

# Greening North America's Energy Economy

A Canadian ENGO Perspective for  
the NAFTA JPAC

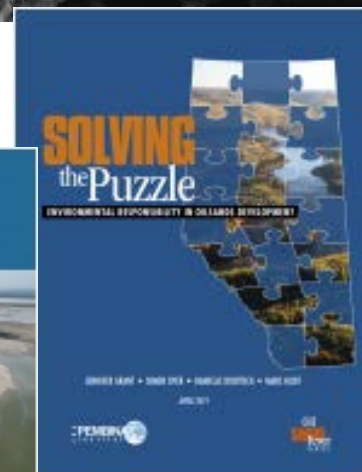
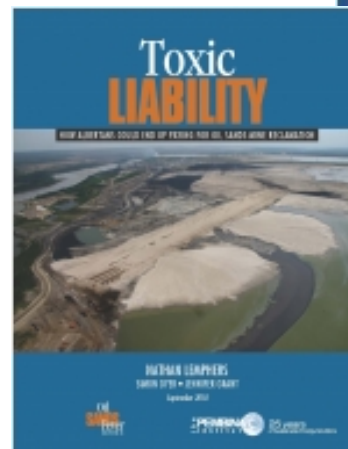
Jason Switzer

Director, Corporate Engagement & Consulting

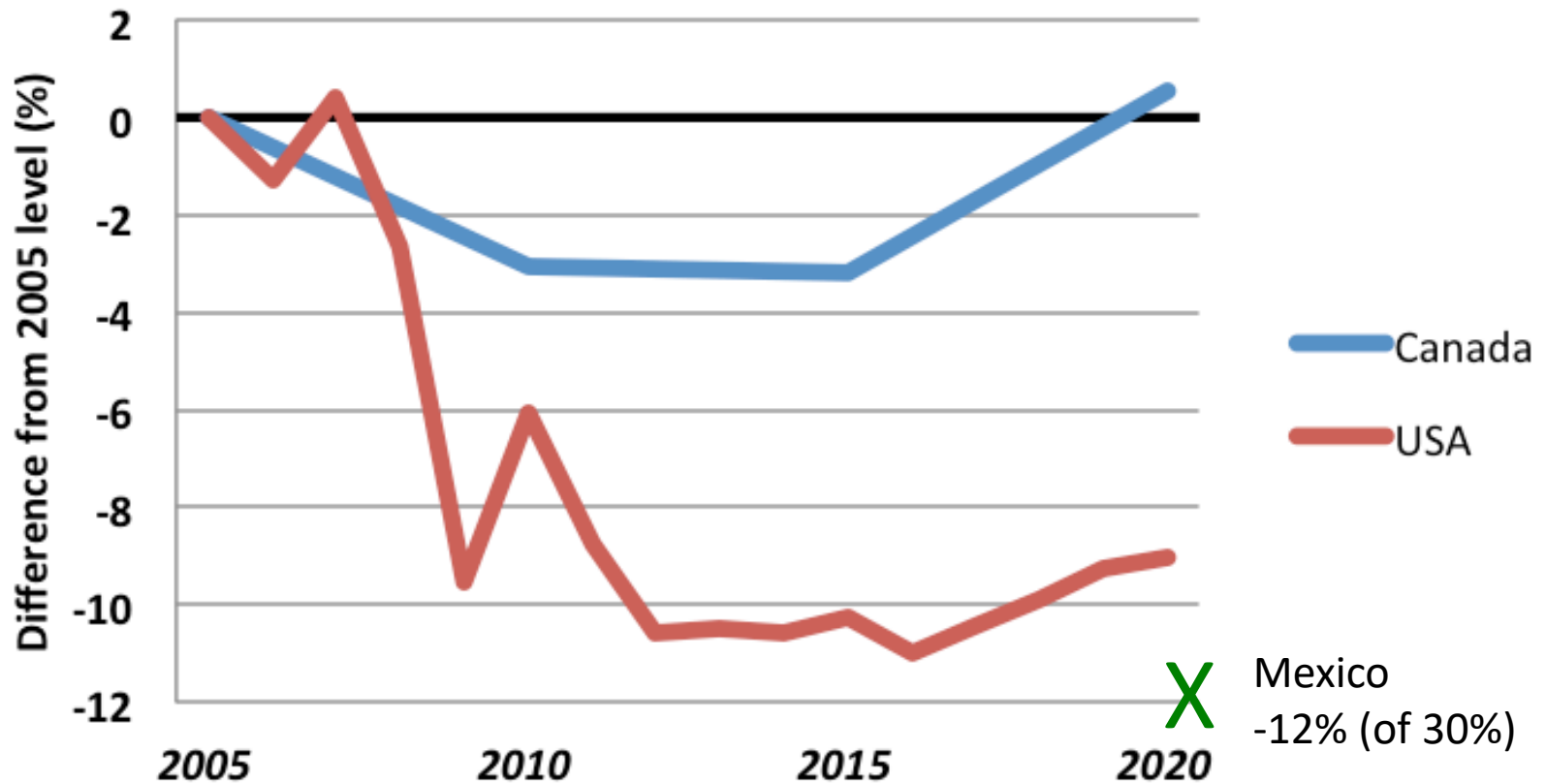
25 April 2013

# Leading Canada's transition to a clean energy future

The Pembina Institute is a national non-profit think tank that advances clean energy solutions through research, education, consulting and advocacy.

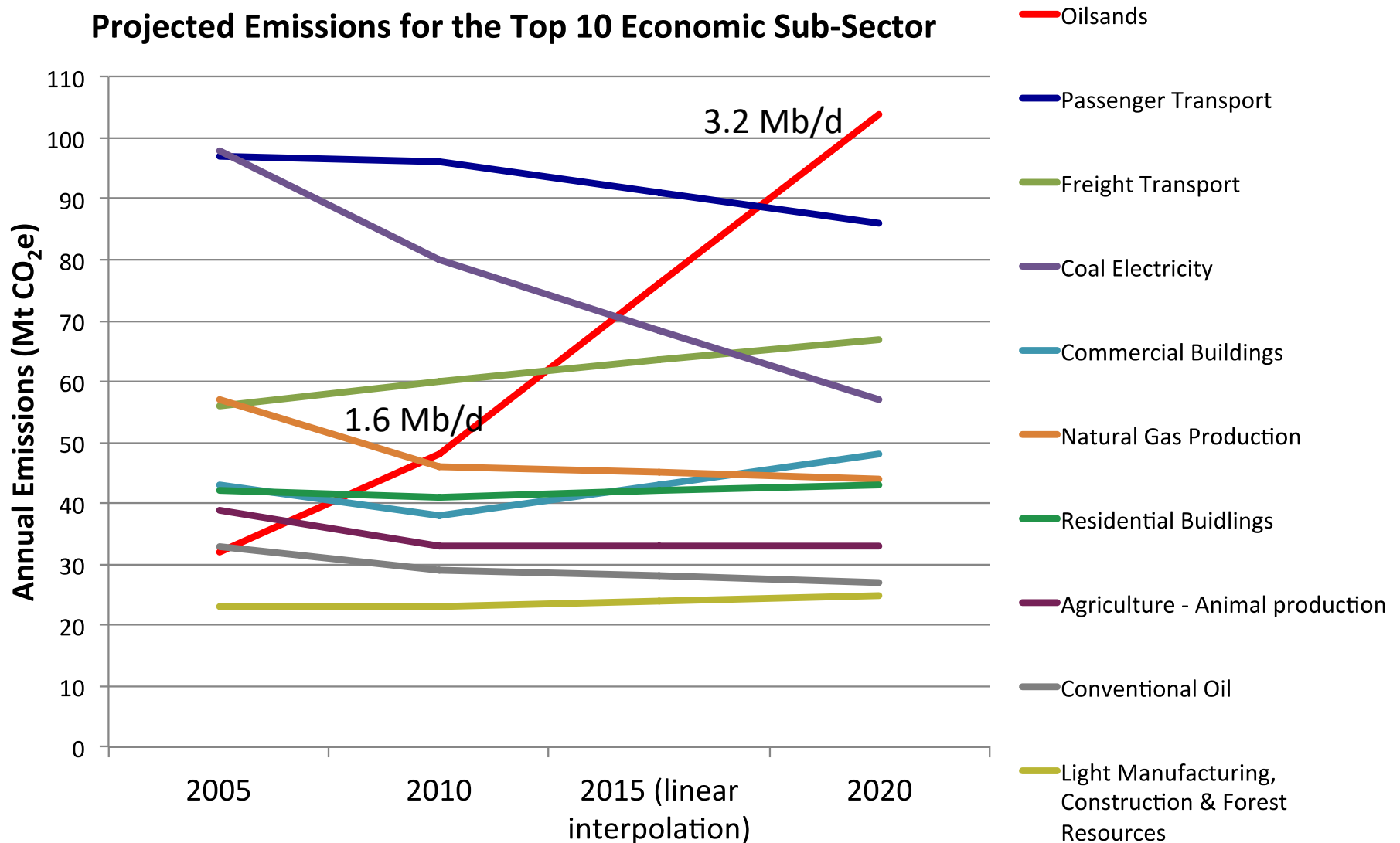


# Projected emissions relative to 2005 level



# Current Oilsands Development Trajectory is Inconsistent with Canada's Climate Commitment

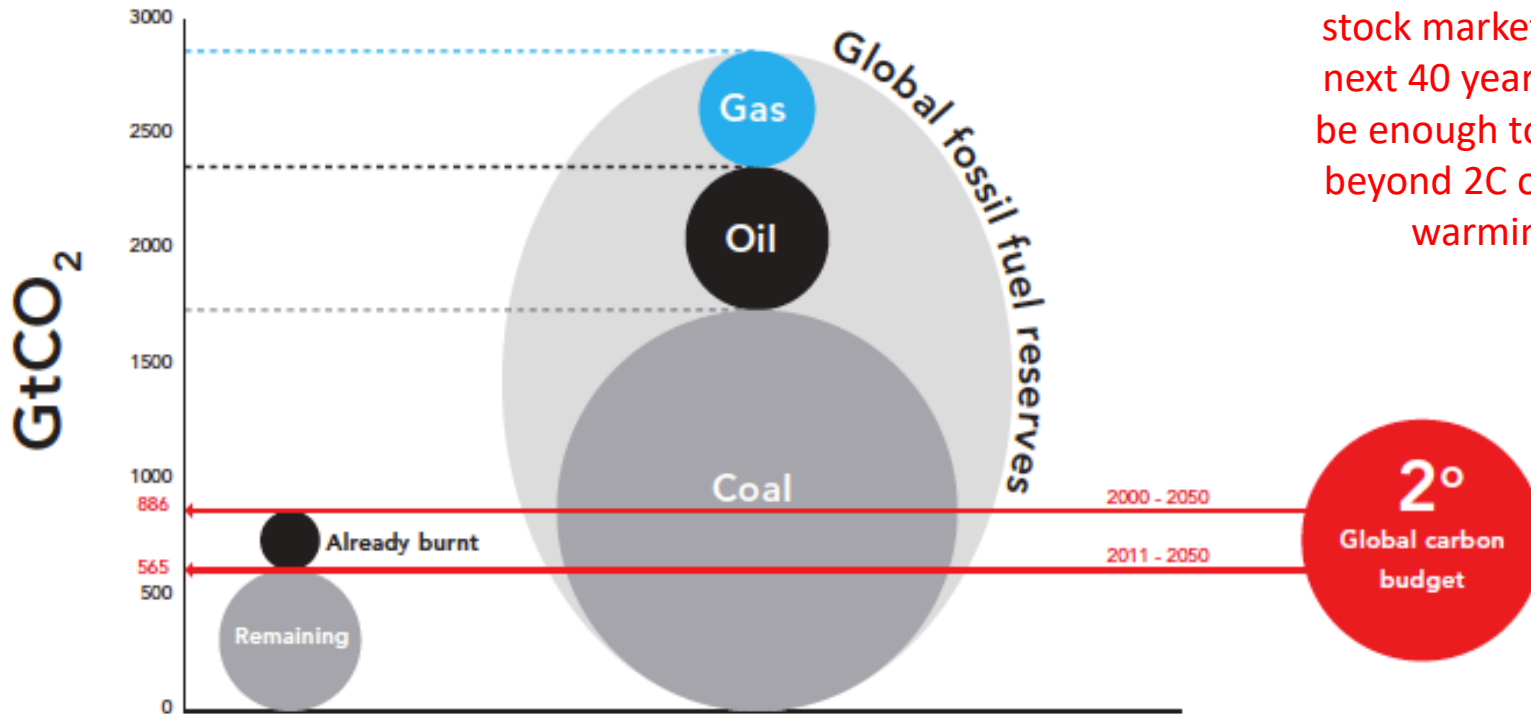
## Projected Emissions for the Top 10 Economic Sub-Sector



# Real Danger of Wasted Capital and Stranded Assets

Comparison of the global 2°C carbon budget with fossil fuel reserves CO<sub>2</sub> emissions potential

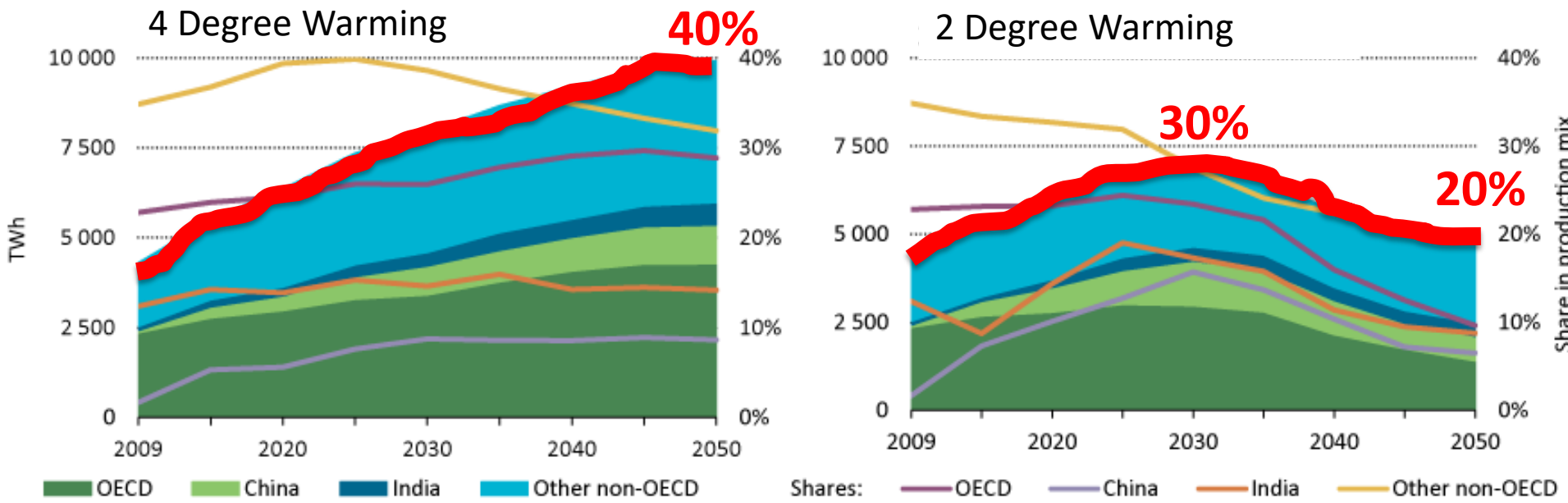
Fig.1



‘using just the reserves listed on the world’s stock markets in the next 40 years would be enough to take us beyond 2C of global warming.’

# Natural Gas as Share of Grid Power Mix

near-term GHG benefits, but lock-in risk, uncertain lifecycle benefits



Note: Natural gas-fired generation includes generation in power plants equipped with CCS units. Biogas is not included.

*IEA: Natural gas-fired power generation must decrease after 2030 to meet the CO2 emissions projected in the 2DS.*



# \$1 Trillion





\$3

Trillion





# Competing in Clean Energy

Capitalizing on Canadian innovation in a \$3 trillion economy



Dan Woynilowicz,  
Penelope Comette,  
Ed Whittingham

Foreword by David McLaughlin

January 2013

**PEMBINA**  
institute

# Renewable energy opportunities in the oil and gas sector

Executive Summary



Jason Switzer, Dave Lovekin and Kelly Finigan

January 2013

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institute

# Competing in Clean Energy

Capitalizing on Canadian innovation  
in a \$3 trillion market

## Clean Energy Intrapreneurs & Entrepreneurs:

individuals and organizations that design,  
develop and manufacture energy  
technologies and/or provide supporting  
services that meaningfully reduce energy's  
environmental footprint

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Push

## Send the right price signals



- Eliminate preferential tax treatment for fossil fuel production
- Establish national carbon price



## Stimulate Demand

- Deploy Public Purchasing Power
- Support Technology Prizes & Golden Carrots



## Enhance Access to Capital

- Public and Private Clean Energy Venture Funds (e.g. SDTC, Cenovus Opportunity Fund)
- Government-backed 'Green' Bonds
- 'Flow Thru Shares'



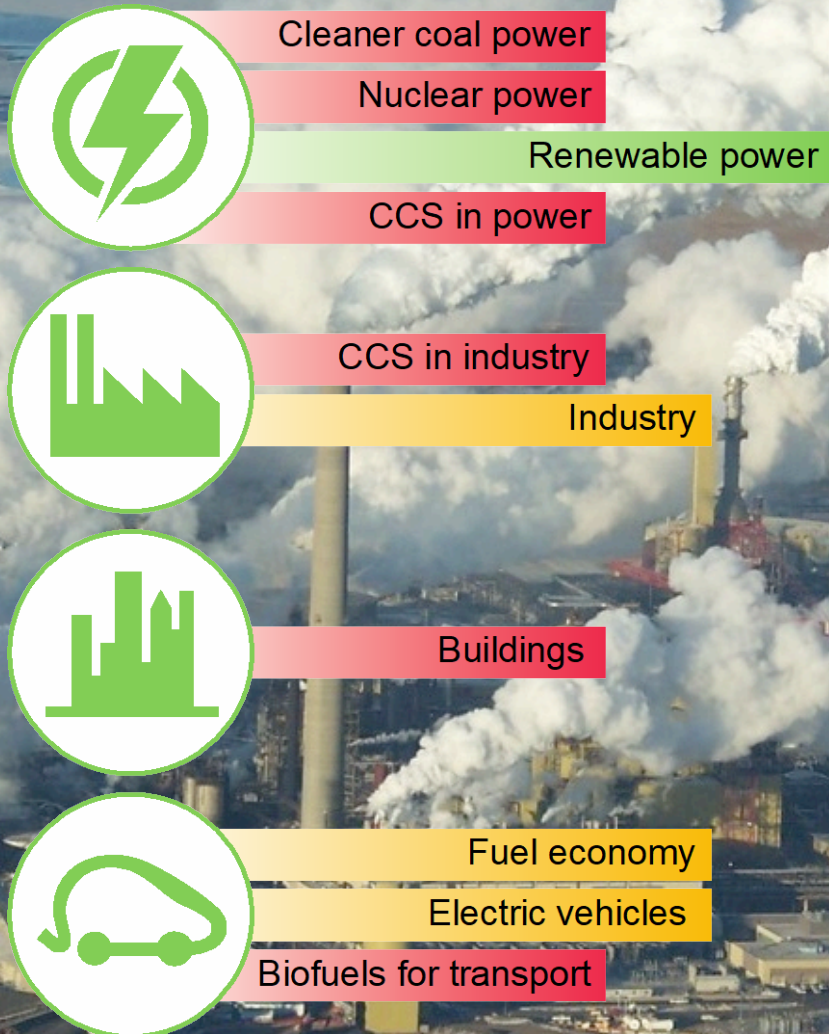


- 1/5 of North American RE investment
- 2 of top 10 RE technology patent holdings
- Leading in geothermal, biofuels
- Opportunities
  - Co-produced hot fluids
  - Solar & Biomass for EOR
  - Post-SAGD Heat Recovery

<http://www.pembina.org/blog/692>



# Clean Energy Transition: “too many red lights”



*According to IEA:  
“On track for 6DS”*

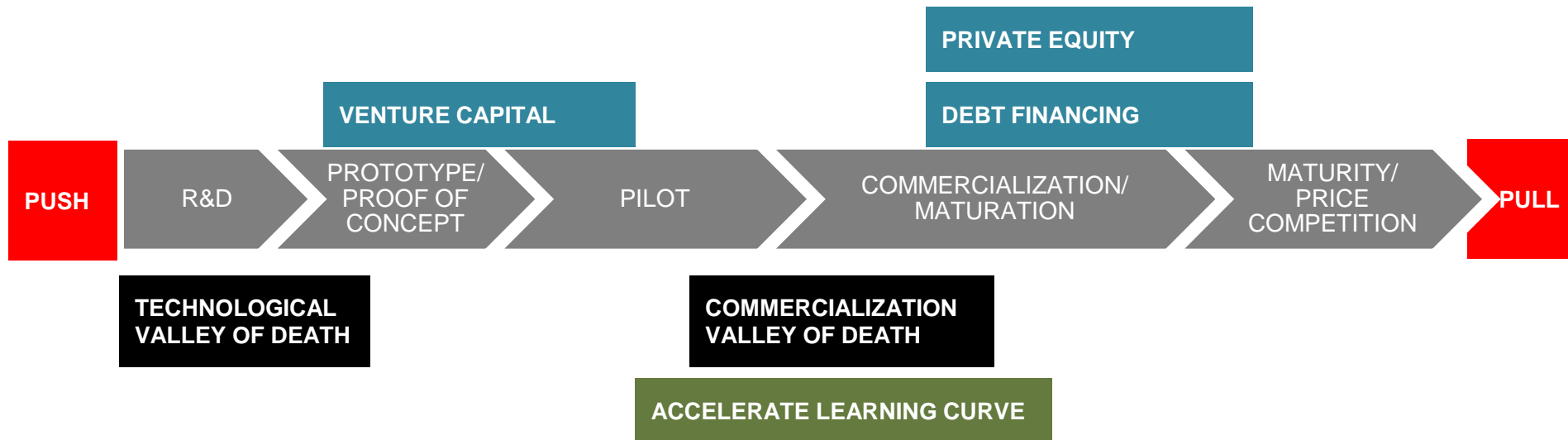
*“Progress is too slow in  
almost all technology areas  
Significant action is required  
to get back on track”*



**Muchas Gracias**  
**Thank you**  
**Merci Beaucoup**

[jasons@pembina.org](mailto:jasons@pembina.org)

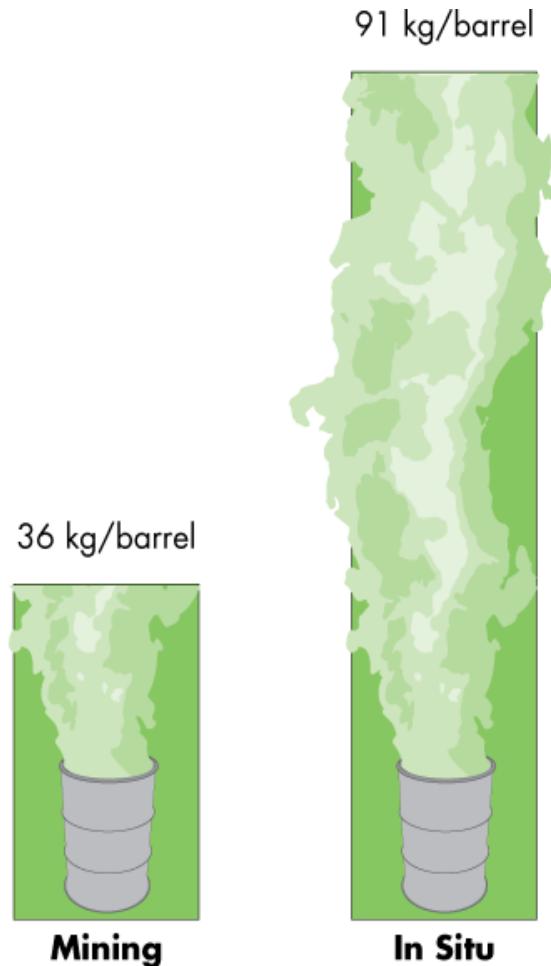
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## The clean energy innovation & diffusion chain

Source: modified from Jenkins and Mansur

# GHG profile for oilsands more likely to worsen than to improve



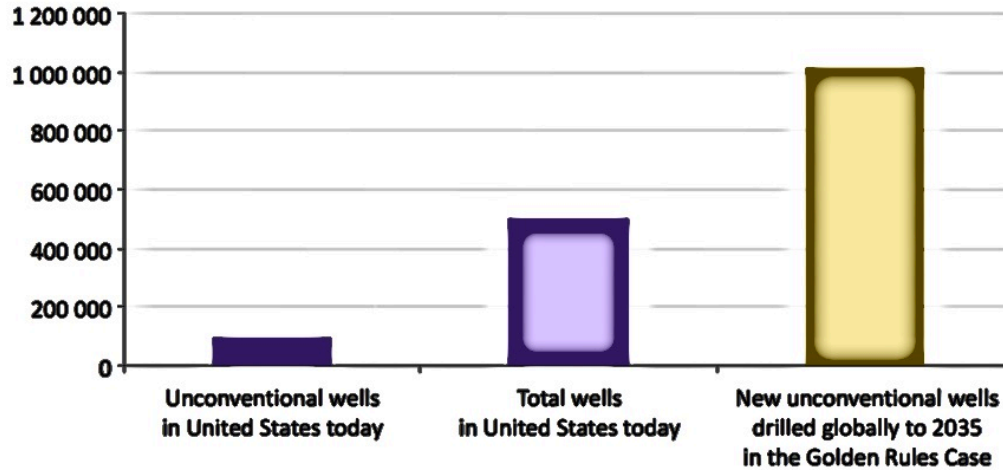
For production of 1 barrel of bitumen

- Best reserves developed first
- Reserve performance declines over time
- In-situ GHG emissions intensity generally higher than mining
- In situ production will overtake mining by 2015
- By 2020, 3.2 M bbls/d
- ~ 9M bbls/d announced



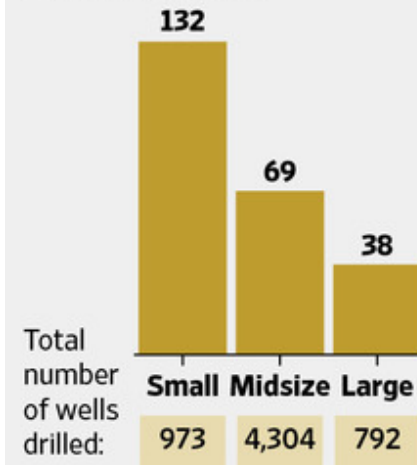
# Natural Gas faces serious social license challenges

Number of gas wells



## Compliance Record

Regulatory violations per 100 wells drilled in the Marcellus Shale, by size of drilling company, 2008-12:

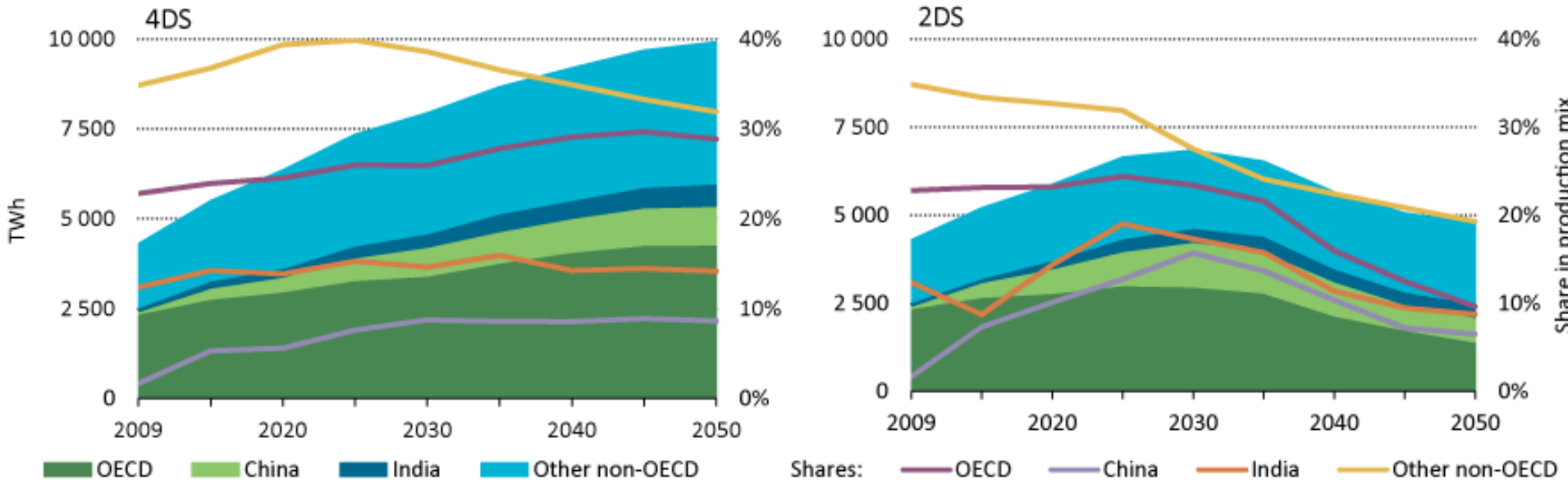


Source: Pennsylvania Department of Environmental Protection

The Wall Street Journal

# Natural Gas as Share of Grid Power Mix

near-term GHG benefits, but lock-in risk, uncertain lifecycle benefits



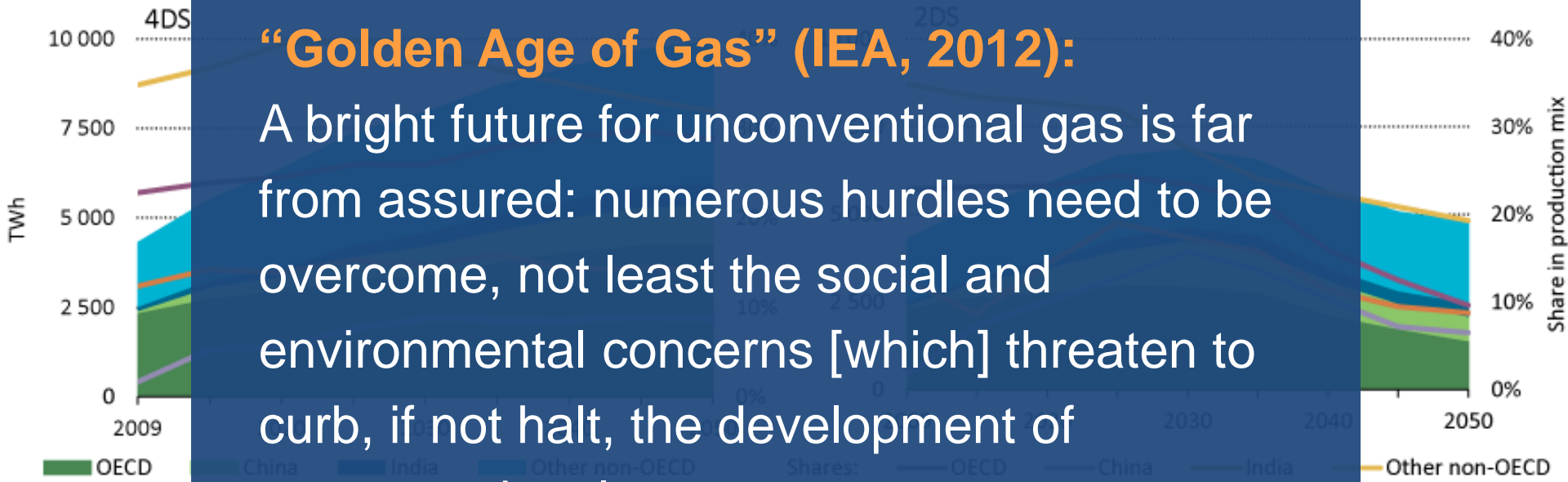
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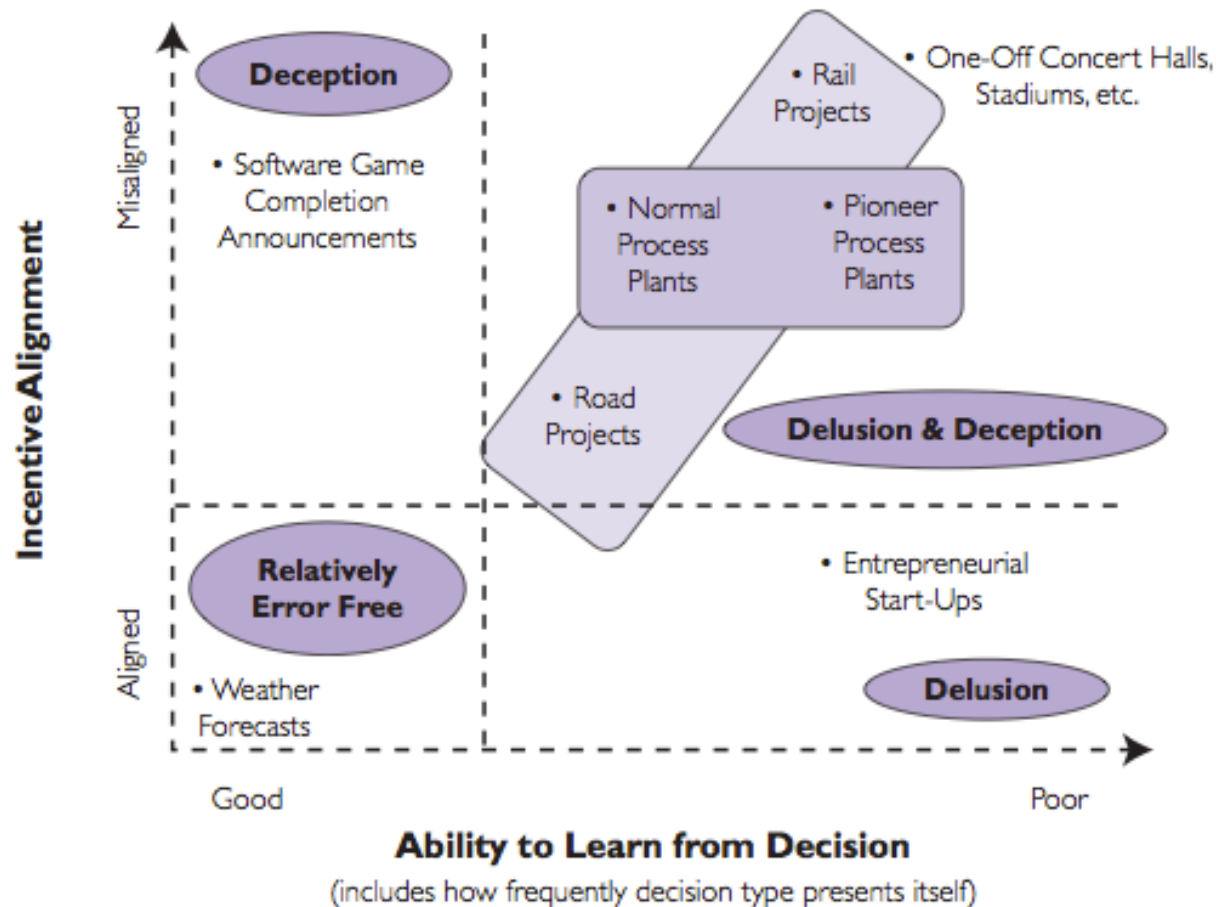
**“Golden Age of Gas” (IEA, 2012):**  
A bright future for unconventional gas is far from assured: numerous hurdles need to be overcome, not least the social and environmental concerns [which] threaten to curb, if not halt, the development of unconventional resources



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# Megaprojects: over budget, over time, over and over again



"Delusion and Deception in Large Infrastructure Projects: Two Models for Explaining and Preventing Executive Disaster." Co-authors: Massimo Garbuio and Dan Lovo. California Management Review, vol. 51, no. 2, Winter 2009, pp. 170-193.

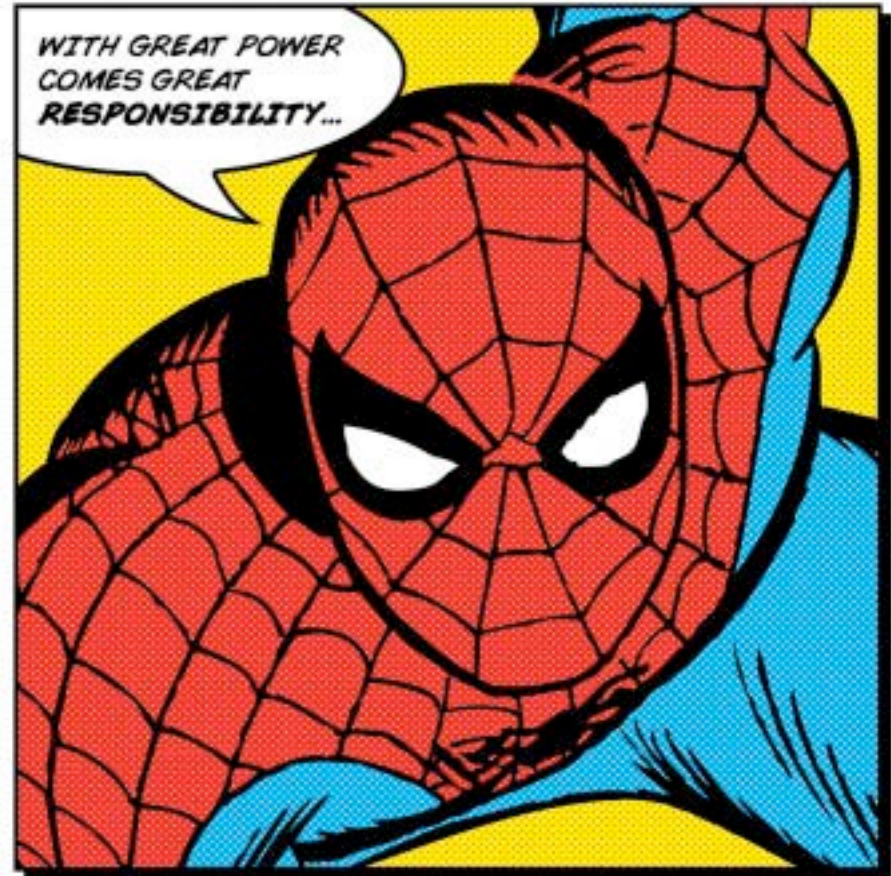


# From Middle Power to Global Powerhouse?

5<sup>th</sup> Largest  
Energy Prod

50%

1<sup>st</sup>



# Planned development increasingly likely to exceed science-based limits

## Air:

Increasing number of air quality exceedences

Approved development predicted to soon exceed acid deposition limits

## Climate:

Failing to achieve AB climate change reductions

No plan in place to meet Canadian commitments

No plan to reconcile projected oilsands emissions growth with targets

## Tailings (future production):

Flexibility with tailings Directive (7 out of 9 mines not in compliance – negotiations with companies)

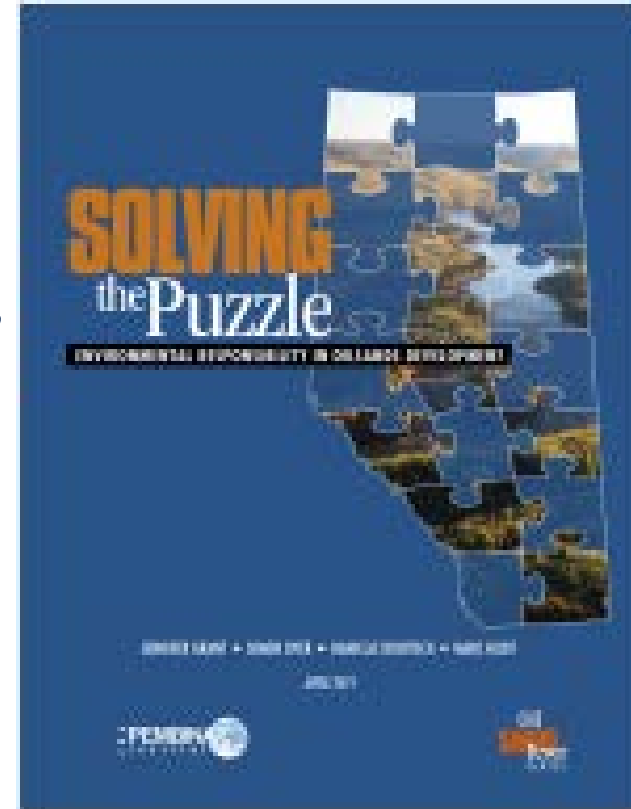
## •Biodiversity:

- No emergency protection for caribou

- Draft recovery plan relies on predator control vs. habitat protection

# Our view on Oilsands

1. **Pace and scale of oil sands expansion** will likely trump incremental improvements
2. **Science based and enforceable regulations and monitoring to cap impacts** are needed, promised, slow to be implemented
3. **Voluntary efforts** to date have not been commensurate with challenge
4. **Environmental liabilities** continue to grow without a clear solution in place
5. **Oilsands revenue** needs to be used to position Canada for clean energy transition





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