

The need for RE and new energy technologies for small scale-grids in ASEAN

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**One Community
for Sustainable
Energy**

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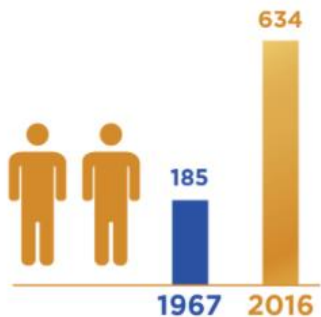
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ASEAN – Community of Opportunities

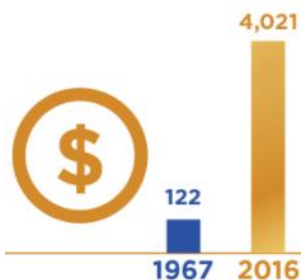
50 years Journey of ASEAN



Population (in million)



GDP per capita (in US\$)



ASEAN population was **8.5%** of the world population in 2016

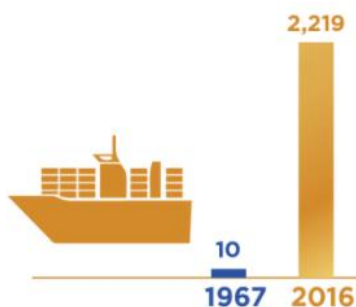


In 2016, attracted **US\$ 96** billion FDI



Poverty has decline from, **47%** in 1990 to **14%** in 2015,

Trade (in US\$ billion)



Trade service quadrupled between 1999 and 2016 to reach **US\$681** billion

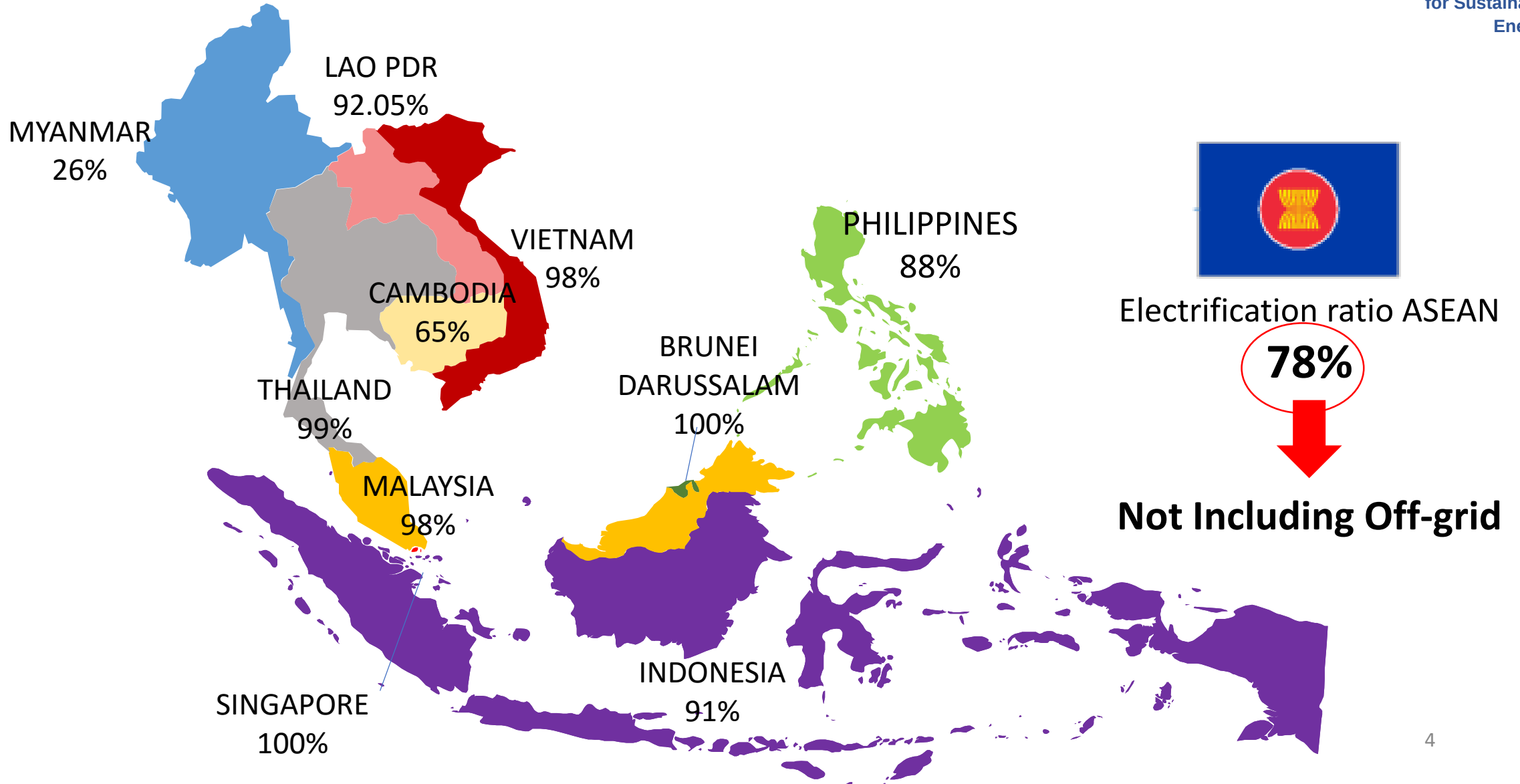


Electricity Consumption
1,287 kWh/cap

the **6th** largest in the world & the **3rd** largest in Asia.



ASEAN Electrification Ratio by 2015



ASEAN Off-grid Demand



Off-grid
demand

107 million people live without electricity

- Huge part of it lives in **remote area**

ASEAN covers **wide area & islands**

- **13,000** inhabited island
- **Indonesia & Philippine** owns big islanded communities

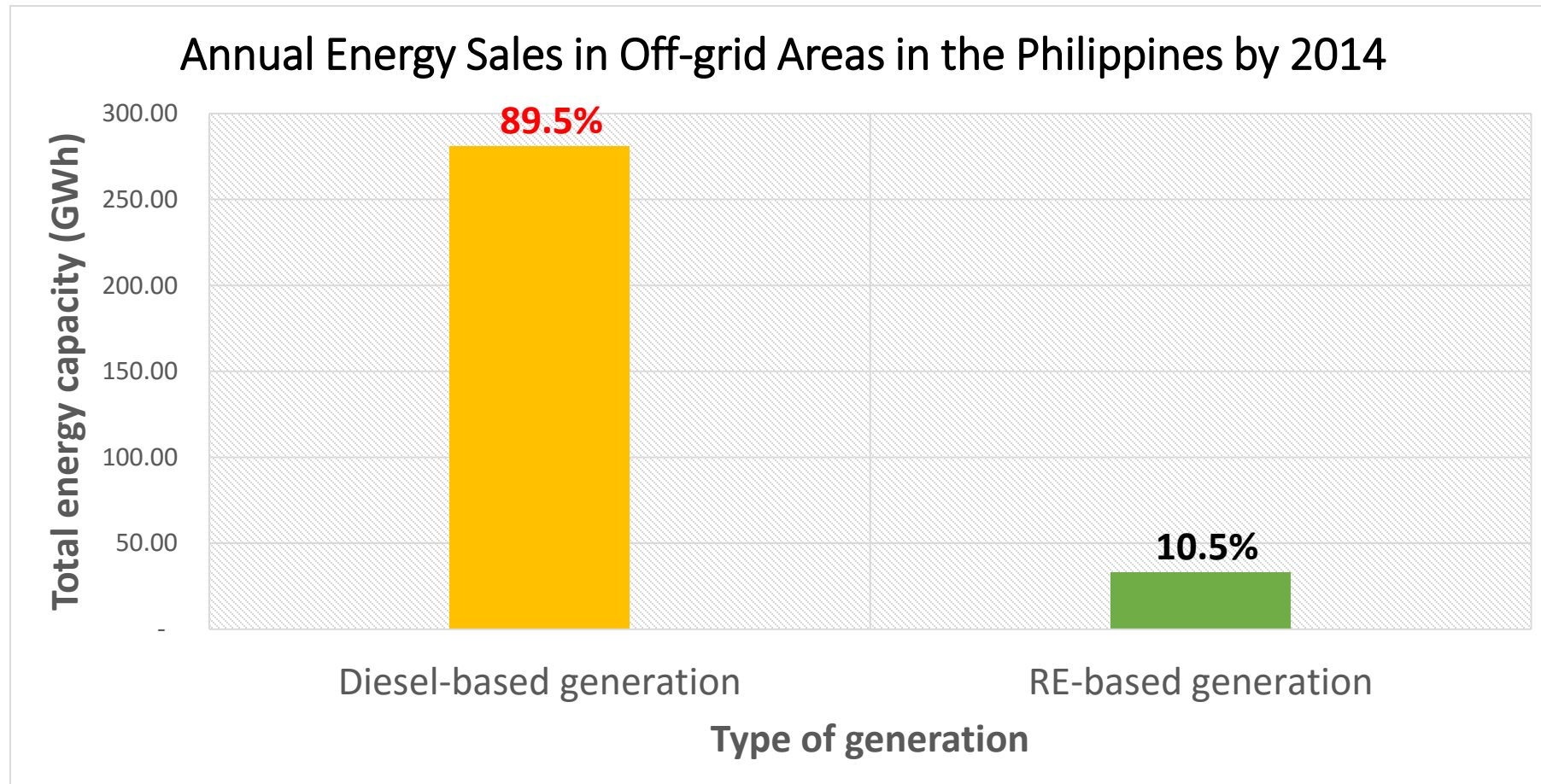
Off-grid generation is still dominated
by **diesel-based plant**

ASEAN Off-grid Electrification Status

Capacity of decentralized diesel-generator in Indonesia



ASEAN Off-grid Electrification Status



Data source: NPC-SPUG 2017

Off-grid Electricity Supply Status : The case of Philippines

True cost of Diesel generation by NPC-SPUG vs Effective Selling rate in 2012

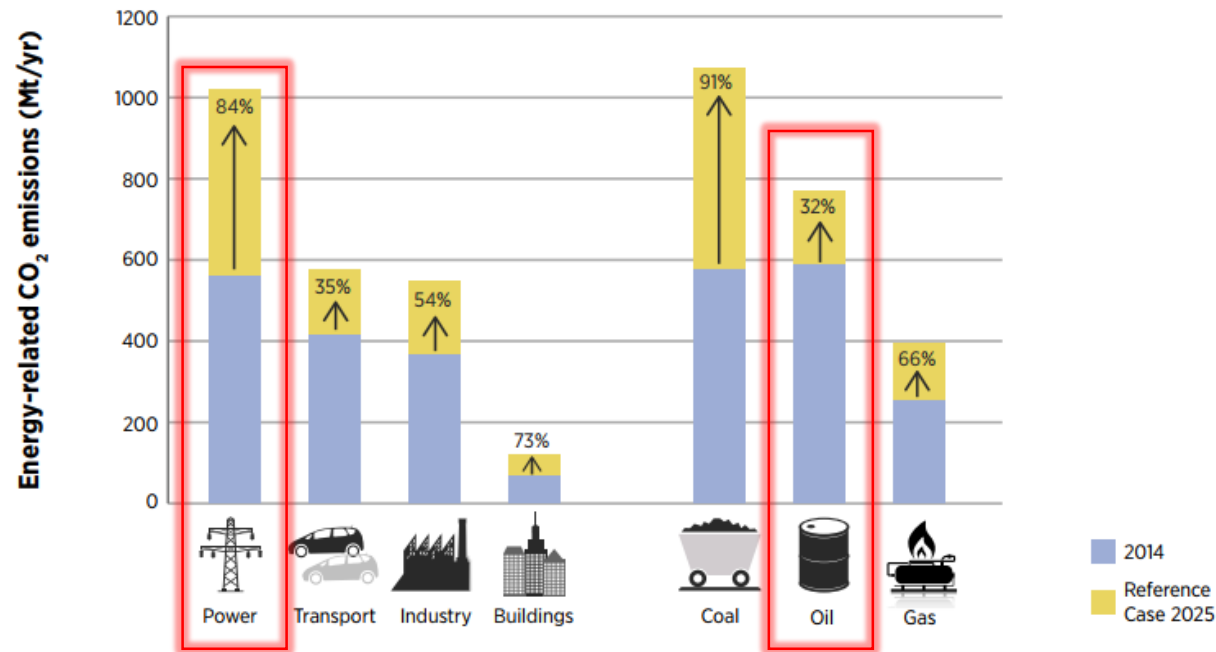
NPC SPUG Area	Municipality	True Cost of Diesel (pesos per kWh)	Effective Selling Rate (pesos per kWh)	Difference
ROMBLON	Alad	28.03	6.59	21.44
CATANDUANES	Palumbanes	21.56	6.59	14.97
MINDORO	Cabra	19.8	5.75	14.05
LEYTE	Caluya	18.89	6.84	12.05
TAWI-TAWI	Manuk Mankaw	17.6	6.27	11.33
KALINGA	Lubuagan	16.52	5.76	10.76
DAVAO DEL NORTE	Talicud	16.87	6.27	10.6
SIQUIJOR	Siquijor	15.49	6.07	9.42
CEBU	Camotes	15.35	6.07	9.28
PALAWAN	El Nido	14.93	6.59	8.34
BATANES	Basco	14.04	6.59	7.45
QUEZON	Polilio	13.92	6.59	7.33
BASILAN	Basilan	13.7	6.58	7.12

Source: GIZ, SPUG-NPC (2012)

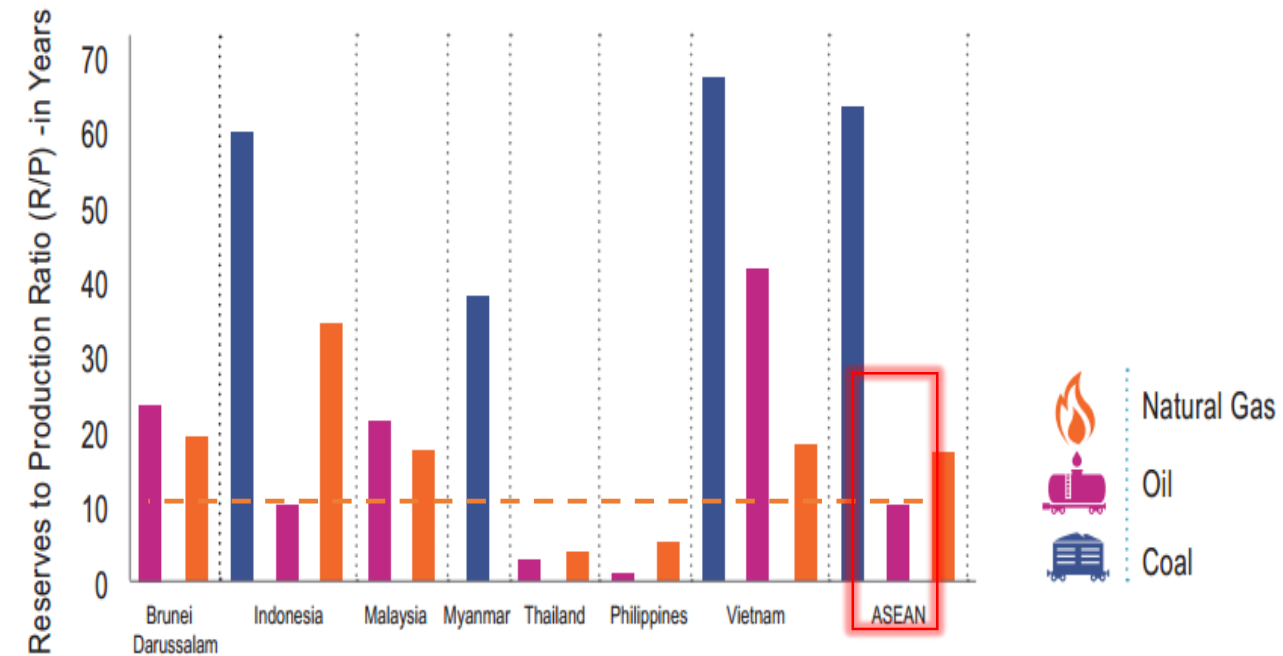
- Diesel generation has **volatile fuel cost** and **high transportation cost**
- Causing **curtailment of service hours** (4-12 hours supply only)
- In some remote area, fuel can exceed **USD 1.2 per liter, 1.5x** than Philippines average
- **10.32 billion** PHP is estimated to cover projected fuel and transportation cost in 2017 to meet off-grid demand
- **Huge subsidies** disbursed for covering fuel and transport cost

Off-grid Generation Issues using fossil-fuel based generation

ASEAN's Energy-related CO₂ Emission by fuel & sector



Reserve to Production ratio of ASEAN's Fossil fuels



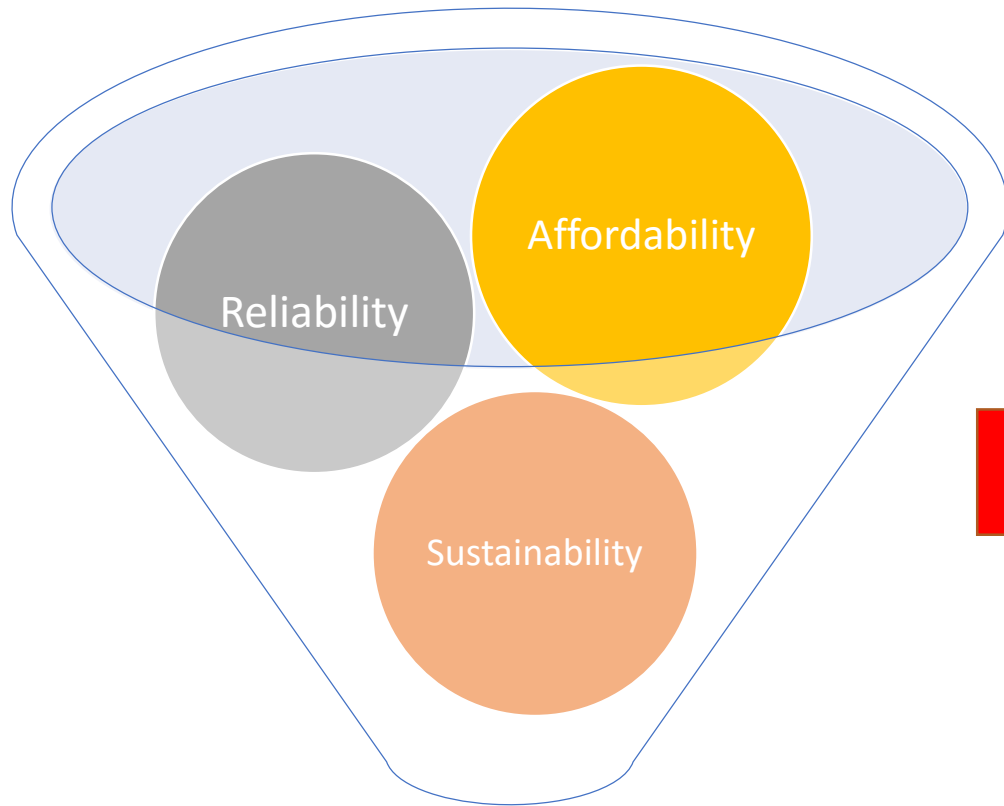
Off-grid Generation Issues using fossil-fuel based generation

Classification of Mini-grid per hours of Generation in Philippines

Service Hours of Mini Grids	Mini Grid Areas (Numbers)
6-8 hours	149
10-15 hours	36
16-20 hours	11
24 hours	25
Total	221

Source: NPC-SPUC,2011

Issues for Off-grid Generation



Not addressed in

Common diesel-plant
generation in off-grid areas



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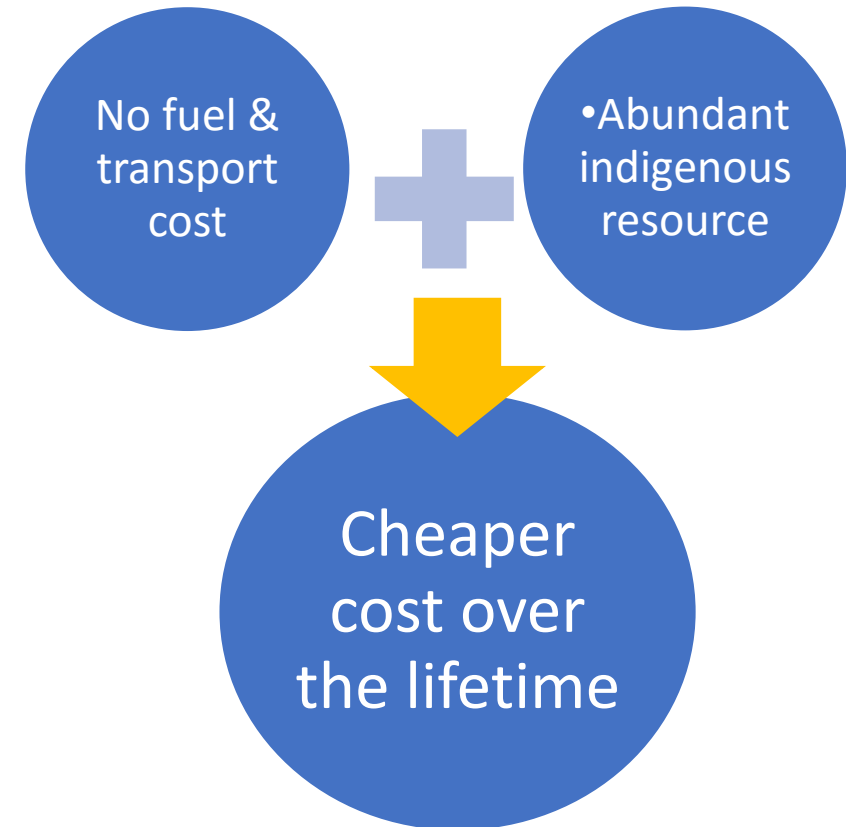
RE & new technologies

Apply in On-grid generation,
but Off-grid?

RE & New Technologies for Off-grid Generation

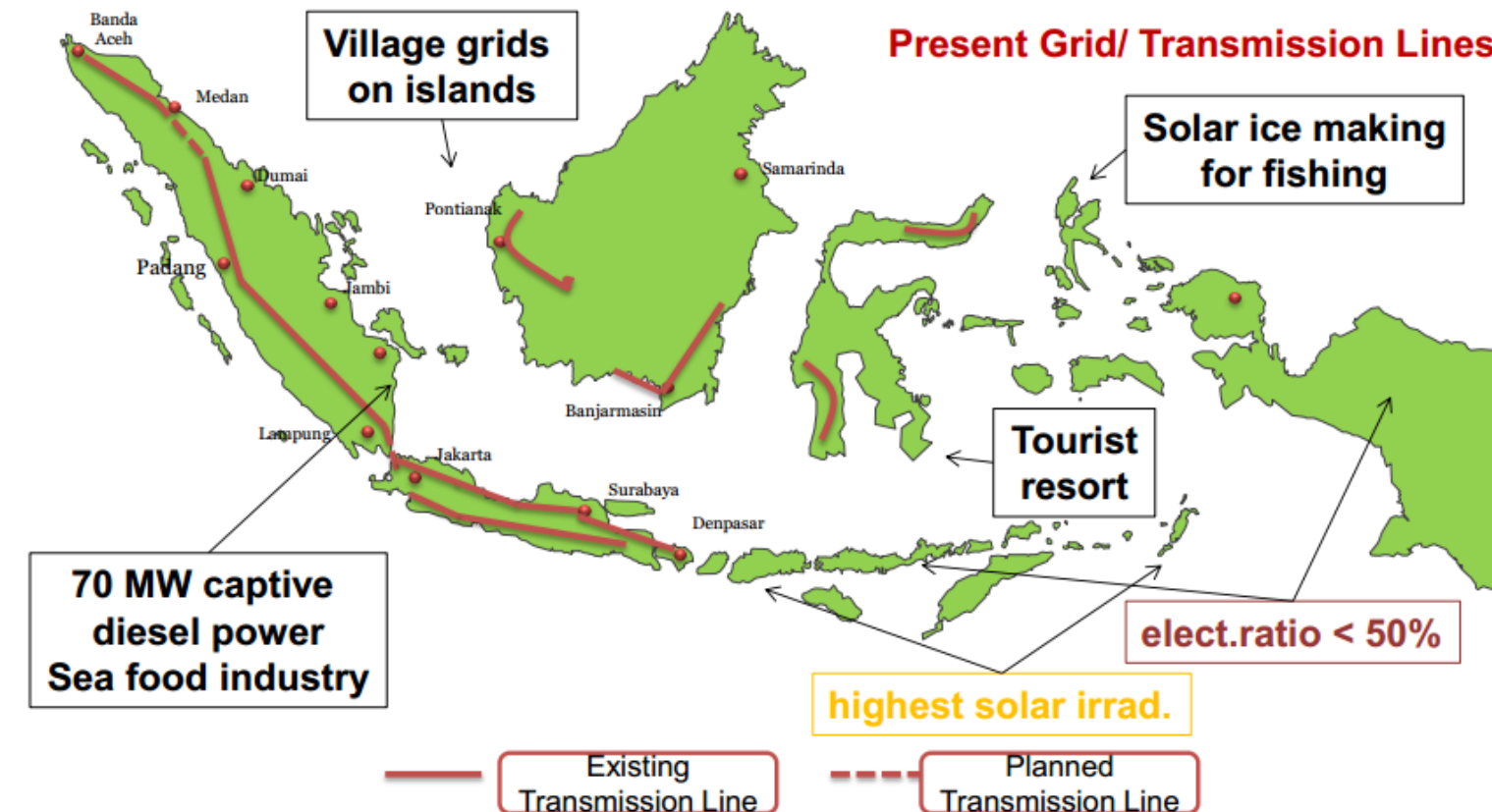
Levelized Cost of Energy Generation Technology

		Levelized Cost of Energy	Carbon Neutral/Rec Potential	State of Technology	Location			Dispatch			
					Distributed	Centralized	Geography	Intermittent	Peaking	Load-Following	Base-load
Alternative Energy	Solar PV	\$46 - 222	✓	Commercial	✓	✓	Universal	✓	✓		
	Solar Thermal	\$199 - 182	✓	Commercial		✓	Varies	✓	✓	✓	
	Fuel Cell	\$106 - 167	?	Emerging/Commercial	✓		Universal				✓
	Micro turbine	\$76 - 89	?	Emerging/Commercial	✓		Universal				✓
	Geothermal	\$79 - 117	✓	Mature		✓	Varies				✓
	Biomass Direct	\$77 - 110	✓	Mature		✓	Universal			✓	✓
	Onshore Wind	\$32 - 62	✓	Mature		✓	Varies	✓			
Conventional Energy	Diesel Reciprocating Engine	\$212 - 281	X	Mature	✓		Universal	✓	✓	✓	✓
	Natural Gas Reciprocating Engine	\$68 - 101	X	Mature	✓		Universal	✓	✓	✓	✓
	Gas Peaking	\$165 - 217	X	Mature	✓	✓	Universal		✓	✓	
	IGCC	\$94 - 210	X	Emerging		✓	Co-located or rural				✓
	Nuclear	\$97 - 136	✓	Mature/ Emerging		✓	Co-located or rural				✓
	Coal	\$60 - 143		Mature		✓	Co-located or rural				✓
	Gas Combined Cycle	\$48 - 78	X	Mature	✓	✓	Universal			✓	✓



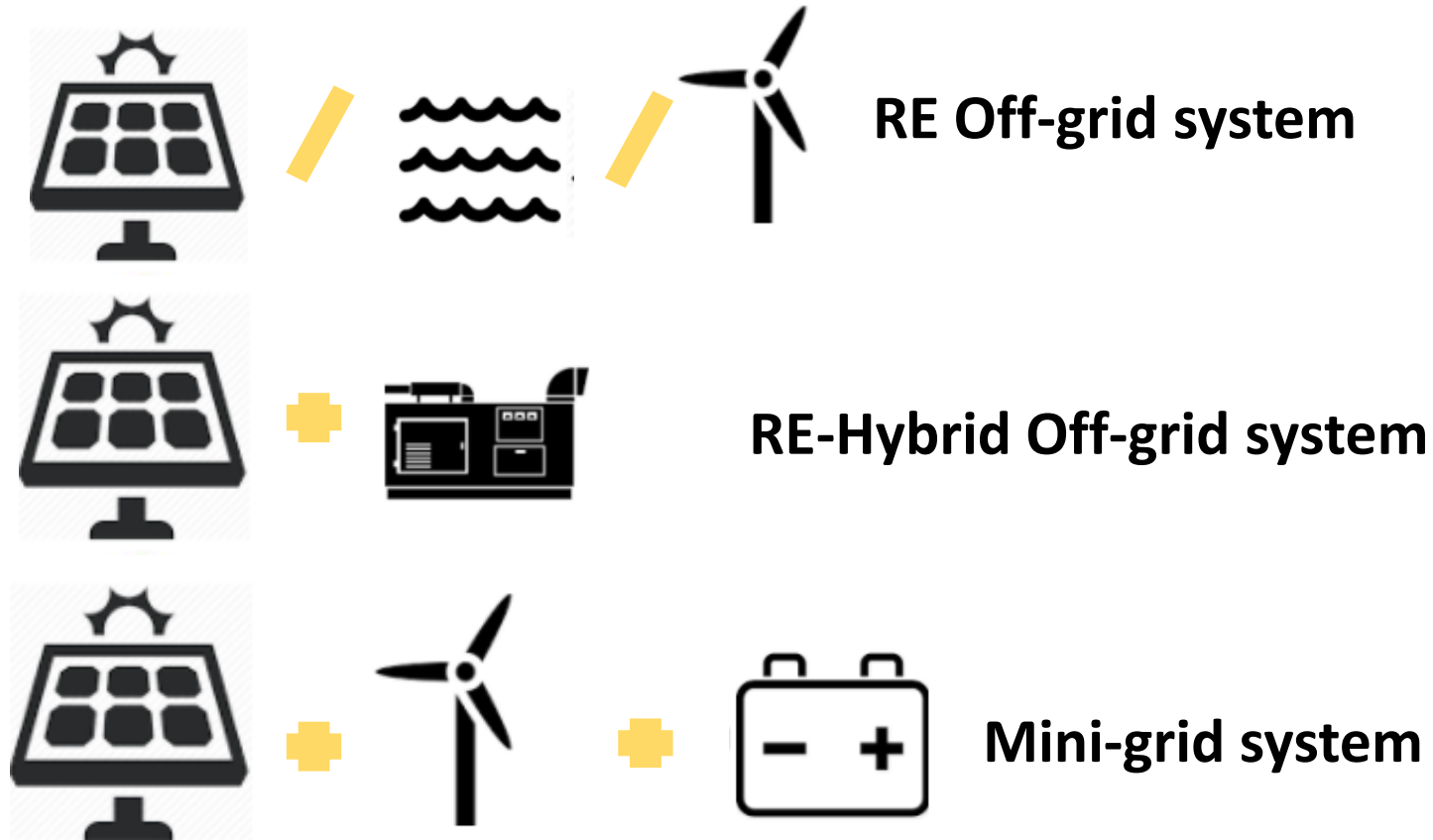
RE & New Technologies for Off-grid Generation

- Huge RE & New technology potential in Off-grid areas



RE & New Technologies for Off-grid Generation

- High Flexibility and Expandability



More Sustainable & Reliable

Opportunities and Challenges

Opportunities

- ❖ Abundant RE and new technology resource to be utilized
- ❖ Huge off-grid market potential to be untapped
- ❖ Commitment to increase RE share in the region

Challenges

- ❖ High investment cost for RE & new technologies
- ❖ Capability in developing RE & new technologies
- ❖ Lack of financing support for RE & new technologies in off-grid electrification
- ❖ No stringent target & rule for RE in off-grid electrification

Conclusion

- There are huge opportunities of utilizing RE & new technologies for fulfilling off-grid demand in islanded communities in ASEAN
- RE & new technologies can be more affordable, reliable, and sustainable solution than fuel-based generation to provide electricity in off-grid areas
- ASEAN should support RE & new technologies for off-grid electrification by establishing target, supporting policies and financing scheme.
- By using RE & new technologies for off-grid electrification it can fulfill off-grid demand while help achieving regional RE target of 23% energy mix in 2025



Thank you.

For more information, please visit our website: www.aseanenergy.org
or email us at secretariat@aseanenergy.org



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