

# Japan's Energy Situation and Its Economic Impact – A View from Abroad

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## Today's Agenda

- ◆ The View from Abroad
  - General public's opinion
- ◆ The View from Abroad
  - Expert and industry opinion
- ◆ The Economic View
  - What are the repercussions for Japan's economy?
- ◆ Some Uncomfortable Questions

## What do “people” think about Japan’s current energy situation?

- ◆ Perhaps not much
- ◆ Two important things one needs to know
  - 1) Japan is an island country.
  - 2) Japan is 99% dependent on energy raw material (coal, gas, etc.) imports.
- ◆ Many people may know this, but they have not connected it to the Fukushima crisis.

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## Germany: Not an Island Country



Connected to existing European grid

Germany can afford to bet on solar and wind: Backup readily available

● Nuclear power plant, Planned or active 2009

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Source: <http://www.theresilientearth.com/?q=content/sweden-reverses-course-nuclear-power>

# Self-Sufficiency Ratio in 2007

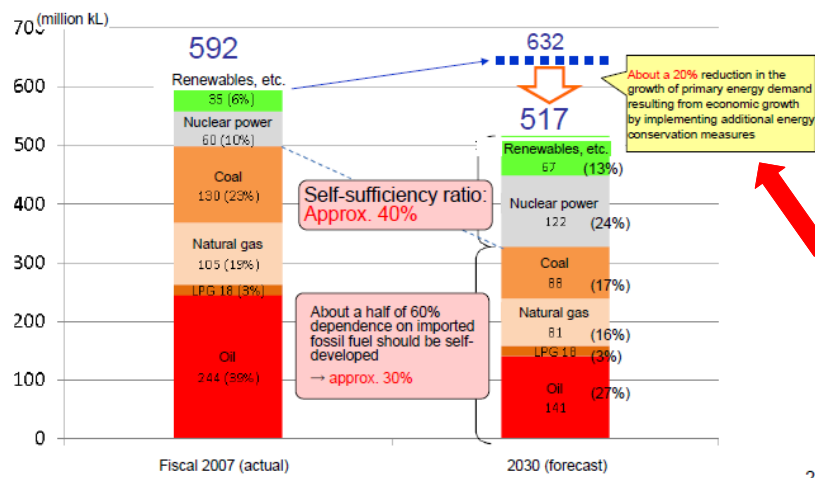
- ◆ Japan's energy mix
  - Domestic: 6% renewables, 10% nuclear\*
  - Imports: 23% coal, 19% gas, 3% LPG, 39% oil
- ◆ Note:
  - "self-sufficient" (domestic) is also "zero emission"
  - "import" is also "expensive"
- ◆ Masayoshi Son's idea:
  - Grid to China; to "liberate" Japan to rely more on renewables

\*data differ slightly depending on source

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Source: IEEJ data

# One Challenge: Dependency



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Source: IEEJ 日本エネルギー経済研究所

## The View from Abroad: Expert\* Opinion

- ◆ Shocked!
  - Japan was the best in the world to manage complex energy policy challenges
- ◆ Japan's nuclear industry was a leading standard
  - Superior engineering, "monozukuri" skills, "anzen daiichi" attitude, long experience
    - Massive safety investments after Three Miles Island/Chernobyl
    - Coherent policy plan
- ◆ Now: no one understands the full risks of nuclear?

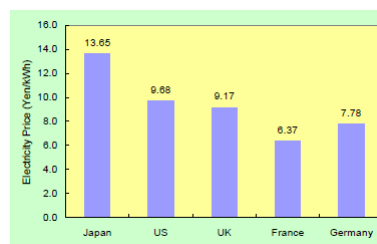
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\*Experts = policymakers, industry, researchers

## What will happen to the "Japan Premium"?

- ◆ Japan has long paid a premium
  - Insurance fee to secure stable supply
- ◆ Japan's power generation is structured as local monopolists
  - No interconnection in gas or electricity
  - Worked well for the 9 電力会社
- ◆ This may now end
  - Could bring interesting dynamics to world energy markets
- ◆ As it is, energy is very expensive for Japan's industry

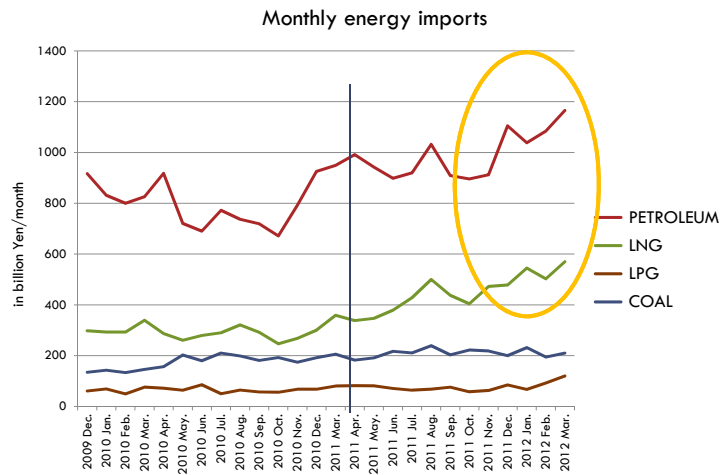
Electricity Price for Industry (2000)



Source: ANRE, Japan  
(<http://www.enedo.meti.go.jp/hokoku/html/16011300.html>)

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## After Fukushima...



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Calculated from:  
<http://www.e-stat.go.jp/SG1/estat/OtherListE.do?bid=000001008815&cycode=1>

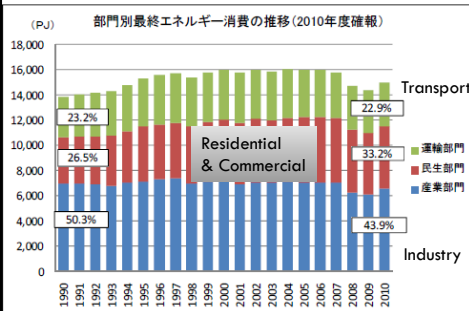
## Global Warming?

- ◆ Kyoto Protocol?
- ◆ Emissions are a critical issue
  - Do we need a new framework?
  - Will we (unwittingly) give up on the environment?

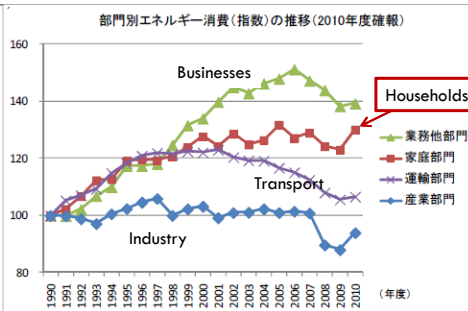
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# Who Consumes Power?

Change in final energy consumption by sector



Change in energy consumption by sector, 1990=100



Households have increased energy consumption by 30% in 20 years.

Industry consumes 44% of energy.

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METI 平成22年度(2010年度)におけるエネルギー需給実績(確報), 4/2012, p.10  
[http://www.enecho.meti.go.jp/info/statistics/jukyu/resource/pdf/r120413\\_honbun.pdf](http://www.enecho.meti.go.jp/info/statistics/jukyu/resource/pdf/r120413_honbun.pdf)

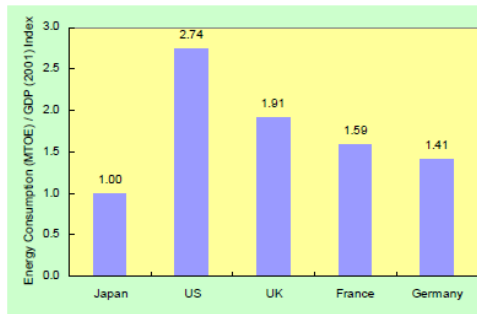
# Energy Savings as a Solution?

- ◆ The current policy advice for households and businesses to reduce air-conditioning, etc. is one reasonable suggestion.
- ◆ What about business?
  - Currently discussed as “efficiency-enhancing” measures
  - Reduction may mean change in industrial structure
    - 1973 “Oil Shock”: Japan managed the shift
    - Will the market (energy prices) now cause a similar shift?
- ◆ If energy costs get too high, some industries will be forced out. What does this mean for the economy?

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# How Much can be Saved?

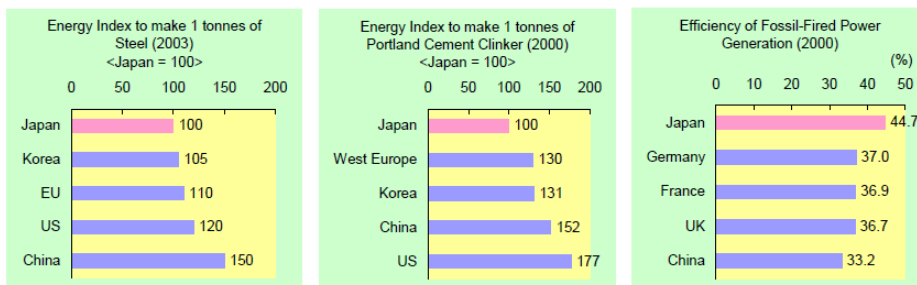
Energy Consumption per GDP (2001)



Source: The Institute of Energy Economics, Japan: "EDMC Handbook of Energy & Economic Statistics in Japan" (Annual)

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# Japan is already very energy-efficient (?)



SOURCE: Keidanren, Japan ([http://www.keidanren.or.jp/japanese/policy/2004/091/gaiyo\\_all.pdf](http://www.keidanren.or.jp/japanese/policy/2004/091/gaiyo_all.pdf))

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## Biggest Manufacturing Industry Users (2010)

Industry	Energy Consumption	% of Industry Consumption
Chemicals	2269	36.9
Steel	1743	28.4
Others/SME	872	14.2
Other 5 big industries	409	6.7
Machinery	348	5.7
Pulp&paper	338	5.5
Kiln (cement, glass, ceramics)	308	5.0
Total (of surveyed industries)	6145	na

(単位: 10<sup>15</sup>J [PJ])

This is a problem for Japan.

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Calculated from:  
METI 平成22年度(2010年度)におけるエネルギー需給実績(確報), 4/2012, p.11

## And the problem is ...

- ◆ These are among Japan's most powerful export industries. Exports have been Japan's engine of growth over the past two decades.
- ◆ Important contributions to GDP and employment.
- ◆ "Chemicals" is not just a heavy, commodity-product industry
  - it is a huge, diversified industry that forms the basis for Japan's technological leadership in materials (素材)
- ◆ Japan's steel industry is a world leader in technological developments and quality
  - forms the basis of competitive advantage in user industries, such as automobiles

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## Chemicals and Steel: 16% of Exports

	2003	2004	2005	2006	2007	2008	2009	2010
Value of Exports (trillion Yen)	54.5	61.2	65.6	75.2	83.9	81	54.2	67.4
Value of Imports (trillion Yen)	44.4	49.2	56.9	67.3	73.1	78.9	51.5	60.8
Leading Industries								
Cars	8.9	9.2	9.9	12.3	14.3	13.7	6.7	9.2
% of Total Exports	16.3	15.0	15.1	16.4	17.0	16.9	12.4	13.6
Chemicals	4.5	5.2	5.8	6.8	7.7	7.3	5.8	6.9
% of Total Exports	8.3	8.5	8.8	9.0	9.2	9.0	10.7	10.2
Electronic Parts	4.1	4.4	4.4	4.9	5.2	4.6	3.4	4.2
% of Total Exports	7.5	7.2	6.7	6.5	6.2	5.7	6.3	6.2
Iron&Steel Products	2.1	2.5	3.0	3.5	4.0	4.6	2.9	3.7
% of Total Exports	3.9	4.1	4.6	4.7	4.8	5.7	5.4	5.5

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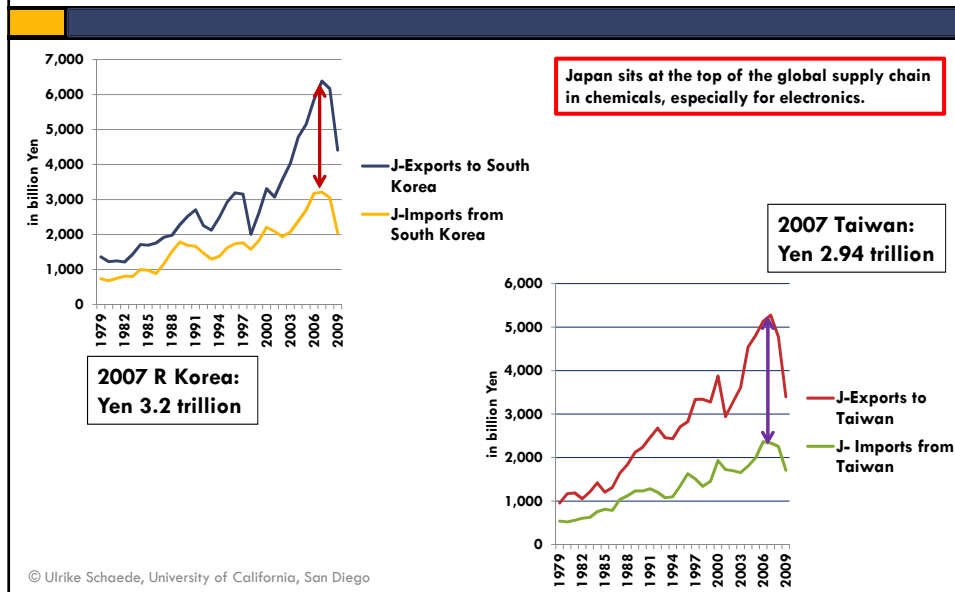
Calculated from:  
 Statistics Bureau Japan, Statistical Handbook of Japan 2007, 2011  
 Chapter 11, [www.stat.go.jp/english/data/handbook/pdf/](http://www.stat.go.jp/english/data/handbook/pdf/)

## Japan's Leadership in Chemicals (broadly defined)

- ◆ Examples: combined global market shares by Japanese companies
  - 70% in fine chemistry for electronics
  - 80% in photoresists (semiconductors)
  - 65% in carbon fiber
- ◆ These industries are located in upstream parts of the global supply chain, and highly profitable.
- ◆ Japan has over time acquired tacit knowledge in chemistry unrivaled by most other countries.
- ◆ Chemicals is a strategic industry for Japan.

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## South Korea and Taiwan have a growing trade deficit with Japan



## Implications for the Economy

- ◆ Chemicals and steel are leading components of Japan's industrial structure
  - Employment, GDP, growth, strategic knowledge creation, product leadership
- ◆ To be successful, they need affordable and reliable energy. Where will it come from?