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Reducing GHG Emissions: The Role of Fisheries

2nd FAO Workshop on Strategies and Practical Options
for GHG Reduction in Fisheries and Aquaculture
Sectors

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2013

Basic quantities

- Global oil use: ≈ 4250 m. tonnes (IEA 2011)
- Global fisheries:
 - Not much reliable information
 - Tyedmers et al. 2005: >42 m tonnes (or $\approx 1\%$)
 - FAO 2007: ≈ 14 m. tonnes (or $\approx 1/3\%$)
 - \therefore My guesstimate: <20 m. tonnes ($<0.5\%$)

**Fisheries oil use is insignificant
in the global context !**

The Outlook

(Cetris paribus)

- Developed world
 - Some fuel savings
 - (i) Higher price of fuel
 - (ii) Improving fisheries management
- Developing world
 - Increased fuel use
 - (i) Increasing fishing effort
 - (ii) Increased motorization
 - (iii) Larger vessels

Options for reducing fuel use

1. Technological improvements

- Various kinds (engines, fuel-type, fishing gear, hull etc...)
- If lucky, **10-20%** reduction in 10 years (**2-4 m. mt.**)
- But at substantial cost! \Rightarrow real savings are less!!
- Need to convince fishers to adopt new technology

2. Taxes and subsidies

- Discourage fossil fuel use
- Encourage alternative energy use (e.g. gas, wind, hydrogen etc...) and fuel savings (engines, fishing gear, vessel hull etc.)

Options for reducing fuel use cont'd

3. Improved fisheries management

- Reduce fishing effort and fishing fleets

⇒ Reduction in fuel use

- Also other benefits:

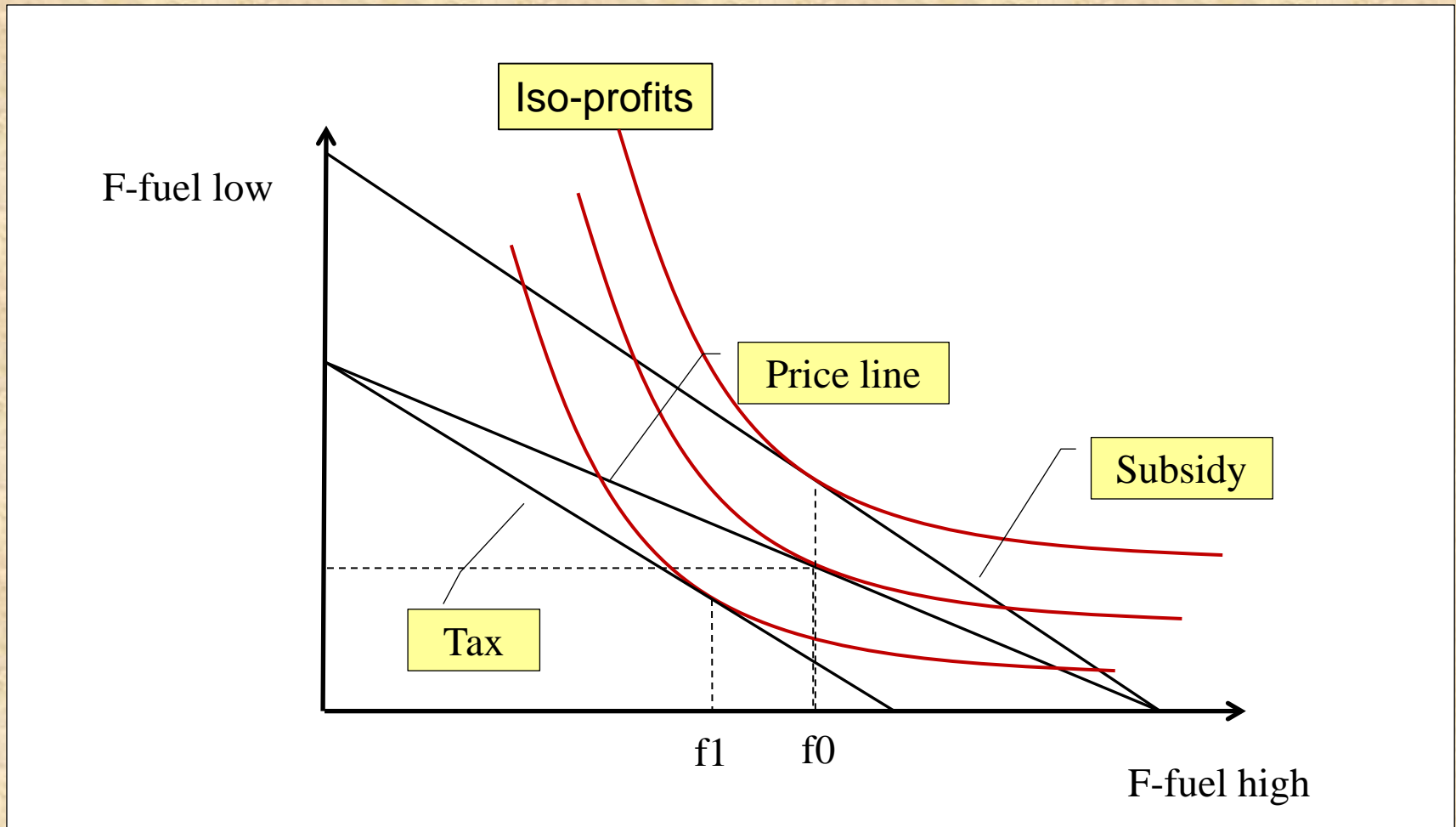
- Higher fishery profits (equivalent to fuel savings)
- Other environmental gains
 - Larger fish stocks
 - Healthier ecosystems

Taxes and subsidies

Note: Represent distortion of prices!!
Only ok if reflects true externalities!!
Ample reason to fear otherwise !!

- Impact of taxes
 - Less fossil fuel use, less fishing effort
 - Two effects in the same direction
 - ⇒ Reduction in fossil fuel use
- Impact of subsidies
 - Relatively less fossil fuel use, more fishing effort
 - Two effects in the opposite direction
 - ⇒ Change in fossil fuel use ?

Analytic tool



Key concept: Elasticity of substitution

Improved fisheries management

Fisheries in the world are characterized by

1. Excessive fishing fleets
2. Excessive fishing effort

⇒ **Excessive fuel use**

∴ **Improved fisheries management will reduce fuel use !**

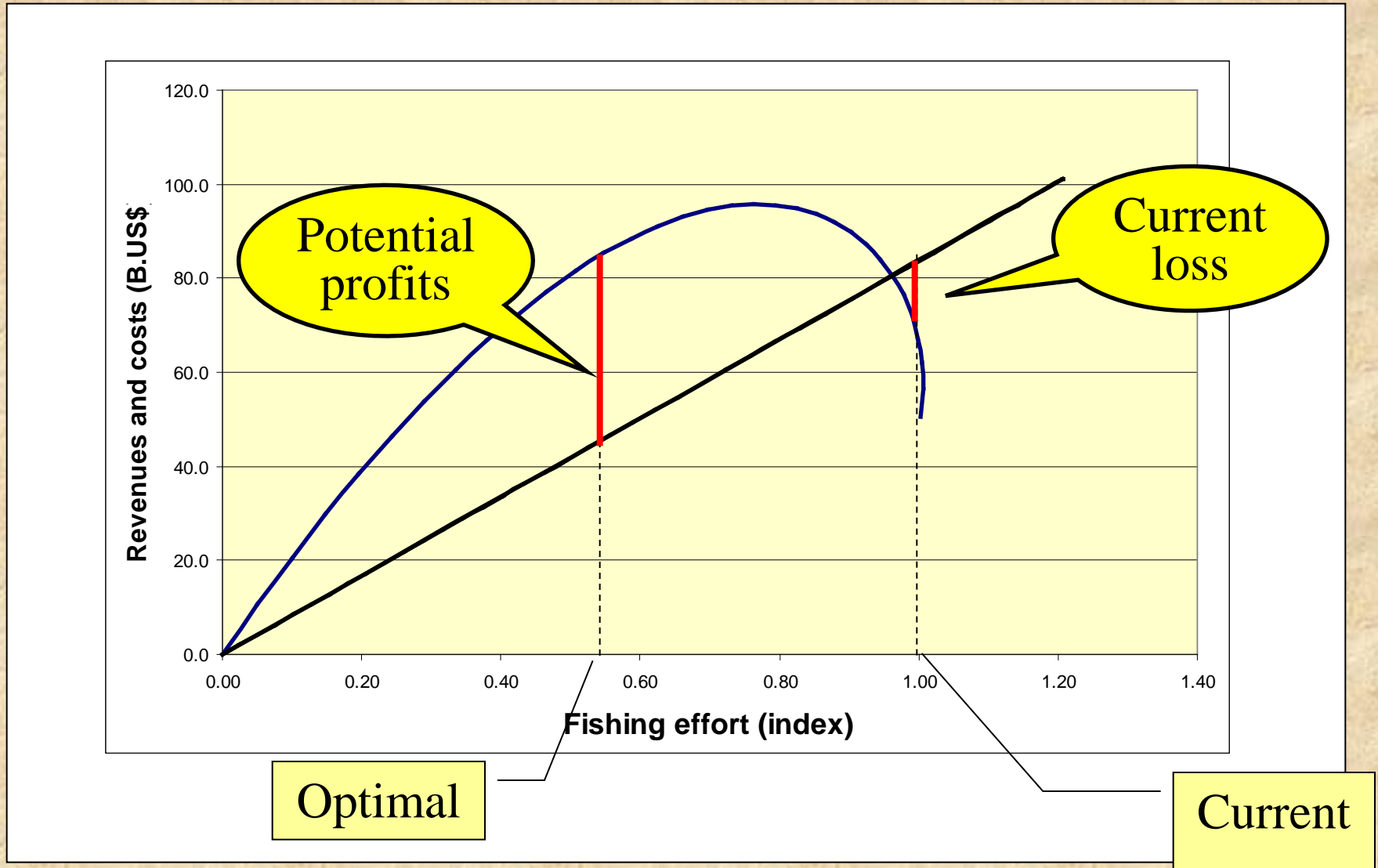
What are the quantities?

The Global Fishery

- Major World Bank/FAO study 2006-9
- Efficiency of the global fishery
- Approach
 - Global fishery as a whole
 - Individual fishery case studies
- Publication in 2009 – ‘The Sunken Billions’

The Economics of the Global Capture Fishery

(FAO/World Bank; Sunken Billions 2009)



Global Fishery Rent Loss

The Sustainable global fishery: Current and profit maximizing outcomes

	Current	Optimal	Difference (optimal –current)
Fishing effort	13.9 m. GRT	7.3 m. GRT	-6.6 m. GRT
Harvest	85 m. mt	81 m. mt.	-4 m. mt.
Biomass	148 m. mt	314 m. mt.	+165 m.mt.
Economic rents	-5 b. USD	44 b. USD	49 b. USD

∴ Wasted profits \approx 50 b. USD

∴ Unnecessary fishing effort \approx 6.6 m. GRT

So, in the global fishery

- Fishing effort should be reduced by $\approx 47\%$
 - Exploited fish stocks rise by: $\approx 112\%$
- \Rightarrow Fuel use will be reduced by well over 50% !!
- Gains in profits ≈ 50 b. US\$; buys over 50 m. tonnes of fuel oil
 - This is equivalent to real savings in fuel

Fuel use will be reduced more than fishing effort !

- Fish stocks increase greatly
 - ⇒ Less need for large fishing gear and powerful engines
 - ⇒ More fish closer to shore
 - ⇒ Less need to travel far
- ⇒ Shift to less fuel consumption technology

So, if fishing effort is reduced by **50%**, fuel use would be reduced by **>50%**

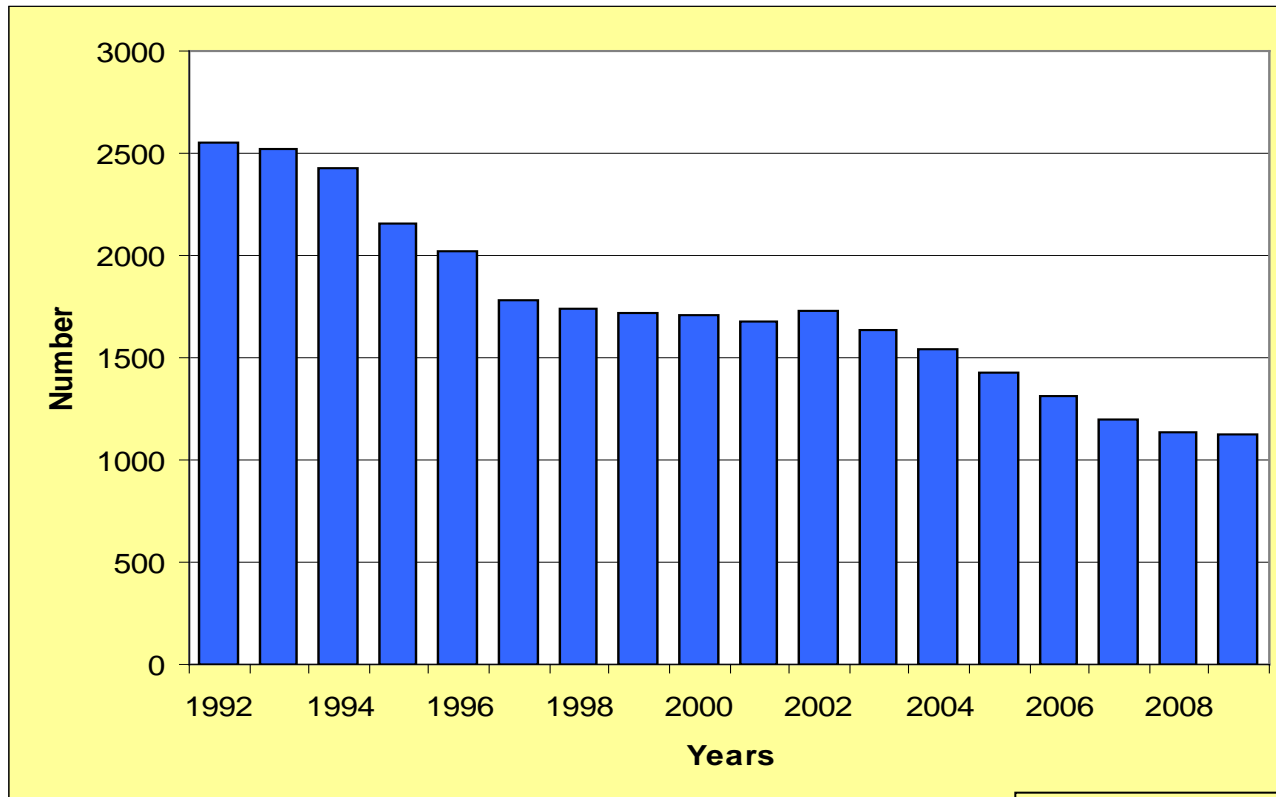
..... but in due course

An empirical example: Fisheries rationalization in Iceland

- One of the first nations to embark on ITQs
- First system in 1979
- Major step in 1990
 - All main fisheries on ITQs
 - Few exceptions
- About 20 years of experience

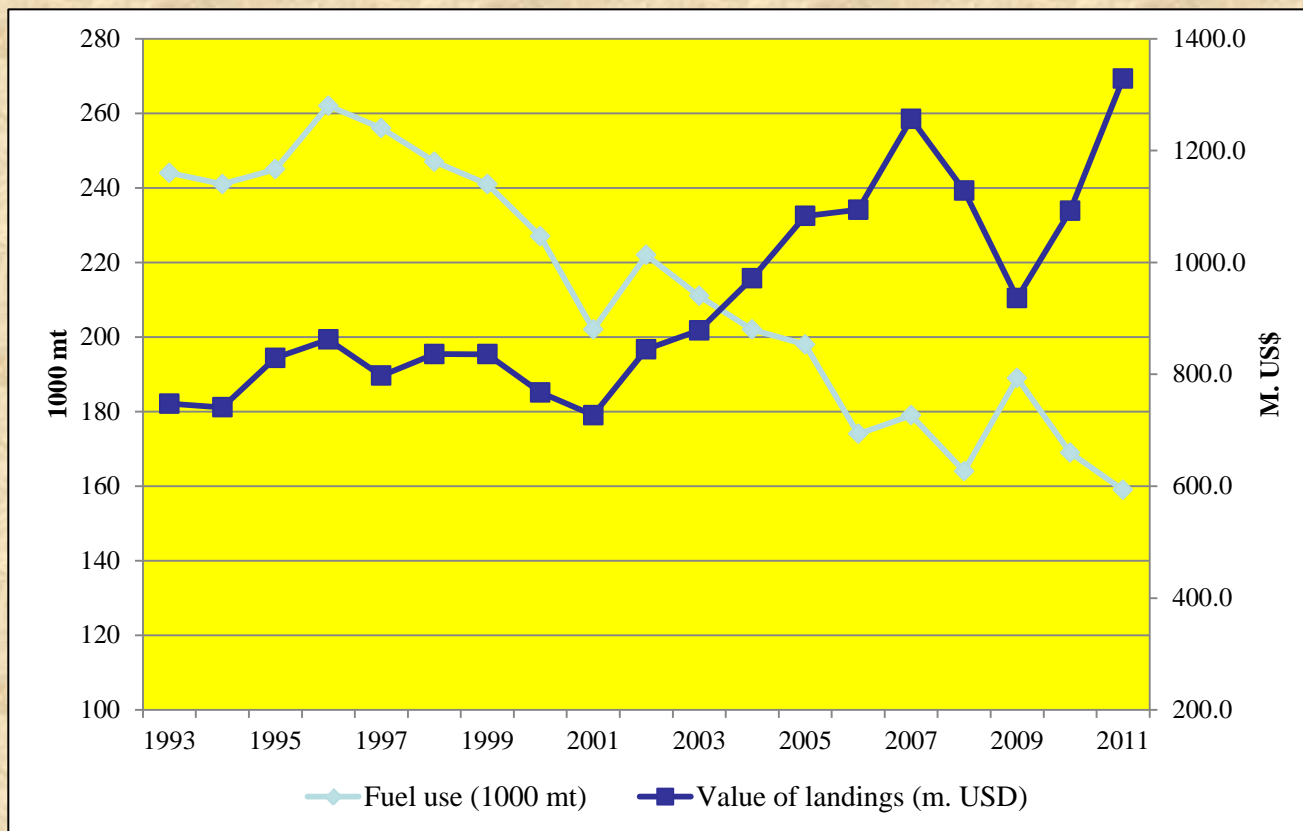
Fishing Fleet

(Number of licenced vessels)



1992: 2552 vessels
2009: 1123 vessels

Icelandic fishing fleet: Fuel use and value of landings



Change in fuel use 1993-2011: **-35%** (-1.9% annually)

Change in catch value 1993-2011: **+78%** (+4.3% annually)

Conclusion

The most effective way to reduce fuel use in fisheries is by improved fisheries management

- It is quick
- It is not only costless, it is profitable !
- Much more promising than technological improvements

**Global fisheries GHG policy should be:
Improved global fisheries management**

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