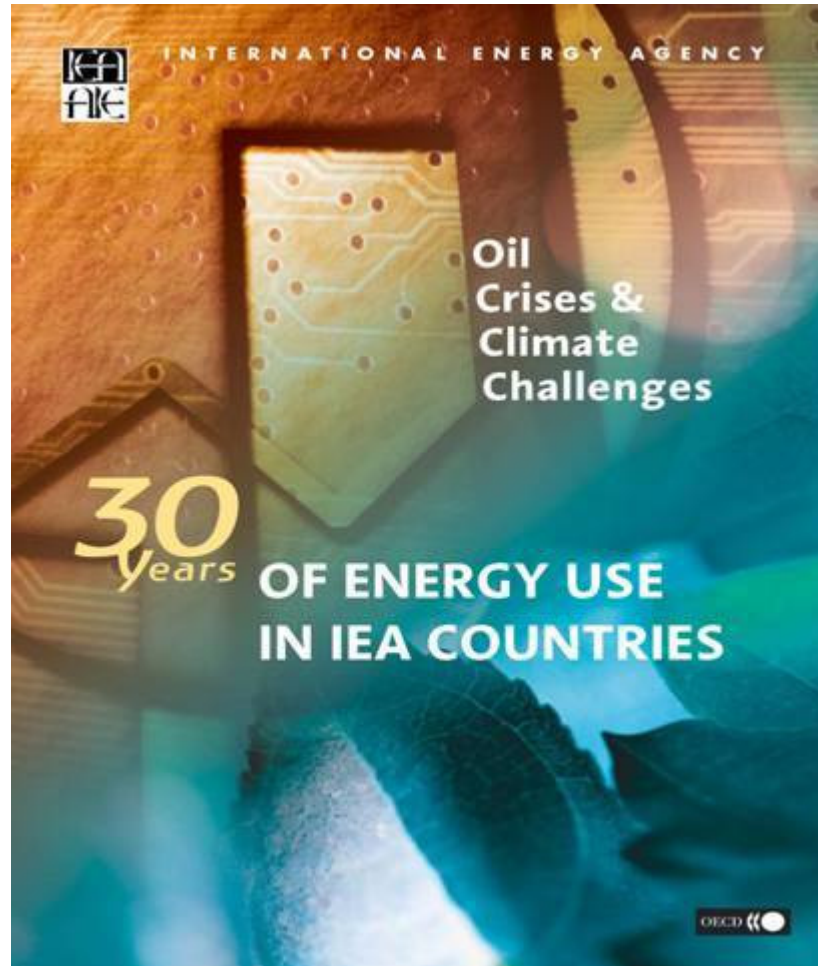


Sectoral Analyses – Transport

Lew Fulton



International Energy Agency



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Climate
Challenges

30
Years

OF ENERGY USE
IN IEA COUNTRIES

To Cover...

- Will share some transport highlights from 30 years after book
- Touch on a few other key issues for transport
- Mention other recent IEA transport work

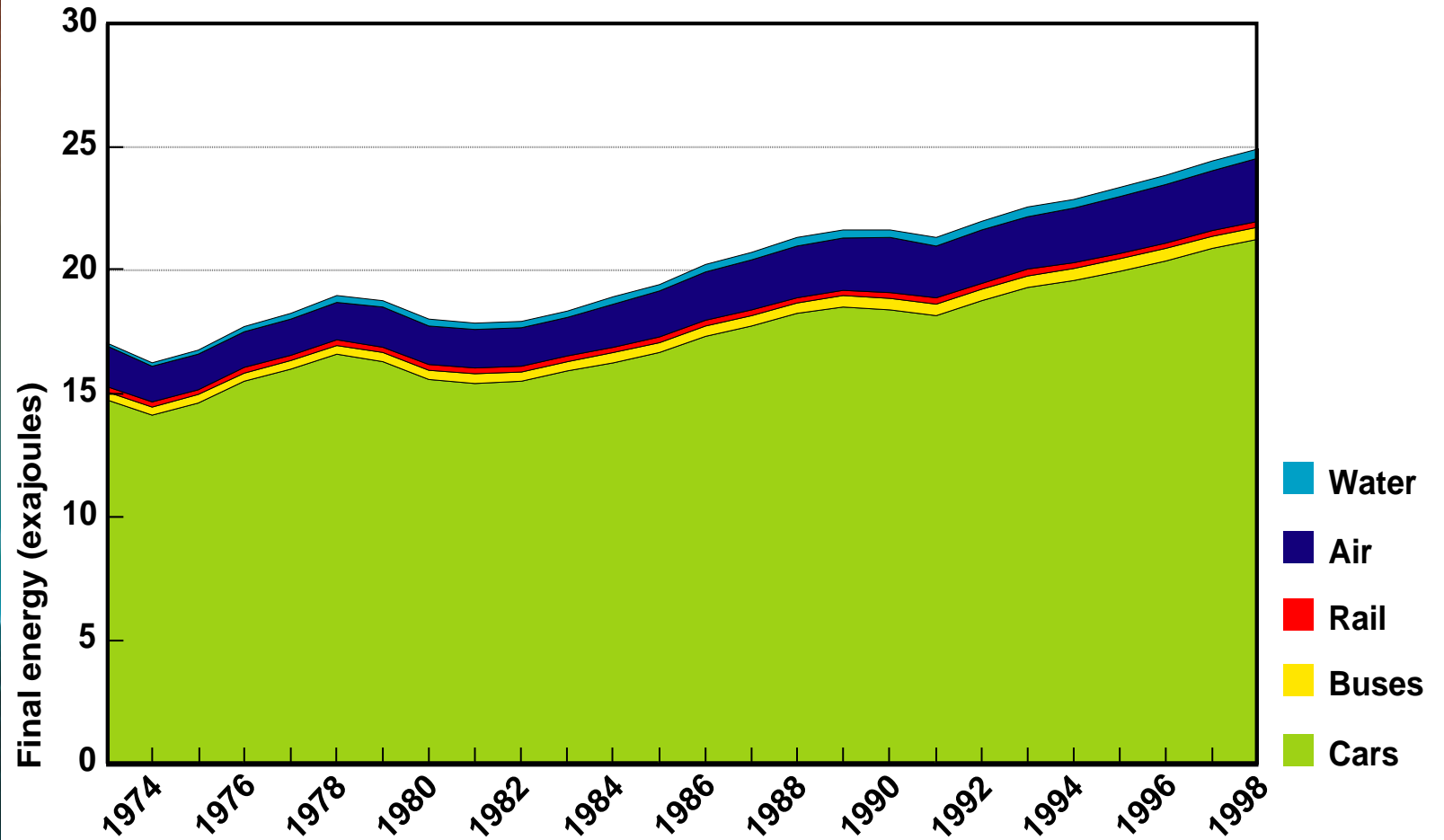


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OF ENERGY USE
IN IEA COUNTRIES

Energy Use in Passenger Transport by Mode, IEA-11



Energy use to move people was 45% higher in 1998 than in 1973

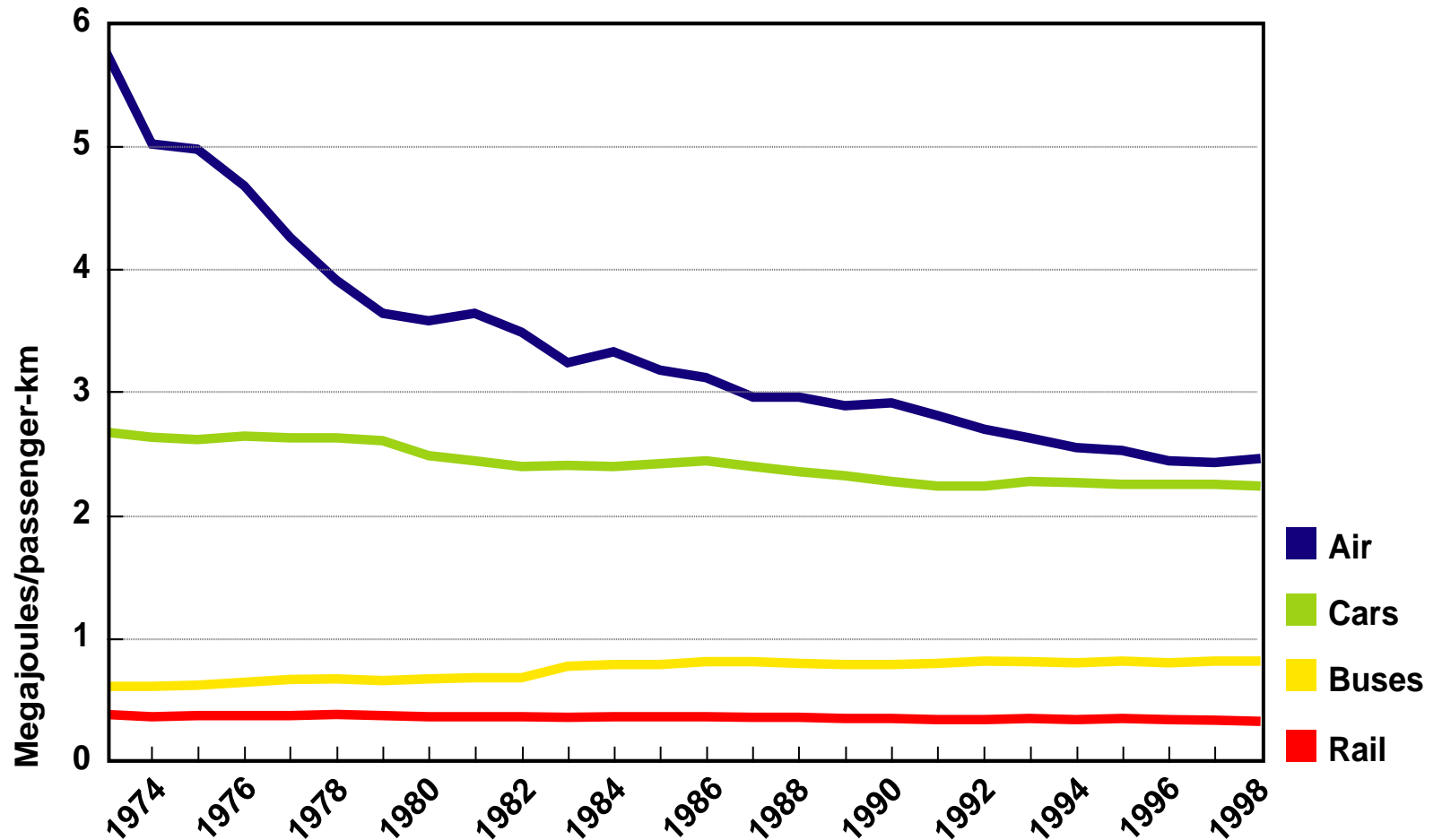


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Energy per Passenger-kilometre by Mode, IEA-11



Energy intensity of air travel has declined the most, but remains the most energy intensive mode



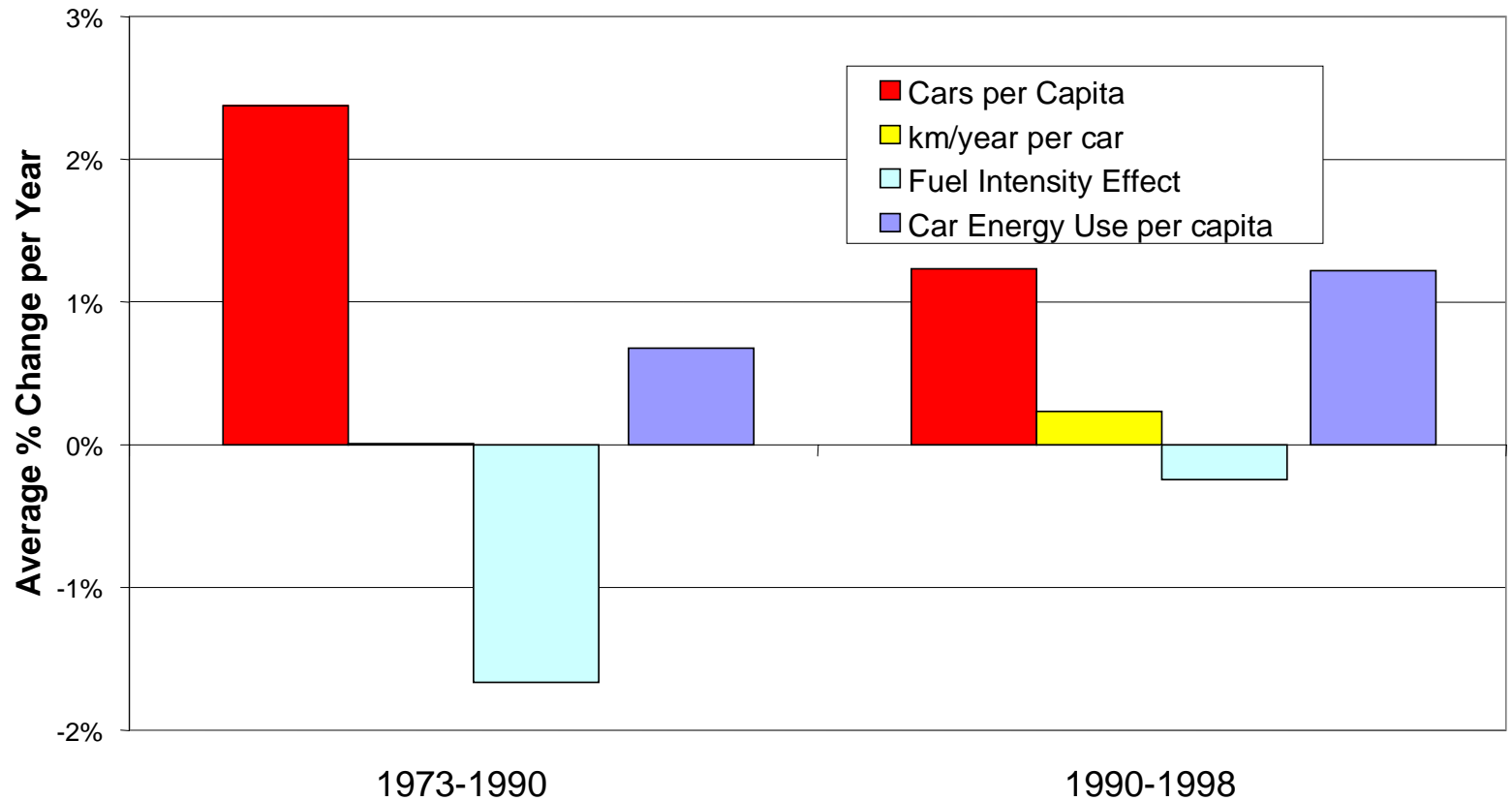
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Energy for Cars (IEA-11)

Factors shaping development 1973-1998



Net result is more rapid growth in fuel demand after 1990 despite lower growth in car ownership

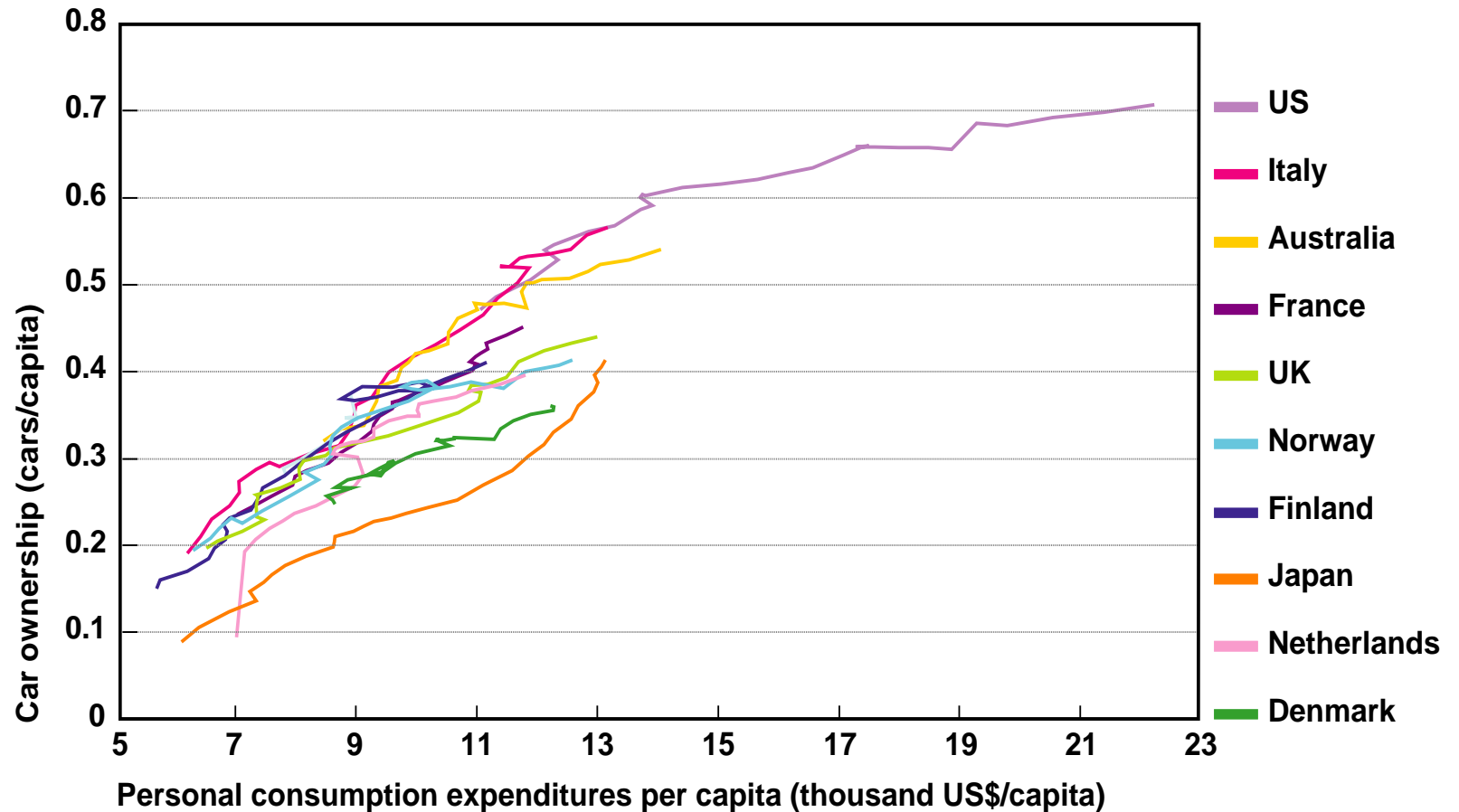


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Car Ownership per Capita and Personal Consumption Expenditures, 1970 - 2000



The United States leads the way in both car ownership and income

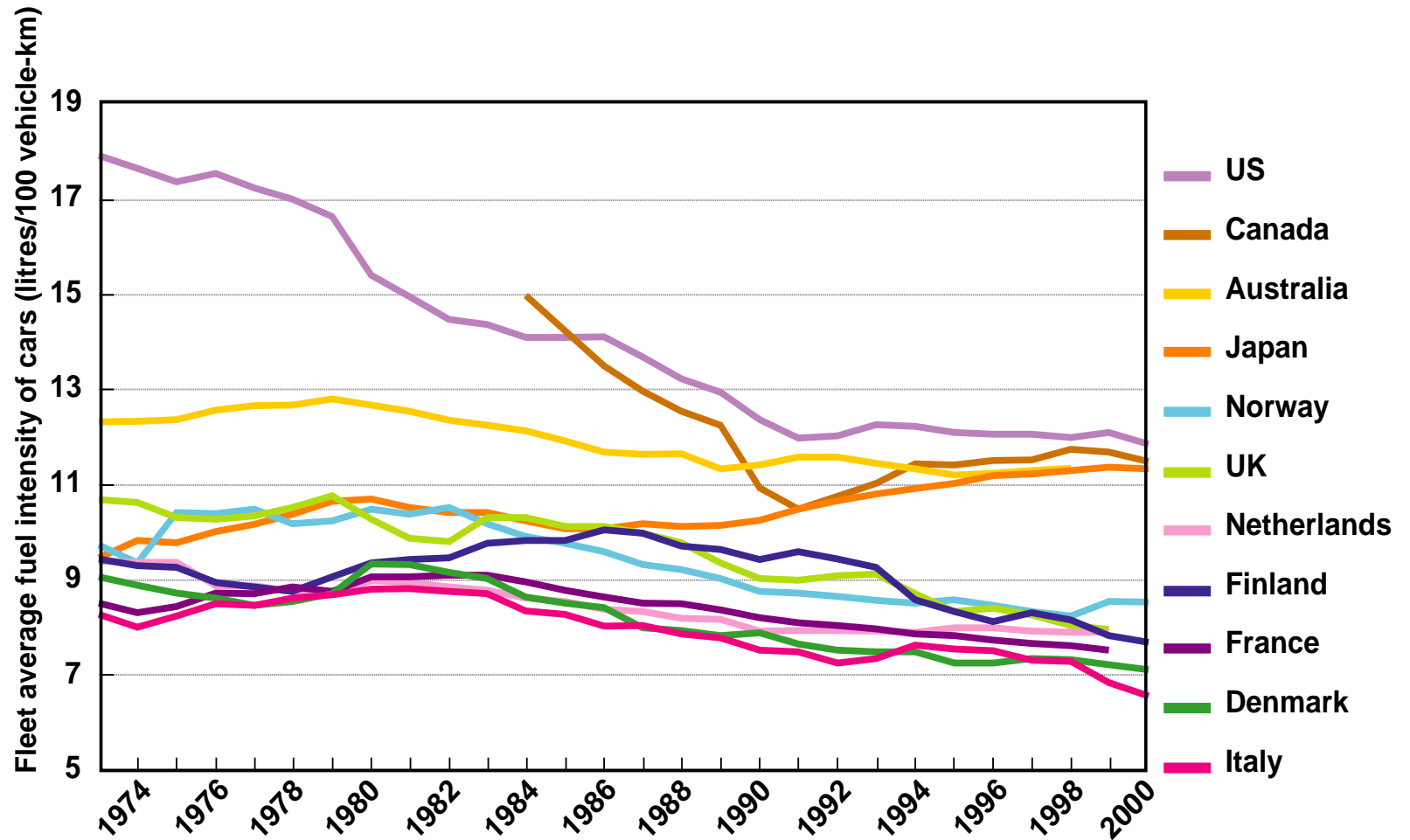


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Car Stock-average Fuel Intensity



Car fuel intensity has declined, but at a slowing rate

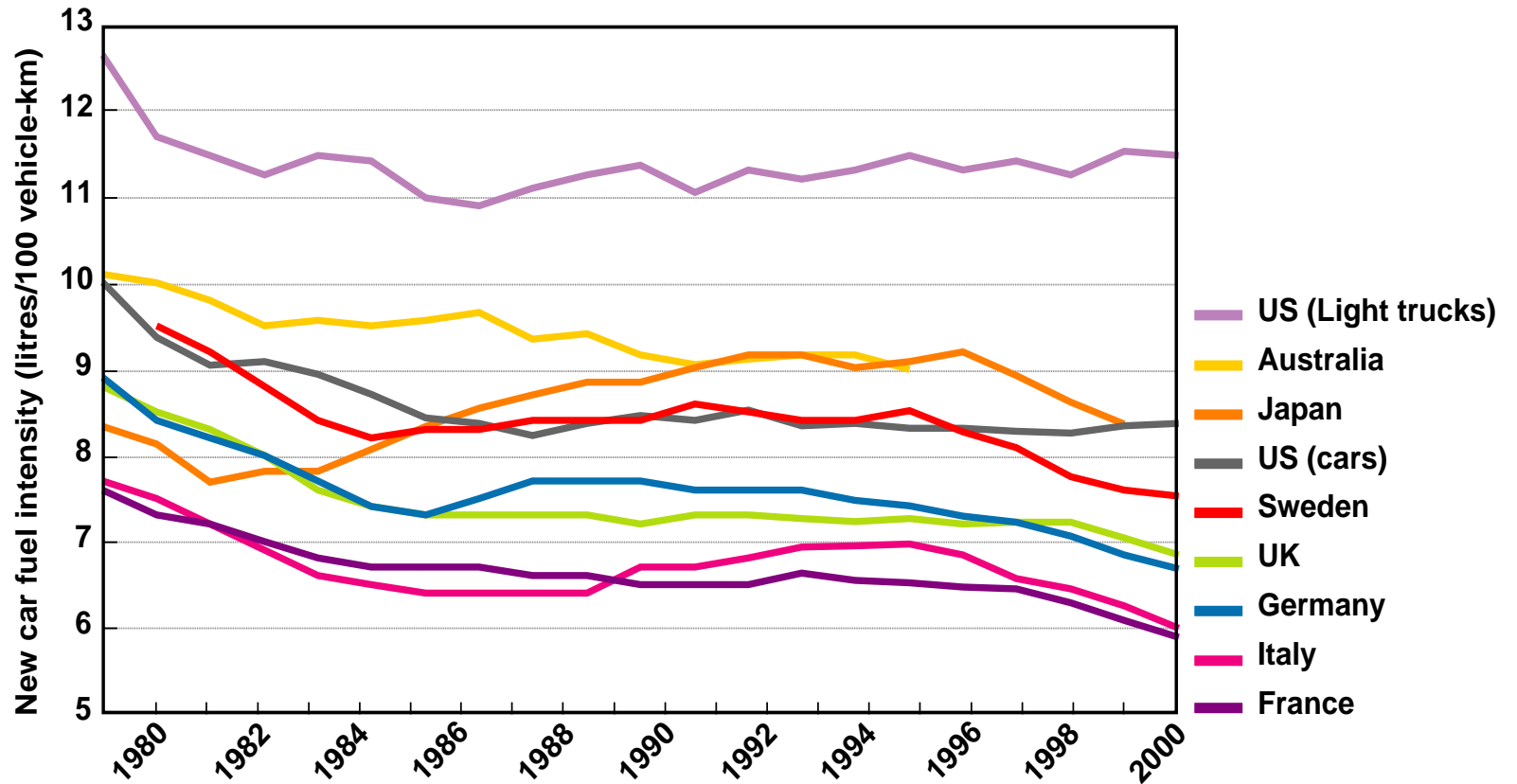


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New Car Fuel Intensity



Small changes since early 1980s, but positive development recently in EU and Japan

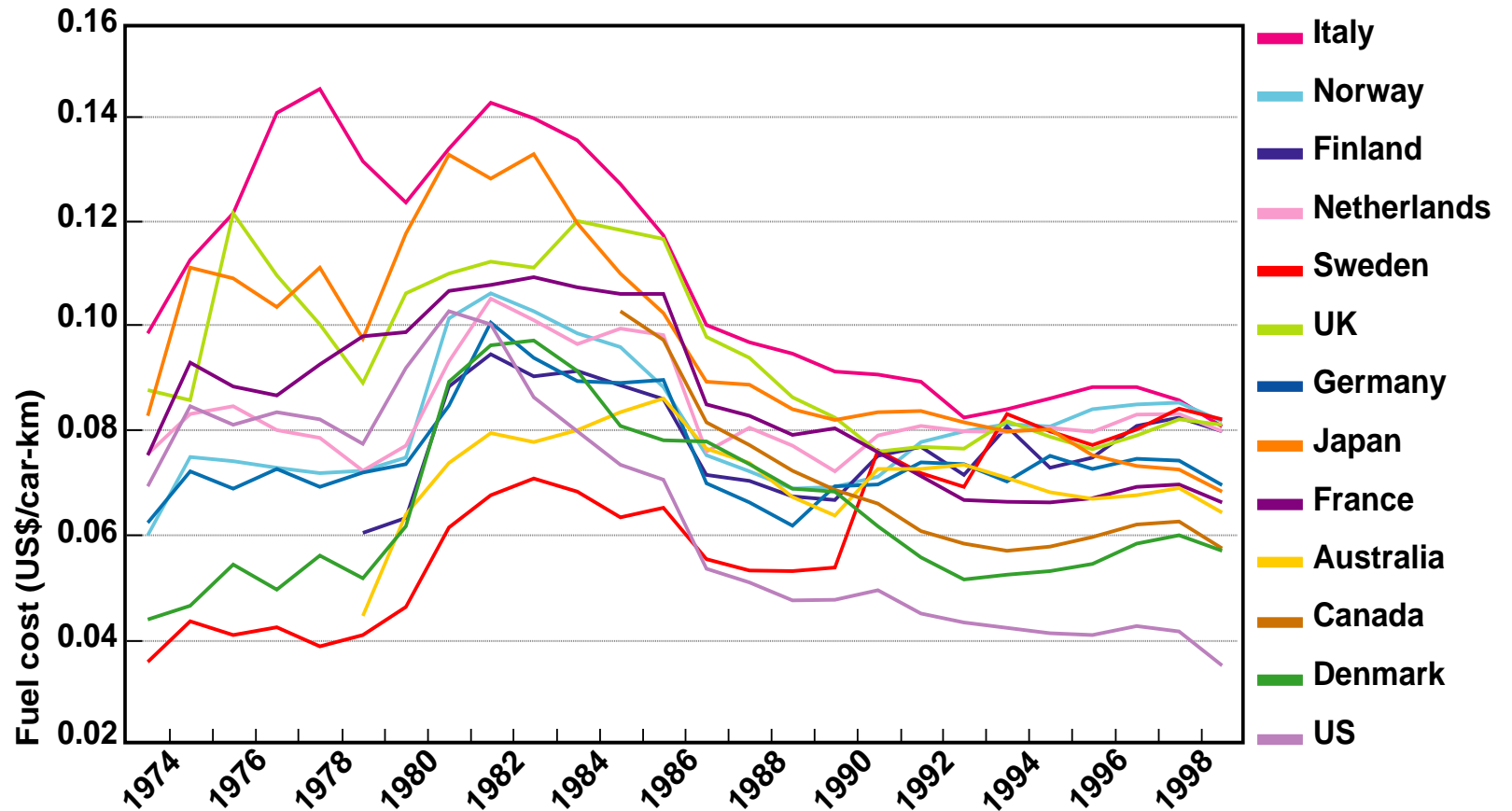


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Fuel Cost per Vehicle-km for Cars (Real Terms, including Taxes)



Car fuel costs per kilometre generally have fallen since the early 1980s

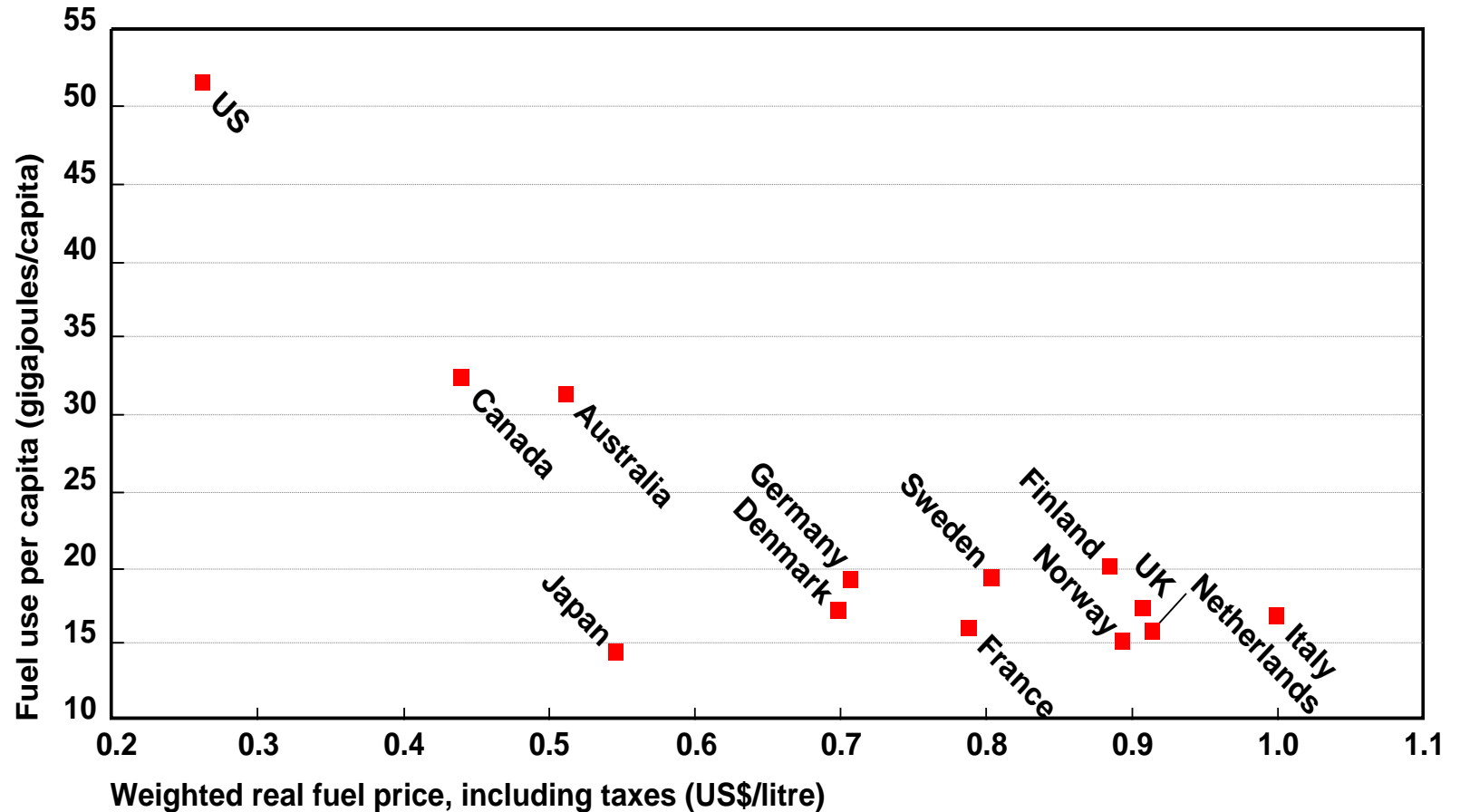


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Car Fuel Use per Capita versus Average Fuel Price, 1998



Energy use for cars is much higher in countries with low fuel prices

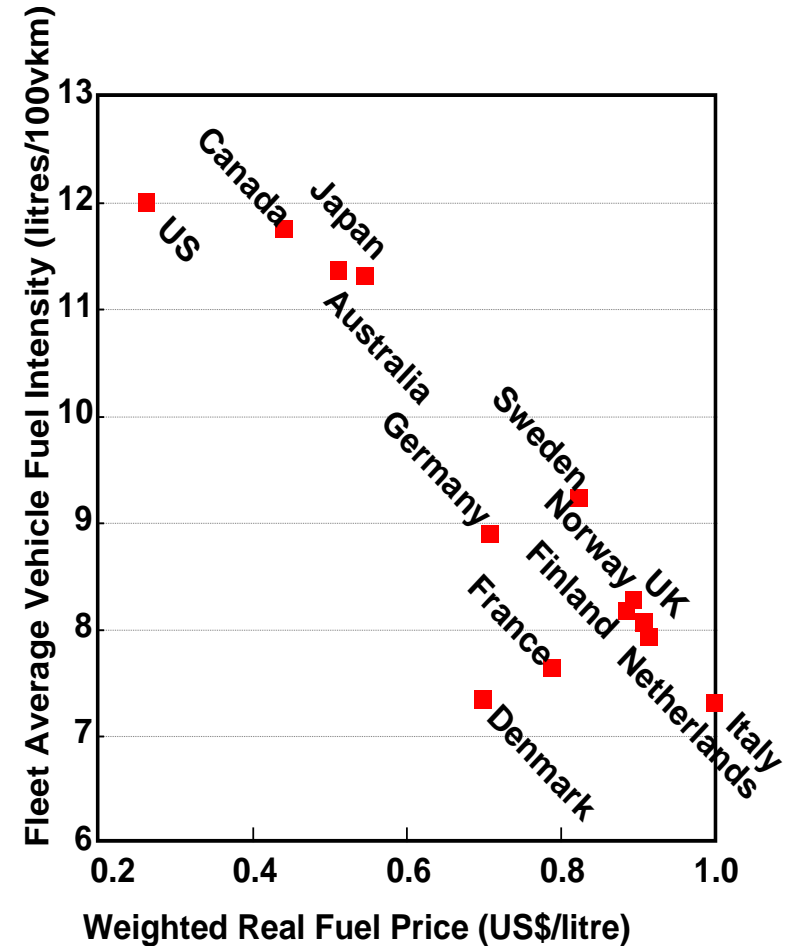
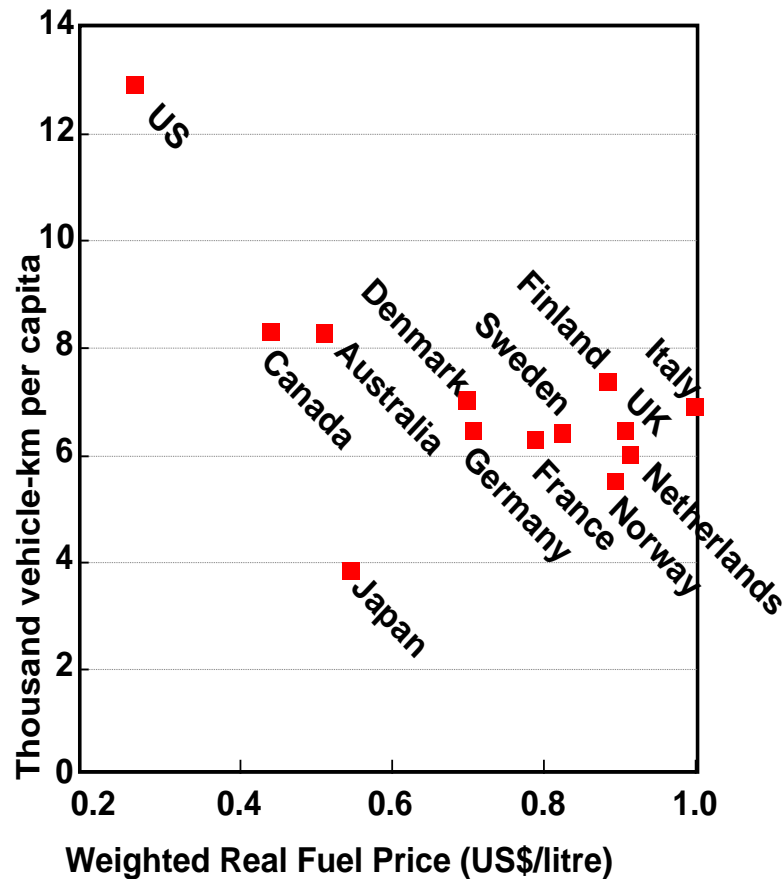


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Passenger Car Travel per Capita and Car Fuel Intensity vs. Average Fuel Price, 1998



Higher fuel prices correlate with lower vehicle fuel intensity

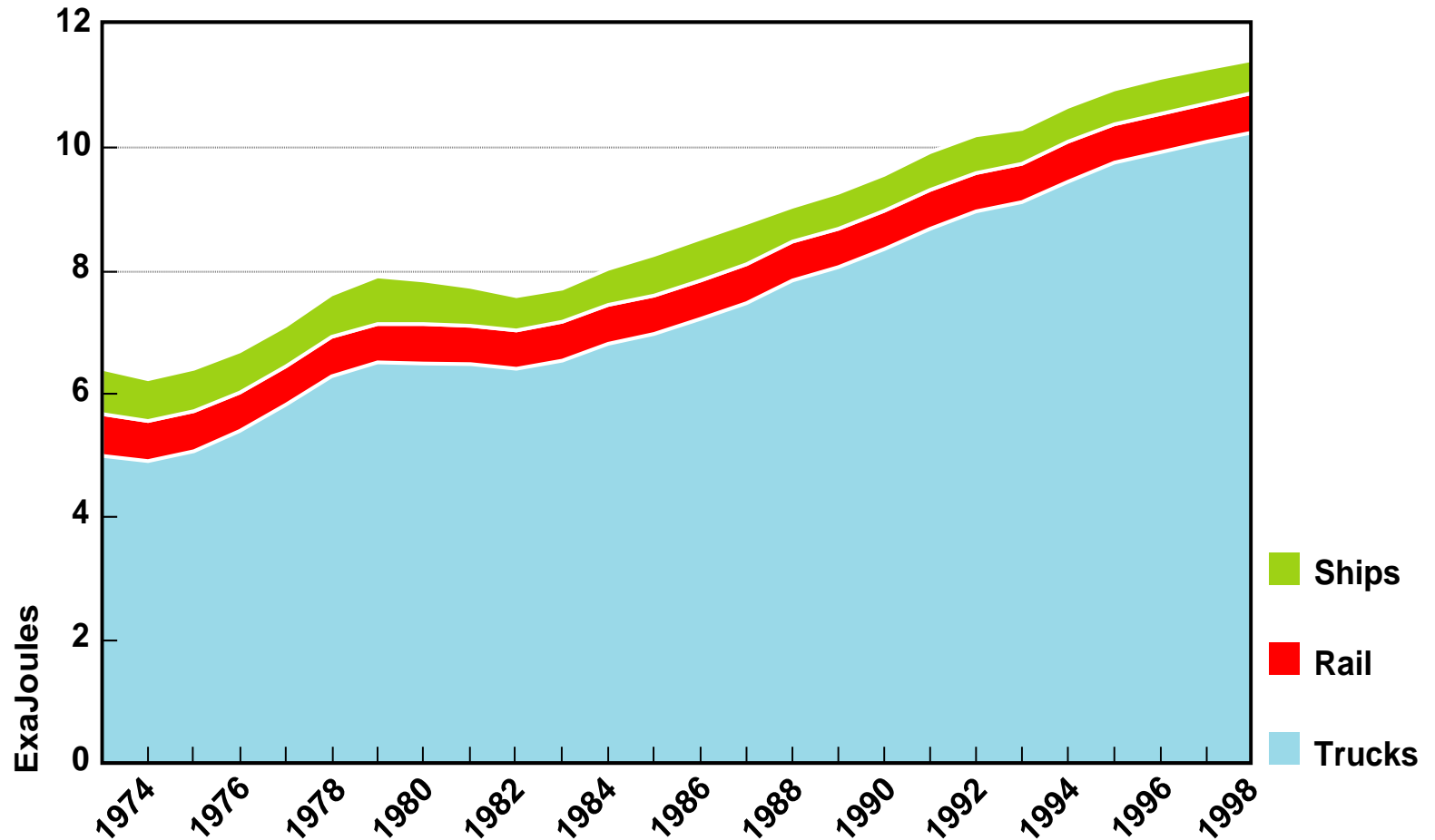


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Energy Use in Freight Transport by Mode, IEA-11



Freight transport energy use was 80% higher in 1998 than in 1973, driven by growth in trucking

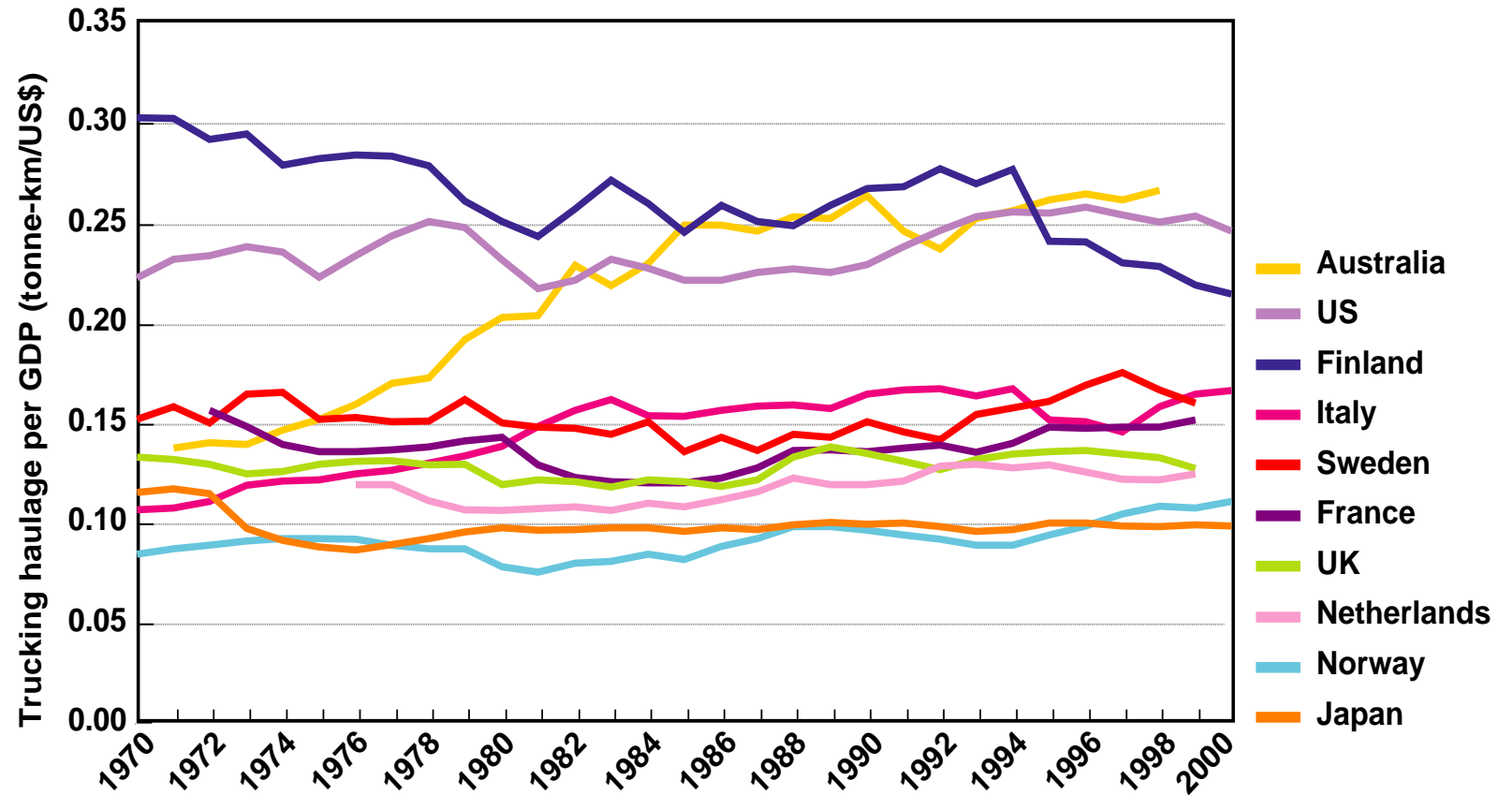


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Truck Freight Tonne-kilometres per GDP



Truck haulage follows GDP growth in most countries

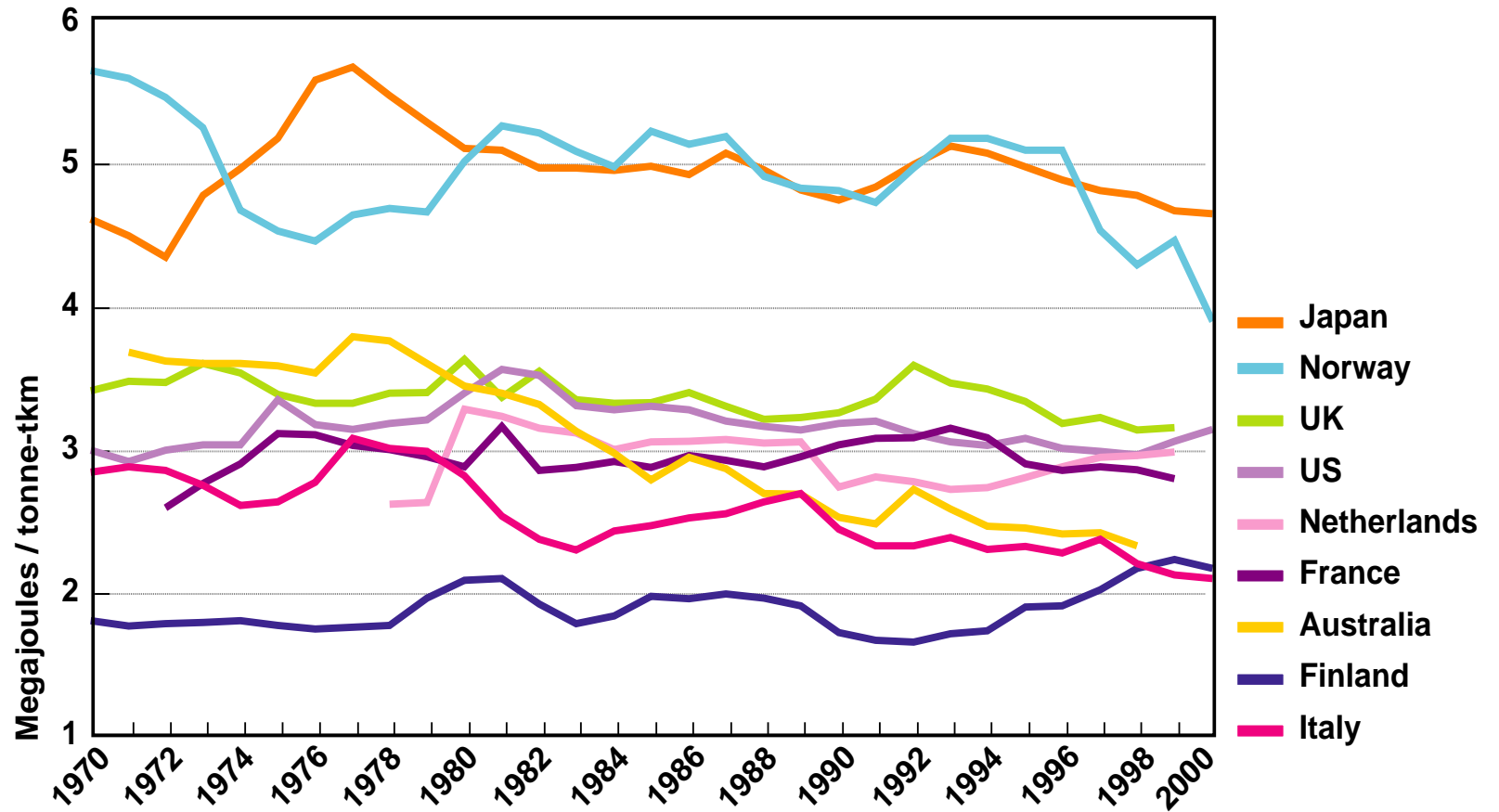


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Energy Intensity for Trucks



In most countries, trucking energy intensity has not declined significantly

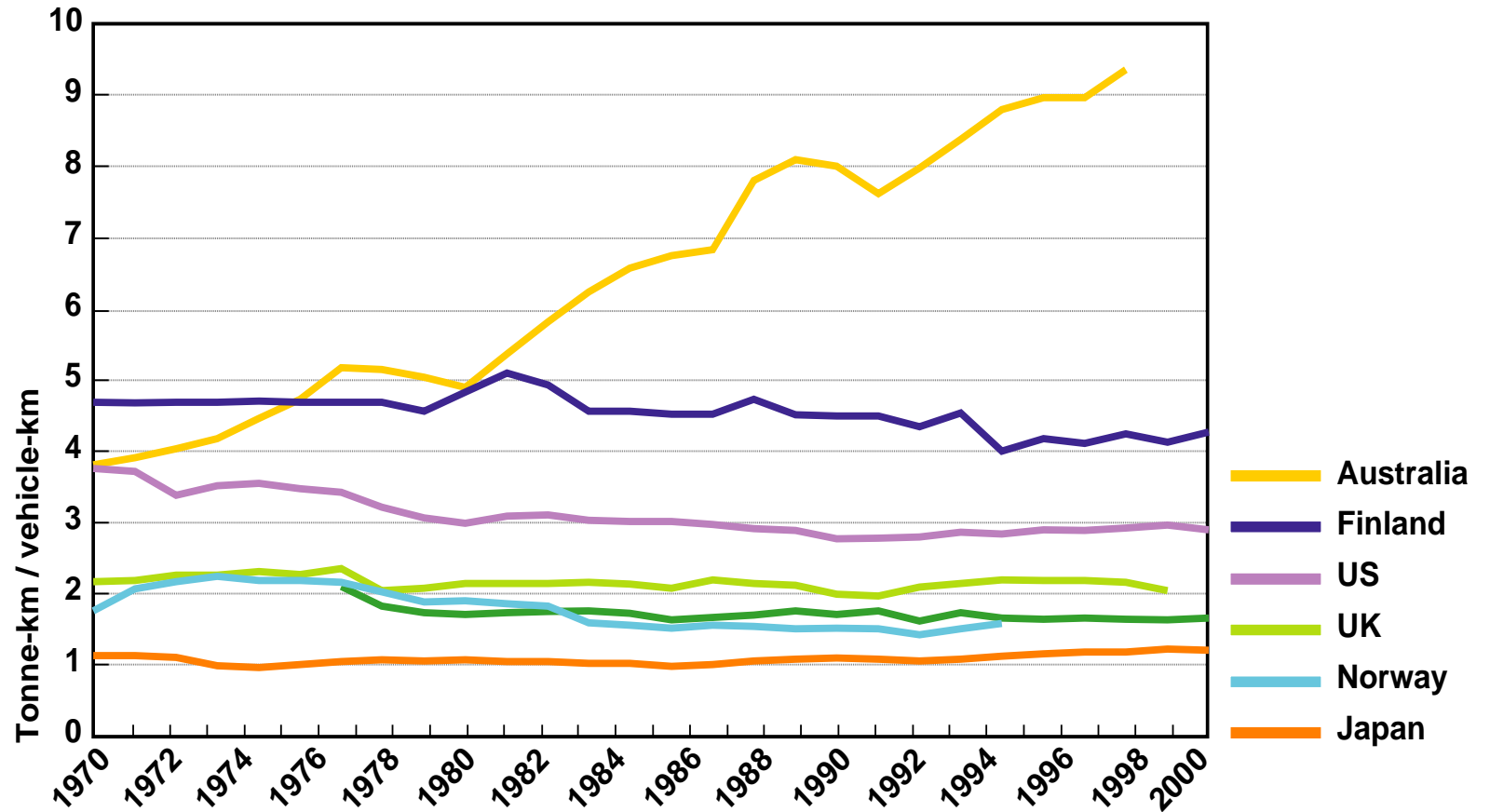


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Truck Average Load per vehicle



Truck average load factors have been fairly constant, with one notable exception



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Implications – What to do?

- **Transport energy intensity is not dropping very quickly, but activity keeps rising**
- **Three areas with strong potential:**
 - ◆ **LDV efficiency improvement**
 - ◆ **Biofuels**
 - ◆ **Fuel cells/hydrogen**



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LDV Efficiency Improvement

- From IEA 2001 “Saving Oil” analysis:
 - ◆ Incremental vehicle efficiency improvement potential is still strong
 - ◆ Including hybrids, at least 25% reduction potential in new cars through 2020
 - ◆ Mix shifting could eliminate the entire improvement
 - ◆ Policies that “hold the line” on vehicle size/weight/power are needed



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Biofuels

- ***Biofuels for Transport: An International Perspective*** forthcoming May 2004
- **Biofuels expensive in IEA countries, but cheap elsewhere**
- **New generation will provide high GHG reductions, relatively low cost per tonne**
- **Global potential could be very large – probably at least 25% of global road transport fuel could be biofuel by 2030**
- **Keys are developing cellulosic ethanol and biomass gasification technologies, and encouraging global trade**



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Fuel cells / hydrogen

- Our work on-going in this area, including ETP optimisation model analysis
- Our findings so far:
 - ◆ Fuel and refueling infrastructure costs could be lower than many expect
 - ◆ Vehicle costs are emerging as the biggest hurdle
 - ◆ Even if strong sales begin by 2015, fuel cells unlikely to save much GHGs in the 2030 time frame; more important by 2050 or even later.



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Conclusions

- **Though recent history has not been impressive, the future could be brighter**
 - ◆ **E.G. could probably reduce oil use and GHGs in road transport by 20-40% in 2030 time frame just from efficiency improvement and biofuels use;**
 - ◆ **Post 2030, with fuel cells, could begin to get “deep decarbonisation”**
- **But this will require a huge policy effort; few signs of this occurring at this point.**