

Int'l Superconductivity Experts Planning Mtg
Arlington, Virginia 11-12 June 2001

EPRI View of Electric Energy

Paul M. Grant

Science Fellow

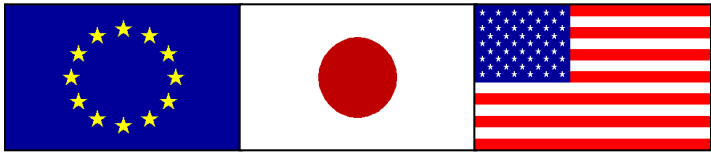
Electric Power Research Institute

Palo Alto, California USA

EPRI

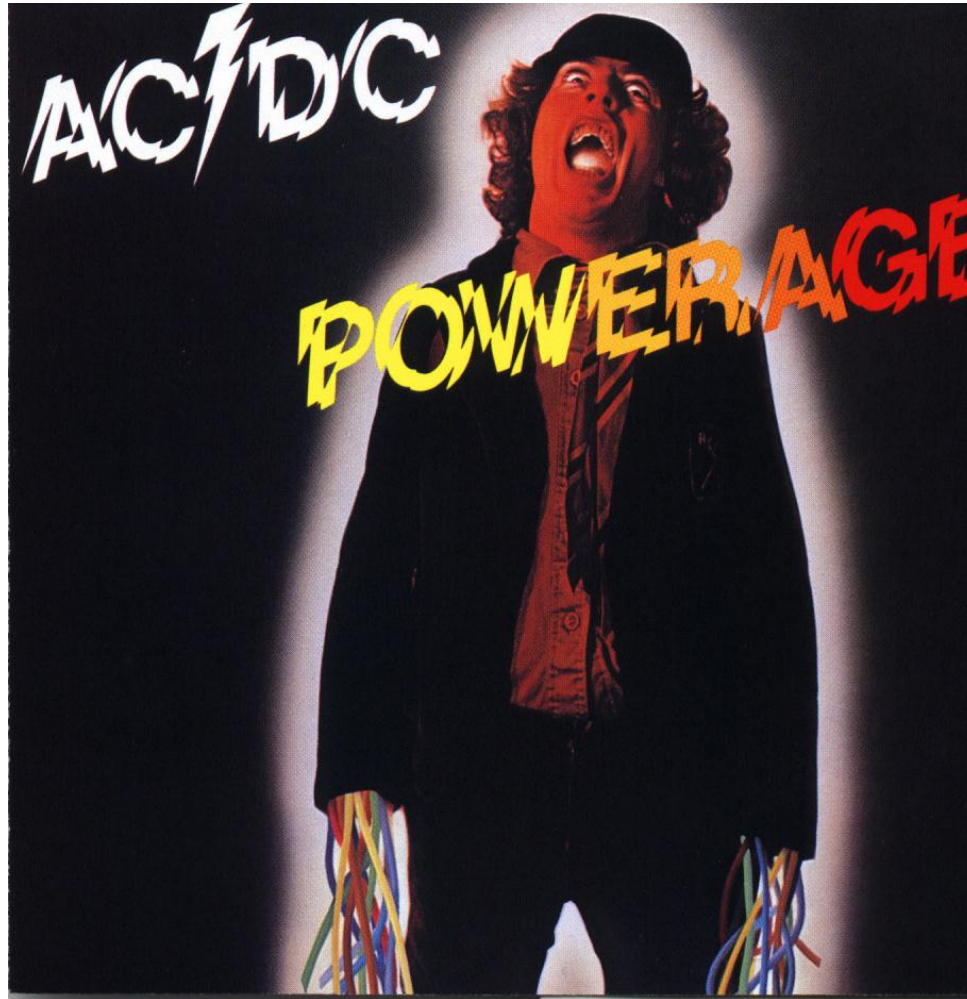
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Californication!

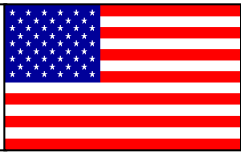
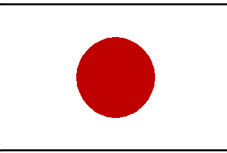
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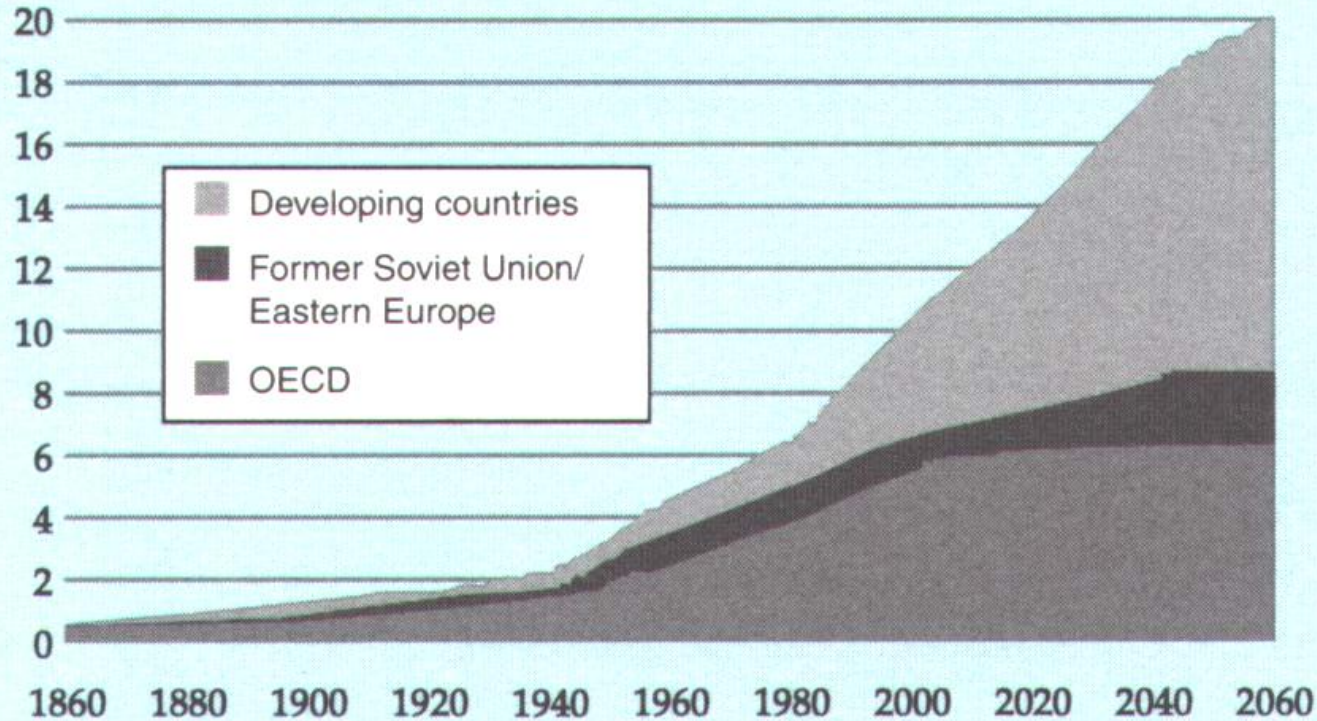


Energy Consumption

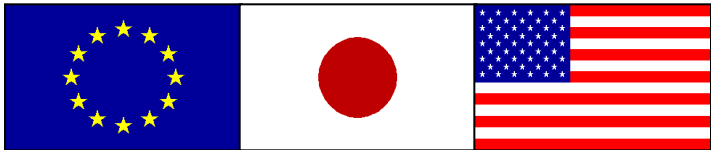
1860 - 2060

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Global Primary Energy Consumption, Gtoe*



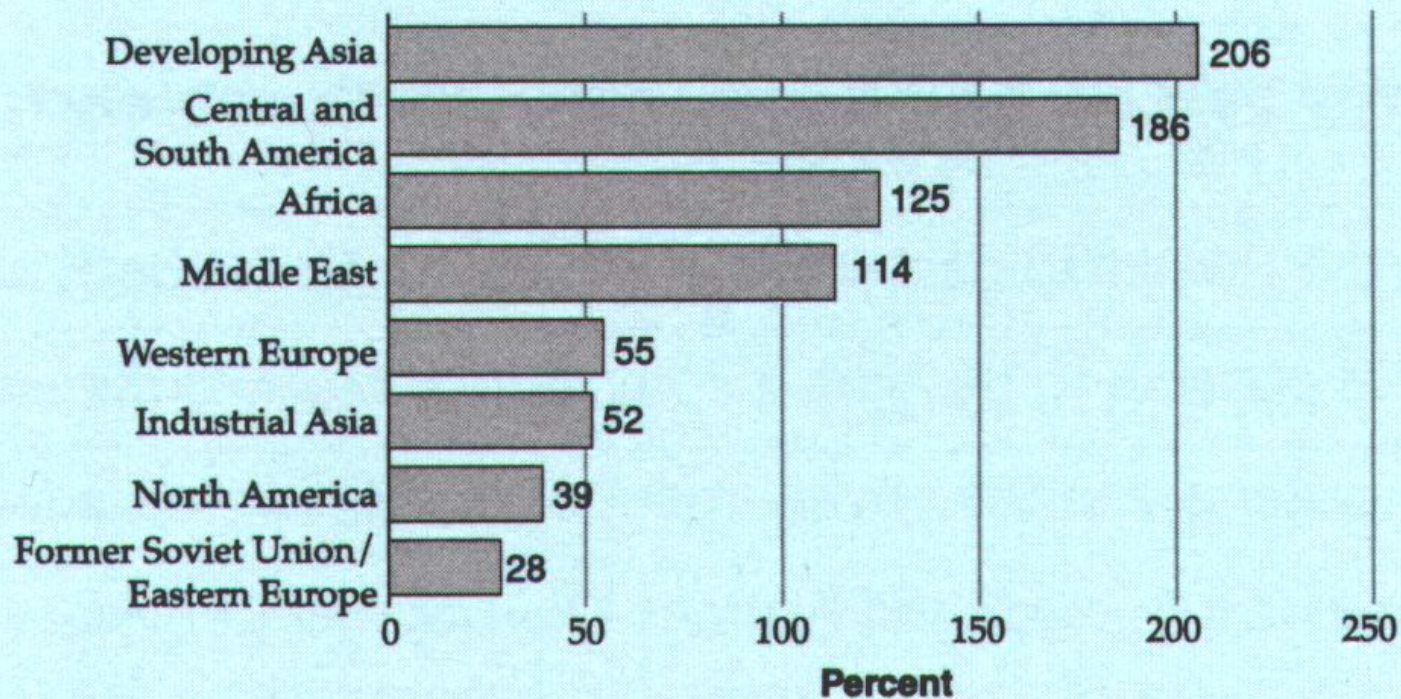
*Gigatonnes of oil equivalent
Source: World Energy Council, World Bank



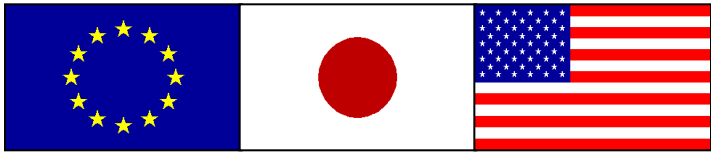
Regional Growth 1996 - 2020

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Growth in Net Electricity Consumption by Region



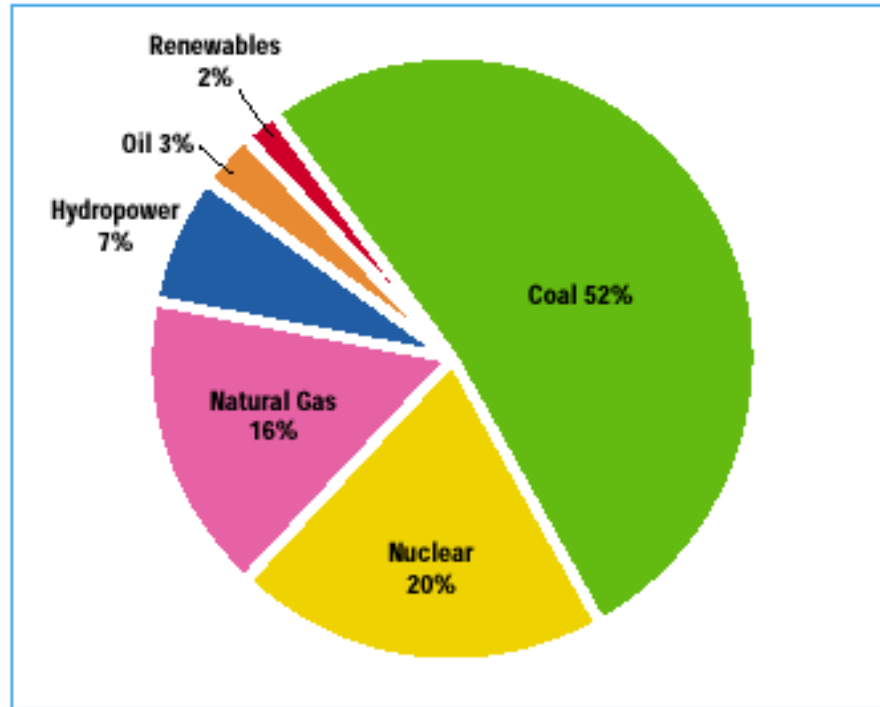
Source: Energy Information Administration/International Energy Outlook 1999

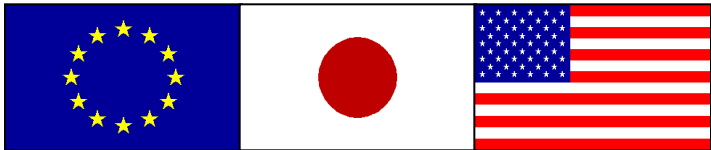


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Fuels for Electricity - 2000

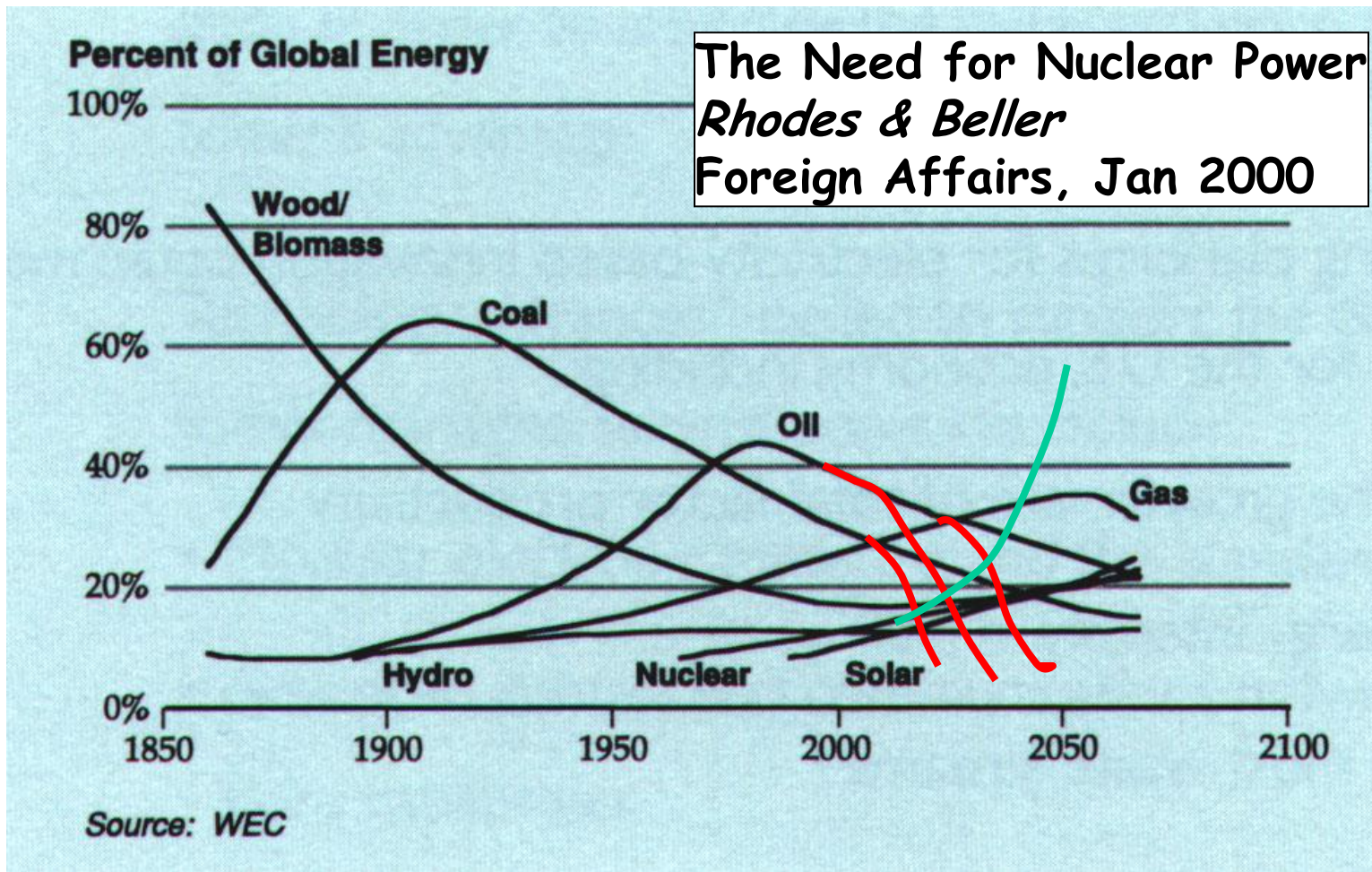
Fuel Sources for Electricity Generation in 2000





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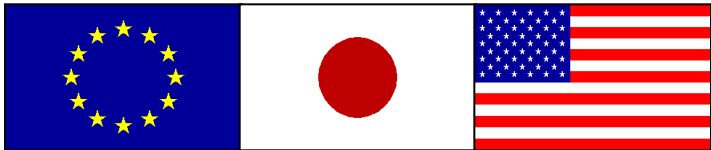
Fuels for Electricity - 2050



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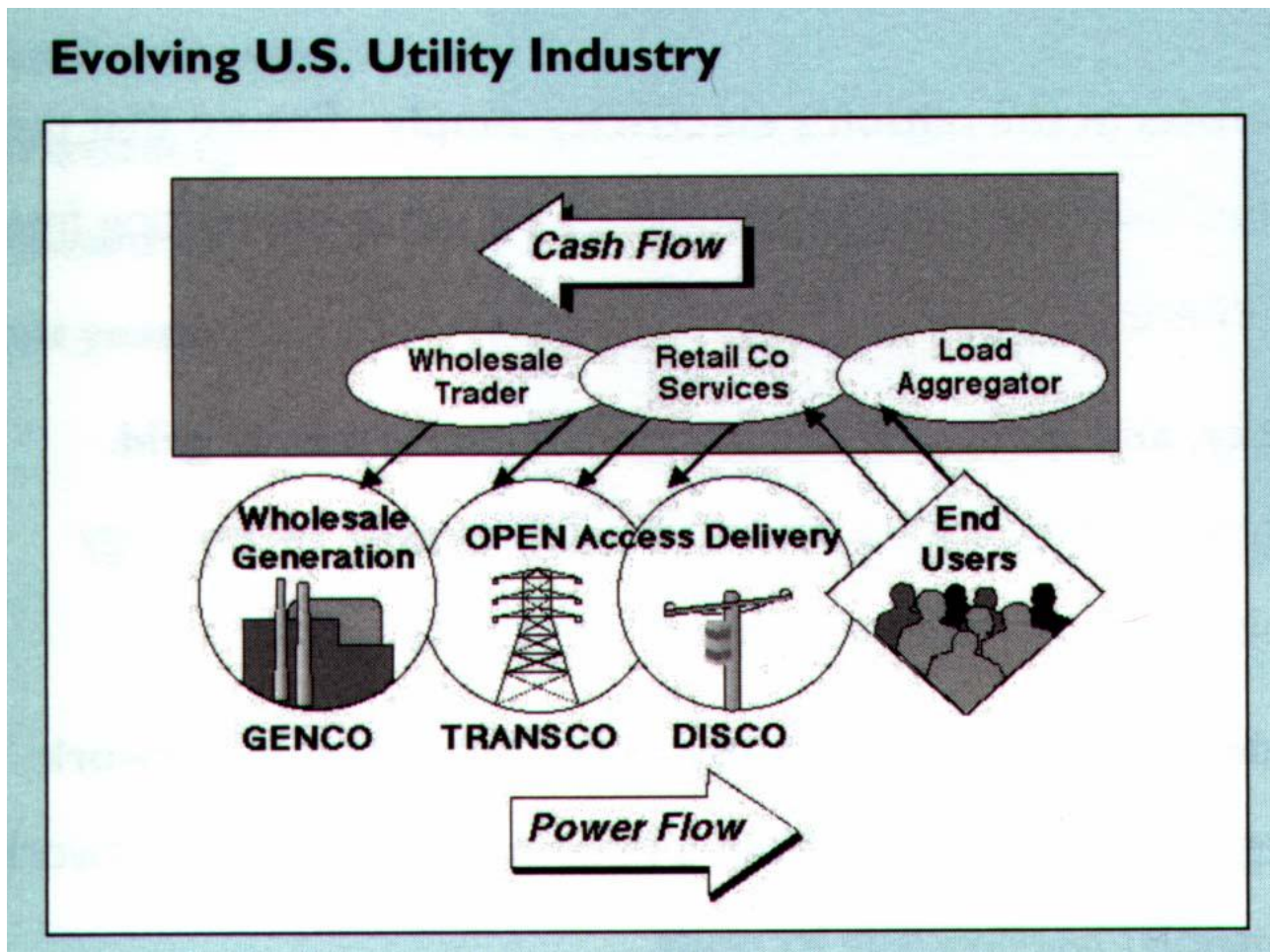
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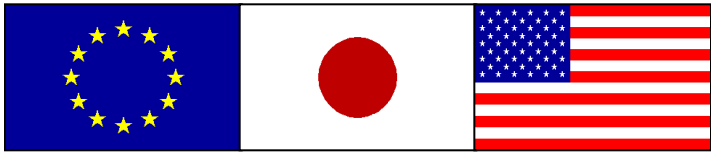
Restructuring



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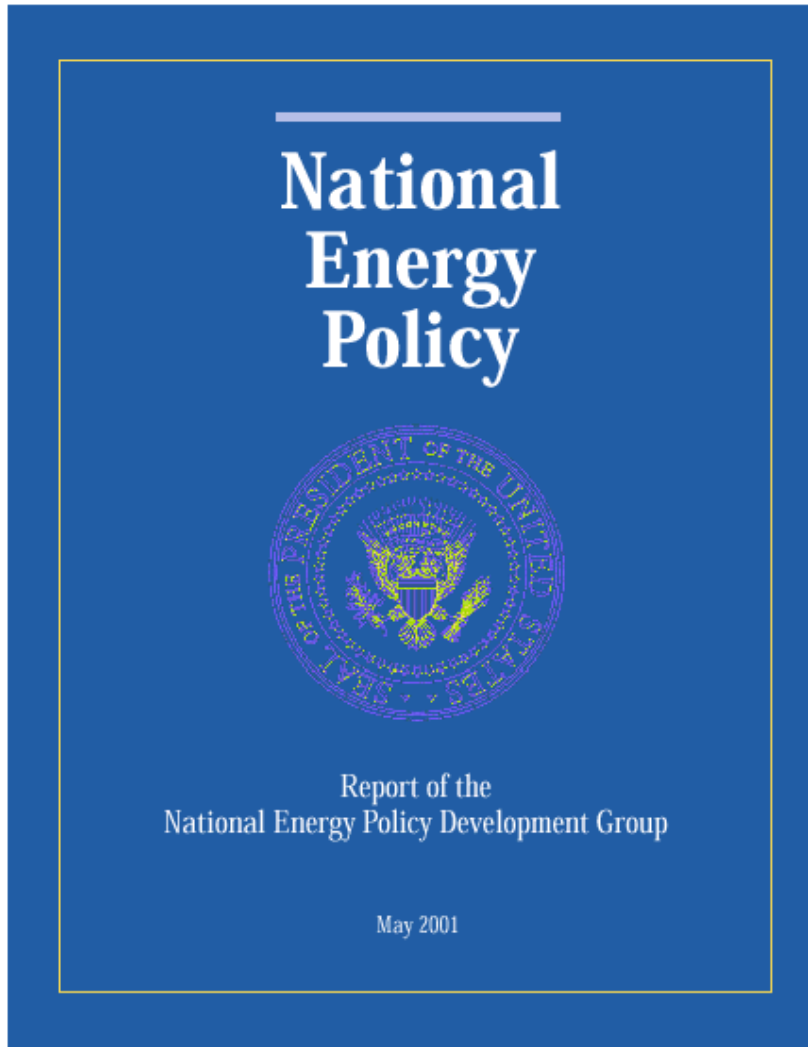
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NEPR - May 2001



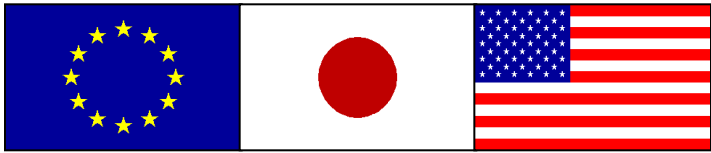
"America must
have an energy
policy that plans
for the future..."

President George W. Bush

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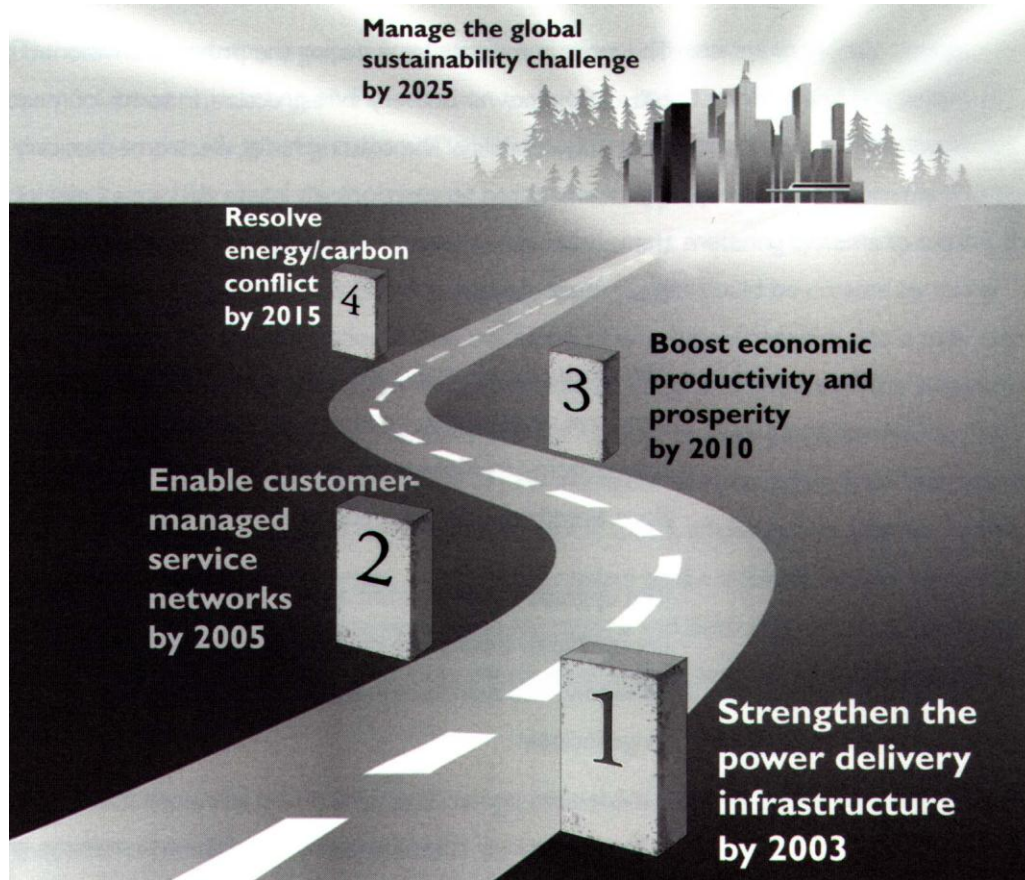
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Electricity

Technology Roadmap



"We must reverse current trends and make a renewed commitment to energy R&D."

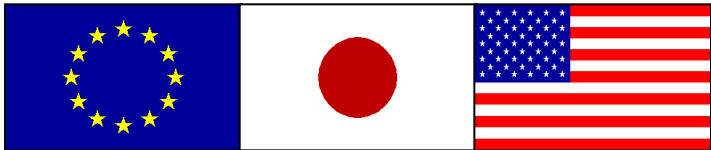
*Kurt Yeager
CEO, EPRI
29 October 1999
NPC Speech*

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http://www.epri.com/corporate/discover_epri/roadmap/index.html

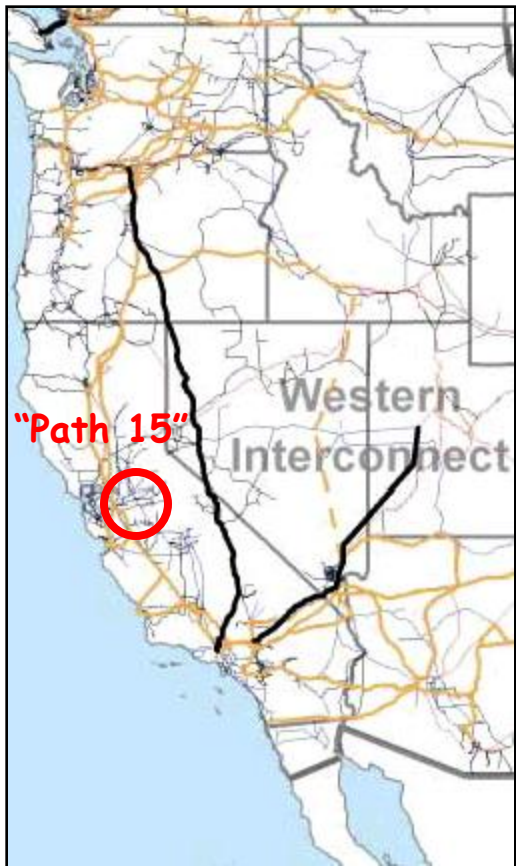
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Bottlenecks



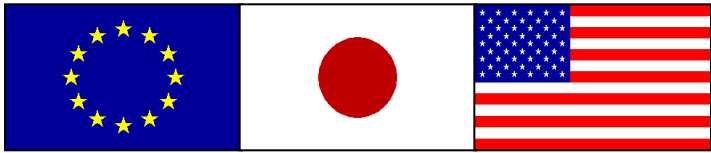
Current Electric Power Bottlenecks



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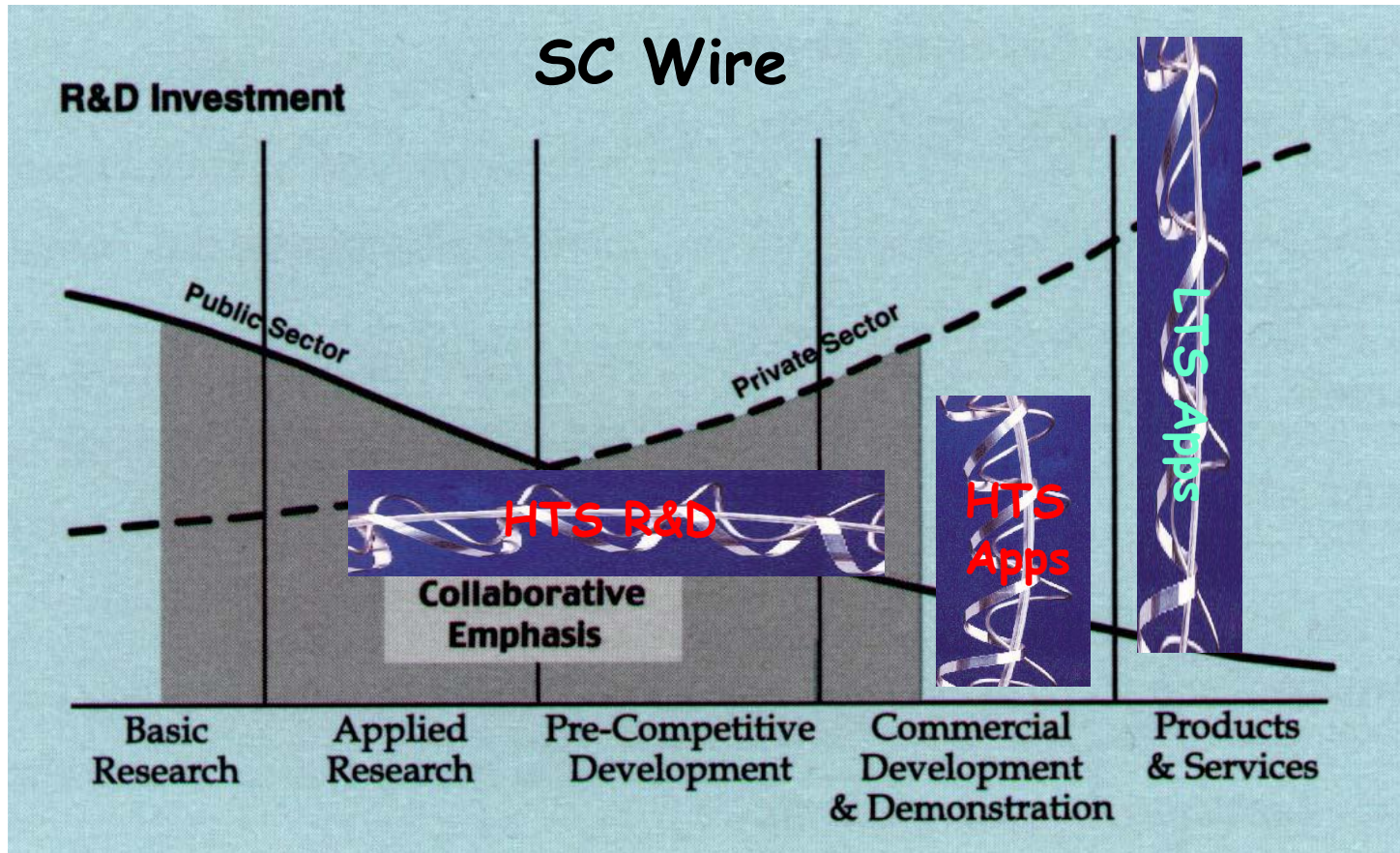
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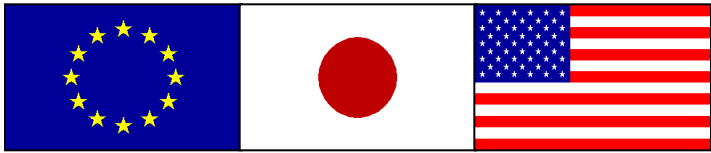
Public/Private R&D Investment



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Opportunity Missed



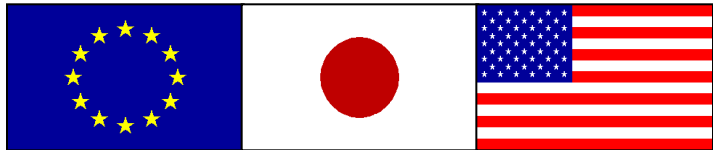
"We are sick
and tired of
them, and they
had better
change!"

*Chicago Mayor
Richard Daley on
the August 1999
Blackout*

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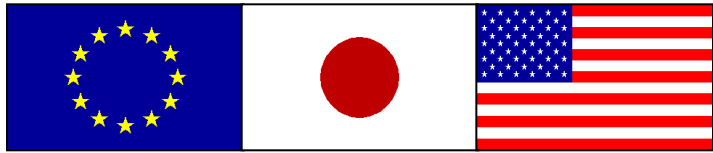


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Superpower to the People

A new DOE SPI program to incent timely deployment of superconducting cables, transformers and SMES in utility field operation

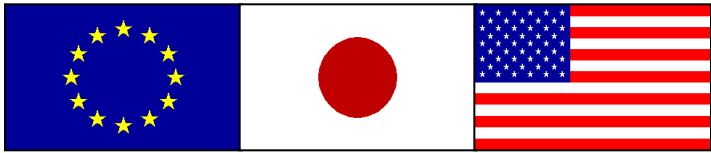
- *Utility-led cooperative agreement with industry and DOE*
- *Utility assumes burden of "conventional" cost plus lifetime operation and maintenance*
- *Government relieves utility of "premium cost" to install superconducting technology*



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Superpower... Implementation

- Solicit proposals for competitive award based on degree of impact of timely insertion of superconductivity technology on power reliability and supply
- Funding:
 - \$150 M/yr
 - 10 utility projects at average \$15 M "premium cost" to deploy superconductivity over "conventional" technology choice



Men at Work

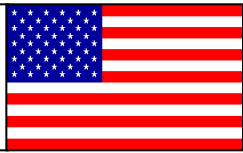
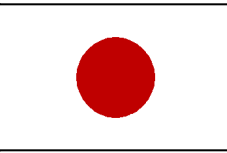
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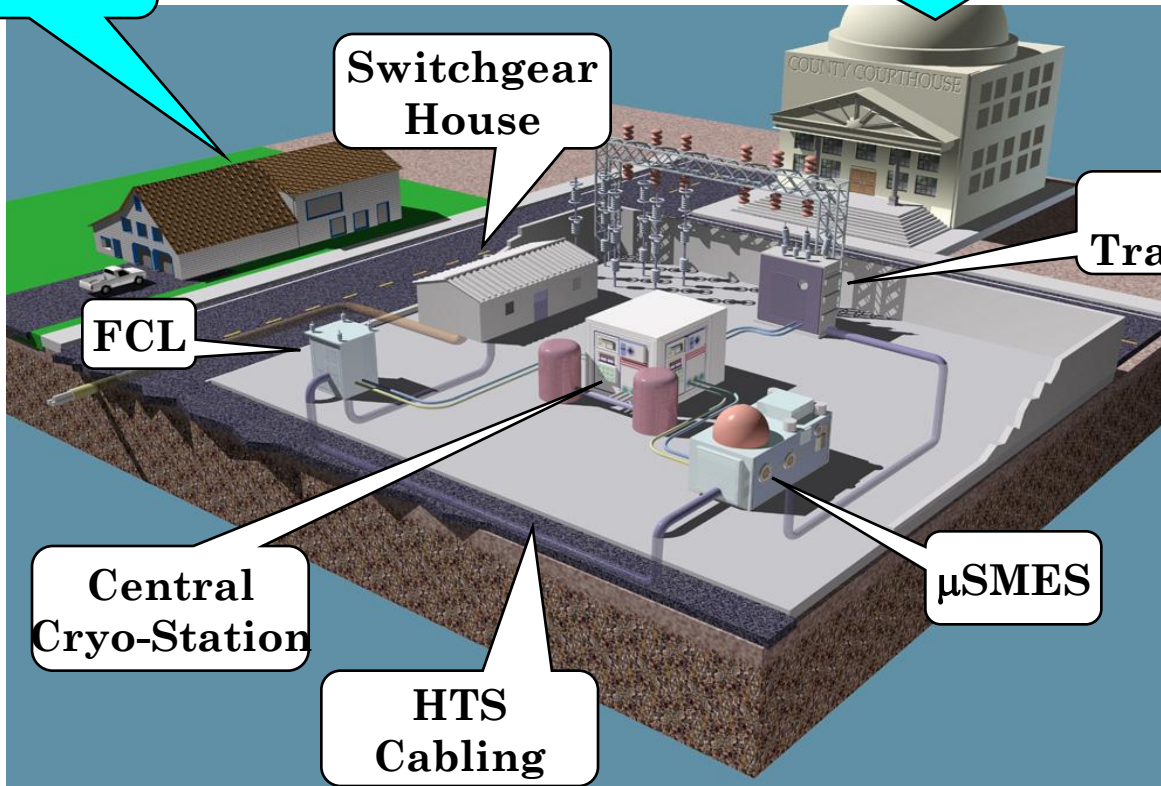


All-Superconducting Substation

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Courthouse where you can sue your local utility when the lights go off

Nice Family House



HTS Transformer

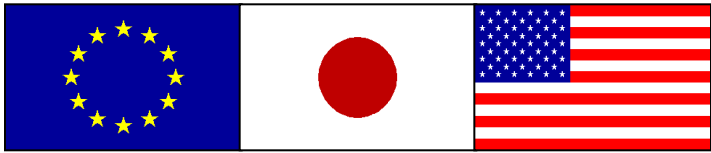
FCL

Central Cryo-Station

HTS Cabling

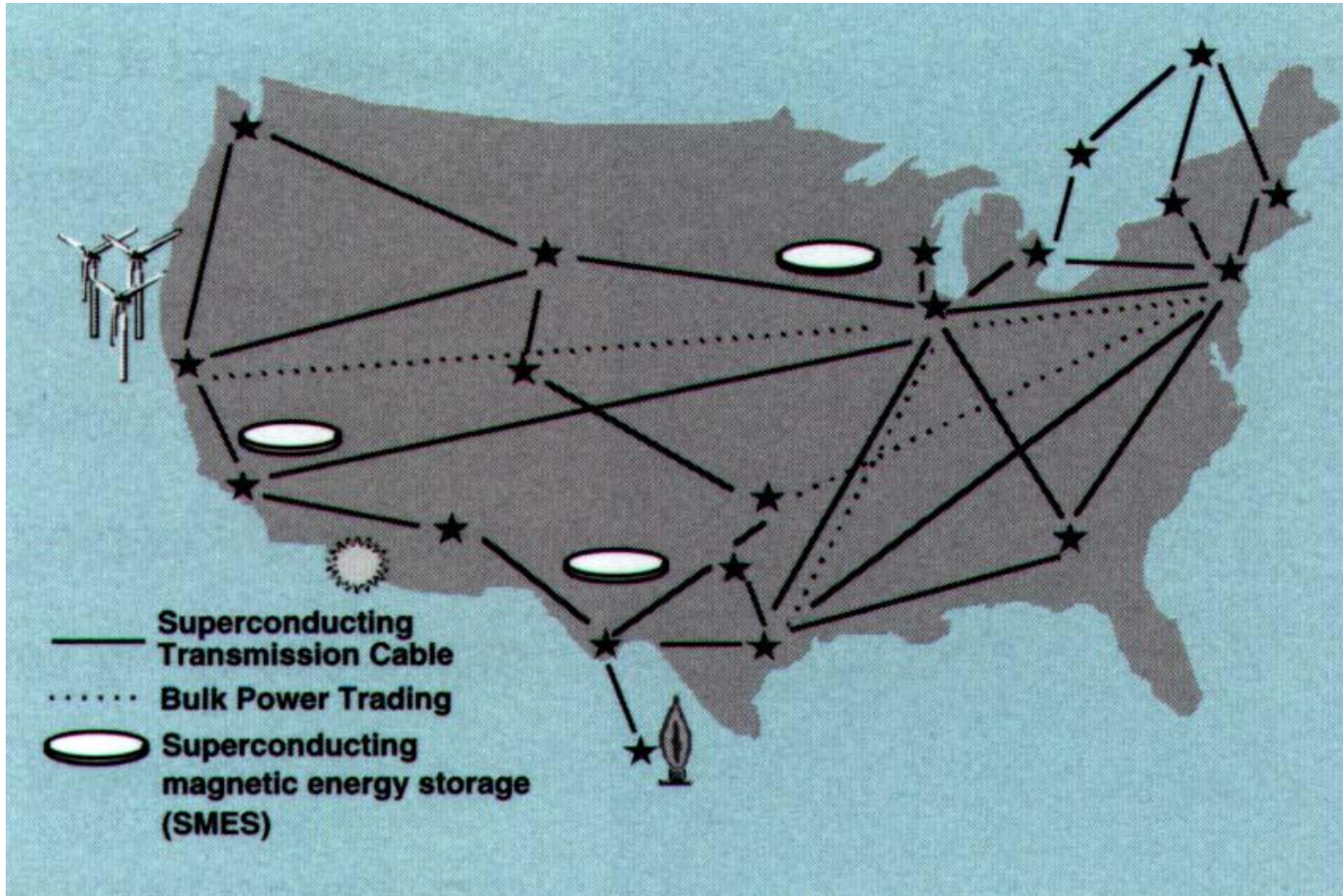
μSMES

Switchgear House



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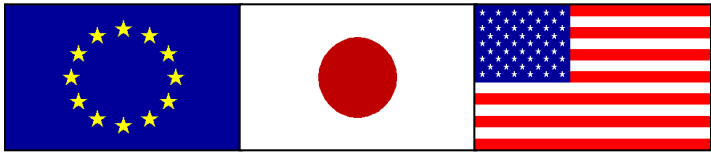
Superconducting Superhighway



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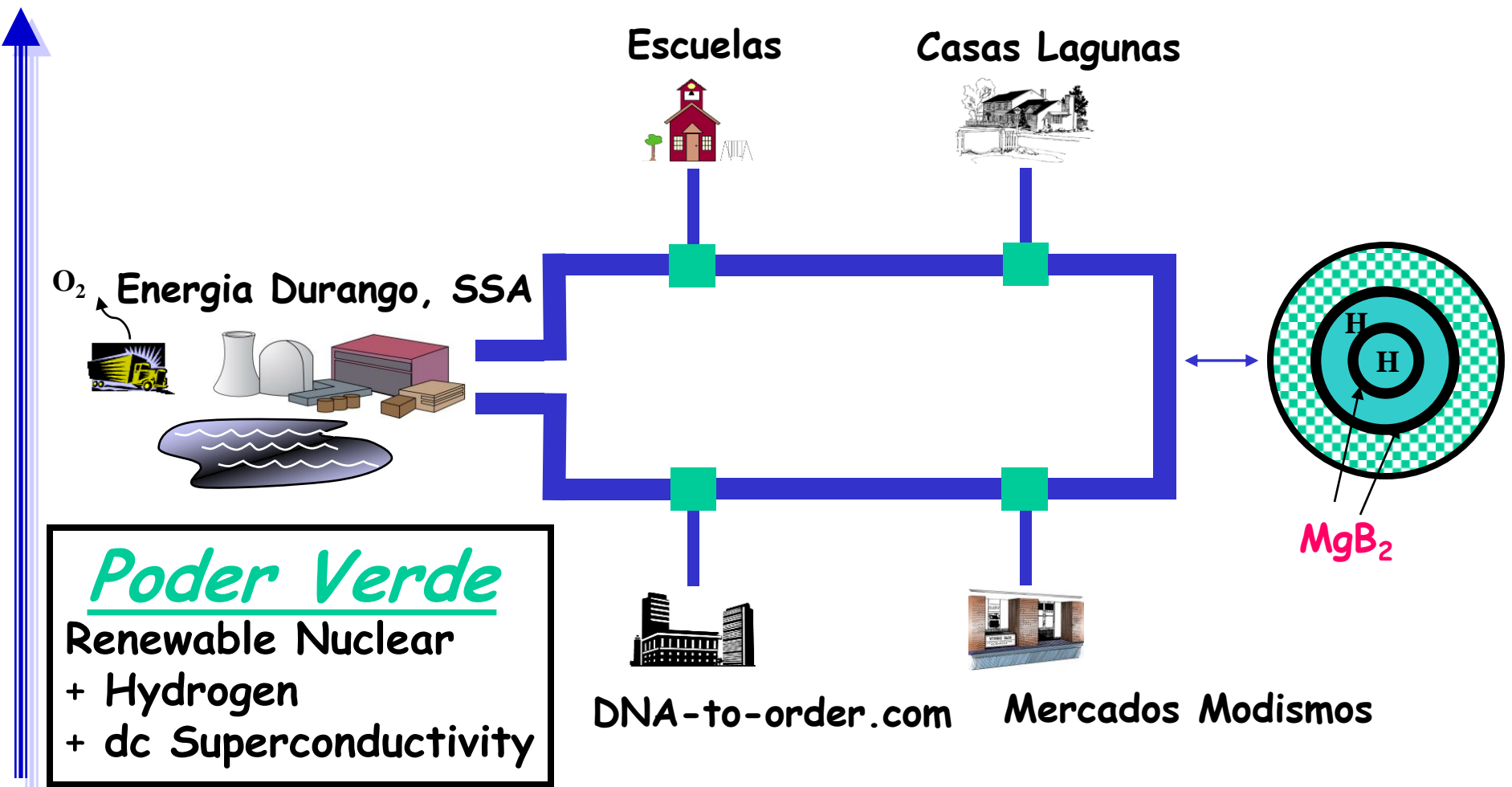
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SupraCiudad

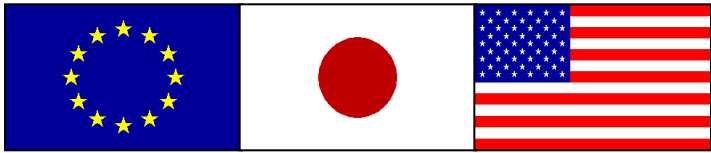


Poder Verde
 Renewable Nuclear
 + Hydrogen
 + dc Superconductivity

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California Dreamin'

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California Dreamin'
with the
Mamas &
the **Papas**



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