

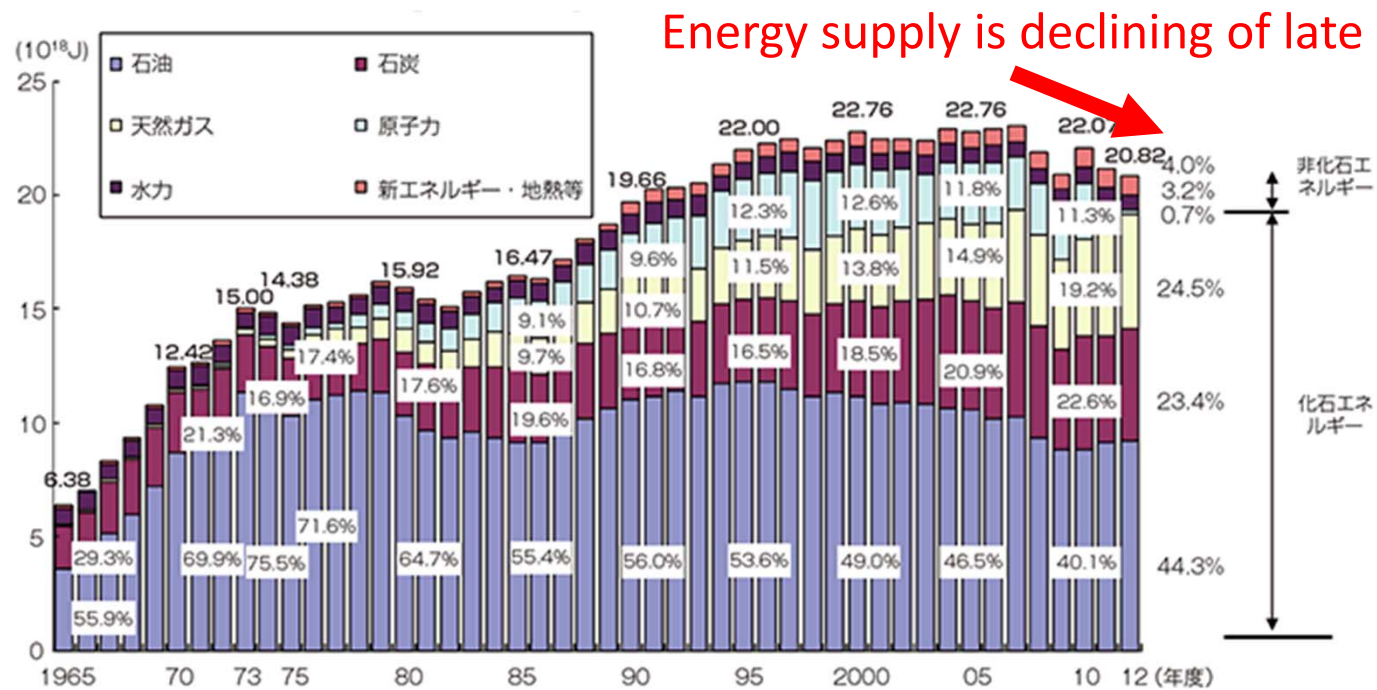
**PECC International Project: Energy Transition and New Economic Models 2013-2014,  
Seminar 3. Energy Transition: A challenging perspective for the Pacific Islands  
and Coastal Areas**

**Nov. 26-28, Noumea, New Caledonia**

**Session 4:  
Economic Models and financing policies for energy transition in the Pacific  
and coastal areas**

**“Development Plans for RE for a smooth energy transition-the Japanese model”  
Mutsuyoshi Nishimura  
nshmr6@gmail.com**

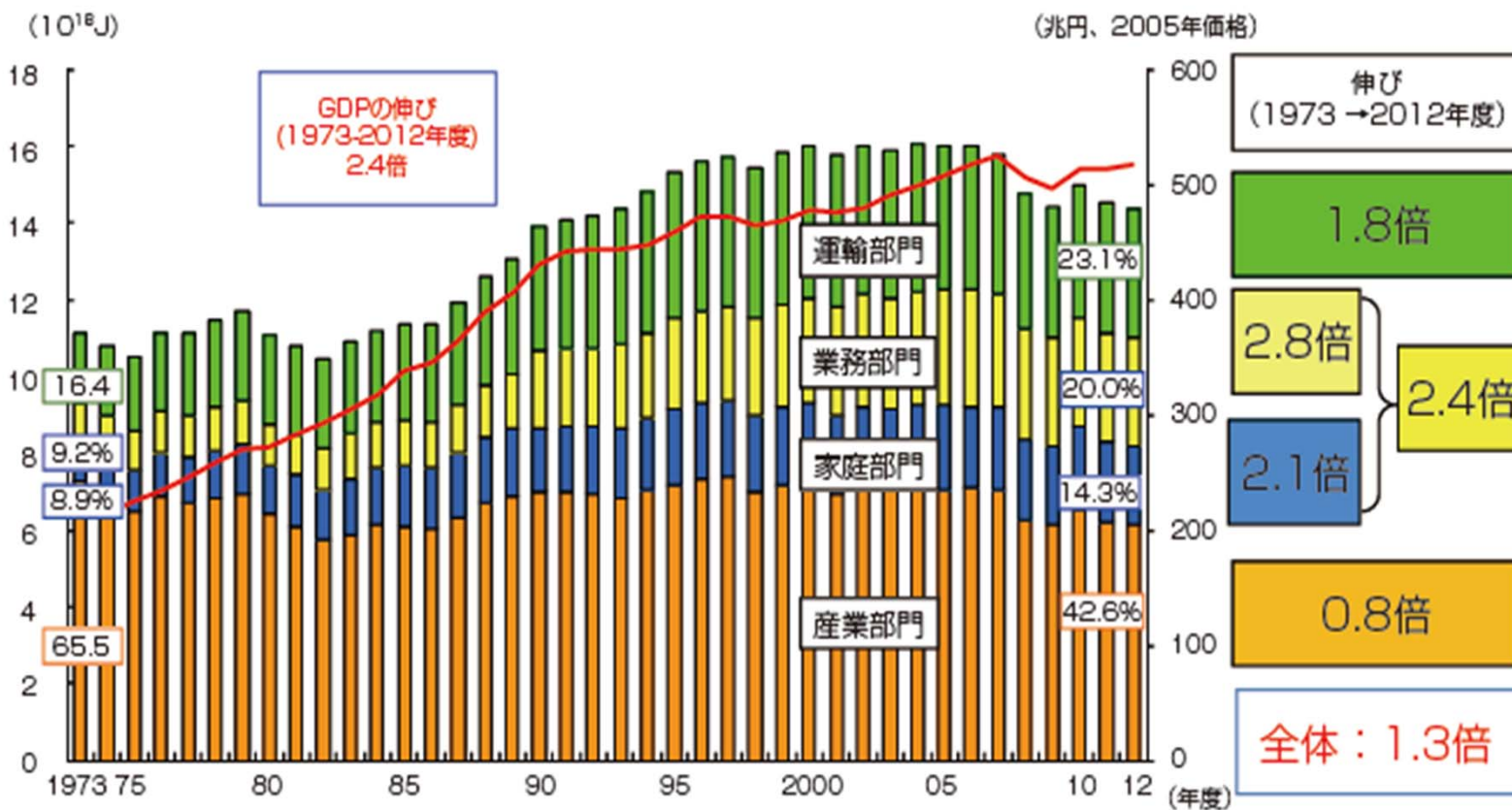
# Primary Energy Supply in Japan



METI Energy White Paper 2014

## Final Energy Consumption vs GDP growth (1973-2012)

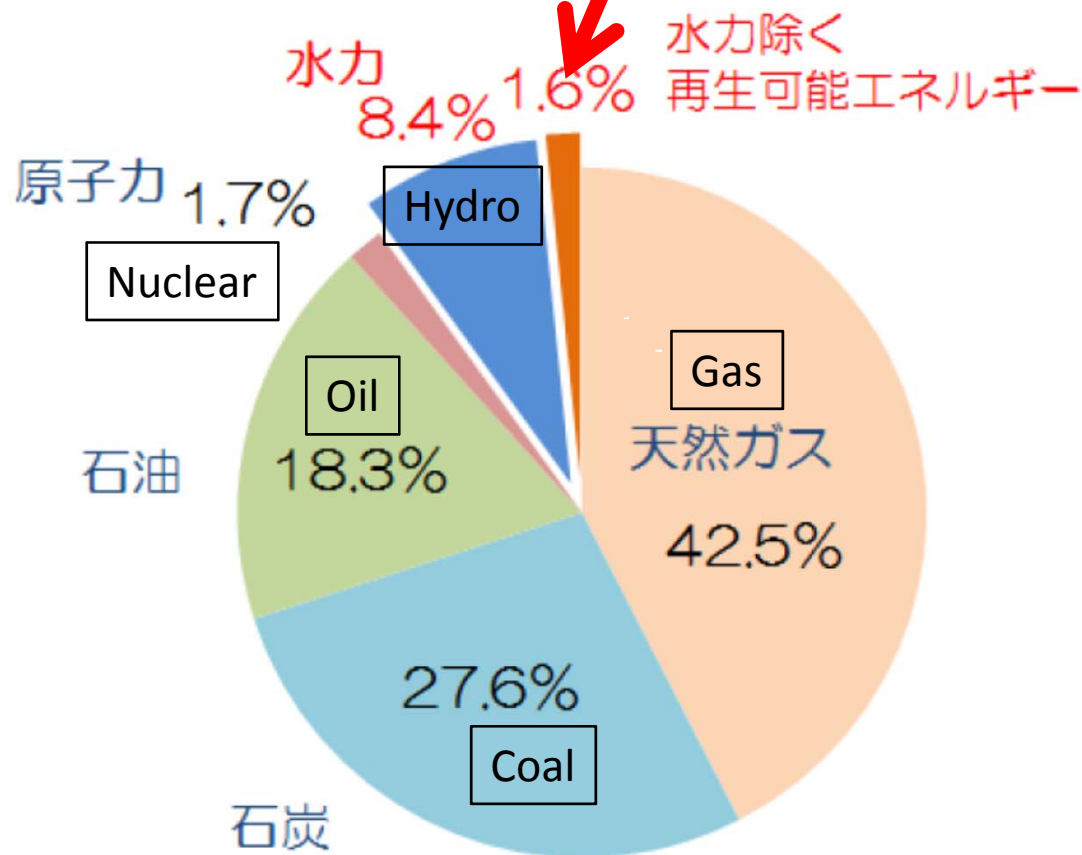
Decoupling is being achieved.....as GDP grew 2.4 times while energy use 1.3 times



METI Energy White Paper 2014

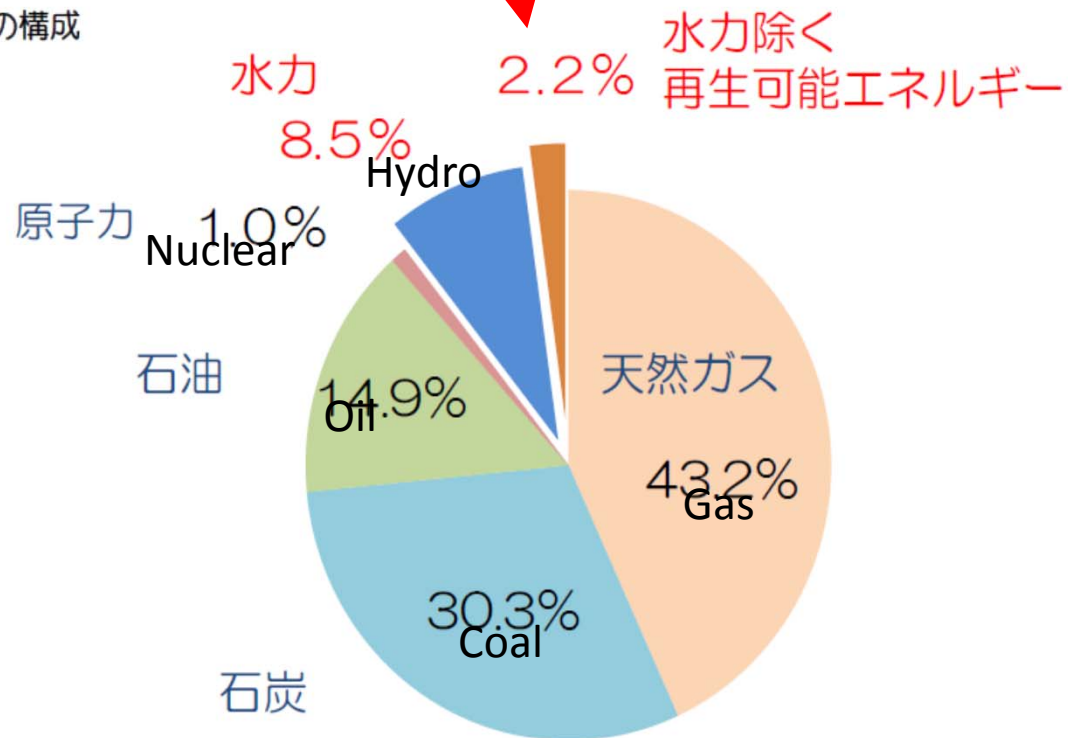
**RE in power generation is a tiny factor  
It was 1.6% in 2012**

【我が国の発電電力量の構成(2012年度)】



**RE' s share increased and stood at 2.2% in 2013....**

【我が国の発電電力量の構成  
(2013年度)】

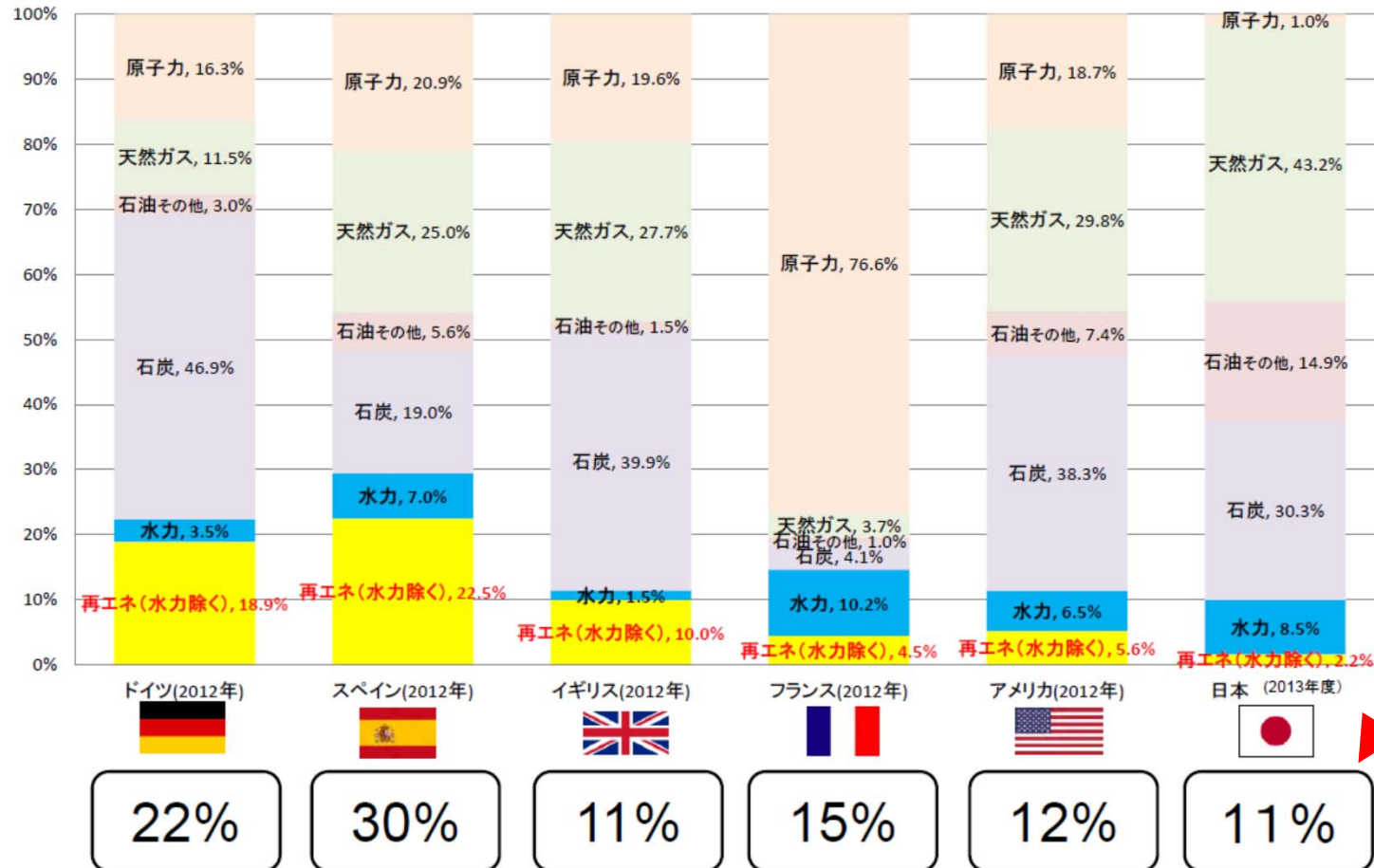


(出所) 電気事業連合会「電源別発電電力量構成比」

# Share of RE in power generation by country

## Japan getting nearer to the pack....

発電電力量に占める割合)



【出所】日本:「電源開発の概要」等より作成

ドイツ、スペイン、イギリス、フランス、イタリア、アメリカ:2012年推計値データ、IEA. Energy Balances of OECD Countries (2013 edition)

## Power Generation by REs increasing exponentially after introduction of FIT in 2012...

Modest increase of 5% p.a.  
2003-2008

Stronger increase of 9% p.a.  
2009-2012

**Big jump by 32% due to  
FIT from 2012**



METI Energy White Paper 2014

FIT is key policy tool for JPN's RE expansion  
but....

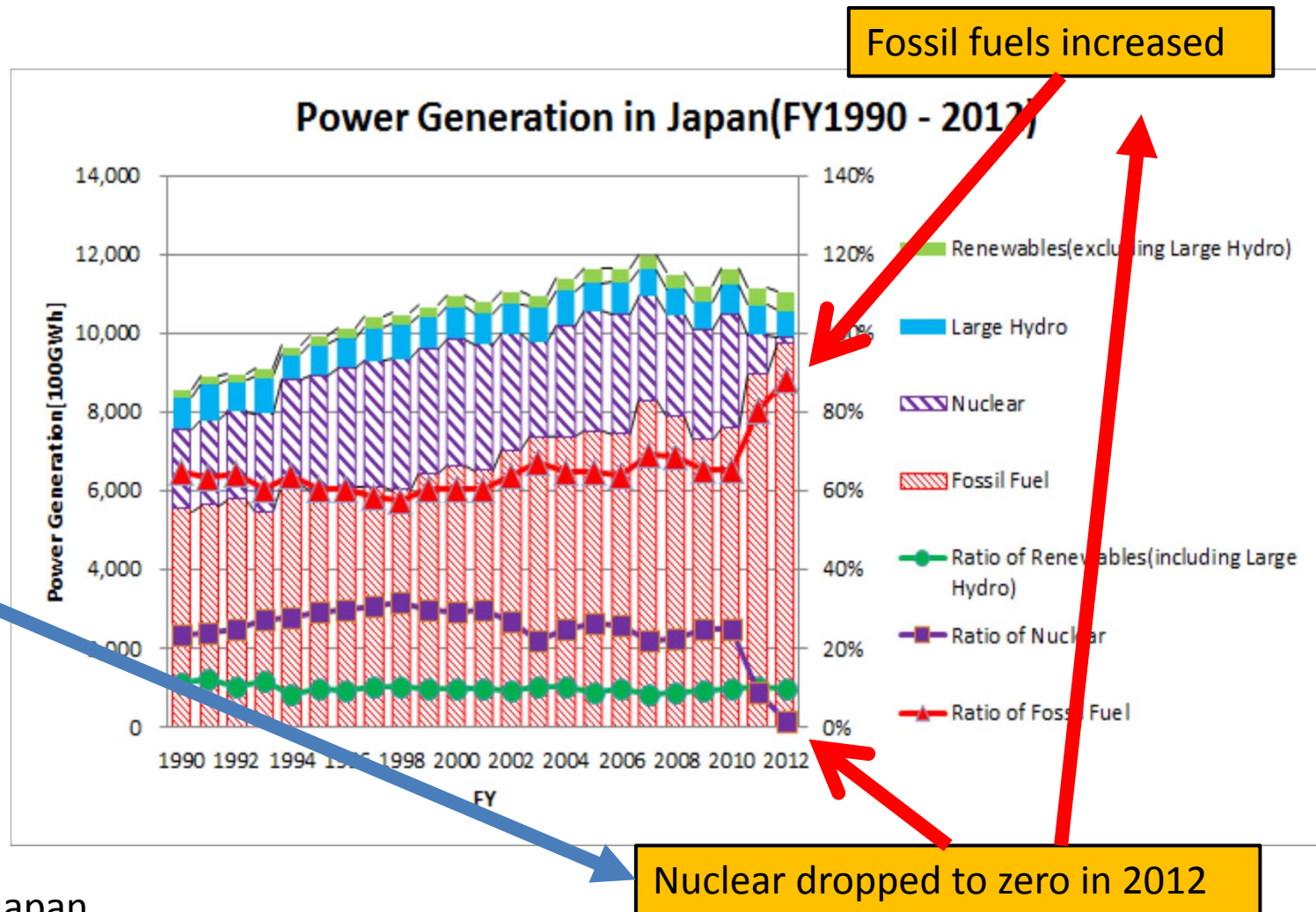
FIT is not devoid of problems...such as the  
difference between;

- Approved RE capacity under FIT    70GW
- Actual output in operation            9GW

This and many other problems are to be dealt  
with as FIT is going through its “learning curve”



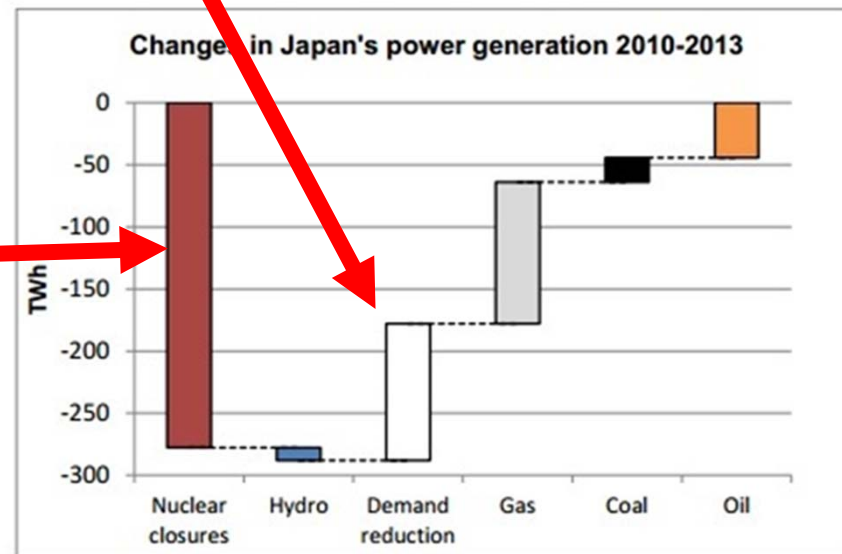
At the bottom, there is uncertainty about how to fill in the power vacuum created by Fukushima...



**Fukushima vacuum (\*) were filled in a large part by efficiency and conservation**

**Efficiency and conservation**

**Fukushima vacuum**



Source: calculated from Japan's official monthly power generation statistics<sup>2</sup>.

(\*) amount of electricity which was lost due to the shut down of nuclear plants after Fukushima

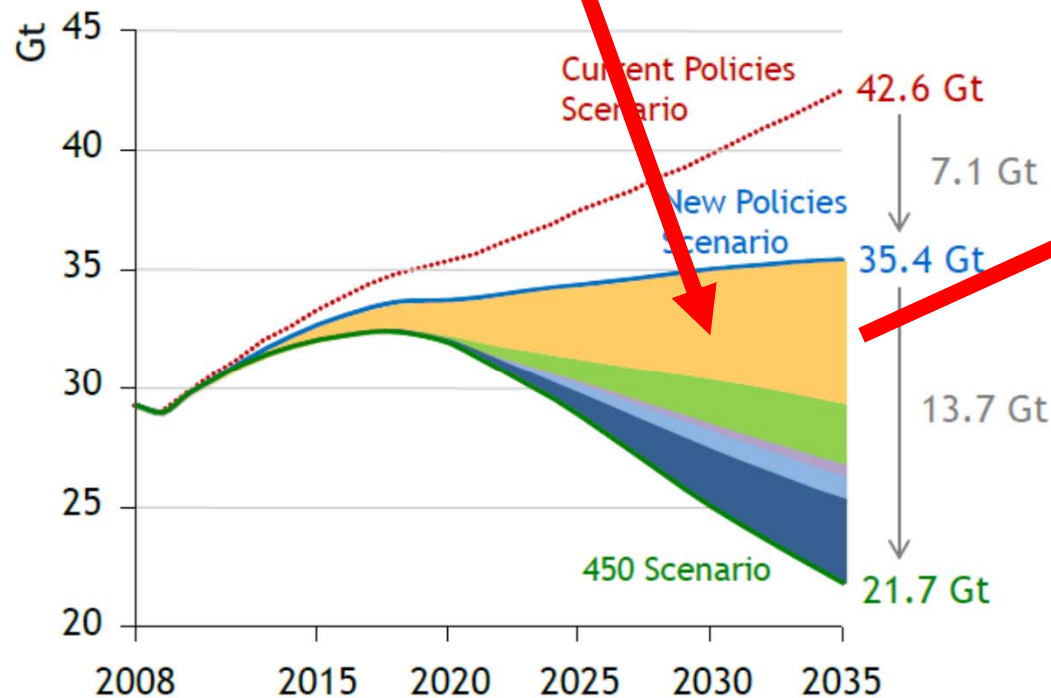
[http://www.huffingtonpost.com/justin-guay/how-japan-replaced-half-i\\_b\\_5093288.html](http://www.huffingtonpost.com/justin-guay/how-japan-replaced-half-i_b_5093288.html)

## Taking a longer-term view, JPN's aim is to use less energy and increase RE participation

Efficiency is one of the cheapest way for energy shift  
IEA projects 50% cut come from efficiency for 2C...

**Energy efficiency & conservation  
are the key**

IEA 450 Scenario Reduction requirements for 2035



Share of cumulative abatement  
between 2010-2035

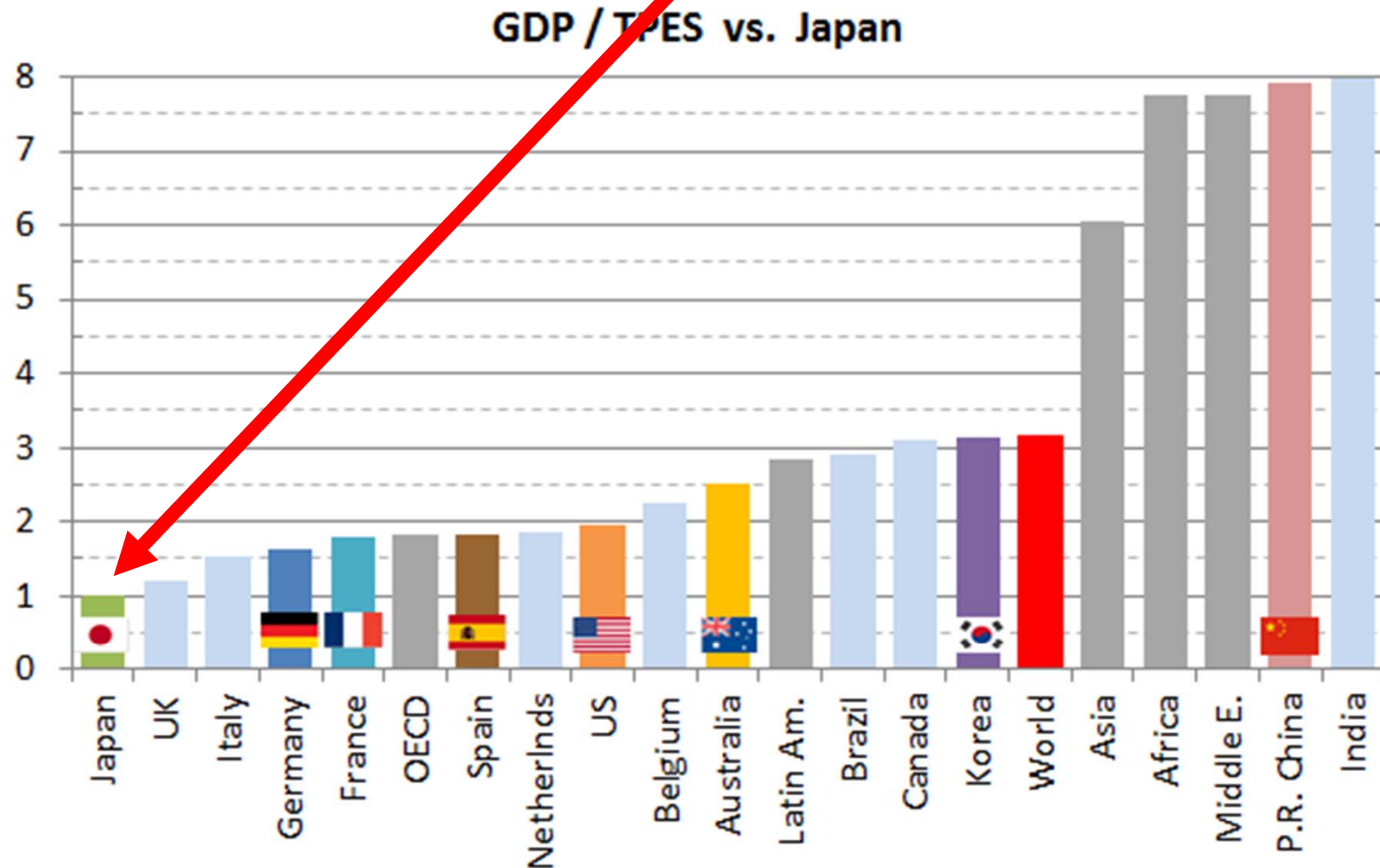
Efficiency	50%
Renewables	18%
Biofuels	4%
Nuclear	9%
CCS	20%

**Low Nuclear : NPS+0.5Gt  
High Gas :NPS -0.2Gt**

# Conservation and efficiency is crucial for energy shift in all countries

We used to say JPN was no.1 in efficiency...

We used to say JPN is the driest towel....(la serviette la plus seche)

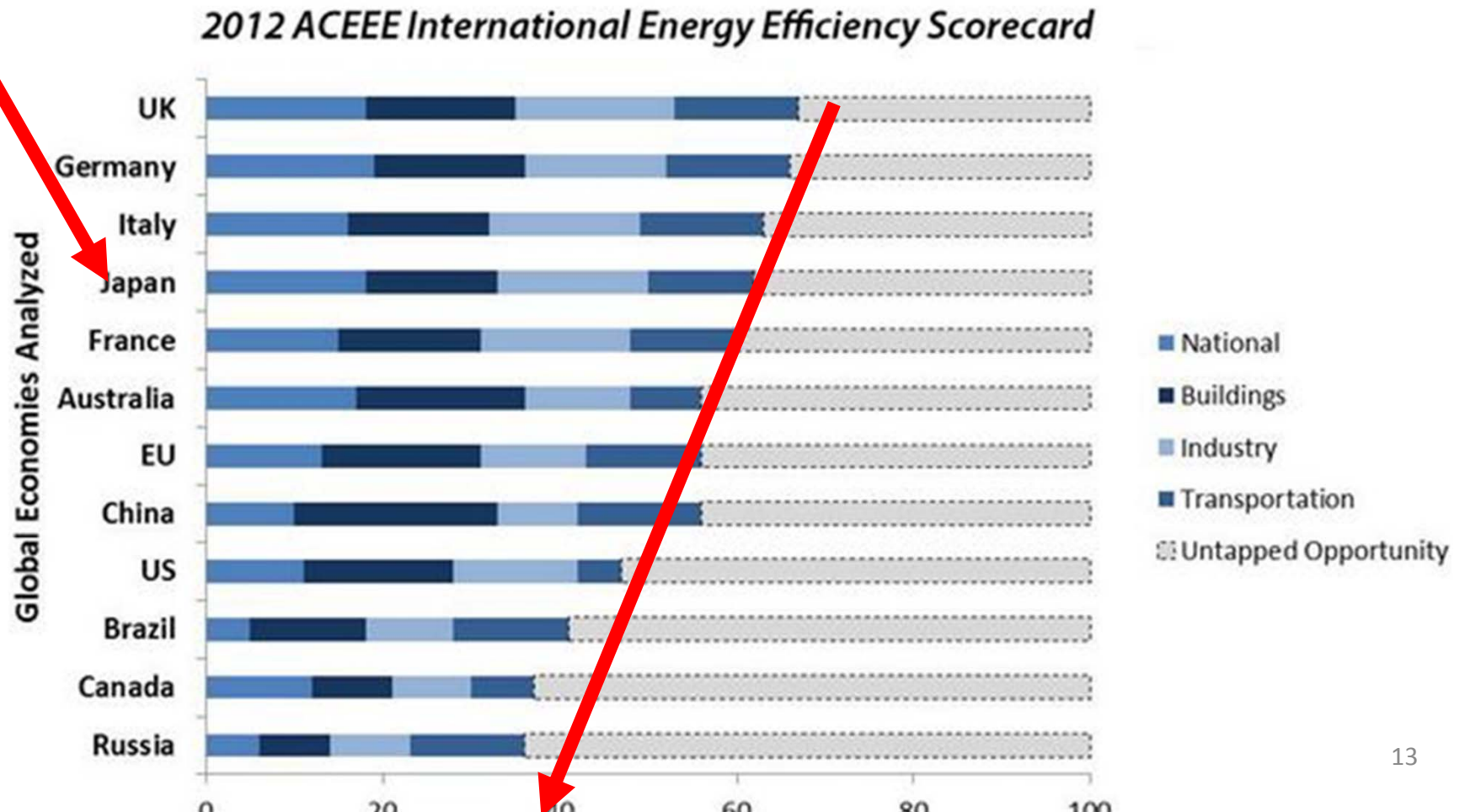


**GDP** : Gross Domestic Product  
**TPES** : Total Primary Energy Supply

Source: [IEA Key World Energy Statistics 2011](#)  
2009 Data

But today things are more diversified....

One thing is certain...even “dry-towel JPN” has had huge savings...  
Why not in many other countries...



## Conservation and Efficiency are crucial for Japan's energy shift

**“Dry-towel Japan” is now readying itself for yet another round of energy conservation... by cutting energy consumption by 40% by 2050...are we really?**

*....Energy cut of 40% by 2050 is possible as long as JPN shifts from manufacturing-centered economy to more on other growth sustaining sectors like ICT, financial services etc. Efforts in energy saving itself would provide a new driver for sustainable growth of Japan....*

**“Energy Consumption Down 40% in Fiscal 2050 by Economic Structural Changes, Energy Conservation is a Growth Engine”**

**Japan Center for Economic Research paper dated Nov. 4, 2014**

**<http://www.jcer.or.jp/eng/research/policy.html>**



## Another key for energy transition...price of RE going down drastically People now talk about “RE Revolution”

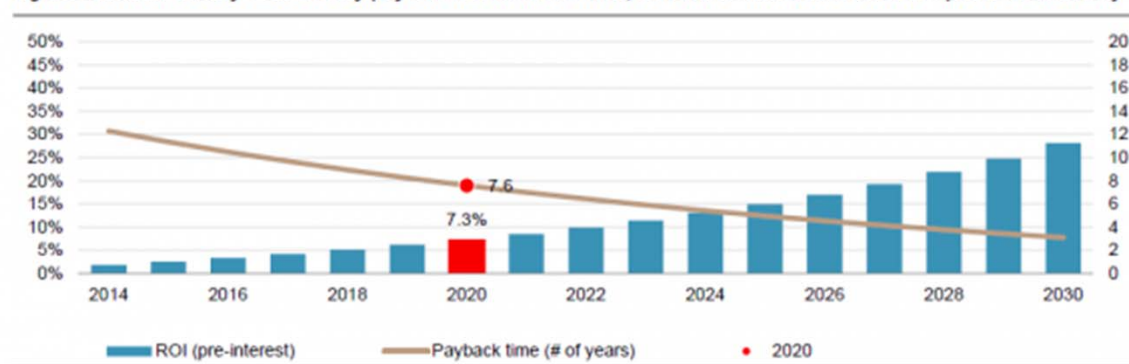
*Analysts from UBS and Citigroup, two of the world’s largest investment banks, believe the growth of solar power, in combination with advances in batteries and electric cars, will cause a huge disruption in the energy industry.*

*UBS believes centralized fossil fuel generation will become “**extinct**” sooner than most people realize.*

*“Large-scale power generation, however, **will be the dinosaur** of the future energy system: Too big, too inflexible, not even relevant for backup power in the long run,”*

*Citigroup predicts renewables will replace coal and gas in power generation, which will free up the use of gas as a substitute for oil in transport.*

Figure 4: Solar + battery + EV already pay off in certain countries, but economics should further improve dramatically



## Costs getting cheaper each year.... renewables continue to surprise.

Lazard Releases New Levelized Cost of Energy Analysis

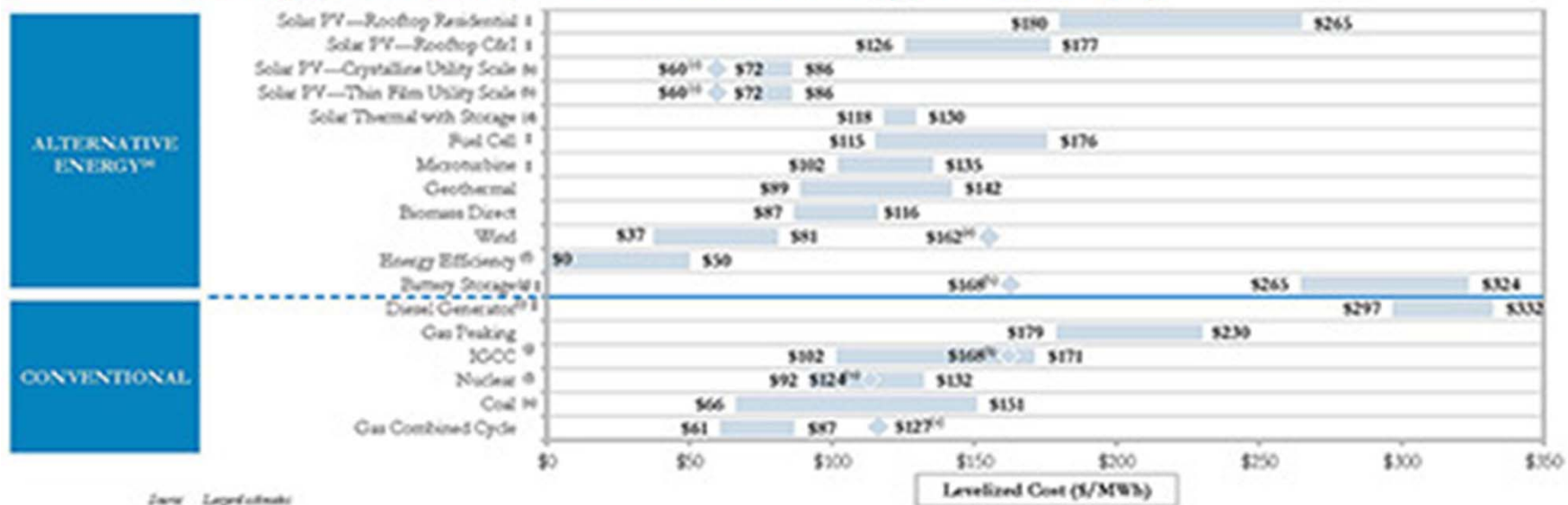
- Costs of renewable energy sources continue to drop –
- Study highlights need for diverse power generation technologies –

<http://www.businesswire.com/news/home/20140918005081/en/Lazard-Releases-Levelized-Cost-Energy-Analysis#.VHJ2LYusVkt>

September 18, 2014 08:00 AM Eastern Daylight Time

### Unsubsidized Levelized Cost of Energy Comparison

Certain Alternative Energy generation technologies are cost-competitive with conventional generation technologies under some scenarios; such observation does not take into account potential social and environmental externalities (e.g., social costs of distributed generation, environmental consequences of certain conventional generation technologies, etc.) or reliability-related considerations (e.g., transmission and back-up generation costs associated with certain Alternative Energy generation technologies)



click to enlarge



## Some notable quotes arguing RE's mainstreaming by dramatically reducing its prices

1. "UBS: Time to join the solar, EV, storage revolution"

<http://reneweconomy.com.au/2014/ubs-time-to-join-the-solar-ev-storage-revolution-27742>

2. CITI Research Commodities "Energy 2020: The Revolution Will Not Be Televised as Disruptors Multiply"

<http://tecsol.blogs.com/files/citi--rapport-%C3%A9nergie-08-14.pdf>

convey

3. "UBS and Citigroup expect massive solar-EV revolution"

<http://www.energypost.eu/ubs-citigroup-warn-investors-massive-revolution-energy-industry/>

4. "How free markets are making solar energy feasible without subsidies"

<http://www.cityam.com/article/1392944530/how-free-markets-are-making-solar-energy-feasible-without-subsidies>

5. Renewable Energy Prices Drop dramatically (again)

October 1, 2014

<http://climatecrocks.com/2014/10/01/renewable-energy-prices-drop-50-percent-since-2008/>

6. How solar energy could be the largest source of electricity by mid-century

To achieve that vision, IEA reports call for clear, credible consistent signals from policy makers 29 September 2014 Paris

## Talking about global energy transition, we have to couple the Paris deal with **a global phase-out commitments**

The Paris deal will most likely be a commitments **though 2030**

IPCC-AR5 talks about global path for 2C as;

(a) minus 40-70% by 2050

(b) **phase-out (net) CO2 emissions by 2100 (some argue by 2070)**

Most OECD countries pledge going minus 80-95% by 2050

Most vulnerable countries can leapfrog to near-zero emissions in coming decades

Emerging economies like China and India can phase-out by the end of the century...

If not earlier.

**Most experts concur;** all technologies are available today & some more would come from around the corner for achieving 2C in time

**Phase-out (net) is possible and indispensable for the global energy transition for 2C**

# So my conclusions;

## JPN's energy transition would be realized mostly through;

- (1) Conservation and efficiency...people still love to be frugal...will they be in 2050?
- (2) Continued investment in technologies and innovations
- (3) Policy framework like improved FIT etc.

## On global energy transition;

- (1) Conservation and efficiency
- (2) Pricing of carbon to harness right technologies & conservation
- (3) Phase-out commitments
- (4) Helping vulnerable countries

**World deserves better assurances for 2C.**