



# *Inflow of Capital in Indian Renewable Energy Sector*

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IEEFA.org

***Possible US\$500 - \$700 billion investment  
in the coming decade***



# Transition in India's Electricity Sector

**India's Electricity Capacity and Generation (2018/19)**

	--- Capacity ---		-- Generation --		Capacity	Increase
	GW	%	TWh	%	Utilisation	GW yoy
Coal-fired	200.7	56.3%	1,022.3	74.3%	58.7%	3.5
Gas-fired	24.9	7.0%	49.8	3.6%	22.8%	0.0
Diesel-fired	0.6	0.2%	0.1	0.0%	1.9%	-0.2
Large Hydro	45.4	12.7%	134.9	9.8%	34.0%	0.1
Nuclear	6.8	1.9%	37.8	2.7%	63.7%	0.0
Renewables	77.8	21.8%	126.8	9.2%	19.7%	8.6
Bhutan (Import)	n.a	n.a	4.4	0.3%	n.a.	
<b>Total</b>	<b>356.3</b>	<b>100%</b>	<b>1,376.1</b>			<b>12.1</b>
Capitve power	51.4					
<b>Total</b>	<b>407.7</b>	<b>114.4%</b>				

Source: CEA, IEEFA Estimates

**India's Electricity Capacity and Generation (2029/30)**

	--- Capacity ---		-- Generation --		Capacity	Increase
	GW	%	TWh	%	Utilisation	GW vs FY19
Coal-fired	239.8	32.2%	1211.5	51.7%	57.7%	39.1
Gas-fired	24.4	3.3%	53.3	2.3%	25.0%	-0.6
Diesel-fired	0.0	0.0%	0.0	0.0%	0.0%	-0.6
Hydro	63.4	8.5%	183.4	7.8%	33.0%	18.0
Nuclear	11.9	1.6%	74.1	3.2%	71.2%	5.1
Renewables	405.0	54.4%	789.6	33.7%	22.3%	327.2
Bhutan/Nepal	n.a.	n.a.	31.2	n.a		
<b>Total</b>	<b>744.5</b>	<b>100.0%</b>	<b>2,343</b>	<b>98.7%</b>		<b>388.2</b>
Battery Storage	34.0					
Capitve power	51.4					
<b>Total</b>	<b>795.9</b>					

Source: CEA, IEEFA Estimates

Note: National Electricity Plan 2018 plans for 21.5GW hydro imports from neighbouring countries

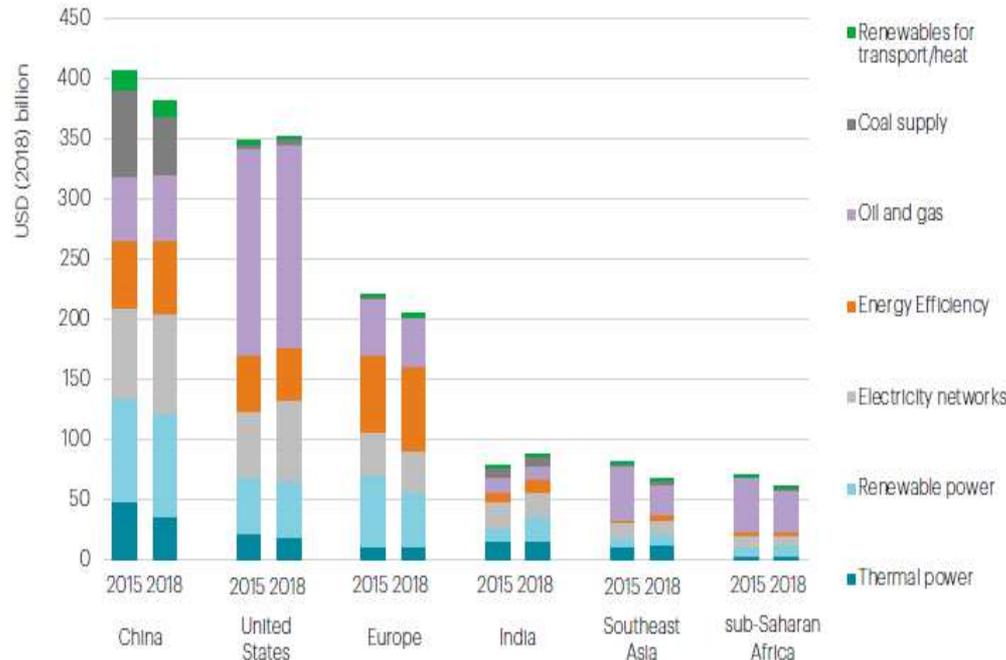
# India's RE Capacity Forecast FY2021/22

(MW)	Installed Capacity as of	Capacity Additions	Estimated Capacity Additions				Total
			FY2018/19	FY2018/19	FY2019/20	FY2020/21	
Utility Scale Solar	26.7	6.5	7.5	11.6	14.0	59.8	
Rooftop Solar	4.4	1.6	2.0	3.0	4.0	12.9	
Wind	35.3	1.7	5.0	6.4	6.4	53.1	
Biomass+Run of River	13.8	0.5	0.5	0.5	0.5	15.3	
Floating Solar				0.1	1.4	1.5	
Hybrid Wind & Solar	0.1			0.4	0.7	1.2	
<b>Total</b>	<b>80.3</b>	<b>10.3</b>	<b>15.0</b>	<b>22.0</b>	<b>27.0</b>	<b>143.8</b>	

# Fastest-growing Energy Market in the World

Investment in India has grown the most over the past three years

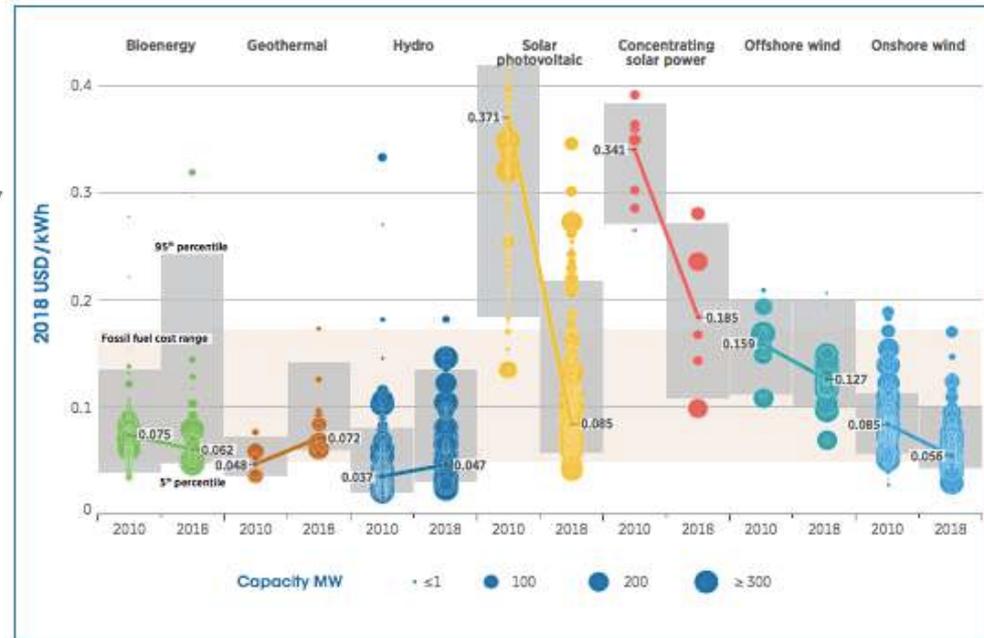
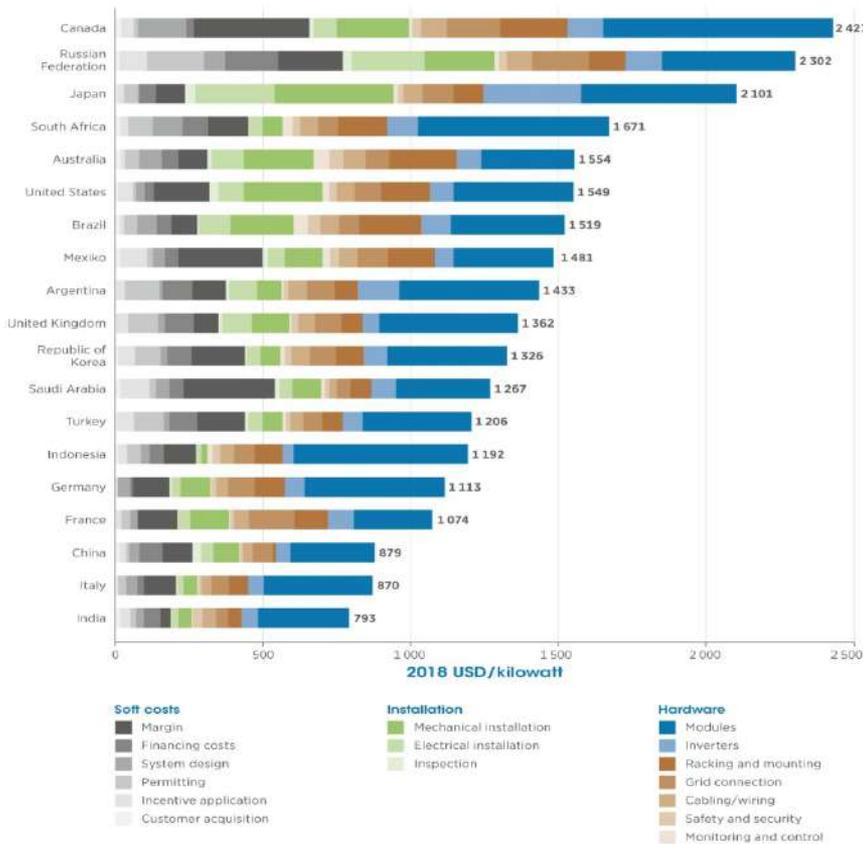
Energy investment by sector in selected markets, 2015 and 2018



- India's investment in the energy sector grew at a rate of 12% in 2018 -- the highest growth rate as compared to any other country, according to the IEA.
- India also led the world in the growth of air conditioner sales in 2018 -- which grew by their largest annual increase with 16% growth to over 175 million units in 2018 -- and also driving down the investment in coal-fired power along with China.
- Grid investment rose by 4%, with one-fifth increase in transmission, however, spending in distribution remained flat
- Coal supply investment in India grew by 5% in 2018, underpinned by policy favouring domestic production while reducing imports as much as possible

# Deflationary LCOE's of Renewable Energy

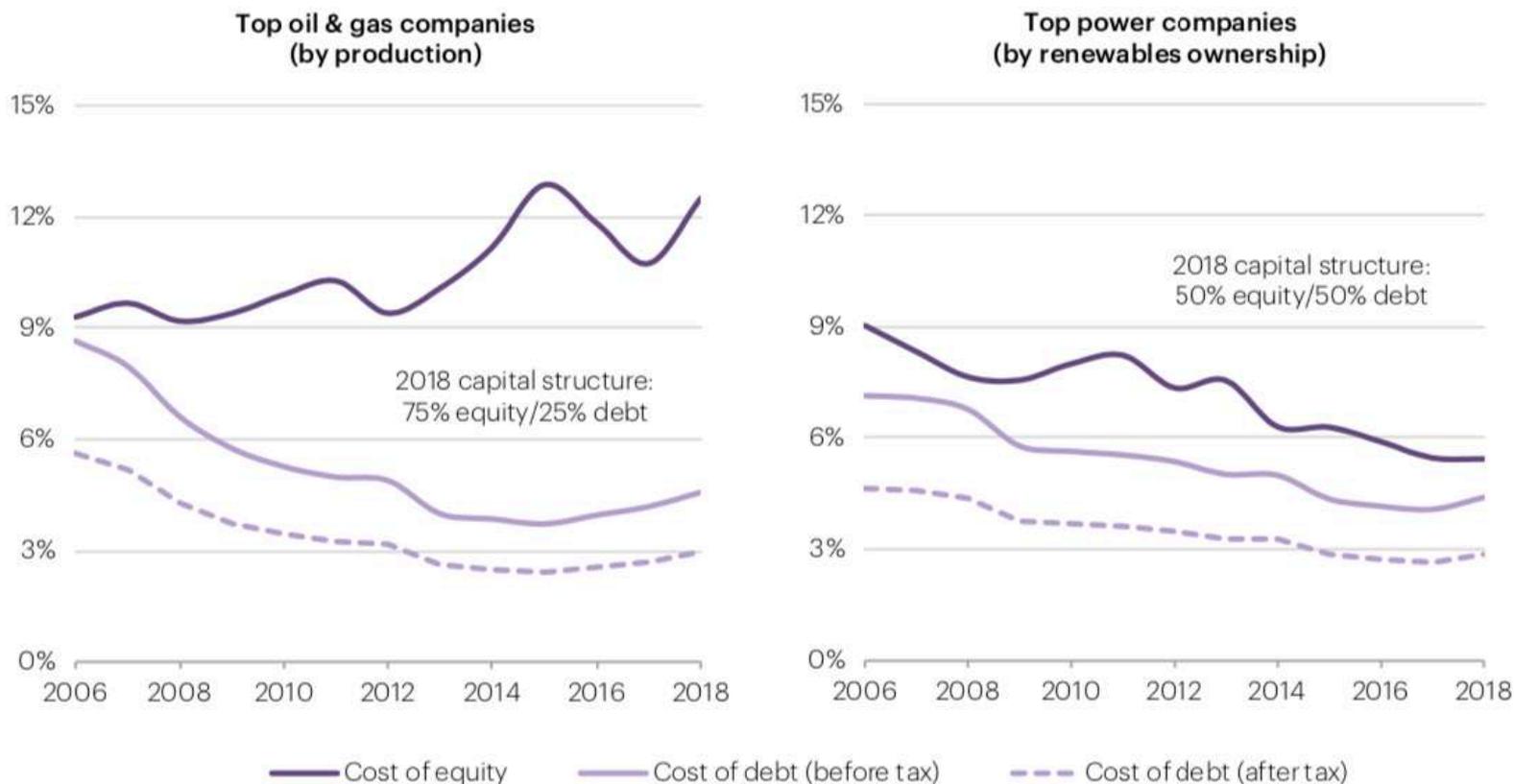
## Total installed costs of utility scale solar in 2018 by component and country - IRENA



- The global weighted-average cost of electricity from all commercially available renewable power generation technologies experienced declines in 2018, with CSP, bioenergy, solar PV and onshore wind experiencing the largest declines.
- The utility-scale solar PV projects commissioned in 2018 had a global-weighted-average LCOE of USD 0.085/kWh, which was around 13% lower than the equivalent figure for 2017. The global weighted-average LCOE of utility-scale solar PV has fallen by 77% between 2010 and 2018.

# Inflow of International Capital

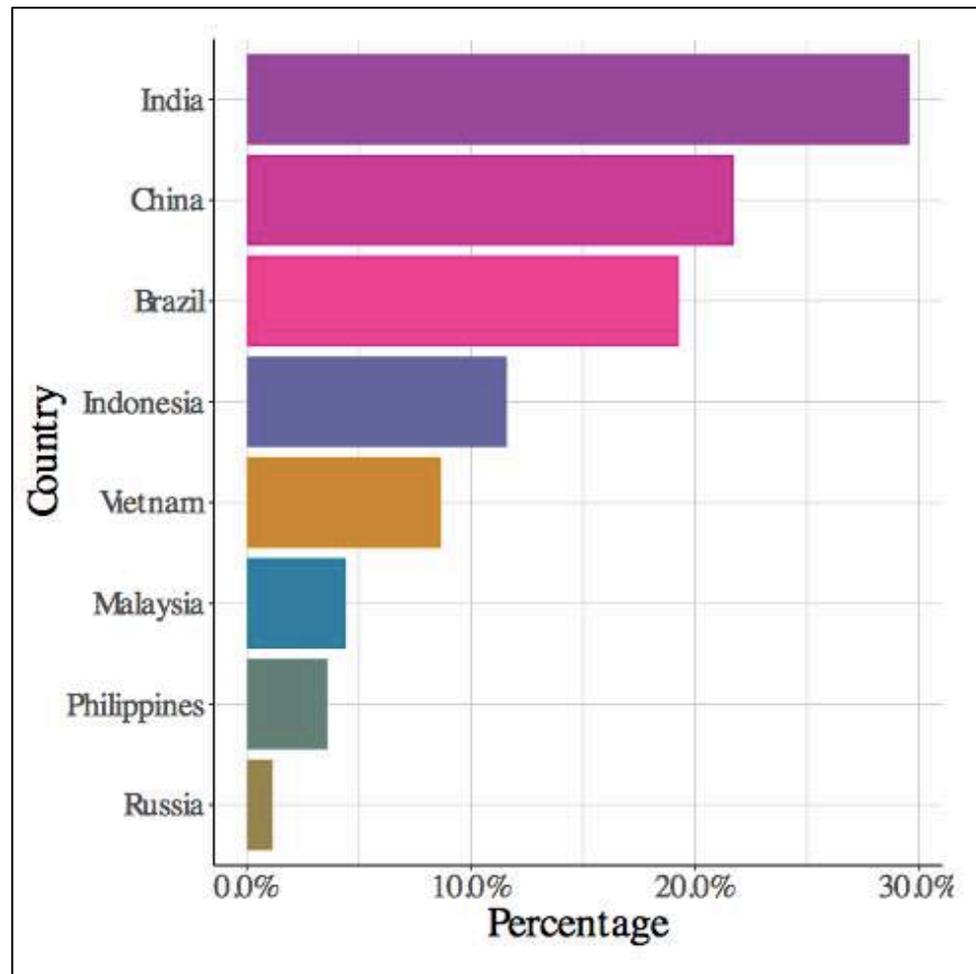
Drivers of weighted average cost of capital (WACC) for listed energy companies



Note: The samples contain the top 25 listed energy companies (in 2018) by oil and gas production and power companies by ownership of solar and wind capacity. Companies based in China and Russia are excluded from the analysis

Source: IEA analysis with calculations based on company data from Thomson Reuters Eikon (2019) and Bloomberg (2019).

# Emerging Markets with the Most Infrastructure Growth Potential in the Next 5 Years



# Renewable Energy Investments by Global Institutional Investors

Buyer	Seller	Acquisition target	Project phase <sup>1</sup>	Total capacity of acquired asset GW	Deal value USD, billions	Investment model	Ownership structure
CPPIB	ENBRIDGE	Renewable energy portfolio (2018)	Non-operating Operating	1.8	1.3	Indirect investment	<ul style="list-style-type: none"> <li>CPPIB (49%)</li> <li>Enbridge (51%)</li> </ul>
	NEXTERA ENERGY	Renewable energy portfolio (2018)	Operating	0.4	0.7	Direct investment	<ul style="list-style-type: none"> <li>CPPIB (100%)</li> </ul>
	ADB	ReNew Power Ventures (2018)	Operating	4.9	0.4	Indirect investment	<ul style="list-style-type: none"> <li>CPPIB (16.2%)</li> <li>GS (48.6%)</li> <li>ADIA, Jera, GEF</li> </ul>
CDPQ	enel	Renewable energy portfolio (2018)	Operating	1.8	1.4	Indirect investment	<ul style="list-style-type: none"> <li>CDPQ and CKD IM (80%)</li> <li>Enel (20%)</li> </ul>
	DONG ENERGY	London Array (2017)	Operating	0.7	1.1	Direct investment	<ul style="list-style-type: none"> <li>CDPQ (25%)</li> <li>E-on (30%)</li> <li>Ørsted (25%)</li> <li>Masdar (20%)</li> </ul>
OMERS	ARCLIGHT	Leeward Renewable Energy (2018)	Non-operating Operating	1.7	Undisclosed	Indirect investment	<ul style="list-style-type: none"> <li>Omers (100%)</li> </ul>
ABP	Capital Dynamics	Renewable energy portfolio (2018)	N/A	1.2	0.4	Fund investment	<ul style="list-style-type: none"> <li>ABP, CalSTRS and ADIA</li> </ul>
	Primary investment	Askalen (2017)	Non-operating	0.3	1.2	Direct investment	<ul style="list-style-type: none"> <li>ABP (100%)</li> </ul>
PFA	Ørsted	Walney Extension (2017)	Non-operating	0.7	1.3	Direct investment	<ul style="list-style-type: none"> <li>PFA (25%)</li> <li>PKA (25%)</li> <li>Ørsted (50%)</li> </ul>
PGGM	EDF	Renewable energy portfolio (2018)	Operating	0.9	Undisclosed	Direct investment	<ul style="list-style-type: none"> <li>PGGM (50%)</li> <li>EDF (50%)</li> </ul>
TEMASEK	Cypress Creek Renewable Energy	Renewable Energy (2018)	Non-operating Operating	0.3	0.7	Indirect investment	<ul style="list-style-type: none"> <li>N/A</li> </ul>
GIC	Greenko	Greenko (2015-2018)	Non-operating Operating	4.5	1.0	Indirect investment	<ul style="list-style-type: none"> <li>GIC (60%)</li> <li>ADIA (15%)</li> <li>Founders (25%)</li> </ul>
ADIA	Capital Dynamics	Renewable energy portfolio (2018)	N/A	1.2	1.2	Fund investment	<ul style="list-style-type: none"> <li>ABP, CalSTRS and ADIA</li> </ul>
	Greenko	Greenko (2015-2018)	Non-operating Operating	4.5	0.3	Indirect investment	<ul style="list-style-type: none"> <li>GIC (60%)</li> <li>ADIA (15%)</li> <li>Founders (25%)</li> </ul>

- Institutional investors are increasingly developing a new asset class for unlisted renewable energy driven by exceptionally low global bond yields, the attractive risk-return-tenor characteristics of the infrastructure market, and the increased maturity of renewable energy technologies.

# Inflow of International Capital



- One of the leading bidders in utility scale solar and wind projects in India, with 3 GW of renewable energy capacity under development in the country
- Masayoshi Son promised to give free solar power to International Solar Alliance (ISA) members post 25-year PPA period
- SoftBank recently invested US\$250m in Ola Electric



SoftBank is expected to make the investment in India's solar power plants through its Vision Fund backed by Saudi Arabia. Photo: PTI

**SoftBank to invest up to \$100 billion in India's solar power sector**

# Inflow of International Capital



Brookfield Asset Management Inc. is an alternative asset management company. It has around \$330bn of assets under management, focusing on real estate, renewable power, infrastructure and private equity.

## Going with the Wind

- Brookfield will acquire Axis Energy's wind farms totalling 210 MW
- Brookfield has made first direct acquisition in renewable energy space in India
- In 2017, it acquired US co SunEdison's unit TerraForm
- This gave Brookfield 300 MW portfolio of renewable assets in India

- With Axis, Brookfield's total renewable portfolio in India is **510 MW**
- Globally, Brookfield has **18,000 MW** of generating capacity & \$47-billion AUM

**Axis Energy Ventures India is the flagship company of Axis Energy Group**

**It has committed to develop 12,500 MW of renewable energy projects by FY22**

**This includes 6,500 MW in Andhra Pradesh**



India is likely to witness investments worth **₹1.1 LAKH CR** in wind energy projects of 14-16 GW over 5 years through 2023  
**CRISIL REPORT**



# Inflow of International Capital

ADIA

جهاز أبوظبي للاستثمار  
Abu Dhabi Investment Authority



GIC



ORIX

Goldman  
Sachs



CPP  
INVESTMENT  
BOARD

- Existing sovereign wealth fund investors **GIC of Singapore and Abu Dhabi Investment Authority (ADIA)** are deploying \$495m in fresh equity funding in **Greenko** to facilitate 2.4GW of storage projects.
- **Goldman Sachs Inc, Canada Pension Plan Investment Board and Abu Dhabi Investment Authority**, the existing investors of **ReNew Power**, are putting in an additional \$300m into the green energy company.
- Japan's **Orix** to buy 874 MW wind energy plants of IL&FS
- The **Japan International Cooperation Agency (JICA)** agreed to loan the Government of India in Delhi \$260m for the Construction of Turga Pumped Hydro Storage

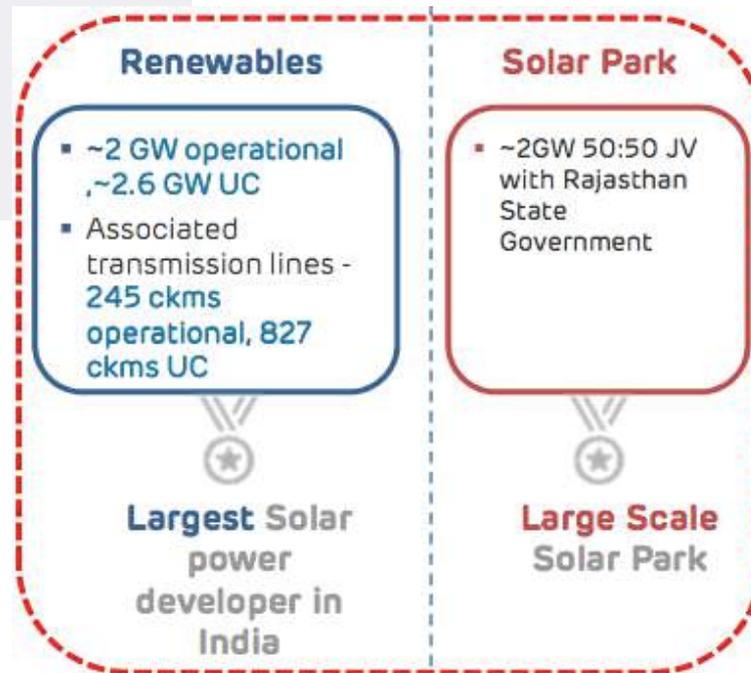
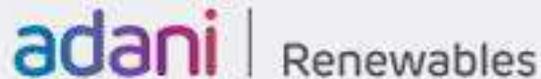
# Inflow of International Capital



- Global energy major **Royal Dutch Shell**, Norway's state utility **Statkraft** and **CLP India (China Light and Power)** have joined the race to buy **Morgan Stanley Infrastructure Partners-owned** wind energy platform **Continuum Wind Energy**.
- Continuum has more than 700 MW of operational wind assets and it has a pipeline of almost 1,700 MW, making it one of the largest portfolios on sale in the market right now.
- Morgan Stanley Infrastructure Partners, which manages more than \$4 billion in assets globally, had invested **\$212 million** in Continuum Wind, founded in 2012.



# Inflow of International Capital



- In July 2018, Adani Green Energy, the renewable power arm of Gautam Adani-controlled Adani Enterprises, began to **raise about \$500-750 million (Rs 3,500-5,000 crore) by selling dollar bonds**, as it plans to refinance its debt and expand its business.
- Adani Green shares started trading from June 18, 2018, and on day one the stock hit the 5% upper limit.

# Inflow of International Capital



- The company's plan, 'Strategic Intent 2025' called for up to **70% of new capacity additions to come from solar, wind and hydro** through to 2025.
- In February 2019, Tata Power Delhi Distribution Ltd (Tata Power-DDL) collaborated with Mitsubishi Corporation and AES India to install **India's first grid-scale battery storage system**.
- Tata Power-DDL is also rolling out smart meters across its network and moving into **electric vehicle (EV) charging with a vision of integrating EV charging and energy storage** with Tata Power's leading rooftop solar position.

# Recent Policy Tailwinds

- ***Recent Surge in Tendering Activity***

Total of 13GW of renewable energy auctioned and tendered during the month June 2019

- ***Removal of Priority Lending Limit***

MNRE recently requested the Reserve Bank of India remove a priority lending limit for the renewable energy sector to allow private banks to lend more to renewable energy infrastructure projects

- ***New Tariff Policy***

The new tariff policy will punish Discoms for unscheduled power cuts, except in the case of technical faults or natural calamities, as power cuts severely impact economic activity

- ***Payment Security Mechanism for Power Generators***

Discoms will now have to open and maintain a line of credit before power is dispatched from the local load dispatch centre.

# Recent Policy Tailwinds (continued)

- ***Status of 'National Significance' For Power Transmission Projects***

The MNRE has invoked special powers to declare transmission projects worth Rs40,000 crore (US\$5.5bn) to be of national importance. These action will facilitate and de-risk more than 66GW of renewable energy projects already under development or planned for the future.

# Mega Battery Manufacturing Tender

- The government of India is likely to soon issue tenders inviting companies to set up 50-GW battery manufacturing base in India at \$50-billion investment with attractive financial incentives.
- Niti Aayog, an Indian government think-tank, will seek proposals from states to identify locations for plants and on providing duty waivers and exemptions to the battery manufacturers. Niti Aayog will have to conclude the bidding in six months from Cabinet approval.
- The states will be asked to reduce state GST, facilitate land acquisition, provide concessional electricity, single-window clearance and environmental clearance.
- The companies will have to set up the manufacturing facilities by 2022, after which they will get the incentives for eight years till 2030.



# Recent Policy Headwinds

- ***Retrospective Changes***

State discoms have repeatedly cancelled already awarded tenders or have forced developers to agree to even lower tariffs

Andhra Pradesh has called for review and renegotiations of legacy renewable energy contracts

- ***Excessively Low Tariff Caps***

In the last 6 to 8 months, a number of tenders have seen a dull response and have been significantly undersubscribed. IEEFA notes developers are viewing the tariff caps as too aggressive, particularly in light of higher policy risks

# Way Forward

## ■ A Green Investment Bank

Alternative Investment Funds (AIFs) could invest in debt securities issued by renewable energy developers with already operational assets.

This essentially reduces the cost of capital, as risk on already operating assets are lower, thus helping developers unlock equity, which could be infused into new projects.

Green Investment Banks have been very successful (and profitable) in mobilising capital in Germany (KfW), Brazil (BNDES), Australia (the [Clean Energy Finance Corp](#)), New York ([NY Green Bank](#)), England (the [Green Investment Bank](#), privatised in 2017 via a sale to Macquarie Group) and New Zealand ([New Zealand Green Investment Finance](#) ).

The bank would also serve as a key knowledge hub to demonstrate financial learnings for the entire sector, drawing on international learnings (particularly for first-of-a-kind projects involving Indian deployment of newer technologies e.g. batteries) while subsequently helping solve financial access issues.

“The constant chaos born out of striving efforts to be a world energy transition leader is far better than the calm of inaction.... ”

# End of Slides..

