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Reality Check: Energy Mix 2030 and Japan's Collapse in Nuclear Power Generation

Japan's national target for carbon emissions reduction has been announced as 26% from those of 2013 to be achieved by the year 2030, equal to a 17% reduction over emissions in 1990.[1] This will be the basis for negotiations at the Group of Seven Summit to be held in Germany on June 7th-8th. However, not only is the Japanese Governments climate target wholly insufficient and significantly less than many other developed nations, such as the 40% reduction target of the EU[2], it is likely that Japan will miss even this low target. The climate target is directly tied to a decision to be made on the mix of 2030 energy share, the so called energy mix. The ambition of the former is directly tied to the reality of the latter. This briefing highlights the reality of Japan's energy crisis and the prospects for both achieving a significant nuclear share of electricity by 2030 and its consequences, including on meeting national climate targets.

The Japanese government is currently considering the percentage of energy it will generate from different sources by the year 2030. In late 2014, a Subcommittee on Long-term Energy Supply-demand Outlook was established under the auspice of the Ministry of Economy, Trade and Industry (METI) to develop a long term energy supply and demand balance.[3] The sub-committee was to propose a so-called energy mix that would set the electricity share for nuclear, renewable and fossil fuel energy for the year 2030. In April 28 2015, METI presented its draft with the proposed nuclear share by 2030 to between 20-22 percent, with renewable energy proposed for 22-24 percent, and fossil fuels of 56 percent.[4] On 1 June 2015, a panel from the Advisory Committee for Natural Resources and Energy, formerly affiliated with METI, agreed to endorse the proposal.[5] A 20-22% nuclear share is a few percent less than the nuclear industry was lobbying for, but more than the 15 percent that Prime Minister Abe was reportedly seeking.[6] The government will seek public comment on the proposal and officially finalize its decision in July.

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1 "Japan aims to cut greenhouse gas emissions by 26% by 2030," 2 June 2015, http://asia.nikkei.com/Politics-Economy/Policy-Politics/Japan-aims-to-cut-greenhous e-gas-emissions-by-26-by-2030

2 2030 Energy Strategy, European Commission, 2015, http://ec.europa.eu/energy/en/topics/energy-strategy/2030-energy-strategy

3 Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, "Establishment of the Subcommittee on Long-term Energy Supply-demand Outlook", December 2014, http://www.meti.go.jp/english/press/2014/1226_01.html

4 Nikkei BP CleanTech Institute, "Japan Announces Energy Mix Plan for 2030", 1 May 2015, http://techon.nikkeibp.co.jp/english/NEWS_EN/20150501/416800/?ST=msbe

5 Japan to raise nuclear power ratio to 20% by 2030, Nikkei Asian Review, 1 June, 2015, http://asia.nikkei.com/Politics-Economy/Policy-Politics/Japan-to-raise-nuclear-power-ratio-to-20-by-2030

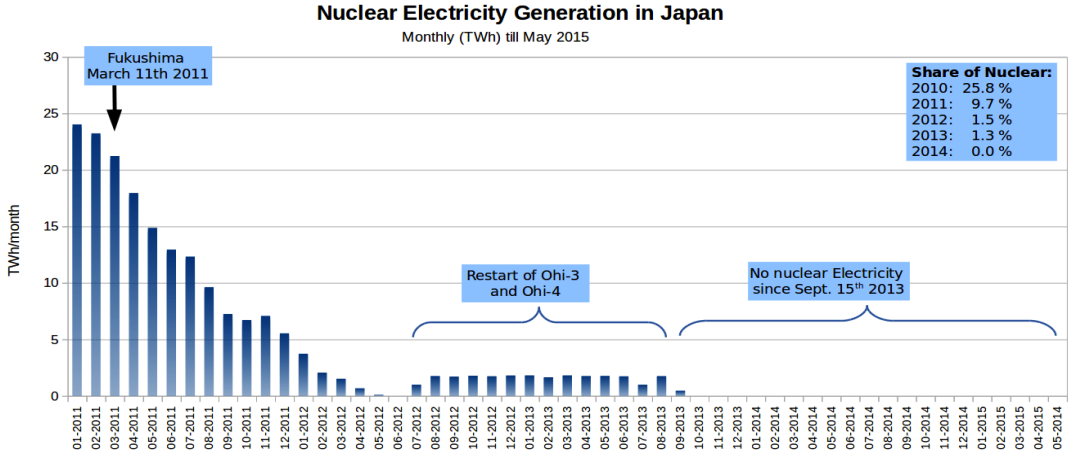
6 Reportedly, Abe was seeking a nuclear share target of 15 percent, http://foreignpolicy.com/2015/04/08/japan-bets-on-nuclear-and-coal-for-future-power/

However, an analysis of the current state of nuclear power in Japan, with all commercial nuclear reactors shutdown as of June 1st 2015, and the prospects for restart in the coming years, leads Greenpeace to conclude that the nuclear generation targets proposed by the Japanese government will not be possible to achieve. The reality facing Japan's nuclear utilities and Government is that the percentage share of nuclear generated electricity in 2030 will likely not reach 15 percent, and is more likely to be in the range of 6-8 percent. One scenario indicates the share could be as low as 2 percent of electricity generation from nuclear power by 2030. This compares with a 29 percent electricity share in2010.

Greenpeace is of the view that Japan's nuclear electricity share in 2030 should be at the level it has been since September 2013 until today – zero percent. That is the only way to ensure the nation avoids further nuclear power accidents – and is supported by the majority of the people of Japan.

1. Nuclear Power Current Reality

A total of 43 commercial reactors remain in Japan and are, in theory, capable of operation. As of September 2013 all commercial nuclear reactors have remained shutdown.



In March 2015 four utilities announced the permanent shutdown of five reactors: Shimane 1, Genkai 1, Mihama 1&2, and Tsuruga 1.[7] There is also no prospect that the four Fukushima Daiini reactors will ever restart[8], thus the number of reactors as of June 1st 2015 theoretically possible to operate is 39. Of these, a total of 24 reactors are currently under review by the Nuclear Regulation Authority (NRA). One of which, Ohma, has yet to complete construction. The Shimane 3 reactor construction is also not completed, and it has yet to be placed under NRA review.

[7] Power Companies Select Aging NPPs to Concentrate Managerial Resources on Restarts Japan Atomic Industrial Forum, March 18th 2015, http://www.jaif.or.jp/en/power-companies-select-aging-npps-to-concentrate-managerial-resources-on-restarts/ and IAEA Power Reactor Information System (PRIS), June 3rd 2015, https://www.iaea.org/PRIS/CountryStatistics/CountryDetails.aspx?current=JP

[8] Tepco May Scrap Second Nuclear Plant July 4, 2012, http://www.wsj.com/articles/SB10001424052702304141204577506531300365556, and Tokyo Electric Power :Restarting Fukushima Daini plant "very difficult": minister, Kyodo News September 25 2015, http://www.globalpost.com/dispatch/news/kyodo-news-international/140925/restarting-fukushima-daini-plant-very-difficult-minist

Commercial Reactor status 2015	No. of reactors	Remaining "operational" reactors
March 11th 2011		54
Reactors destroyed in accident: Fukushima Daiichi	-4	50
1-4	-2	48
Fukushima Daiichi 5-6 declassified	-5	43
March 2015 - 5 reactors declassified	-4	39
Fukushima Daiini		

There are major technical, political, economic and legal uncertainties that make accurately predicting the number of reactors that will eventually restart in Japan impossible: the Japanese government does not know; the utilities don't know; and, the financial markets don't know. What we do know is that the majority of the Japanese public oppose the operation of any nuclear reactors9.

Projections from pro-nuclear analysts, including METI related think tanks, on nuclear restart schedules in recent years have proven to be unreliable and of such wide range as to be almost meaningless; most particularly the influential IEEJ which in December 2013[10] was predicting between 6 and 22 reactors could restart during 2014, and which one year later was giving a range of between 2 reactors and 20 and even a "hypothetical" 32 reactors during 2015.[11] In contrast, Greenpeace expects no more than two reactors at most to begin operation before the end of December 2015, and even this requires overcoming technical obstacles, with perhaps one additional reactor at Ikata before end of FY 2015. In other words there are enormous uncertainties even within the next 12 months over the future operation of 4-5 reactors that have been slated for imminent restart for more than a year, and yet remain shutdown. This means that nuclear power output in 2015 will remain under 1% of the electricity supply, following no nuclear output in 2014 and less than 2% in 2012 and 2013.

For these reasons, estimates on the percentage of electricity share generated by nuclear power in the coming years to 2030 must cover a range of scenarios. However, what is all but certain is that the scale of the challenges facing Japan's electric utilities are so enormous that the electricity share generated by nuclear power in 2030 will be much less than prior to the 2011 Fukushima Daiichi nuclear accident.

9 "4 years after Fukushima, Japan considers restarting nuclear facilities", Los Angeles Times, March 30 2015, http://www.latimes.com/world/asia/la-fg-japan-nuclear-20150330-story.html#page=1

10 http://eneken.ieej.or.jp/en/press/press_131220.pdf

11 http://eneken.ieej.or.jp/en/press/press141219.pdf

Japan's Nuclear Reactor Status 2015 – 2030

Owner	Reactor	Gross Capacity MWe	Start up/Age	Shutdown (1)	NRA guidelines compliance		TWh in 2010[12]	Percentage of electricity supply in 2030 (980-1170TWh)[13]	Age in 2030
					Application	Final approval by NRA			
Kyushu Electric	Sendai Unit 1 PWR	890	1984 – 31 years	10/05/11	08/07/13		4.9*		46 years
	Sendai Unit 2 PWR	890	1985 – 30 years	01/09/11	08/07/13		5.7*		45 years
	Genkai Unit 1 PWR	559	1975 – 40 years	01/12/11 permanent	N/A	N/A			Shutdown March 2015 (would be 55 years)
	Genkai Unit 2 PWR	559	1981 – 34 years	29/01/11			4.7*		49 years
	Genkai Unit 3 PWR	1180	1984 – 31 years	11/12/10	12/07/13		9.5*		46 years
	Genkai Unit 4 PWR	1180	1997 – 18 years	25/12/11	12/07/13		8.3* (under 40 in 2030)		33 years
Shikoku Electric	Ikata Unit 1 PWR	556	1977 – 38 years	04/09/11			3.9*		52 years
	Ikata Unit 2 PWR	556	1982 – 33 years	13/12/12			4.7* (2011)		48 years
	Ikata Unit 3 PWR	890	1994 – 21 years	29/04/11	08/07/13		6.3*		36 years
Hokkaido Electric	Tomari Unit 1 PWR	579	1989 – 26 years	22/04/11	08/07/13		3.9*		41 years
	Tomari Unit 2 PWR	579	1991 – 24 years	26/08/11	08/07/13		4*		39 years
	Tomari Unit 3 PWR	912	2009 – 6 years	05/05/12	08/07/13		7.9*		21 years
Chugoku Electric	Shimane Unit 1 BWR	460	1974 – 41 years	08/11/10 permanent	N/A	N/A			Shutdown March 2015 (would be 56 years)
	Shimane Unit 2 BWR	820	1989 – 26 years	27/01/12	25/12/13		1.9*		41 years
Kansai Electric	Takahama Unit 1 PWR	826	1974 – 41 years	10/01/11	17/03/15		7.1*		56 years
	Takahama Unit 2 PWR	826	1975 – 40 years	25/11/11	17/03/15		6.5*		55 years
	Takahama Unit 3 PWR	870	1984 – 31 years	20/02/12	08/07/13		6.2*		46 years
	Takahama Unit 4 PWR	870	1984 – 31 years	21/07/11	08/07/13		5.3*		46 years
	Ohi Unit 1 PWR	1175	1977 – 38 years	10/12/11			6.5* (2010)		53 years
	Ohi Unit 2 PWR	1175	1978 – 37 years	16/12/11			9.6* (2011)		52 years
	Ohi Unit 3 PWR	1180	1991 – 24 years	02/09/13	08/07/13		8.3*		39 years

[12] Those marked in red exceed 40 years old by 2030. The Twh is based on taking the near maximum recent output from reactors, not average load factors which could be considered a more realistic reflection of likely future projection but which in many cases would see a lower Twh.

[13] METI are proposing a high demand figure of 1170TWh, with a lower target of 970TWh based on demand reduction energy efficiency.

	Ohi Unit 4 PWR	1180	1993 – 22 years	15/09/13	08/07/13		6.9*		37 years
	Mihama Unit 1 PWR	340	1970 – 45 years	24/11/10 permanent	N/A	N/A			Shutdown March 2015 (would be 60 years)
	Mihama Unit 2 PWR	500	1972 – 43 years	16/11/11 permanent	N/A	N/A			Shutdown March 2015 (would be 58 years)
	Mihama Unit 3 PWR	826	1976 – 39 years	14/05/11	17/03/15		6.7		54 years
Tokyo Electric	Kashiwazaki-Kariwa Unit 1 BWR	1100	1985 – 30 years	06/08/11			6.2* (2006)		45 years
	Kashiwazaki Kariwa Unit 2 BWR	1100	1990 – 25 years	19/02/07			9.3* (2006)		40 years
	Kashiwazaki Kariwa Unit 3 BWR	1100	1993 – 22 years	19/09/07			7.3* (2006)		37 years
	Kashiwazaki Kariwa Unit 4 BWR	1100	1994 – 21 years	11/02/08			7.1* (2005)		36 years
	Kashiwazaki Kariwa Unit 5 ABWR	1100	1990 – 25 years	25/01/12			9.4*		40 years
	Kashiwazaki Kariwa Unit 6 ABWR	1365	1996 – 19 years	23/06/12	27/09/13		9.5*		34 years
	Kashiwazaki Kariwa Unit 7 BWR	1365	1997 – 18 years	23/08/11	27/09/13		9*		33 years
	Fukushima-Daiini Unit 1 BWR	1100	1981 – 34 years	11/03/11					39 years
	Fukushima-Daiini Unit 2 BWR	1100	1983 – 32 years	11/03/11					37 years
	Fukushima-Daiini Unit 3 BWR	1100	1984 – 31 years	11/03/11					46 years
	Fukushima-Daiini Unit 4 BWR	1100	1986 – 29 years	11/03/11					44 years
JAPCO	Tsuruga Unit 1 BWR	357	1969 – 46 years	26/01/11 permanent					Shutdown March 2015 (would be 61 years)
	Tsuruga Unit 2 – PWR	1160	1986 – 29 years	29/08/11			6.1* (2010)		44 years
	Tokai Unit 2 BWR – 1978	1100	1978 – 37 years	21/05/11	20/05/14		5.1*		52 years
Chubu Electric	Hamaoka Unit 3 BWR	1100	1987 – 28 years	29/11/10			8*		43 years
	Hamaoka Unit 4 BWR	1137	1993 – 22 years	25/01/12	14/02/14		7.5*		37 years
	Hamaoka Unit 5 ABWR	1380	2005 – 10 years	22/03/12			7.6* (2007)		25 years

Tohoku Electric	Higashidori Unit 1 BWR	1100	2005 – 10 years	06/02/11	10/06/14		9.2*		25 years
	Onagawa Unit 1 BWR	524	1984 – 31 years	10/09/11			2.6*		46 years
	Onagawa Unit 2 BWR	825	1995 – 20 years	06/11/10	27/12/13		5.9*		35 years
	Onagawa Unit 3 BWR	825	2002 – 13 years	10/09/11			5.3*		28 years
Hokuriku Electric	Shika Unit 1 BWR	540	1993 – 22 years	08/10/11			3.1*		37 years
	Shika Unit 2 ABWR	1358	2006 – 9 years	11/03/11	12/08/14		9.2*		24 years
J--Power	Oma ABWR	1383	Under construction		16/12/14		9.2*		9 years assuming operation from 2021
Chugoku Electric	Shimane Unit 3 ABWR	1373	Under construction – no start date				9.2		10 years - 94percent complete in March 2011 – scheduled to begin operation December 2011 – assuming operation from 2020
Of those under NRA review/ applied – as of April 2015							164	14-16.70%	
Existing construction completed and operated – 2030							173.2	14.8-17.60%	
All available reactors operated including those yet to be reviewed, and beyond 40 years							268.5	22.9-27.30%	
On the basis that only reactors less then 40 years operate in 2030							77.5	6.6-7.90%	
Excluding those reactors less than forty years of age in 2030, but most vulnerable to never restarting							21.4	1.8-2.10%	

2. Nuclear Power Future Reality

Scenario 1 – High case - 14-27.3% nuclear share by 2030

Under this scenario, all 24 reactors currently under NRA review are approved for restart – plus additional capacity with operation of Chugoku's Shimane 3 reactor – generating 164-173TWh or 14-17.6 percent of 2030 electricity output. If a resumption of all other reactors currently not under NRA review and operating beyond 40 years are included, this percentage rises to a generation of 268.5TWh or 22-27.3 percent of

2030's total projected electricity output.

Analysis - not all 24 reactors currently under review will restart. For example, the Tsuruga 2 reactor has been confirmed by the NRA to be located on an active seismic fault, Higashi-dori remains uncertain in terms of active fault; likely active fault lines under the Shika nuclear power plant; political block to Kashiwazaki-Kariwa units 6&7 operation; legal rulings against Takahama 3&4 and Ohi 3&4; major political opposition to Tokai-1 and Hamaoka-4 restart; and legal injunction challenges against restart of all under review will continue and could prevent multiple nuclear reactor restarts; it is unclear whether reactors such as Takahama 1&2, aged 40 and 41 years, will pass NRA review given age-related issues. It is also highly uncertain if, or which, reactors not currently under review will apply to the NRA approval. For example, Ikata 1 and Ohi 1&2 are already 37-38 years old. The two Kashiwazaki Kariwa reactors (units 6&7) under review remain blocked from restart by political opposition in Niigata and will face legal challenge. The failure to operate these two will also stop any restart for the remaining Kashiwazaki Kariwa plants. The Hamaoka unit 5 reactor is unlikely to restart operations, and there are major questions over the restart of unit 4 currently under NRA review. The assumption is that there is no new construction beyond the current two (Ohma and Shimane 3), and TEPCO's Higasho-dori reactor is cancelled.

Conclusion: Such a high nuclear scenario is unrealistic and Japan will not be able to reach 14 percent of its electricity share from nuclear power by 2030. Consequently, there are no prospects of generating the proposed Government target of 20-22 percent or the maximum scenario of 27.30 percent of its electricity from reactor operation. Multiple reactors currently under NRA review will not restart while others will not apply for NRA review, many, if not all, of the older reactors that are currently in the 35 year range as of 2015 are unlikely to be operating in 2030, and a number of reactors will not pass the current NRA review, or will fail to secure legal and or political approval for restart.

Scenario 2 – Low cases – between 1.8-2.1 and 6.6-7.9 percentage nuclear share by 2030

All reactors (those currently under review and those not under review) are operated to a maximum of 40 years – generating 77.5TWh or 6.6-7.9 percent of 2030 electrical output. All reactors forty years or above are permanently shutdown. Taking into account those reactors less than 40 years old but that have major issues – technical, legal and public/political - the electricity share could be as low as 1.8-2.1 percent of the projected 2030 generation.

Analysis: A key to these scenarios are that reactors approaching 40 years will either require too large an investment to bring them up to more modern standards, are of a smaller capacity, are unable to pass NRA review, and/or fail to garner political, public and legal approval.

Aging challenge

While Kansai Electric has applied for NRA review of three reactors that are in the 40 year range (Takahama 1 Takahama 2 and Mihama 3) it is by no means certain that a/they will pass the review, and b/ that Kansai Electric will actually restart these reactors. Japanese utilities are faced with one of the oldest nuclear power programs in the world – as of April 2015 Japan's remaining nuclear reactor fleet (including Fukushima Daiini) has an average age of 29.3 years, with seven reactors 37 years or older (not including the five reactors permanently shutdown in March 2015). The average

age of reactors worldwide in 2014 was 28.5 years.

Globally the age structure of reactors of the 153 reactor units already shut down (not including the five announced shutdown in Japan in March 2015) highlights the reality that many, if not all, reactors in Japan will likely shutdown due to age in the coming decade.

As of July 2014, the average age of the 153 reactors that were permanently shutdown for decommissioning was 24 years. In total, 45 reactors worldwide operated for 30 years or more, and of those, 20 reactors operated for 40 years or more. The majority of these were Magnox reactors located in the U.K. As they were designed to produce weapons-grade plutonium, these were all small reactors (50–490 MW) that had operated with very low burn-up fuel and very low power density (watts of heat per liter of core volume). Therefore there are significant differences from the large 900 MW or 1,300 MW commercial reactors whose high burn-up fuel and high power density generate significantly more stress on materials and equipment.[14] Many reactor units of the first generation operated for only a few years.

Plans to extend the operational lifetime of large numbers of reactor units to beyond 40 years globally, but particularly in Japan, is both unrealistic and dangerous.

Of Japan's newest reactors, those that will not reach their 40 year age by 2030, there are a significant number that are most vulnerable to never restarting operations due to a combination of factors including public and political opposition, technical obstacles – including seismic related, and as a consequence of successful legal challenges. These are:

Shika units 1 and 2 (3.1 and 9.2TWh) Hamaoka 5 and possibly 4 (7.4 and 7.5TWh) Higashi-dori 1, Onagawa 3 (5.3TWh) Kashiwazaki units 3 and 4 (7.3 and 7.1TWh)

Conclusion: The significance of these newer reactors not restarting is that they are some of the largest capacity nuclear plants in Japan. Failure to operate these will significantly reduce nuclear electrical output. In total, non-operation of these reactors through 2030 will reduce nuclear generation by as much as 56.1TWh, which in percentage terms would be 1.8 percent of Japan's electrical output as projected by METI.

3. Renewable energy – current reality and future potential

In September 2011, Greenpeace released its Energy Revolution Japan Scenario which showed that by 2030, renewable energy sources could supply 596TWh or 56.8 percent of the nations electricity generation.[15] Even the Ministry of Environment has recently proposed that Japan could generate as much as 36 percent of its electricity by 2030.[16] But these more ambitious but achievable targets have been rejected by METI which proposes instead 22-24 percent.[17] However, beneath the surface lies the deliberate policy of METI to under-develop renewables. In 2012, 95.8 TWh or 10.3 percent of

[14] World Nuclear Industry Status Report 2014, Mycle Schneider, Antony Froggatt, July 2014, http://www.worldnuclearreport.org/IMG/pdf/201408msc-worldnuclearreport2014-hr-v4.pdf

[15] The Advanced Energy Revolution: A Sustainable Energy Outlook for Japan, Greenpeace, September 2011, http://www.energyblueprint.info/fileadmin/media/documents/national/2012/10_japan_E_R__national_report_lr.pdf

[16] "Japan Could Triple Power From Renewables by 2030, Study Shows", Bloomberg April 5th 2015, http://www.bloomberg.com/news/articles/2015-04-06/japan-could-triple-power-from-renewables-by-2030-study-shows

[17] "Japan's CO2 emissions goal to use 2013 as base year", Nikkei Asian Review, April 26 2015, http://asia.nikkei.com/Politics-Economy/Policy-Politics/Japan-s-CO2-emissions-goal-to-use-2013-as-base-year

Japan's electricity was supplied by renewable energy, which, when broken down by technology, shows that of this total 87 percent (83.6TWh) was generated by hydro electric.[18] Even if between 2015 and 2030 most new renewable is solar photovoltaic development, which it likely will be, METI is proposing to increase renewable generation by between 119.2TWh and 184TWh[19] [20] Is this possible on current trends ?

Solar growth in Japan has been strong in the last few years. In 2012 Japan generated 3.1TWh solar electricity; in the year to March 2014 this increased to 13.6TWh. The potential to install additional capacity that would generate up to 70TWh on the present trend is clearly there but the prospects are looking less likely.[21] The nuclear utilities and METI are putting up obstacles to block this growth rate.

In October 2014, five utilities announced they were suspending access to their electricity grids for renewable energy.[22] The utilities claimed that further feed-in of renewable energy could endanger the stability of their grids. This sudden move to block renewable energy was a shock to the renewable energy industry and led to METI setting up a special committee to assess the issue. The result in early 2015 was the passing of regulations based on a system with a new renewable energy output-control scheme and a revision of the current operation system for the Feed In Tariff scheme.[23]

The fundamental problem with the new rule is that it effectively caps the growth of renewable energy by giving priority to nuclear and fossil fuel rather than to renewables. The cap amount is based on a calculation involving restarting all existing nuclear reactors, which would mean energy from nuclear plants would be the same as it was over the last 30 years and before the Fukushima disaster. Even the discredited new energy mix from METI is not proposing a return to this level of nuclear generation.[24] The new regulations ignore the range of technological adaptation measures available to extensively increase the capacity of grids and that Japanese utilities have applied a narrow definition for their capacity limits for feeding in renewables, choosing criteria that reduce the amount of renewable energy their grids can actually integrate.[25] This shows the clear preference of METI and the utilities for the existing energy system and their clear aim to maintain the predominance of nuclear and fossil fuel generation. The commitment to a 60 percent base load target for 2030 encapsulates the current flawed government policy.[26]

The situation for wind energy growth is even more critical. In 2012 wind generated electricity supplied 4.83TWh, in 2013 this had increased by 0.143TWh to 4.98TWh. In contrast, also in 2013, Germany generated 53.4TWh from wind energy, and a total of 8.9 percent of the nations electricity.[27]

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18 JREF table based on the ANRE/METI (2014) Energy Balances 2012, and ANRE/METI (2012) Status Report 2011 on Special Measures Law Concerning the Use of New Energy by Electric Utilities, http://www.jref.or.jp/en/energy/statistics2/energy_01.php#energy_0102

19 Depending on percentage share achieved and total generation demand – between 1170TWh or 980TWh.

20 In the year to March 2013, Japan generated an additional 2.4TWh of solar and 0.184TWh of wind electricity - http://www.jref.or.jp/en/energy/statistics2/energy_02.php#energy_0202

21 17.3 GW Of Approved FiT Solar PV Projects In Japan Being Canceled Due To "Insufficient Grid Capacity" December 31st, 2014 http://cleantechnica.com/2014/12/31/17-3-gw-approved-fit-solar-pv-projects-japan-canceled-due-insufficient-grid-capacity/

22 Hokkaido, Tohoku, Shikoku, Okinawa and Kyushu Electric.

23 http://www.meti.go.jp/english/press/2014/1218_01.html

24 http://www.meti.go.jp/committee/sougouenergy/shoene_shinene/shin_ene/keitou_wg/pdf/003_09_00.pdf

25 Japanese Utilities Hinder Clean Energy, Greenpeace Japan Briefing January 2015, http://www.greenpeace.de/sites/www.greenpeace.de/files/publications/final_engrid_report_jan2015.pdf

26 LDP stealthily seeking to raise nuclear energy dependence, Asahi Shimbun, April 3rd 2015, http://ajw.asahi.com/article/behind_news/politics/AJ201504030042

27 International Energy Agency Wind Energy Country report Germany, 2014, https://www.ieawind.org/annual_reports_PDF/2013/Germany.pdf

In one year, Germany increased wind generation by 2.7TWh, equivalent to 56 percent of the total installed capacity in Japan. The Greenpeace Energy Scenario calculated that Japan could generate 179TWh of electricity from wind power by 2030. On present growth rates it would take Japan over 1200 years to reach this generation – but with the right policies Japan could install a significant percentage share of wind generation – and by 2030.

In the fifteen years to 2014, Germany increased its wind generation output from 4.5TWh to 53.4TWh.[28] Japan, with the the benefit of major cost reductions in wind power and economies of scale – significantly larger turbines are available today than 15 years ago – could be a beneficiary. But this will not materialize with current energy policy. On-shore wind energy development is currently being held up by requirements to conduct environmental impact assessments which take 3 years. The prospect for off shore wind development is better, both in terms of potential resource and less restrictive planning regulations. With such poor prospects for wind generation under current policy, especially on-shore, due almost entirely to government policy, there is every prospect that Japan will not achieve the government new renewable target with a potential shortfall of perhaps as much as 100TWh.

4. Japan's Energy Mix Reality – Failed Nuclear and Renewable Policy and Implications

As a consequence of its current energy policy, based on an impossible nuclear share and a low, but possibly unattainable, renewable target, Japan by 2030 will miss even its very low carbon emission target. Fossil fuel use will continue to be the predominant energy source. The opportunity to create an energy transition in Japan with an economy based on reliable, affordable renewable energy and energy efficiency will have been missed. The evidence is clear: Japan has the potential to be nuclear free, generating a high percentage share from renewable energy, combined with a major reduction in energy demand. An energy policy based on these principles would see Japan, by 2030, well on the way to substantial and essential reductions in its carbon emissions and less dependent on the import of fossil fuels.

Japan's reliance on nuclear power to generate 20-22 percent of its electricity by 2030 will not be achievable in the coming years. A more likely share will be in the range 2-8 percent. While this cannot be admitted by the Abe government, METI or the utilities, in energy planning terms its what should be a major determinant for the present energy mix debate, and its implications for setting an achievable national climate commitment. Unfortunately it is not. The consequences are that a low 2030 renewables target of 22-24 percent will be adopted in July 2015, with an unrealistically high nuclear share of 20-22 percent. The Government will set a fossil fuel electricity generation figure of 56%, largely coal and LNG.

One obvious consequence of setting a energy mix and carbon reduction target based on an unattainable nuclear share and unattainable renewable target, as a result of industrial and government policy, is that when it fails to materialize, Japan could be faced with a potential 20-30 percentage shortfall of electricity generation. Given the determination of major forces in METI and the nuclear utilities to place limits on renewable growth, the only likely option they will then adopt will be to increase fossil fuel use. The conclusion is that the current Japanese government cannot be

[28] International Energy Agency Wind Energy Country report Germany, 2001 https://www.ieawind.org/annual_reports_PDF/2000/Germany.pdf

relied upon to set a credible climate target in advance of the June G7.

It is a critically important time for setting ambitious climate goals, including at the G7 in June and the Paris Summit in November. In tying its carbon reduction plans to wholly unrealistic nuclear generation targets, and by restricting renewable growth, the Japanese government is trying to deceive not only its own people but also the international community.

5. Greenpeace recommendations on Japanese Energy Policy

- Japan must set an ambitious national target to increase renewable energy;
- Japan must give priority access and dispatch for renewables before other energy sources;
- Unbundling of electricity generation, transmission and distribution must be comprehensive and effective;
- New policies must optimize the grids towards full market integration on the national level while breaking down the monopolistic structure in regional markets;
- Inflexible nuclear power plants must be replaced with a combination of variable renewable energy sources with flexible gas plants as a 'bridge' (as flexible gas plants are able to quickly respond to electricity spikes and dips);
- Ambitious investments in energy efficiency and demand management must prioritized.

For further information:

Shaun Burnie – Senior Nuclear Specialist, Greenpeace Germany
sburnie@greenpeace.org
Jan Vande Putte – Senior Nuclear Specialist, Greenpeace Belgium
jan.vande.putte@greenpeace.org
Kendra Ulrich – Senior Global Energy Campaigner, Greenpeace Japan
kendra.ulrich@greenpeace.org
Hisayo Takada – Climate/Energy Campaigner, Greenpeace Japan
hisayo.takada@greenpeace.org