

Energy and Global Climate Change Challenges in the ASEAN Countries and the Significance of SETA in this Context

by

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Outlines

1. Energy Outlook for ASEAN countries.
2. Energy Outlook for Thailand.
3. Summary of SETA 2016.
4. SETA 2017 Prospectus.
5. Why SETA ?



1. ASEAN ENERGY OUTLOOK

- ASEAN Energy Characteristics
- ASEAN Energy Resources
- ASEAN Primary Energy Demand
- GHG Emissions from ASEAN Countries
- ASEAN Key Energy Challenges
- ASEAN Countries' Energy Policies
- ASEAN Power Grid
- ASEAN Gas Pipelines



ASEAN Energy Characteristics

Country	Main Characteristics
1. Indonesia	238 millions population (largest in ASEAN), largest energy consumer, world's largest coal exporter, major LNG exporter.
2. Thailand	69.5 millions population, second largest energy consumer, gas is dominant fuel in electricity, increasingly dependent on energy import
3. Malaysia	28.9 millions population , third largest energy consumer, world's second largest LNG exporter.
4. Philippines	95.7 millions population, World's 2nd largest geo-thermal producer, dependent on energy import.
5. Vietnam	87.9 millions population, growing energy demand, increasing energy import, introducing nuclear.

ASEAN Energy Characteristics *(cont'd)*

Country	Main Characteristics
6.Singapore	5.2 millions population, small size, most developed ASEAN economy, entirely dependent on energy import, refining and petrochemical hub.
7.Myanmar	54 millions population, low level of energy access, accelerating economic development.
8.Brunei Darussalam	0.4 millions population, significant oil and gas exporter, gas is dominant in electricity.
9.Lao PDR	6.3 millions population, significant hydro and wind power, exporter of electricity to neighbors.
10.Cambodia	15 millions population, low level of energy access, low per-capita energy demand.

ASEAN Energy Resources

Country	Oil BBl	Gas TCF	Coal MMT	Hydro MW	Geoth MW	Wood kTon
1.Indo.	10	169.5	38,000	75,625	19,658	439,049
2.Thai	0.156	12.2	1,240	5,000	n.d.	67,180
3.Malay.	3.42	84.4	1,024.5	25,000	n.d.	137,301
4.Phil.	0.285	4.6	346	9,150	n.d.	89,267
5.Viet.	5	19.2	4,500	68,500	n.d.	48,960

ASEAN Energy Resources *(cont.d)*

Country	Oil BBl	Gas TCF	Coal MMT	Hydro MW	Geoth MW	Wood kTon
6.Sing.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
7.Brunei	6	34.8	n.d.	n.d.	n.d.	n.d.
8.Myanm.	3.1	12.1	n.d.	108,000	n.d.	129,935
9.Lao	n.d.	3.6	600	26,500	n.d.	46,006
10.Cambo	n.d.	9.89	n.d.	10,000	n.d.	81,565

ASEAN Primary Energy Demand (Mtoe)

Country	2011	2020	2025	2035	2011-2035 % increase
1.Indo.	196	252	282	358	2.5
2.Thai	118	151	168	206	2.3
3.Malay.	74	96	106	128	2.3
4.Phil.	40	58	69	92	3.5
5.The Rest	119	161	178	221	2.6
Total	549	718	804	1,004	2.5

GHG Emission from ASEAN

No.	Country	GHG emiss.(1000 tons)
1	Indonesia	433,989
2	Thailand	295,262
3	Malaysia	216,804
4	Vietnam	150,230
5	Philippines	81,591
6	Singapore	13,520
7	Myanmar	8,995
8	Brunei Darussalam	9,160
9	Lao	1,874
10	Cambodia	4,180

ASEAN Key Energy Challenges

	2030
1.Primary Demand Growth Rate 2007-2030 to increase	+2.5%
2.Fossil fuel to increase	+76%
3.Coal to increase	+24%
4.Oil to decrease	-15%
5.Accessibility (now 160 Millions) to increase	+63 Millions
6.Energy Investment (cumulative to 2030) to increase Investment in Power Sector alone	1.1 Trillion USD 55%
7.Carbon Footprint (now 3.5%) to increase	5%



ASEAN Countries' Energy Policies

Country	E.E.	R.E.	Climate Change	Nuclear
1.Indonesia	1% /y en. Inten. Reduc. until 2030	23% by 2035, 31% by 2050	26% GHG emis. Reduc. by 2020, 41% with help	n.d.
2.Thailand	30%. En.Inten. Reduc. by 2036	20% power gen., 20% bio fuel for transp. By 2036	20-25% GHG emission Reduc. By 2036	2,000 MW by 2036
3.Malaysia	Promote E.E. in Indus., Building, Domestic	2,000 MW in 2020, 4,000 MW in 2030	40% GHG reduc. By 2020	Feasibility
4.Phillippines	Energy saving eq. to 15% final en. Demand/y	Triple cap. To 15 GW by 2030	n.d.	n.d.
5.Vietnam	Reduce energy consumption 8-10% by 2020 6% by 2030	n.d.	n.d.	10.7 GW by 2030

ASEAN Countries' Energy Policies (*cont.d*)

Country	E.E.	R.E.	Climate Change	Nuclear
6.Singapore	35% en. Inten. Reduc. 2030	n.d.	36% GHG emis. Reduc. 2030	n.d.
7.Brunei	45% reduc. En. Intensity 2035	10% electricity gen. 2035	n.d.	n.d.
8.Myanmar	10% en. deman reduc.	15-18% power gen. 2020	n.d	n.d.
9.Lao	10% En. Cons. Reduc.	30% share in suppl. 2025	n.d.	n.d.
10.Cambodia	20% en. Cons. Reduc. 2035	n.d.	n.d.	n.d.

ASEAN Power Grid

Existing and Planned Interconnection	Grid-to-Grid	Grid-to-Load
1.Peninsular Malaysia-Singapore	x	
2.Thailand-Peninsular Malaysia	x	
3.Thailand-Lao		x
4.Lao-Vietnam		x
5.Thailand-Cambodia		x
6.Thailand-Myanmar		x
7.Peninsular Malaysia-Sumatra-Java	x	
8.Peninsular Malaysia-Sarawak	x	
9.Sarawak-Sabah-Brunei	X	
10.Sarawak-Kalimantan	X	
11.Sabah-Philippines	X	
12.Vietnam-Cambodia		X
13.Lao Cambodia		x



ASEAN Gas Pipelines

Pipelines	Country-to-country	Country-to-reserv.
1.Thailand-Myanmar	X	
2.Thailand-JDA		X
3.JDA-Malaysia		X
4.Singapore-Malaysia	X	
5.Singapore-Sumatra	X	
6.Malaysia-West Natuna		X
7.West Natuna-Singapore		X
8.Malaysia-CAA		X
9.CAA-Vietnam		x

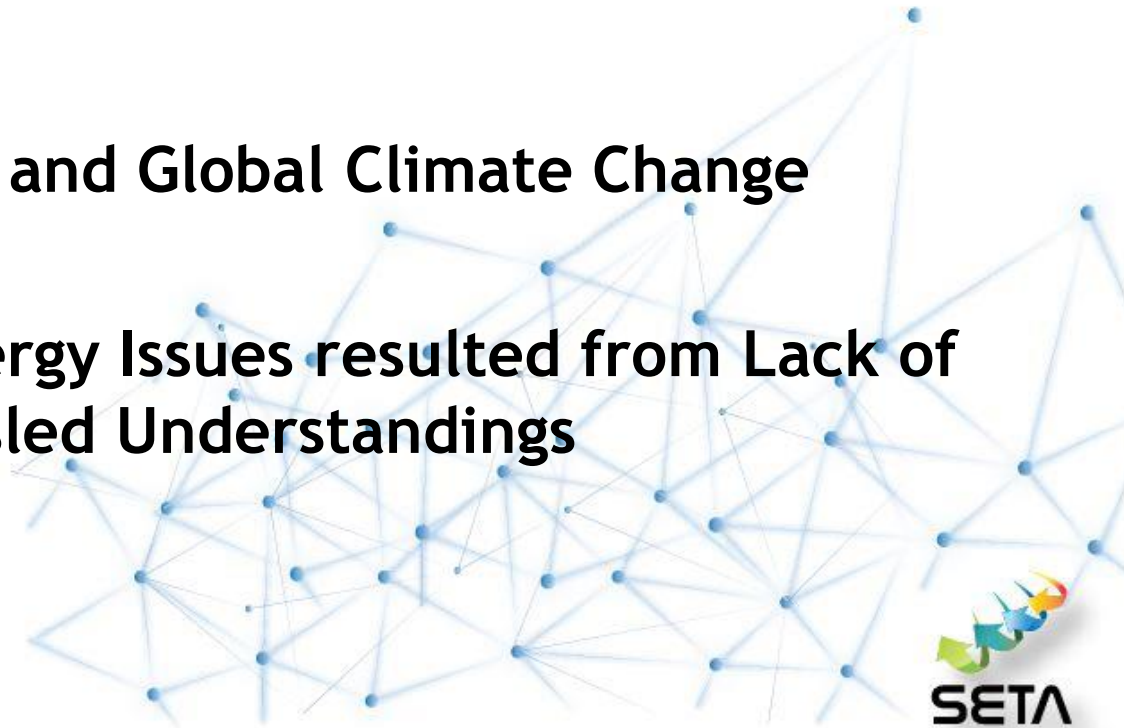
2. THAILAND ENERGY OUTLOOK

- The Challenges for Thailand's Energy Future
- Thailand Primary Energy Demand
- Types of Primary Energy in 2036
- Final Energy Demand
- Power Development Plan (PDP 2015)
- Energy Efficiency Targets
- Alternative Energy Targets



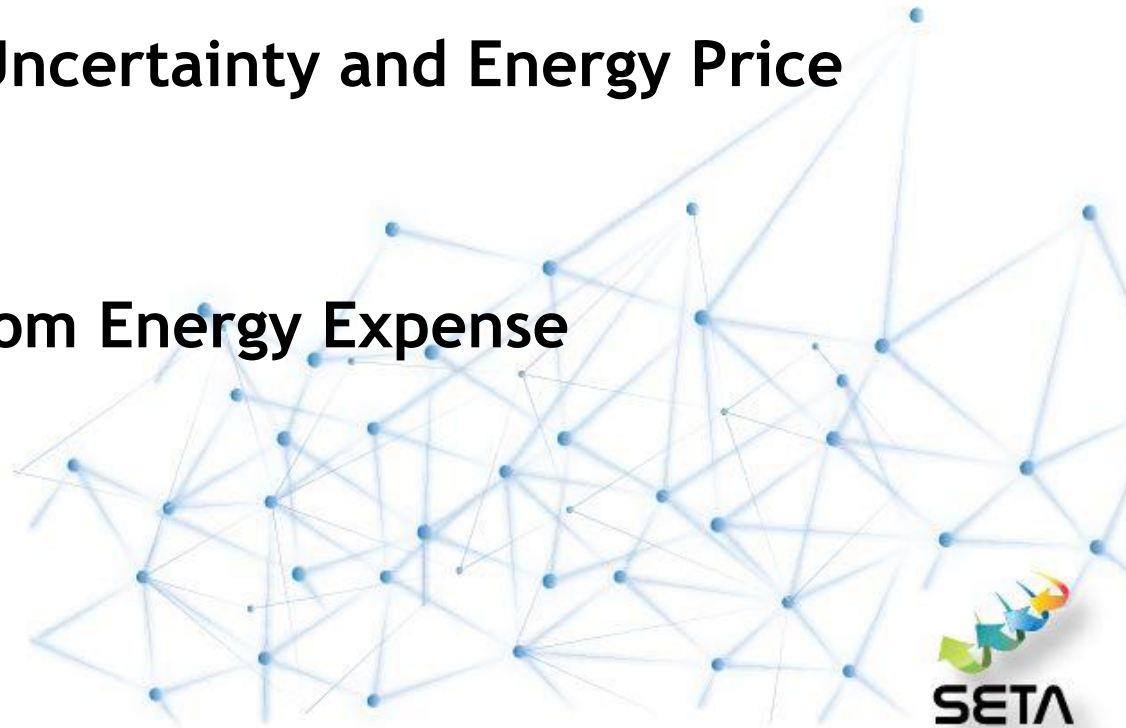
The Challenges for Thailand's Energy Future

- **Reliance on Imported Energy and Deficit Trade Balance**
(next 20 y imported oil and gas >90% of domestic consumption)
- **Environmental Issues and Global Climate Change**
- **Social Conflict on Energy Issues resulted from Lack of Transparency and misled Understandings**



The Challenges for Thailand's Energy Future *(cont'd)*

- Continued Economic Growth and Investor's Confidence
- Risk from Economic Uncertainty and Energy Price Fluctuation
- High Cost of Living from Energy Expense



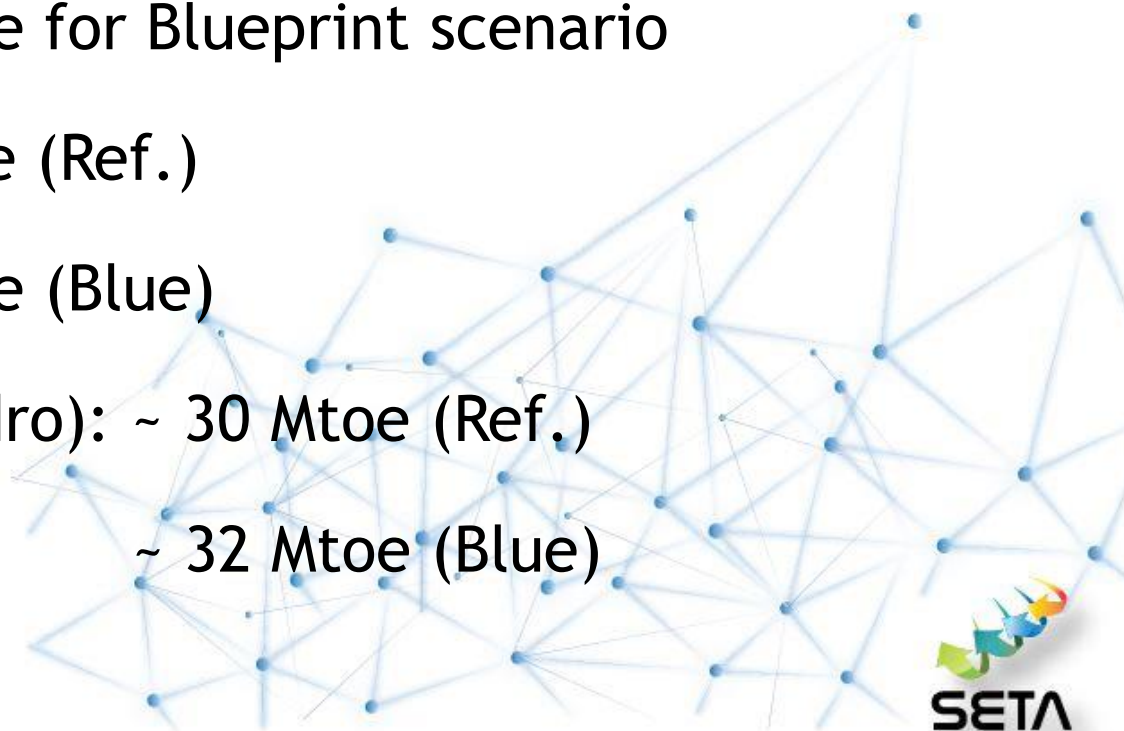
Thailand Primary Energy Demand

Year	Description	Mtoe
2013	Total demand	120
2036	Total Demand in Reference Case (conservative Approach)	220
2036	Blueprint Scenario (less dependency on imported energy, minimize environmental impact, diminish financial cost)	170

NB. The Blueprint scenario recommends an equal share among the natural gas, coal and renewables for electricity generation.

Type of Primary Energy in 2036

- **Crude Oil:** ~ 58 Mtoe (both scenario)
- **Natural Gas:** ~ 97 Mtoe for Reference Scenario
~ 55 Mtoe for Blueprint scenario
- **Solid (Coal):** ~ 35 Mtoe (Ref.)
~ 25 Mtoe (Blue)
- **Renewables (incl. hydro):** ~ 30 Mtoe (Ref.)
~ 32 Mtoe (Blue)



Final Energy Demand

The final energy demand is shared almost equally among:

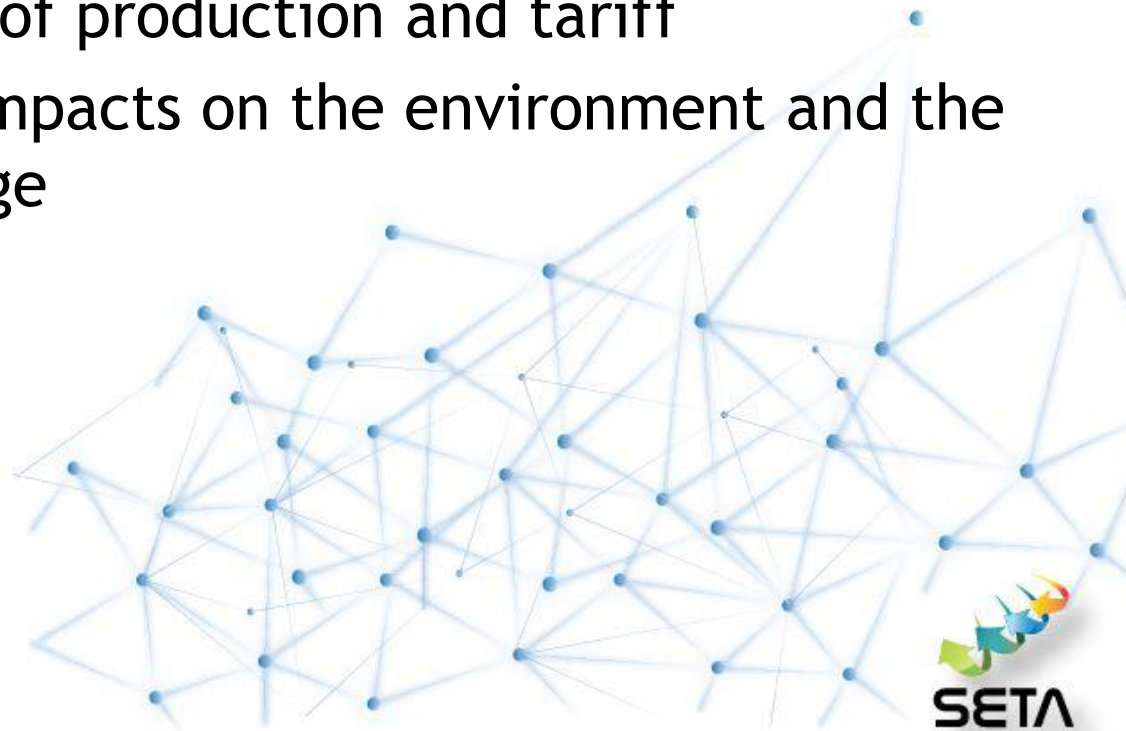
- Industry Sector
- Transport Sector
- Business/Service Sector and Households



Power Development Plan

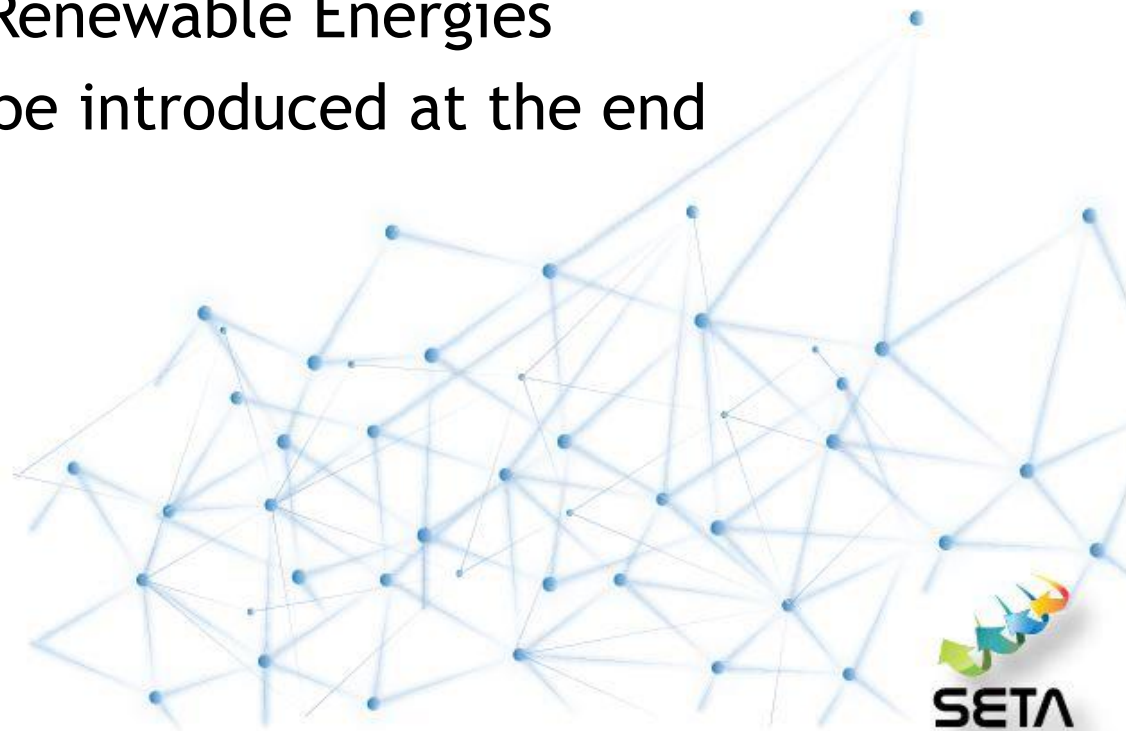
3 Basic Principles:

- Security: incl. fuel diversification to reduce risk
- Economy: incl. cost of production and tariff
- Ecology: minimize impacts on the environment and the global climate change



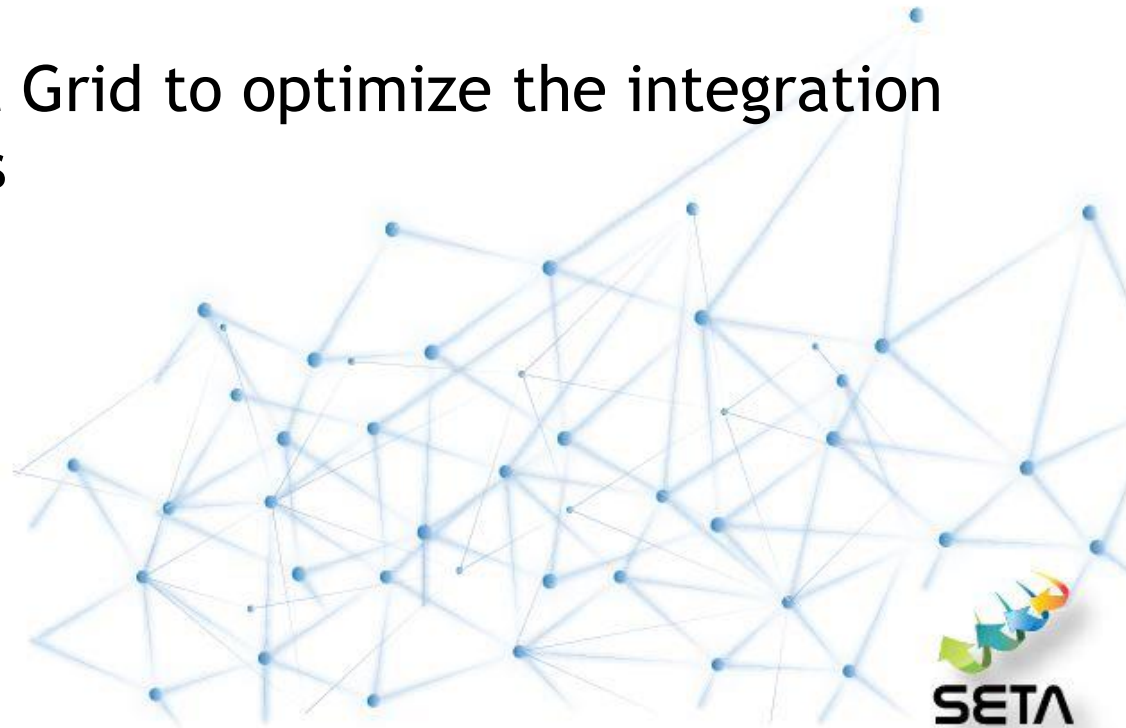
Fuel Diversification

- Reduce the use of Natural Gas
- Increase the use of Clean Coal
- Import more electricity
- Increase the use of Renewable Energies
- Nuclear Power may be introduced at the end



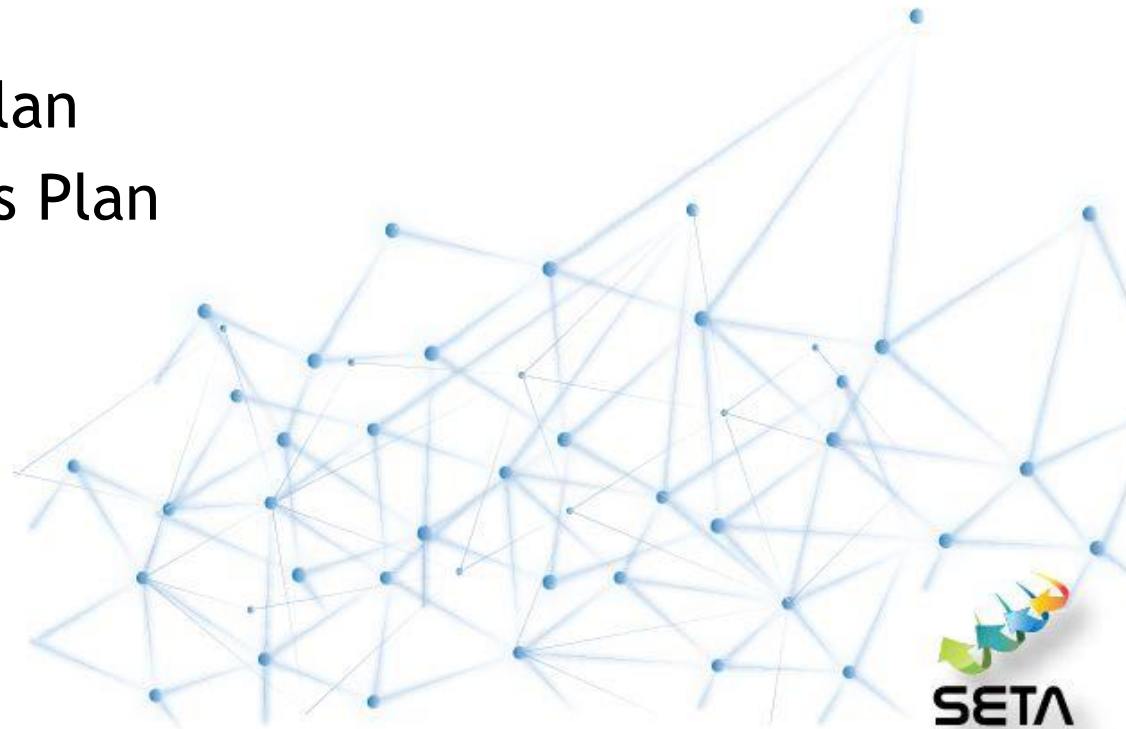
Investment in Infrastructure

- Invest in Transmission and Distribution lines to support the AEC and GMS
- Development of Smart Grid to optimize the integration of Renewable Energies



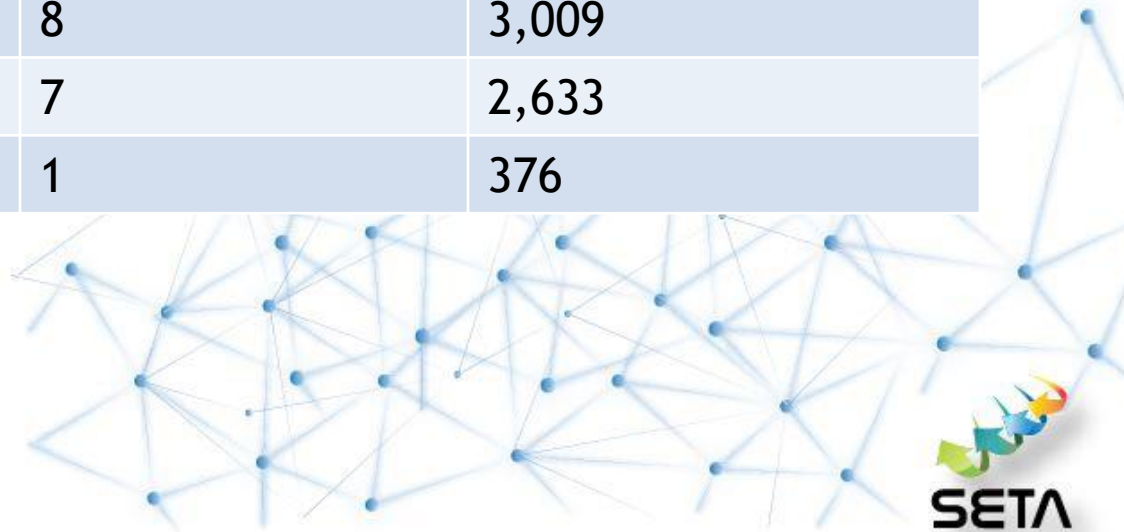
Other Principles

- Reserve Margin: 15% of Peak Power Demand
- Integrate with
 - ✓ Energy Efficiency Plan
 - ✓ Alternative Energies Plan



Current Electricity Generation by Fuel Types

Fuel Type	Percentage (%)	MW
Natural Gas	64	24,072
Coal (Lignite)	20	7,522
Renewable Energies	8	3,009
Imported/Hydro	7	2,633
Diesel/Fuel Oil	1	376



PDP 2015

Fuel Type	2014 (%)	2026 (%)	2036 (%)
Natural Gas	64	40-50	30-40
Clean Coal (incl. Lignite)	20	20-25	20-25
Renewable Energy	8	10-20	15-20
Imported / Hydro	7	10-15	15-20
Diesel/ Fuel Oil	1	-	-
Nuclear	-	-	0-5

Summary of PDP 2015

Installed Capacity	MW
Existing Installed Capacity (2014)	37,612
New Installed Capacity (2014-2036)	57,459
Retired Power Plants (2014-2036)	-24,736
Total Installed Capacity (2036)	70,336

Summary of New Installed Capacity

Plant Type	Number of Unit	Installed Capacity (MW)
Natural Gas	64	17,478
Gas Turbine	5	1,250
Clean Coal (incl. Lignite)	9	7,390
Renewable Energy	-	12,105
Imported Hydro	-	11,016
Cogeneration	-	4,119
Pumped Stored Hydro	-	2,101
Nuclear	2	2,000

Energy Efficiency Target (GWh)

	Residen.	Industry	Business	Gov.	Total
1.ENCON Act (spec. consump.)	-	10,814	5,654	3,180	19,648
2.BEC (Building Energy Code)	-	-	11,975	1,711	13,686
3.HEP & MEP (High and Min. Performance Standards)	8,936	6,226	7,609	-	23,760
4.Financial Incentives	-	9,133	5,941	-	15,074
5.LED (Promotion)	3,354	3,303	3,711	1,264	11,632
6.EERS (Energy Efficiency Resource Standards)	1,343	2,367	2,162	-	5,872
Total	13,633 15%	31,843 36%	37,052 41%	7,144 8%	89,672

Alternative Energy Target (MW)

Type	2014	2036
Solar	1,298.5	6,000
Wind	224.5	3,002
Hydro	2,906.4	2,906.4
Mini Hydro (<12 MW)	142	376
MSW	65.7	500
Bio-gas	311.5	600
Bio-mass	2,541.8	5,570
Energy Crop	-	680
Total (MW)	7,490.4	19,634.4

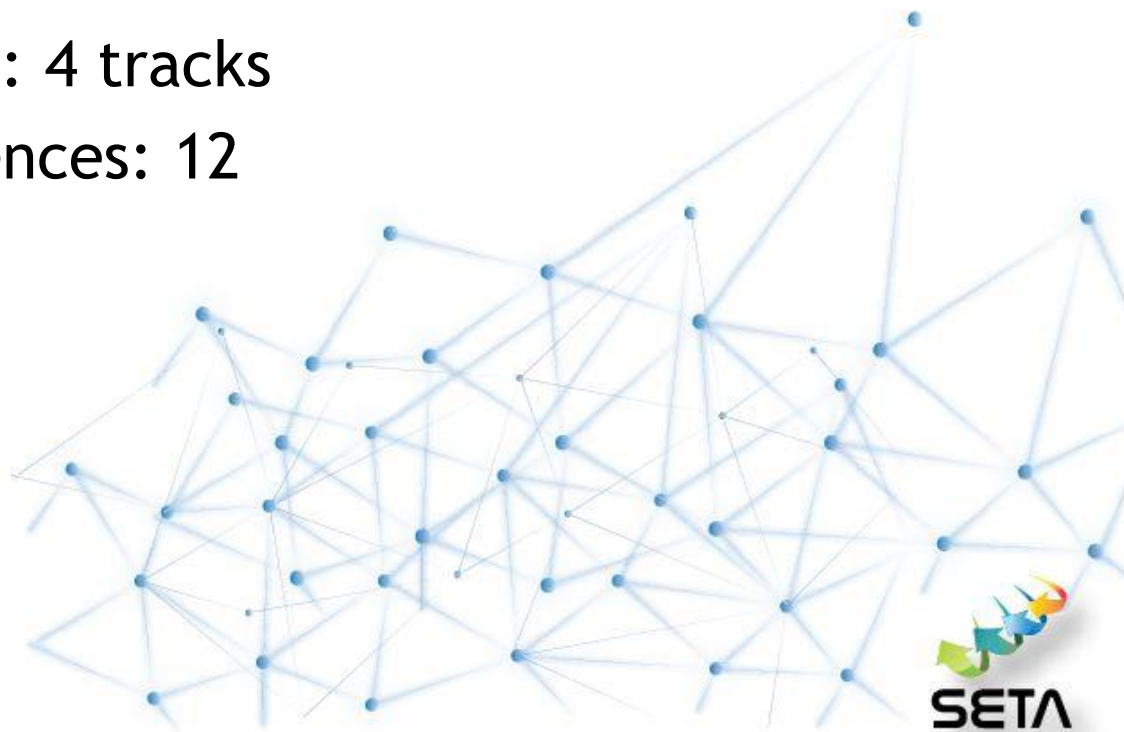
3. SUMMARY OF SETA 2016

- SETA 2016 consisted of
 - ✓ International Conference
 - ✓ Exhibition
- Over 5,300 participants
- 41 countries represented
- 12 Side Events
- 97% of attendees rated the Event between good and excellent



International Conference

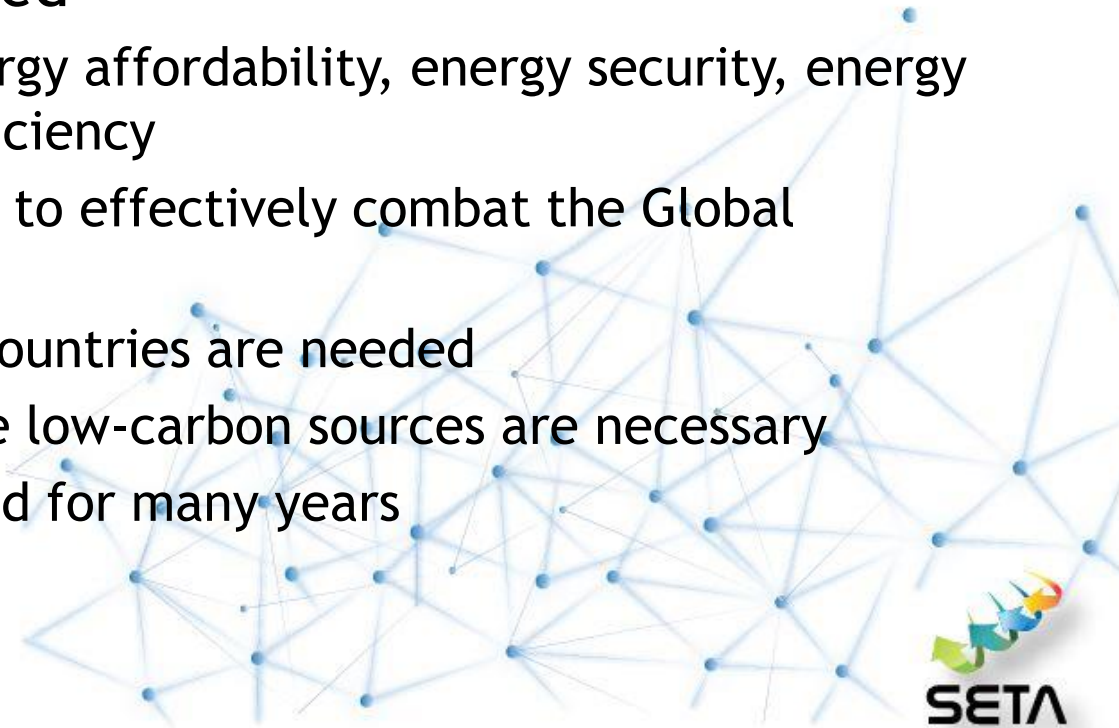
- Theme: Sustainable Energy and Technology Asia
- Speakers: 140
- Delegates: 1225
- Conference Sub-topics: 4 tracks
- Other Parallel Conferences: 12



Track 1

Energy Policy and Planning

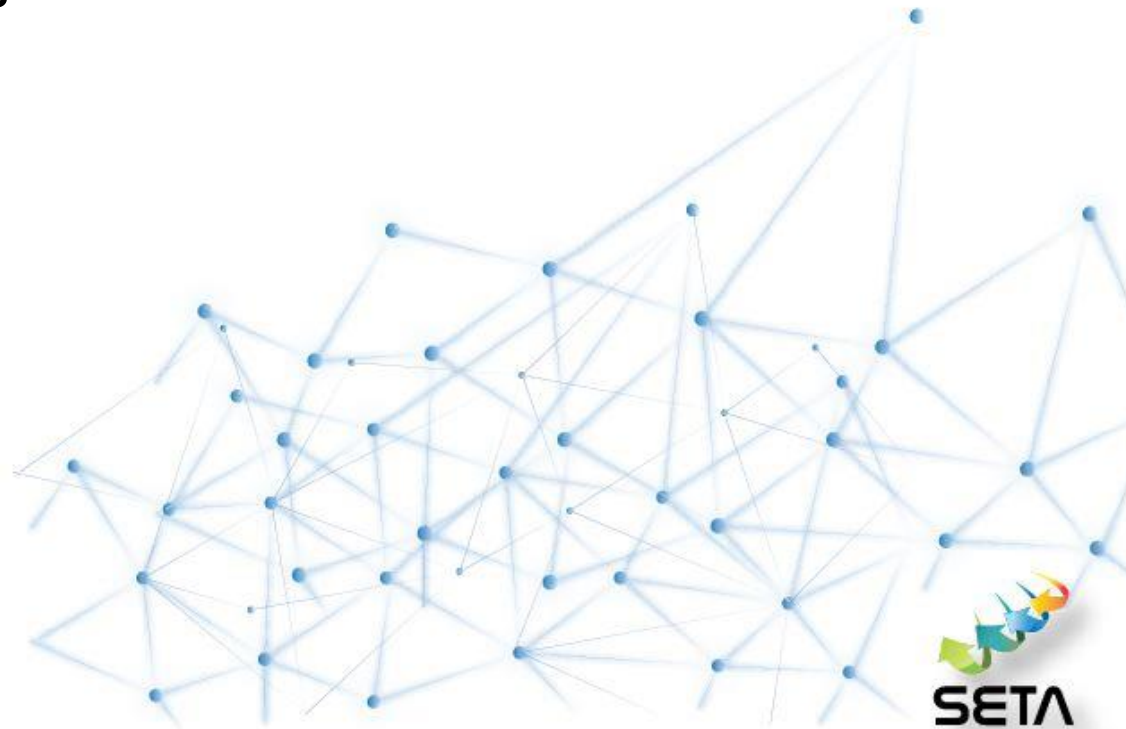
- COP 21 was very much concerned
- 5 main issues were raised
 - ✓ Energy accessibility, energy affordability, energy security, energy sustainability, energy efficiency
 - ✓ Technologies are needed to effectively combat the Global Climate Change
 - ✓ Collaboration between countries are needed
 - ✓ Diversification to include low-carbon sources are necessary
 - ✓ Fossil fuels will be around for many years



Track 2

Electrical System Technology

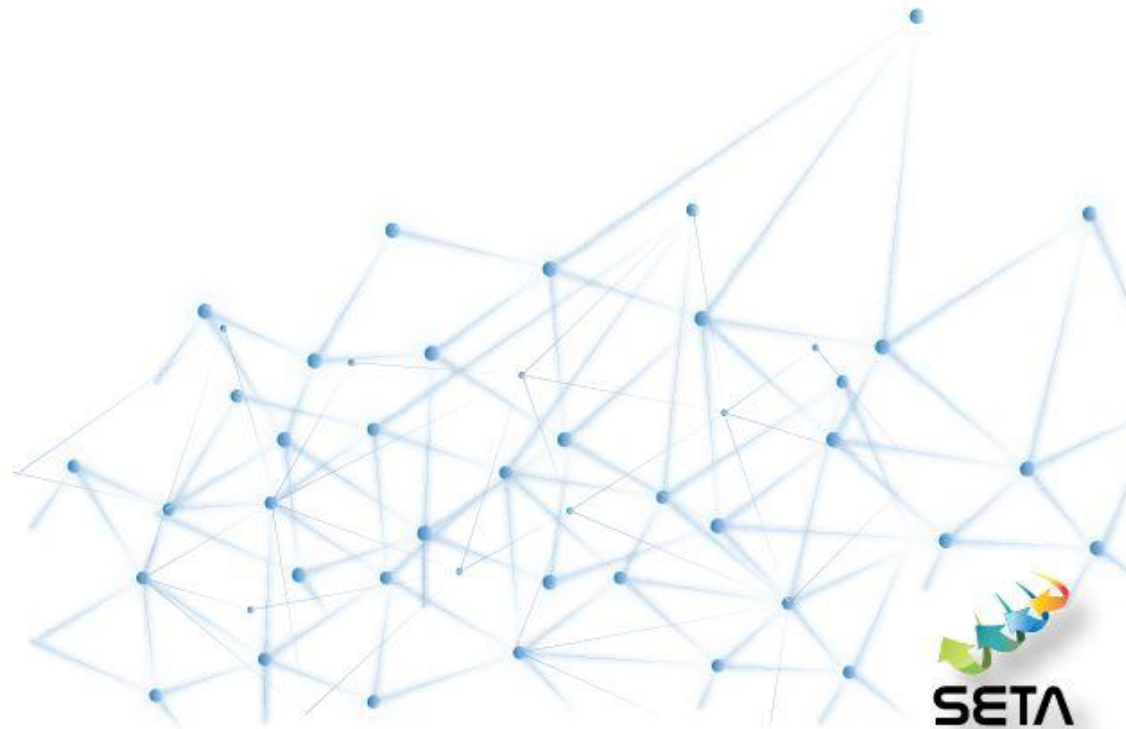
- Grid-to-Grid connection
- Smart grid and micro grid
- Energy storage systems
- Clean coal technology
- Nuclear Power



Track 3

Transportation and alternative fuels

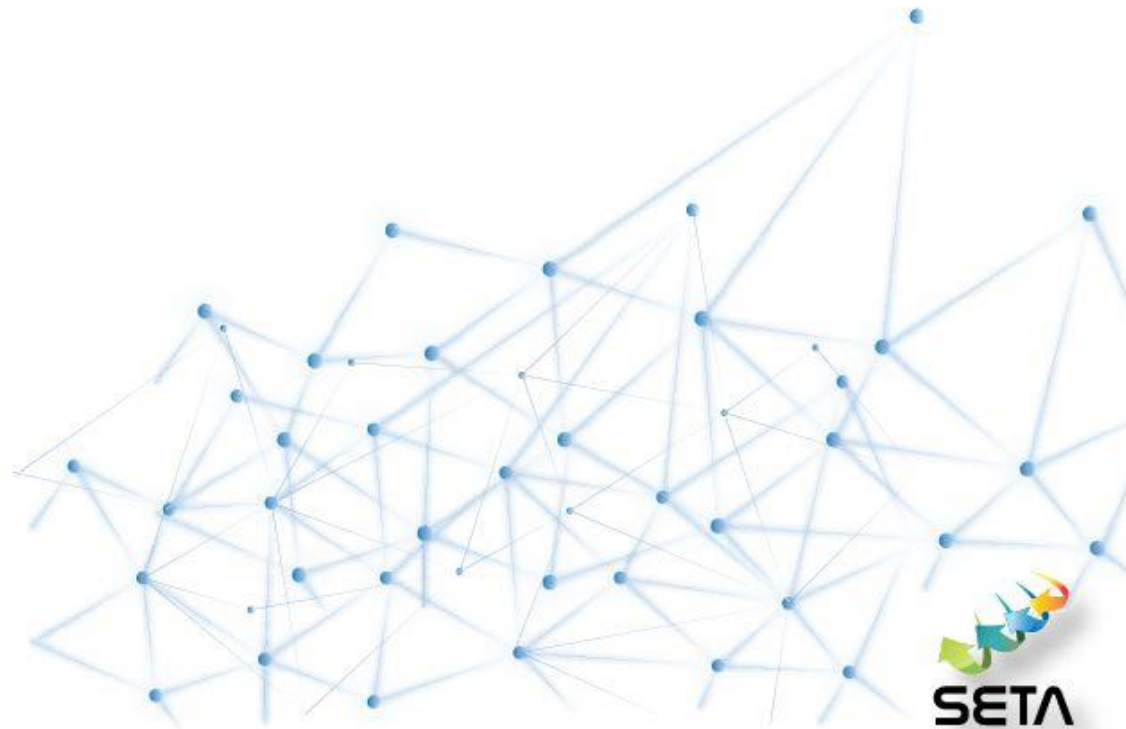
- Green Vehicles such as EV, HV, PHV, FCV
- Alternative fuels
- Hydrogen
- Freights and Logistics



Track 4

Sustainable Energy and Green Technology

- Solar PV
- Wind
- Bio-mass and Bio-gas
- Green urbanization
- Low-carbon cities



Fact of Statistics

Statistics at A Glance

Attendees	5325	Conference Tracks	4
Exhibitors	97	Side Event	12
Countries	41	Speakers	140
Overseas Pavilion	4	Delegates	1225

Participants Feedback

- **97%** of Attendees surveyed considered the Event good to excellent
- **86%** of Exhibitors achieved their objectives and expectation
- **42%** of Exhibitors polled came to showcase new service and products
- **98%** of Delegates rated the quality of speakers above good to excellent
- **93%** of Delegates believe that Asia will remain the world's fastest growing market for power infrastructure in next decade
- **64%** of Visitors attending had final decision authority or were recommenders
- **96%** of Attendees said they will attend SETA again next year

97% attendees are satisfied with SETA2016



Highlights : Opening Ceremony



Highlights : Conference



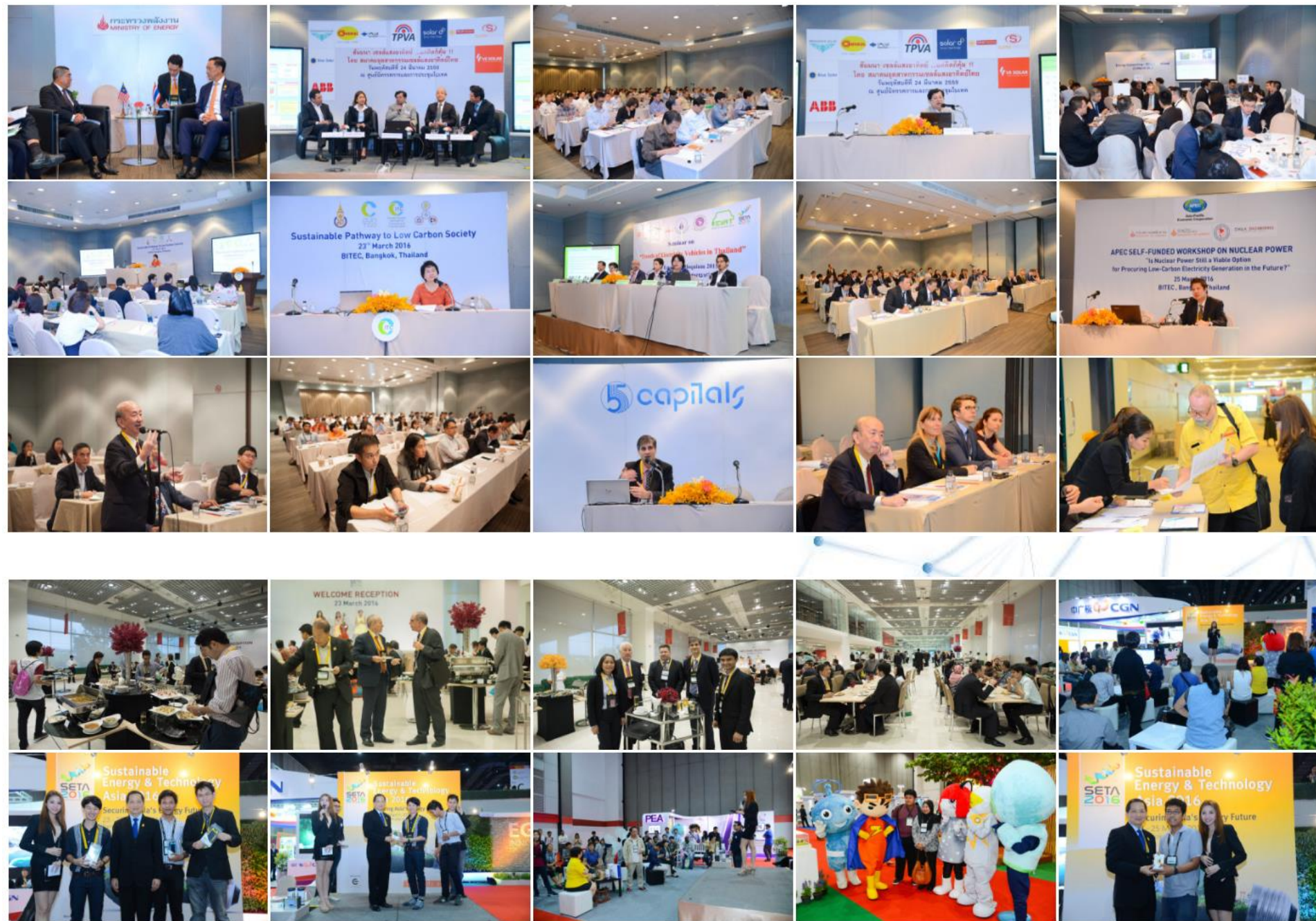
Highlights : Exhibition



Highlights : VIP Networking



Highlights : Side Events



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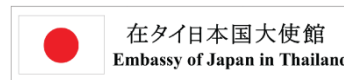
Silver Sponsor



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Supporting Organizations



4. SETA 2017 PROSPECTUS

- Same format as SETA 2016:
 - ✓ International Conference
 - ✓ Exhibition
- Topics subdivided into 4 tracks:
 - Sustainable Energy Policy and Planning
 - Low-Carbon Electricity Generation
 - Green Transport and Logistics
 - Smart City and Green Industry



Track 1

Sustainable Energy Policy and Planning

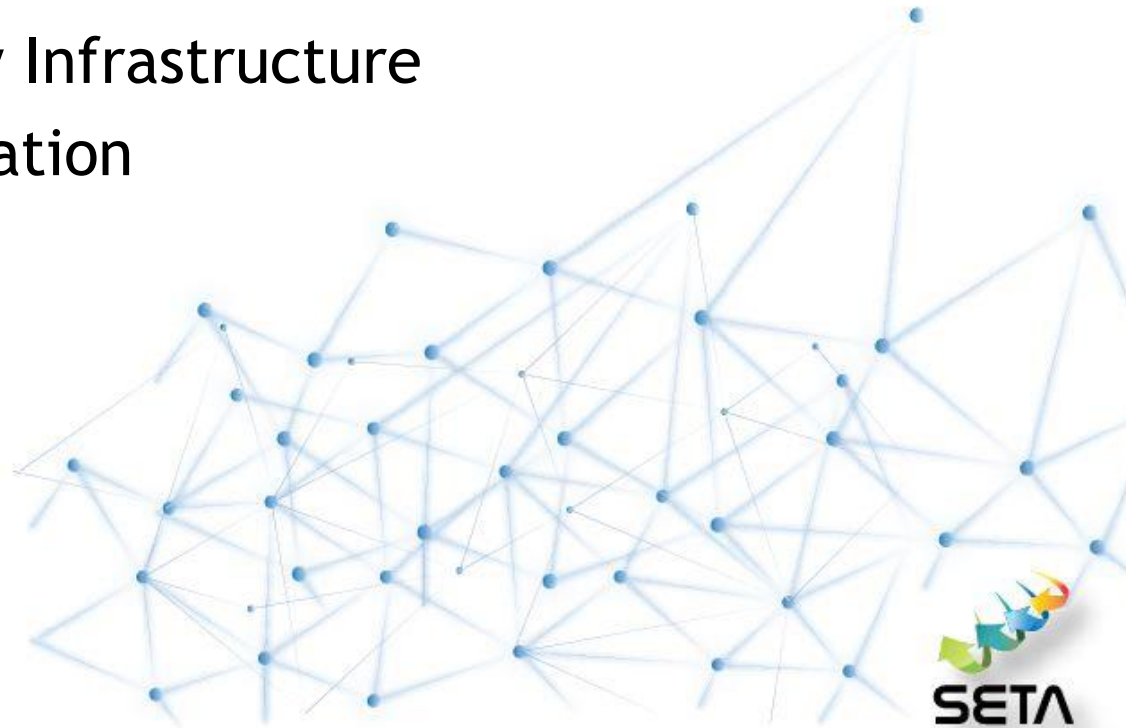
- Energy Planning at a Regional, National and Local Scale
- Energy Pricing
- Fiscal and Regulatory Policies at Supply
- Existing and Emerging Energy Markets and Reforms
- Alternative Energy Market and Policies



Track 1 *(cont'd)*

Sustainable Energy Policy and Planning

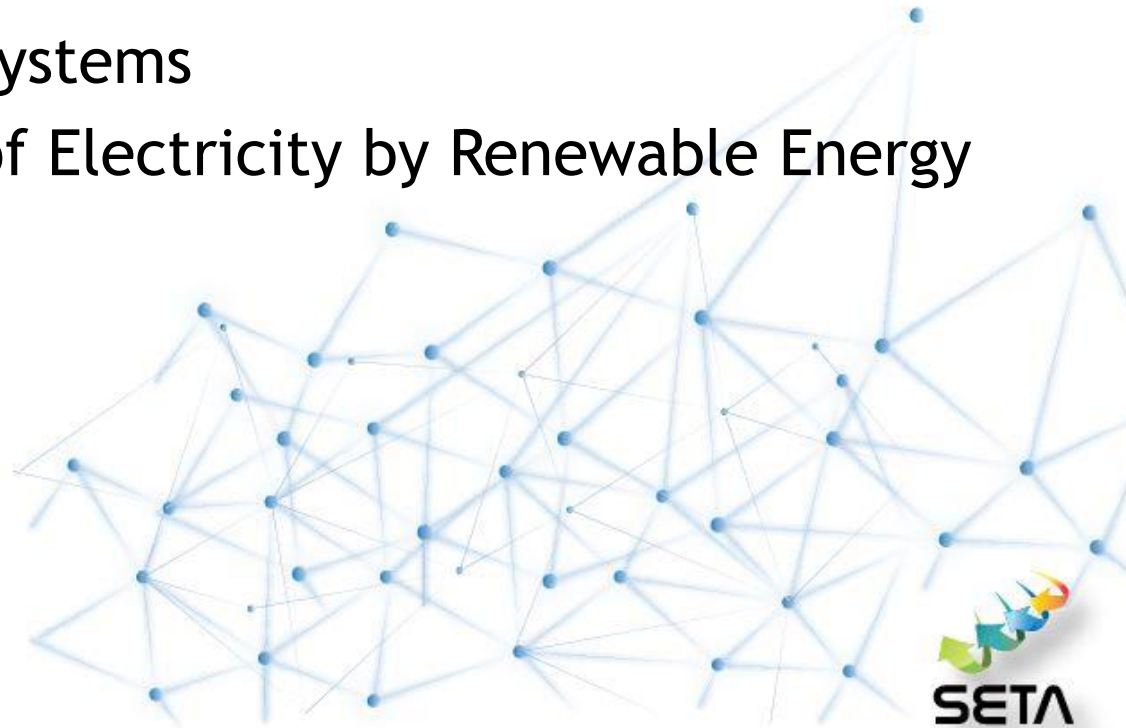
- Financing and Investments for Energy Supply
- Energy Integration Plan, Experiences, Challenges and Opportunities
- Regional Energy Supply Infrastructure
- Regional Energy Integration
- Energy Sustainability



Track 2

Low-Carbon Electricity Generation

- New Trend in Electric Power Systems (Generation, Transmission, Distribution)
- Electricity Storage Systems
- Smart Grids in Power Systems
- Extended Generation of Electricity by Renewable Energy in Asia



Track 2 *(cont'd)*

Low-Carbon Electricity Generation

- Bio-mass and Bio-gas as Alternative Fuels
- Energy Efficiency and Management
- Co-Generation
- State of the Art in Clean Coal Technology
- Nuclear Power in Asia



Track 3

Green Transport and Logistics

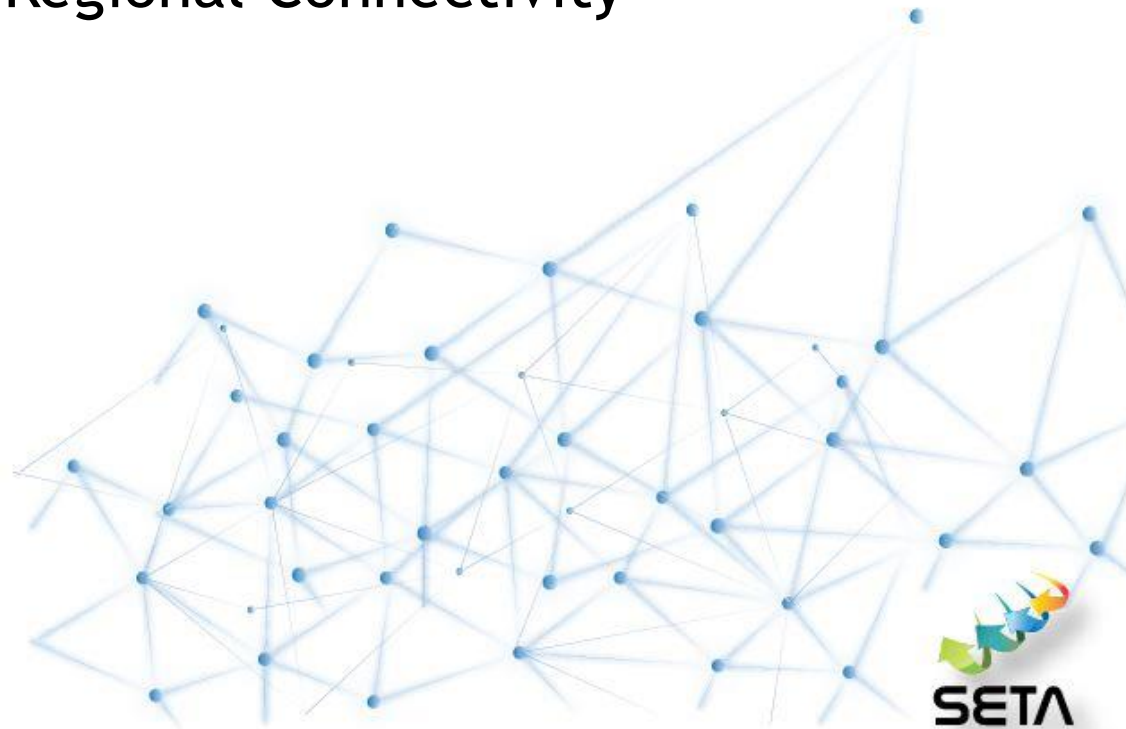
- Novel Hybrid Vehicles
- Electric Vehicles and Infrastructure
- Novel Battery Development and Charging Systems
- Hydrogen and Fuel Cell Vehicles
- Green Transport



Track 3 *(cont'd)*

Green Transport and Logistics

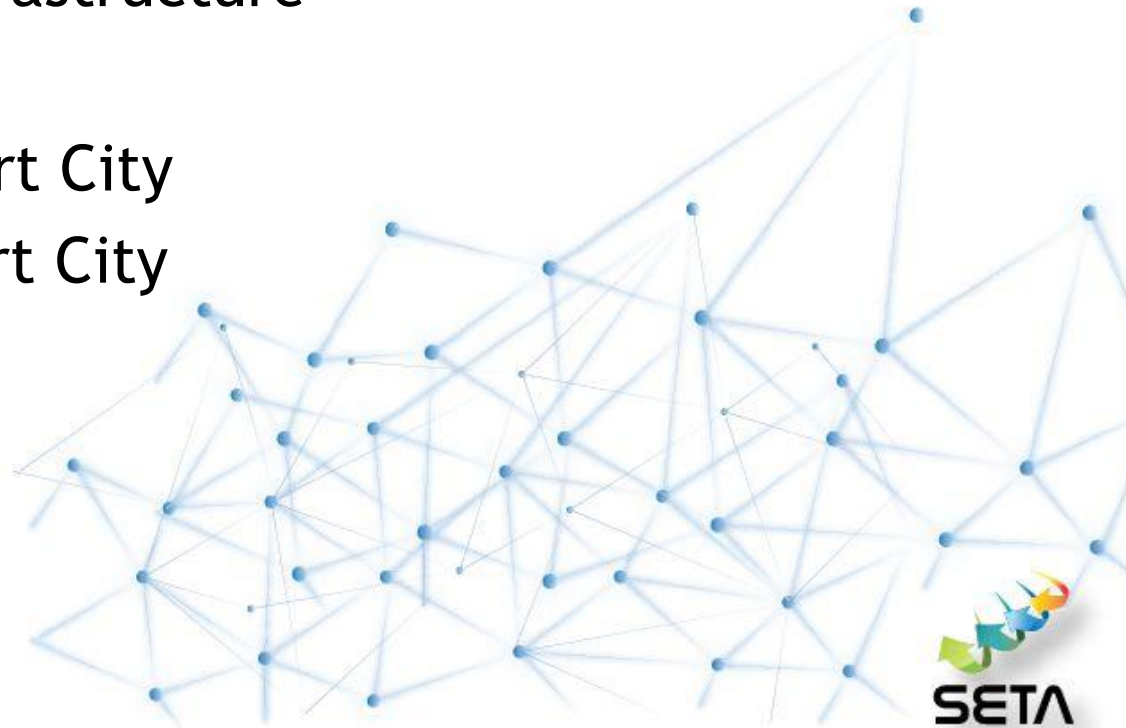
- Fuel Pricing and Tax Incentives for Transportation
- Bio-fuels for Transportation
- Pipeline Transport and Regional Connectivity
- Green Logistics
- Floating LNG Terminal



Track 4

Smart City and Green Industry

- Green City
- Green Urbanization
- Green Building and Infrastructure
- BEMS and HEMS
- ESCO Approach to Smart City
- ICT Application in Smart City



Track 4 *(cont'd)*

Smart City and Green Industry

- Low-energy and Low-carbon City
- Digital Utilities
- Smart Grid for Smart City
- Renewable Energy Integration in Urban Area
- Smart Waste Management
- Green Industry



5.WHY SETA?

- Asia is one of the World's big centers for manufacturing thus consuming a lot of energy
- Current energy uses lead to GHG emissions
- Need to mitigate the Global Climate Change following the Paris Agreement (COP21)
- Not enough technologies available at a reasonable price to attain sustainability
- No platform to discuss freely the burning issues



A Unique Platform for Asia

- A unique non-governmental platform in Asia
- A Flexible platform that can change the topics according to interests
- Strongest support by policy makers in Asia
- Biggest participation from ASEAN economies
- Combine important issues of energy in a single event: policy, electricity generation, transport and sustainable energy development



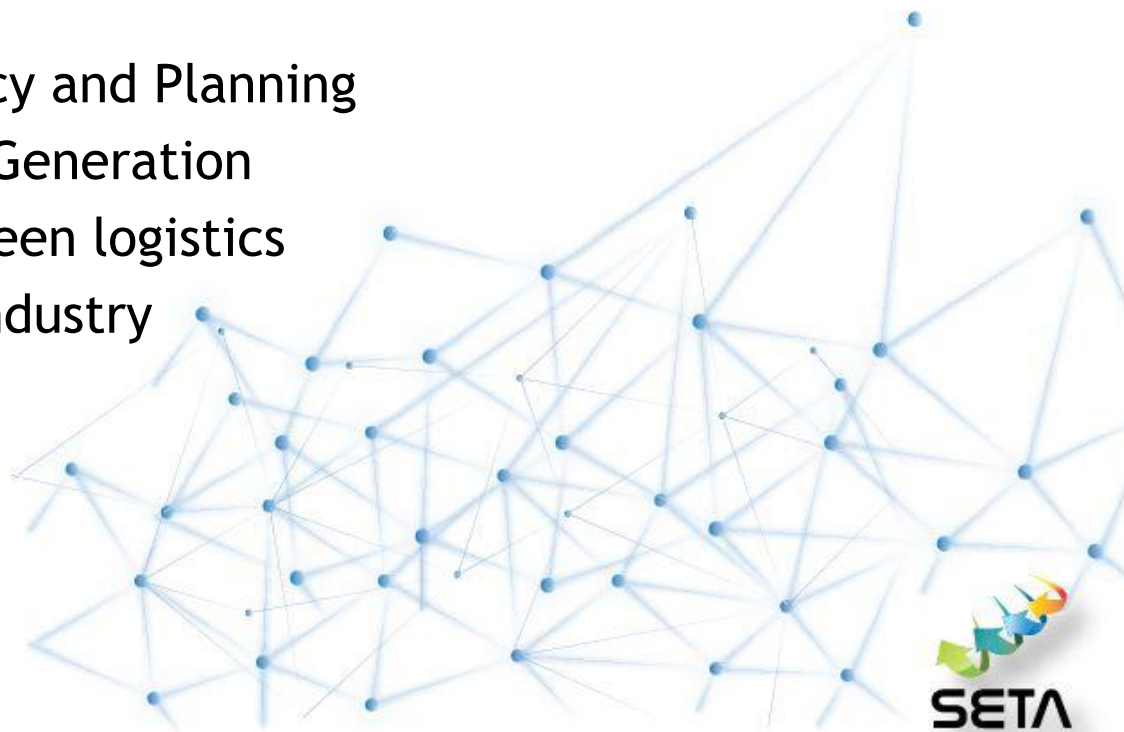
Some critical issues towards sustainability

- SETA2016 showed the willingness of Asian economies to reduce GHG emissions
- To attain a sustainable development in Asia more innovative technologies should be used
- A need for effective technologies for Asia to mitigate the Global Climate Change
- A need for cooperation and connectivity among economies in Asia



Towards a Low-carbon Society

- SETA2017 responds to this need by focusing on the way towards a Low-carbon Society
- Balanced topics:
 - ✓ Sustainable Energy Policy and Planning
 - ✓ Low-carbon Electricity Generation
 - ✓ Green Transport and Green logistics
 - ✓ Smart City and Green Industry





Welcome to SETA 2017

Thank you very much for your attention
and see you in Bangkok 8-10 March 2017.

