



Renewable Energy Markets



in North America

Evan Lloyd, Executive Director
Commission for Environmental Cooperation
JPAC, Toronto April 18, 2012



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The Commission for Environmental Cooperation

Council Priorities

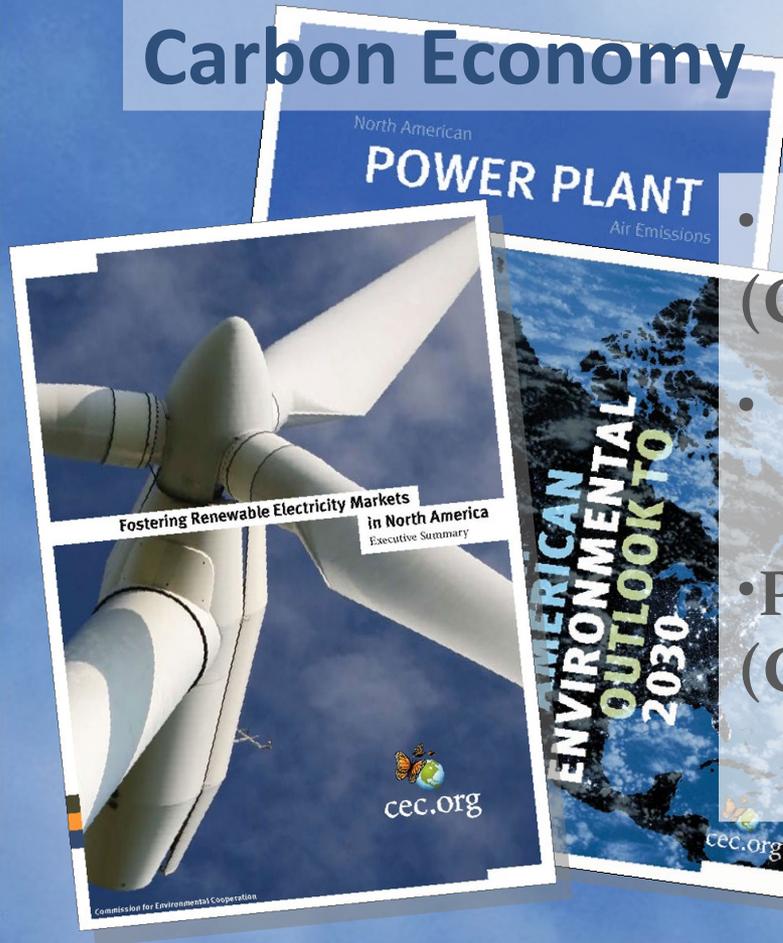
- **Healthy Communities and Ecosystems**
- **Climate Change—Low-Carbon Economy**
- **Greening the North American Economy**

Priority: Climate Change—Low-Carbon Economy

2011-2012 projects

- Improving comparability of emissions data, methodologies and inventories
- Engagement of experts and strengthened information-sharing:
 - Ecosystem carbon sources and storage
 - NA on-line platform on climate change

Priority: Climate Change—Low-Carbon Economy



- Environmental Outlook 2030 (CEC 2008)
- Fostering Renewable Energy Markets in NA (CEC 2007)
- Power Plant – Air Emissions (CEC 2011)



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Environmental *and* climate impacts

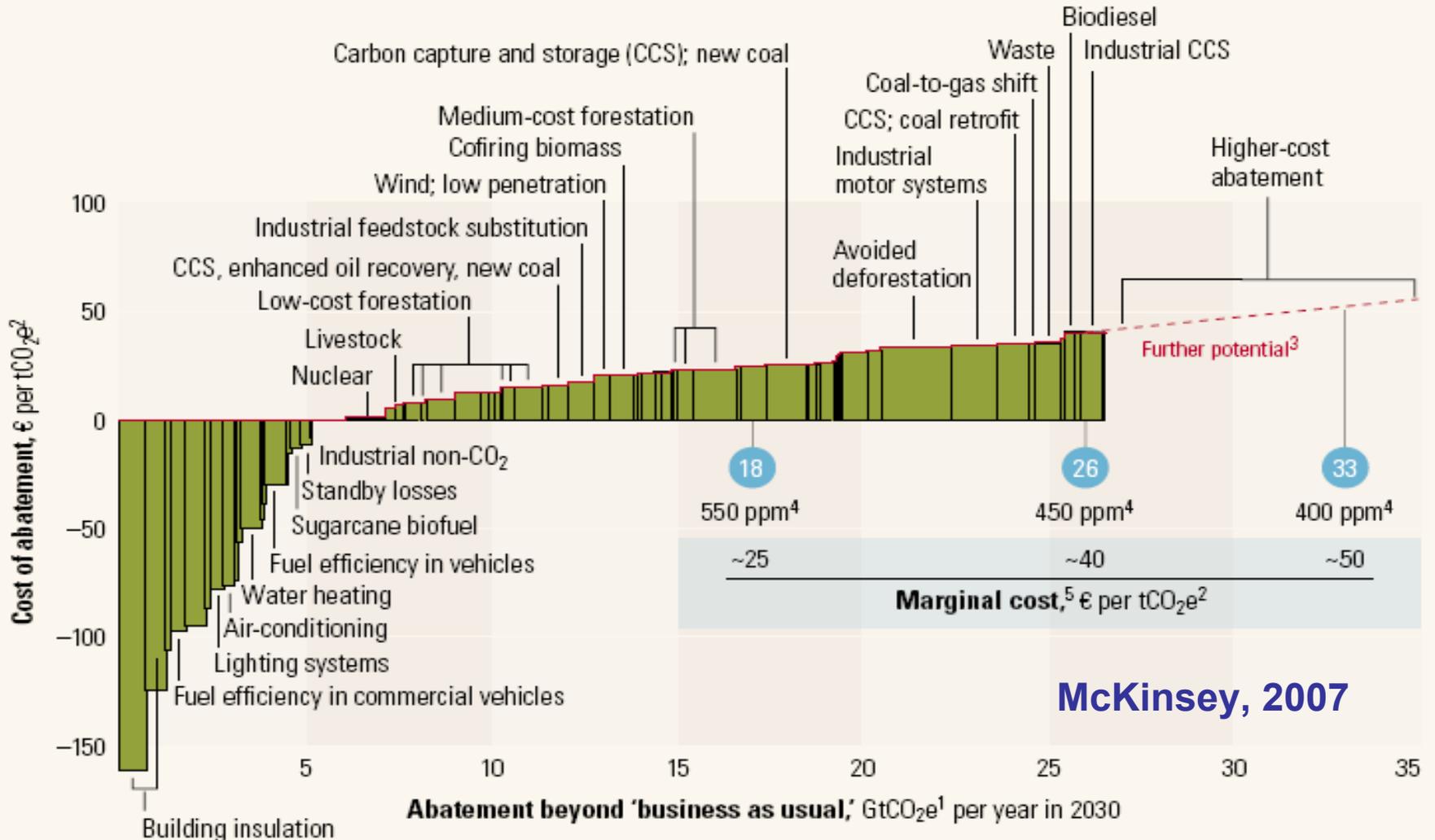
Electricity generation:

- **Most prominent source** of reported toxic air emissions (US, Mexico)
- **Second most prominent source** in Canada (#1= oil & gas extraction)
- **Dominant source** of GHG emissions from stationary sources in NAFTA region
 - 33% Mexico (RETC 2006)
 - 42% US (2010 US-GHG inventory)
 - 36% Canada's (2006 GHG inventory)

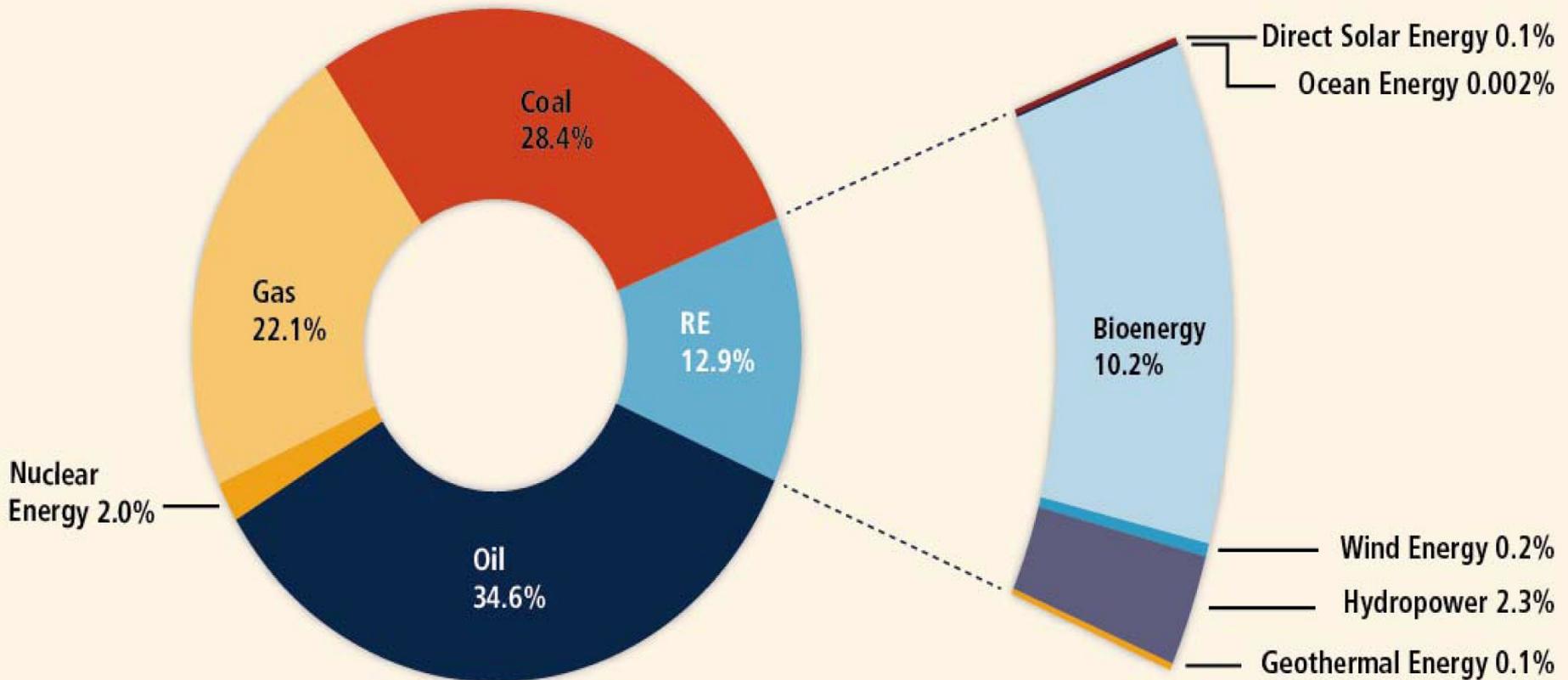
Supply Curve for GHG abatement 2030

Global cost curve for greenhouse gas abatement measures beyond 'business as usual'; greenhouse gases measured in GtCO₂e¹

● Approximate abatement required beyond 'business as usual,' 2030



Fossil fuels dominate current global energy system



Shares of energy sources in total global primary energy supply in 2008

Global RE Forecast

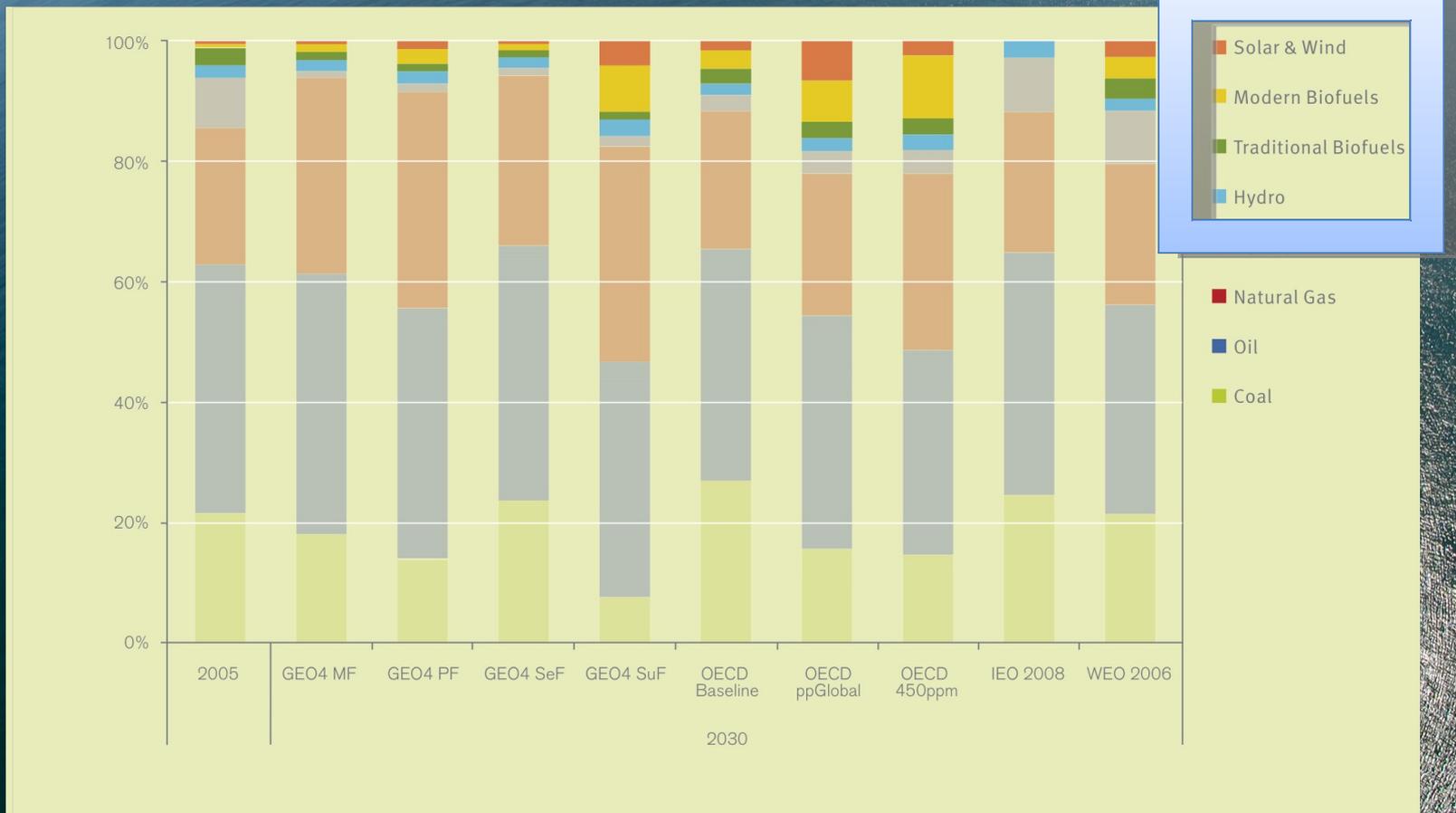
IPCC Special Report on Renewable Energy Sources and Climate Mitigation (SSREN – 2011)

3. Close to 80 percent of the world's energy supply could be met by renewables by 2050
4. Some RE technologies already competitive without climate policy
5. In case of ambitious climate policies RE potential increases enormously
6. RE not the only option or means to reduce GHG – part of a portfolio of climate action
7. Without dedicated national energy policies no rapid deployment of RE technologies



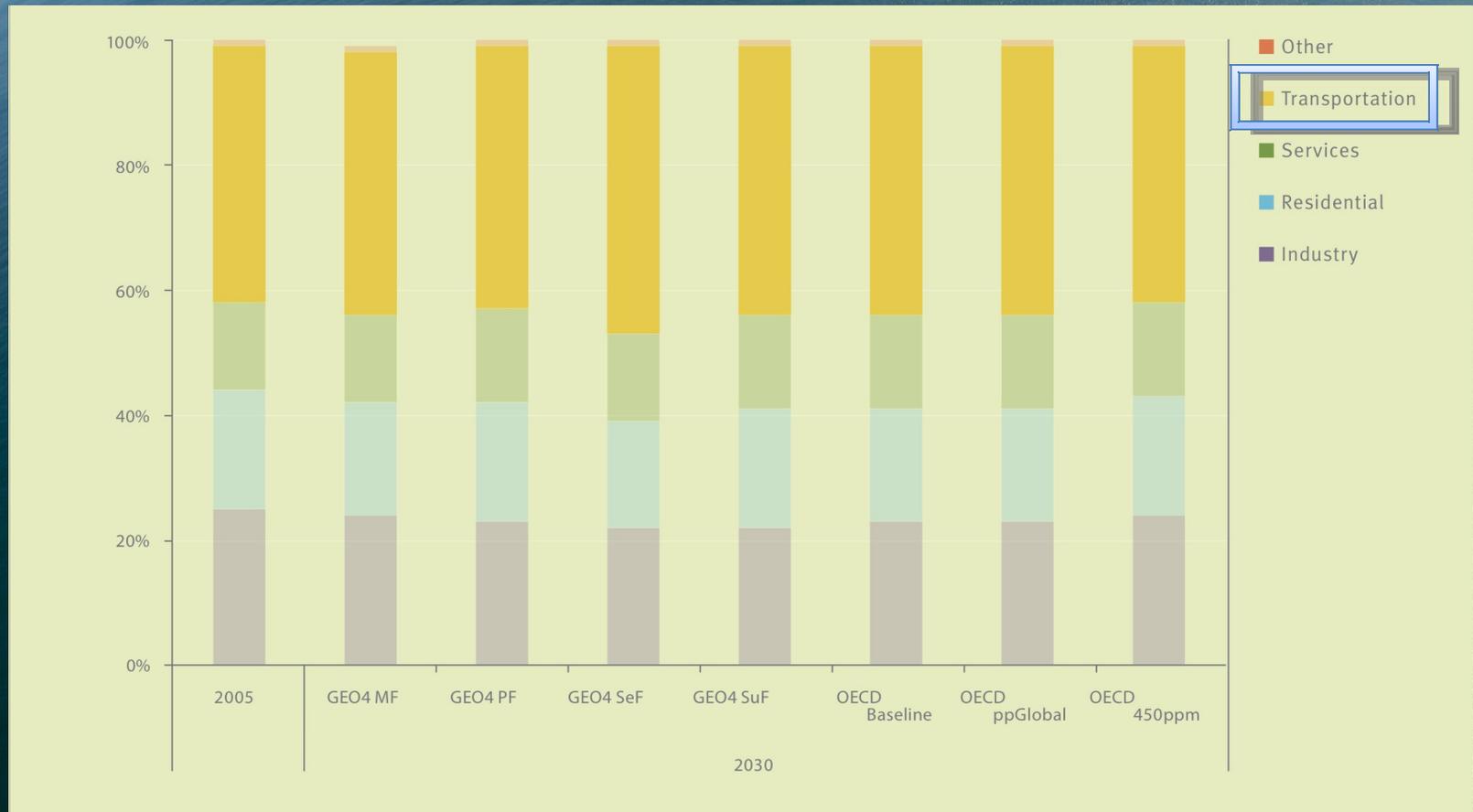
NA Forecast - Primary Energy Use by Fuel

CEC Outlook - 2030



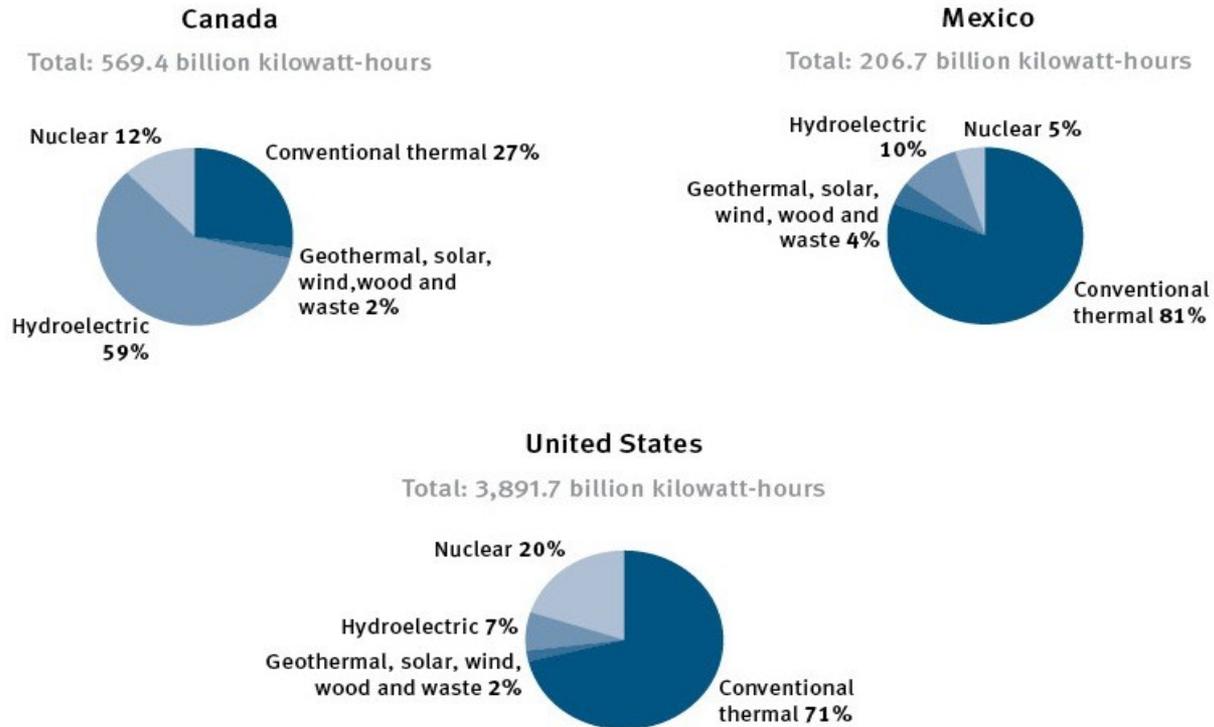
NA Forecast - Energy Use by Sector

CEC Outlook - 2030



North America's Electricity Profile (2003)

Figure 1. Electricity Generation in North America (2003)



Source: Energy Information Administration, *International Energy Annual 2004*, <http://www.eia.doe.gov/iea/elec.html>.

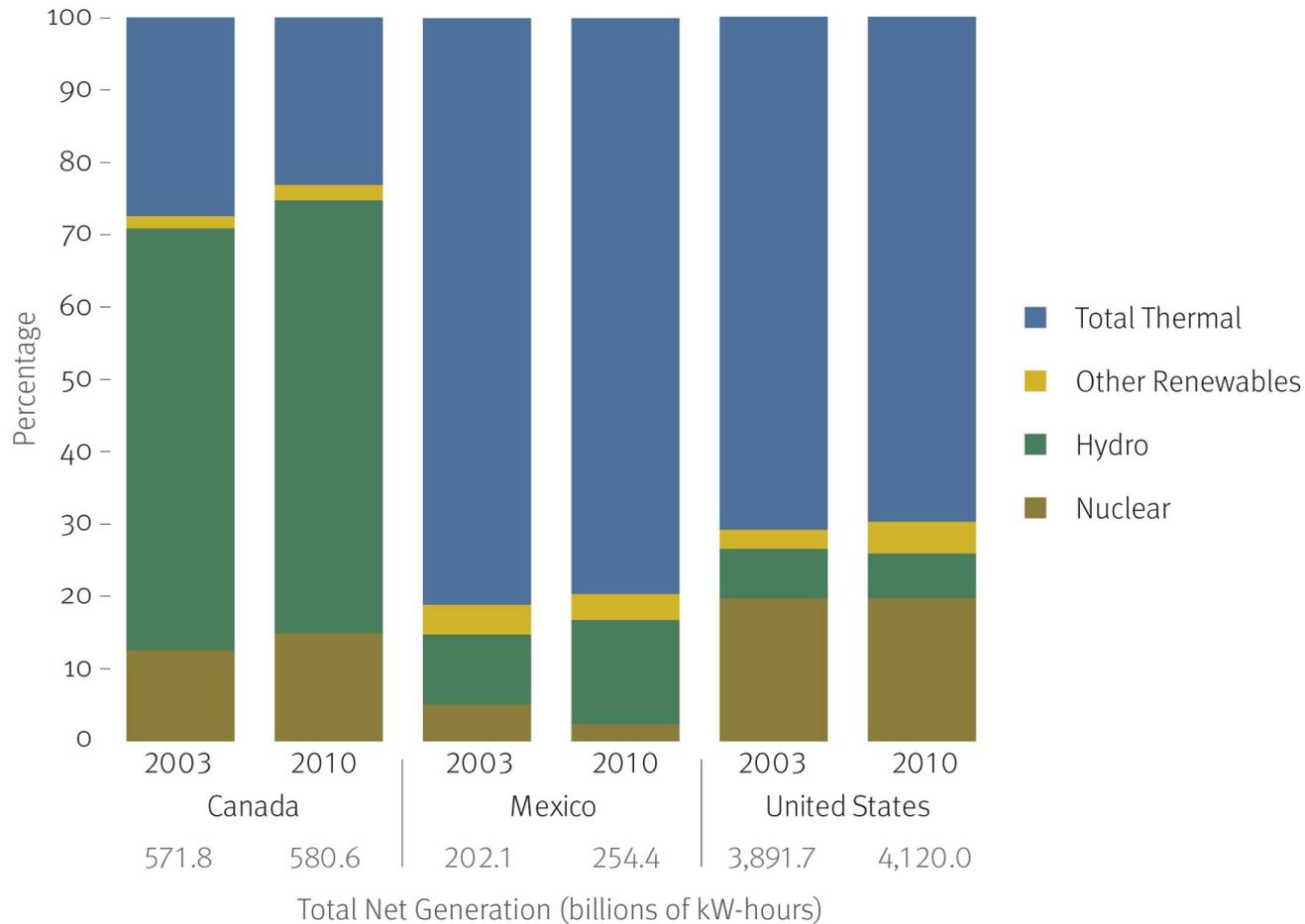


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North America's Electricity Profile 2003 → 2010



Fostering Renewable Electricity Markets in North America (CEC 2007)

Analysis of barriers to *continent-wide* renewable electricity markets.

- Informational and transactional barriers:
- Facilitate information sharing
- Foster cooperation
- Increase cross-border trading of renewables on short and long-term markets

Fostering Renewable Electricity Markets in North America
Executive Summary

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Fostering Renewable Electricity Markets in North America (CEC 2007)

Key drivers - Demand & Supply-side Canada, Mexico, USA

- regulatory mandates
- voluntary purchases
- self-supply
- financial incentives

Fostering Renewable Electricity Markets in North America
Executive Summary



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Fostering Renewable Electricity Markets in North America (CEC 2007)

Recommendations for growing the renewable electricity market:

- Facilitate information sharing
- Foster North-South cooperation
- Increase cross-border trading of renewables on short and long-term markets

Fostering Renewable Electricity Markets
in North America
Summary

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Fostering Renewable Electricity Markets in North America (CEC 2007)

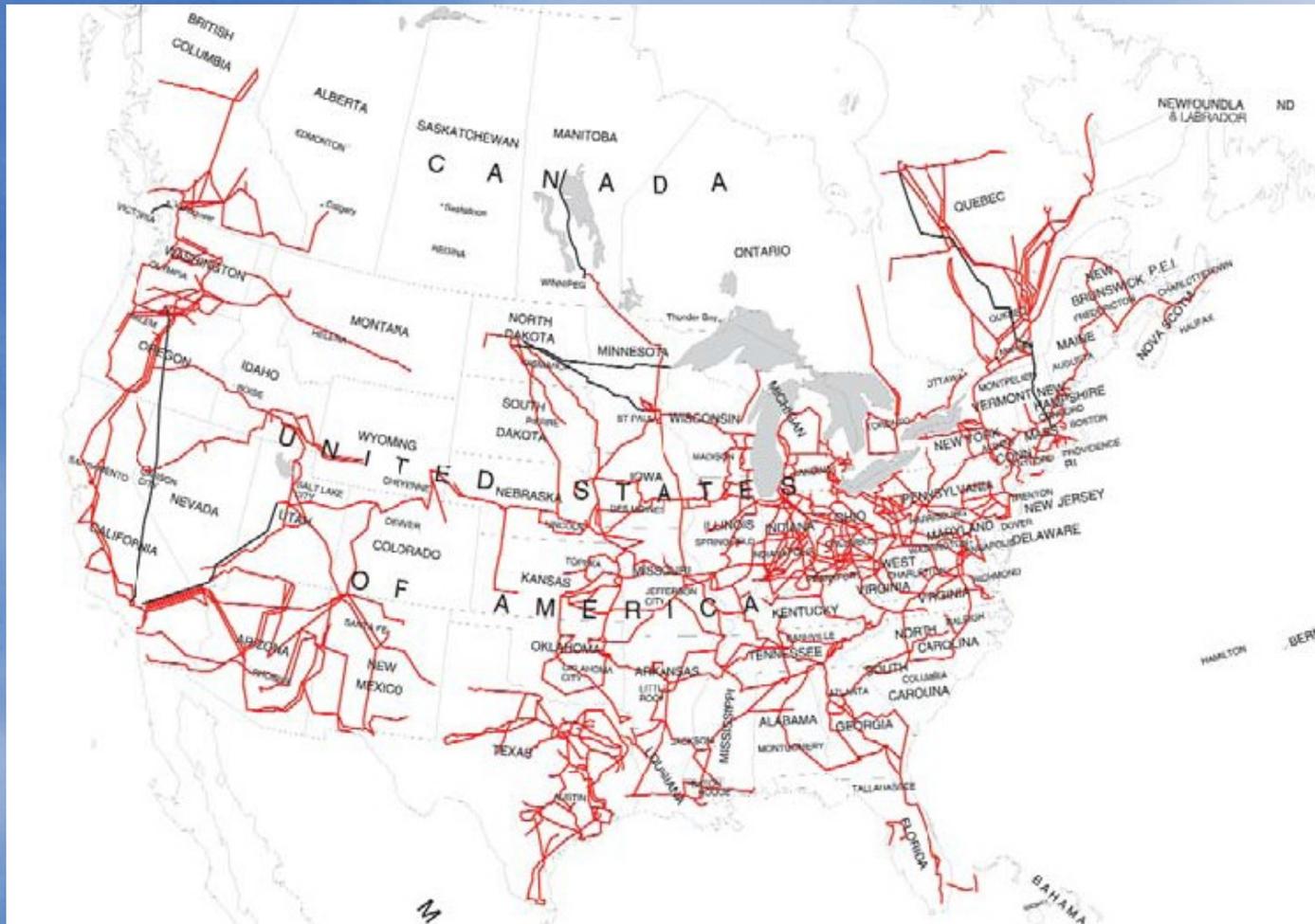
Cross-Border Issues

- Grid
- Knowledge and definition of RE capacity and technology
- What's renewable? (hydro \neq RE?)
- *Green* pollution havens?
- Transboundary assessment of cumulative environmental effects



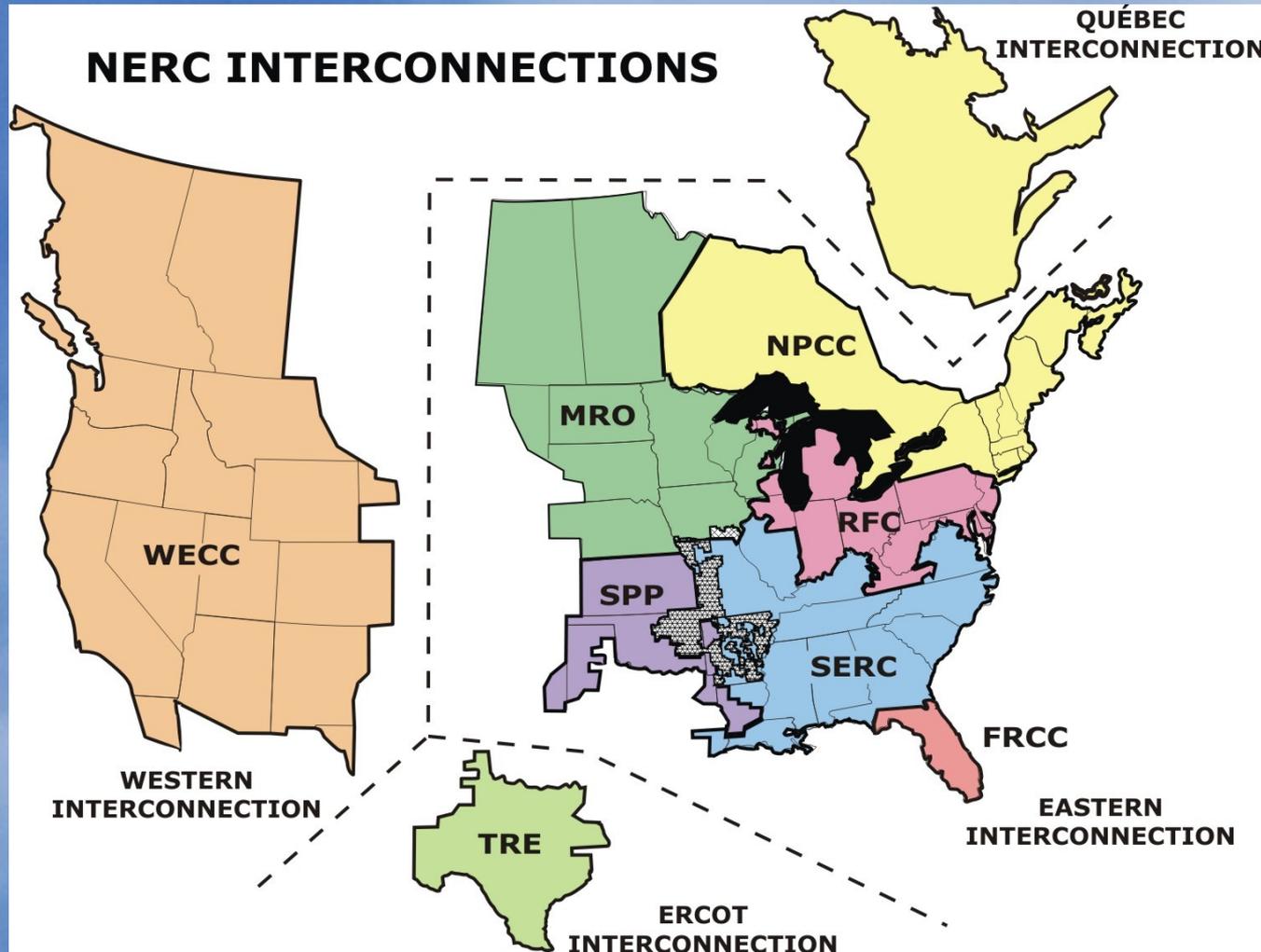
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North American Electricity Transmission



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North American Electricity Grid



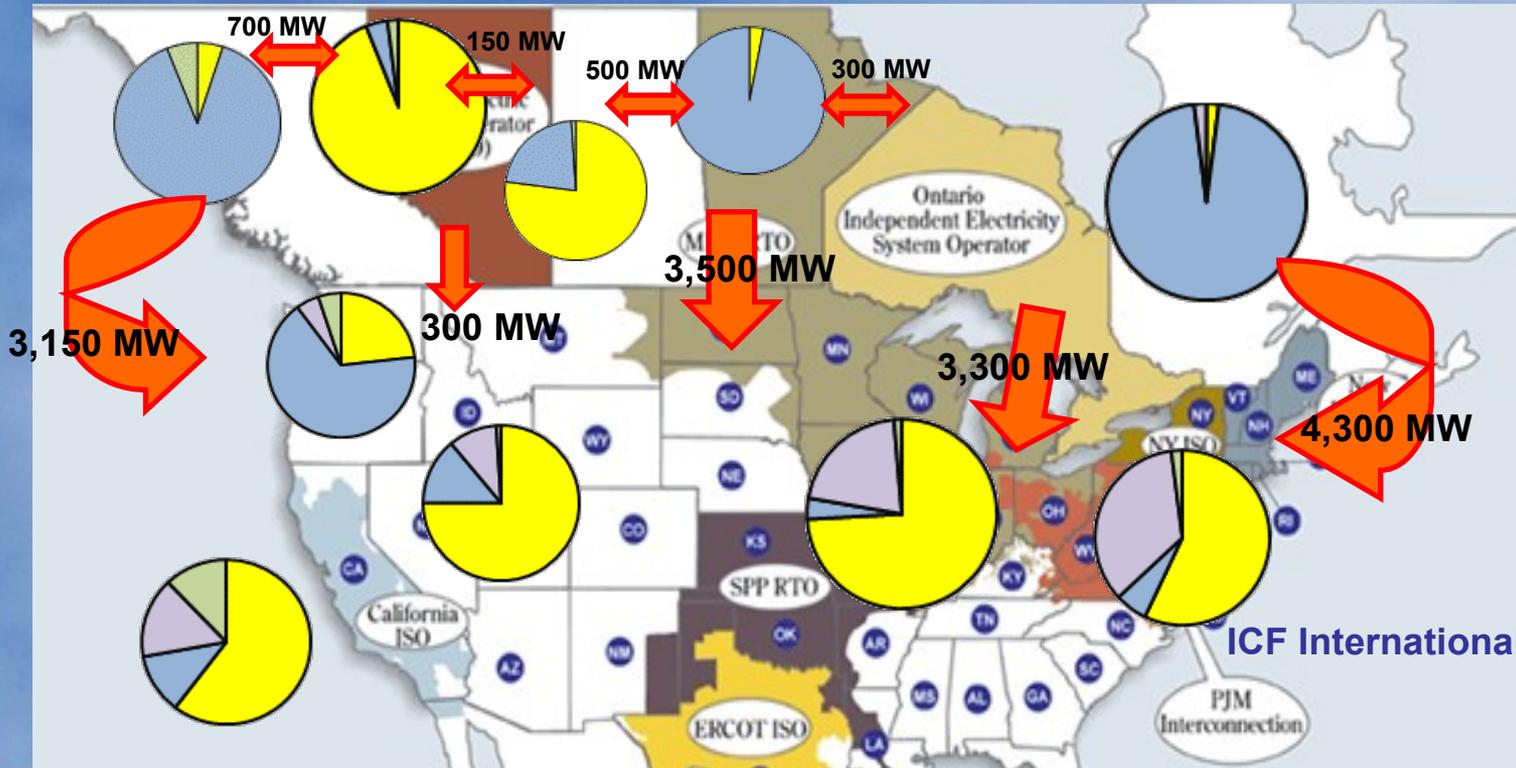
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Transmission - Imports - Exports

TWh 2006	
Canada to US	41.5
US to Canada	23.4
Mexico to US	1.1
US to Mexico	0.8
Net Canada	-18.1
Net US	18.4
Net Mexico	-0.4

- Regional Existing Supply
- *Interties* Can Diversify Resources

Existing Regional Supply



Western Interconnect - Portfolio

WECC (2007)



	TW-h	
• Coal	247	35%
• Hydro	188	27%
• Gas	156	22%
• Nuclear	74	11%
• Oil	2	< 1%
• Renewable	30	4%
Total	697	



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Three countries. One environment.