Transition to the clean energy economy: global trends and opportunities for B.C.

Address to OBWB

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Pembina Institute

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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.

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A little about myself…..

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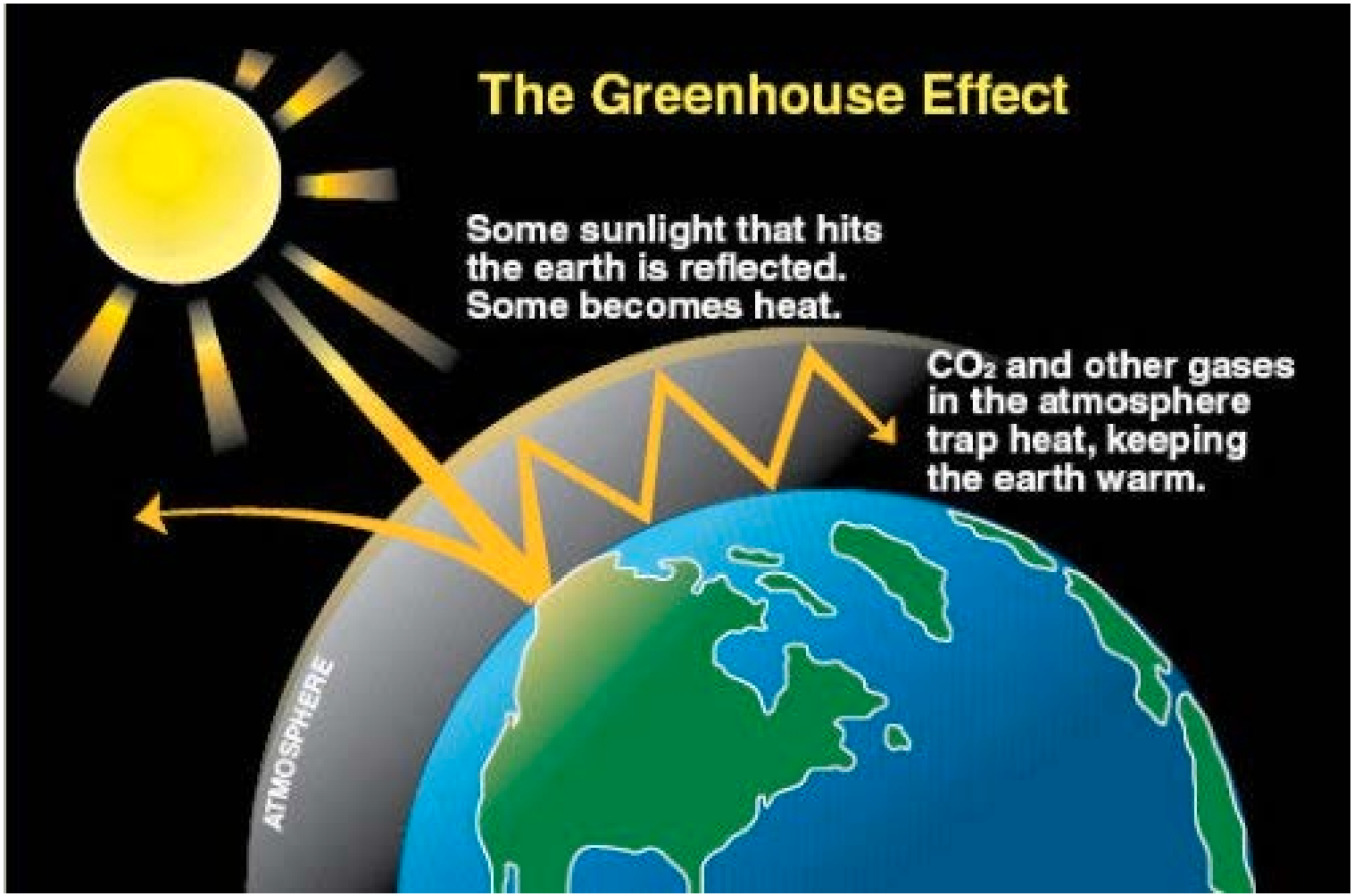
Presentation Overview

- Global energy demand and the climate change challenge
- Global trends towards the clean energy economy
- Challenges for B.C.
- Opportunities for B.C.

Greenhouse Effect – Basics



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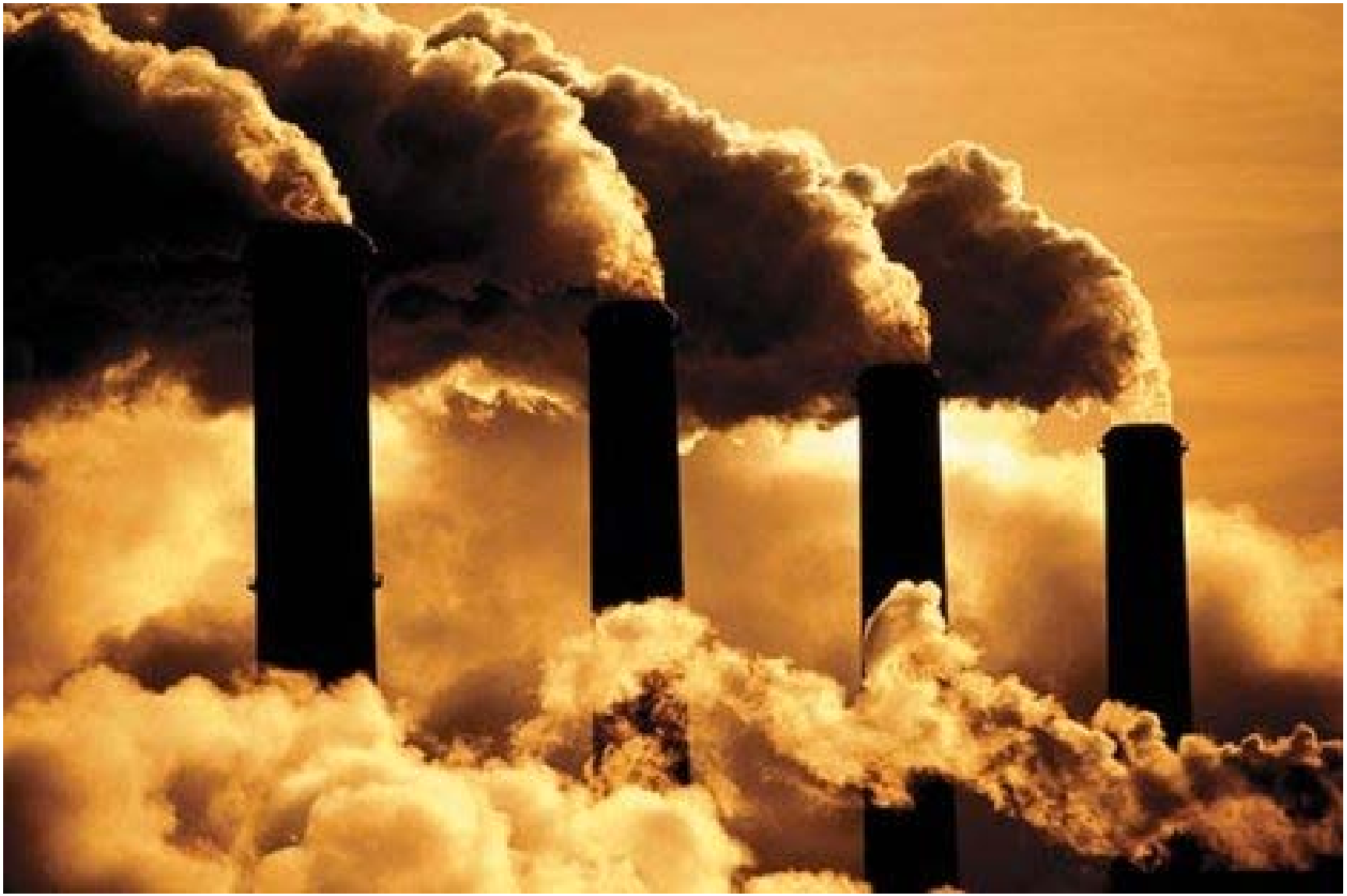

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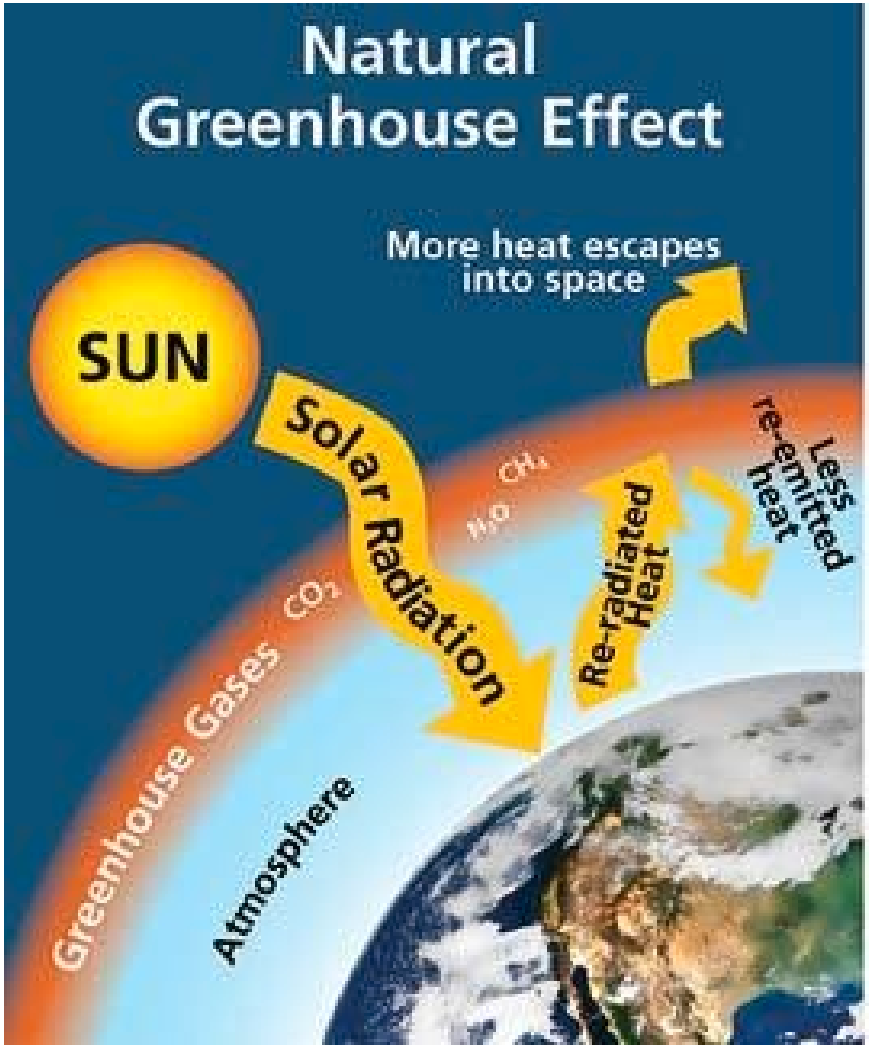

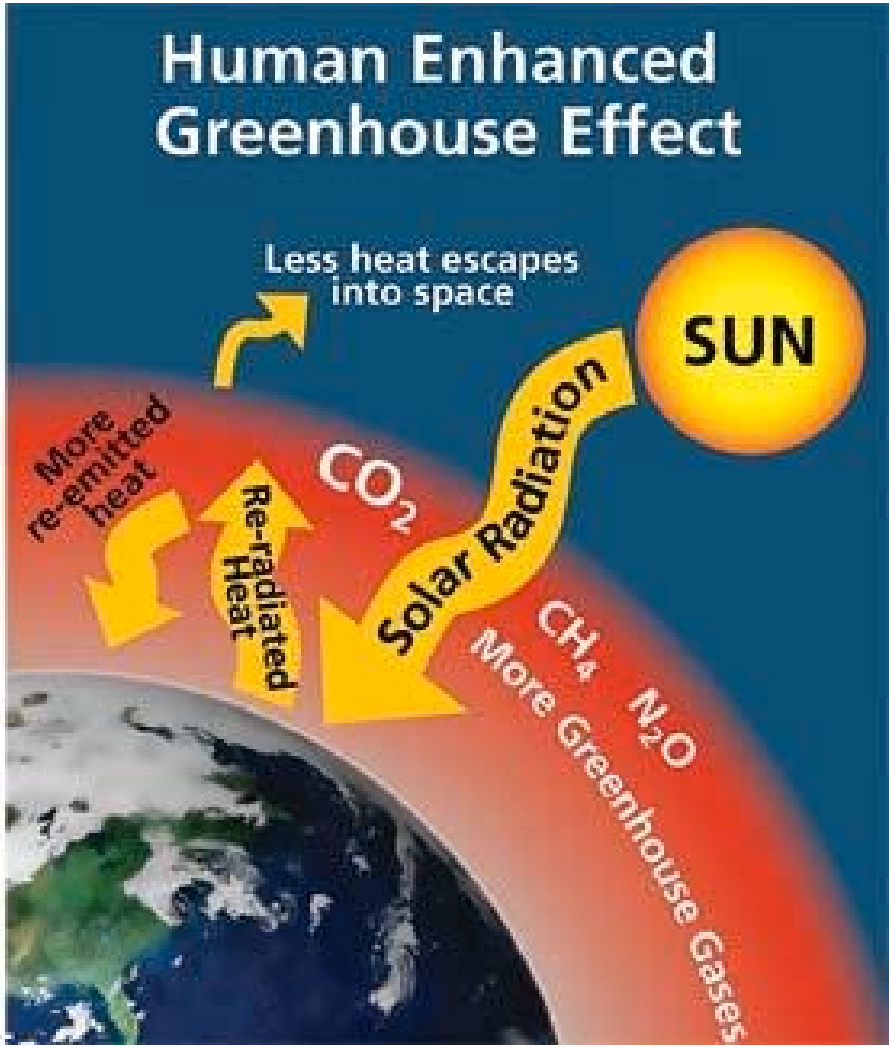

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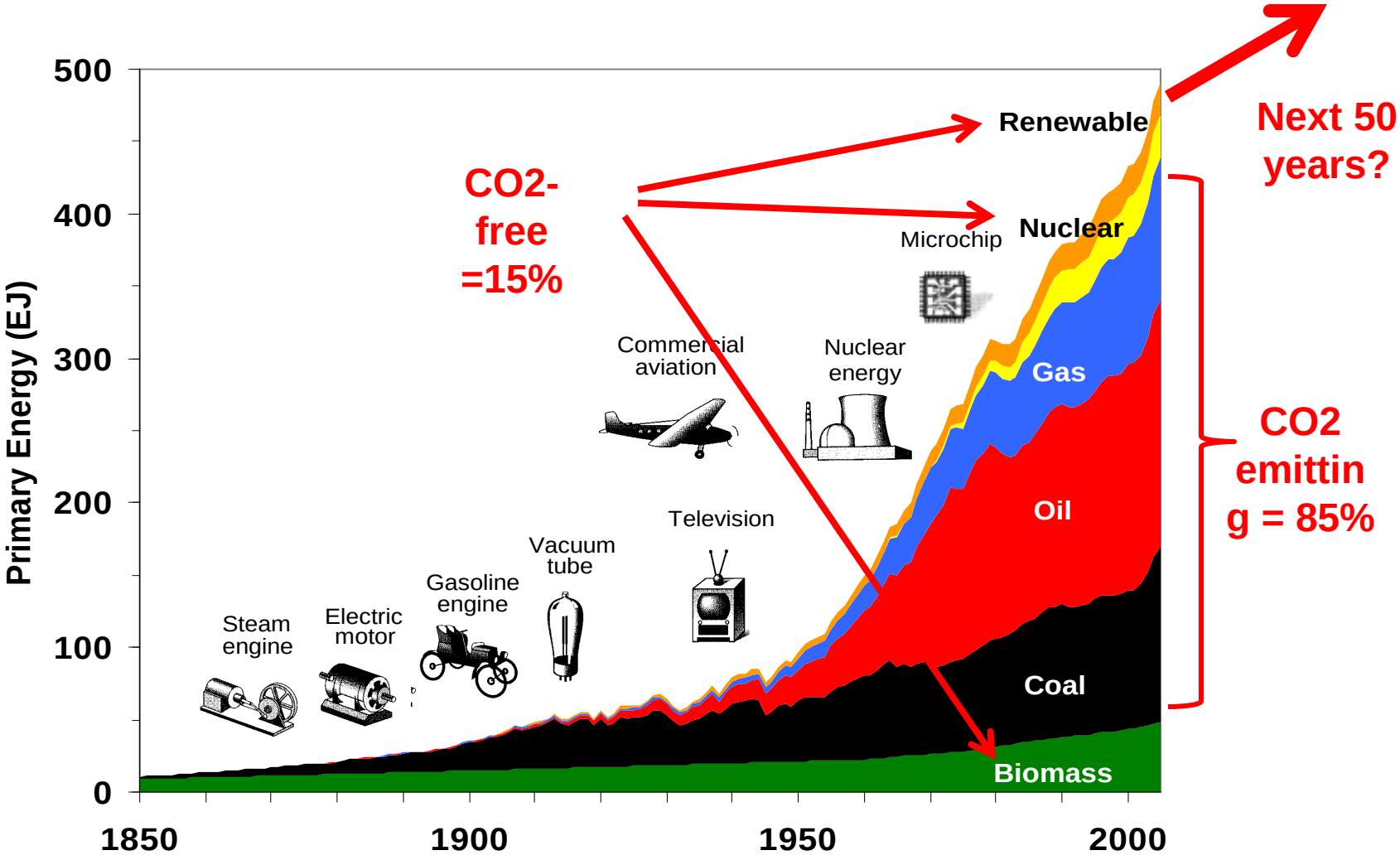
Current world energy-CO_2 path



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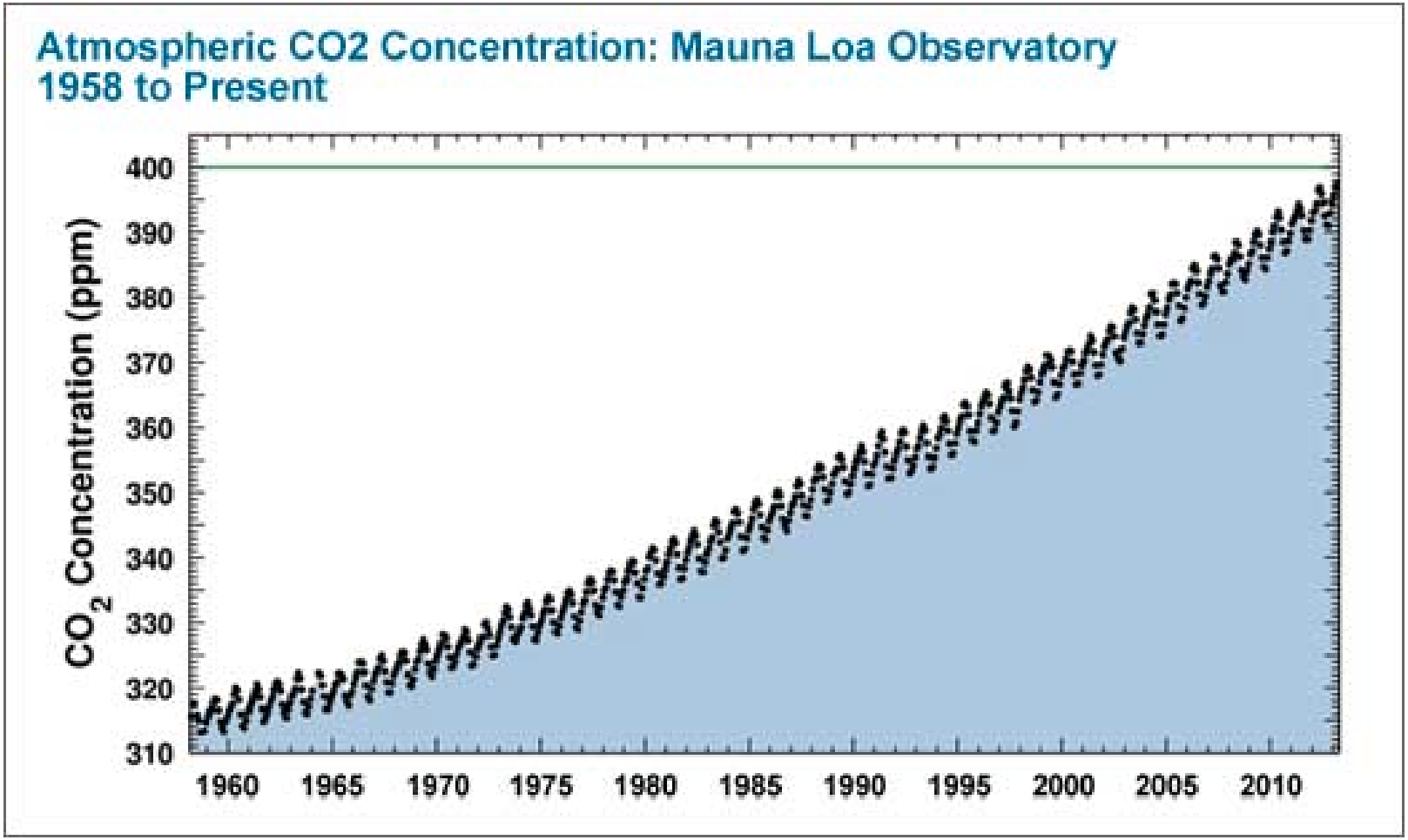
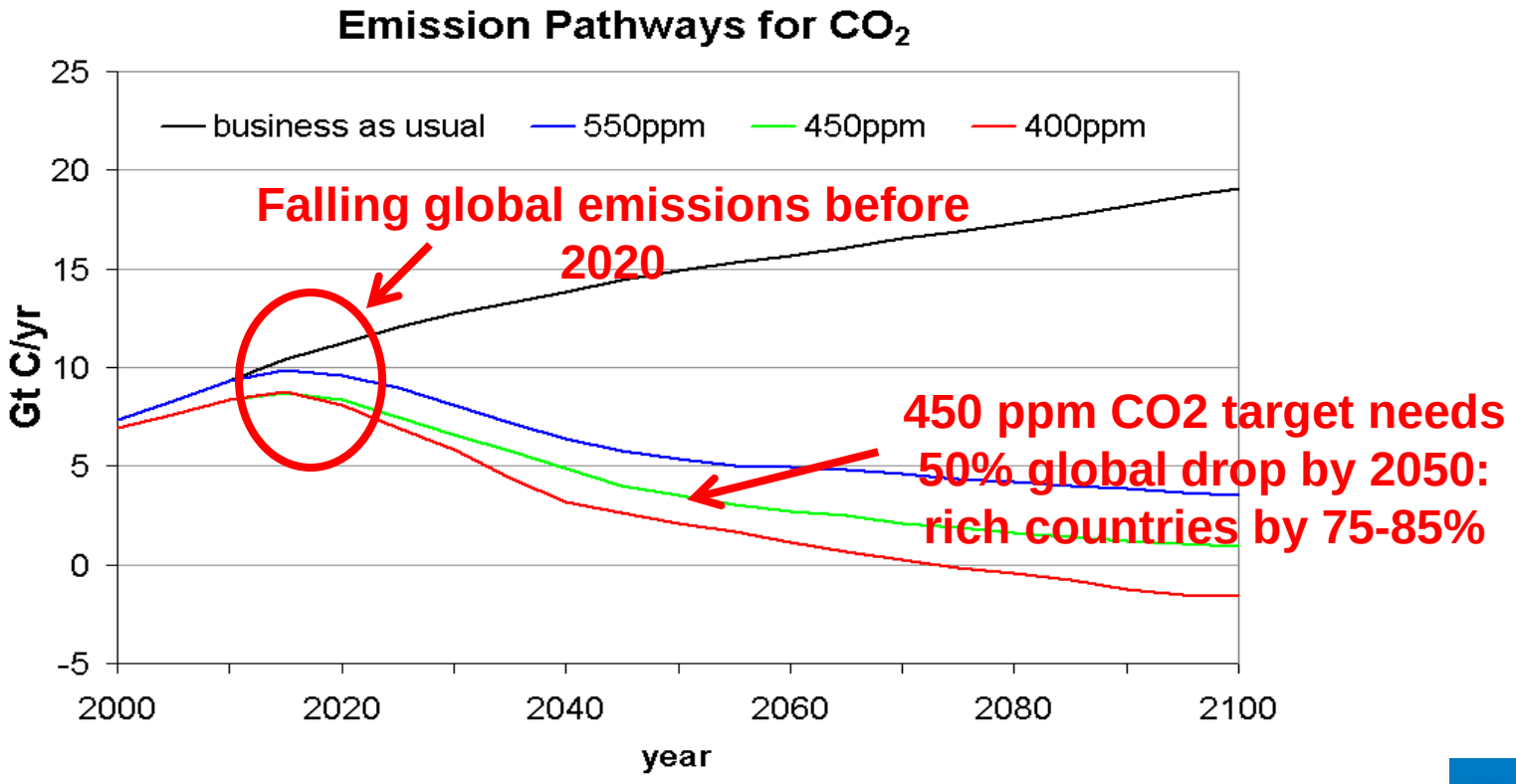


450 ppm is estimated to be the 2C limit

NASA, 2013

How do we stay below 2C?

- Business as usual = no climate policy; start date of 2000
- 3 CO2e stabilisation targets: 550ppm, 450ppm, 400ppm



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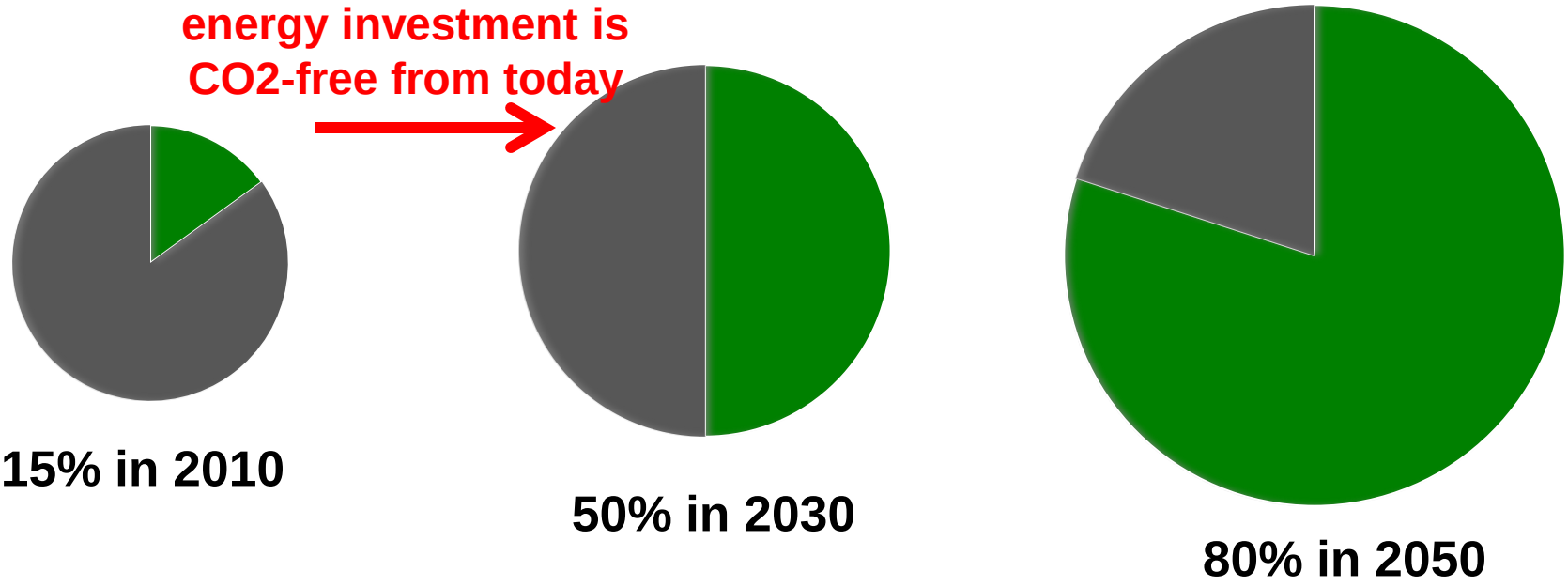
CO2–free energy share to stay below 2C

50% reduction from growing system requires 80% CO2-free globally

Only possible if all energy investment is CO2-free from today



15% in 2010

50% in 2030

80% in 2050

Source: Nakicenovic

CO2-free energy share = biomass + other renewables + nuclear + fossil fuels with CCS

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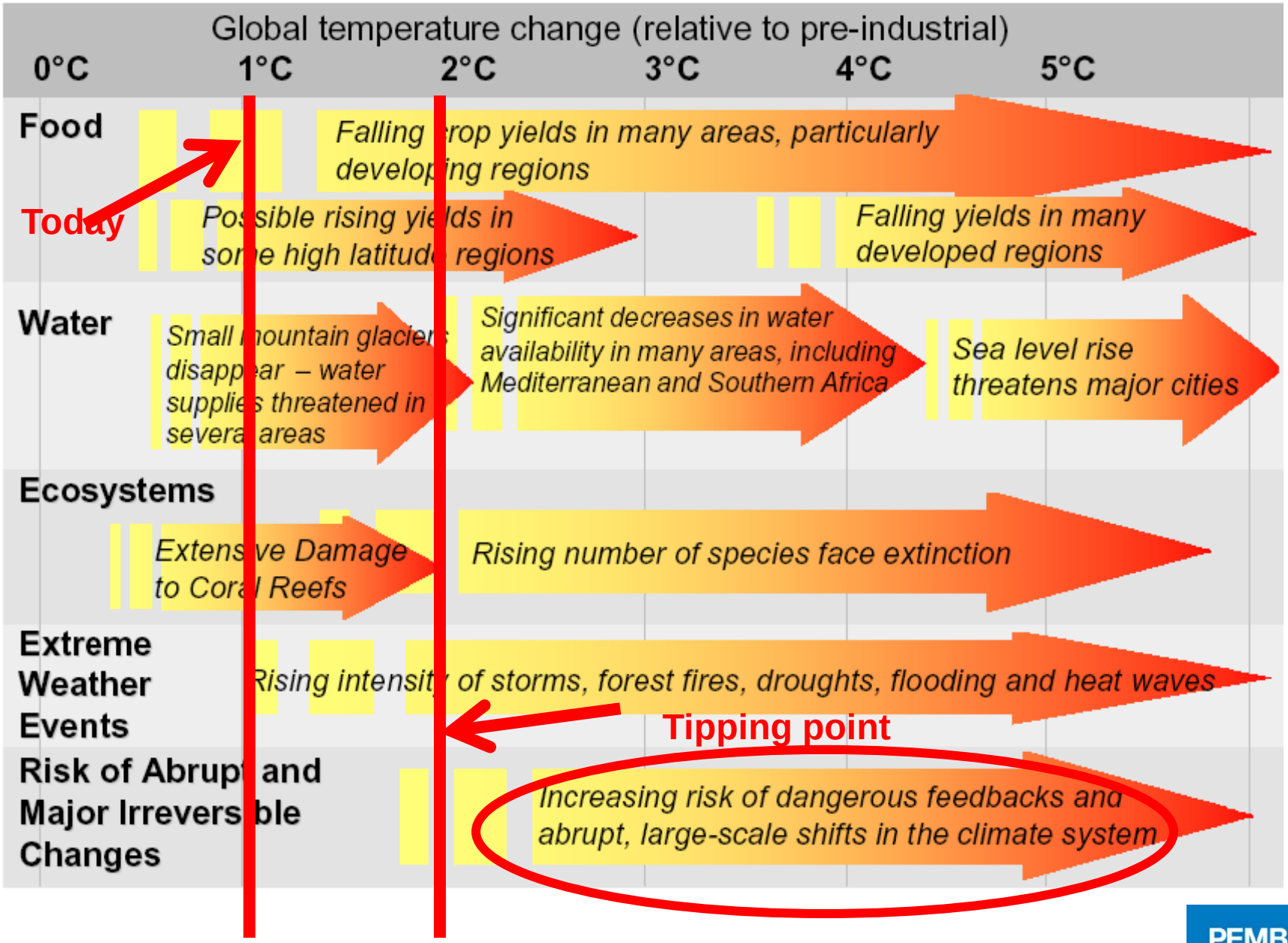
Projected Impacts of Climate Change



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But it’s not hopeless

Past “successes” addressing environmental threats

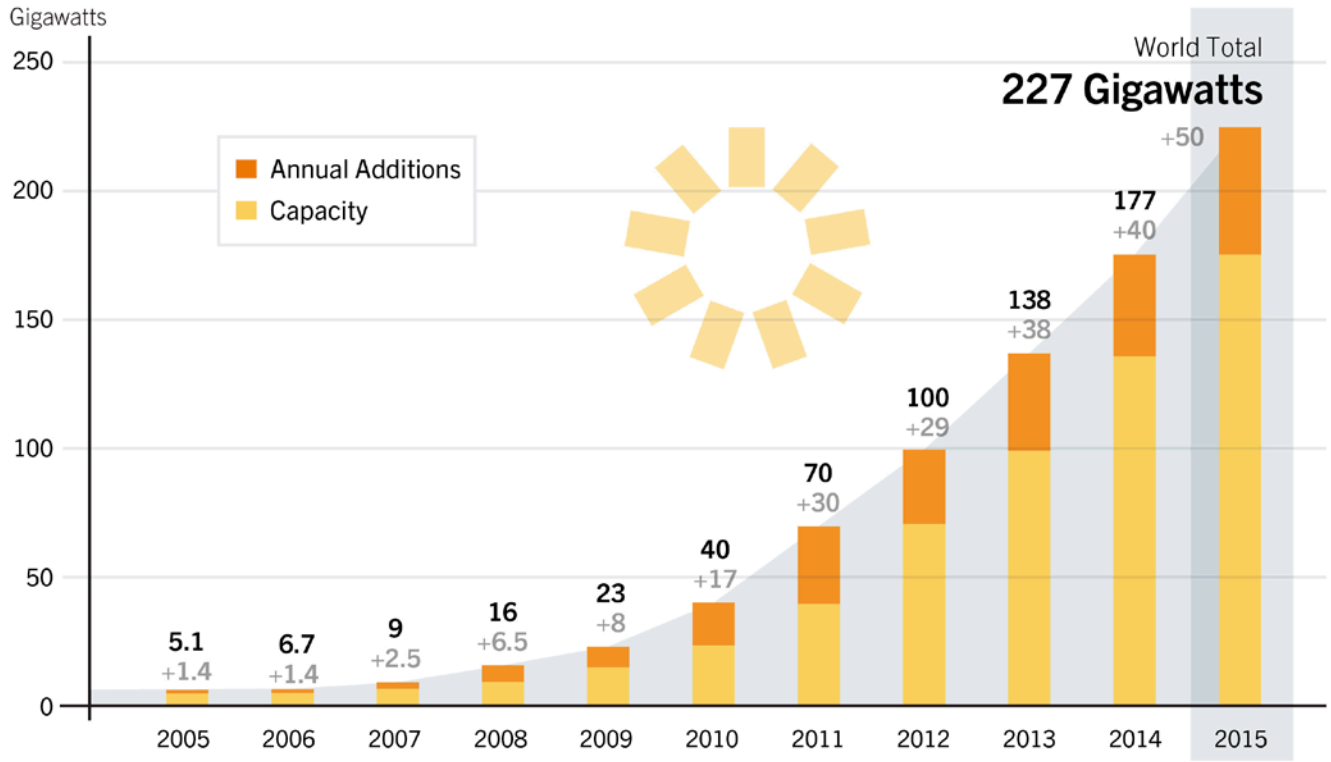
- Acid emissions
- Smog creating emissions
- Ozone-depleting emissions
- Lead emissions
- etc.

Technical and policy solutions are available!

Looking ahead: The world is embracing the clean energy economy

Growth in Solar Power

Solar PV Global Capacity and Annual Additions, 2005–2015



REN21 *Renewables 2016 Global Status Report*

REN21 Renewable Energy Policy Network for the 21st Century

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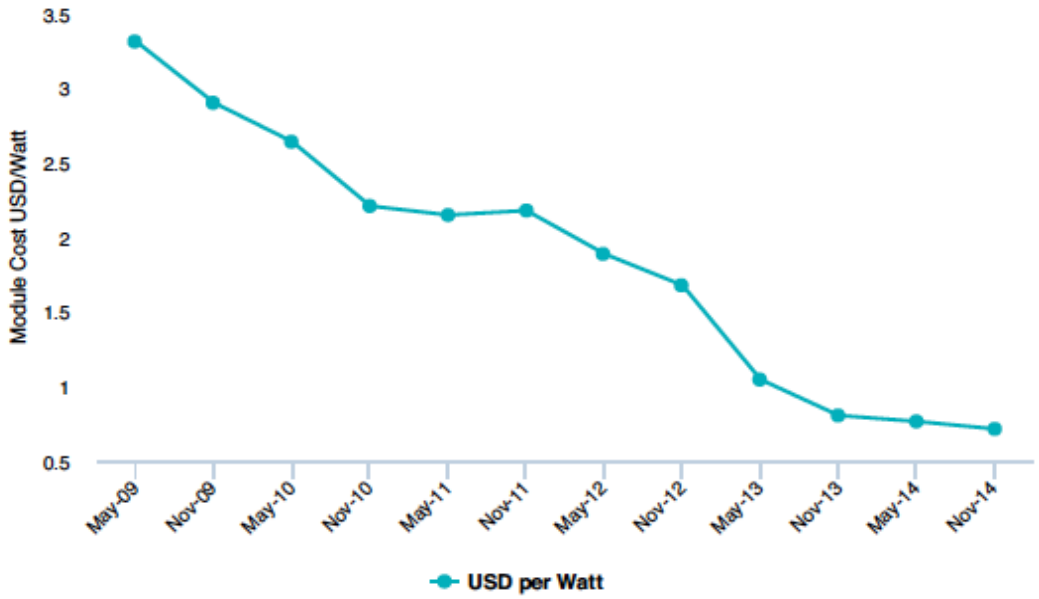
Dropping cost of Solar Energy

Dropping Solar Costs in 2014

Adapted from IRENA - Renewable Power Generation Costs in 2014

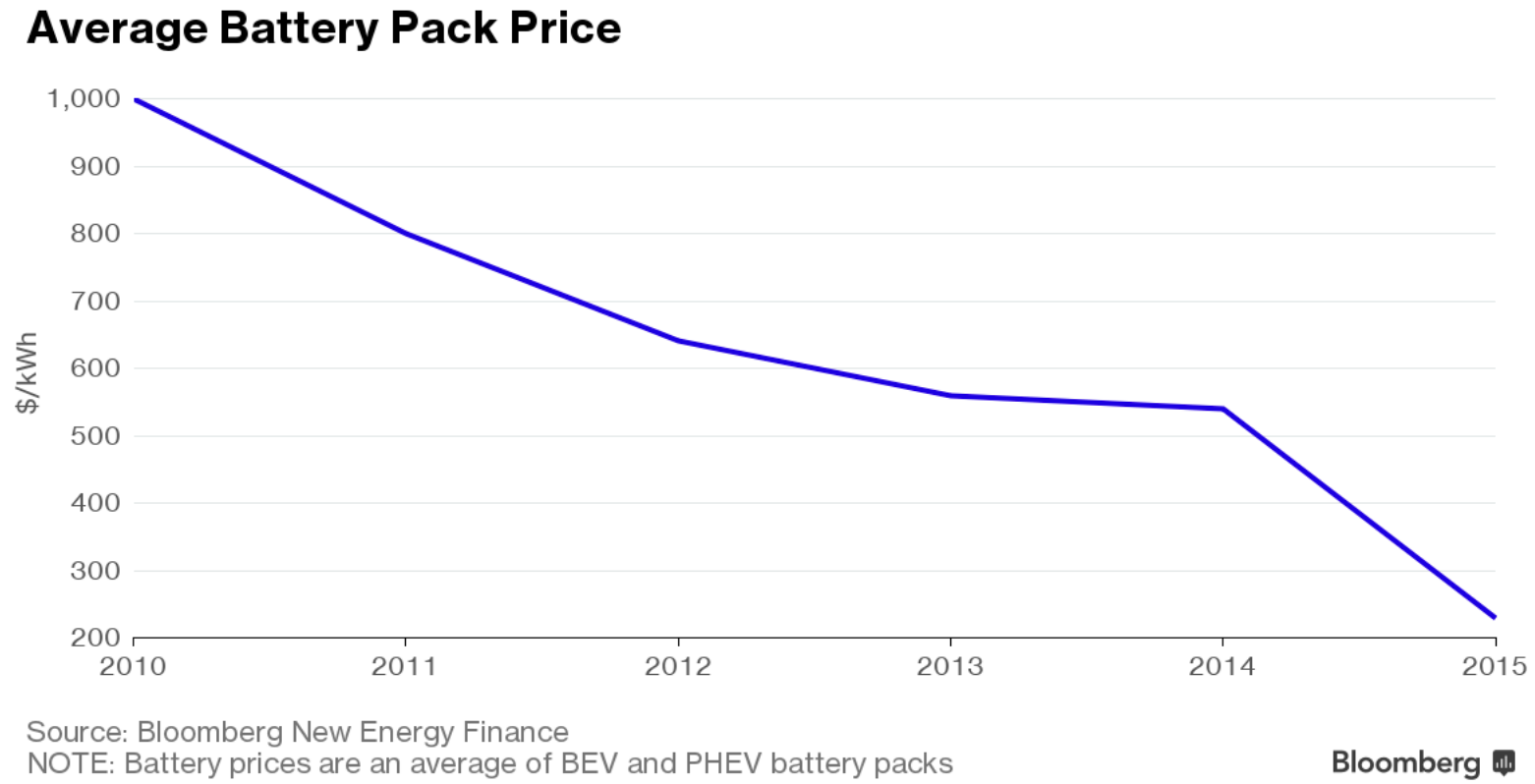


Solar Costs (2914 USD/Watt)

2014 USD/Watt		Date (month - year)
$	3.31	May-09
$	2.90	Nov-09
$	2.64	May-10
$	2.21	Nov-10
$	2.15	May-11
$	2.18	Nov-11
$	1.89	May-12
$	1.68	Nov-12
$	1.05	May-13
$	0.81	Nov-13
$	0.77	May-14
$	0.72	Nov-14

Source: Clean Energy Canada (2015)

Dropping costs of lithium-ion batteries



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Carbon pollution pricing is going mainstream

- In 2008 B.C. was the first jurisdiction to implement a revenue neutral carbon price
- Today, a carbon price exists in 7 of the world's 10 largest economies

What are the challenges and opportunities for B.C. in this changing energy landscape?

First, the challenges:

B.C.’s Climate Leadership Plan

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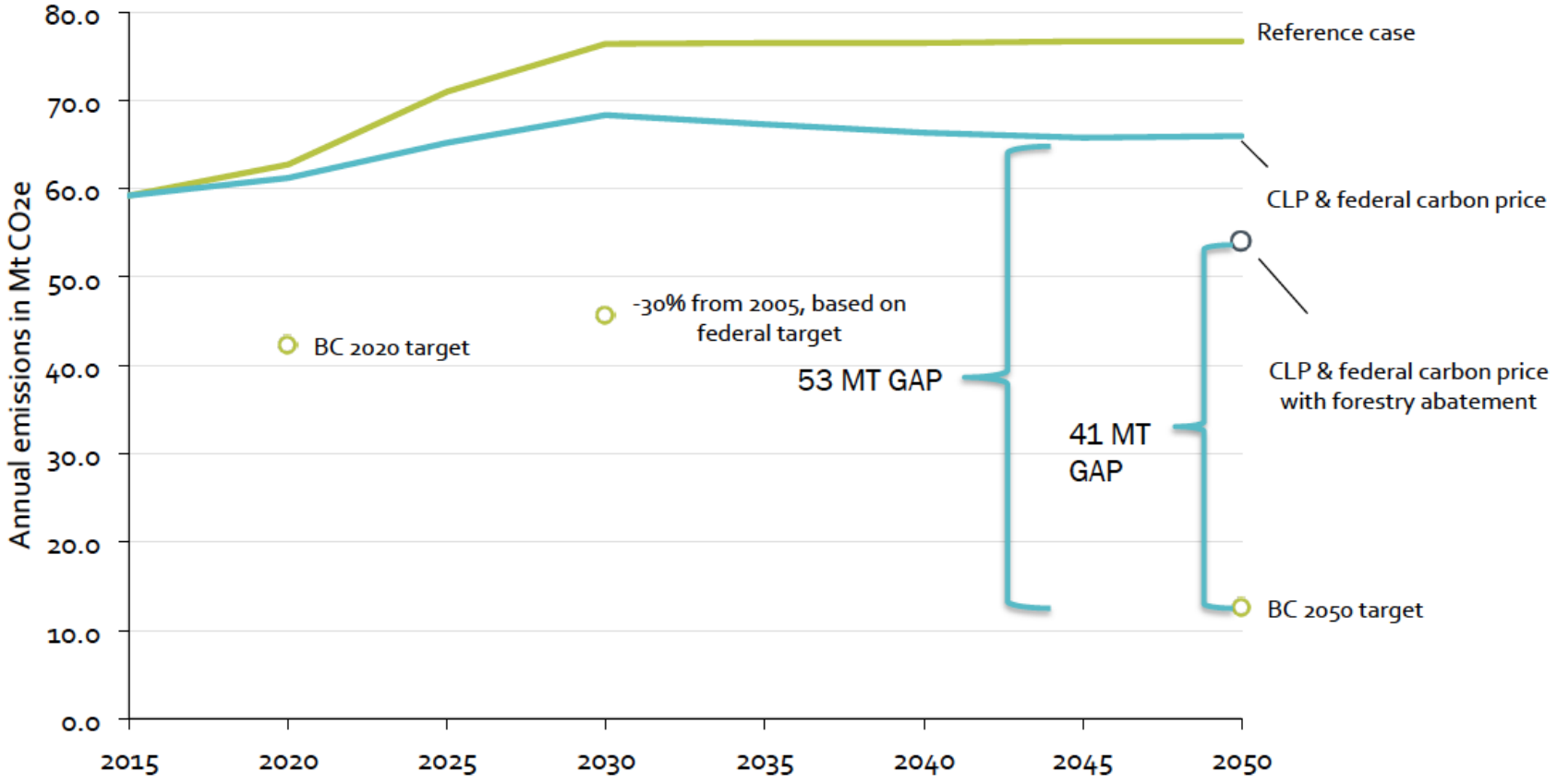
State of climate action in B.C.



Source: Pembina, CEC, PICS, Navius

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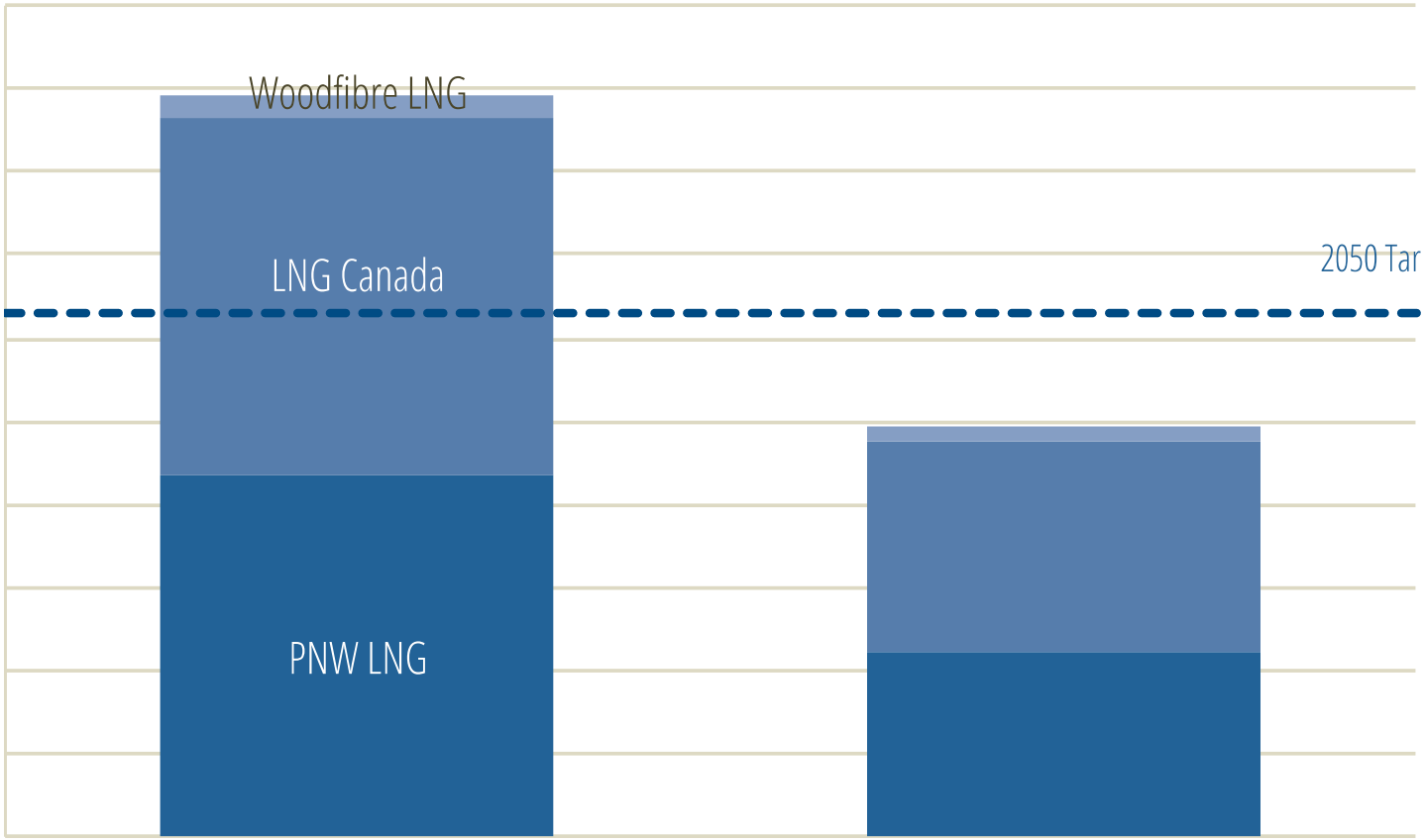
LNG and B.C.’s climate targets



Source: Pembina Institute (2017)

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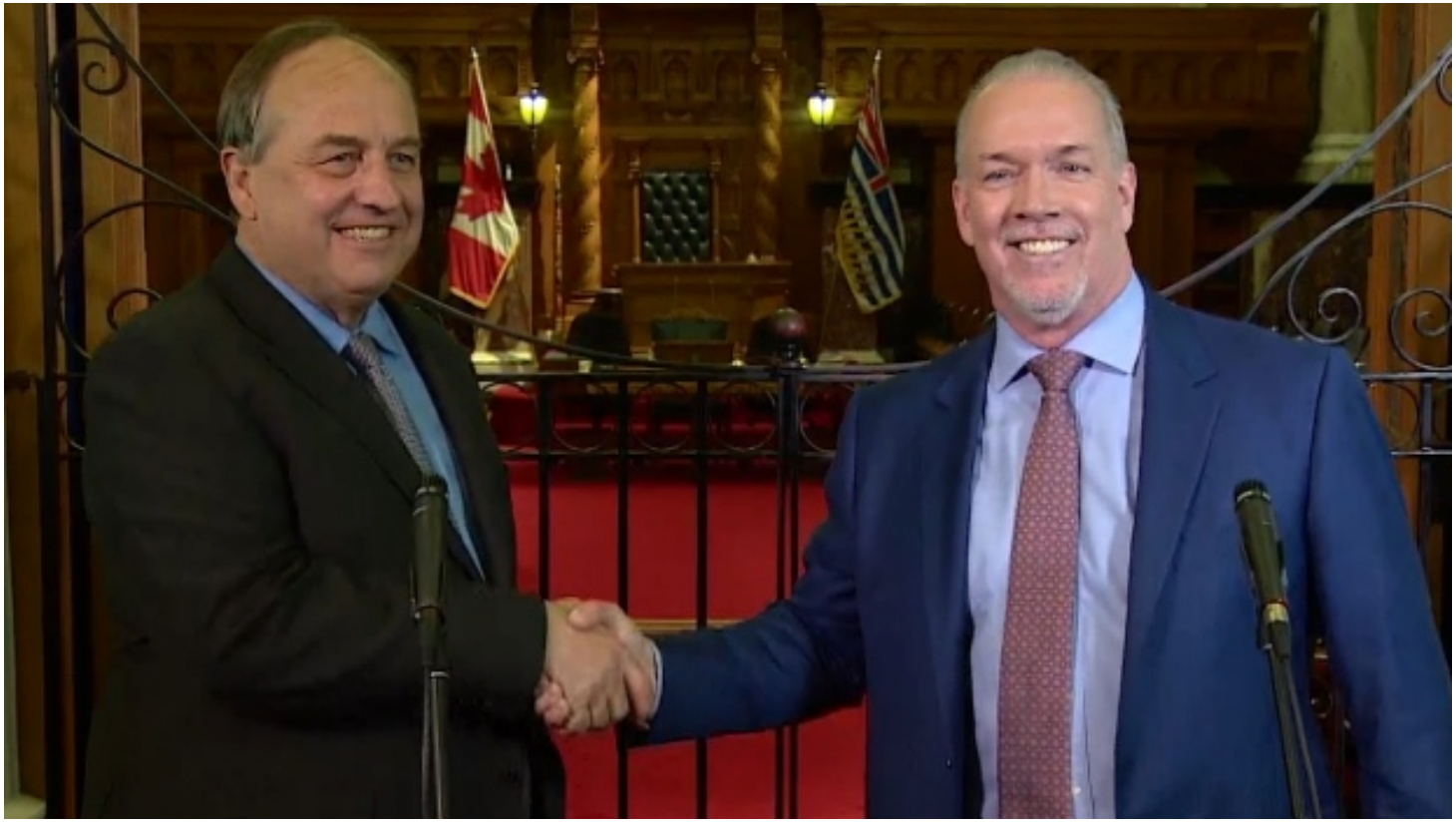
What comes next?



Source: CBC

Pan-Canadian Framework on Climate Change

Source: Government of Canada (2016)

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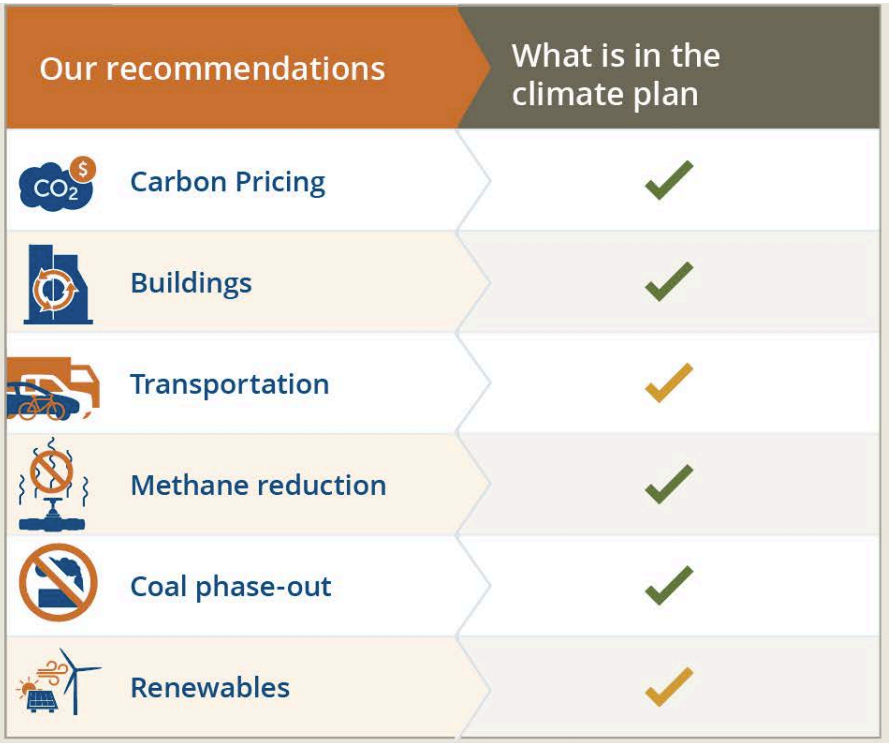
HOW DID THE

PAN-CANADIAN CLIMATE PLAN

SHAKE OUT?



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Full infographic: pembina.org/pub/pan-canadian-climate-plan

Source: Pembina Institute (2016)

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And how about the opportunities?

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Vision for Clean Growth in B.C.

Five key priorities for economic security and prosperity

May 2017

- Build a strong clean tech sector
- Position B.C. to be competitive in the changing global economy
- Make clean choices more affordable
- Stand up for healthy and safe communities
- Grow sustainable resource jobs

Source: Pembina 2017

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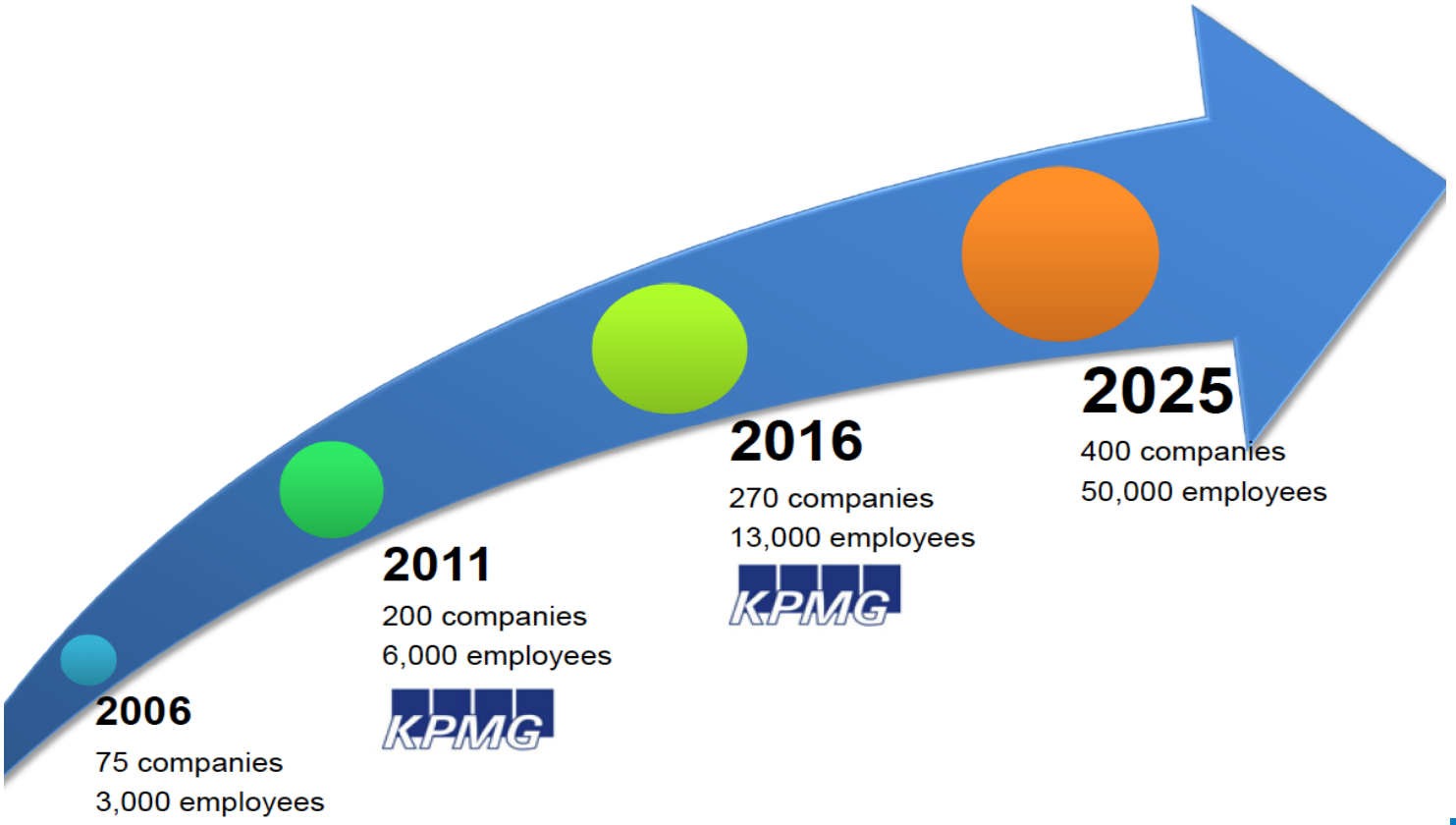
Build a strong clean tech sector

- Global clean tech: $3 trillion /yr (KPMG)
- B.C. already a globally significant hub



Source: BC Clean Tech CEO Alliance

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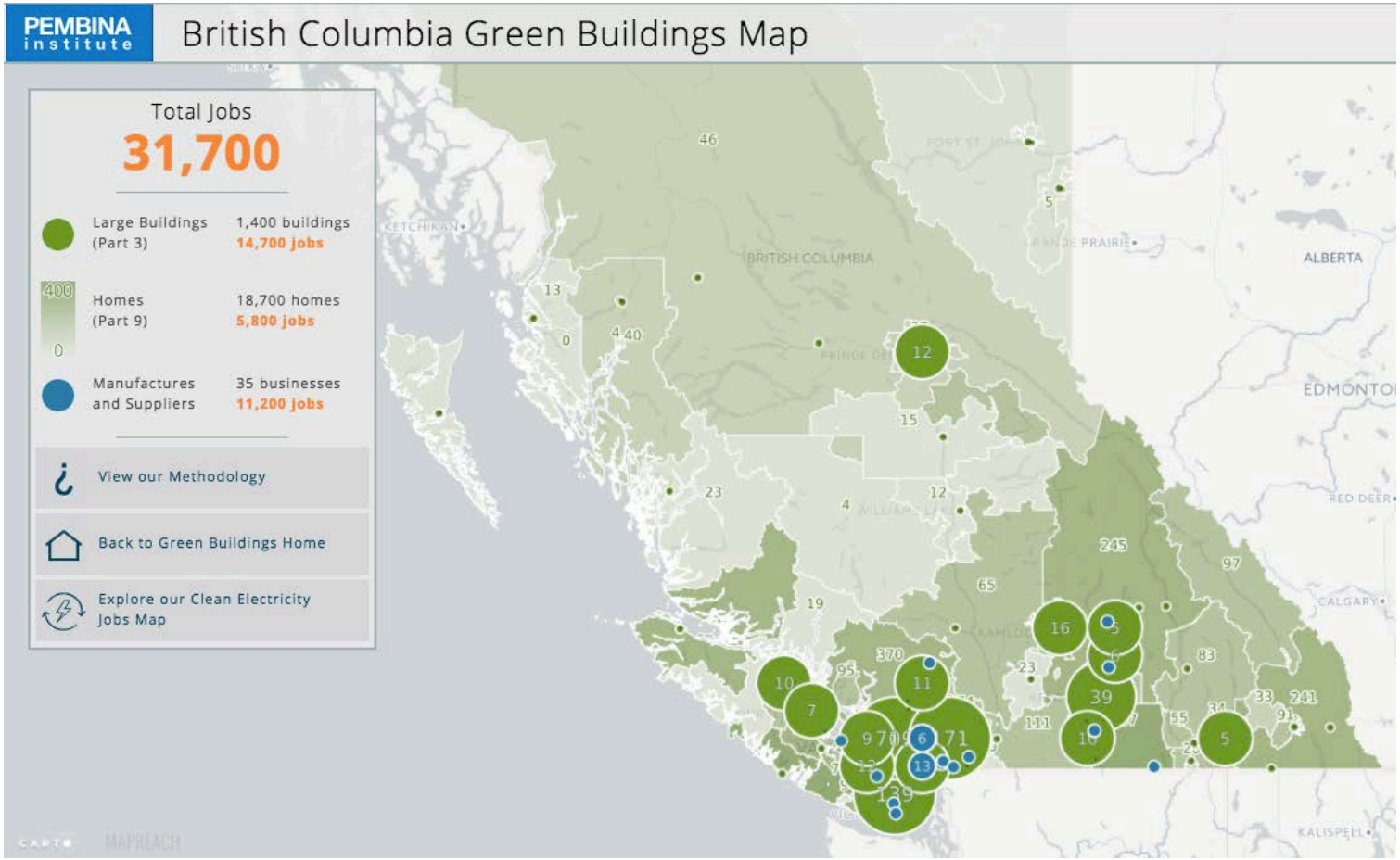
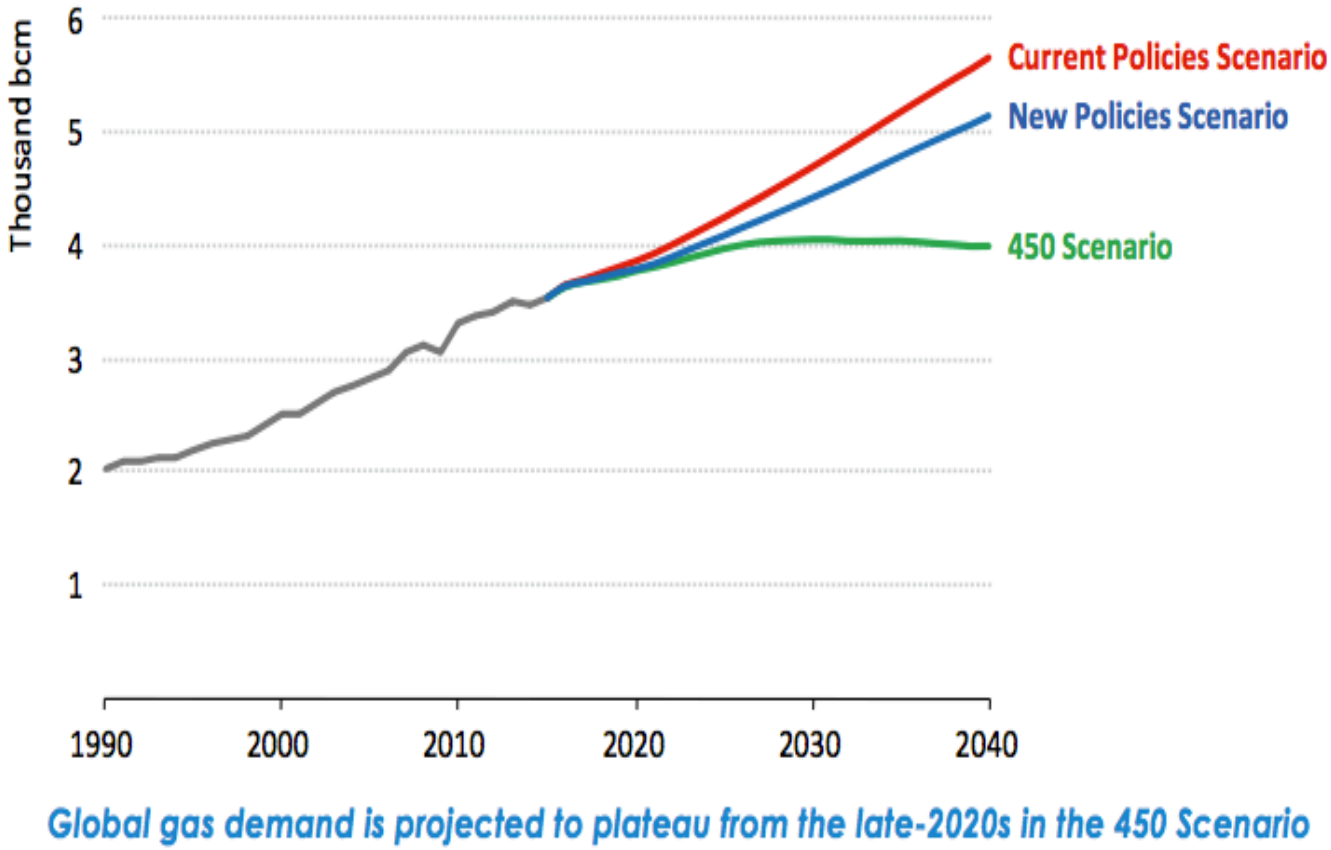
Clean tech example: Energy Efficient Buildings



Source: Pembina (2016)

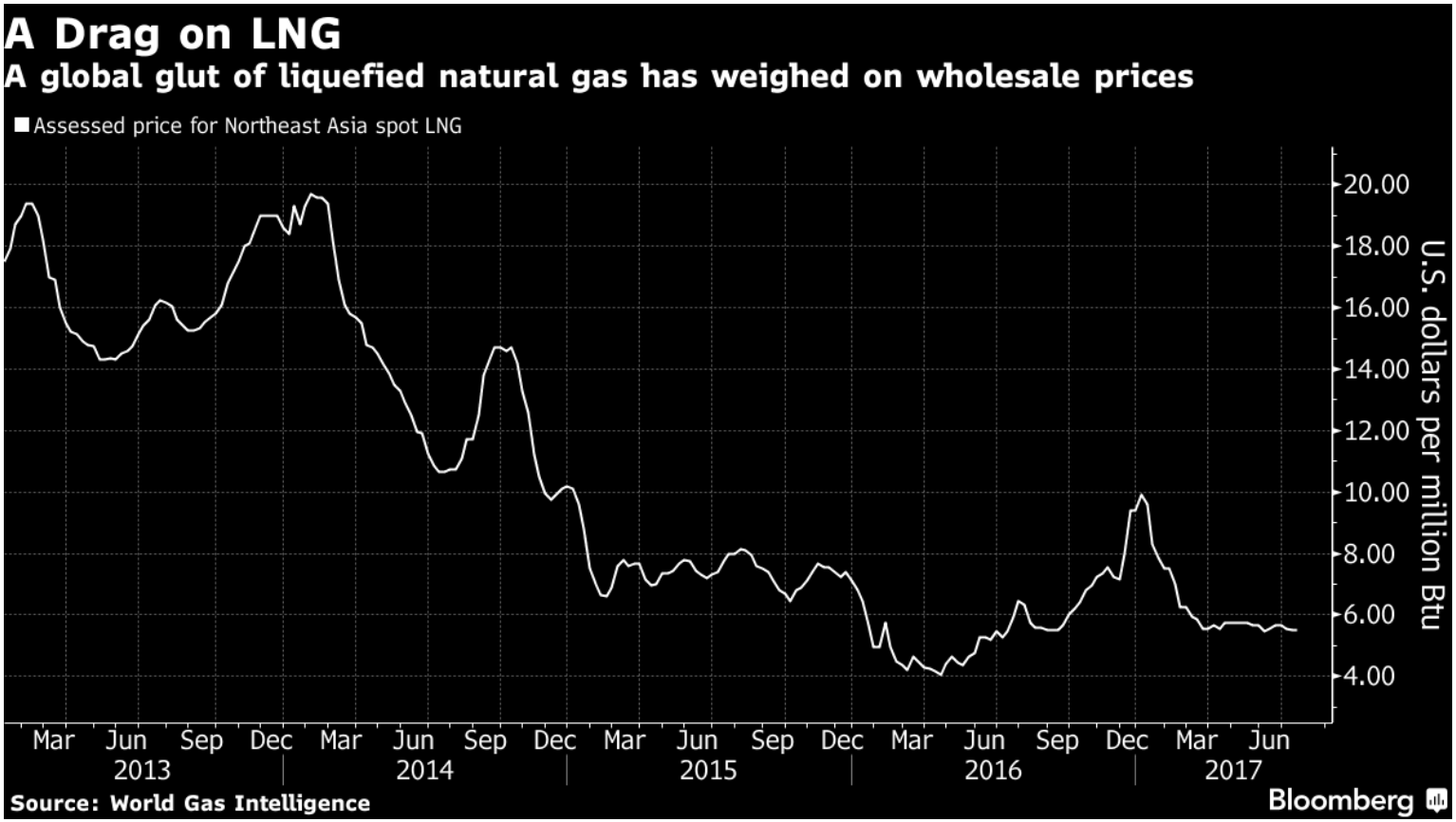
Position B.C. to be competitive in the low carbon economy



Global gas demand is projected to plateau from the late-2020s in the 450 Scenario

Source: IEA, 2016

Position B.C. to be competitive in the low carbon economy



Source: Bloomberg, 2017

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Make Clean Choices more affordable

- Invest in energy efficiency
  - More efficient = less polluting and more money to spend in the local economy
- Invest in transportation options
  - Less congestion = less polluting and more time for work and family (and many other benefits)
- Target support to vulnerable Canadians
  - Design policy to offset any adverse impacts on vulnerable Canadians

Stand up for healthy and safe communities

- Acting on clean growth will make our communities more resilient and healthier
- Must have both:
  - Ambitious mitigation to achieve our commitments
  - Thoughtful adaptation to impacts already underway

Grow sustainable resource sector jobs

Source: BIV, CEC, Ledcor

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Concluding thoughts

- We are at an inflection point on acting on climate and energy
- B.C. is well positioned to benefit from clean growth. We must act now to ensure we don’t miss this opportunity to future-proof our economy.
- What can you do? Help spread the narrative that clean growth is B.C.’s path to future prosperity!

Thank you

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Questions?

Specific challenges of climate issue

- Global commons good - individual initiatives of little value
- Delayed effects – must act now to prevent future impacts
- Who pays - perceptions of equity aligned with self-interest (polluter pays vs equal payment per capita or GDP vs historical responsibility)
- Uncertainty – complex earth-atmosphere system causes uncertainties, even though catastrophic outcome is virtually certain.
- High starting costs – total transformation costs small, but high initial costs and risks to begin shift to CO2-free (renewables, CCS, nuclear)