



Nuclear Energy

The Future

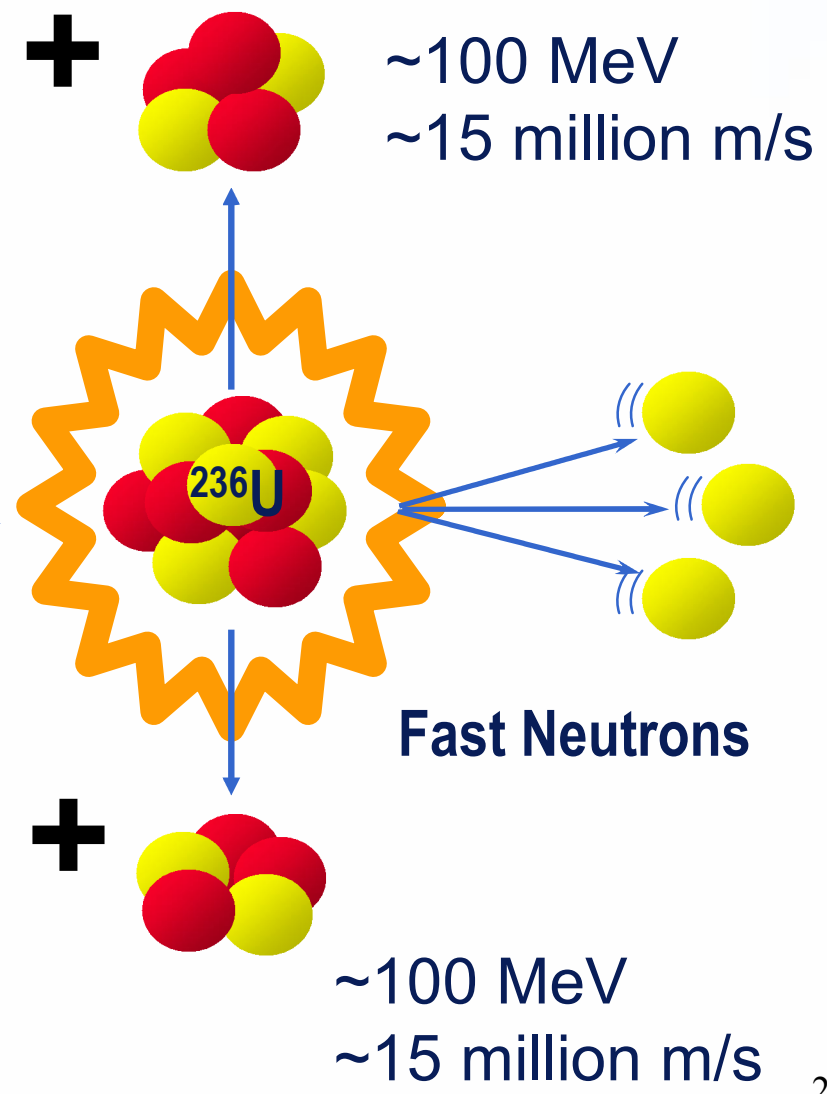


Dave Torgerson
Student's Seminar
2007 February 29



Point 1: Nuclear power is a relatively new technology: younger than television, computers, ...

Slow Neutron



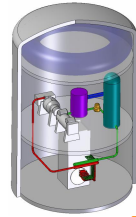
And the technology will continue to evolve, limited only by our imagination.

Evolution of CANDU

Innovation

CANDU X
Gen V

CANDU SCWR
Gen IV



Advanced
CANDU Reactor
Gen III+



*Continual enhancement of both
the design and applications*

Product

Evolution

Current
CANDU

20

30

40

50

60

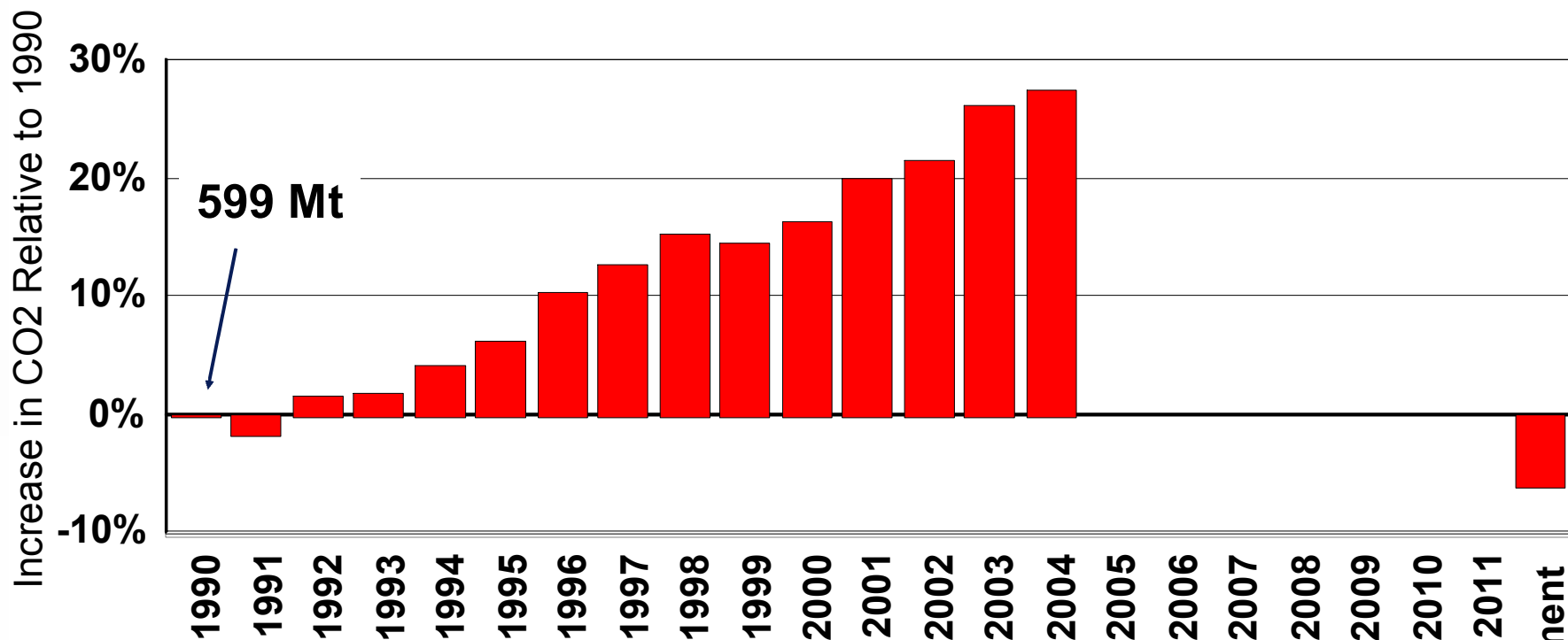
70

Years from today



Point 2: Society needs nuclear energy

Actual Canadian CO₂ Emissions and the Kyoto Protocol Commitment



Information from "Statistical Review of World Energy 2005" published 2005 June 14



Nuclear Hydrogen

*A Twin ACR-1000 station
= 300 000 t/y hydrogen
= 1.8 million fuel cell vehicles*

“Within the scope of today’s technology, nuclear fission is the only viable, clean source of large quantities of energy.”

*– Geoffrey Ballard
Founder, Ballard Power*





What would “Off-Carbon” power and transportation look like for Canada?

- Replace 80% of coal with nuclear by 2030
- Between 2020 and 2040, supply 80% of road-transport with H₂ or batteries
- Assume ~2% growth in vehicles and power (electricity and transportation doubles by 2040)

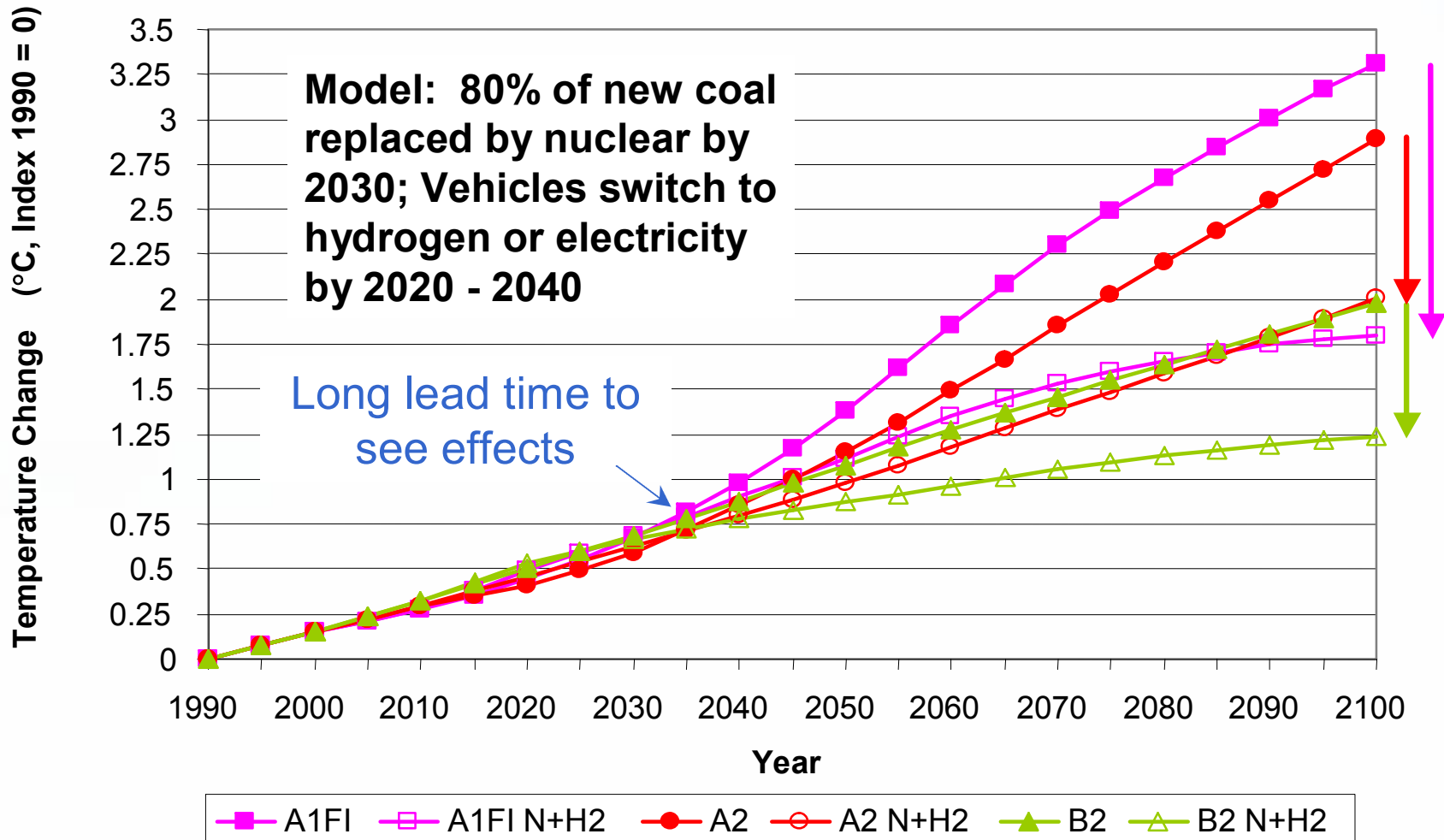
- ~40 ACR-1000s by 2040 would achieve this
 - 1971-1993, 22 CANDUs entered service in Canada
- Avoids/displaces 200 to 300 Mt GHG per year



What if this Canadian model were applied to the rest of the world?



Stabilizes Estimated Temperature Rise: IPCC Scenarios





In Summary

1. **Nuclear energy is new and evolving with lots of exciting innovation and development ahead**
 - **Generation IV and beyond technology**
 - **Hydrogen production**
 - **Desalination**
 - **Oil sands applications**
 - **Fuel cycles ...**

- **Society needs nuclear power**
 - **Large scale energy production**
 - **Environment**
 - **Predictable costs**

