Market integration and competitiveness

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ELECTRICITY MARKET INTEGRATION – A NORTH EUROPEAN PERSPECTIVE

Centre for Environmental and Resource Economics

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UMEÅ UNIVERSITET

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- Centre inaugurated in December 2009
- A joint venture between Umeå University and the Swedish University of Agricultural Sciences
- Location: Economics Dept., USBE, Umeå University
- 37 members in total, but about 30 in core
- 6 Professors, 2 Docent, 9 post-docs/assistant professor, 15 PhD students
- Focal point: Energy Economics

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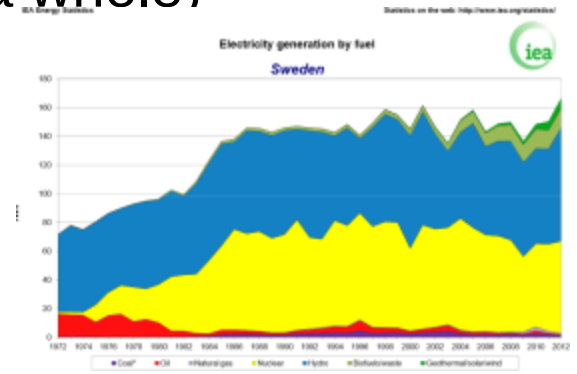
A tangled web of questions on energy, competitiveness and market integration

- Market integration (Electricity, Certificates?...)
- Hydropower
  -- Implications of WFD?
  -- Domestic processes
- Nuclear phase out
  -- waste tax (financial system as a whole)
- 16 environmental goals:



Example: Forest goal-conflicts
-- Renewable energy
-- Preservation
-- Transport
--…

Fossile free transportfleet by 2030

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Top ten competitive sectors in Sweden

	SWE							
Product label	2001	2002	2003	2004	2005	2006	2007	2008
Ores, slag and ash	1,412	1,488	1,528	1,412	1,550	1,641	1,435	1,518
Pharmaceutical products	2,797	2,343	2,579	2,199	2,159	2,387	1,957	1,828
Wood and articles of wood, wood charcoal	3,263	3,357	3,363	3,025	3,167	3,471	3,646	3,621
Pulp of wood, fibrous cellulosic material, waste etc	6,412	6,068	5,634	6,047	5,844	5,360	5,433	5,895
Paper & paperboard, articles of pulp, paper and board	5,164	5,133	5,150	5,145	5,393	5,458	5,336	5,836
Iron and steel	2,114	2,069	1,876	1,760	1,968	1,715	1,861	1,658
Lead and articles thereof	1,523	1,618	1,972	2,020	2,019	2,197	2,058	1,700
Tools, implements, cutlery, etc of base metal	2,205	2,233	2,248	2,211	2,503	2,160	2,247	2,183
Furniture, lighting, signs, prefabricated buildings	1,602	1,622	1,561	1,646	1,589	1,644	1,650	1,727
Commodities not elsewhere specified	2,000	1,872	2,019	1,779	0,777	2,095	2,251	2,365

Source: kie.vse.cz/wp-content/uploads/**balassa-index**.xls

$$RCA_ij = \frac{\frac{x_ij}{X_i}}{\frac{x_aj}{X_a}}$$

x_{ij} denotes the export of products *j* from country *i*

X_i denotes the total export from country *i*

x_{aj} denotes the total export of product *j* from reference area, say World

X_a denotes the total export from reference area.

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Bottom ten competitive sectors

Product label	2001	2002	2003	2004	2005	2006	2007	2008
Silk	0,005	0,009	0,014	0,013	0,012	0,008	0,007	0,007
Vegetable plaiting materials, vegetable products nes	0,022	0,035	0,033	0,046	0,039	0,050	0,054	0,059
Live trees, plants, bulbs, roots, cut flowers etc	0,047	0,048	0,047	0,040	0,054	0,044	0,063	0,046
Wool, animal hair, horsehair yarn and fabric thereof	0,050	0,053	0,056	0,051	0,055	0,056	0,054	0,081
Cork and articles of cork	0,057	0,041	0,036	0,030	0,038	0,031	0,032	0,028
Residues, wastes of food industry, animal fodder	0,093	0,095	0,102	0,108	0,123	0,119	0,136	0,170
Clocks and watches and parts thereof	0,096	0,124	0,113	0,129	0,115	0,133	0,140	0,123
Umbrellas, walking-sticks, seat-sticks, whips, etc	0,108	0,172	0,182	0,183	0,142	0,145	0,158	0,154
Footwear, gaiters and the like, parts thereof	0,112	0,138	0,160	0,170	0,176	0,230	0,212	0,222
Vegetable textile fibres nes, paper yarn, woven fabric	0,116	0,128	0,154	0,146	0,152	0,139	0,139	0,165

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Market integration

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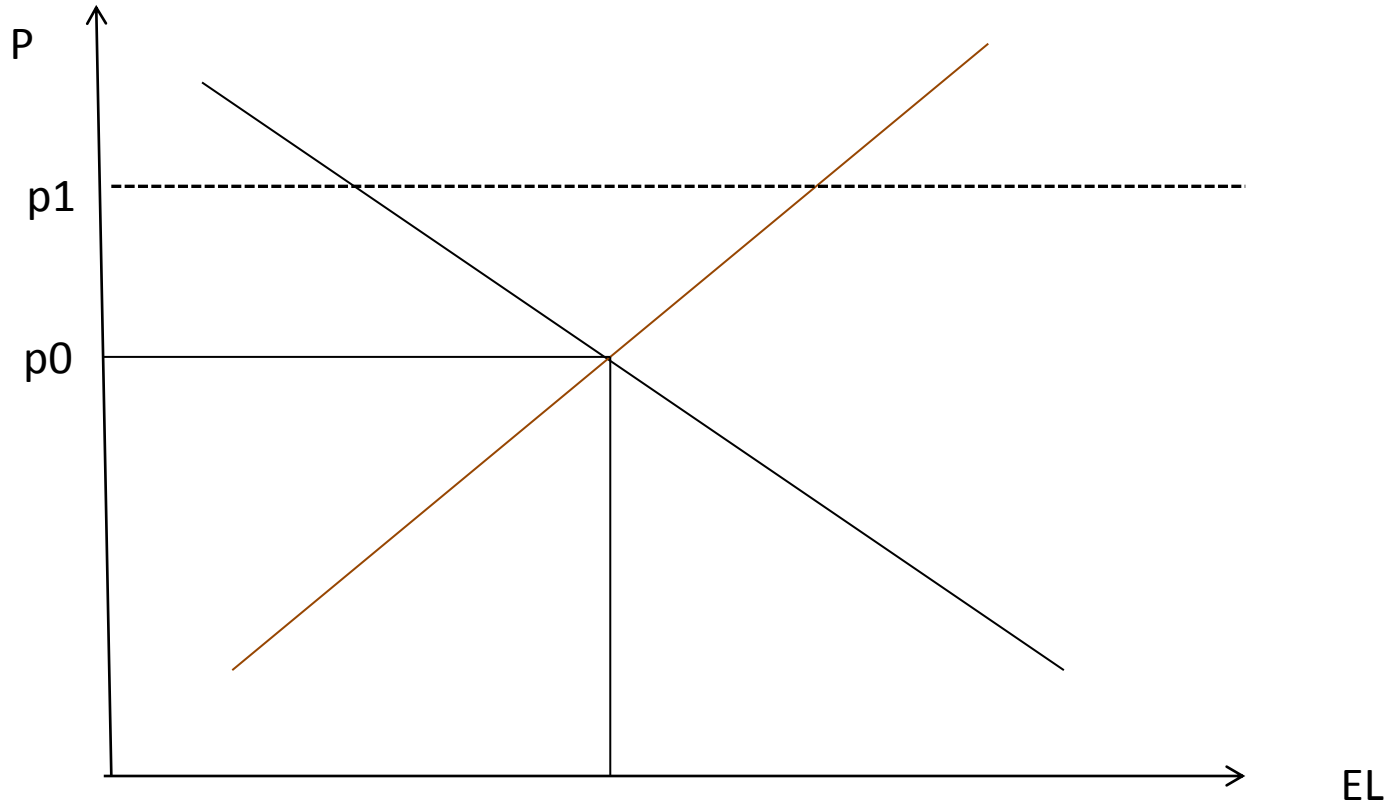
Market integration



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Market integration and welfare

- There will be winners and losers
- In the standard model, more trade is socially beneficial (Kaldor-Hicks, only the size of the cake matters)
- Modern view: consider the portfolio of all assets, including environment & natural resources
- Identifying winners & losers (whose welfare are we interested in?)
- How to weigh winners and losers?

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Electricity price, Energy intensive industry and competitiveness: economic analysis

- Level 1: the individual firm
- Level 2: the individual sector
- Level 3: the economy
- Level 4: multiregional (eg Nordic)
- Level 5: global
- Impact of elprice shocks depends on perspective
- Marshalls law: ”the importance of being unimportant”

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Level 1

	Elprice change -15%	Elprice change +12%	Costshare el (2004)	Elcost per Kwh (2004,SEK)
Mining	dQ=0.3%, dL=0.2%	dQ=-0.7% dL=-0.2%	0.056	
Wood	dQ=0.1% dL=0.2%	dQ=-0.1% dL=-0.2%	0.06	0.324
Pulp&Paper	dQ=1.5% dL=6.4%	dQ=-1.5% dL=-6.6%	0.087	0.281
Chem	dQ=0.2% dL=-1.3%	dQ=-0.2% dL=+1%	0.056	0.321
Iron &Steel	dQ=1.4% dL=0.1%	dQ=-0.8% dL=-0.1%	0.037	0.377
Source:	Brännlund & Lundgren (2012)	Brännlund& Lundgren (2011)		

Important! These are average effects

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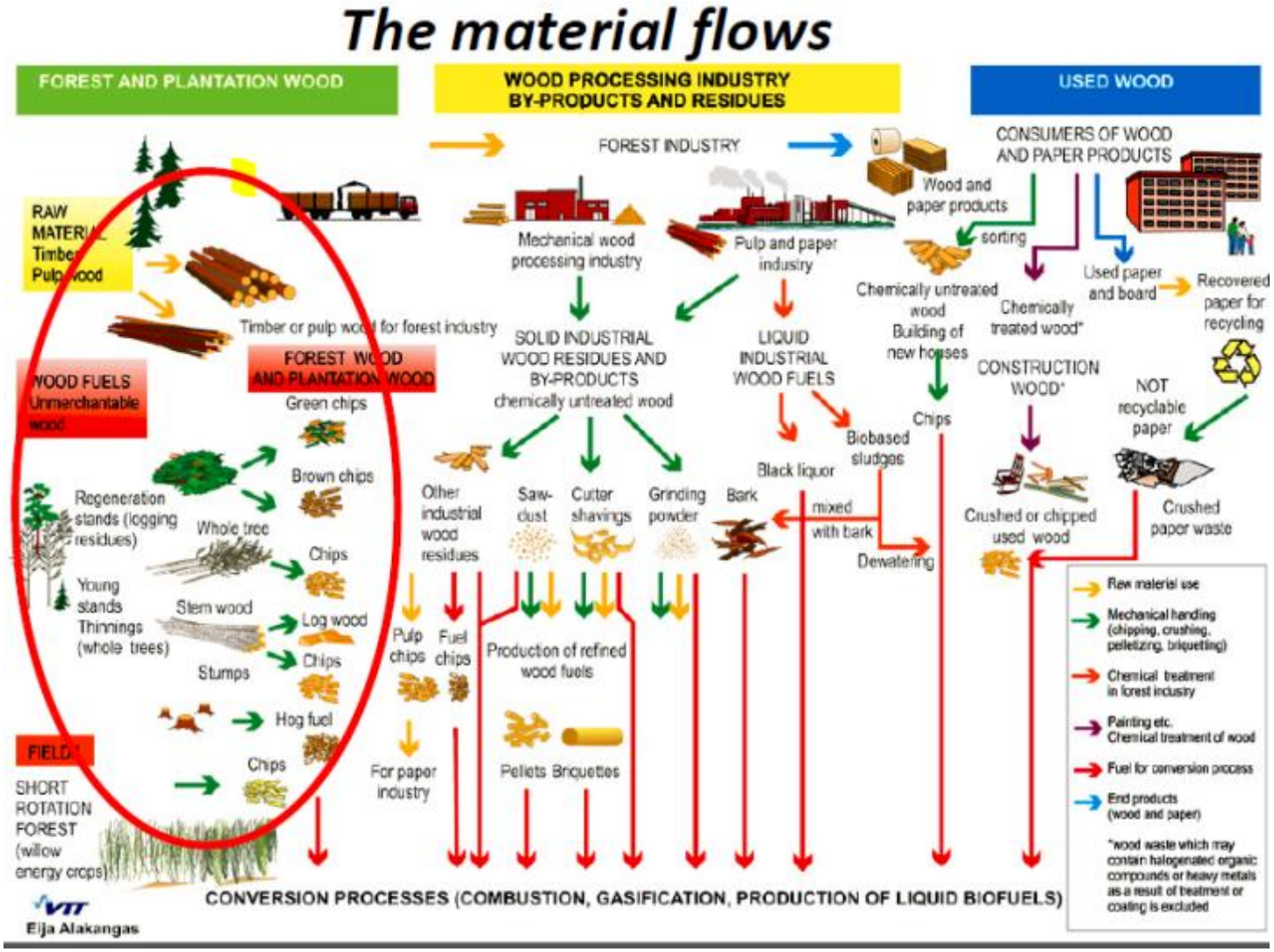
Level 2: example forestry sector



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Level 3-5

- Level 3: Sweden model (EMEC, TIMES, CERE-CGE-E, Hill, Harrison-Kriström)
- Level 4: Fennoscandia + Nordic (NORDEEC)
- Level 5: Europe/Global (GTAP)

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The question

- How can we use hydropower more efficiently?
- Allow more regulatory flexibility
  -- Basin perspective
  -- Country perspective
  -- Nordic perspective
- Potential win-win solutions: ”More energy, more environment”

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Question to be studied: regulatory flexibility

1. Upper Ljusnan -- hydro
2. Middle Ljusnan (Protected) – no hydro
3. Lower Ljusnan – hydro

= has the ”invertered water Streams” (seasonal) problem
Solution: build a ”bypass tunnel”

Laforsen hydroplant (a natural fish hinder 150 km upstream)

River mouth. No fish passage possible today