

JAPAN ELECTRICITY MARKET AND THE ROLE OF RENEWABLES

ENERGY TRANSPARENCY 2013

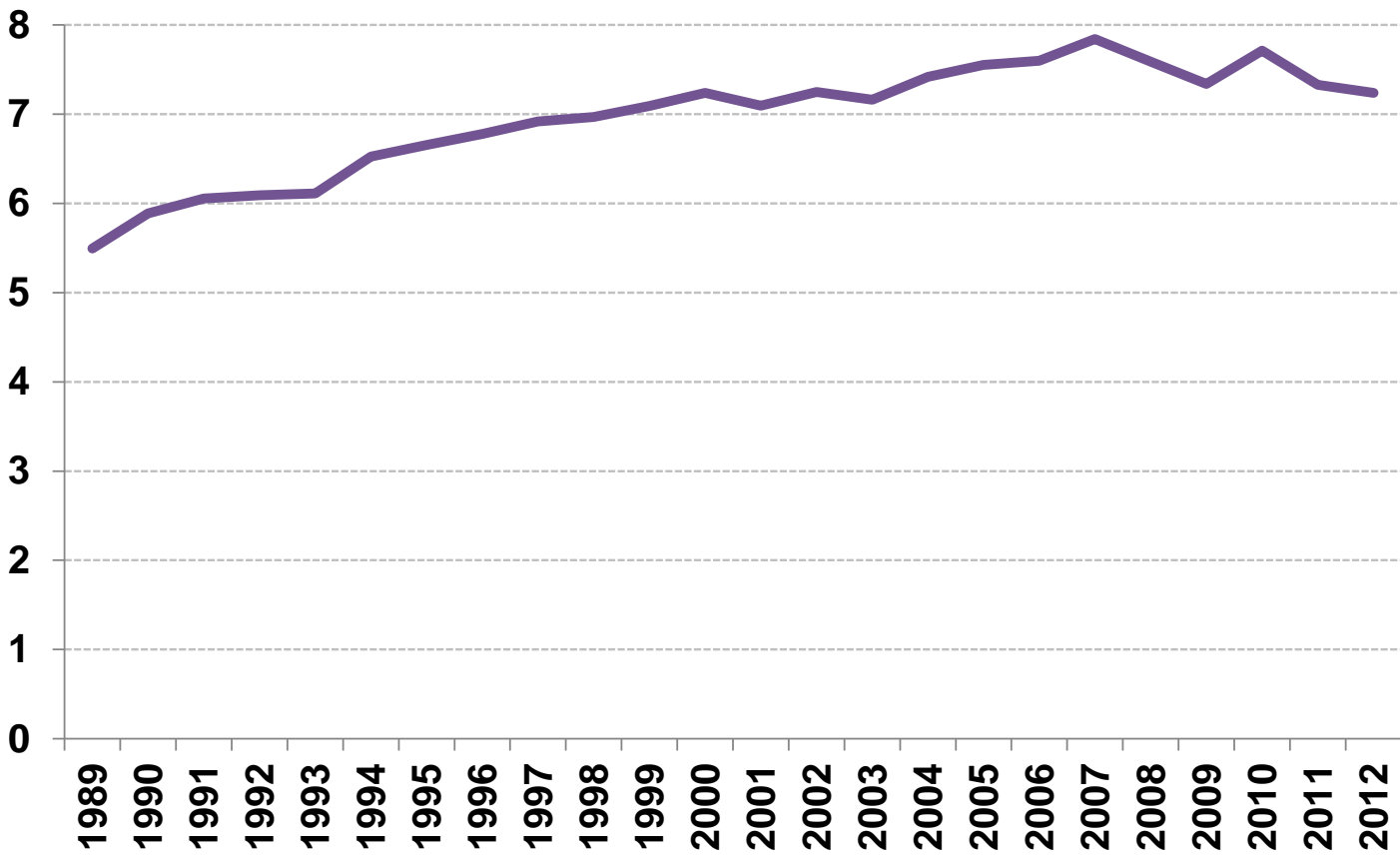
ALI IZADI

20 JUNE 2013



JAPAN ELECTRICITY CONSUMPTION INTENSITY

(MWh/PERSON)

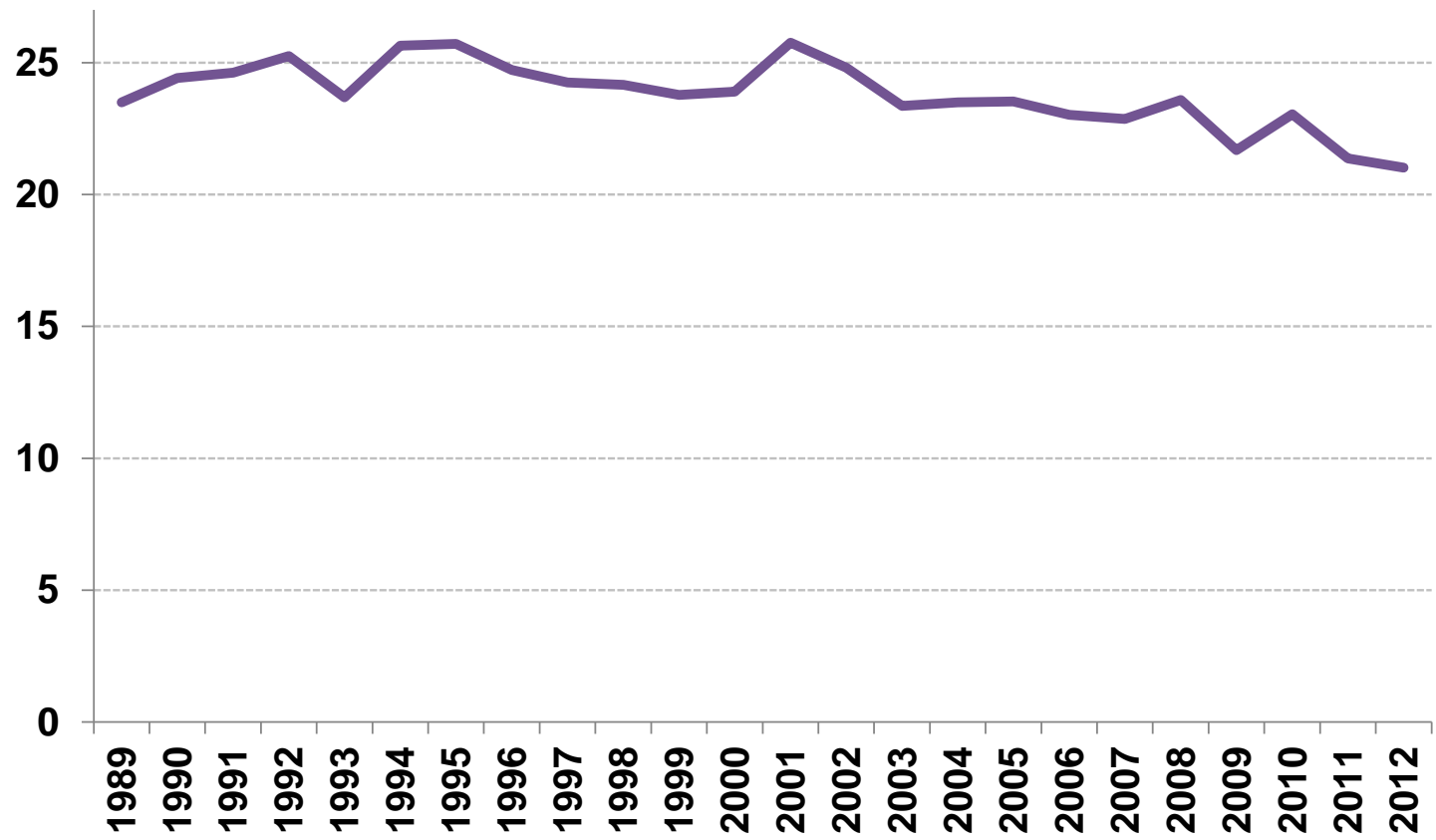


Note: Japanese fiscal year runs from April to March

Source: The Federation of Electric Power Companies of Japan, IMF

JAPAN (MAXIMUM) PEAK DEMAND INTENSITY

(kW/PERSON)

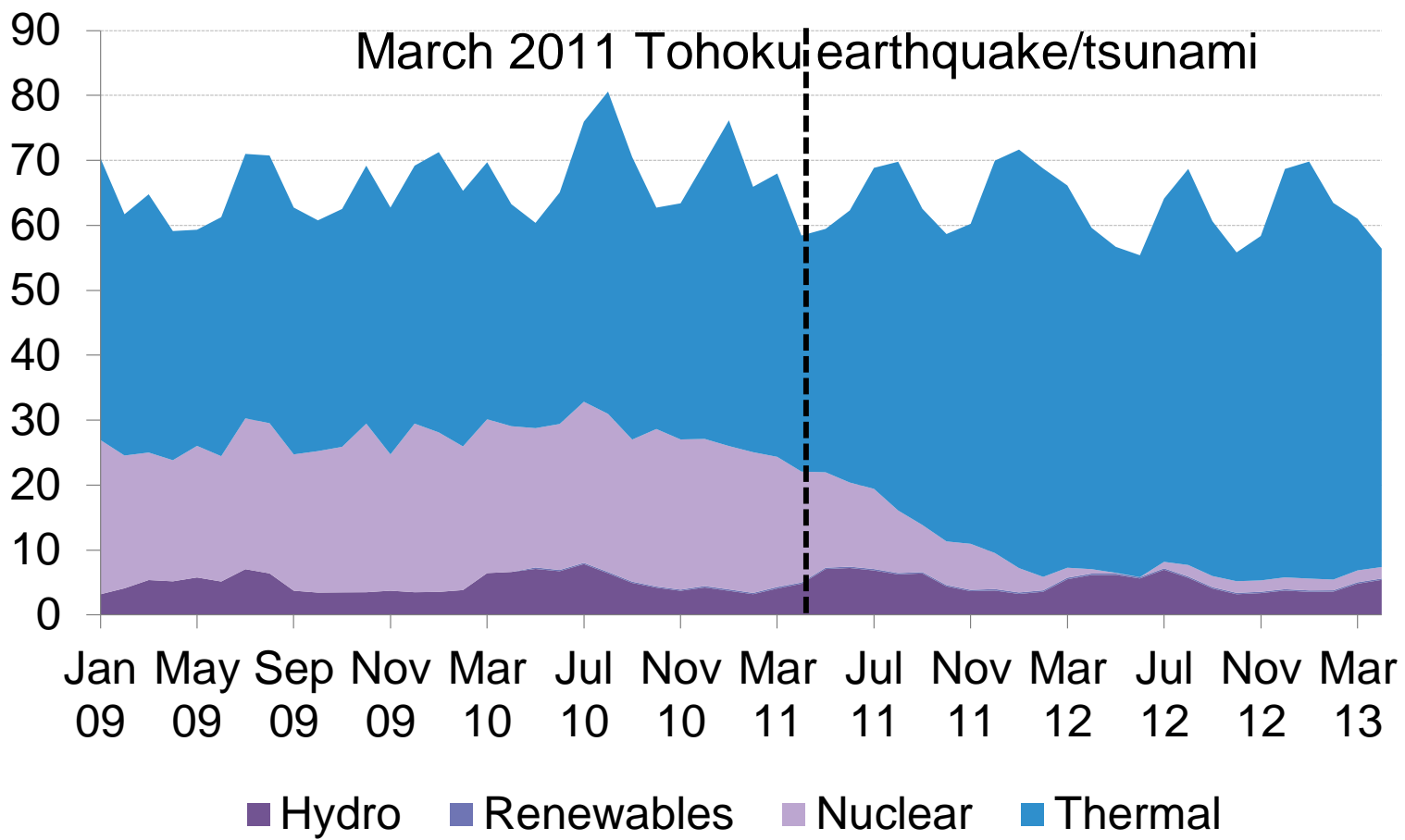


Note: Japanese fiscal year runs from April to March

Source: The Federation of Electric Power Companies of Japan, IMF

JAPAN MONTHLY ELECTRICITY CONSUMPTION

(TWh)



Source: The Federation of Electric Power Companies of Japan

KEY GOVERNMENT SUPPORT PROGRAMMES

FEED-IN TARIFFS

- Provide predictable revenue stream for specified tenure
- Rates revised annually; the programme will be reviewed at least once in three years
- Financed by electricity consumers through a surcharge on their monthly bill

INSTALLATION SUBSIDIES

- Residential PV: up to JPY 35/W
- Residential/commercial PV: 3-5% of lease payments
- RE projects in Tohoku: 10% of CAPEX (up to JPY 500m/year for 4 years)

TAX INCENTIVES

- Choice of:
 - Superbonus depreciation (100% in year one) for FiT approved projects
 - Accelerated depreciation of up to 30% of original book value
 - Tax deduction of up to 7% of investment (SME)

OTHERS

- Ministries/local governments offer various other programmes that developers could enjoy on top of feed-in tariffs

FEED-IN TARIFF LEGISLATION

START DATE

1 July 2012

SECTOR

Biomass, geothermal, small hydro, solar and wind

TARIFF RATES

Set by Ministry of Economy Trade and Industry
Adjusted annually or mid year if the minister deems it necessary

COST COVERAGE

Surcharge (per kWh): charged on monthly electricity bill

FEED-IN TARIFF RATES FOR APRIL 2013 - MARCH 2014

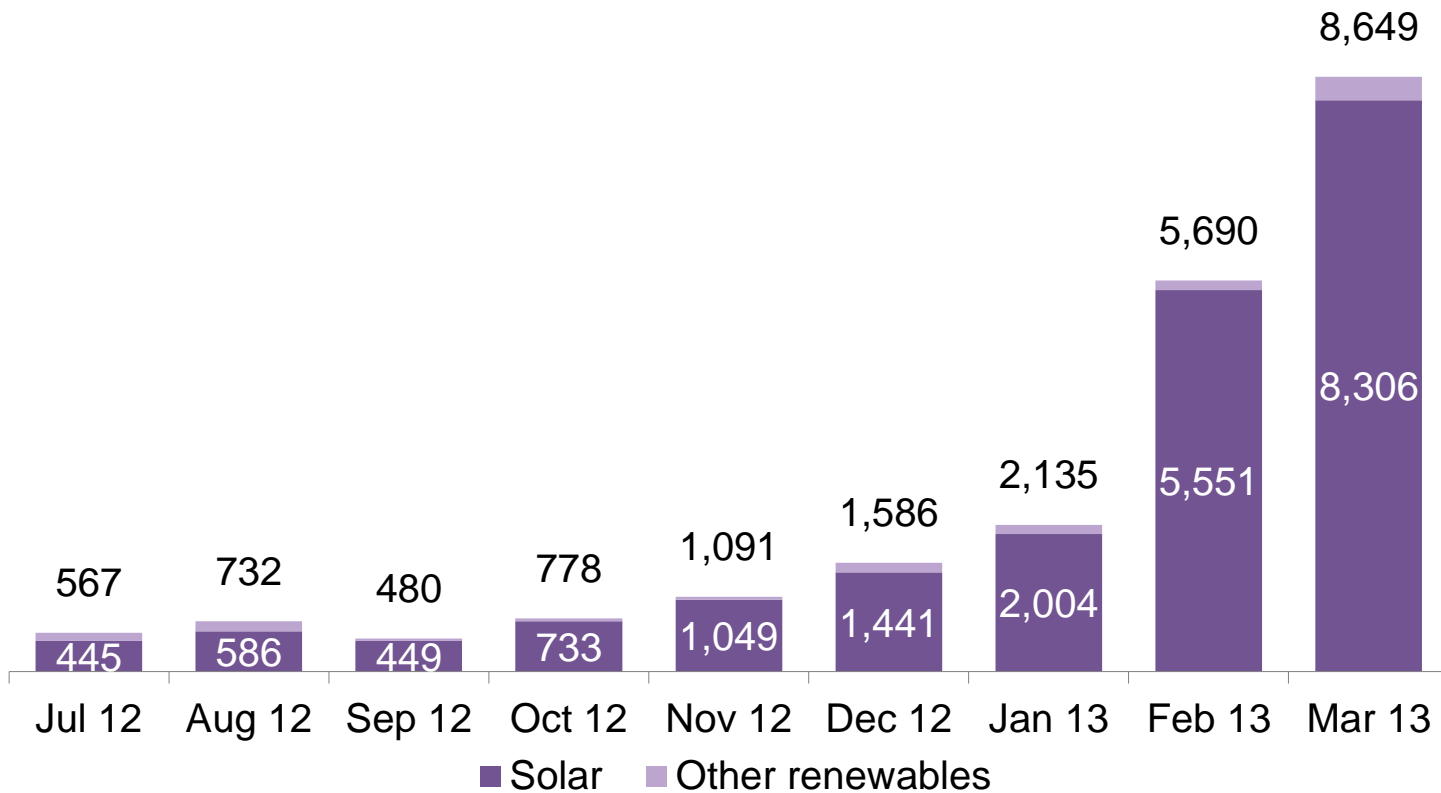
Sector	Capacity threshold	Rates (/kWh)	Term (year)	Capex assumption (/W)	Opex assumption (/W per yr)	Project IRR assumption
Geothermal	15MW+	JPY 26 (\$0.27)	15	JPY 790 (\$8.32)	JPY 33 (\$0.35)	13.0%
	<15MW	JPY 40 (\$0.42)	15	JPY 1,230 (\$12.95)	JPY 48 (\$0.50)	13.0%
Hydro	1 - 30MW	JPY 24 (\$0.25)	20	JPY 850 (\$8.95)	JPY 9.5 (\$0.10)	7.0%
	0.2 - 1MW	JPY 29 (\$0.31)	20	JPY 800 (\$8.42)	JPY 69 (\$0.73)	7.0%
	<0.2MW	JPY 34 (\$0.36)	20	JPY 1,000 (\$10.53)	JPY 75 (\$0.79)	7.0%
Solar	10kW+	JPY 36 (\$0.38)	20	JPY 280 (\$2.94)	JPY 10 (\$0.11)	6.0%
	(surplus buyback) <10kW	JPY 38 (\$0.40)	10	JPY 427 (\$4.49)	JPY 4.7 (\$0.05)	3.2%
Wind	20kW+	JPY 22 (\$0.23)	20	JPY 300 (\$3.16)	JPY 6 (\$0.06)	8.0%
	<20kW	JPY 55 (\$0.58)	20	JPY 1,250 (\$13.16)	-	1.8%

Note: Changes from inaugural assumptions are highlighted in orange. Rates exclude consumption tax (5%). Consumption tax is not applicable for residential. Residential sector enjoys installation subsidy. JPY 95/\$; capex, capital expenditure; opex, operational expenditure (fuel cost excluded), IRR=internal rate of return.

Source: METI

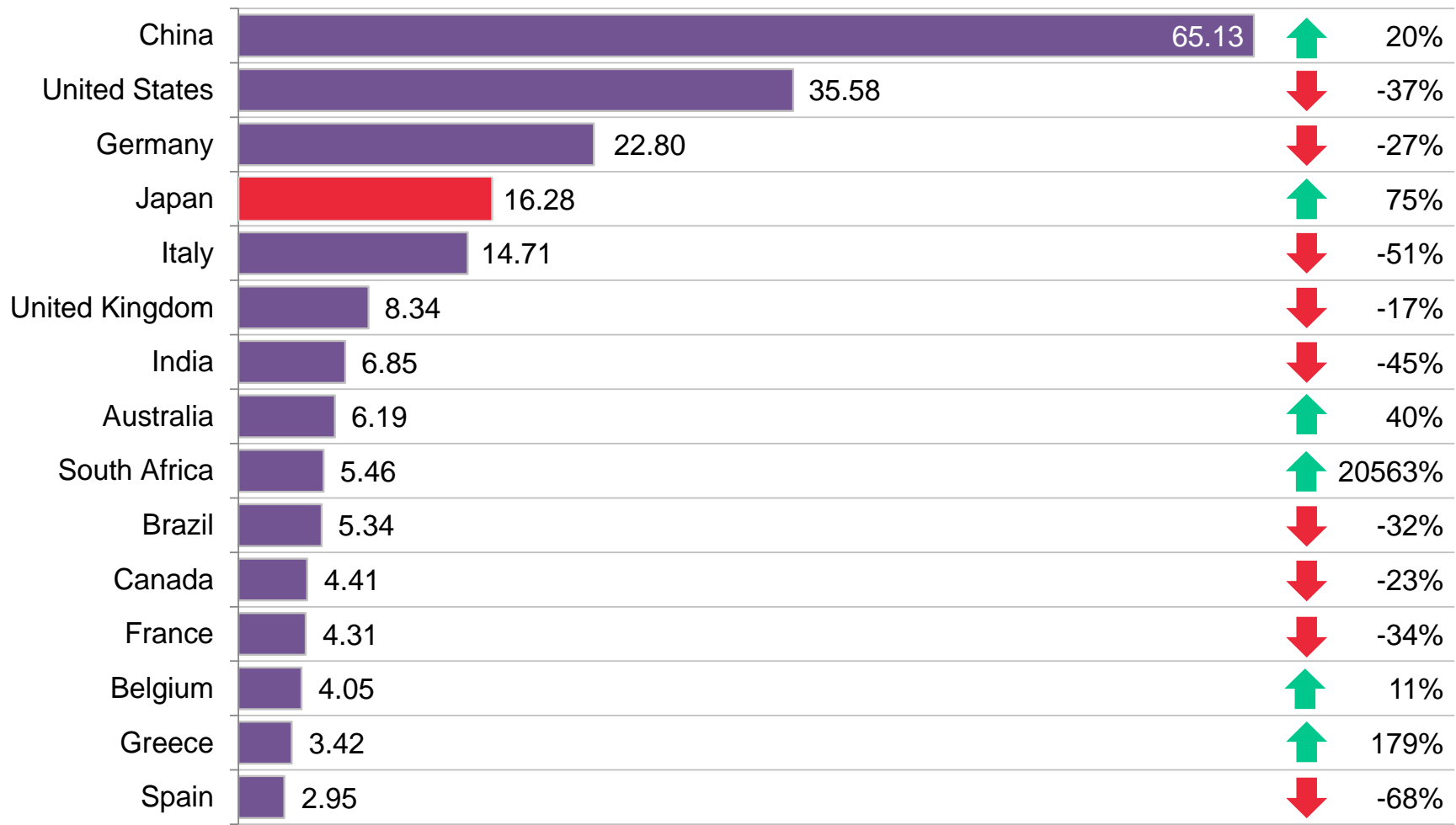
PROJECTS APPROVED UNDER FEED-IN TARIFF

(MW)



Source: Ministry of Economy Trade and Industry

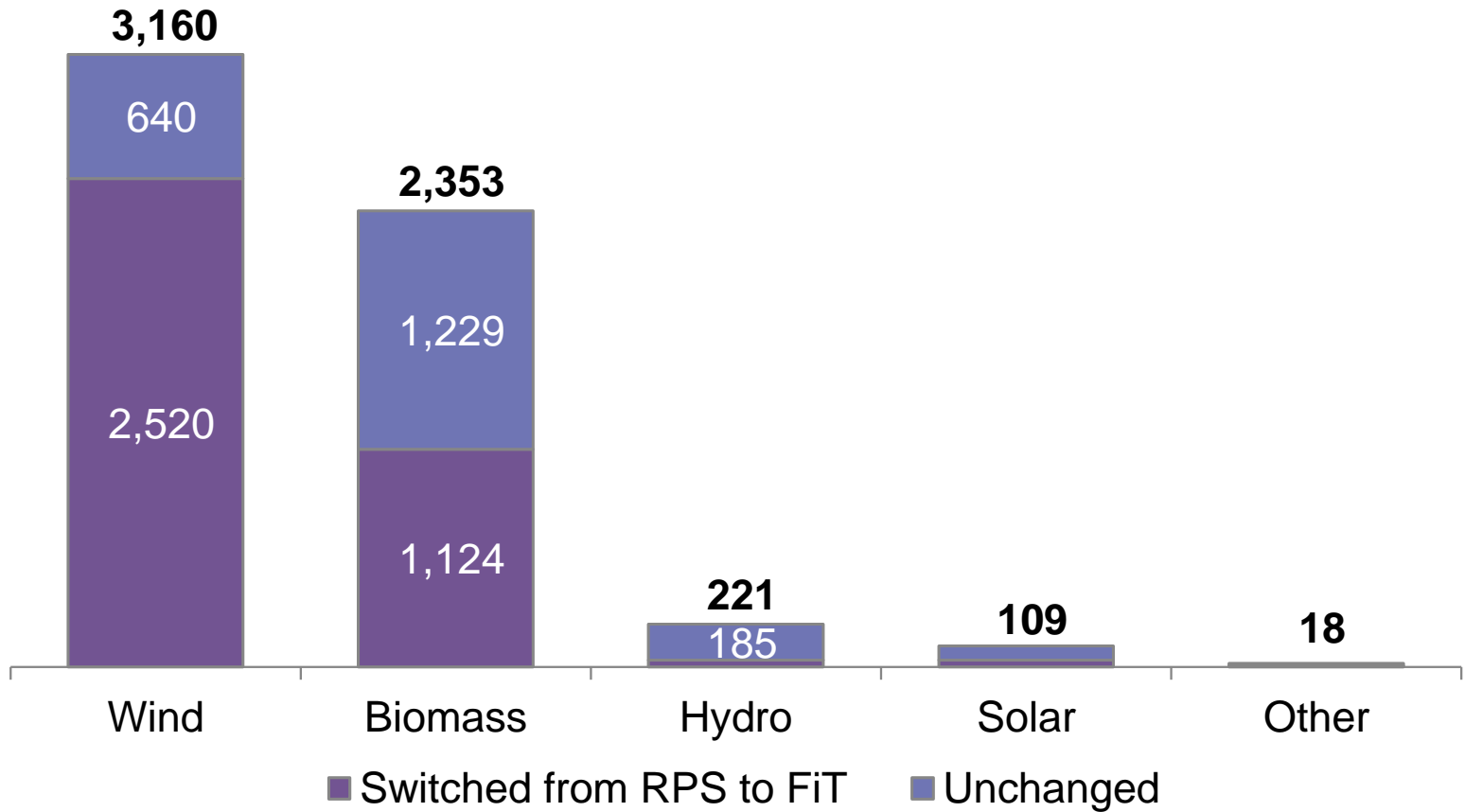
TOP 15 COUNTRIES FOR NEW INVESTMENT IN CLEAN ENERGY IN 2012 AND % CHANGE ON 2011 (\$BN)



Note: Excludes corporate and government R&D

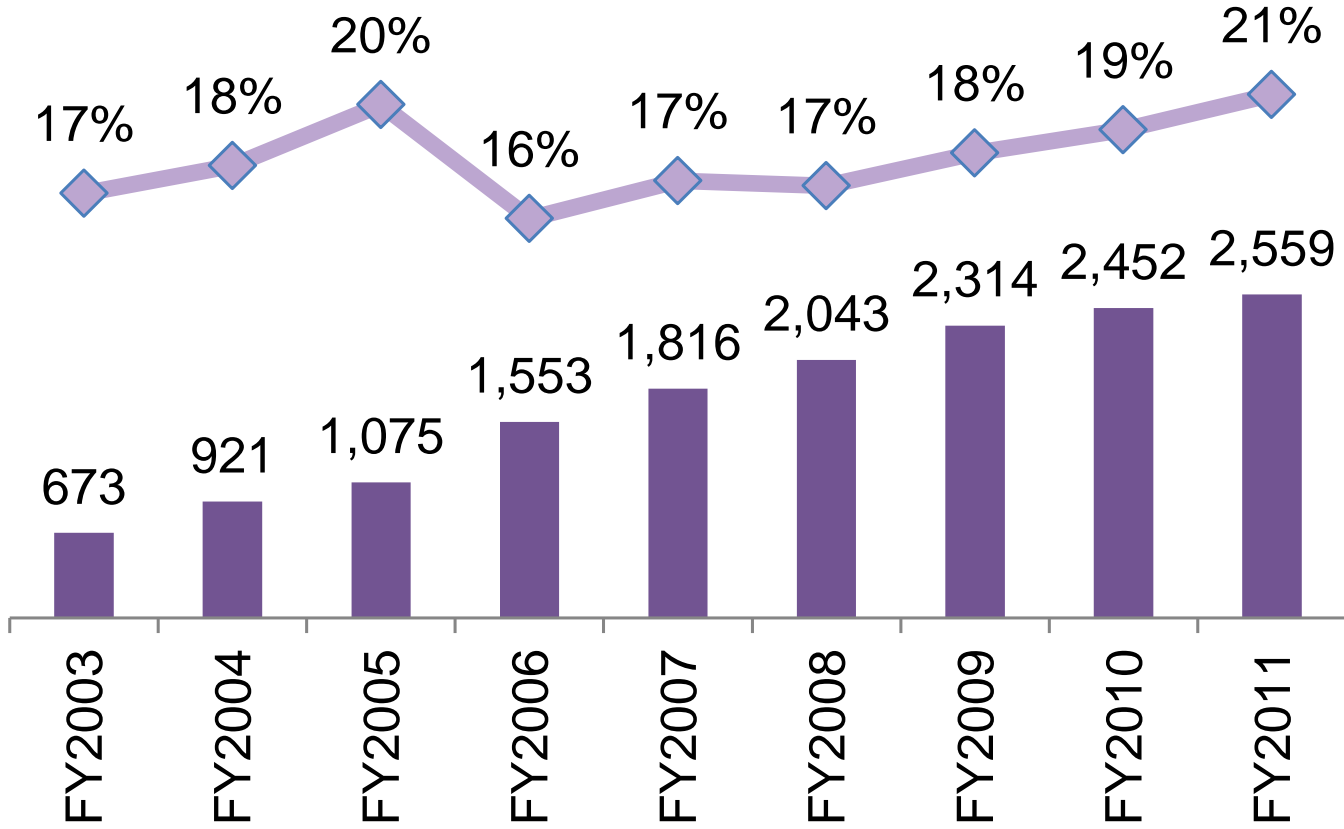
Source: Bloomberg New Energy Finance

CAPACITY CONVERTED FROM RPS SCHEME TO FEED-IN TARIFF (MW)



Source: NEDO

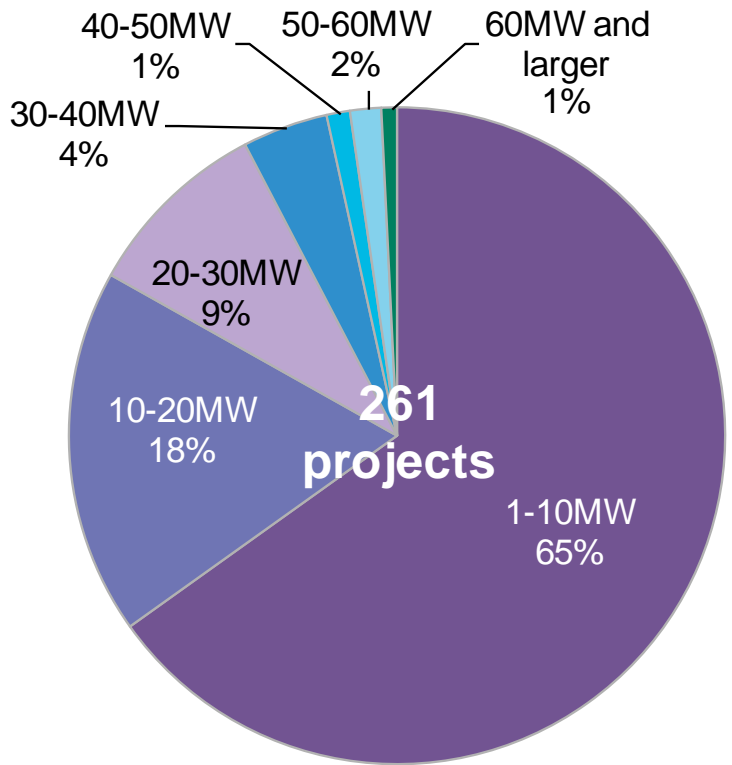
JAPAN CUMULATIVE WIND INSTALLATIONS (MW) AND AVERAGE CAPACITY FACTOR (%)



Source: Japan Wind Power Association

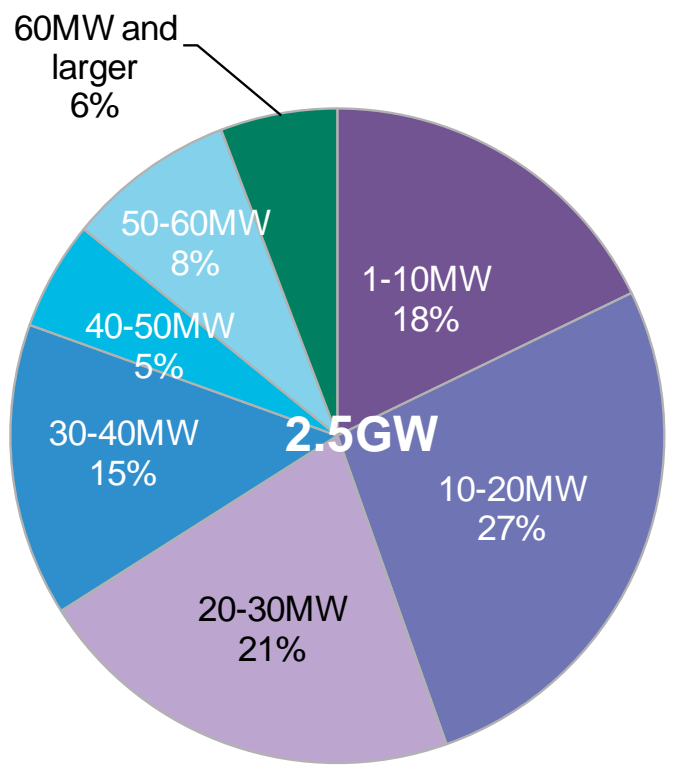
WIND FARMS IN JAPAN

BY NUMBER OF PROJECT



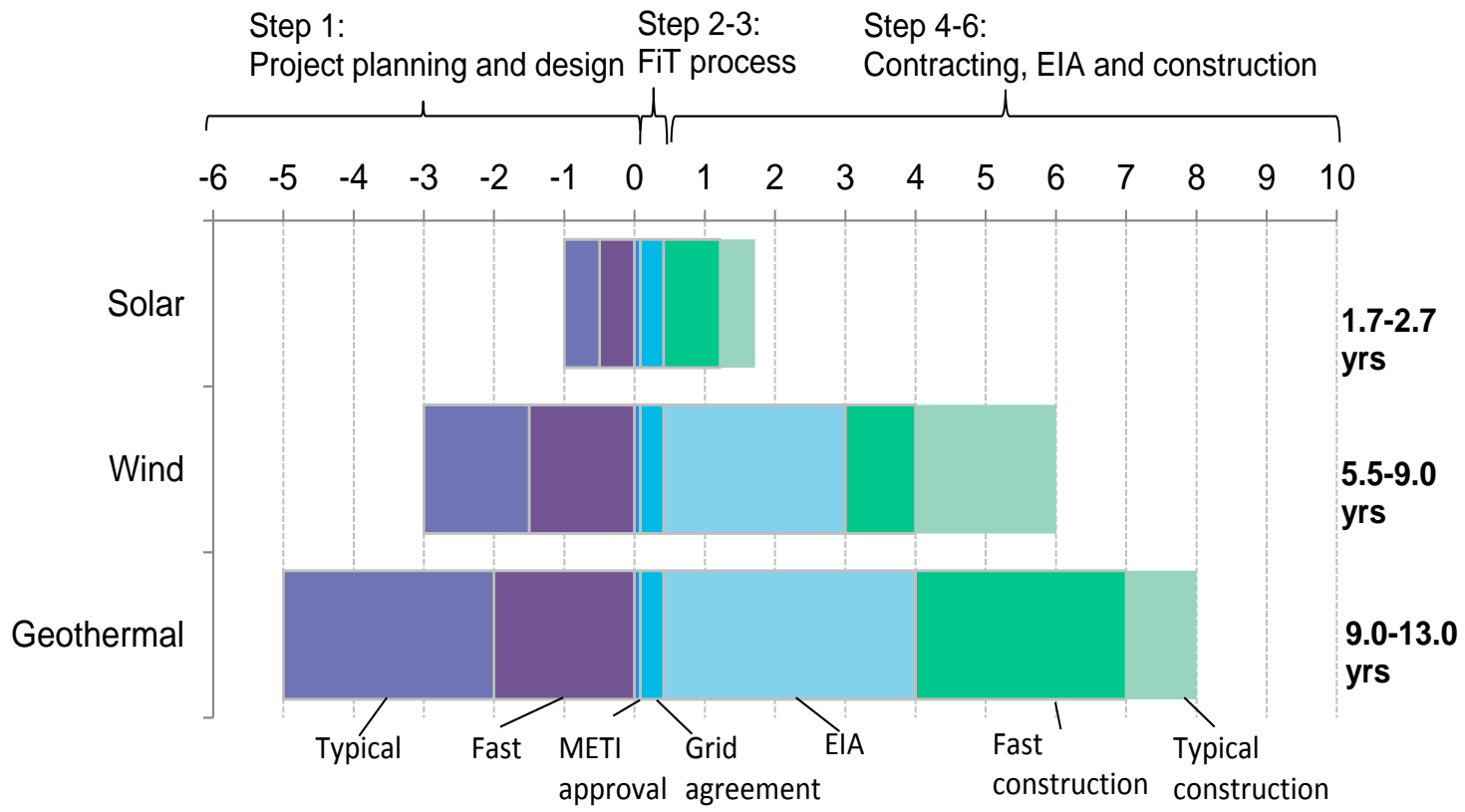
Note: Projects less than 1MW are excluded

BY CAPACITY



Source: Bloomberg New Energy Finance

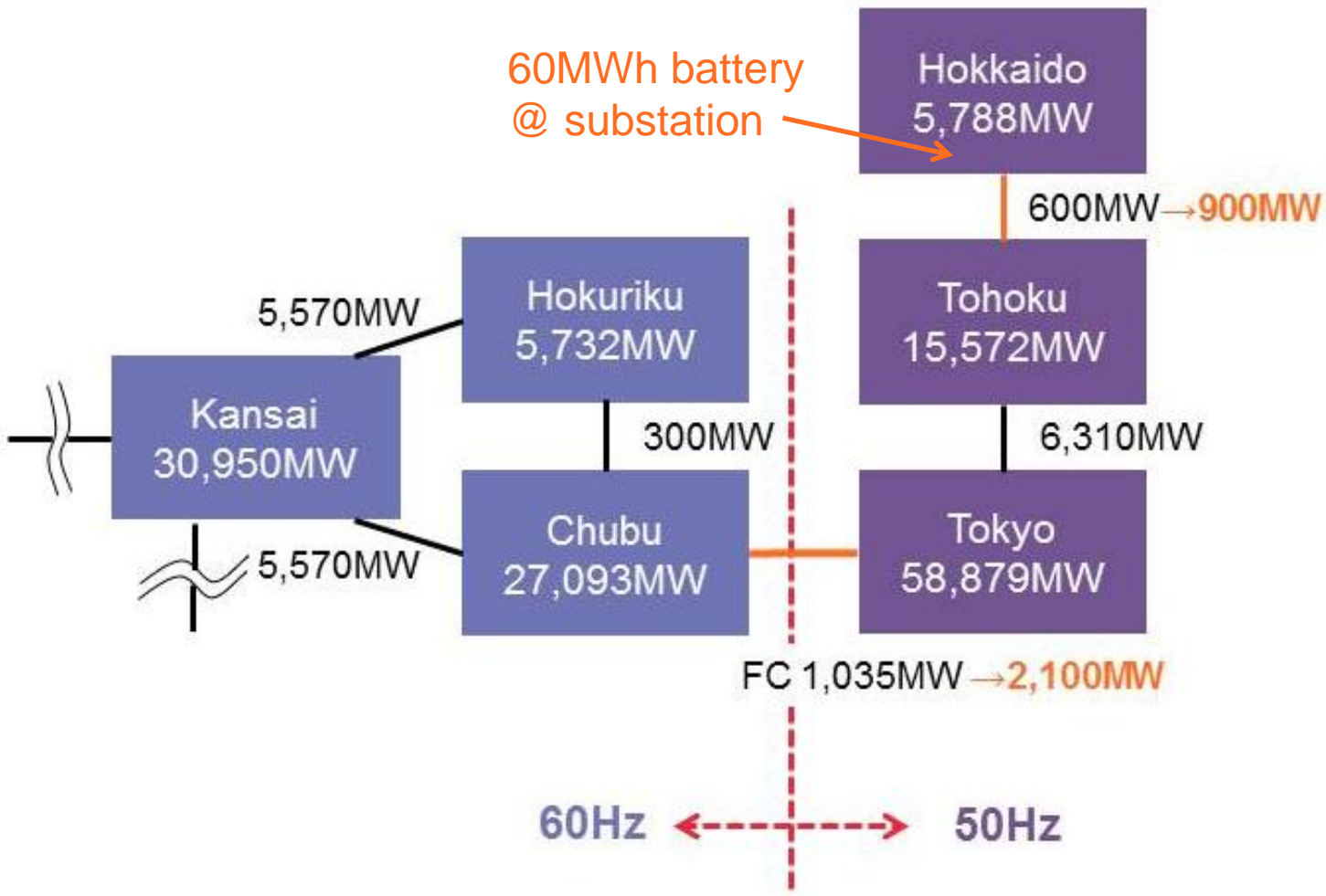
ESTIMATED TIME REQUIRED BY FOR 10MW AND LARGER PROJECTS (YEARS)



Note: EIA stands for Environmental Impact Assessment

Source: Bloomberg New Energy Finance

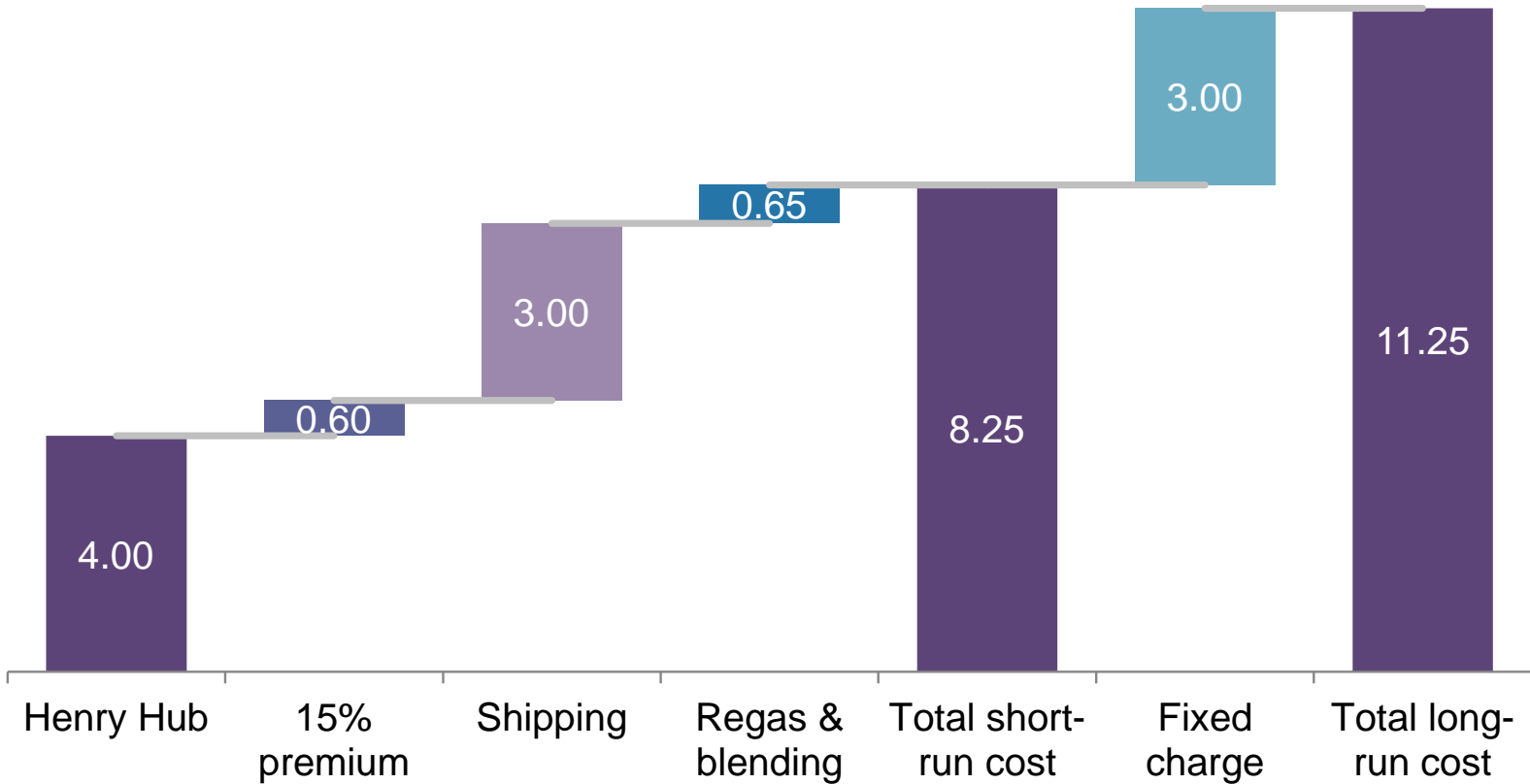
INTER-REGIONAL GRID ENHANCEMENT PLAN



Source: METI

US LNG COST BUILD-UP (TO JAPAN)

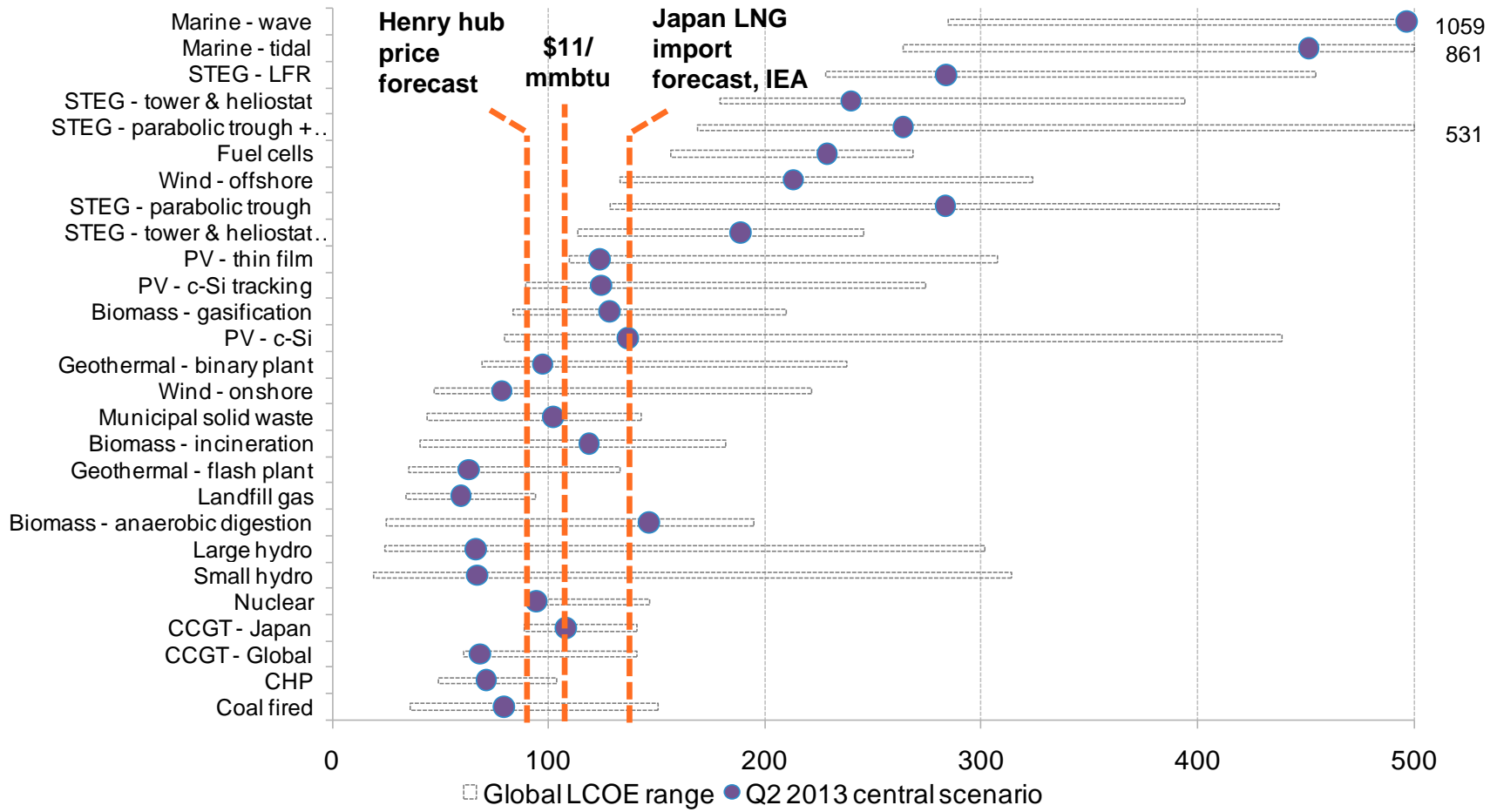
(\$/MMBTU)



Note: Short-run costs do not include the fixed charge, which must be paid on full contract volumes regardless of whether the buyer actually takes them. Regas & blending accounts for LPG reinjection to get US lean LNG (~1,020Btu/scf) to a HHV of closer to 1,090Btu/scf.

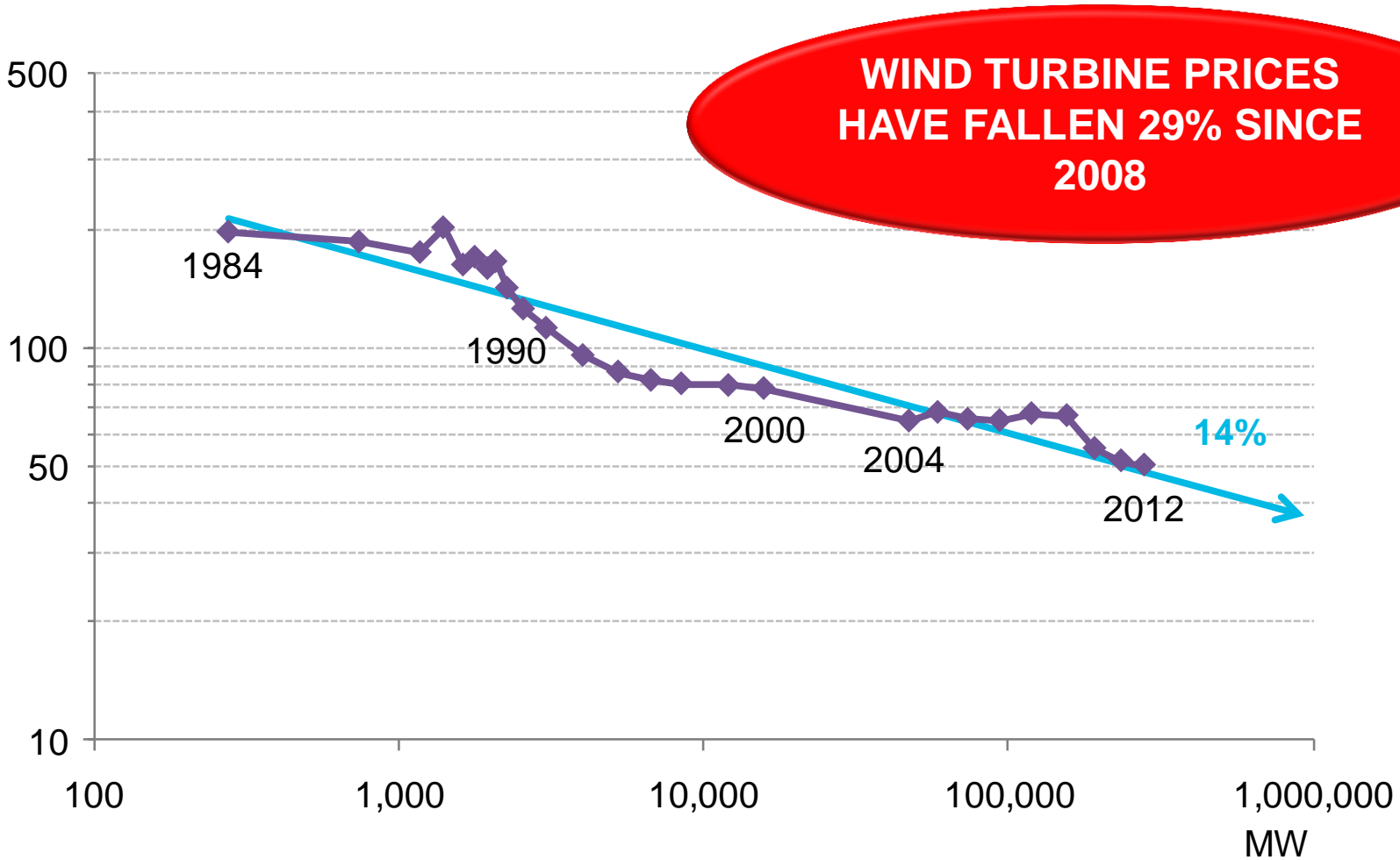
Source: Bloomberg New Energy Finance

GLOBAL LEVELISED COST OF ELECTRICITY RANGES VS. JAPAN CCGT SCENARIOS (\$/MWh)



Note: Data represents global ranges except for Japan CCGT scenario. Central scenario is representative of a typical developed market such as Western Europe and the US. Source: Bloomberg New Energy Finance, IEA, Japan National Policy Unit

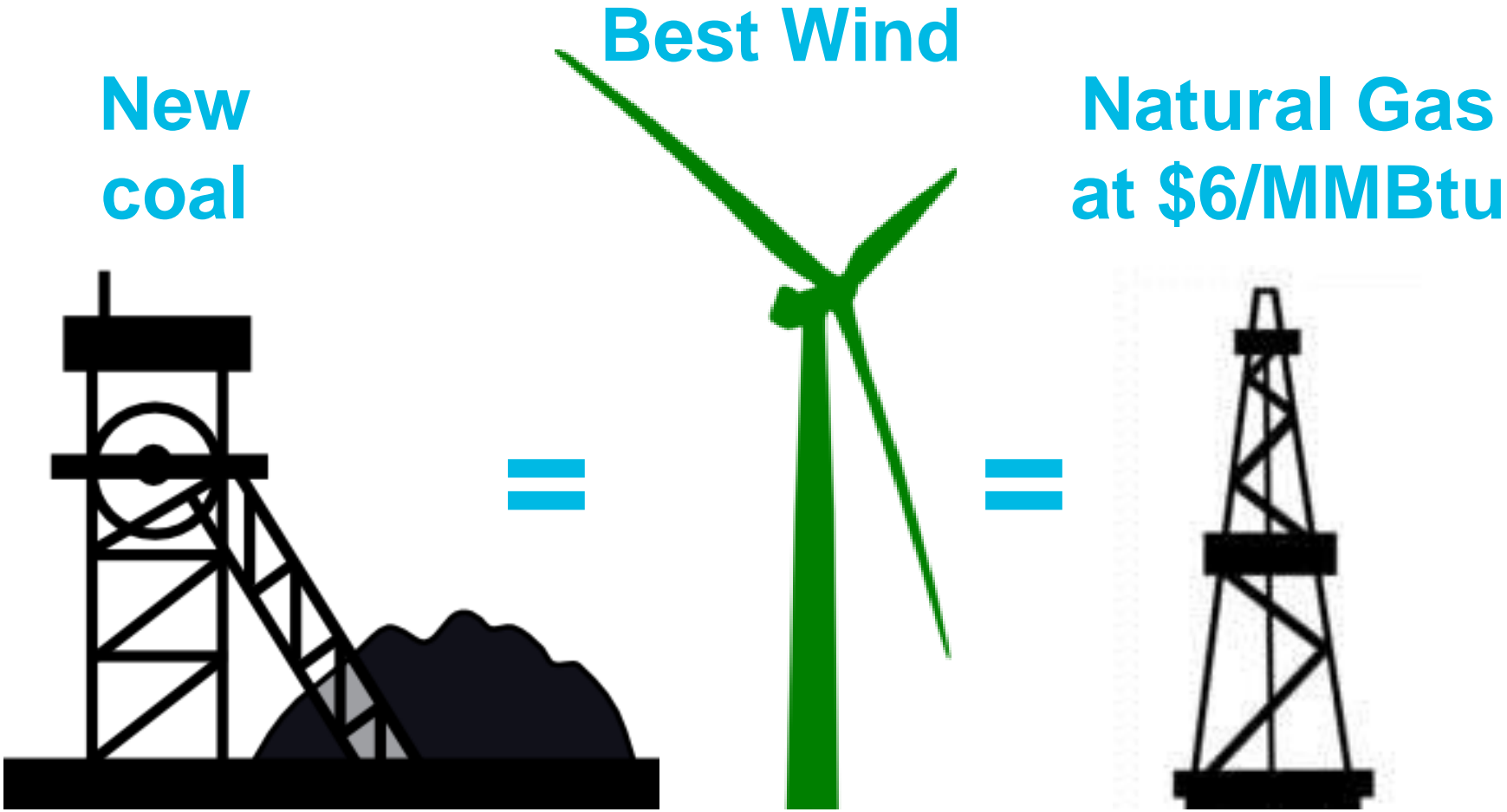
AVERAGE LEVELISED COST OF ONSHORE WIND, 1984-2012 (€/MWH)



Note: Learning curve (blue line) is least square regression: $R^2 = 0.88$ and 14% learning rate.

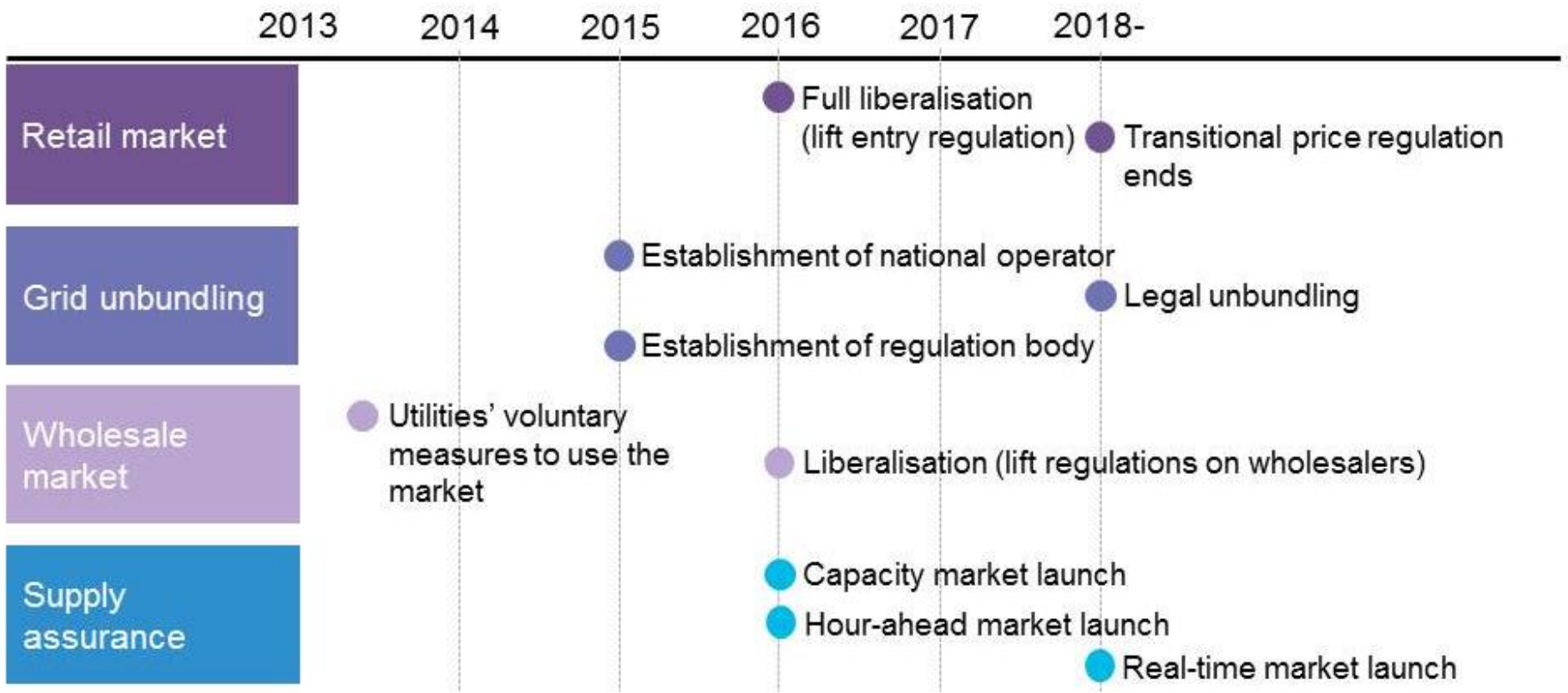
Source: Bloomberg New Energy Finance, ExTool

GRID-COMPETITIVE CLEAN ENERGY



Source: Bloomberg New Energy Finance

SCHEDULE OF KEY EVENTS FOR ELECTRICITY MARKET REFORM



Note: Schedules are soft targets and could turn to be hard targets after relevant bills pass the Diet.

Source: METI, Bloomberg New Energy Finance


SUMMARY



Japan's FiT has been successful in spurring investment in renewables: 21.7GW worth of applications approved by April 2013, however **90% of approvals are for solar PV** (only 798MW of wind).



There is **substantial uncertainty** in how much electricity generation contribution the FiT-approved projects will make due to grid connection and curtailment rules for utility-scale projects.



For renewable resources to make a significant contribution to Japan's electricity mix, significant restructuring of both the **electricity market rules** and the **physical grid structure** is needed.

COPYRIGHT AND DISCLAIMER

This publication is the copyright of Bloomberg New Energy Finance. No portion of this document may be photocopied, reproduced, scanned into an electronic system or transmitted, forwarded or distributed in any way without prior consent of Bloomberg New Energy Finance.

The information contained in this publication is derived from carefully selected sources we believe are reasonable. We do not guarantee its accuracy or completeness and nothing in this document shall be construed to be a representation of such a guarantee. Any opinions expressed reflect the current judgment of the author of the relevant article or features, and does not necessarily reflect the opinion of Bloomberg New Energy Finance, Bloomberg Finance L.P., Bloomberg L.P. or any of their affiliates ("Bloomberg"). The opinions presented are subject to change without notice. Bloomberg accepts no responsibility for any liability arising from use of this document or its contents. Nothing herein shall constitute or be construed as an offering of financial instruments, or as investment advice or recommendations by Bloomberg of an investment strategy or whether or not to "buy," "sell" or "hold" an investment.

JAPAN ELECTRICITY MARKET AND THE ROLE OF RENEWABLES

ALI IZADI, AIZADINAJAFA@BLOOMBERG.NET

MARKETS

Renewable Energy

Carbon Markets

Energy Smart Technologies

Renewable Energy Certificates

Carbon Capture & Storage

Power

Water

Nuclear

SERVICES

Insight: research, analysis & forecasting

Industry Intelligence: data & analytics

News & Briefing: daily, weekly & monthly

Applied Research: custom research & data mining

Knowledge Services: Summit, Leadership Forums, Executive Briefings & workshops

Subscription-based news, data
and analysis to support your
decisions in clean energy, power
and water and the carbon markets

sales.bnef@bloomberg.net

Bloomberg
NEW ENERGY FINANCE