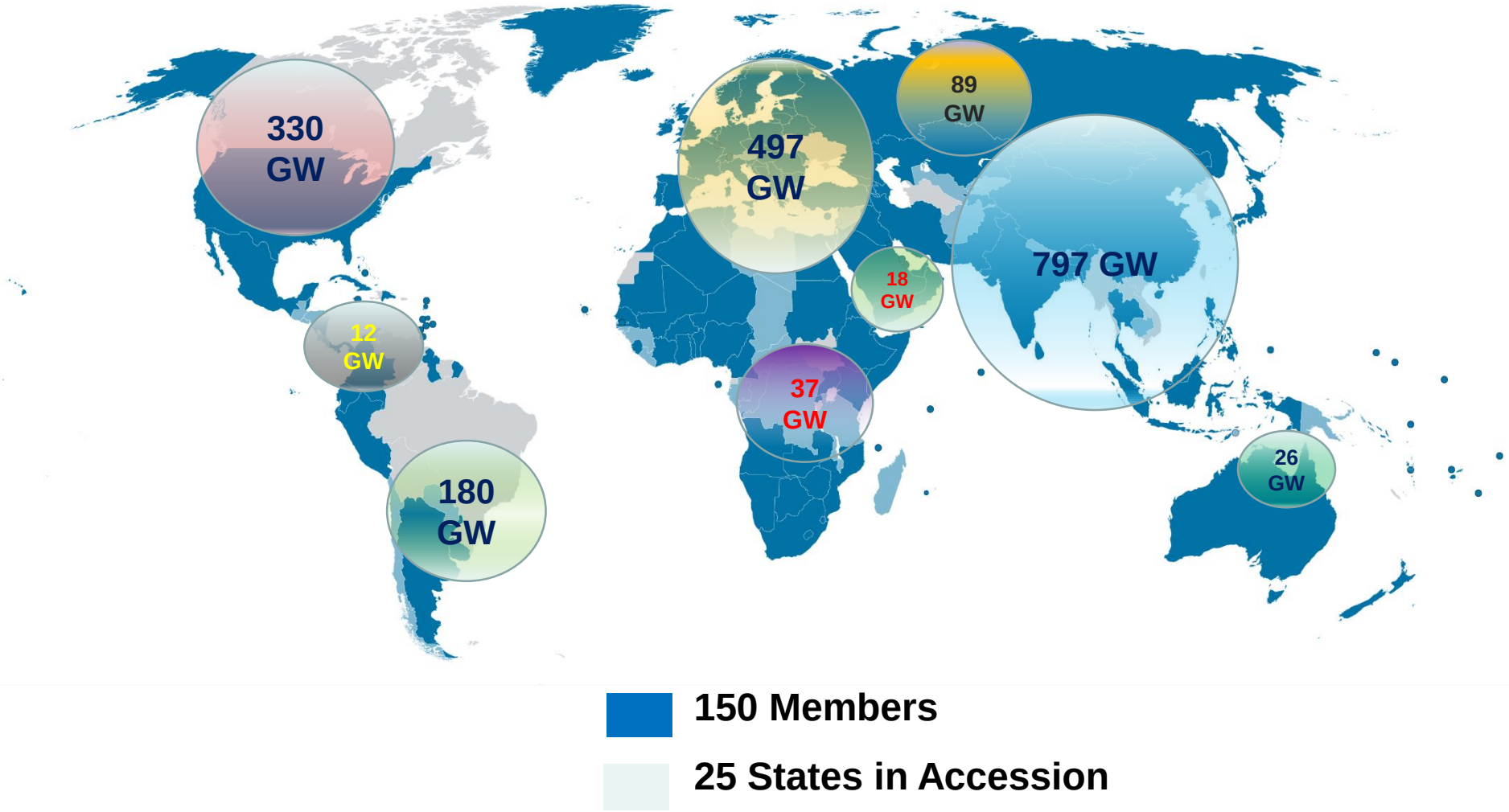
Renewables Readiness Assessment

Thailand

(Progress Report)

Yong CHEN
International Renewable Energy Agency
Workshop on RRA and REmap for Thailand
Bangkok, Thailand 23-24 February 2017

IRENA's Global Coverage



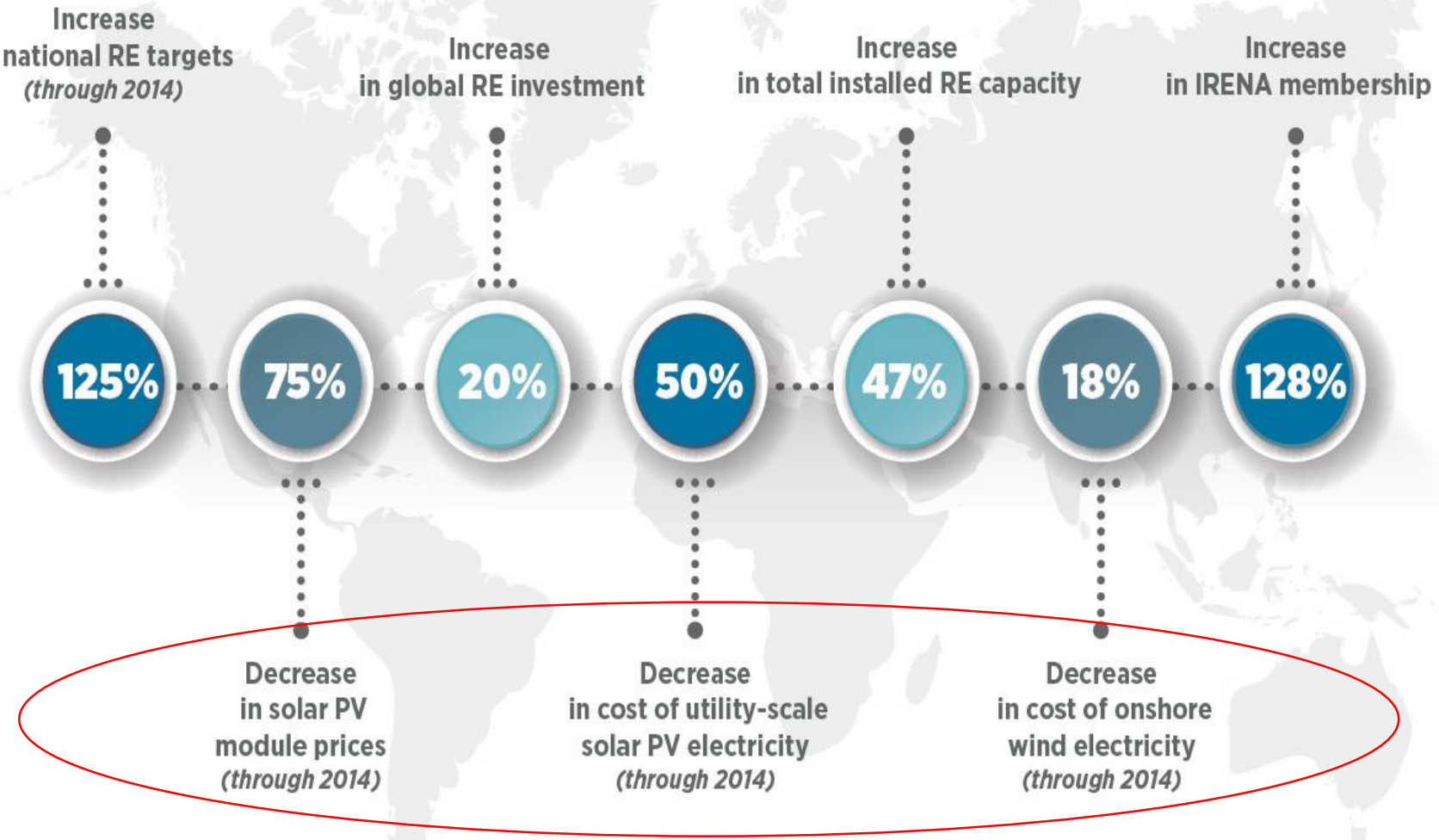
Representing (2016):

- ❑ 87% of the global installed renewable electricity generation capacity
- ❑ 80% of the global renewable electricity generation output

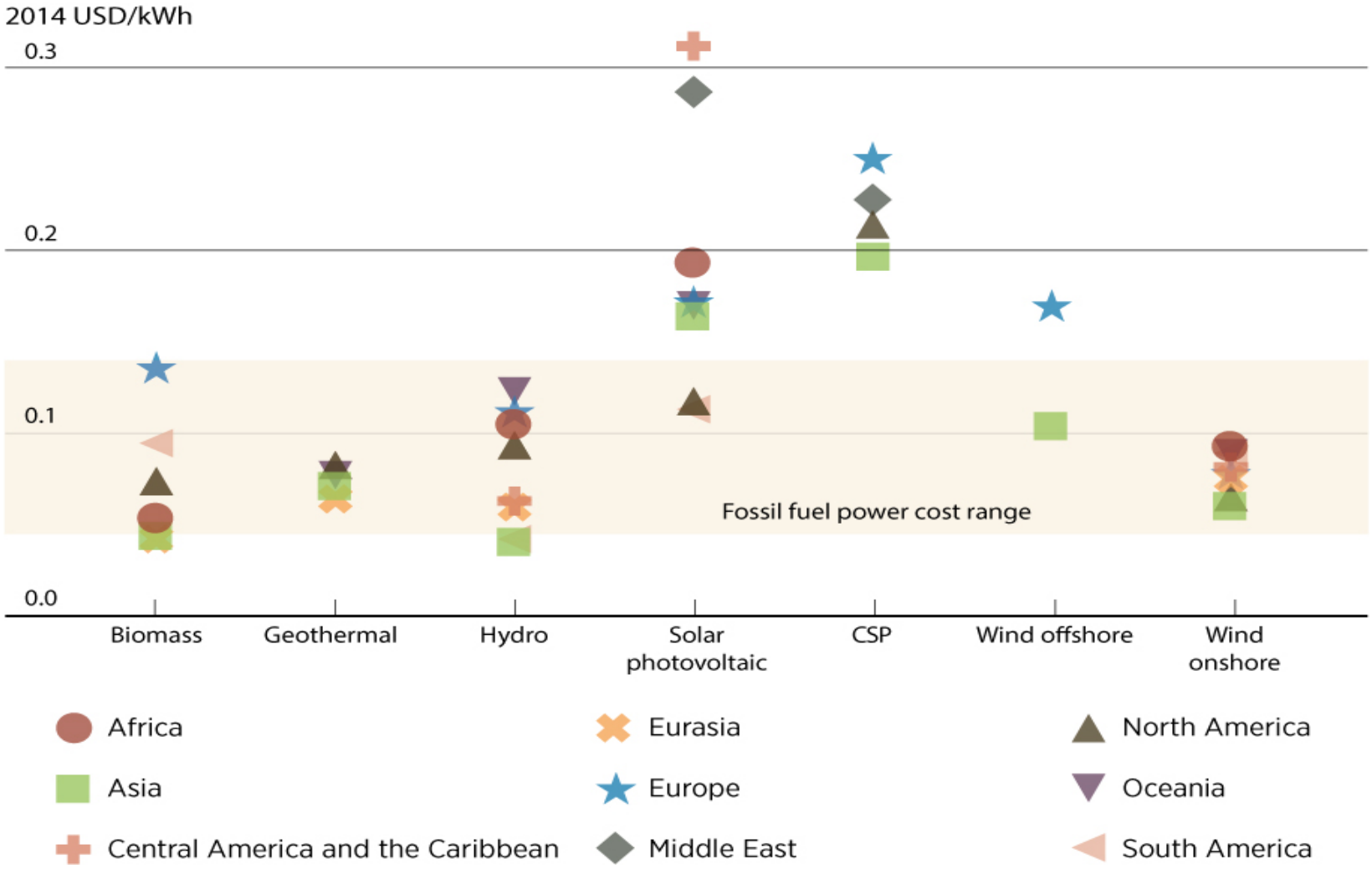
IRENA
International Renewable Energy Agency

Snapshot of Global Renewable Energy Development

RENEWABLE ENERGY (RE) IN THE LAST 5 YEARS:



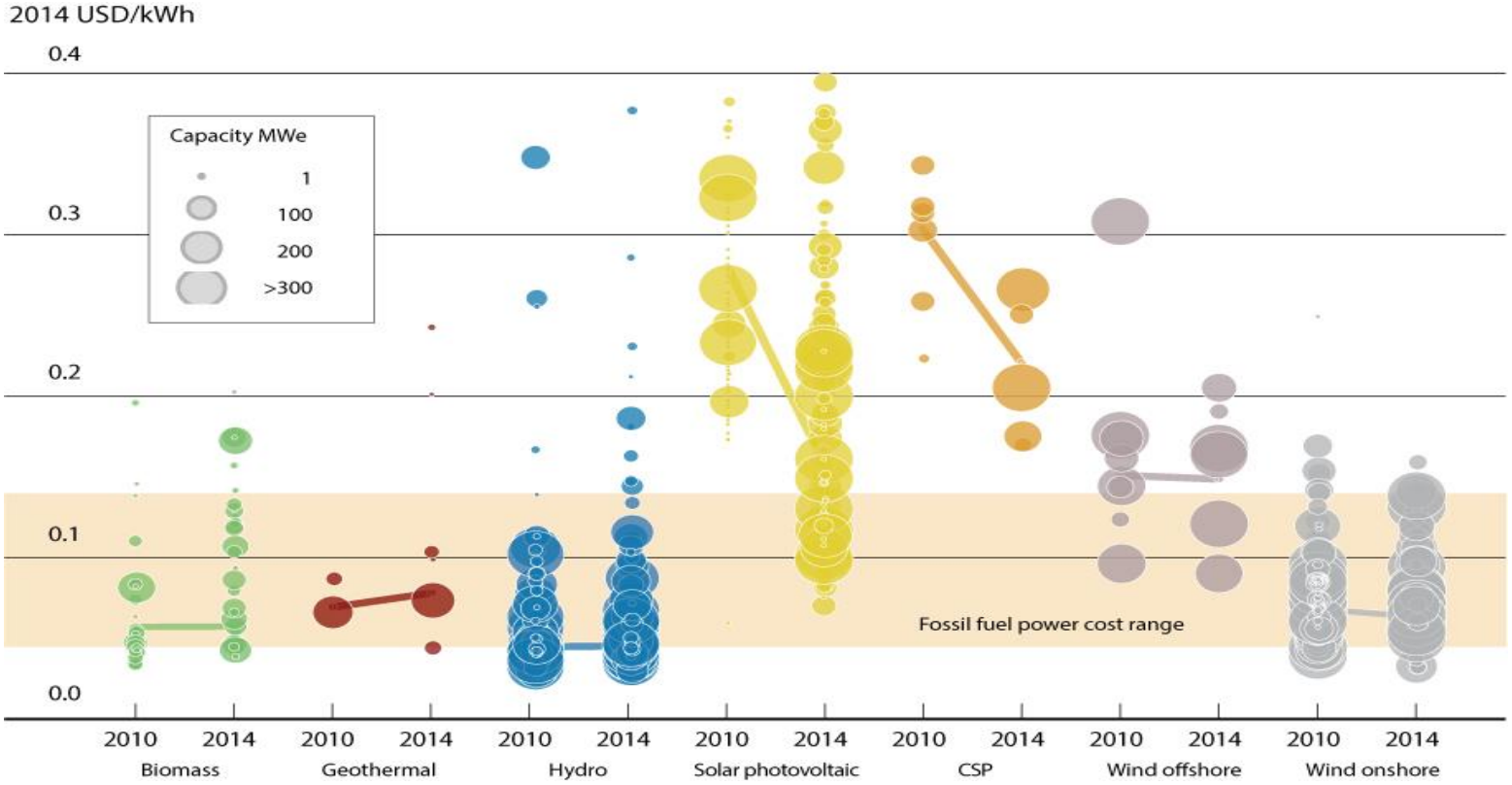
Renewables cost-competitiveness



Competing head-to-head with fossil fuels in all regions

The Past and Trend

2010-2014, by technology



2015-2025

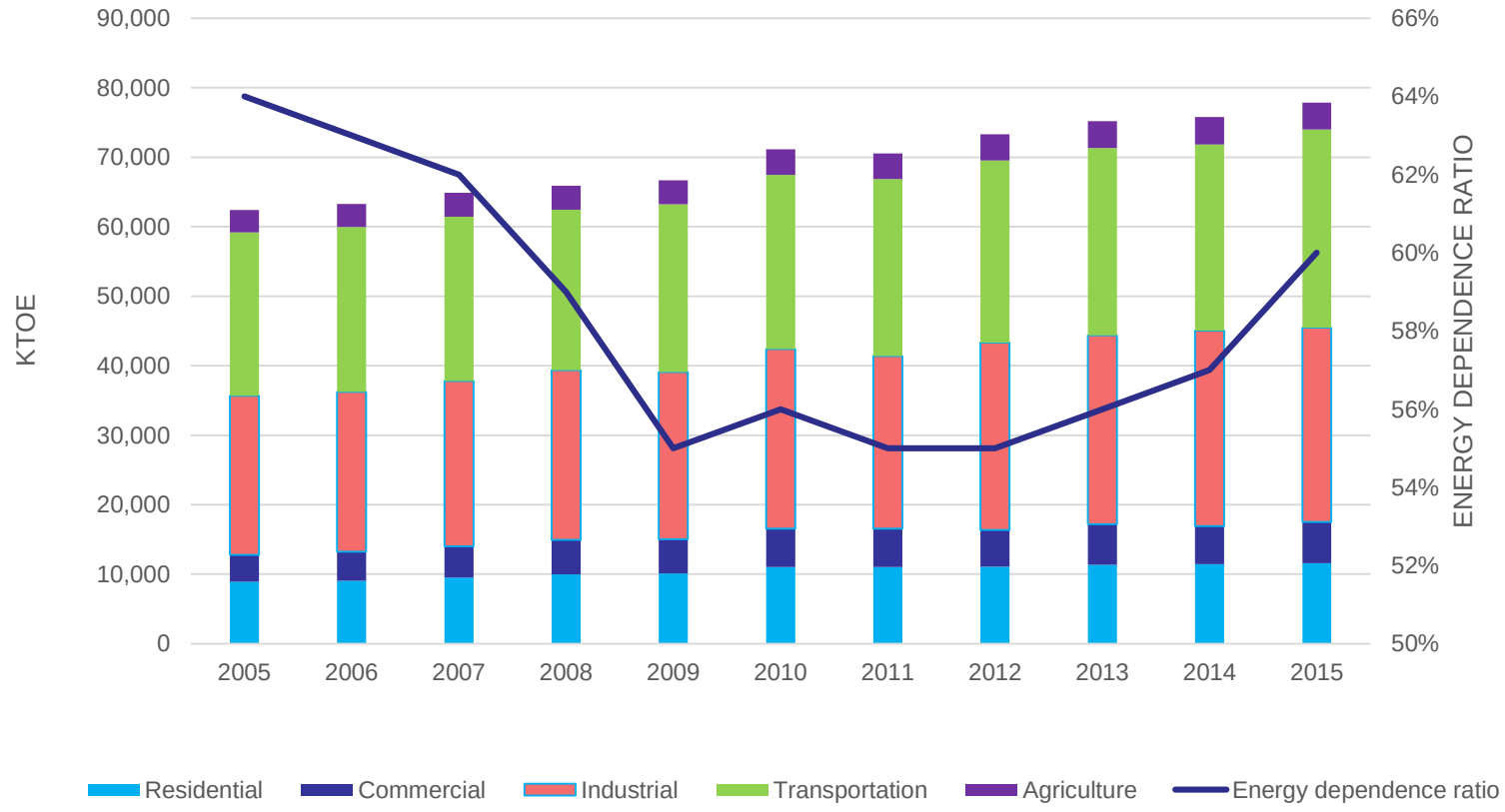
- Investment costs (2015 USD/kW): **solar PV** could fall by **57%** while **on-shore wind** by **12%**
- LCOE: **solar PV** could fall by **59%** while **on-shore wind** by **26%**

IRENA
International Renewable Energy Agency

Thailand's Energy Challenges

Thailand's Energy Challenges

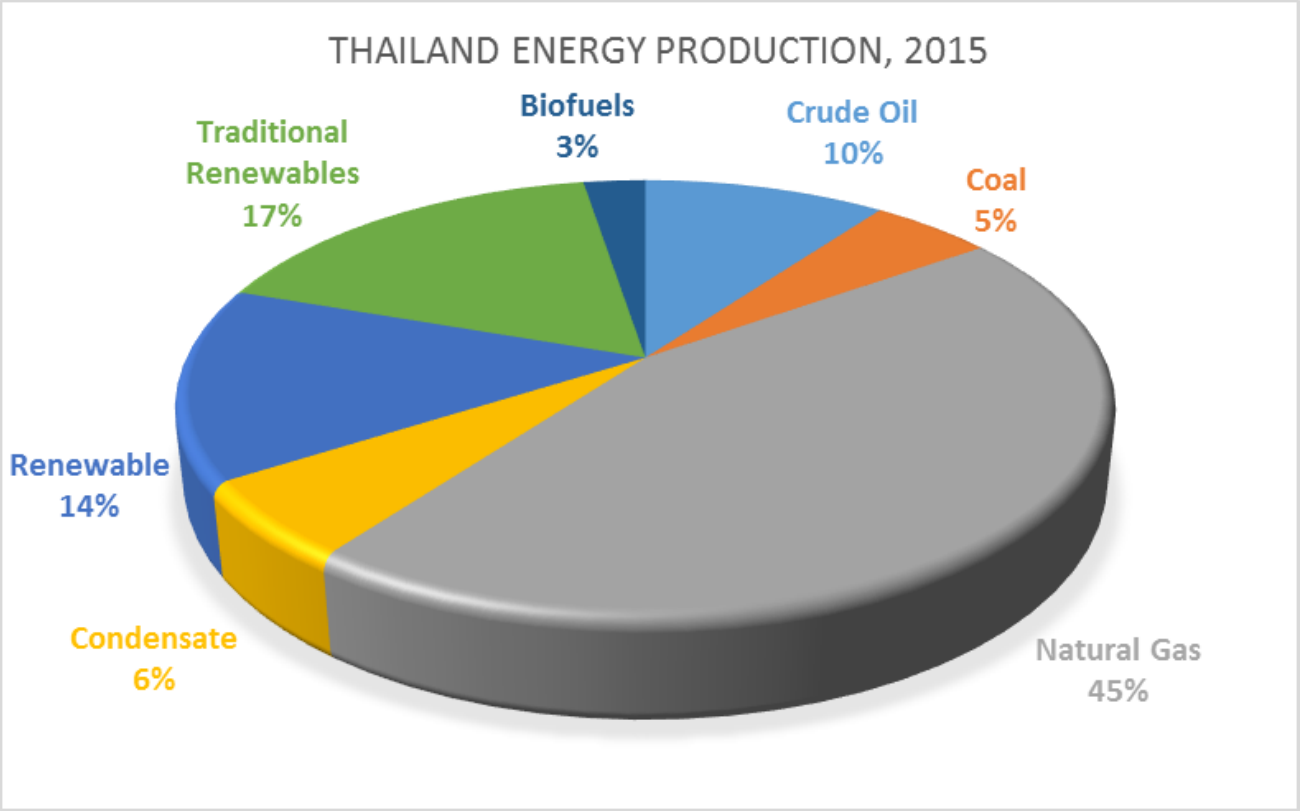
The biggest challenge is energy security, given over-dependency on imported energy, and ….



- Technical or geo-political shocks always remain a risk

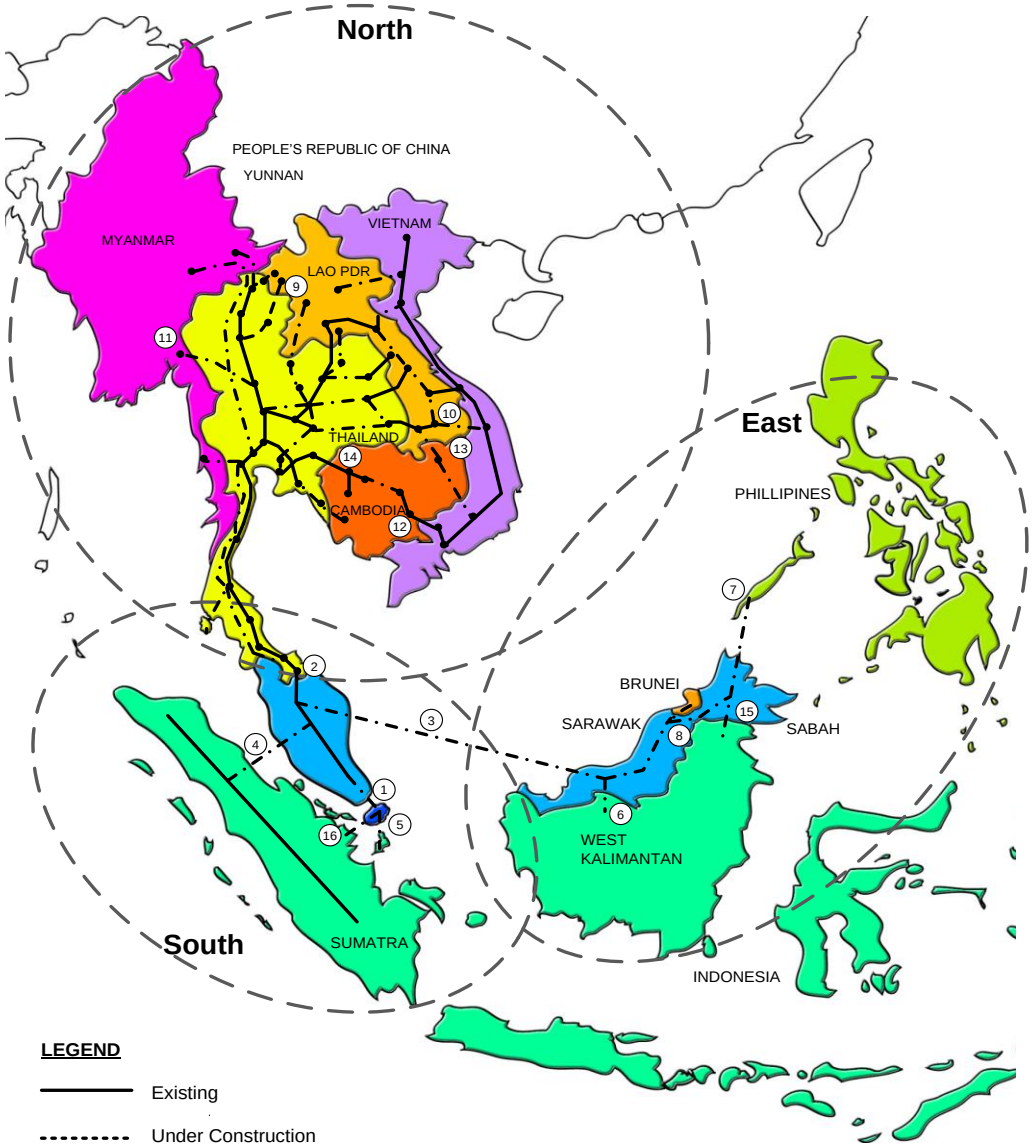
Thailand's Energy Challenges

Depleting indigenous resources: natural gas and oil reserves for a decade



- On the consumption side, oil-derived energy products and natural gas accounted for around 70% of the total final energy consumption (2015)

Regional context



ASEAN Power Grid

Key highlights on Thailand

Cross-border transmission capacity could total to approx.22,000 -25,000 MW by 2025

Breakdown:

- Thailand – Laos: 7,328 MW
- Thailand – Myanmar: 11,709-14,859 MW
- Thailand – Cambodia: 2,300 MW
- Thailand – P. Malaysia: 780 MW

Benefits of Renewable Energy

IRENA
International Renewable Energy Agency

Renewables can improve the resilience of energy system to external energy security shocks

- **Indigenous energy resources**, independent from the global energy commodity market fluctuations (on accessibility and prices)
- **Increased inter-dependency** if the regional power grid networks are properly inter-connected, thanks to the stochastic feature of variable renewable electricity (VREs).
- **Long-term cost predictability** to balance out the uncertainties and price volatility of fossil fuels

Other benefits:

- Environmental, social and economic development, benefits, including job creation, for Thailand at least 80,000 jobs in the renewable energy sector in 2015 (IRENA's "Renewable Energy and Jobs - Annual Review 2016“)

Targets in AEDP 2015 (overview)

The renewable energy target in final energy consumption (2036): 131,000 Ktoe, accounting for 30% of the total, with a breakdown shown as follow:

Energy Type	Final energy consumption (Ktoe) in 2036
Power	27,789
Thermal	68,413
Bio-fuels	34,798
Total of final energy consumption	131,000

- Assuming GDP would be at around 4%, and energy intensity target (30% reduction) could be reached by 2036.

RE targets in the power sector

Energy Type	Year 2036 Target (MW)
1. Municipal Waste	500
2. Industrial Waste	50
3. Biomass	5,570
4. Biogas	600
5. Biogas (Energy crop)	376
6. Small Hydropower	680
7. Wind	3,002
8. Solar	6,000
9. Large Hydropower	2,906.4
Total	**19,684.4**

RE targets in thermal and biofuel sectors

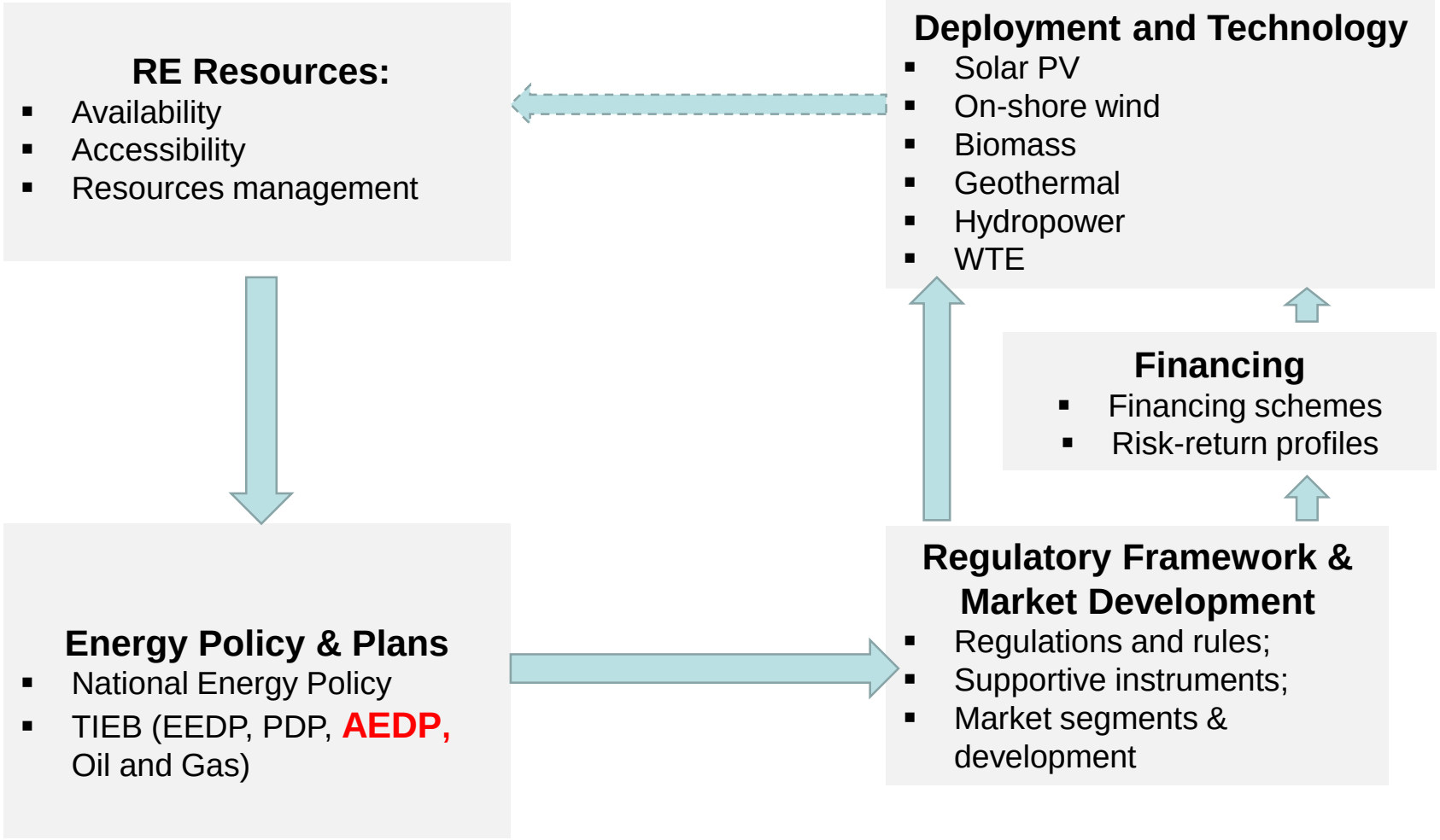
Energy Type	Year 2036 Target (ktoe)
1. MSW	495
2. Biomass	22,100.00
3. Biogas	1,283.00
4. Solar	1,200.00
5. Other alternative energy*	10
Total	**25,088.00**

Energy Type	Liters/day (x 1,000)	Ktoe
1. Ethanol	11.3	2.103.5
2. Biodiesel	14	4,404.82
3. Pyrolysis Oil	0.53	170.87
4. Compressed Biogas (ton/day)	4800	2,023.24
5. Other alternative energy**		10.00
Total	-	**8,712.43**

Renewables Readiness Assessment

IRENA
International Renewable Energy Agency

Assessment Framework



Preliminary findings (1)

Renewable Energy Resources

- In general, Thailand has **good renewable energy resources** including hydropower, solar, biomass (including the wastes), to less extent, on-shore wind, and small amount of geothermal.
- Site-specific makes **accessibility** potentially an issue, given the remote location, land acquisition issues (environmental, legal, and planning), the grid accessibility, thus the pro-active energy planning may be needed.
- Biomass **feedstock management** (logistics, awareness, cooperative model with farmers, energy plantation) does not seem to pose a challenge, but with scaling up of bioenergy use, it can be.

Discussions

- The on-shore **wind potential** for 3,000 MW by 2036.
- Supply of different **biomass feedstocks** would require different mechanisms
  - **Residuals** from the established industries would face less challenges;
  - For dedicated energy **plantations** for biofuels (bio-ethanol and bio-diesel in particular) would require a long-term contract with farmers with a reasonably adjusted prices in relation to food prices.

Preliminary findings (2)

Energy Policy and Plans

- A **National Energy Policy** seems missing, despite Thailand Integrated Energy Blueprint (TIEB) acts de facto as a guiding document for the energy sector development
- **TIEB**, consisting of five inter-dependent individual plans, has a synchronized timeframe, which is a very positive move.
- **RE zoning** is a right approach to take.

Discussions

- Should an inter-ministerial (high-level**) coordination mechanism** for implementing TIEB be needed, given the different policy priorities/objectives of the different ministries?
- For RE zoning, the **planning procedure** should be improved to ensure PDP and AEDP to be more effectively integrated in the process
- The **grid stability analyses** (for both transmission and discussion networks) should be conducted, if not yet.
- Incentive mechanisms for **RE-for-heating** would help create market. In this regard, a non-electricity RE statistic system should be established.
- Harmonization of TIEB and **climate policy**?

Preliminary findings (3)

Regulatory Framework & Market Development

- Overall, Thailand has established **a good regulatory framework** in the energy sector, particularly in supporting RE development with fair competition, transparency and rather clear rules.
- Moving **from Adder to FiT to the Reverse Auction** is rational.

Discussions

- The **new promotion plan** for RE requires SPPs to provide firm capacity: how would it affect the cost structure and eventually the market? What other options are available to cope with the high shares of VREs? Auxiliary power market?
- **Roof-top solar PV**, especially for urban areas where land acquisition is challenging, could play an important role. What incentives should be provided? Is it clear on how that would affect the distribution grids (MEA and PEA)?
- As VREs grows, **the curtailment** should be allowed when it comes to system costs. Yet, above what level, it should be compensated?
- Stricter regulations on the market players seem to be increasingly necessary, in terms of assuring the quality of RE project installations and operations.

Preliminary findings (4)

Renewable Energy Financing

- **Financing schemes** are in favor of renewable energy projects, thanks largely to the supportive policy and regulations.
- The **local banks** are well educated on the RE risk-return profiles, and also in general supports environmentally friendly projects.

Discussions

- The RE projects, except wind, are **trending toward a smaller project scale**, which would increase the transaction costs for lenders.
- On the other hand, as more **new players** enter into the market, driven by different motivations, this could bring in new risks.
- The **hybrid systems** under the new promotion plan would require banks to better understand the new risks that might affect the return.
- **Policy coordination and consistency** is key to enhancing the investor/developer confidence. The recent land issue on wind is a case in point.
- How to improve the **investment environment** to attract high-quality RE investors/developers to develop RE projects in Thailand?

Preliminary findings (5)

Transportation energy: biofuels v.s. Electric Vehicle

- In the EEP, the saving in the **transport sector** is expected to be 30,213 ktoe, accounting for 59% of the total savings
- **EVs** will have a role to play.

Discussions

- How much would EVs affect the **market share** for biofuel vehicles given the automobile market in Thailand is not so big (on average 800,000 units/year)? The industry seems to welcome EVs as long as the demand is there and it would not dramatically jeopardize the market position of biofuel vehicles. For EVs, the **fix-route transport fleet** could be pilot for EVs in Thailand.
- Regardless of biofuel or electric vehicles, a sufficient amount of **lead time** should be provided to allow the industry to adjust their business plan. In this regards, **a roadmap for EV development** might be worth doing. This would help consistent policy development and guide the industry to evolve.
- **New business models** could be created, including battery-based back-up power, regulating power for the grid (auxiliary service), and battery leasing modeling for EVs.


IRENA
International Renewable Energy Agency
2013
2012
2011
2010
2009

Thank you!