

Sweden has considered
breaking its dependence on oil by 2020.
Should Eastern Canada do this too, and how?

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Presentation at
Parkland Institute's 10th Annual Fall Conference
University of Alberta
November 17-19, 2006

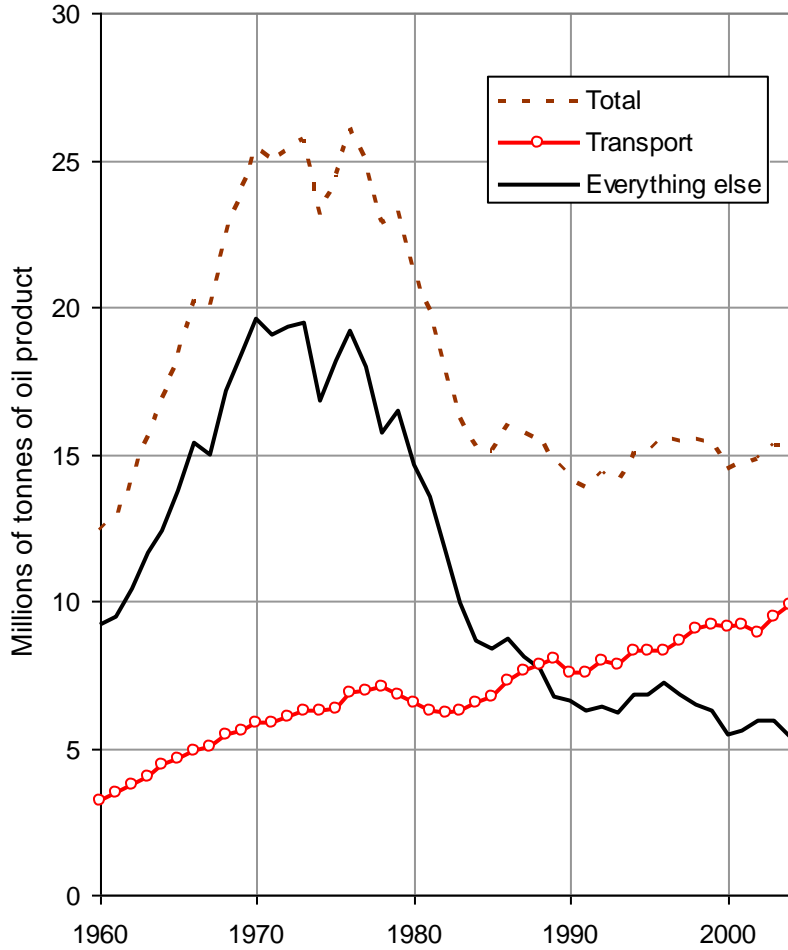
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Sweden's Energy Policy 1

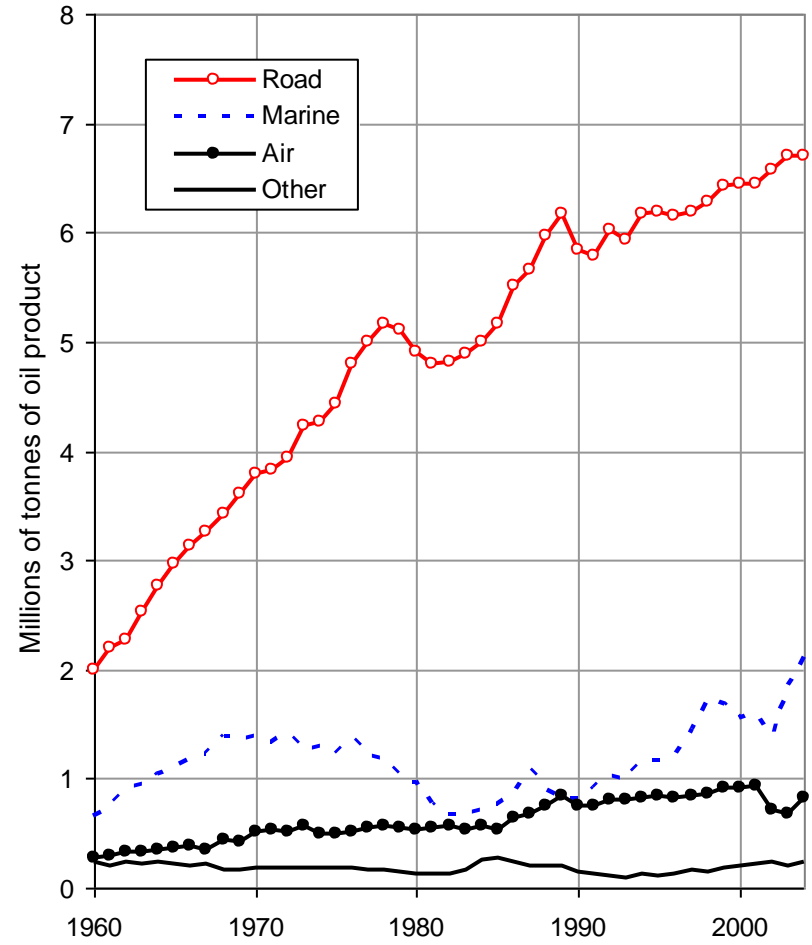
1. Announced by Prime Minister Göran Persson in September 2005: “Sweden will seek to end its dependency on fossil fuels by 2020”.
2. **Main fossil fuel use is oil** (32% of total primary energy use in 2004). Other fossil fuels used are coal (5%) and natural gas (1%). Other fuels used are nuclear (36%; being phased out?) and hydro (26%).
3. **Of Sweden's oil use, 45% is for road transport**, 19% for other transport (air and marine), and 36% for other uses, chiefly in industry as fuel and feedstock.
4. Oil use has declined 42% since the peak year of 1976, when it was used chiefly for home heating and in industry. These uses are down dramatically, but consumption for transport is up 44% (next slide).
5. **Oil use for road transport would be Sweden's major challenge** in implementing its energy policy (next slide).

Oil use in Sweden, 1960-2004

ALL USES



TRANSPORT ONLY



Source: OECD/IEA database

Sweden's Energy Policy 2

1. Commission on Oil Independence was established in December 2005, chaired by the prime minister. Its June 2006 report was entitled 'Making Sweden an OIL-FREE society'.
2. The **key proposals** were to **reduce oil use for road transport by 40-50%**, and ensure motorists always have the **option of using a renewable fuel**.
3. Present trends would have Sweden's road oil use increase by 17% by 2020. Thus, the **target is in reality a reduction by more than 50%**.
4. Response within Sweden has been mixed, but the **large auto industry (Volvo, Saab, Scania) is on side**. The manufacturers' association head, Ulf Perbo, said, "Oil is not what interests us; cars are. And oil is going to be a limitation [to the production and sale of cars] in the future."
5. A **new, centre-right government** took office in October 2006. It is maintaining most transport-related initiatives. The focus appears to be on reducing climate change rather than on breaking dependence on oil.

Reasons for Sweden's Energy Policy (from the Commission report)

“We have been influenced by the experts who predict that supplies of conventional oil will decline. ... [By] improving the efficiency of energy use and in the long term replacing fossil energy sources with renewable energy:

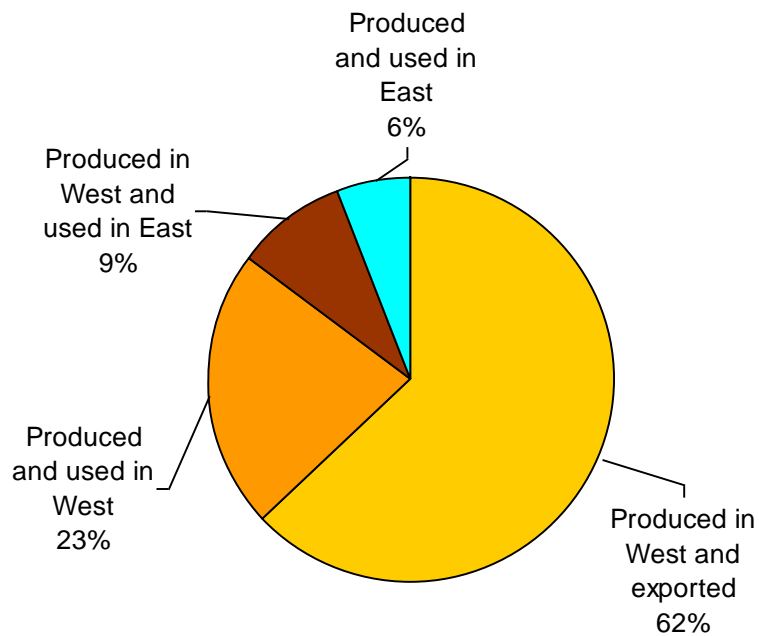
1. We will **reduce Sweden's climate impact**
2. We will **secure Sweden's supply of energy** in the long term
3. We can become a **leading nation in the development of new technology for sustainable use of energy** and more efficient use of energy
4. We will strengthen our **international economic competitiveness**
5. We will use and develop the energy resources from forests and fields, 'Sweden's green gold'”

Proposed measures

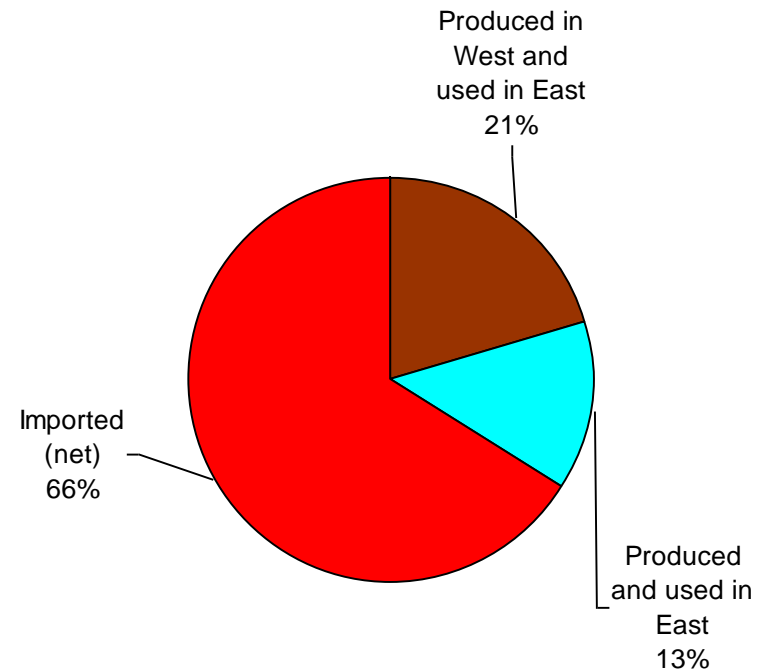
- **Improve road vehicle fuel efficiency**—i.e., reduce average L/100 km by 25-50%—by more use of diesel fuel, of hybrid vehicles, and of smaller, lighter vehicles, achieved by taxing vehicles and fuels according to their net CO₂ emissions.
- **Increase biofuel production** to 12-14 TWh/year by 2020, equivalent to about 15% of current use of oil products for transport.
- **Educate car purchasers about likely rising fuel prices** and label new cars according to their fuel use.
- **Improve traffic planning and route optimisation**, and teach driving for reduced fuel use (ecodriving).
- **Use procurement for public purposes** to achieve early adoption of vehicles with no or low fossil-fuel use.
- **Improve freight logistics**—i.e., reduce fuel use per tonne-kilometre of payload—**and intermodality**—i.e., ease with which goods can be moved between modes, so as to take advantage of the most fuel-efficient mode available.
- **Encourage use of public transport** for the local and longer-distance movement of people and rail and water for the movement of freight; promote alternatives to aviation.
- **Replace mobility by accessibility** chiefly through greater use of information technology to obviate work-related travel.

Canadian production, disposition, and sources of oil, 2004

DISPOSITION OF
CANADIAN OIL
PRODUCTION, 2004
(133.1 megatonnes)



SOURCES OF
EASTERN CANADIAN
SUPPLY, 2004
(57.9 megatonnes)

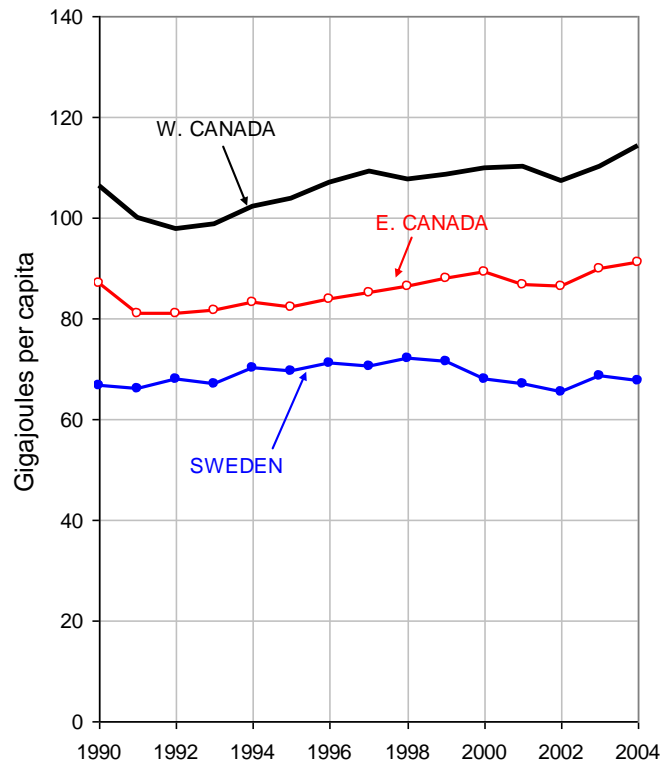


Sources: National Energy Board and Statistics Canada

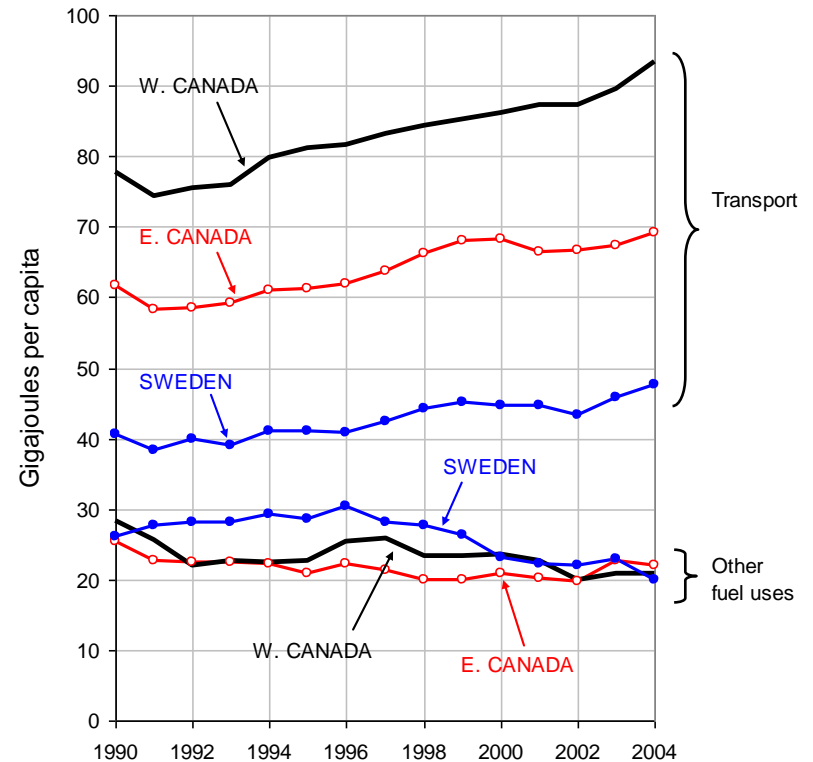
Western Canadian supply (all own production) is 30.6 megatonnes.

Eastern Canadian, Western Canadian, and Swedish per-capita consumption of oil

OVERALL FINAL OIL CONSUMPTION
(fuel uses except international marine bunkers)



OIL CONSUMPTION FOR TRANSPORT AND FOR OTHER FUEL USES



Source: OECD/IEA and Natural Resources Canada

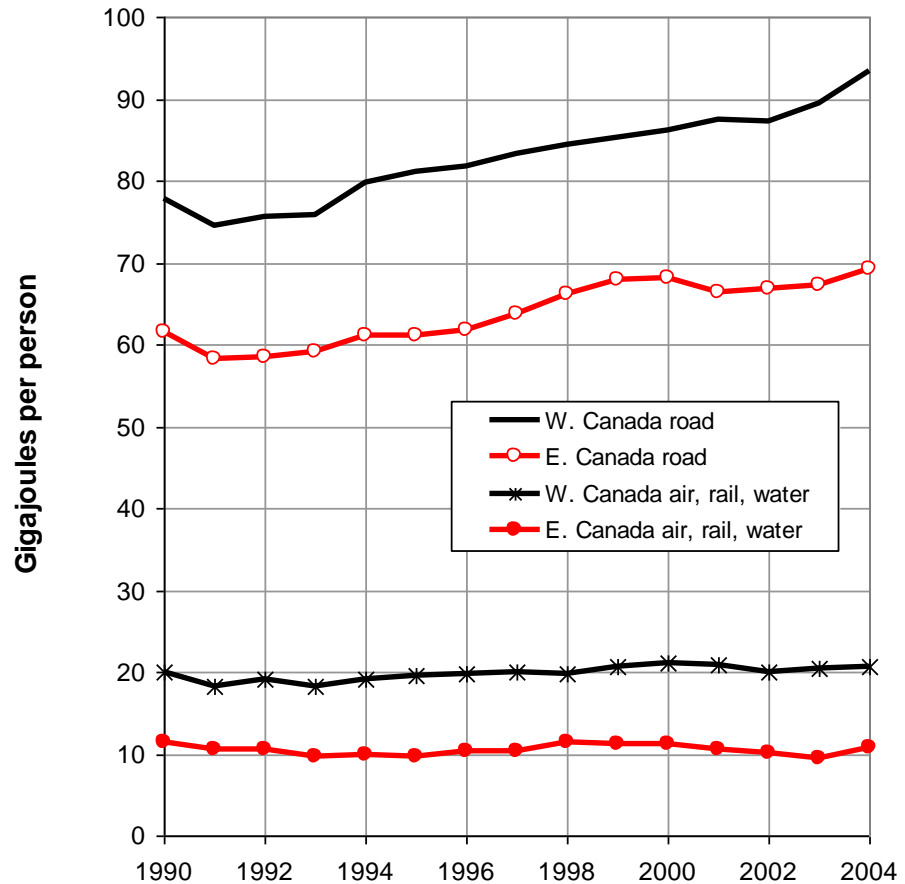
Shares in 2004 of total final use of non-fuel uses—e.g., feedstock for fertilizers—and international marine bunkers were: for Canada 22% and 1%; for Sweden 13% and 13% (not included in above charts).

Eastern Canada and Sweden

1. Sweden imports almost all of its oil from OPEC and North Sea countries; the total was **just under 1.7 tonnes per person** in 2004.
2. Eastern Canada imports almost of its oil from OPEC and North Sea countries: **just over 1.7 tonnes (net) per person** in 2004
3. Thus, Sweden and Eastern Canada may be similarly vulnerable.
4. Eastern Canadians use about 50% more oil than Swedes, mostly for transport, roughly equivalent to net production from Hibernia and imports from Western Canada.
5. **Sweden's main challenge: reducing oil use for road transport** (70% of use as fuel in 2004, rising by 1.0%/y since 1990; 0.6% per capita).
6. **Eastern Canada's main challenge: reducing oil use for road transport** (76% of use as fuel in 2004, rising by 1.9%/year or 1.0% per capita).

As for Sweden, Eastern Canada's main challenge would be road transport

OIL USE FOR TRANSPORT BY MODE

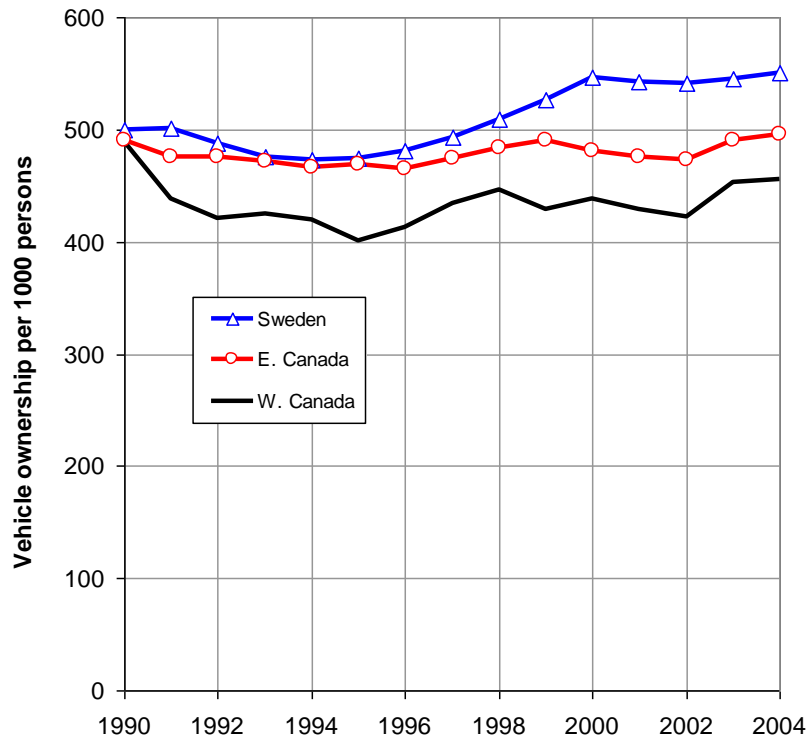


Source: Natural Resources Canada

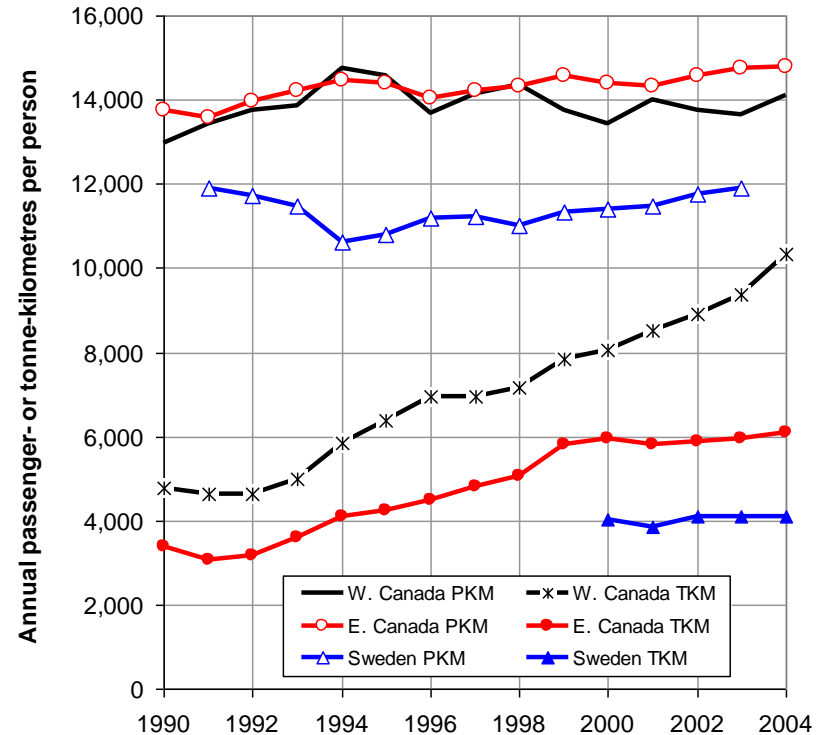
Main factors in road energy use

AUTOMOBILE OWNERSHIP

(cars, SUVs, vans, etc.)



MOTORIZED MOVEMENT OF PEOPLE AND FREIGHT BY ROAD



Sources: Eurostat and Natural Resources Canada

The lower energy use for transport in Sweden is not because of the number of vehicles per person (about the same, see left chart) or their efficiency, which is about the same (not shown, Sweden has among worst in Europe) but the amount driven, which depends on settlement density. Higher energy use for transport in Western Canada is more a matter of higher freight activity than anything else.

Prescription for breaking dependence on oil, Eastern Canada and Sweden

1. Shift as much motorized transport as possible to electric vehicles, especially grid-connected passenger and freight vehicles, including innovative forms to replace personal vehicles (personal rapid transport).
2. Pending that, reduce personal vehicle use, particularly in E. Canada; chiefly by increasing settlement density, which can both reduce level of vehicle ownership and reduce distances driven.
3. Increase fuel efficiency of personal vehicles; a 50% reduction would be readily achievable, but translates into corresponding reduction in fuel use *only* if price increases.
4. Support foregoing with better transit, bicycling, walking facilities.
5. On the road freight side, shift to rail (>90% lower fuel use per tonne-kilometre moved) and water (can use even less fuel than rail).
6. For remaining road freight: improve loading (a truck uses 2.5 times more fuel per tonne-kilometre when $\frac{1}{4}$ -full vs. when $\frac{3}{4}$ -full).