



Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

Solar Power Policy : Status Update 2016

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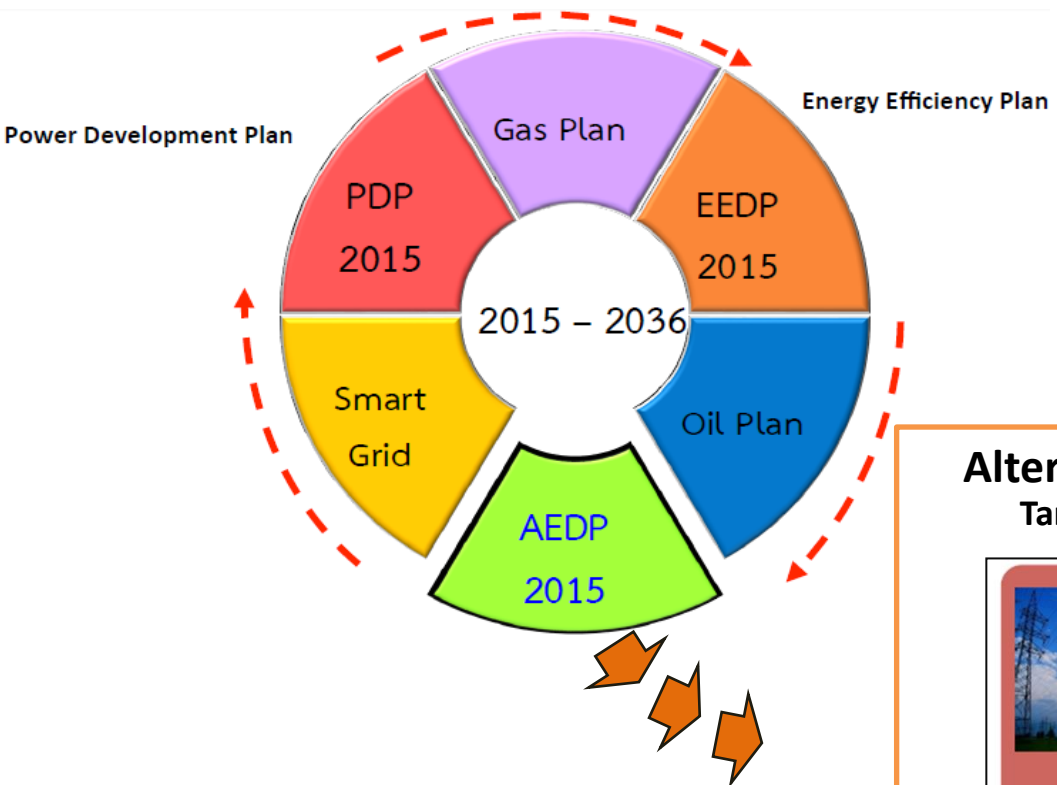


Alternative Energy Development Plan (AEDP 2015)

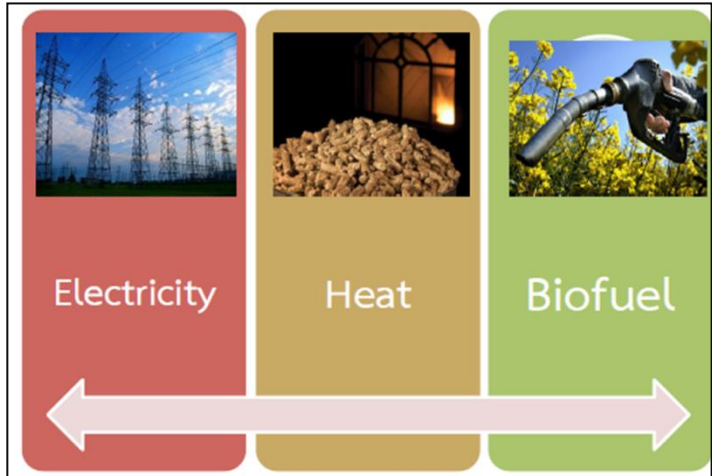
Solar PV Policy : Status Update

Solar PV Opportunities





Alternative Energy Development Plan Target : 30% of final energy consumption



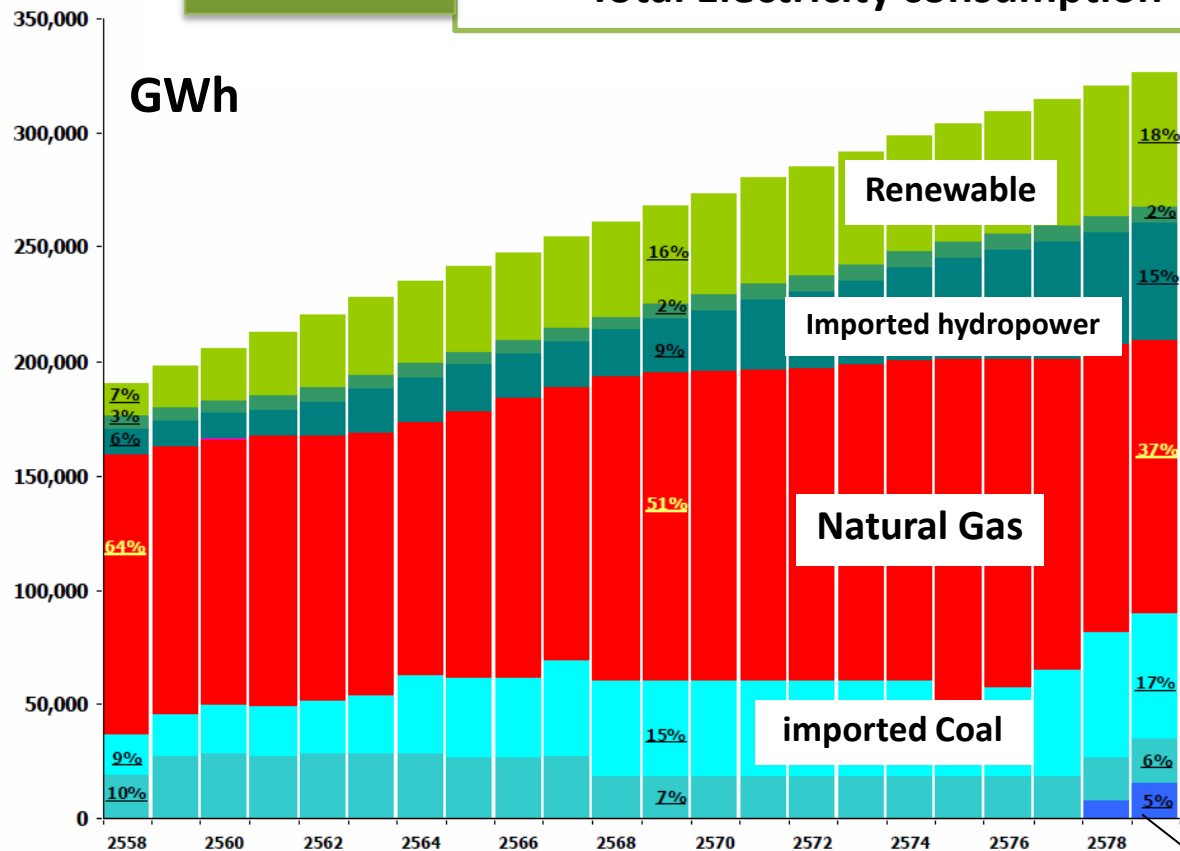


Power development plan (PDP2015)

**In the year
2036**

Total Installed Capacity = 70,335 MW

Total Electricity consumption = 326,119 GWh



Fuel Type	2015 (%)	2036 (%)
Imported hydropower	7	15-20
Clean Coal (Lignite included)	20	20-25
Renewable	8	15-20
Natural Gas	64	30-40
Nuclear	-	0-5
Diesel/Fuel Oil	1	0

Nuclear

Source: EPPO, PDP 2015

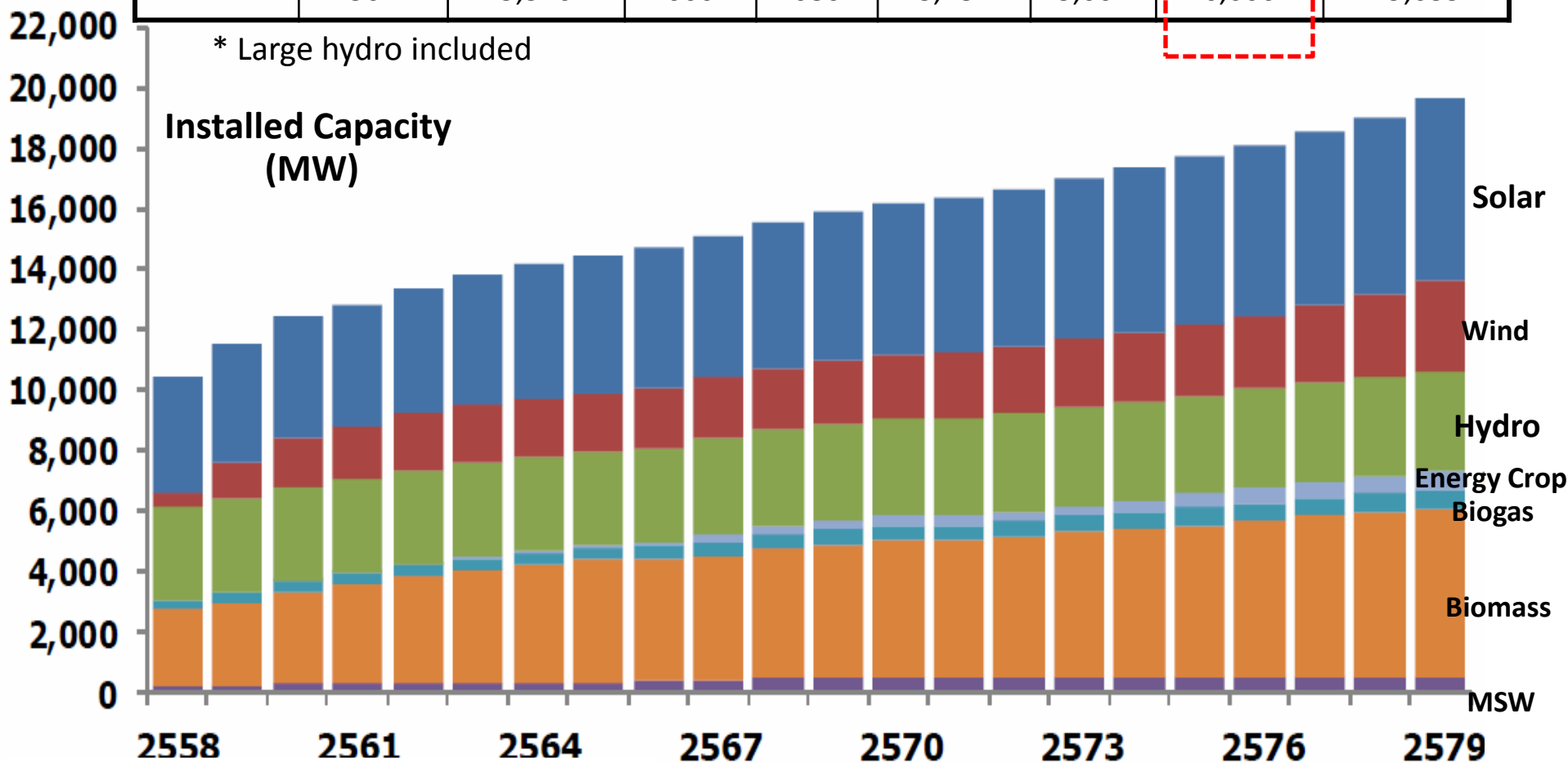




RE target in PDP 2015

MW	MSW	Biomass	Biogas	Energy Crop	Hydro	Wind	Solar	Total
Current Dec 2014	65.72	2,451.82	311.5	-	3,048.4*	224.47	1,298.51	7,400.43
2036	501	5,570	600	680	3,282	3,002	6,000	19,635

* Large hydro included





The Alternative Energy Development Plan (AEDP 2015)

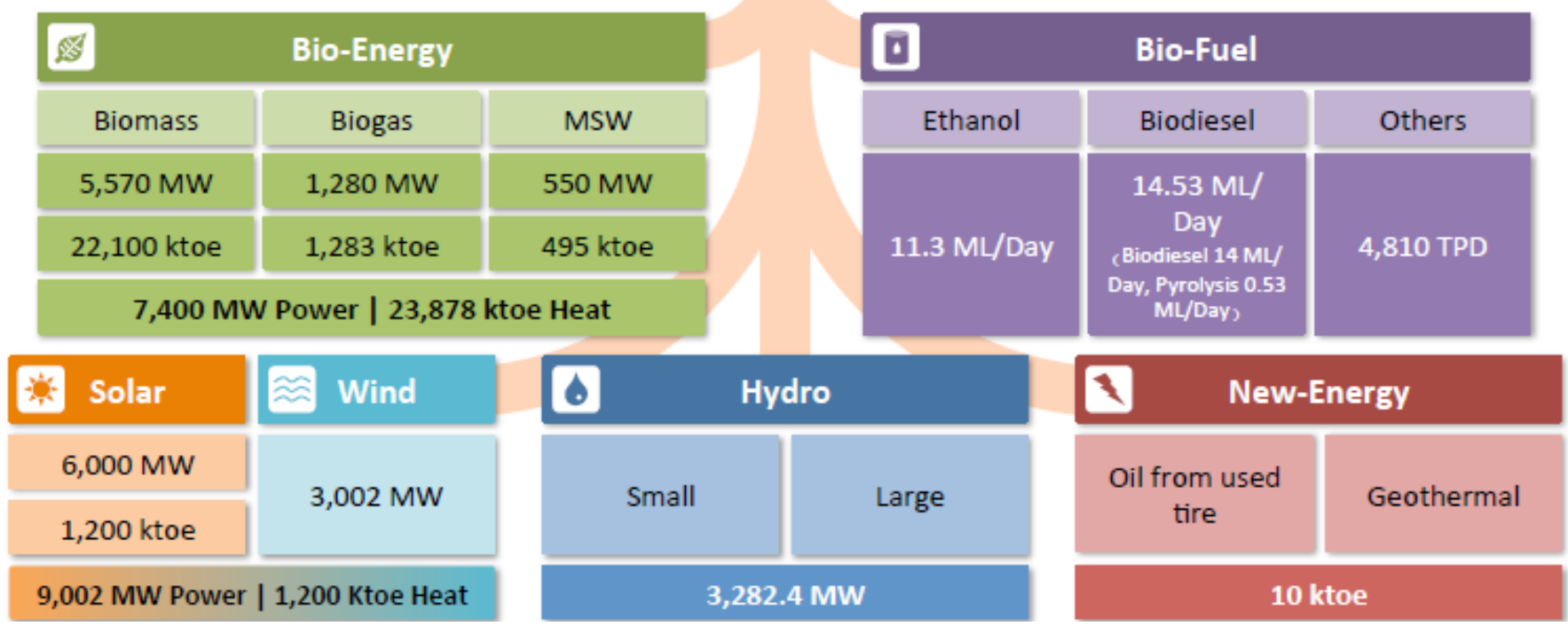
Foundation: Commitment to the development of a low-carbon society

Facilitator:
*Private-led
investment*

Strategy: Alternative Energy
Development Plan 2015-2036

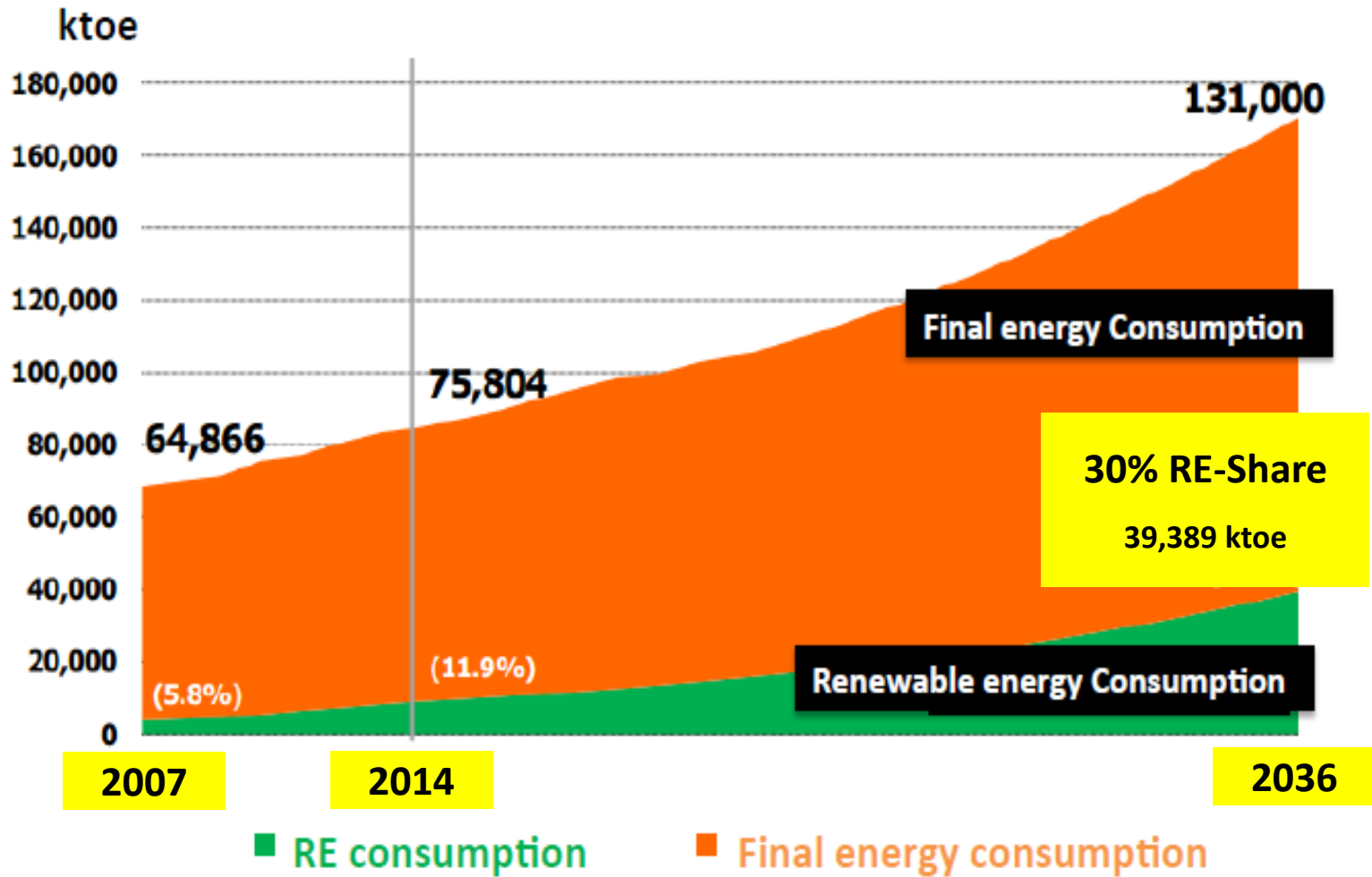
Facilitator:
*Government
funded R&D*

Goal: Target 30% renewables in Total Energy Consumption by 2036





Alternative Energy Consumption Target Plan



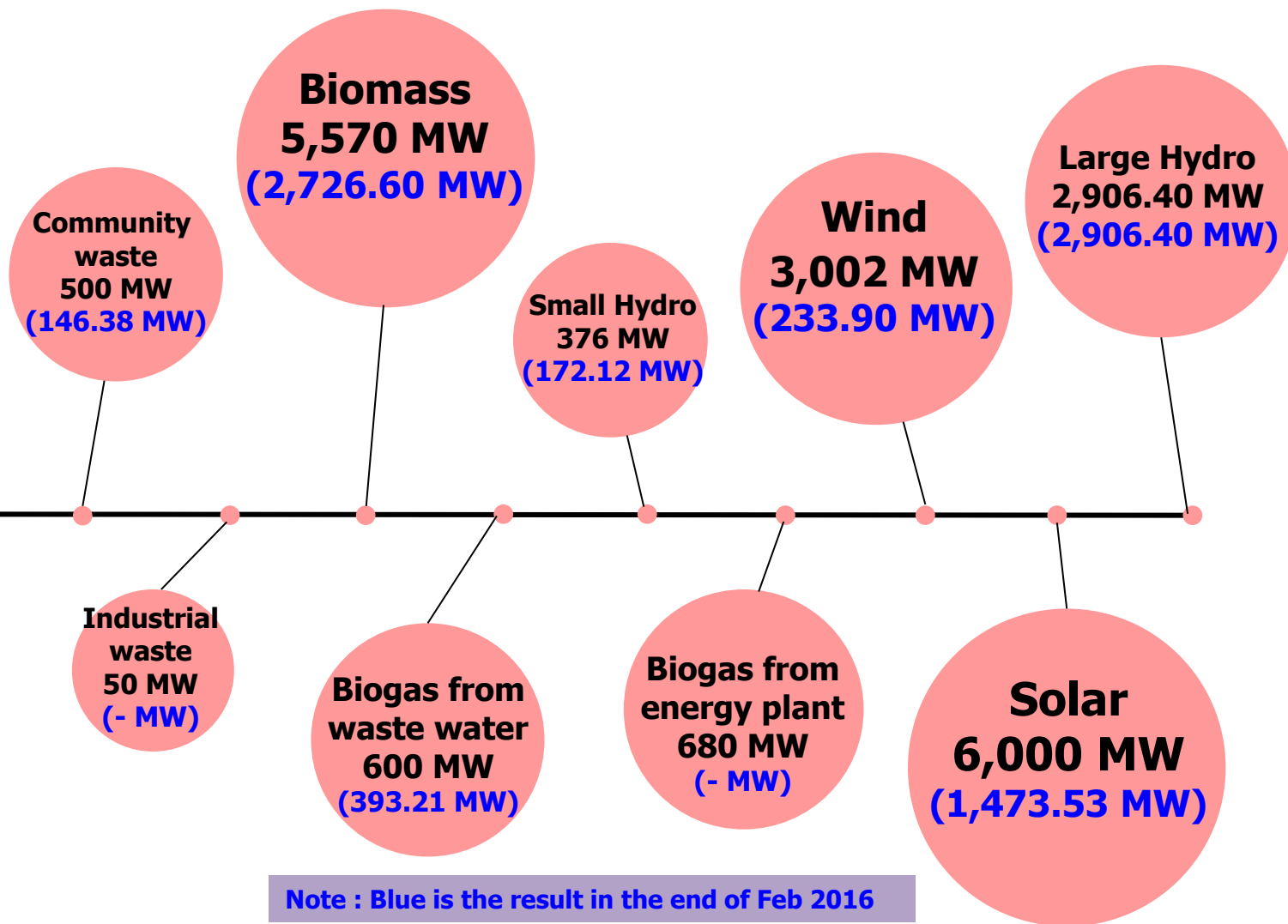


Target and current RE status : Power

RE proportion
in power
sector
20%



19,684.40 MW
(8,052.14 MW)



Source: DEDE

Note : Blue is the result in the end of Feb 2016





Target and current RE status : Heat

RE proportion
in heat sector

36.67%



25,088.00 kteo
(7,737.80 ktoe)

Waste to energy
495 ktoe
(104 ktoe)

Biogas
1,283 ktoe
(565 ktoe)

New energy*
10 ktoe
(- ktoe)

Biomass
22,100 ktoe
(7,063 ktoe)

Solar
1,200 ktoe
(5.80 ktoe)

Note : Blue is the result in the end of Feb 2016
New energy is geothermal , oil from used tire , etc.

Source: DEDE





Target and current RE status : Biofuel

RE proportion in biofuel sector

25.04%



25.83 ลล./วัน
4,800 ตัน/วัน
10 ktoe
(7.70 ลล./วัน)

Biodiesel
14 ML/day
(4.19 ML/day)

Ethanol
11.3 ML/day
(3.51 ML/day)

Bio-oil , Hydrogen*
10 ktoe
(- ktoe)

Pyrolysis Oil
0.53 ML/day
(- ML/day)

CBG
4,800 Ton/day
(- Ton/day)

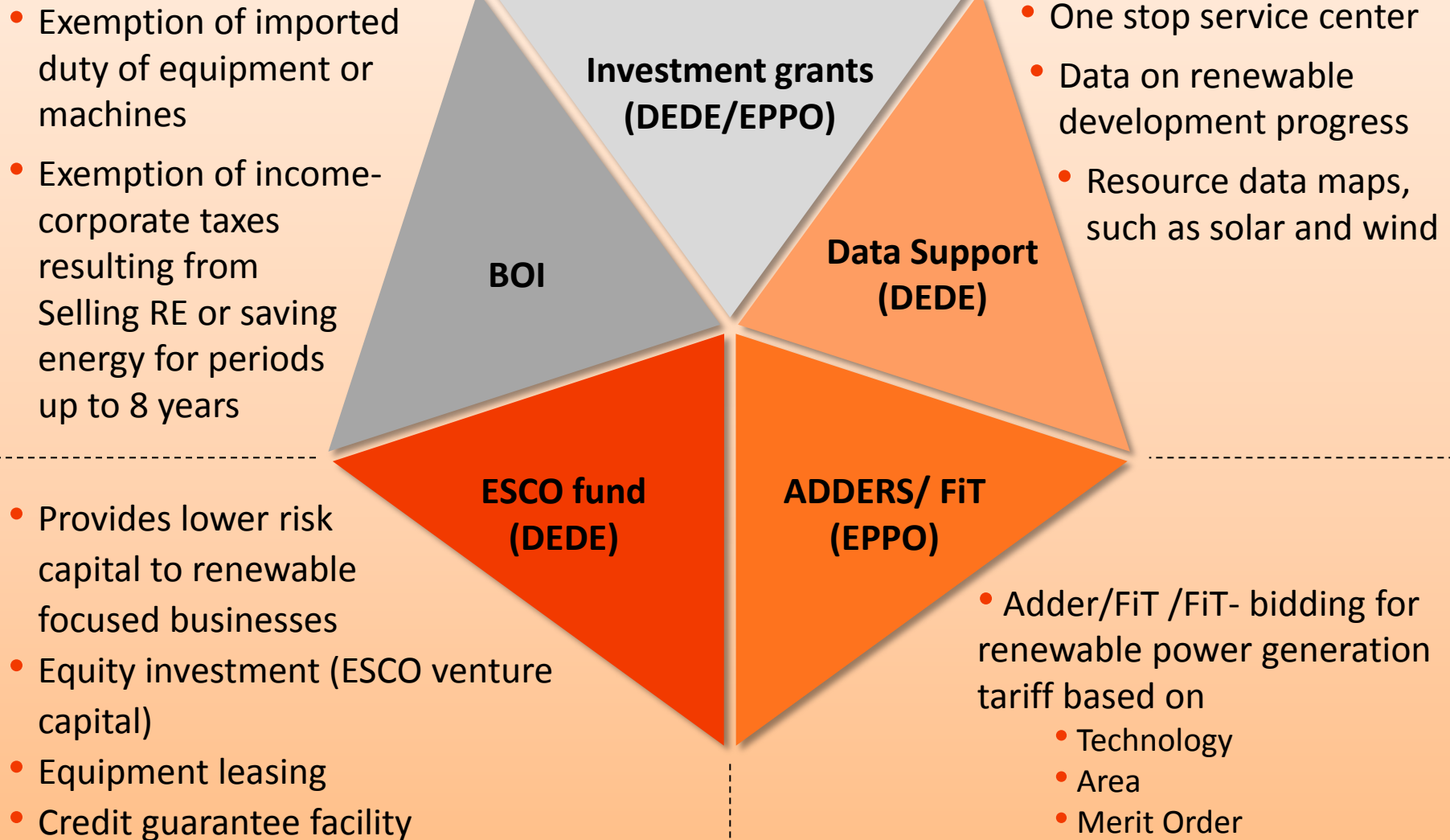
Source: DEDE

Note : Blue is the result in the end of Feb 2016





Supporting measures





Solar PV Policy : Status Update 2016





Summary of Solar PV Policy

1993-present

- Solar Off-grid program for rural non-electrified areas for village, school, health care clinic, water pumping, the royal project and military and police at the border area.
- 100% Government support with regular maintenance. 30 MWp in total

2007

- Introducing of “Adder (Feed-in Premium)” policy for the VSPP and SPP for all RE generation up to 90MWp
- Solar PV target: 500 MWp, Adder: 8 baht/kWh or 23 UScent/kWh for 10 years

2010

- Since there were huge applications for Solar PV
- Solar PV target: 2,000 MWp, Adder: decreased to 6.5 baht/kWh or 18.6 UScent/kWh for 10 years and stop taking application since June 2010

2013

- Solar PV target: increased to 3,000 MWp
 - Solar farm: 2,000 MWp-with Adder for 10 years
 - Solar Rooftop: 200 MWp-with FiT 6-6.84 baht/kWh for 25 years
 - Solar for Community 800 MWp-with decreasing FiT for 25 years

2014

- Solar PV target: increased to 3,800 MWp
 - Solar farm: 1,800 MWp-with Adder for 10 years
 - Solar farm: 1,000 MWp- applied before June 2010-changed from Adder for 10 years to FiT 5.66 baht/kWh for 25 years
 - Solar Rooftop: 200 MWp-with FiT 6-6.84 baht/kWh for 25 years
 - Solar for Community 800 MWp-changed to Solar for Governmental Agency and Agricultural Cooperative -with FiT 5.66 baht/kWh for 25 years

2015

- Phase 1: Solar for Government al Agency and Agricultural Cooperative

2016

- Pilot project for Solar PV rooftop (for self consumption) 100 MWp
- Phase 2: Solar for Government al Agency and Agricultural Cooperative



Solar Power SPP and VSPP status

Technology	Proposed Project		Waiting for PPA		Signed PPA		COD		Total	
	Project (no.)	Installed Capacity (MW)	Project (no.)	Installed Capacity (MW)	Project (no.)	Installed Capacity (MW)	Project (no.)	Installed Capacity (MW)	Project (no.)	Installed Capacity (MW)
	0	0	1	1.25	2	1.25	453	2,330.95	456	2,333.45
SPP	0	0	0	0	1	90.72	6	454.72	7	545.44
VSPP*	0	0	1	1.25	1	1.0	447	1,876.22	449	1,878.47

Source: ERC May 2016

* Solar PV rooftop program in 2013, 2015 is not included





Adder/FiT Rate for Solar PV

Installed Capacity	FiT Rate (year 2014-2015)	
	FiT Rate (THB/kWh)	Supporting Period
Solar Farm		
≤ 90 MWp	5.66 (0.14 EUR)	25
PV Rooftop (Residential)		
≤ 10 kWp	6.85 (0.17 EUR)	25
PV Rooftop (Business/Industrial)*		
> 10 – 250 kWp	6.40 (0.16 EUR)	25
> 250 – 1,000 kWp	6.01 (0.15 EUR)	25
Ground Mounted PV (Governmental Agency and Agricultural Cooperatives)		
≤5 MWp	5.66 (0.14 EUR)	25

* Only FiT rate announcement, no program for 2014-2015



Solar Farm Programme with FiT

- Solar Farms applied under the Adder Scheme before June 2010
- Acceptance change from Adder 6.50 baht/kWh for 10 years to the FiT rate at 5.66 baht/kWh for 25 years
- The COD date by December 2015 (NEPC resolution : Extended COD to April with the same FiT rate and for later extended to June 2016 with FiT: 5.377 THB)
- The final approved capacity : 990.01 MW for 171 Projects

Category	COD *		Final Approved		Total	
	Projects	MW	Projects	MW	Projects	MW
1. VSPP	156	886.2	14	62.81	170	949.01
2. SPP	1	41			1	41
Total	157	927.2	14	62.81	171	990.01

Data update 30 April 2016





Solar PV Programme for Governmental Agency and Agricultural Cooperative

Programme Description

- VSPP program with max. size at 5 MWp
- Total target: 800 MWp separated in 2 phases
- FiT : 5.66 Baht/kWh for 25 years
- Installation in areas announced by ERC
- The selection method : drawing lots after application evaluation
- COD by the end December 2016

Phase 1

- Application acceptance period : November 2015
 - 281 applications submitted
 - 2,905.50 MWP
- The drawing lots process has completed on the 21st April 2016
- Selected Projects for making PPA are 67 Projects for 281.32 MWp
- Projects to sign PPA with in 120 days

Phase2

SCOD for Jan – June 2018 more detail to come





50 MW

Pilot Project

100 MW

**Energy Policy Management
Committee
Resolution
on 24 Feb 2016**



50 MW

Household
10 MWp
(below 10 kWp)

Commercial
40 MWp
(10 kWp-1 MWp)

Household
10 MWp
(below 10 kWp)

Commercial
40 MWp
(10 kW-1 MWp)

Solar PV Rooftop

Self Consumption



The Pilot Project of Solar PV Rooftop (Self Consumption)

(1) Objective

- ✓ **Day-Peak Reduction**
- ✓ **Study the impact to utilities, Grid and investors**

(2) Descriptions

- ✓ **Households and Building/Factory with certain electricity consumption during daytime**
- ✓ **Allow for electricity feed-back to the grid but no payment**



(3) Milestone

May 2016 : ERC → Announcement

July 2016 : Open for the Application

Jan 2017 : System Installation

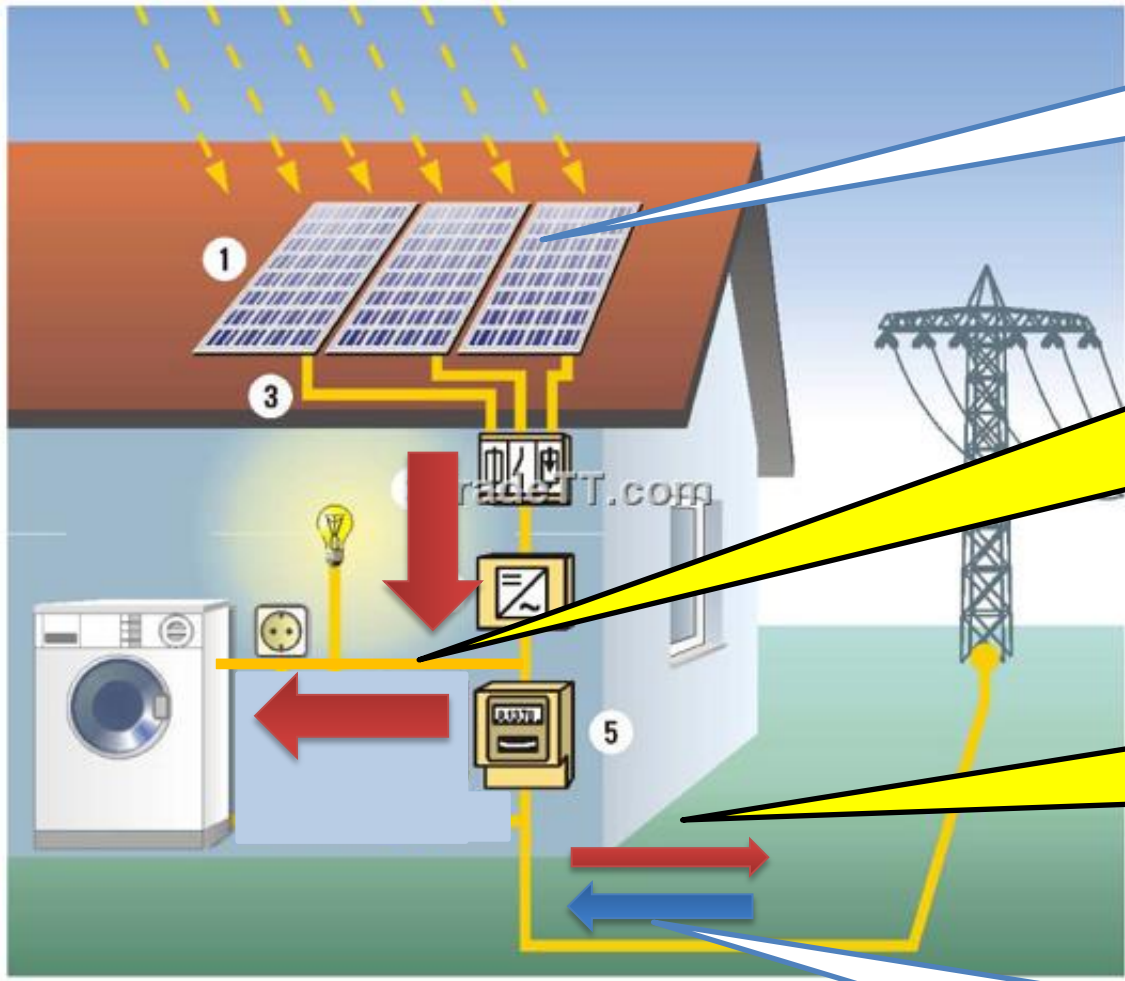
Jan -May 2017 :

Monitor and Analysis overall of program
and Recommend for full implementation





Solar PV rooftop pilot project 100 MWp



Solar PV rooftop produces electricity

Solar PV Produce electricity and use in house / buildings first

The excess electricity feedback to grid with no compensation

Buy electricity from the grid when Solar PV generated less than demand





On progress

- **PTEC:** Code of conduct for PV rooftop installation
- **The Engineering institute of Thailand :**
Recommendation for PV installation
- **TPQI :** Certificate for PV Installer





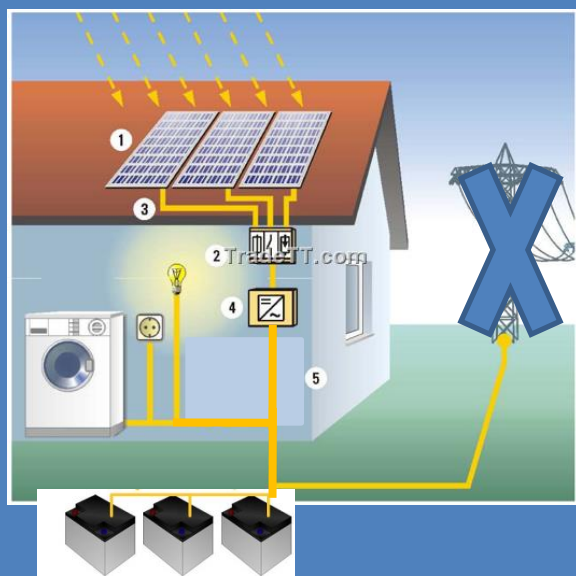
Solar PV Opportunities 2016



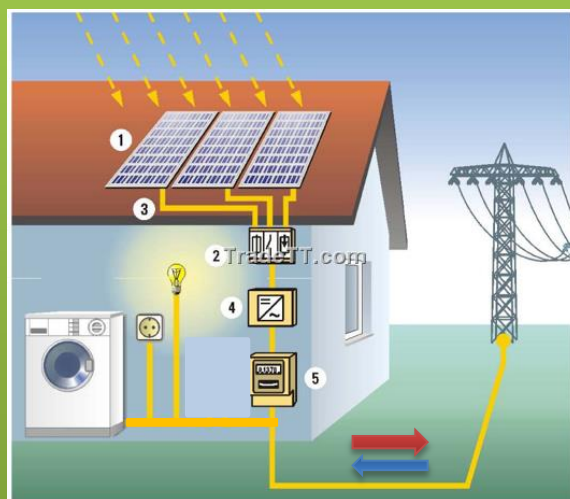


Type of PV rooftop utilisations

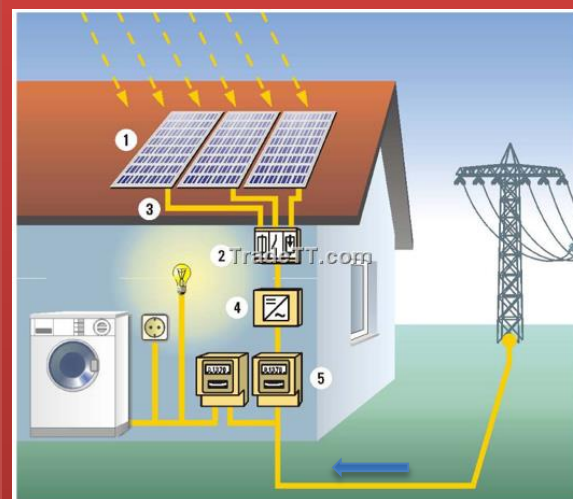
Stand Alone



Net metering



All sell to grid





Applied to project submitted since 1st January 2015)

Summary BOI's Support which Solar PV can benefit

- New Criteria for Project approval (BOI's announcement 2/2557)
- Measure for target industries in special economic zone
- Measure for improvement of production efficiency (Application must be submitted by the end of 2017)

Source: BOI, BOI's New Investment Promotion Policies , 2015





New Criteria for Project approval

BOI's announcement 2/2557

Activity-based Incentives



**Classified incentives based on
the importance of activities**



Merit-based Incentives

- 1. Competitiveness Enhancement**
- 2. Decentralization**
- 3. Industrial Area Development**

**Grant additional incentives to encourage
more investment/expenditures that
benefit the country or overall industry**

Source: BOI, BOI's New Investment Promotion Policies , 2015





BOI incentive and PV Activities

	Activities	Incentive
5.4.2	Solar Cell manufacturing and/or raw material for solar cells	A2
7.1.1.2	Power generation or power and steam from RE such as solar, wind, biomass, biogas etc. except waste or refuse derived fuel	A2
5.4.8	Part and/or equipment for solar-cell manufacturing	A3

Group	corporate income tax exemption	Exemption of import duty on machinery	Exemption of import duty on raw or essential materials used in manufacturing export products	Non-tax
Group A: shall receive corporate income tax incentives, machinery and raw materials import duty incentives and other non-tax incentives.				
A1	8 year (Without cap) + Merit	✓	✓	✓
A2	8 year + Merit	✓	✓	✓
A3	5 year + Merit	✓	✓	✓
A4	3 year + Merit	✓	✓	✓
Group B: shall receive only machinery and raw materials import duty incentives and other non-tax incentives.				
B1	Merit (some activities)	✓	✓	✓
B2	Merit (some activities)	-	✓	✓



Special Economic Zone

Selection criteria

- ✓ *Labor-intensive industries*
- ✓ *Industries that use agricultural raw materials or raw materials from neighboring countries*
- ✓ *Not heavy industries*
- ✓ *Not industries that cause pollution*

Incentives

Cabinet resolution 20 April 2015

Tax Incentive	Corporate income tax reduction from 20% to <u>10% for 10 years</u> for newly registered businesses or expansion of existing businesses
Condition	<ul style="list-style-type: none"> • Must register by the end of 2017 • Must not be promoted by BOI • Must not use tax incentive under MOF's SMEs taxation scheme

Target Industries in each special economic zone

Industries	Tak	Sa Kaew	Trat	Mukdahan	Songkhla
1. Agriculture, Food Processing	✓	✓	✓	✓	✓
2. Ceramic Products	✓				
3. Textile, Garment, Leather Products	✓	✓			✓
4. Furniture	✓	✓			✓
5. Gems & Jewelries	✓	✓			
6. Medical Equipment	✓	✓			
7. Automotive, Machinery & Parts	✓	✓			
8. Electrical & Electronic Products	✓	✓		✓	
9. Plastic Products	✓	✓			
10. Medicine	✓	✓			
11. Logisitcs	✓	✓	✓	✓	✓
12. Industrial Estate / Zones	✓	✓	✓	✓	✓
13. Tourism Related Activities	✓	✓	✓	✓	✓



Additional incentive for SMEs
(38 Eligible activities)



Measure for improvement of production efficiency

BOI's Announcement 1/2557

Eligible projects: Existing projects, whether BOI or non-BOI promoted.

Benefits:

3.1 Exemption of import duty for machinery

3.2 CIT exemption for 3 years on the revenue of an existing project, accounting for 50% of the investment under this measure.

Conditions:

4.1 Investment amount must not be less than 1 million baht, excluding cost of land and working capital.

4.2 Applications must be submitted by the end of 2017 and project must complete implementation within 3 years from the issuance date of the promotion certificate.





Key takeaways

- Solar PV market in Thailand is still very active
- More opportunities for PV self-consumption and as tool for energy efficiency
- Still-strong support from BOI for PV supply chain
- Solar PV Pilot project planned to open for application in July 2016





Thank you

