



Department of Alternative  
Energy Development and Efficiency  
**MINISTRY OF ENERGY**



# Strategy and Roadmap for PV Systems in Thailand

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13-16 April 2015

**Foundation:** Commitment to the development of a low-carbon society

**Facilitator:**  
Private-led investment

**Strategy:** Alternative Energy Development Plan 2012-2021

**Facilitator:**  
Government funded RD&D

**Goal:** Target 25% renewables in Total Energy Consumption by 2021

**Bio-Energy**

Biomass	Biogas	MSW
4,800 MW	3,600 MW	400 MW
8,500 ktoe	1,000 ktoe	200 ktoe

**8,800 MW Power | 9,700 Ktoe Heat**

**Bio-Fuel**

Ethanol	Biodiesel	2 <sup>nd</sup> Gen.	CBG
9 ML/Day	7.2 ML/Day	3 ML/Day	1,200 tons/Day

**Solar**

3,000 MW
100 Ktoe

**Wind**

1,800 MW
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**Hydro**

Mini (<1 MW)	Micro (<100 kW)
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**New-Energy**

Tidal Wave	Geothermal
2 MW	1 MW

**4,800 MW Power | 100 Ktoe Heat**

**324 MW**

**3 MW**

**Strategy** to promote renewable and alternative energy development for 25% in 10 year



1

Promoting the community to collaborate in broaden producing and consuming renewable energy.

2

Adjusting the incentive measure on investment from private sector appropriated with the situation.

3

Amending the laws and regulations which do not benefit to renewable energy development.

4

Improving the infrastructure as system of transmission line, power distribution line, including a development towards Smart Grid System.

5

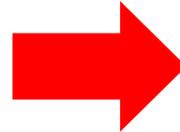
Public relations and building up comprehensive knowledge for the people.

6

Promoting the research work as mechanism to develop the integrated renewable energy industry.

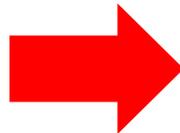


**Power Development Plan :**  
**PDP 2010 Rev.3**  
(2010 – 2030)



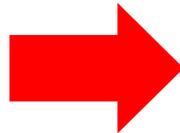
**Power Development Plan :**  
**PDP 2015**  
(2015 – 2036)

**Alternative Energy Development Plan:**  
**AEDP**  
(2012 – 2021)



**Alternative Energy Development Plan:**  
**AEDP 2015**  
(2015 – 2036)

**Energy Efficiency Development Plan: EEDP**  
**20 Year**  
(2011 – 2030)



**Energy Efficiency Development Plan: EEDP**  
**2015**  
(2015 – 2036)



## Demand-Supply Matching Procedure

**1**

**RE Remaining Grid Capacity** for each EGAT  
Transmission Substation

**2**

Assuming that the above **Renewable Energy**  
grid capacity data match with load  
**demand** in each EGAT Substation coverage area

**3**

**Define coverage area** for each EGAT  
substation

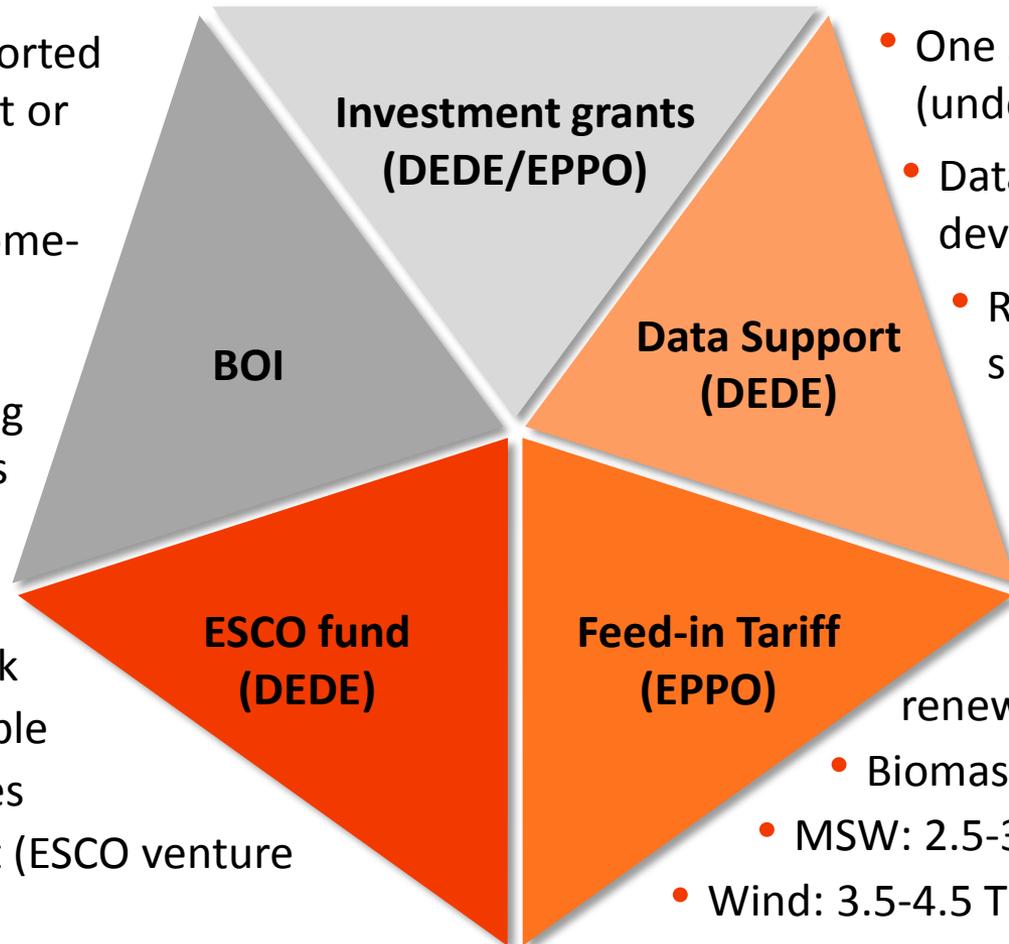
**4**

**Allocate Renewable Energy** base on **Renewable**  
**Energy remaining potential & Merit order**  
in that area



- Exemption of imported duty of equipment or machines
- Exemption of income-corporate taxes resulting from Selling RE or saving energy for periods up to 8 years

- Provides lower risk capital to renewable focused businesses
- Equity investment (ESCO venture capital)
- Equipment leasing
- Credit guarantee facility



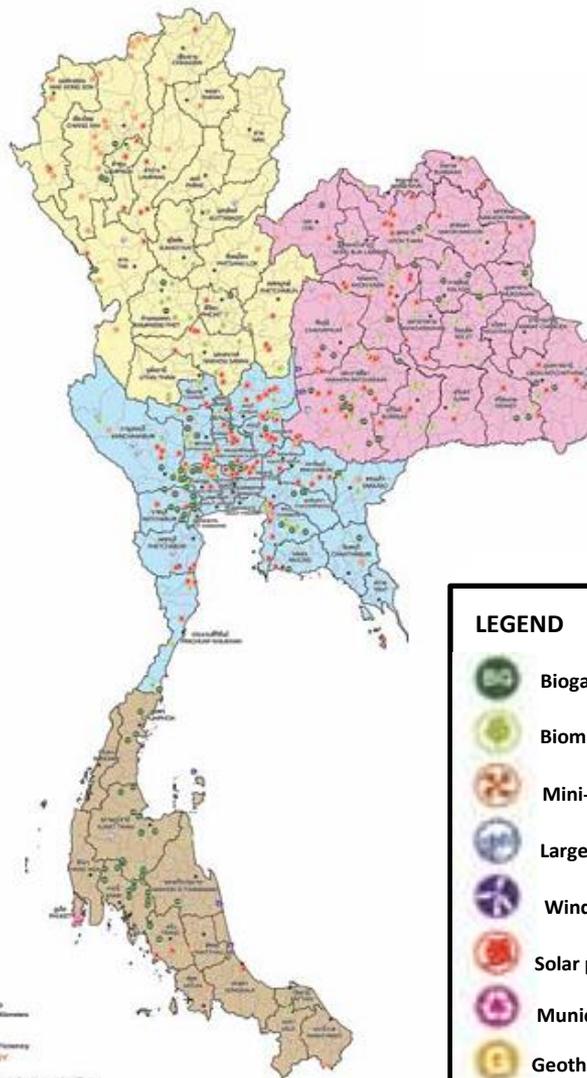
- One stop service center (under development)
- Data on renewable development progress
- Resource data maps, such as solar and wind

- Premiums paid for renewable power generation
  - Biomass & biogas: 0.3-0.5 THB
  - MSW: 2.5-3.5 THB
  - Wind: 3.5-4.5 THB
  - Hydro: 0.8-2.5 THB
  - Solar: 5.6 THB



## Renewable Energy Power plant in Thailand 2013

Power plant Type	Capacity (MW)
Large Hydro power plant	3,406
Biomass power plant	994
Solar power and Solar rooftop	787
Wind power plant	194
Biogas power plant	156
Municipal Waste incineration power plant	18
<b>Total</b>	<b>5,646</b>



**LEGEND**

-  Biogas power plants
-  Biomass power plants
-  Mini-Hydro plants
-  Large Hydro power plants
-  Wind plants
-  Solar power and Solar rooftop
-  Municipal Waste incineration power plants
-  Geothermal power plants

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## Current development progress

Item	Electricity (MW)	Heat (ktoe)
Target in 2021	3,000	100
Jan – Oct 2014	1,298.17	5.0



## Solar energy: Development would be focused on

- Promote implementation of **community/ residential scale solar** system projects
- Supplant ADDER incentive system with revised **feed-in tariff (FiT)** system
- Accelerate the **amendment of Laws and Industrial Act, 1992 (B.E. 2535)**
- Improve **infrastructure system**
  - Asking EGAT, PEA, MEA for preparation in **extension and increasing the transmission**
  - Preparing a development toward **Smart Grid** system
  - Zoning (grid capacity + technical potential)
- Promote the civilian sector or any sectors concerning to gain knowledge in using solar power generation system by various types
- Promote integrated **upstream industry** for domestic solar panel production (e.g. silicon wafer plant support)



Capacity (MW)	FiT (Baht/Unit)	Supporting period (Year)	Fit Premium (Baht/Unit) ***
<input type="checkbox"/> Solar			
- Rooftop 0-10 kWp	6.85	20	0.50
- Rooftop 10-250 kWp	6.40	20	0.50
- Rooftop 250-1,000 kWp	6.01	20	0.50
- Solar farm	5.66	20	0.50

**Note: \*\*\*Special Scheme for the 4 provinces in Southern Thailand**

- Technology based premiums
- More incentives for smaller projects



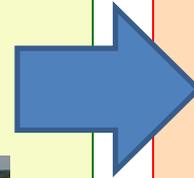
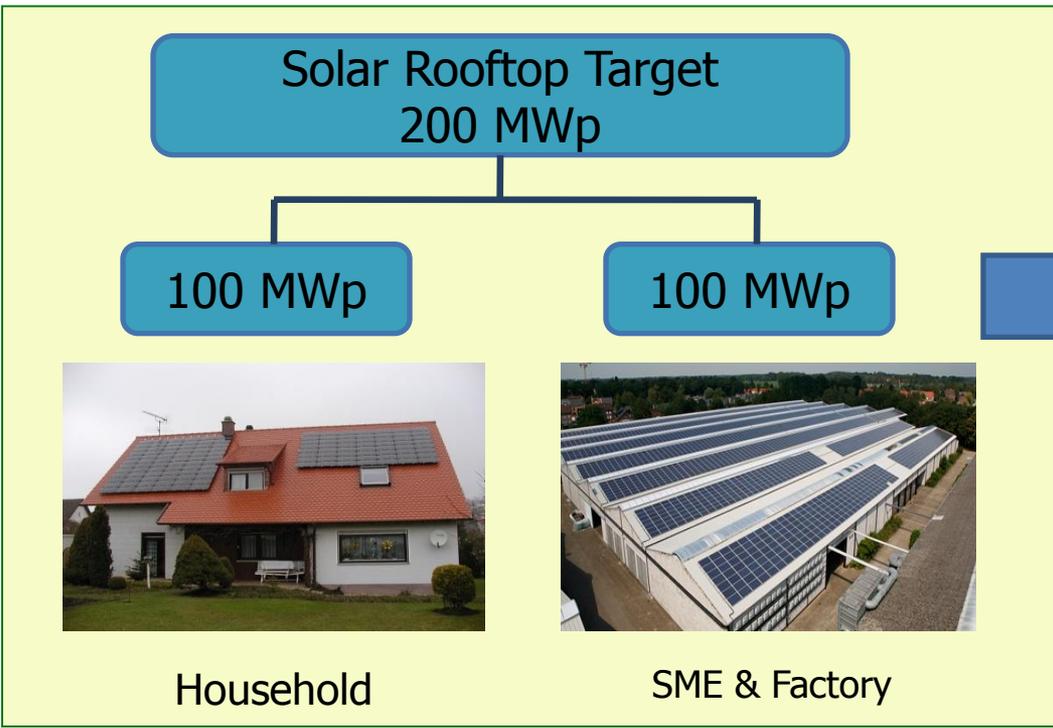
# Solar PV Rooftop



✓ National Energy Policy Committee resolution in 2015

=> Feed-in Tariff (FIT) for Solar PV Rooftop

- => Objectives - Encourage private & community investment in solar power
- Minimize Peak Load
  - Energy security



<b>FIT Rate</b>	
1. Household (0-10 kWp)	= <b>6.85</b> baht/unit
2. Small Enterprise (10 - 250 kWp)	= <b>6.40</b> baht/unit
3. Medium & Large Enterprise /Factory (250 – 1,000 kWp)	= <b>6.01</b> baht/unit
• supported period 25 years and COD in December 2013	

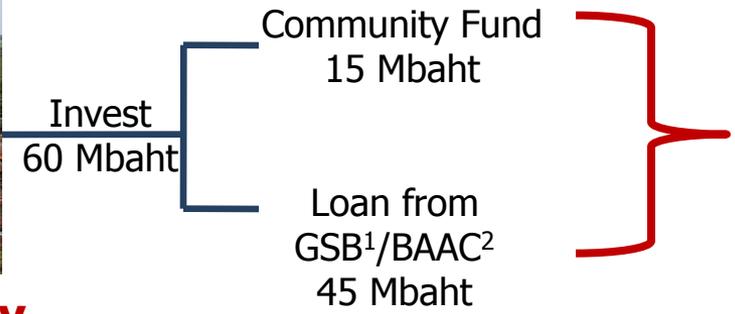


- ✓ National Energy Policy committee resolution on July 16th, 2013
  - => Joint project : MOEN + National Village & Urban Community Fund Office
  - => Objectives
    - Encourage community participation
    - Job creation & generate incomes for community
    - Promote distributed RE power or Distributed Green Generation)

Target for Community Scale Solar  
800 MWp



**Village/Community**



**1 MW**  
Supported period 25 yrs  
COD in December 2014

<sup>1</sup> Government Savings Bank

<sup>2</sup> Bank for Agriculture and Agricultural Cooperatives

Thank you for your kind attention



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