



NTPC Simhadri



Offshore Wind Development in India



NTPC Bhadla



Kayamkulam Floating



NTPC Rojmal

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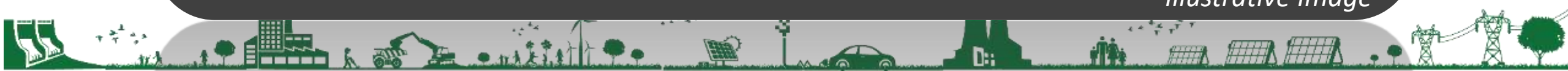
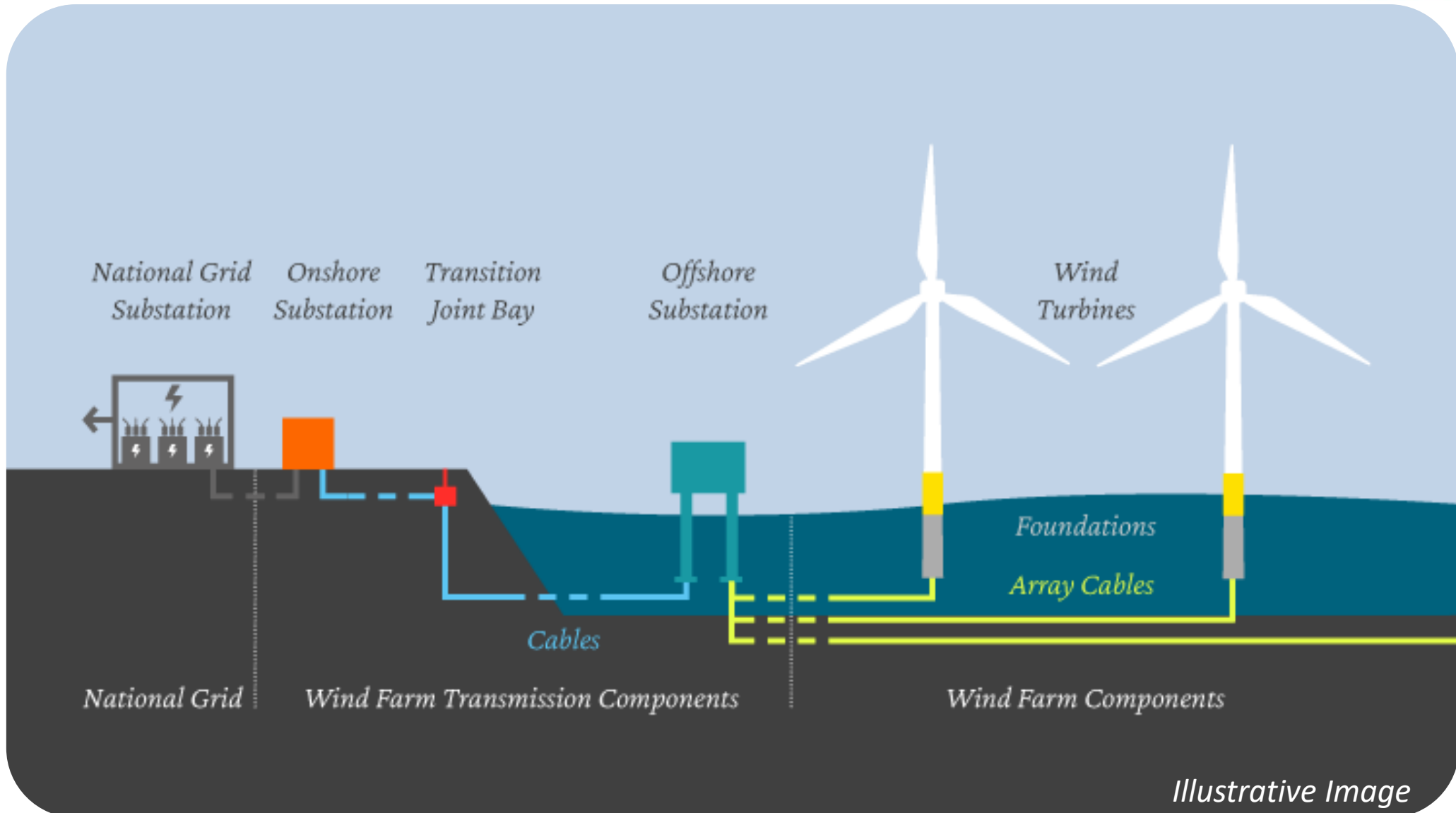
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Offshore Wind Elements



INDIA'S 'PANCHAMRIT' AT COP26

by Prime Minister Narendra Modi

1. Reach non-fossil energy capacity to 500GW by 2030
2. Fulfil 50% energy requirements via RE by 2030
3. Reduce 1 bn carbon emissions by 2030
4. Reduce carbon intensity >45% by 2030
5. Achieve the target of Net-Zero by 2070



India targets 30 GW Offshore Wind by 2030

Advantages of Offshore

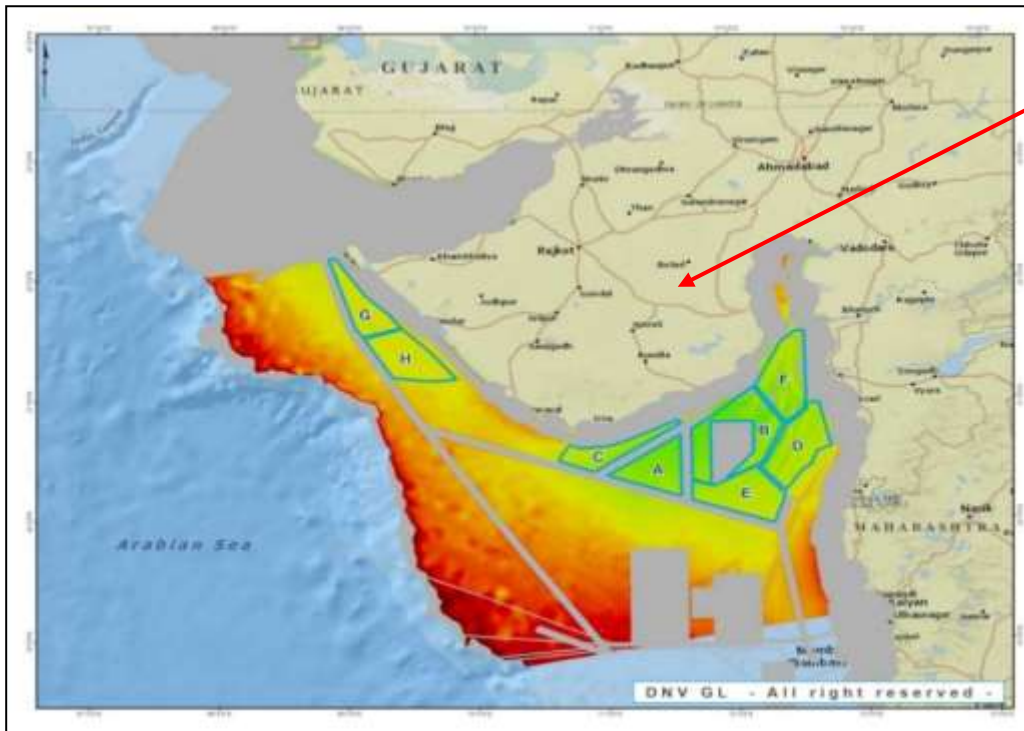
- Complementary RE resource to Solar
- Strong support to RE-RTC
- High PLF
- Green Hydrogen (Higher CUF)

Challenges with Onshore

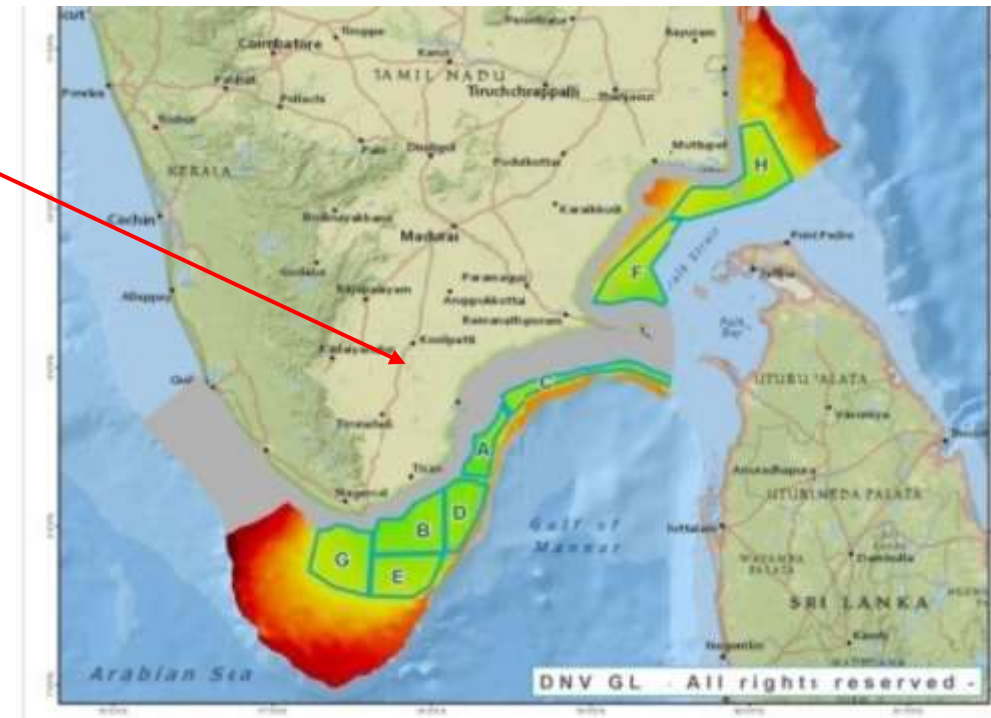
- Land acquisition
- Variable generation profile



Offshore Wind Zones in India



Gujarat

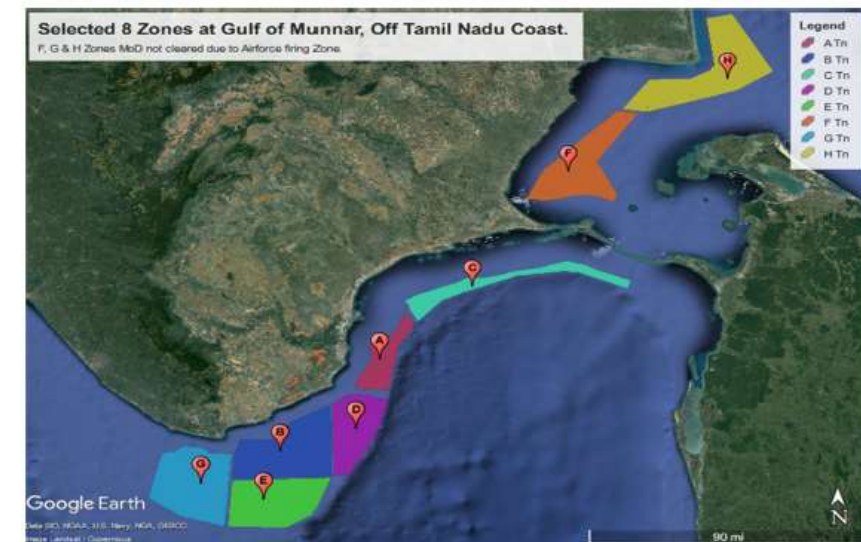
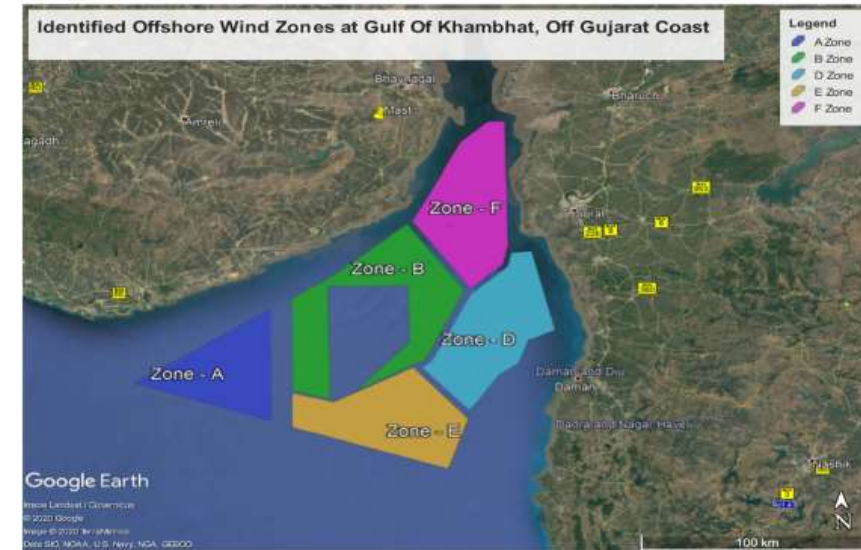


Tamil Nadu



Offshore Wind Potential

	Zone	Area(km2)	Potential Capacity (GW)
Gujarat	A	1921	12
	B	2924	18
	D	2547	15
	E	2503	15
	F	2519	15
			75 GW
Tamil Nadu	A	588	4
	B	1557	9
	C	810	5
	D	1015	6
	E	1316	8
	F	1556	9
	G	1602	10
		Total	51 GW



Progress made by the Nodal Agency (NIWE)



For wind speed measurement LiDAR is installed in Zone B of Gujarat in 2018

NIWE is planning to install 4 more LiDAR in other promising zones (A in GJ , A,B & C in TN)



Models for adoption of Offshore

Model – 1 (1GW)

- Demarcated Zones where studies are carried by NIWE/MNRE
- Phase-1: Gujarat B3 Zone (365 sq.km) for 1 GW

Model 2A & 2B (24 GW)

- **Model 2A** : 2GW Bids in 2024-25
 - Agencies who have carried out studies would be allowed to bid
 - VGF mechanism on pre determined tariff
- **Model 2B**: Own merchant plants

Model – 3 (12 GW)

- Time to Time
- Lease basis (single stage two envelope bidding)

VGF



Preliminary Studies done by NTPC-ONGC



14 MW model	Tamilnadu (210 MW)	Gujarat (210 MW)
Mean Wind Speed (m/s)	10.0	7.8
Gross Energy (GWh/year)	1162.3	749.1
Net Energy* (GWh/year)	961.5	607.7
PLF %(Plant load factor)	52.2	33.0

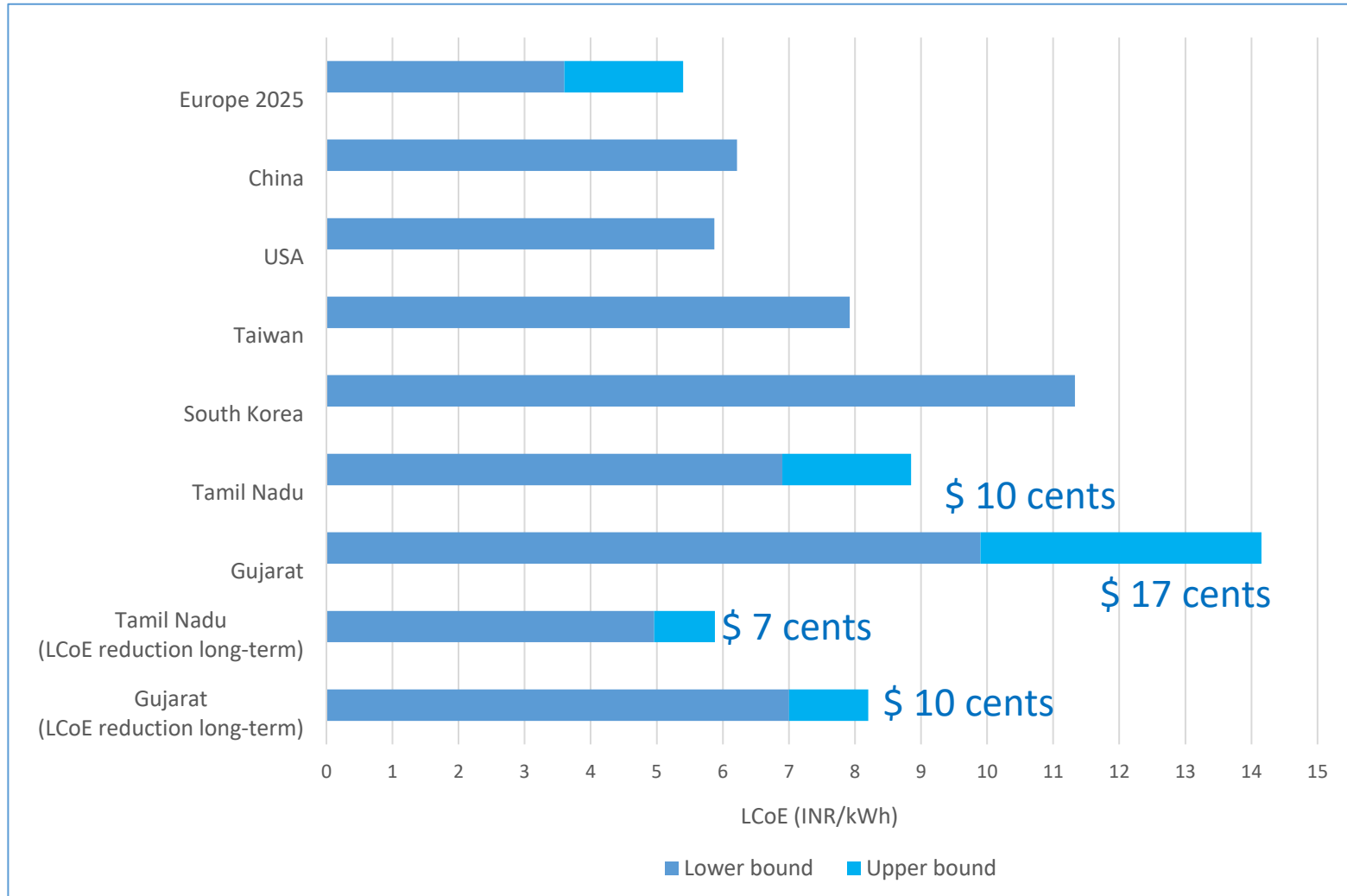
8 MW model	Tamilnadu (200 MW)	Gujarat (200 MW)
Mean Wind Speed (m/s)	9.9	7.6
Gross Energy (GWh/year)	1100.2	649.6
Net Energy* (GWh/year)	891.5	557.1
PLF %(Plant load factor)	50.8	31.3

Sensitivity analyses for Gujarat with customized turbine models

CASES	TURBINE RATING [MW]	ROTOR DIAMETER [M]	HUB HEIGHT [M]	POWER DENSITY [W/M2]	CAPACITY FACTOR (%)
Case 1	8	200	125	255	39.8%
Case 2	10	224	140	255	40.8%



Tariff Comparison vis a vis Others



- ❖ Both TN and GJ presently have LCoEs that are higher than those in mature markets
- ❖ TN (site B) LCoE similar to Taiwan which is an emerging market with high-wind speed sites
- ❖ GJ (site B) LCoE similar to South Korea which is an emerging market with low-wind speed sites
- ❖ TN LCoE can approach Europe LCoEs in the long-term for the high-wind speed sites



Way Forward



Additional Studies Required

Port Readiness Assessment

Environmental impact Assessment

LiDAR measurement

Metocean Study

Geophysical & Geotechnical surveys

Typhoon assessment

Support for Offshore

Viability gap funding

Dedicated green zones on ports/manufacturing facilities

Offshore Wind RPO

Project Development guidelines

Long term offshore wind block auction plan

Fiscal incentives

Exemption of import duties & taxes

Feed In Tariff

Low cost of finance

Single Window Clearance

Offshore electric export system ownership

Onshore Grid infrastructure

Incentives to fishing community



Thank
you !



Power Evacuation for the models

