

CURRENT STATUS & DEVELOPMENT PLAN FOR GRID SMALL HYDRO POWER IN VIETNAM - BARRIERS & MEASURES TO OVERCOME BARRIERS IN THE FUTURE

**Ministry of Industry and Trade
General Directorate of Energy**

Friday, May 10, 2013

CONTEXT



- I. Current status and development plan for grid small hydro power plant.
- II. Barriers & measures to overcome barriers in the future

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I. Current status and development plan for grid small hydro power plant.

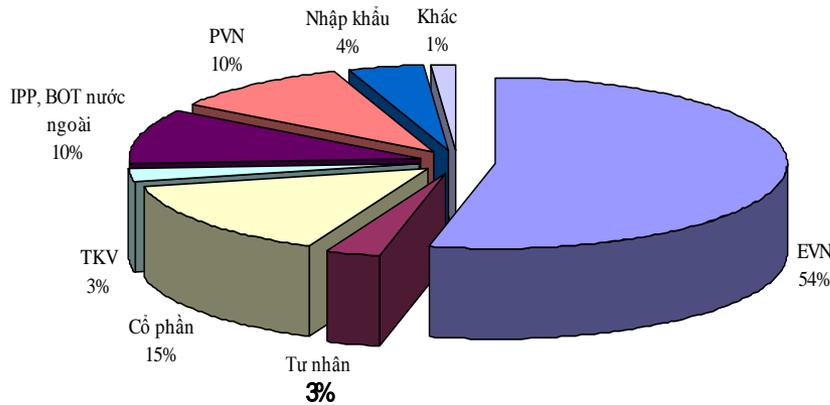
II. Barriers & measures to overcome barriers in the future

Current status and development plan for grid small hydro power plant

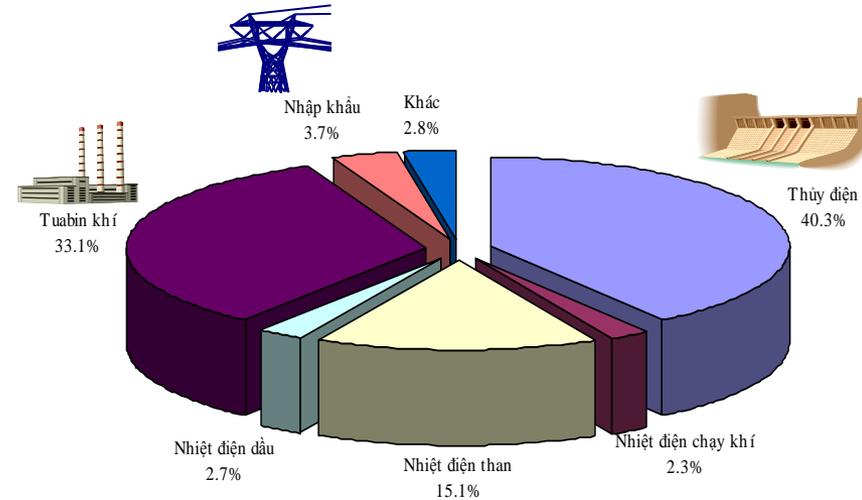
(CURRENT GENERATION SHARE IN 2012)



By Owner



By Generation type



2012: Total Installed Capacity **24,274 MW**

In which: Hydro power **10,733MW** taking share of **40%**

Small hydro power (<30MW) takes **1,200 MW**.

Total generated power : **117.6 TWh**.

Total power consumption: **105.3 TWh**.

Current status and development plan for grid small hydro power plant



Hydro Power Plant (Large, Medium, Small)

- Potential of : **35.000 MW**, 300TWh/year
- Exploitable: **20-25 GW**, 80-85TWh/year. Planned into **1,097 Projects**

Of which:

- Completed and commissioning project: **195 Projects** with total installed capacity **10,733MW**.
- Under construction projects: **245 Projects** with total installed capacity **7,101 MW**.
- Not yet constructed: **657 Projects**.

Small Hydro Power Plant (Installed Capacity <30MW)

- Planned into **990 Projects** with **4,300MW** of installed capacity of which **361 Projects** has been completed and commissioning (36% of total) with total installed capacity of **1,200 MW**.
- Connect to Grid: Mainly by middle voltage at **22kV**, **35kV** (existing for installed capacity <10MW if compatible to network capacity or brand new) & partly at **110kV**.
- Average forestland use: **3ha/MW** (3,98ha/MW for large and medium hydro power project).
- Most of small hydro power plan do not have to arrange resettlement.

Current status and development plan for grid small hydro power plant



Incentive mechanism and policy to encourage the development of Renewable energy including small hydro power

General incentives:

- Import tax exemption for goods which can not be produced domestically.
- Corporate tax exemption for the first four years and reduce to 50% in the next 9 years.
- Obligation to purchase electricity: EVN must purchase all electricity generated from renewable energy sources.
- Tax and land use fee exemption for renewable energy projects.
- Free Environmental protection fee.

Specific policy: Tariff mechanism

- Decision No.18/2008/QD-BCT dated 18th July 2008 on avoided cost tariffs for small hydro projects
 - Avoided costs as The avoided costs of the national power system is calculated when there is a (01) kWh power from small power plants using renewable energy is emitted into the distribution grid;
 - Production costs of the generator 1kWh have the highest cost in the national electricity system, these costs can be avoided if buyers purchase 1kWh from a small power plants using renewable energy replacement.

Current status and development plan for grid small hydro power plant

(GENERATION SHARE TO 2030)



(Master Plan VII for period of 2011-2020, outlook to 2030)

	2015		2020		2025		2030	
	MW	Share %	MW	Share %	MW	Share %	MW	Share %
Hydropower & Pump Storage	14200	33.60%	19050	25.40%	19800	20.90%	22106	15.70%
Oil and Gas Fired Thermal Power	10500	24.90%	12375	16.50%	16700	17.60%	16614	11.80%
Coal Fired Thermal Power	14900	35.10%	36000	48.00%	42900	45.20%	72653	51.60%
Imported	1070	2.50%	2325	3.10%	4600	4.80%	6899.2	4.90%
Renewable Energy	1.670	3.90%	4.200	5.60%	4.800	5.10%	13.235	9.40%
Nuclear Power		0.00%	975	1.30%	6000	6.30%	9292.8	6.60%
Total Installed Capacity	42.500		75.000		95.000		146.800	
Pmax	30800		52000		77000		110000	
Produced Electricity (Billion kWh)	194.3		329.4		489.6		695.1	

Current status and development plan for grid small hydro power plant



(DEVELOPMENT PLAN OF SMALL HYDRO POWER PLANT)

Capacity of Renewable Energy on-grid (MW)

Capacity	2011-2015	2016-2020	2021-2030	2011-2030
Wind power	213	780	5.200	6.193
Small Hydro power (on grid)	895	1.100	2.380	4.375
Biomass (solid)	50	305	1.500	1.855
Waste	39	100	200	339
Geothermal	0	80	198	278
Solar power	1	9	45	55
Biogas	1	34	65	100
Total	1.198	2.408	9.588	13.194

Capacity of Renewable Energy off-grid (MW)

Capacity	2011-2015	2016-2020	2011-2020
Solar system	12,3	10	14
Small Hydro power (off grid)	31,2	25,6	58
Biogas	1,3	1	5
Wind power-diesel system	3,6	3	8
Solar-diesel system	4,6	3,8	8
wind-diesel-solar system	3.6	2,3	9
Total	56,7	45,7	102,4

Current status and development plan for grid small hydro power plant



(EXPLOITABLE SMALL HYDRO POWER TO 2030)

ENERGY TYPE	2010		2015		2020		2025		2030	
	Natural unit	KTOE	Natural unit	KTOE	Natural unit	KTOE	Natural unit	KTOE	Natural unit	KTOE
Primary Energy Demand		59346		89534		123009		157407		201186
Exploitable Energy Sources		77.386		94.828		108.004		130.538		144.913
- Coal	50 mil tons	28000	62,7 mil tons	35112	79 mil tons	44240	110 mil tons	61600	130 mil tons	72800
- Crude Oil	19,86 mil tons	20217	20 mil tons	20360	20,7 mil tons	21073	21,7 mil tons	22091	22 mil tons	22396
- Natual Gas	8,16 bil m ³	7349	11,82 bil m ³	10641	13,2 bil m ³	11908	17,8 bil m ³	16012	18,3 bil m ³	16485
- Hydro Power	30,13 TWh	6478	56,8 TWh	12219	60,17 TWh	12938	60,7 TWh	13051	63,3 TWh	13620
- Small Hydro Power	1,99 TWh	428	4,17 TWh	896	9,79 TWh	2105	12,8 TWh	2754	15,06 TWh	3240
Renewable Energy (ton of fuel wood equivalent)	45,2 mil tons	14914	47,2 mil tons	15600	47,7 mil tons	15740	45,5 mil tons	15031	49,6 mil tons	16372
Surplus (+) Shortage (-)		18.040		5.294		-15.005		-26.869		-56.274

Current status and development plan for grid small hydro power plant



(DEVELOPMENT PLAN OF SMALL HYDRO POWER PLANT)

TOTAL CAPITAL INVESTMENT NEEDED/ AVERAGE CAPITAL INVESTMENT PER YEAR FOR GENERATOR CONSTRUCTION UP TO 2030

No	Items	2011-2015	2016-2020	2021-2025	2026-2030	2011-2030
1	Coal Fired Thermal Power	37.1%	35.3%	28.5%	49.6%	38.4%
2	Hydropower	18.3%	1.6%	0.1%	0.0%	3.8%
3	Pump Storage	0.0%	2.7%	2.7%	1.3%	1.8%
4	Oil and Gas Fired Thermal Power	10.9%	7.7%	6.0%	0.2%	5.6%
5	Nuclear Power	6.6%	23.1%	27.5%	15.9%	18.9%
6	Renewable Energy	2.3%	3.0%	3.8%	0.1%	2.2%
	TOTAL (Billion USD)	22,076/ 4,415	28,830/ 5,766	27,005/ 5,401	32,441/ 6,482	110,322/ 5,516

CONTEXT



I. Current status and development plan for grid small hydro power plant.

II. Barriers & measures to overcome barriers in the future



Barriers

1. Investors:

- Limited capacity and experience of the investors in management and monitoring construction.
- Lack of financial resources. Difficulty to access bank's loan with reasonable interest rate. Especially in crisis period when bank's interest rate reach 30%/year.

Which leads:

- Low quality project's construction, affect safety of downstream community.
- Project's progress slower than committed.



Barriers (cont.)

2. Connection grid:

- Difficulty and uncertainty in the system connection due to big investment required to transmit all capacity of hydro power plants in one big area.
- Locally congestion on transmission network due to many hydro power project centralized in 1 area.

3. Electricity Tariff:

- Unchangeable long-term tariff: Only small hydro power projects start operation since 2010 may be applied The avoided cost (Decision 18) and most of small hydro power projects have to sign a Long-term contract normally effective for 20 years. While average electric price may change regularly due to input indicators (e.g. Fuel price, current exchange, inflation...). It means in some case, the tariff is lower than average price.



Barriers (cont.)

4. Local state bodies:

- Inaccurate planning due to out-of-date basic material (hydrology, topography, geology, etc...).
- Insufficient management, inspection, monitoring of registered project.

Which leads:

- Unstable Planning, uncertain projects;
- Several projects negatively affect the natural environment and society.

Barriers & measures to overcome barriers in the future



Solutions

- **Strengthening capability** of management and planning for Local state bodies;
- **Evaluate Investor ability (Experience, Finance):** Exclude the project has low socio-economic efficiency such as projects has major influence on the environment, large reservoir flooded large land area, especially paddy, forestland; Withdrawn the investment certificate of No-go projects;
- **Develop efficient connection network** to optimize construction cost, transmitting capacity and land occupation.
- **Establish regulations on safety management of hydropower dams;**
- **Strengthening of the management, inspection capacity** to ensure the safety of hydroelectric production, flood control, dealing with rain, storms, floods ...
- **Establish regulation on using surface water resource** to ensure harmonize water resource to irrigation and household in dry season and the flood season.

THANKS FOR YOUR ATTENTION