Putting Energy First 1

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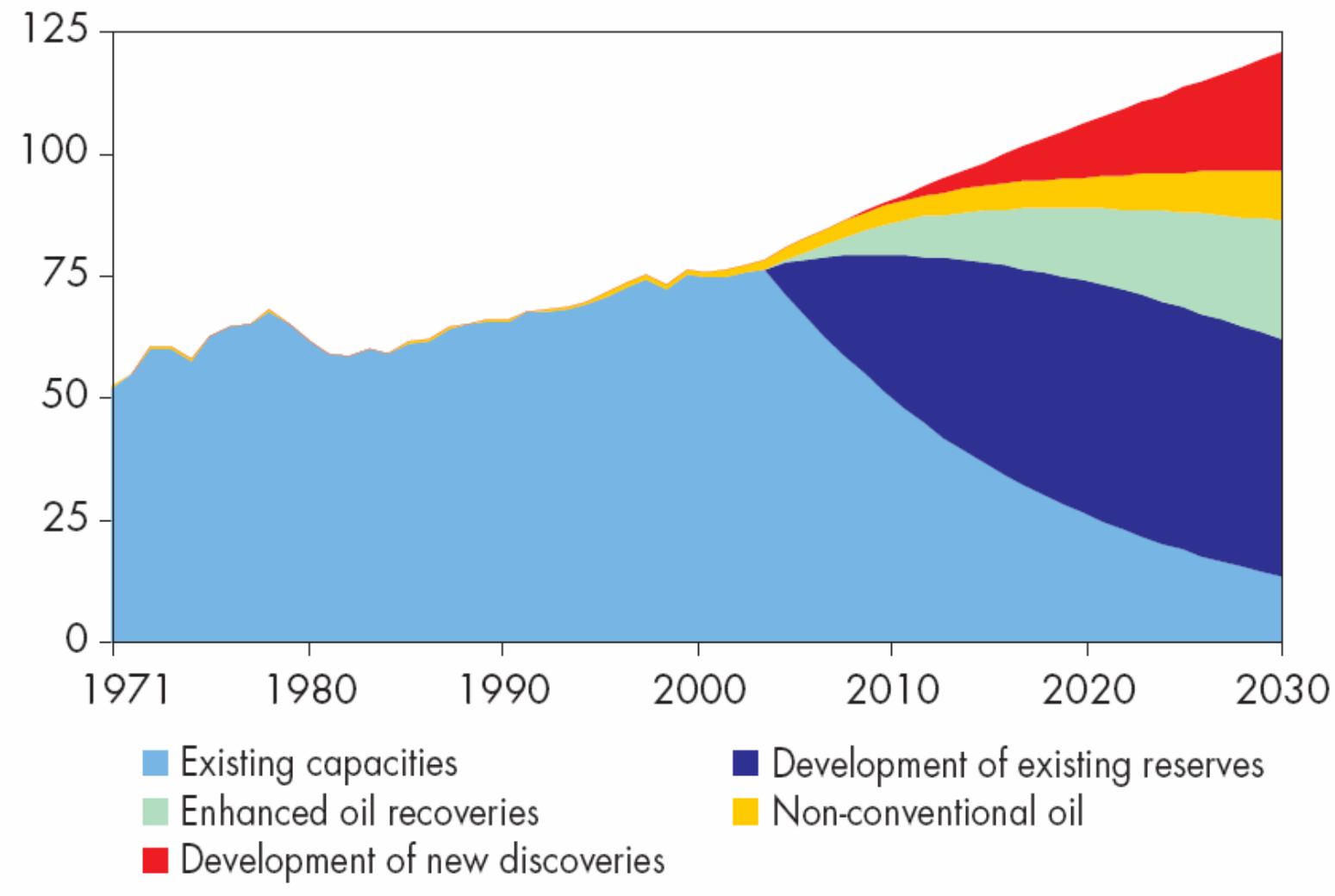
Presentation to the Liveable Peel Conference
Living Arts Centre, Mississauga
February 10, 2006

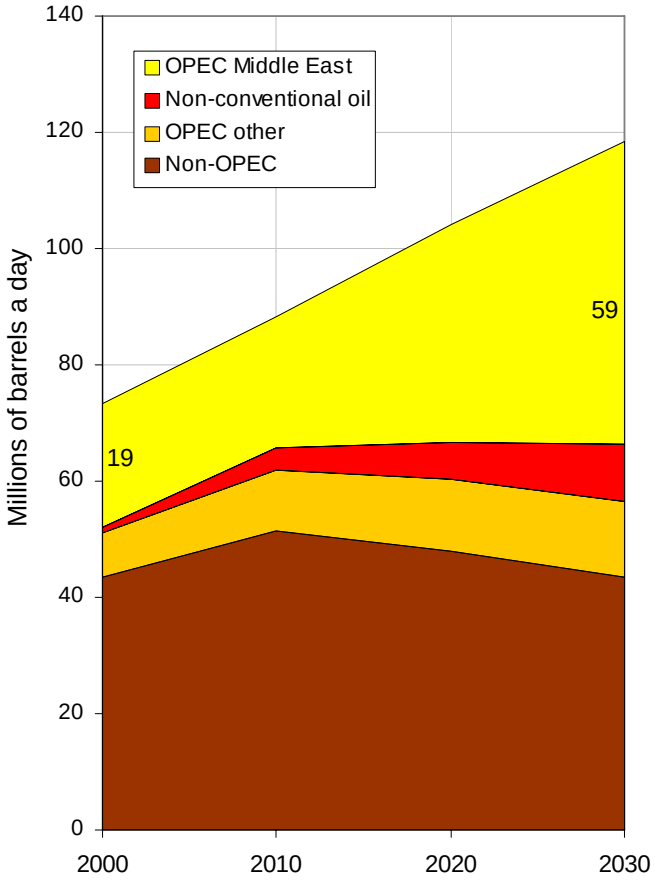
In the session entitled
‘Coming to terms with the Energy Dilemma’

IEA's view of World oil production by source, 1971-2030
(in millions of barrels per day)

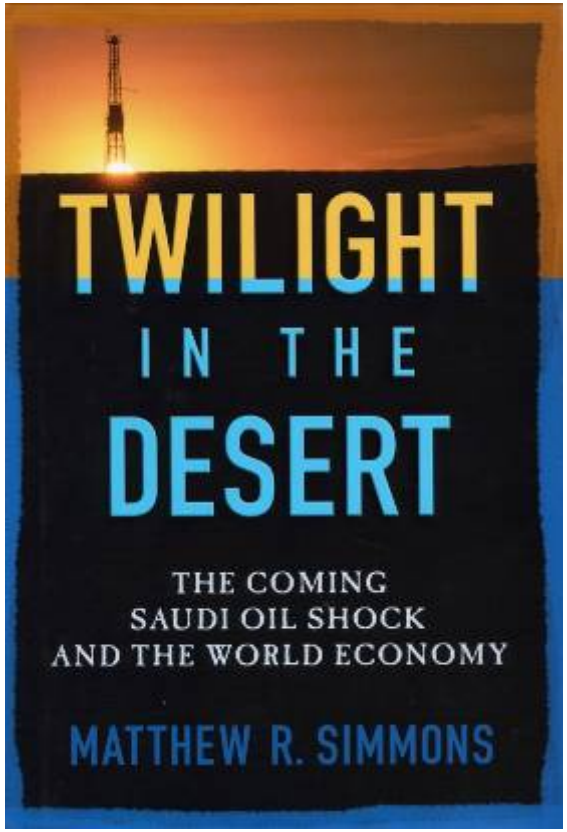


Source: International Energy Agency

IEA's view of World oil production by location, 2000-2030

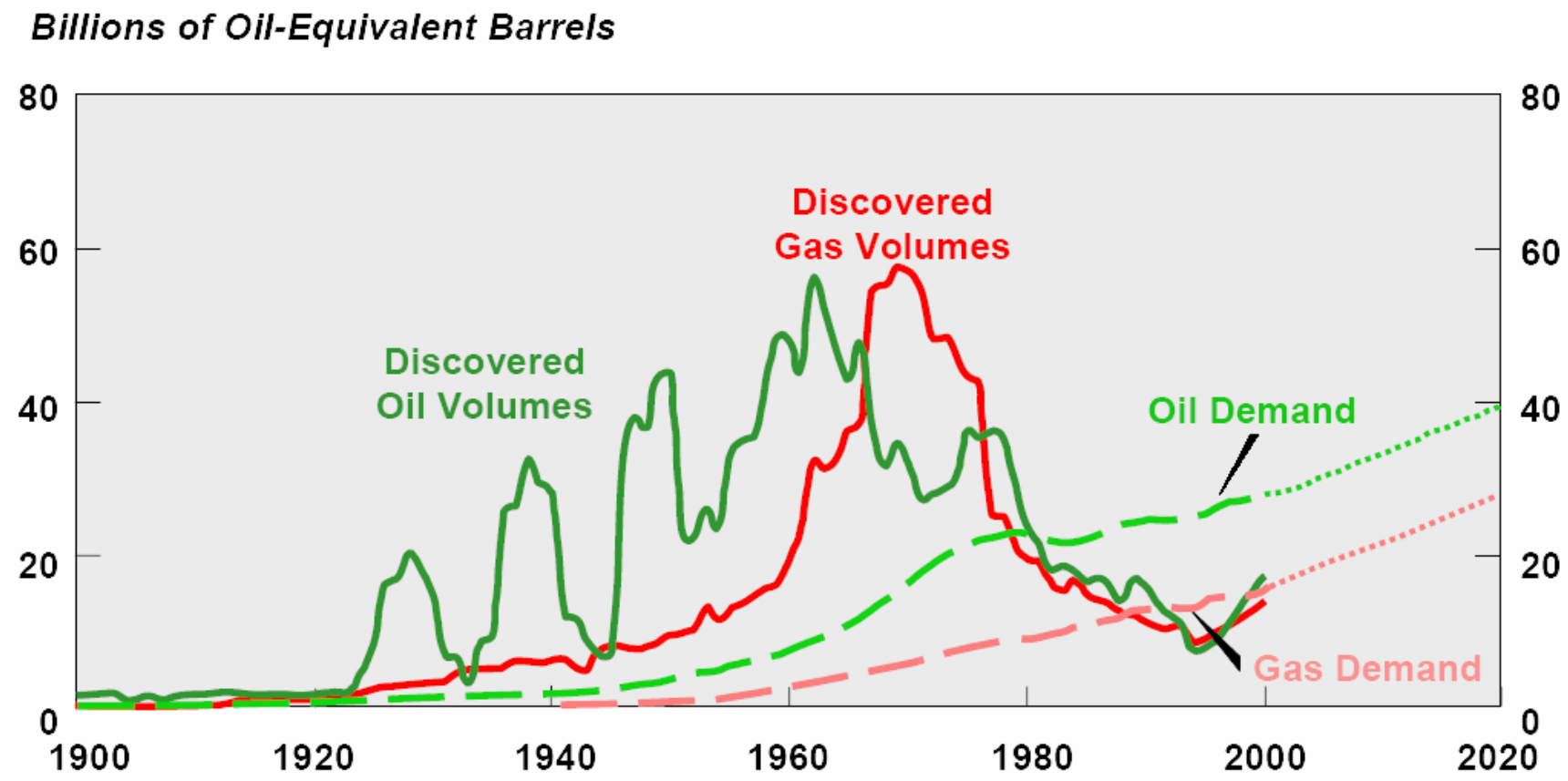


But, Simmons says, there is doubt as to whether Saudi Arabia can even maintain the current production of 9.5 mb/d.



IEA: "Of the projected 31 mb/d rise in world oil demand between 2010 and 2030, 29 mb/d will come from OPEC Middle East … Saudi Arabia, Iraq, and Iran are likely to contribute most of the increase."

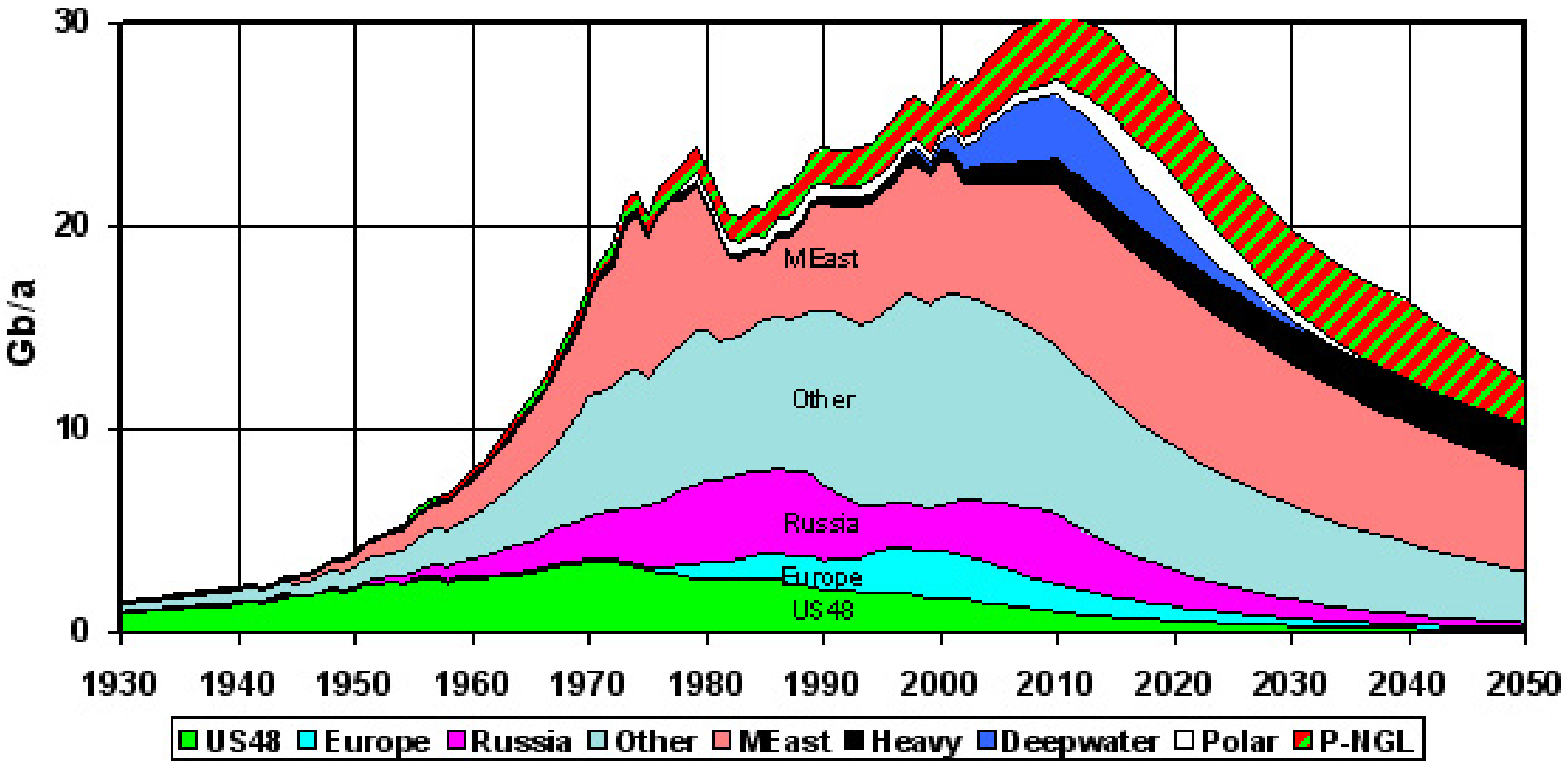
World discovery of and demand for oil and natural gas, 1900-2000, and projected potential demand until 2020



Source: Exxon Mobile Corporation

We haven't been finding the fuel we need to sustain what we depend on. In this decade, we are using more natural gas than we are discovering, and very much more oil.

World production of regular oil by region, non-conventional oil, and natural gas liquids, actual and estimated, billions of barrels per year, 1930-2050



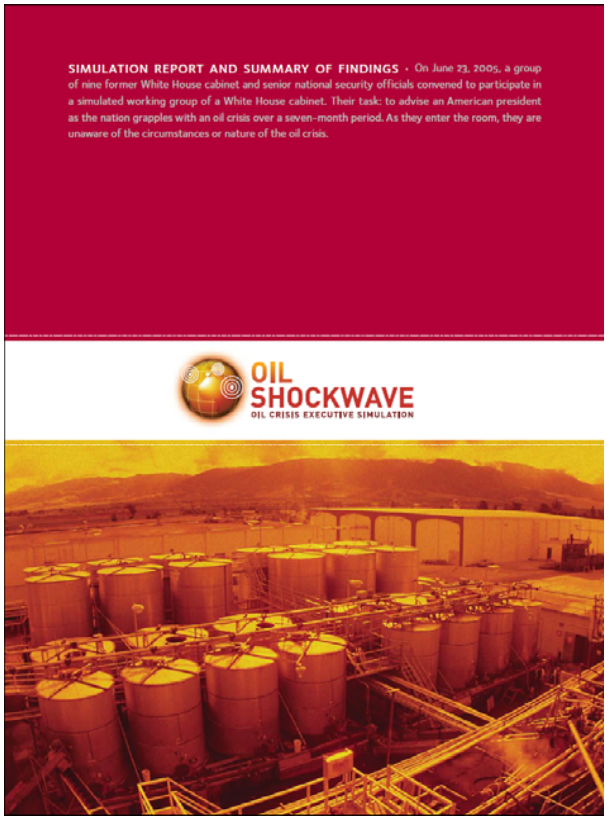
Source: Uppsala Hydrocarbon Depletion Group

Production of crude oil and equivalents—which provide >95% of transport fuels worldwide—may peak in 2012, which will mean very high prices unless consumption falls first.

Crude oil prices and pump prices

Based on analysis for the U.S. by the Brookings Institution

	Shortfall in crude oil supply			
	0%	5%	10%	15%
Resulting increase in crude oil price	0%	30%	200%	550%
Crude oil price per barrel (US$)	$50	$65	$150	$320
Resulting gasoline pump price (Can$/litre)	$0.85	$1.00	$1.50	$2.50



However, the U.S. National Commission on Energy Policy concluded in June 2005 that a "4 percent global shortfall in daily supply results in a 177 percent increase in the price of oil (from $58 to $161 per barrel). [See www.energycommission.org/ewebeditpro/items/O82F6801.pdf.]

Natural gas

- World peak production may be some decades away.
- But North American production may already have peaked.
- Importing oil across oceans is relatively easy, but natural gas must be liquefied and shipped in highly specialized containers.
- This is an expensive, potentially dangerous process. (Logan airport closes when an LNG tanker enters Boston Harbour.)
- Natural gas prices reached their highest-ever level a few months ago. (Now they are about a third lower because of this warm winter.)

Prospects

- Predicting where oil and natural gas prices will go (apart from up) is near impossible.

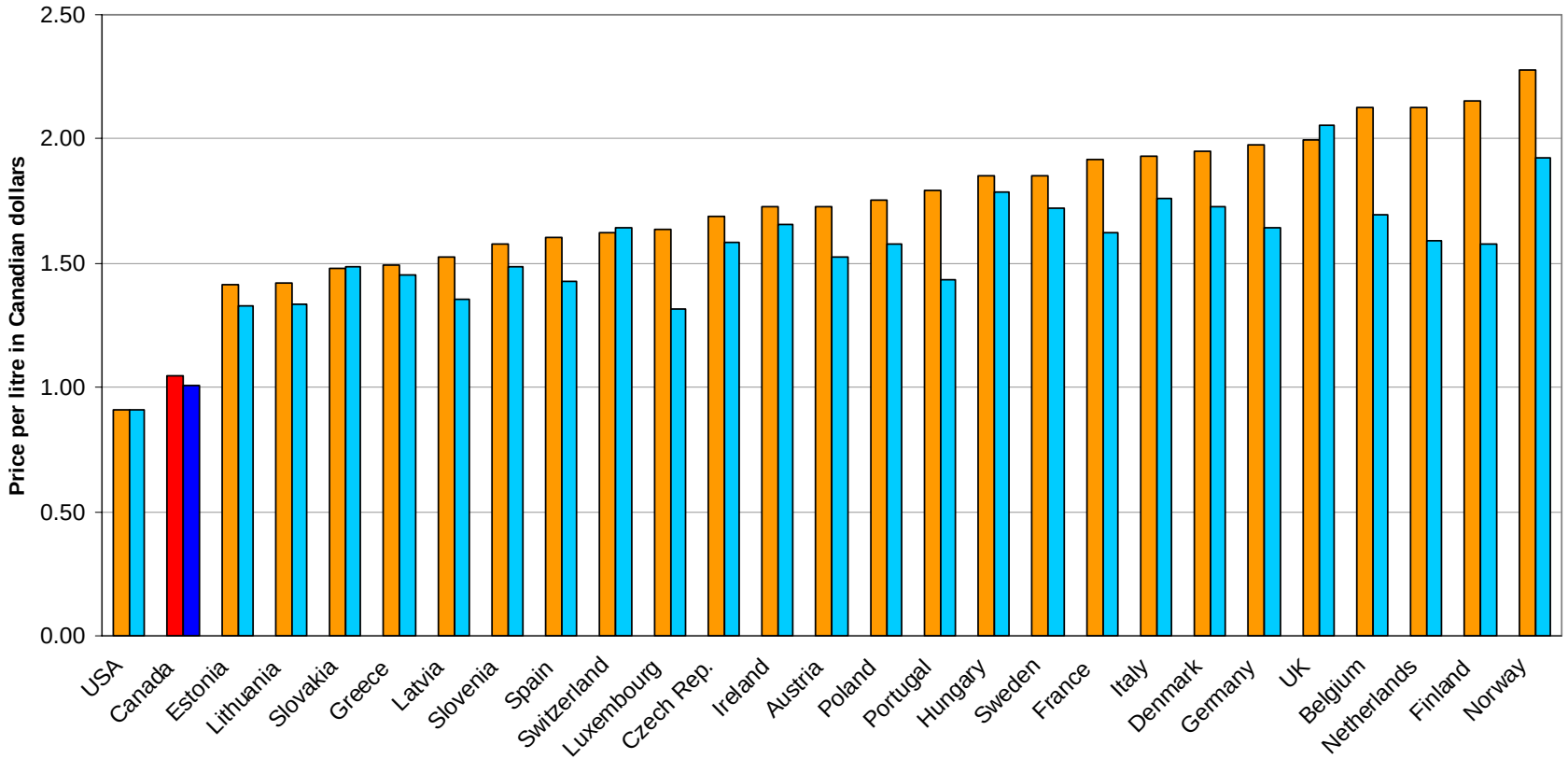
- As prices rise, consumption of these fuels will fall, reducing the rate of increase in prices, but not enough to prevent increases.

- Very high fuel prices could be a good sign. It could mean that society had adjusted well to energy constraints.

- European and other experience suggest that little will change until retail fuel prices rise above twice current prices, i.e., to above \$2/litre for transport fuels and \$1/m^3 for natural gas.

- Until prices more than double, Canadians will drive almost as much as they do now, and make few other changes in how they use energy.

Gasoline (cheapest posted) and diesel fuel, September 19-20, 2005, ranked by gasoline price, using official exchange rates for this period



How Canadians and Europeans travel (EU15 and land travel only)

	Kilometres travelled per person	Share by personal vehicle	Share by surface public transport
Canada	14,529	90%	10%
EU15	12,659	84%	16%

Radical changes to occur when prices are four times higher

1. Such increases, to $4/L transport fuels and $2/m^3 natural gas, could have a >50% chance of happening during the next 15 years.

2. This will be a ‘soft landing’: civilization will be continuing in the face of severe energy constraints. In the new equilibrium, a gradual decline in production of oil (and natural gas) would be matched by progressively more efficient use and a transition to use of other fuels.

3. Electricity will dominate end-use fuels, because it can be sustainably produced, locally and at a distance, with most changes occurring in *production* rather than in use.

4. Much electricity will be locally generated, chiefly from sun and wind. Many communities could be self-sufficient, linked by the grid. Oil and natural gas use will be more than 75% below current levels.

Energy considerations will prevail

1. Key considerations in municipal planning of all kinds, particularly land use and transport, will be energy production and use.

2. Land use planning will balance energy production (requiring lower densities) with energy use (requiring higher densities) and more local food production (to avoid high transport costs).

3. Building faces will be solar collectors. Wind turbines will be every-where, particularly over water. Much use will be made of geo-exchange, energy from waste (heat and biogas), deep lake water cooling, and other resources.

4. Transport will be mostly electric, often grid-connected. Buildings, including greenhouses, will be heavily insulated.