Tensions in Japan's Shift to Renewables

27 January, 2022

JAPAN NRG

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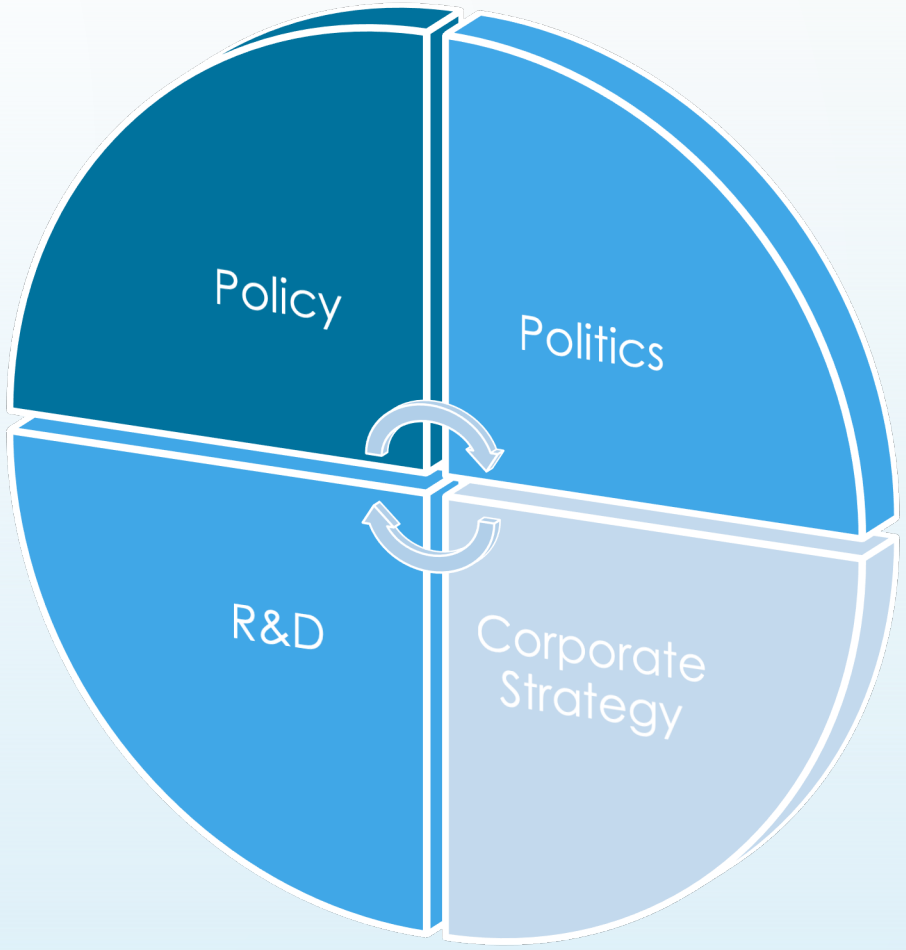
- Japan NRG is a one-stop INTELLIGENCE | ANALYSIS | EVENTS platform focused on the broad energy and electricity markets in Japan
- Independent, pragmatic and holistic information about Japanese energy policies, markets, companies and people
- Also, Japan NRG acts as a community and networking space

Our Perspective

- We are a team of researchers, analysts, consultants and reporters with a broad people network in Japan and globally
- We evaluate the situation around energy and power through four core areas



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POLICY: Japan Supports More Renewables….

- "Japan … is reducing its dependency on nuclear power as much as possible as it aims to **expand renewable energy**." (6th Basic Energy Plan, Oct. 2021)
- "Renewable energy will be introduced **as much as possible**. For this reason, we will **reduce costs**, **secure suitable sites** that can coexist with the local community, and expand the ability to adjust fluctuating output by using storage batteries, etc." (Green Growth Strategy, published Dec. 2020, updated June 2021)

…. But, not exclusively

- "Falls in the prices of renewable energy and gas induce technological innovation for fossil energy and nuclear power and **moves to oppose or co-exist with renewable energy are also emerging**."
- "…at the current time, perfect energy technologies that are economic and decarbonized and can satisfy fluctuating energy demand alone have not been realized. **Competition among technologies has just started**, and the outcome of that competition is still unclear."

(6th Basic Energy Plan, Oct. 2021)

PM Kishida's To-Do List for METI and MoE

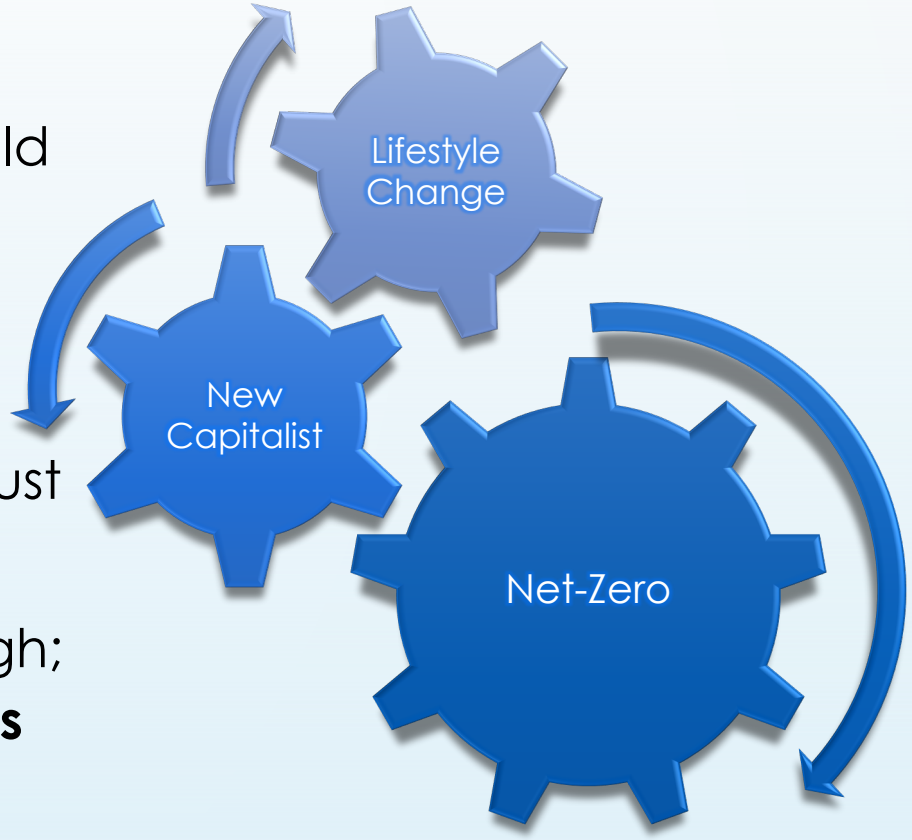
- Power transmission
- Storage batteries
- Renewables
- Hydrogen and ammonia
- Change industrial demand
- Net-zero in local communities
- Lifestyle change
- Financing
- Carbon pricing

Jan. 18, 2022,
Roundtable on Clean Energy Strategy

View from the Top: PM Kishida

Decarbonization is not an isolated process; should be carried out through the prism of New Capitalism:

- Energy must be **inexpensive** and **stable**
- Public & Private **investment** in net-zero tech must **double**
- Changing energy supply structure is not enough; Also **revamp of industrial structures** and **regions**
- **Lifestyle change** mentioned 3 times in short speech



(Jan. 18, 2022, Roundtable discussion on the "Clean Energy Strategy" at the PM's official residence)

METI Stance: Cautious or Hands-Off?

KUME Takashi, Director at METI's Policy Planning and Coordination Division

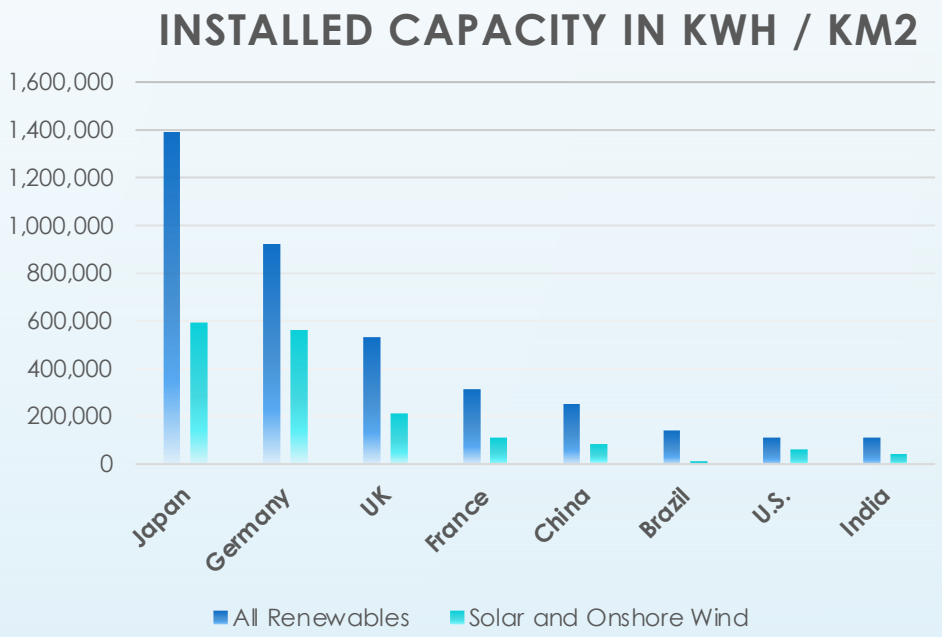
- Over the next decade, the govt. is relying on solar to hit net-zero targets; PV capacity must double (from ~56 GW)
- But, some residents are weary; Operators must give "proper explanation of projects to local communities"
- National govt. cannot force municipalities to accept solar; It can ask them to "discuss the matter carefully"
- Drivers: Solar promotion areas (MoE), zero-carbon cities
- Also, new "space": airports, schools, public buildings, construction of new homes

Nation Policy Vs Local Reality = Rising Tensions

- Land space constraints
- Expensive/unavailable grid connection
- Curtailments
- Rising material prices
- Uncertainty on future tariffs
- Rising inflation

Land Availability Leads to …

- In terms of installed PV capacity per capita, Japan is second (438 Wp per capita) only to Germany (554 Wp) (World Bank, June 2020)
- Japan is top when PV is combined with onshore wind (METI, March 2021)
- When comparing flat land surfaces only, Japan has the highest solar-panel cover density among major countries; twice that of Germany



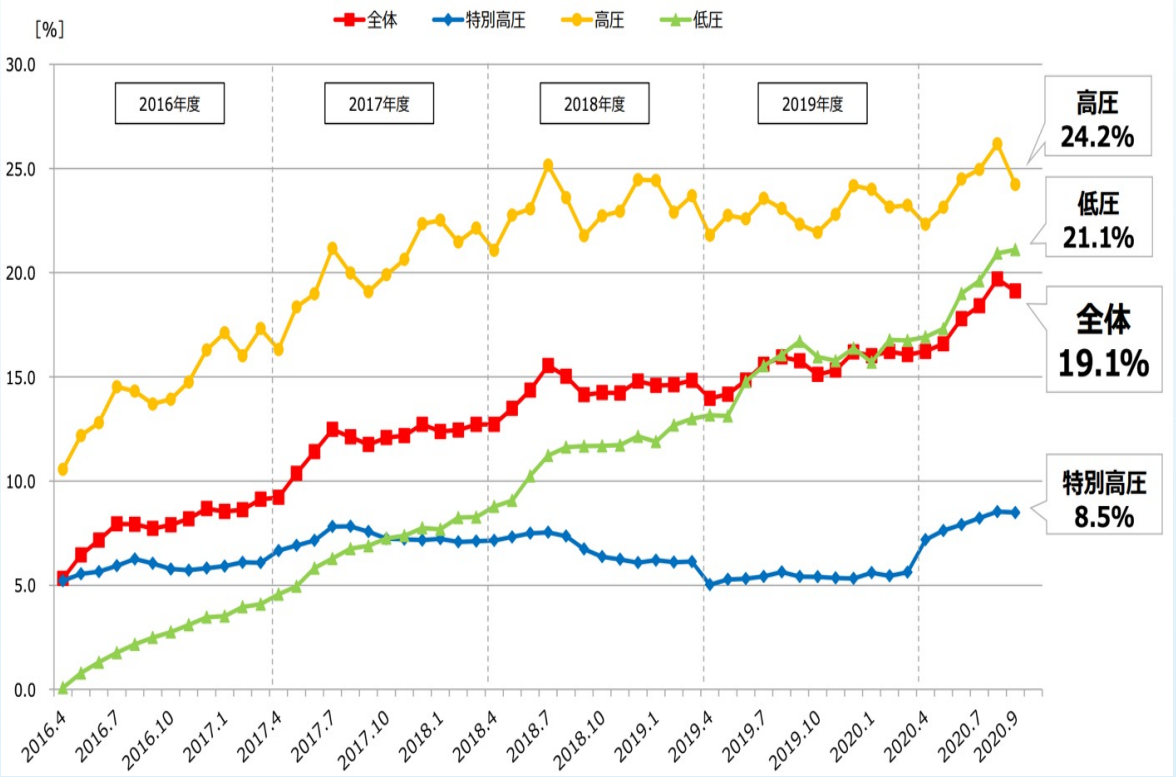
Source: METI, March 2021

… Solar and Wind No-Go Zones

- Yufu City, Oita prefecture, is a popular tourist destination. The city became Japan's first municipality to pass an **ordinance to limit development of utility solar** in January 2014, less than 2 years after the FIT program began
- Nearly **150 local governments** – including three prefectures, and 145 cities and towns – have followed Yufu's example
- This month, a town in western Japan passed an ordinance that will introduce a **tax on the area taken up by solar panels**

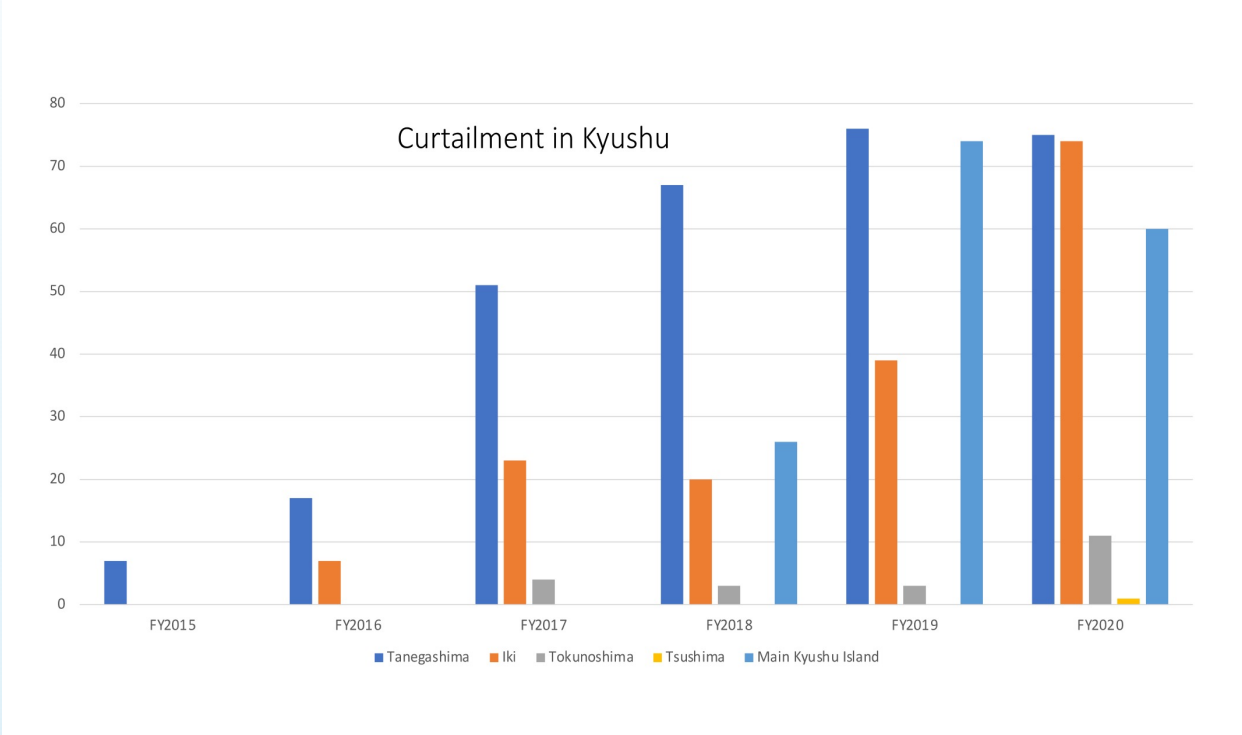
Dichotomy in Power Asset Ownership Leads to…

- Five years after the power market was fully liberalized, "regional" utilities control 80% of market and maintain an asset base heavily weighted to thermal and nuclear
- New market entrants largely focus on renewable energy, but no single company has yet to assemble at least 1 GW of capacity



… Increasing Rates of Curtailment

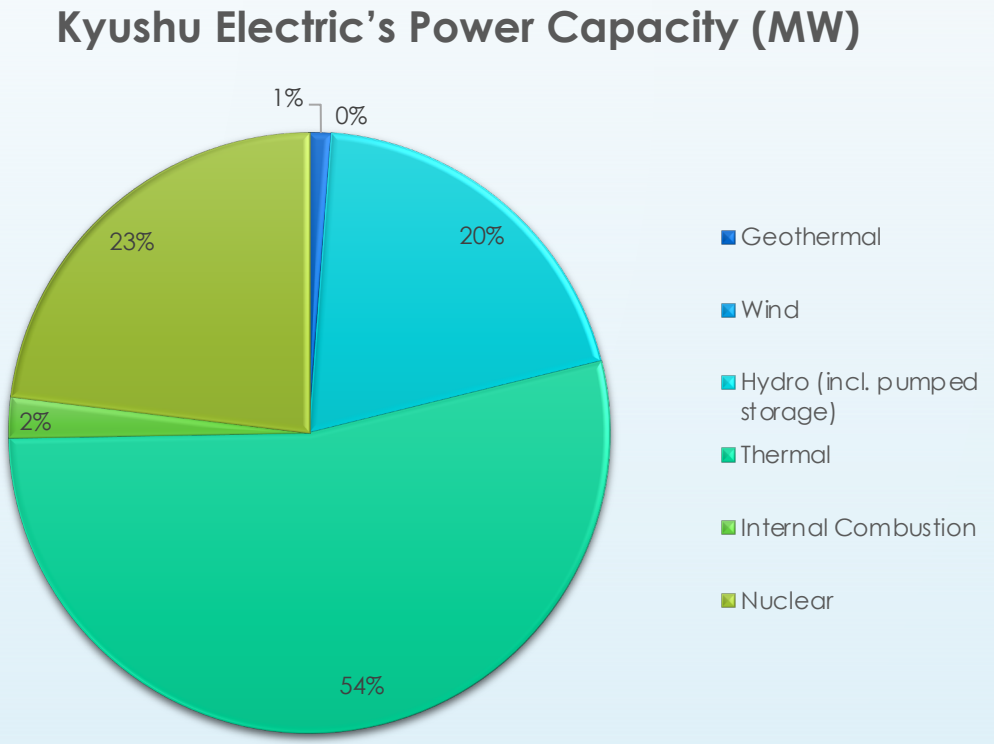
- Up to **5.2%** of Kyushu region's renewables output will be curtailed next fiscal year
- Curtailment issue is due to spread to **four more regions** including both Hokkaido and Okinawa (which heavily rely on coal-fired generation)



Source: METI

Example: Kyushu Region

- The Kyushu region has 10.88 GW of solar and wind power generation connected to the grid (FY2021).
- The dominant utility in the region, Kyushu Electric, has 17.91 GW of total capacity. Of which: 1 wind facility (250 kW). Renewables are 21% of total, but most are hydro.
- Kyushu Electric plans to add ~2.7 GW of renewables over the next 10 years. Mainly in offshore wind and biomass.



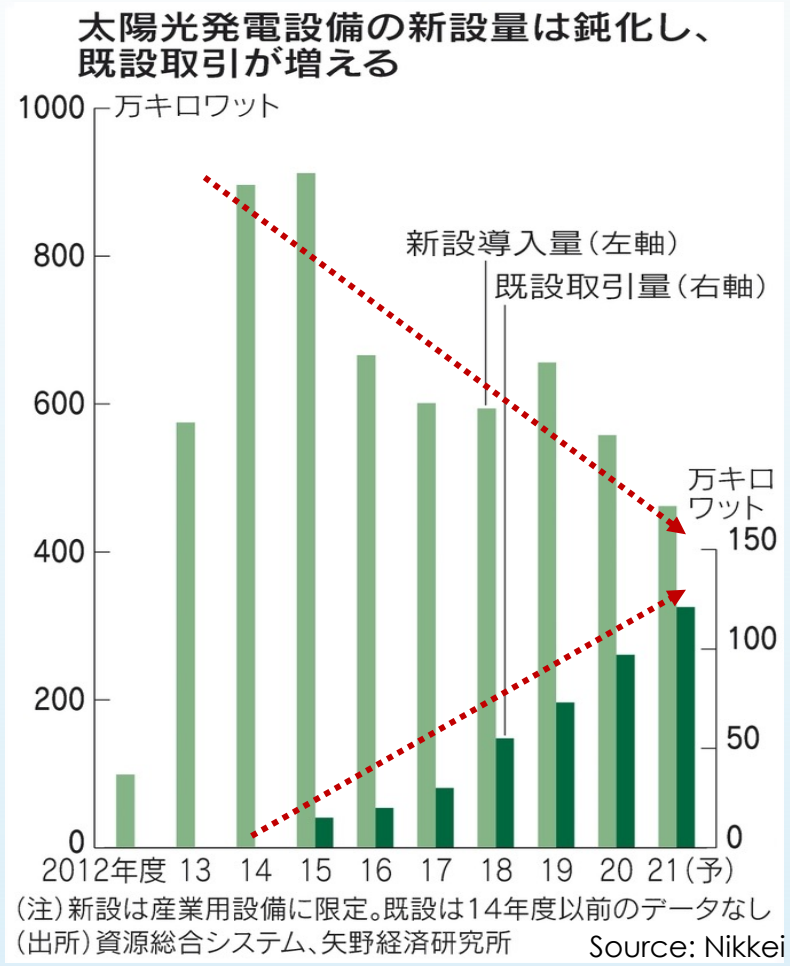
Source: Kyushu Electric

Push to Lower Solar Prices…

- The solar auction prices have dropped to ¥10.31/ kWh in the latest (10th) round of bids for commercial solar power capacity with an output of 250 kW or more, based on the FIT
- Close to 243 MW of capacity was auctioned in November 2021

…Make Older Assets Attractive

- Drawing some capital away from new build



Source: Nikkei

… Make the Economics of New Solar Tough

- Japan already has among the highest CAPEX for solar due to land cost, regulatory process, and banks favoring "blue chip" borrows
- Rising material costs and the weakening yen
- Cost declines are seen as unlikely over next two years

TABLE 2.3: CAPEX FOR A UTILITY-SCALE PV POWER PLANT VALUE FOR 19 SELECTED COUNTRIES IN 2018

Country Name	CAPEX [$/kWp]	Country Name	CAPEX [$/kWp]
Canada	2,427	Republic of Korea	1,326
Russia	2,302	Saudi Arabia	1,267
Japan	2,101	Turkey	1,206
South Africa	1,671	Indonesia	1,192
Australia	1,554	Germany	1,113
United States	1,549	France	1,074
Brazil	1,519	China	879
Mexico	1,541	Italy	870
Argentina	1,433	India	794
United Kingdom	1,362	Global Weighted Average	1,210

Source: IRENA [17].

Push to Lower Wind Prices…

- First three fixed-bottom offshore wind tenders all went to groups led by Mitsubishi Corp and a unit of Chubu Electric
- Winning price as low as ¥11.99/ kWh, said to be considerably lower (as much as ¥5) than rivals
- Consolidation of 1.7 GW of projects in one group may lower supply chain costs, improve project management and communication with govt.
- Govt. also due to start streamlined local and environmental assessment process

… Meets with Industry Pushback

- Major Japanese power firms and experienced European wind operators felt snubbed, and some appealed to METI to reconsider the tender rules – which **could delay future auctions**
- All three winning tenders will install the same wind turbine (GE's Haliade-X) – which does not support the building of a broad supply chain
- One-winner approach may be a **gamble** that ignores "existing systems or consensus" (*Prof. Yamaka Kimio, Kyoto University*) – which may make low prices less of a factor in future tenders
- A test project in almost the same Akita area as Mitsubishi won for ¥11.99 was awarded in early 2020 to a Marubeni-led group for ¥36/ kWh

Conclusion

PM Kishida talked about changing industrial structures to decarbonize. This will apply as much to which **companies** drive the expansion of renewables supply as promoting change to demand patterns (i.e. dynamic pricing). If EPCos do not join the "green" revolution, power market may be split into two competing sides.

Individuals and **local governments** also need greater motivation to support the shift to renewables without raising the base cost of green electricity.

Hybrid systems combining solar, wind, energy, batteries and hydrogen, as well as gas and other generation types may drive future development.