Vietnam Wind Development Status and Challenges: Finance, Supply Chain Analysis and other Issues

Vietnam Wind 2019

12 June 2019

Wood Mackenzie
POWER & RENEWABLES

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- Over 500 sector-dedicated analysts and consultants globally, including 75 specifically to power and renewables
- Located close to clients and industry contacts

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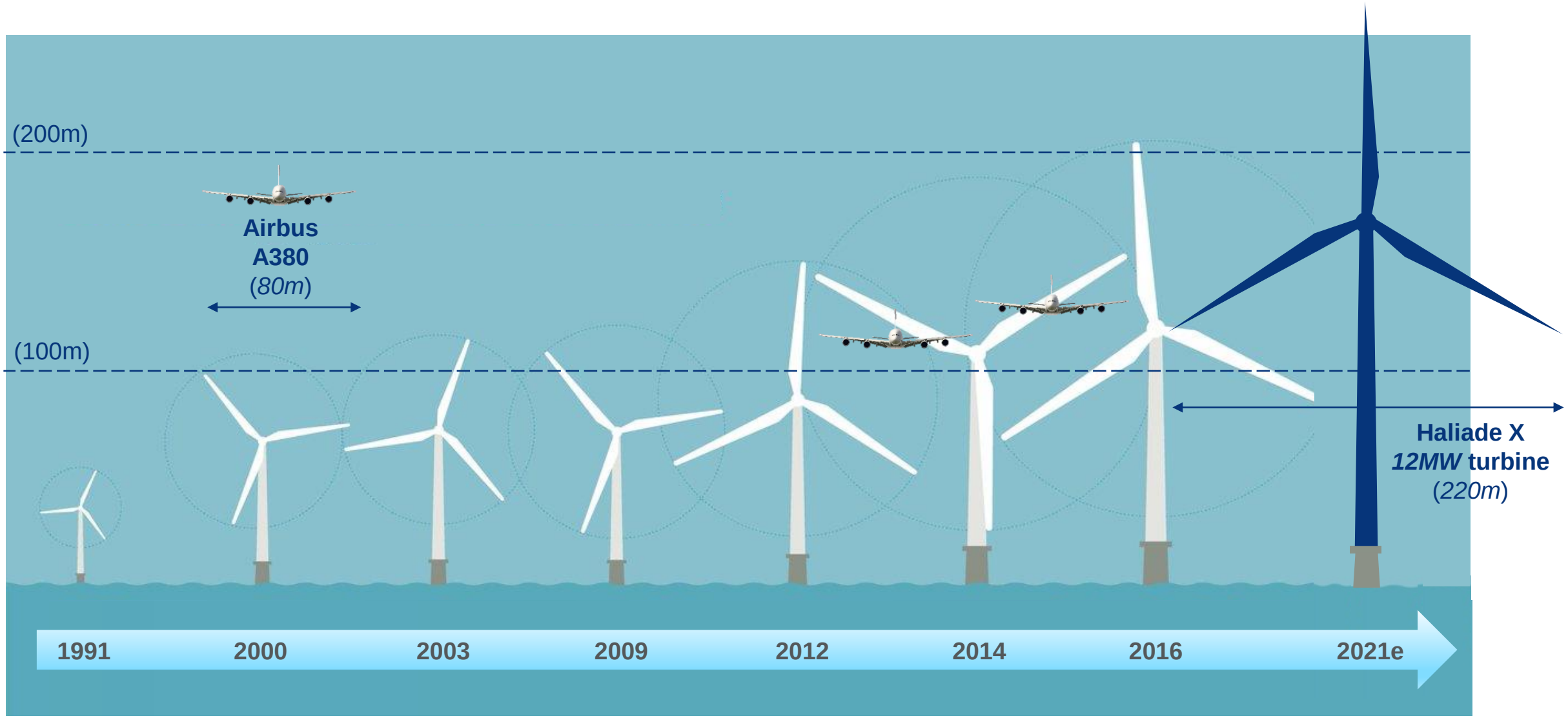
Modern offshore wind power turbines are megastructures

Growth of offshore wind power turbines, 1991-2021e



Source: Internet, Wood Mackenzie

Four fundamental drivers for new supply chain investments

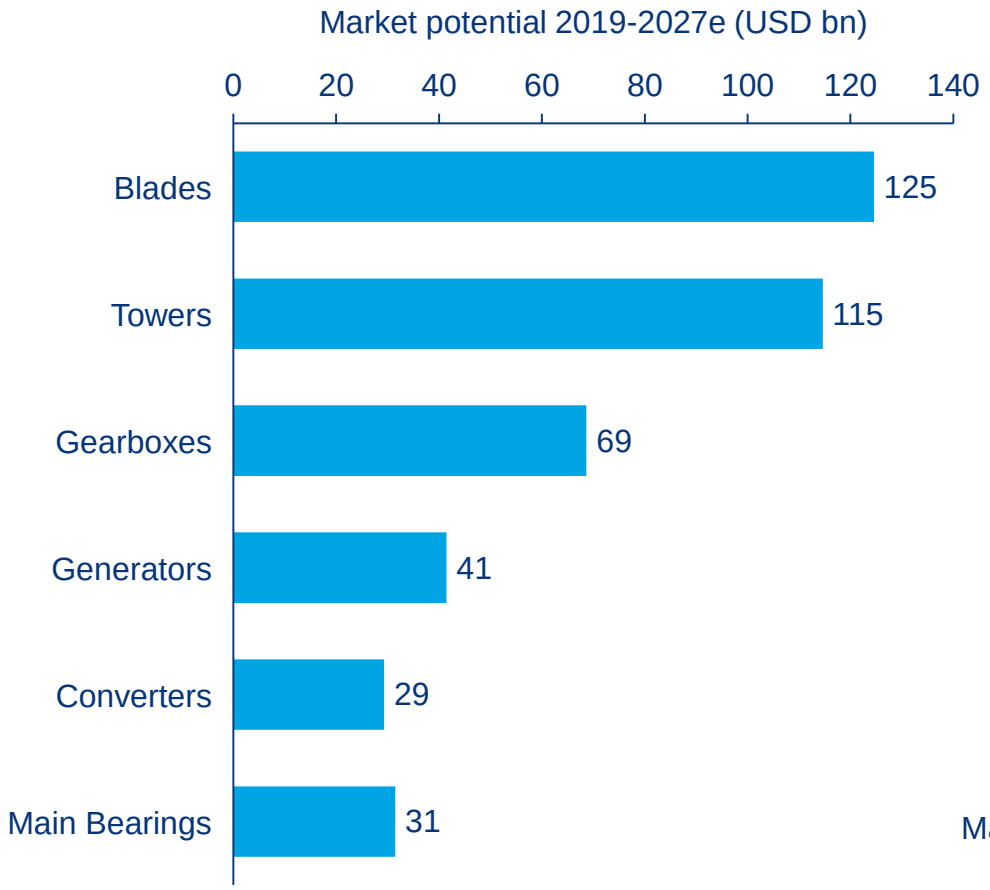
1	Local content policies (LCP)	LCP are attracting new investments, as turbine OEMs and component suppliers queue up these markets to win market share. Examples include Turkey, Russia, Argentina with Vestas, SGRE, Nordex, GRI, Ruselprom, CS Wind, Windar all setting up facilities in those markets
2	Best cost effective countries (APAC)	Supply chain migration to best cost countries is not a new phenomenon, but has intensified as companies further exploit the cost saving and volume potential achieved by relocating production resources into these countries, with an aim to serve both domestic and export markets
3	Demand growth	Growth over the next decade warrants new supply chain investments to comply with LCP and lower landed cost of strategic components Few examples- New investments/expansion in France, China and Taiwan from GE/LM , SGRE , MHI Vestas , MingYang, Sewind, Envision
4	Industry 4.0	To improve the productivity and lower costs, companies will focus on industry 4.0 initiatives such as digitizing existing brownfield sites, exploiting information and communication technologies, mass custom production, and smart automation.

Source: Wood Mackenzie

Global wind demand remains robust with over US $540bn opportunity through 2027

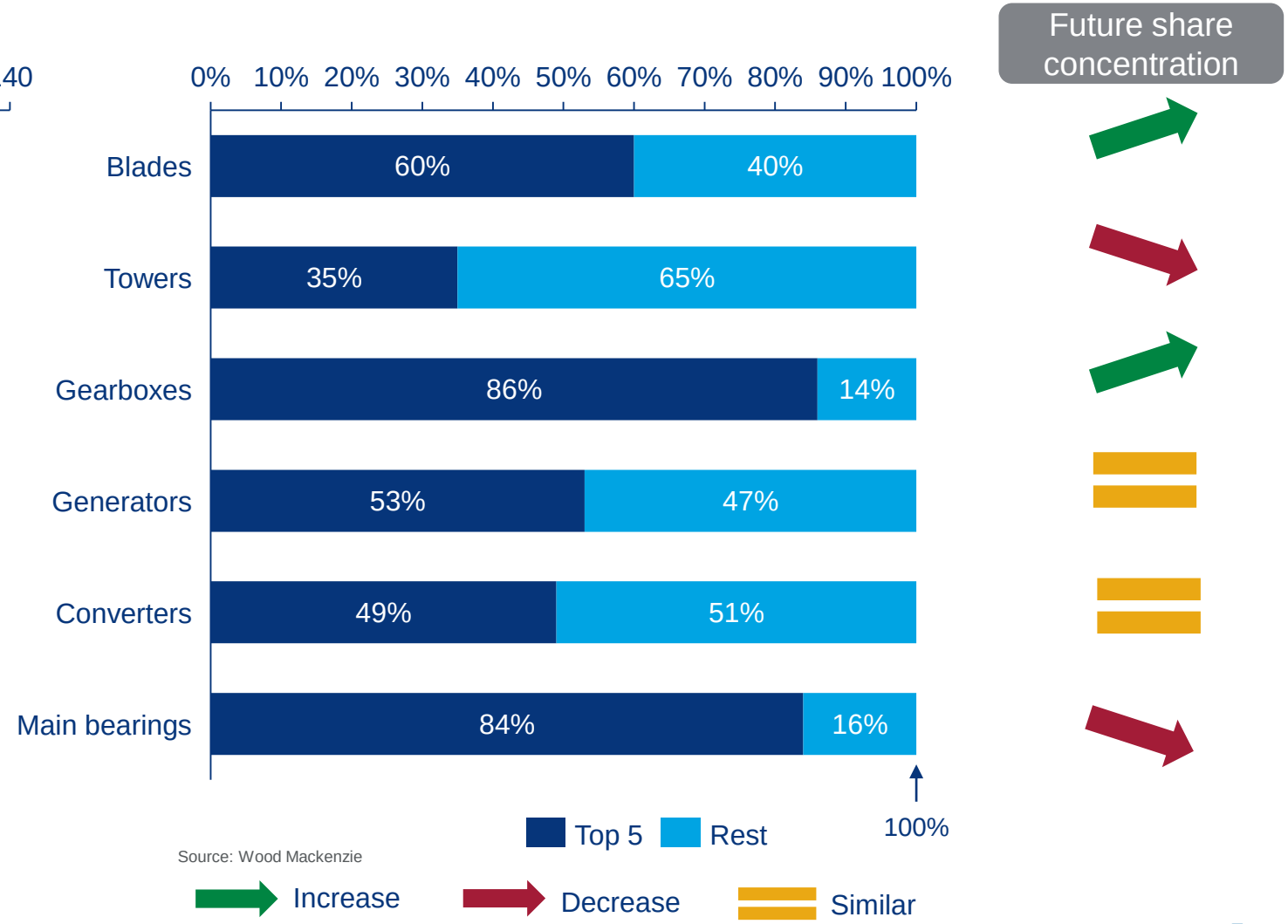
Top line revenue growth assured despite mounting price pressures on turbine supply chain

Market potential for wind supply chain 2018-2027e



Note: The other components like Hub, balance of nacelle contribute to USD 128bn, not listed in the above chart
Source: Wood Mackenzie

Market share split for critical components 2018e



Source: Wood Mackenzie

Vietnam - fast growing emerging market – sustaining momentum will be a challenge

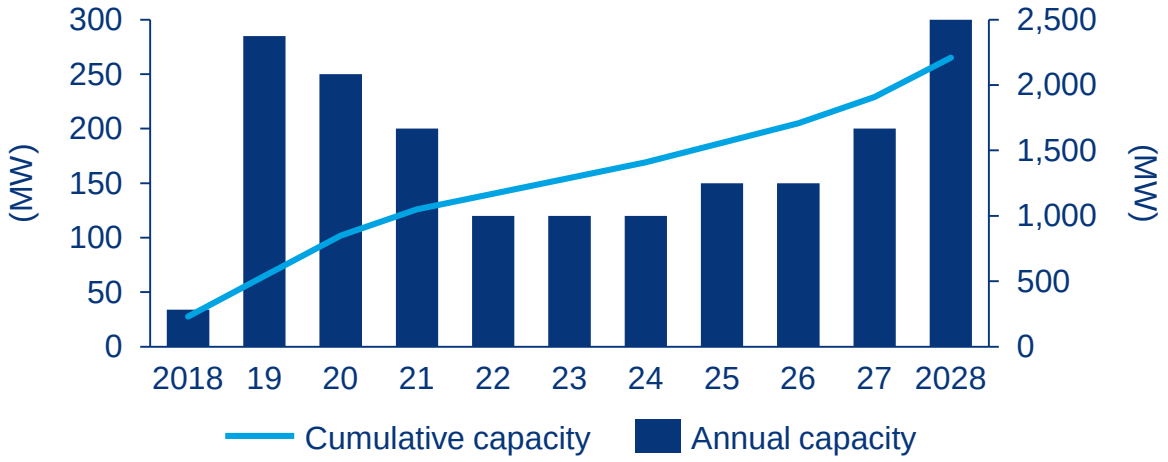
Key facts

Annual installations (2019-2028E)	**120 - 312MW**
Cumulative capacity (by YE/2028)	**2.2GW**
APeC market size rank (2019-2028E)	**6th out of 14**
FITs for onshore wind	**Yes**
Auctions for large-scale onshore wind	**No**
Onshore wind LCOE, 2020	**52 - 112 USD/MWh**
Average electricity tariff, 2018	**76 USD/MWh**
Domestic wind supply chain	**Limited**

Market opportunities and risks/uncertainties

- Wind market is fragmented – many local companies keen to build wind power plants but have no/limited experience.
- Rapid growth has been enabled by attractive FIT combined with lower wind LCOE thus increasing winds' price competitiveness
- Over 17GW of solar applications are creating grid queues for wind projects – as solar applications are requesting grid capacity to be reserved
- Lack of non-recourse long term project financing especially by local banks

Vietnam onshore wind power outlook, 2018-2028



Vietnam's wind power market drivers and barriers

		Short-term (2019-2021)	Mid-term (2022-2024)	Long-term (2025-2028)
Drivers	Growing power demand	●●○	●●●	●●●
	National power plans	●●●	●●○	●○○
	Wind competitiveness	●●○	●●●	●●●
Barriers	Project debt financing	●●●	●●○	●○○
	Grid congestion	●●○	●●●	●●●

Major impact ●●● Some impact ●●○ Less impact ●○○

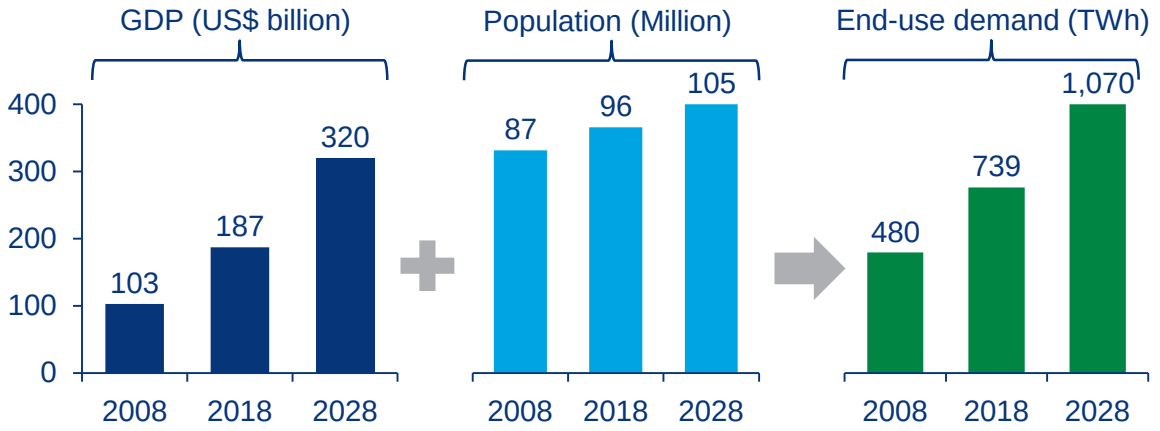
Source: Wood Mackenzie

Power demand growth in Vietnam is amongst the highest in the region

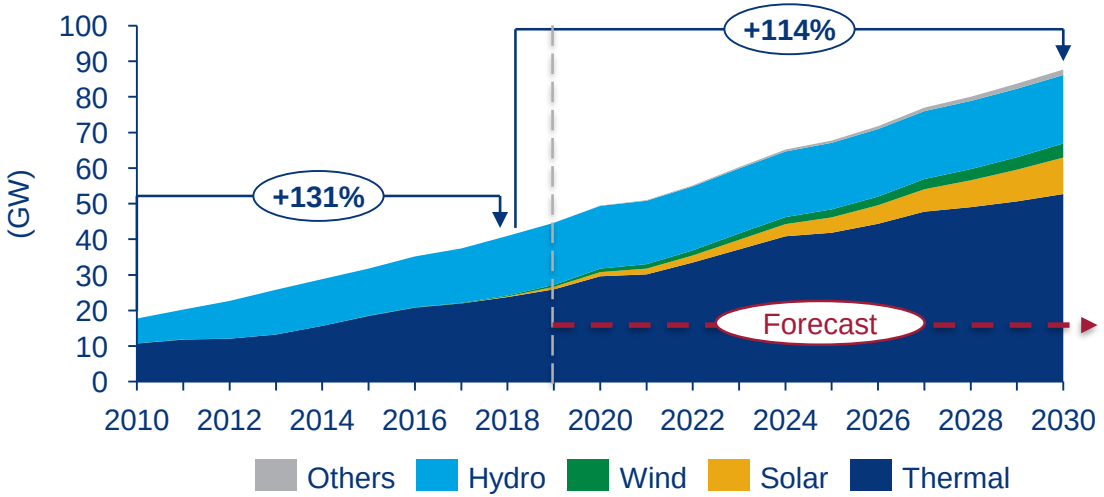
Government is looking at all options to address accelerating power demand to prevent shortages

- Electricity peak demand is growing at 11% per annum
- Low electricity prices has been policy focus with government now exploring more options for rapid power capacity deployment which supports incorporating more renewable energy build out
- Renewables growth is still not fast enough to cater to power demand growth – need to do more for this to happen

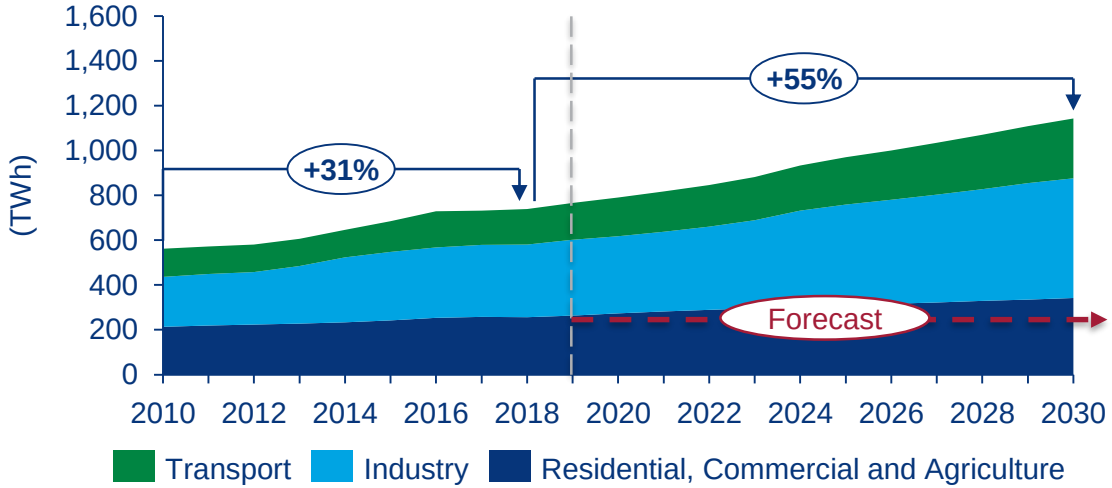
Vietnam macro indicators for end use power demand, 2008-2028



Vietnam cumulative power capacity outlook by fuel, 2018-2030e



Vietnam end use demand flow by sector, 2010-2030



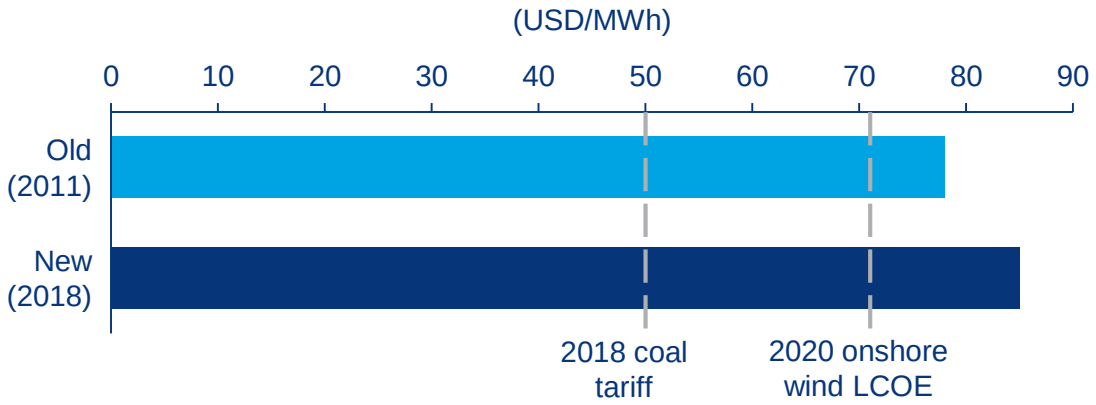
Source: Wood Mackenzie

Aggressive wind targets rely on attractive FIT to kickstart the sector

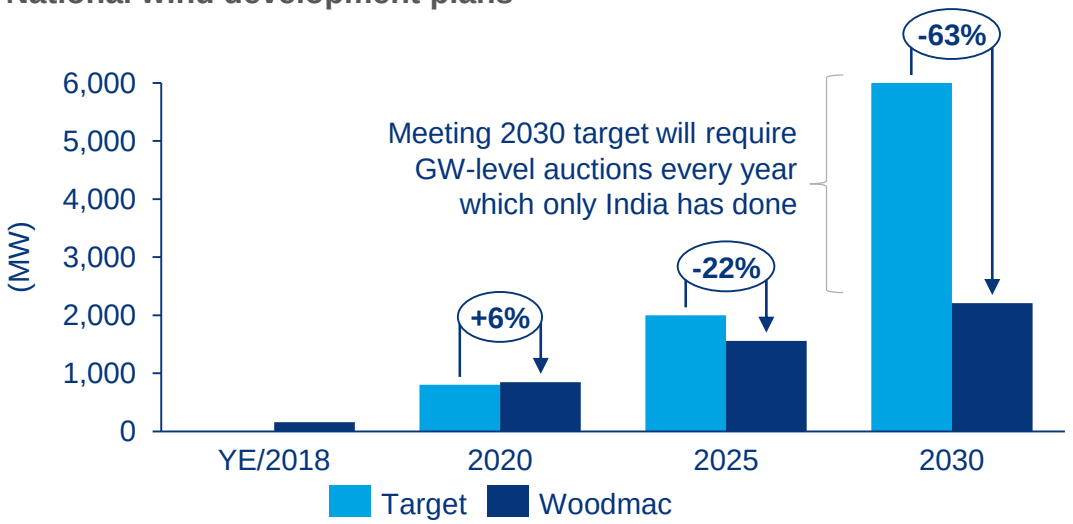
Longer term transition to open power market will enable onshore wind to compete without FIT support

- Current active wind market (e.g. with 0.8GW under construction by YE/2018) has been driven by a 9% upgrade to the existing onshore wind FIT at a time when other markets in the region have shifted to remove FITs for wind power
- The government's decision to increase wind FIT in 2018 (but will expire in 2021) was part of efforts to rapidly add more power capacity
- Vietnam electricity market is currently halfway through a 20 year reform roadmap to move away from a state-owned power market to a competitive market (2006-2014), wholesale market (2015-2020) and eventually a retail market (2021-2023)

Onshore wind FIT rates



National wind development plans



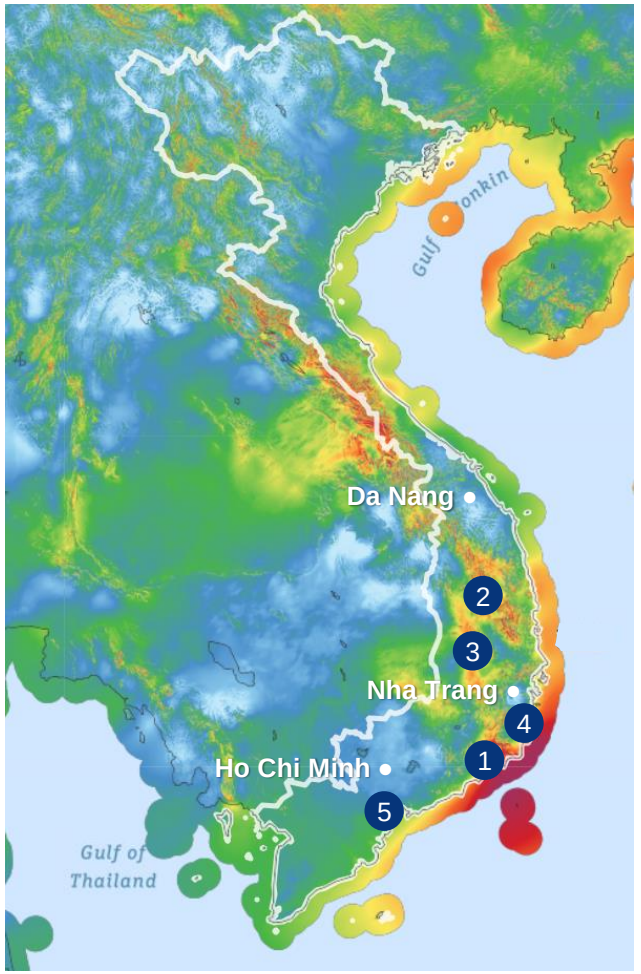
Source: Wood Mackenzie

Transmission and distribution grid investments critical

Large scale onshore wind deployment is targeting southern and central regions

Wind areas requires more grid investments

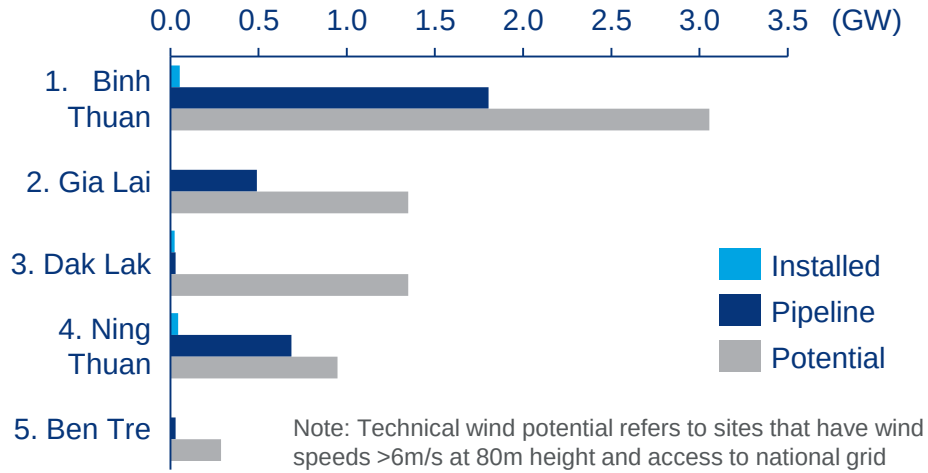
- Development focus in southern and central regions – high wind near near major cities
- Binh Thuan province is targeted as a key wind area given proximity to national grid, potential for large scale development (topography is flat with incline of <5°) with average wind speeds of >6m/s – however grid issues are arising
- Transmission investments for 220kV and 500kV are undertake by National Transmission Corp with distribution lines (>110kV) undertaken by the five national power companies.
- Currently all wind projects are connected via 110kV lines and grid upgrades depends on investments by the national power companies



Wind speed at 100m hub height (m/s)

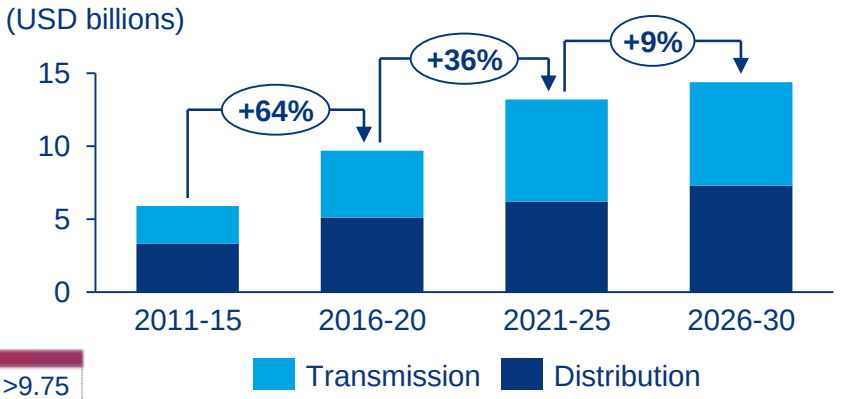
6-6.5	6.5-7.5	7.6-8.5	8.6-9.75	>9.75

Top 5 provinces' technical wind potential and announced pipeline



Note: Technical wind potential refers to sites that have wind speeds >6m/s at 80m height and access to national grid

Planned national investments in grid infrastructure



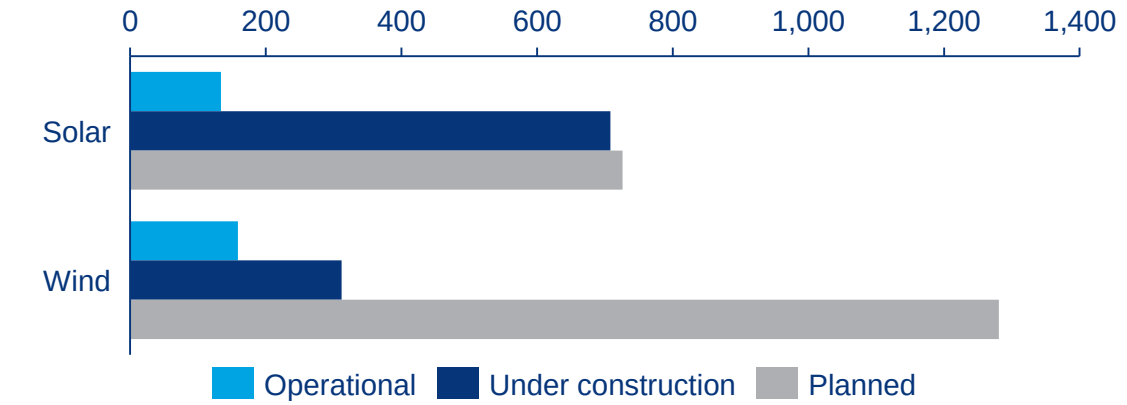
Source: Wood Mackenzie, The Global Wind Atlas (ESMAP)

Surge of renewable projects in short term raises growing risk of curtailment

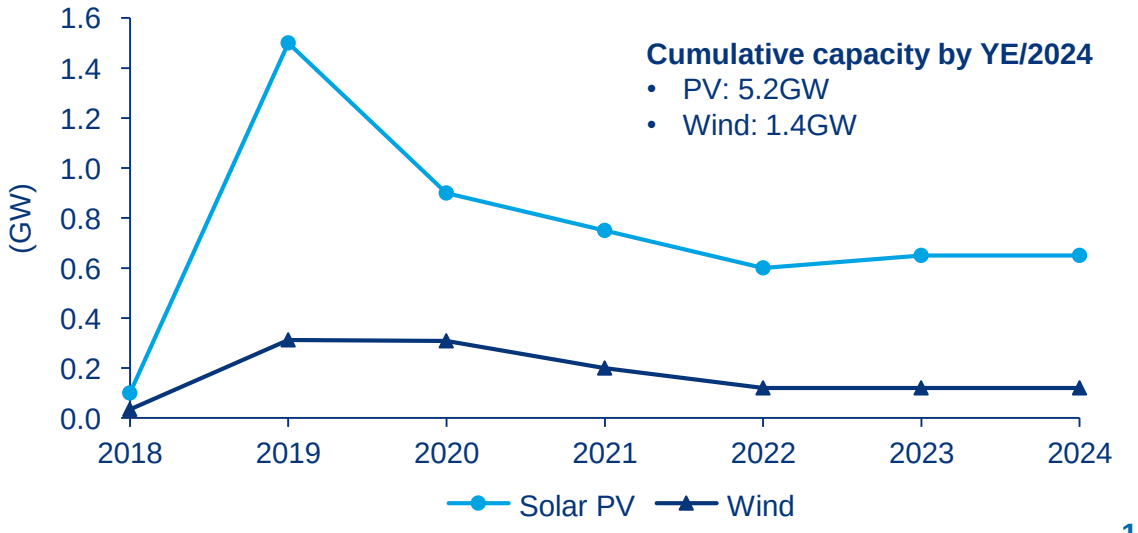
Despite large pipeline for solar PV, expect delays due to haphazard development and limited experience

- Compared to solar PV, onshore wind costs are already competitive with thermal power and there is over 1GW of wind projects in early planning stages (e.g. registered with the government) but most are unlikely to be released as they are being rushed to be completed before wind FITs expire in 2021
- Onshore wind growth will be limited in the long term as surge of new solar and wind power capacity before FIT expiry will result in curtailment especially in southern regions where renewable projects are concentrated
- Without a FIT post-2021 and improvements to PPA bankability, the transition to an auction mechanism (potentially starting in 2020) will be a challenge for developers as local financing is limited for large scale projects

Vietnam solar PV and wind pipeline, YE2018



Vietnam solar PV and onshore wind power outlook, 2018-2024



Note: LNG refers to F-class CCGT. Planned solar projects excludes pre-contract projects (which are over 15GW).
Source: Wood Mackenzie

Summary

- Attractive onshore wind FiT with many new players entering the market
- Growth in wind supported by growth in power demand – government has figured out that renewables can be built in a fraction of the time gas or coal can be built
- Vietnam should not try to impose requirements for high levels of local content – this will increase the cost wind in Vietnam and the market is not large enough to support a stand-alone wind supply chain
- Key challenges in:
  - Grid curtailment – with no compensation for curtailment, developers need to pick sites carefully
  - International project finance – there will be limits as to how much debt can be provided by local banks

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