular
- Decree of Government
- Prime minister's decision
- Resolution

➤ General policy

- A course of official texts from Government on specific fields in a certain period

➤ Time-based policy

- Short-term policy: less than 3 years
- Medium-term policy: less than 10 years
- Long-term policy: more than 10 years

6. Basis structure of policy

- Statement
- Reason – urgent requirements
- Status analysis
- Development background - world trend – development demands of Vietnam
- General points of view
- Purpose/Target
- Priorities
- Solutions: Finance – Material facilities – Human resources – Particular solutions
- Action pathway

II. Energy Policies in Vietnam

To meet the increasing demand for energy, electricity especially, Vietnamese government has promulgated energy policies to:

- ▶ Improve the energy sector structure
- ▶ Develop primary energy sources
- ▶ Recognize and apply nuclear power
- ▶ Develop REs
- ▶ Increase energy efficiency

1. Improve the energy sector structure

❖ *Established general department of energy*

- Approved by the prime minister through decision No 50/2011/QĐ-TTg dated on 5/9/2011
- The leading department on electricity development, nuclear power, REs application and deployment, energy management.
- The establishment of the department is necessary in order to overall manage activities, plans, strategies, etc of energy sector

❖ *Establish a competitive market for electricity production*

- Competitive market for electricity production piloted by Ministry of industry and trade since 1/7/2011
- Right after that day 48/73 power plants with over 30MW-capacity offered an electricity market price. By the end of 2011, 55 plants occupying 61% of total country's electricity capacity offered a market price
- Multi-purpose hydropower plants (Son La, Hoa Binh, Ialy) do not offer a market price since beside generating electricity, one of their priorities is flood prevention and irrigation

2. Develop primary energy sources

❖ *Develop coal exploitation technologies*

- Total remained reserves of anthracite in Quang Ninh at 300m - depth is about 1.5 bill .tons, at 300-1000m depth is ~ 7 bill. tons
- Total reserves of brown coal in Red Delta River is about 200 bill. tons
- Exploitation technologies of brown coal are researching and piloting

❖ *Develop associated-dissolved gas collection natural gas extraction technologies*

3. Recognize and apply nuclear power

- Two first nuclear power plants will be constructed in Ninh Thuan (Russian tech) and operated by 2014, capacity: 2000MW
- Two other plants (Japanese tech) is under-research
- Safety of nuclear power plants is the first priority of Vietnamese government

4. Develop renewable energies

- ❖ Power Development Plan VII (Decision No. 1208/QD-TTg approved by The Prime Minister dated on 21/07/2011)

Priority is given to development of renewable energy resources for electricity production with share of electricity produced from renewable energy resources increased from level of 3 % of total electricity production in 2010 to 5 % in 2020 and 11% in 2050

- ❖ Decision No. 1855/QD-TTg approving “Vietnam's national energy development strategy up to 2020, with 2050 vision”

Priority is given to development of renewable energy resources, with share of electricity produced from renewable energy resources increased from level of 3.5 % of total electricity production in 2010 to 4.5 % in 2020 and 6.0% in 2030

- ❖ On June, 29th the Prime Minister issued Decision No. 37/2011/QĐ-TTg concerning “the Mechanism supporting the development of Wind Power Project in Vietnam”.

Government provided current priorities about the investment credit of government; exempted on import taxes on machines, equipment and materials that cannot be produced by domestic firms; exempted and reduced on income taxes for enterprises; and given preferences at infrastructure. The buyer sector will be supported with the electricity price of 7,8 UScents / KWh for all amount of electricity it buys from the grid-linked wind power

- ❖ Others: “Bio-energy development strategy up to 2015, with 2025 vision”; “Biogas program for animal husbandry section in Vietnam, 2007-2012”

III. Overviews of Renewable Energy in the World

Figure 1. Annual Investment in Renewable Energy, 2004–2009

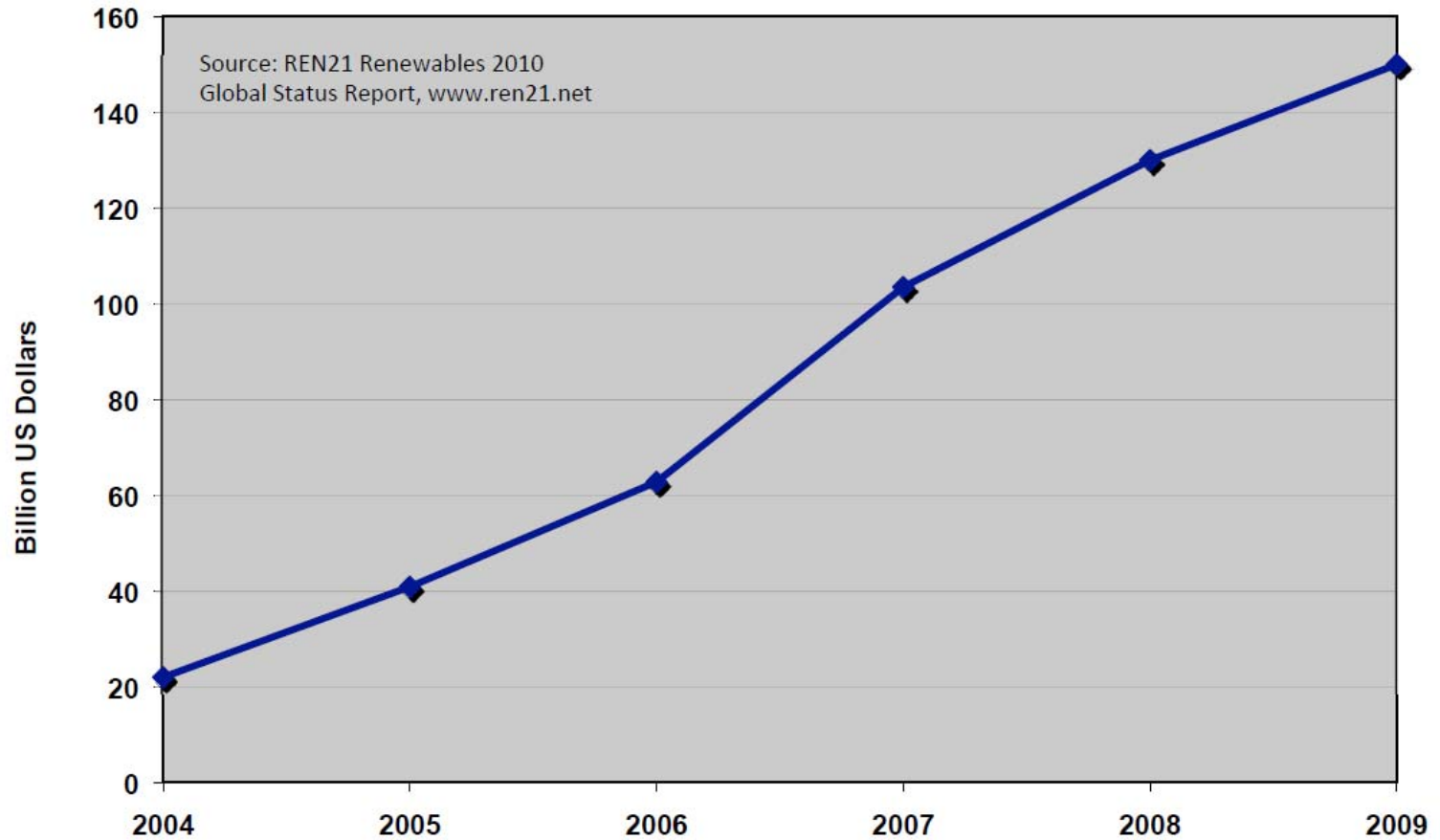


Figure 2. Wind Power Capacity, Top 10 Countries, 2009

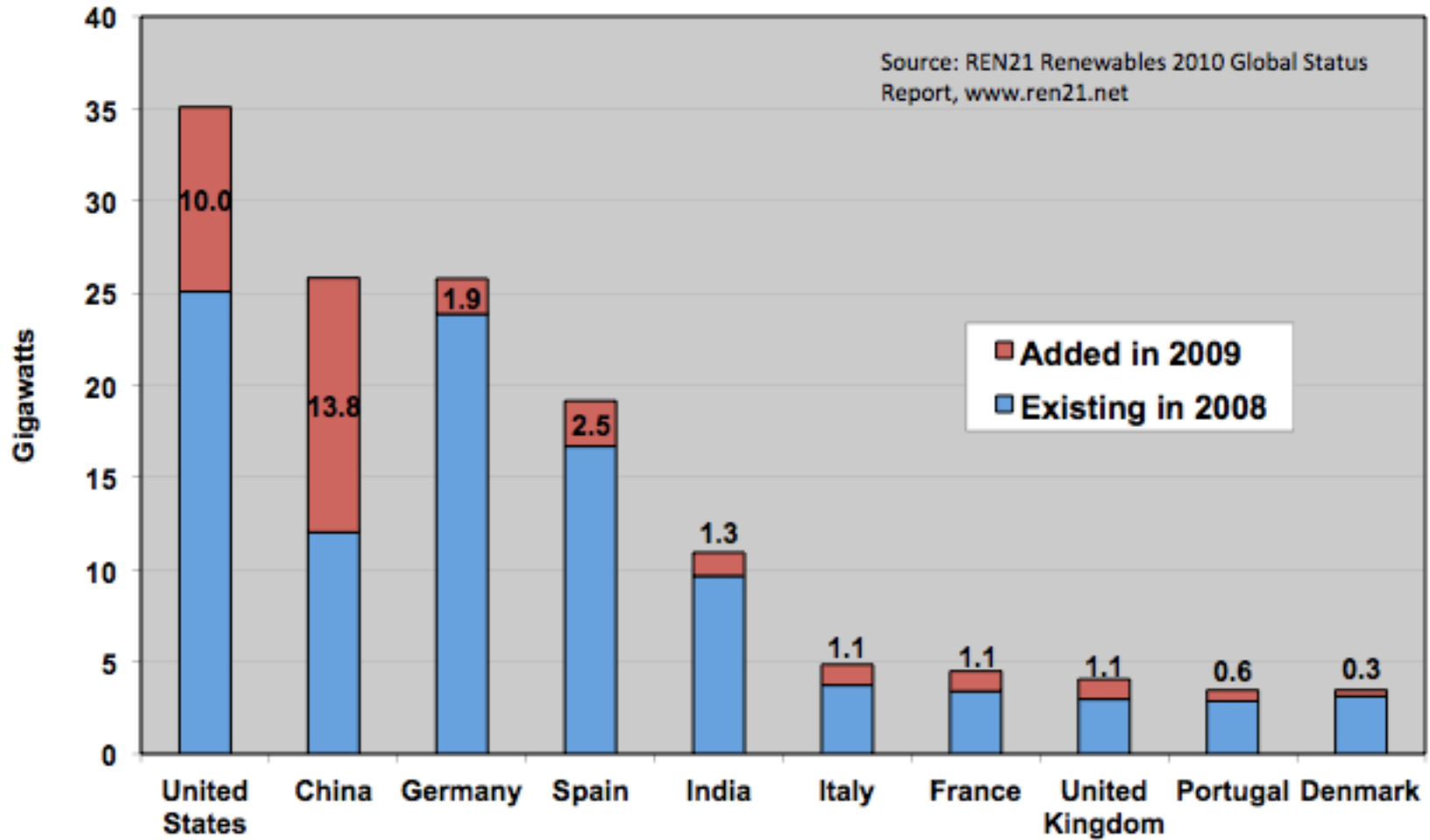
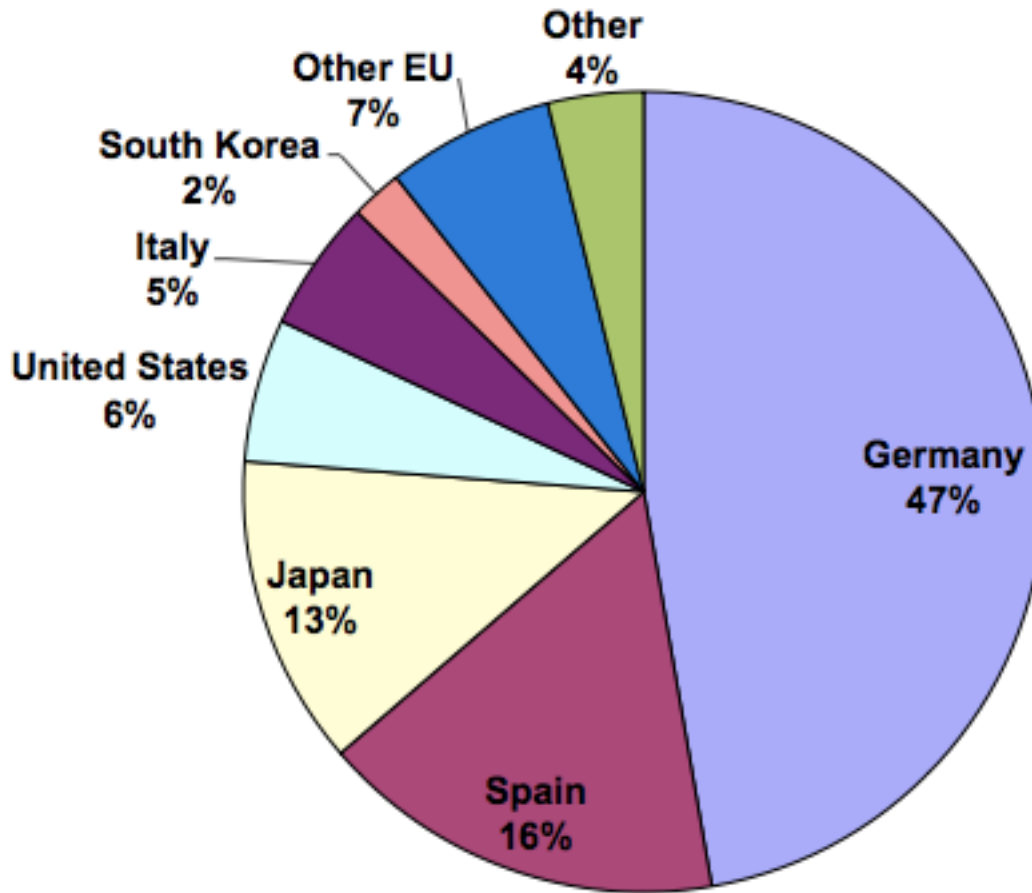


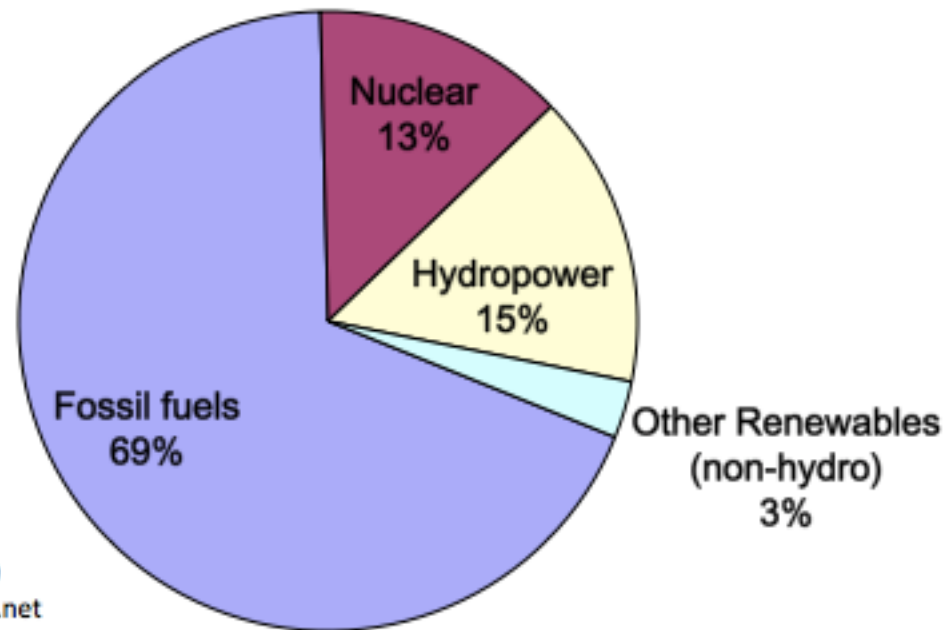
Figure 3. Solar PV Existing Capacity, Top Six Countries, 2009



Global Total = 21 GW

Source: REN21 Renewables 2010 Global Status Report, www.ren21.net

Figure 4. Share of Global Electricity from Renewable Energy, 2008



Source: REN21 Renewables 2010
Global Status Report, www.ren21.net

Share of Renewable Energy in 2008 and Targets by 2020

No	Country	2008	By 2020
1	Sweden	44.40%	49%
2	Austria	28.50%	34%
3	France	11%	23%
4	Germany	8.9	18%
5	China		15%
6	Thailand		22%
7	Vietnam		5%

IV. Potential and exploitation of renewable energy sources in Vietnam

1. Solar energy

- Vietnam has significant solar energy potential
- Sunshine hours per year in the north are about 1800-2000hrs, in the south (from Da Nang) are about 2000-2600hrs
- The daily average solar energy incident over Vietnam varies from 3,54 to 5,15 kWh/m²/day. Theoretical solar energy potential is about 43,9 bill TOE/year

- However, the share of solar energy is still very small. Up to now, the total installed capacity of solar electricity is 1,2 MWp
- The solar energy is mainly used for water heating (household) and small scale electricity generation
- Solar energy for drying, cooking, water distill is insignificant
- ▶ Solar electricity in Vietnam is very small, off - grid systems and often used for lighting or converted into AC electricity

2. Wind energy

- Vietnam is located in tropical monsoon climate area, with 2 main reasons a year.
- The region with high potential of wind power is only 2% of total territorial area (coastal or plateau)
- In large regions of country, annual wind power is less than 200kWh/m²

	Region	Wind power (kWh/m ²)
1	South central coast	300 - 400
2	Truong Sa island	2058
3	Bach Long Vi	3064
4	Con Dao	302
5	Phu Quoc	440

- Wind energy depends on the height above sea level
- According to the data of World Bank, Vietnam is a leading country in southeast area on wind power potential with total potential is about 513.360MW.

- Wind power plants have been constructed in central coast provinces (Ninh Thuan, Binh Thuan, Binh Dinh), southern provinces (Ca Mau, Kien Giang) and islands (Truong Sa, Con Dao, Phu Quoc)
- Currently there are 42 wind power projects with total installed capacity of about 3.906 MW in 12 provinces. However, the progress of the projects is very slow. Tuy Phong wind power plant was operated in 2009 but the electricity price has not decided yet (by EVN)

3. Small hydropower (SHP)

- In Vietnam, the definition of small hydropower is not clear. Hydropower plant with the capacity under 10 MW was considered as SHP. However, in 2007, MOIT defined the new capacity of SHP that is less than 30MW. The potential for micro-hydropower is significantly large (1 million potential sites with capacity of 200W-100kW each site)
- Technical potential is about 4.015,1MW, SHP is one of most important REs
- 2010, there are 500 under-operation SHP stations with capacity of 5-10.000kW/station and total installed capacity of about 106 MW, generating 120-150kWh/year.

- Most 5-100kW stations have been out of operation due to brokenness of equipment or stopped operation as the area is able to access to electricity grid
- There are 117 stations with installed capacity of 100kW-10.000kW, in which 55/117 stations is under-operation (47%)
- About 100.000-150.000 of 0.2-5kW stations operated and managed my families in the no-electricity access regions is working well.

4. *Bioenergy*

- Bioenergy is renewable energy made available from materials derived from biological sources, including biomass energy, bio-fuels and biogas
- Can be generated from agricultural by products, forestry residues, waste, animal dung, and organic industrial waste, etc
- Biomass, as a renewable energy source, is biological material from living, or recently living organisms

- With favorable climate and soil, the bioenergy potential of Vietnam is significantly large
- In Vietnam, the material for bioenergy is abundant. Soybean, peanut, jatropha and fish oil (biodiesel); corn, sugar cane, cassava (bio-ethanol)
- One of barriers of bioenergy is the food security. If a large area is shifted to cultivate biodiesel plants, then food security will be threatened

- Potential of biogas from agricultural by-products and husbandry waste is about 4.844 million m³, equivalent to 2 million tons of oil
- 4 ethanol factories with installed capacity of 100 million liters/year (for each) has been constructed.
- Million tons of agricultural by-products and husbandry waste are unused → energy waste and environmental pollution

- In recent years, biofuels have been paid much consideration. Biofuel is a potential substitute for petroleum in Vietnam. The area of biofuel plants is enlarged. Vietnam can potentially produce 5 million liters of biofuel per year.
- Vietnam also has big potential on biodiesel production (500 million tons/year)

V. Policies for renewable energy development in Vietnam

1. Policies for renewable energy development in Vietnam

- ▶ Vietnam's national energy development strategy until 2020, with 2050 vision
- ▶ Environment protection law
- ▶ Electricity law
- ▶ National Strategy for Environmental Protection until 2010 and vision toward 2020
- ▶ ...

Vietnam's national energy development strategy until 2020, with 2050 vision

Development viewpoint

- ✓ Develop energy sector comprehensively and appropriately: electricity, oil, coal and REs, pay priorities for clean, renewable energies.
- ✓ Distribute electricity properly
- ✓ Balance energy exploration, exploitation and production.
- ✓ Integrate environment protection into energy development strategies

Targets:

- Ensure national energy security
- Promote socio-economic development
- Sustainably exploit and use domestic energy resources
- Establish and develop competitive energy market.
- Diversify investment means and business modes of energy sector
- Develop REs (especially in mountainous, remote areas). Increase the share of renewable energy up to 3% in 2010, 5% in 2020 and 11% in 2050
- Combine energy development, environment protection and sustainable natural resource use.

Development orientation:

- ✓ Energy planning: the potential of renewable energy has not been fully recognized.
- ✓ Strengthen propaganda and improve awareness on REs, promote REs use in remote areas, promulgate management and encourage mechanism for REs
- ✓ Integrate REs into national energy development strategies, energy saving projects, programs to electrify the countryside, forest planting projects, etc

- ✓ Encourage REs use and deployment in industrial and residential sectors: water heating, small, small hydropower plant, biogas
- ✓ Financially support by providing priorities about the investment credit of government; exempting on import taxes on machines, equipment and materials that cannot be produced by domestic firms; exempting and reducing on income taxes for enterprises; and given preferences at infrastructure
- ✓ Permit domestic/international organizations or individuals to invest, exploit, utilize REs legally based on the principle of mutual benefit

Law on environmental protection

- ▶ The State encourages production and consumption of less polluting and easily decomposable products and goods; use of waste for production of clean energy, production, import and use of machinery, equipment and means of transport driven by clean or renewable energy.
- ▶ The Government shall formulate and implement clean/renewable energy development strategies to enhance national capacity in research and application of RE, to expand international cooperation and mobilize resources for exploiting and using renewable energy, to gradually raise renewable energy ratios in total national energy output; ensure energy security, to integrate clean energy and renewable energy development programs into programs on socio-economic programs
- ▶ Organizations and individuals investing in the development and use of clean energy, renewable energy, production of environment-friendly products shall be granted by the State preferences in tax, funding support and land for building production establishments

Electricity Law, 2004

Vietnam Electricity Law comes into effect on 1 July. 2005.

One of policies of electricity development is:

- To step up the exploitation and use of sources of new energies, renewable energy for electricity generation. Providing investment, electricity price and tax preferences as guided by the Finance Ministry to investment projects on development of power plants using sources or new energy or renewable energy.
- To encourage organizations and individuals to invest in construction of electricity grids or electricity-generating stations using local energies, new energies, renewable energies to supply electricity to rural, mountainous or island areas.

National Strategy for Environmental Protection until 2010 and vision toward 2020

- ▶ Incentives should, in combination with enforcement, be provided to encourage production and business units to make investment in the technological renovation and adoption of environmentally friendly and/or low waste production technologies.
- ▶ Increase the rate of clean energy use to 5% of the total annual energy consumption
- ▶ Encourage the consumption of energy in an economical manner and the use of clean energy and less pollution fuel substitutes

Electricity Development Strategy in 2004-2010 and its orientation towards 2020

Decision No. 176/2004/QĐ-TTg (5/10/2004) approved by the Prime Minister

Indicate the role of research and development of renewable energies to meet the electricity demand, especially in islands, mountainous and remote areas

Priorities is given to small hydropower. Solutions to encourage investment and application of SHP are presented.

2. Policies to encourage development of renewable energy

1. Wind power policies

On June, 29th the Prime Minister issued Decision No. 37/2011/QĐ-TTg concerning the Mechanism supporting the development of Wind Power Project in Vietnam.

- *Project construction expenditure from:*
 - National budget:
 - Provincial budget

- ***Electricity purchase responsibility***

Vietnam Electricity Cooperation (The buyer sector) is responsible for purchasing all electricity produced by grid-linked wind power firms managed by the Cooperation

Electricity price subsidy for grid-linked wind power project

- Vietnam Electricity Cooperation (The buyer sector) is responsible for purchasing all electricity produced by grid-linked wind power firms managed by the Cooperation with price of 1.614VND/kWh (7,8UScents/kWh)
- The buyer sector will be supported with the electricity price of 207 dong/ KWh for all amount of electricity it buys from the grid-linked wind power firms based on Vietnam Environmental Protection Fund
- Wind power projects can apply clean development mechanism

Investment capital, tax preference

- Investors of the wind power firms are mobilized with the investment capital from domestic and overseas organizations and individuals under legal permitted forms to fully raise the budget for the development of projects;
- Provided with current priorities about the investment credit of government;
- Exempted on import taxes on machines equipment and materials that cannot be produced by domestic firms;

ENTERPRISE INCOME TAX

Exemption and reduction of income taxes for wind power production enterprises is regulated in the Law on investment, the Tax Law, etc

Infrastructure, land use preference

The wind power stations, electricity transmission systems electricity transformer stations are given preferences at infrastructure and land use (exempted, reduced on land use fees)

3. Policies to encourage development of bio-energy

- **Policy targets**

- To promote and generate a new field agriculture sector by developing a raw material zones in combination with constructing diesel processing factories.
- To effectively use uncultivated or low productivity land
- To improve living standard in poor/difficult regions and protect environment and ecosystems

- **Targets in 2011-2015 and vision toward 2025**
 - Gradually expand the production scale based on the market demand
 - Increase the material plant area to 300.000 ha by 2015 and 500.000 ha by 2025 (perspective)
 - Expand the scale of diesel production lines (Jatropha)

- Increase the total bio-diesel production capacity to 300.000 tons/year by 2015 and 1 billions tons/year by 2025 (oriented), substitute 10-15% of imported diesel
- Create job, improve income, eradicate and reduce poverty, reduce deforestation.
- Protect land, ecosystems and environment

• **Encouragement policy**

Land preference

- Assign uncultivated land (bare hill) to households, individuals
- Encourage the cooperation between investors and land-owners based on the principle of mutual benefit
- Simplify administration procedures
- Give land preference to bio-diesel production enterprises

Investment capital support

- Provide jatropha seed and sapling to land owners until 2010
- Give loan preference to jatropha planters or jatropha bio-diesel producers
- Tax policy: Enterprise income tax exemption for bio-diesel producers during the beginning time when bio-diesel price is higher than conventional diesel

Technology solutions and agriculture encouragement

- The State should approve a national long – term research program on bio-diesel
- Promote researches on bio-technology, gene-technology especially in order to create a new , oil-rich, high-productivity Jatropha variety
- Establish a center for Jatropha research (established by the State or by enterprises)

- Encourage scientists and science organizations, private enterprises to invest and research on bio-diesel
- Set up a agriculture encouragement program on Jatropha in 2009-2015
- Training and improving management capacity and research capacity for officers and researchers

Market solutions

- Regulate the mandatory Biodiesel and Diesel Mix ratio in which ratio of bio-diesel is 1-5% (corresponding to B1-B5). The adjustment of this ratio depends on the domestic bio-diesel production status and world oil market

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