



Swiss Centre for Life Cycle Inventories

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2<sup>nd</sup> International ecoinvent Meeting  
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# energy supply: electricity mix updates

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# Overview



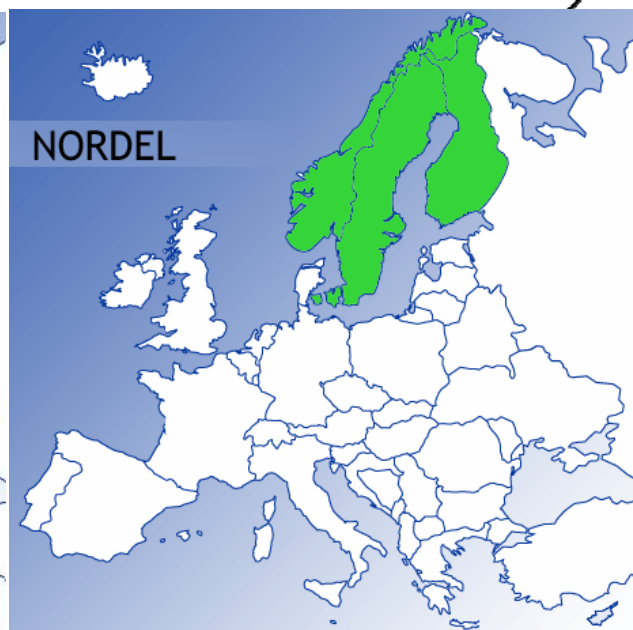
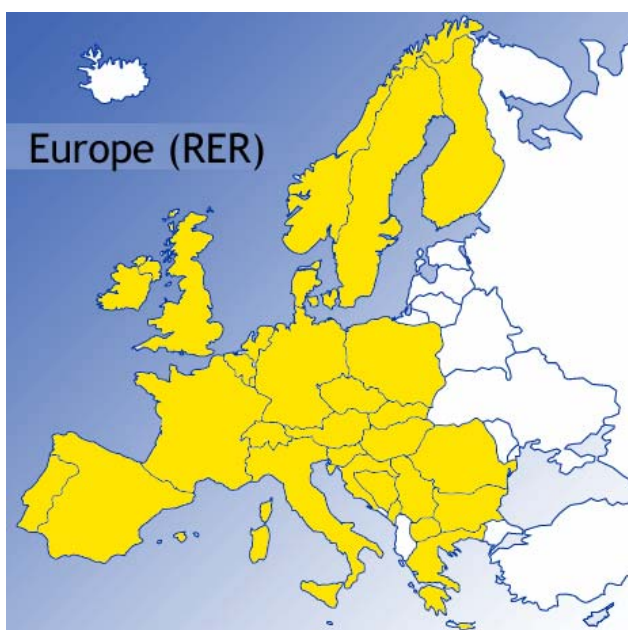
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- countries covered
- changes and improvements implemented
- the role of certified electricity
- comparison of results
- Conclusions



## countries covered (2004/5)



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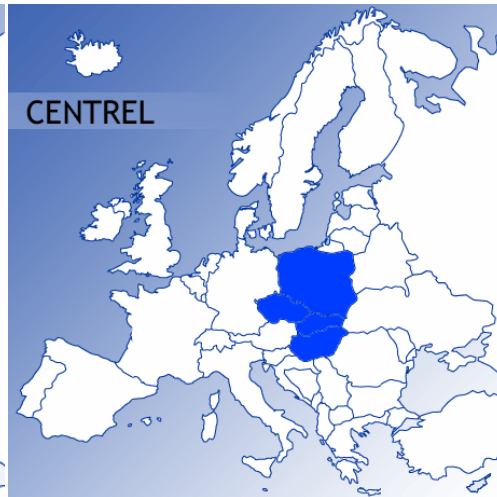
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including Bulgaria and Romania



# countries covered (2004/5)



including CENTREL countries

Additional countries and mixes:

- Brazil, China, Japan, USA
- Aluminium industry
- Swiss Railways



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# Datasets per electricity mix

- Different voltages:
  - at the busbar
  - High voltage >24kV
  - Medium voltage 1-24kV
  - Low voltage <1kV
- Different mixes:
  - Production mix (domestic production only)
  - Supply mix (domestic production plus imports)

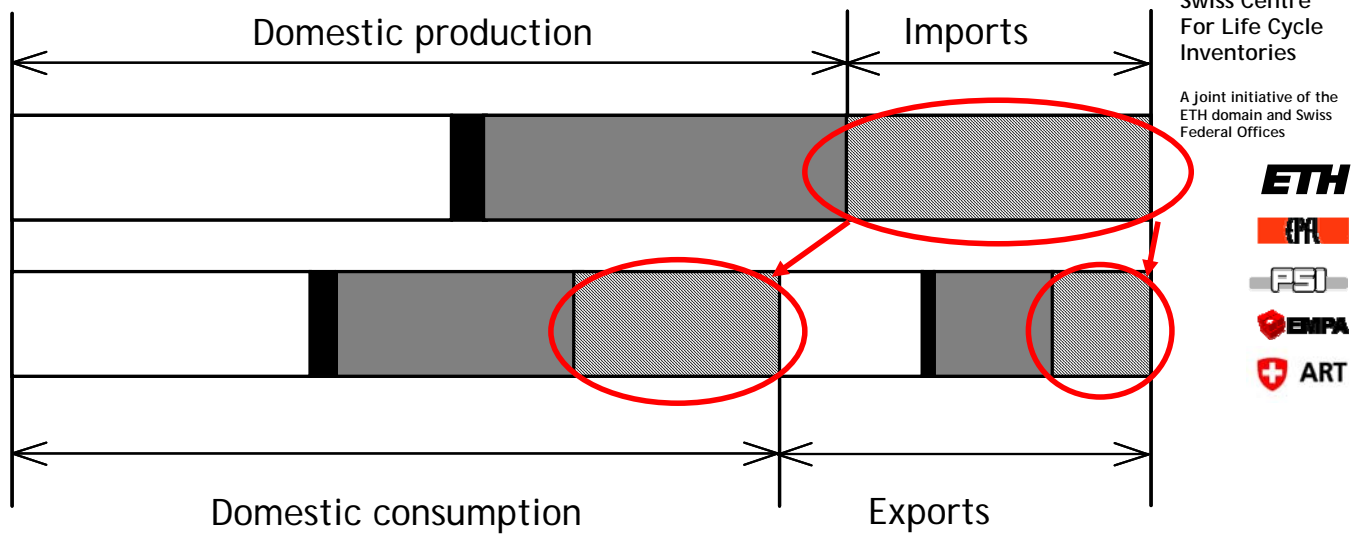


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# Electricity model



Mix domestic production plus Mix Imports = Supply mix

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# Power plant technologies



- Hard coal and lignite \*
- Heavy fuel oil \*, Diesel CHP
- Natural gas (also CHP) and Industrial gases \*
- Hydroelectric power (run of river and storage)
- Pumping storage hydroelectric power \*
- Nuclear power (pressurised and boiling water reactors) \*
- Photovoltaic (average yield) \*
- Wind power (also offshore, Baltic Sea case study)
- Biomass (Wood CHP)
- Biogas (from sewage sludge and biowaste)

\* country specific

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# Electricity network



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- High / medium voltage:  
SF<sub>6</sub>-losses in Switchyards considered
- Low voltage:  
Heavy metal leachate from use phase of treated  
wood poles
- Country specific losses;  
between about 3.5% in Finland and nearly 19% in the  
successor states of the former Yugoslavia.



# Features of v2 modelling



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- CENTREL countries (PL, HU, CS, CZ) now included in UCTE
- emission factors of CENTREL fossil power plants updated
- LNG supply of Japan modelled separately
- Greenhouse gas emissions of Brazil hydroelectric power plants:  
104 g "CO<sub>2</sub>, land transformation" per kWh
- NEW EU 27 mix, applicable where no specific information  
available on
  - product provenience (production phase) or
  - product destination (use phase)
- Certified electricity production modelled separately



# Roles of certified electricity



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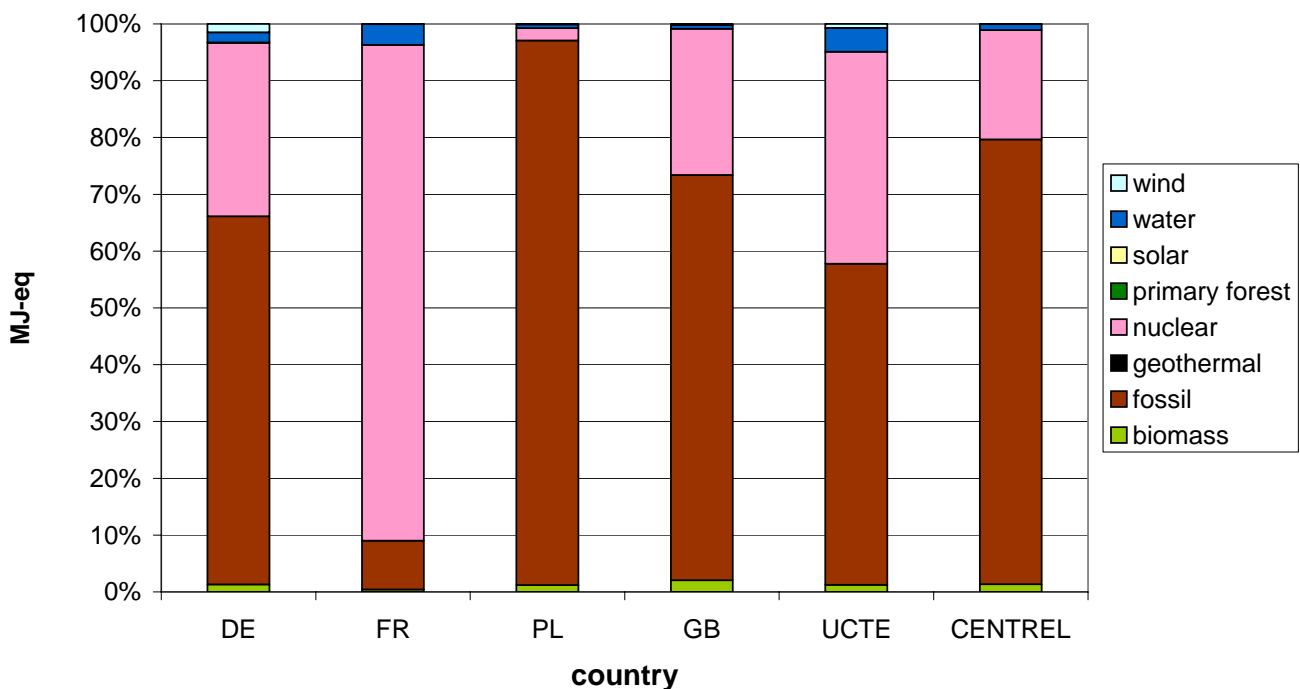
- 12% of Swiss hydro power, and 26% of new renewable power is certified and sold separately
- Swiss production mix includes certified electricity
- Swiss supply mix excludes certified electricity
- No differentiation in all other country mixes
- Separation of “green” electricity from grid supply mix gets more important in the future



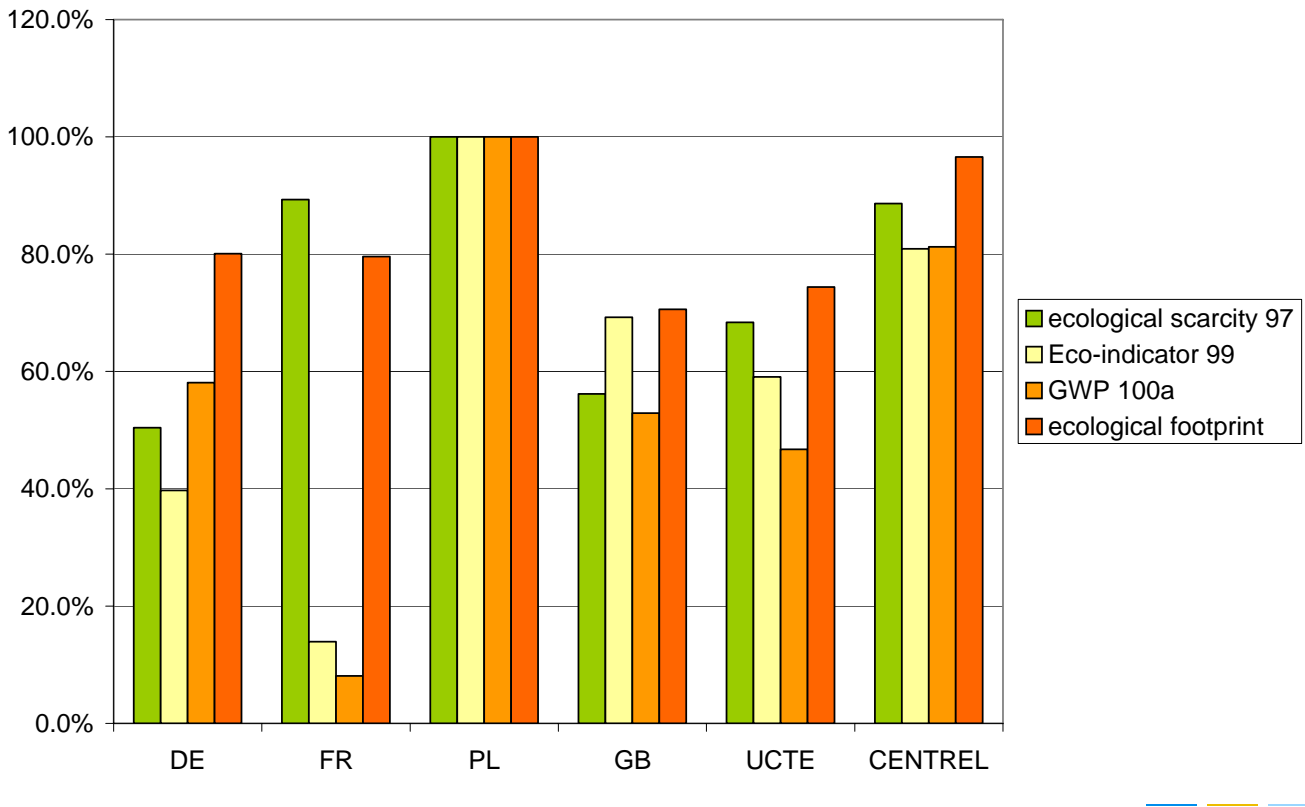
# CED electricity supply mix



production mix, per kWh<sub>el</sub>



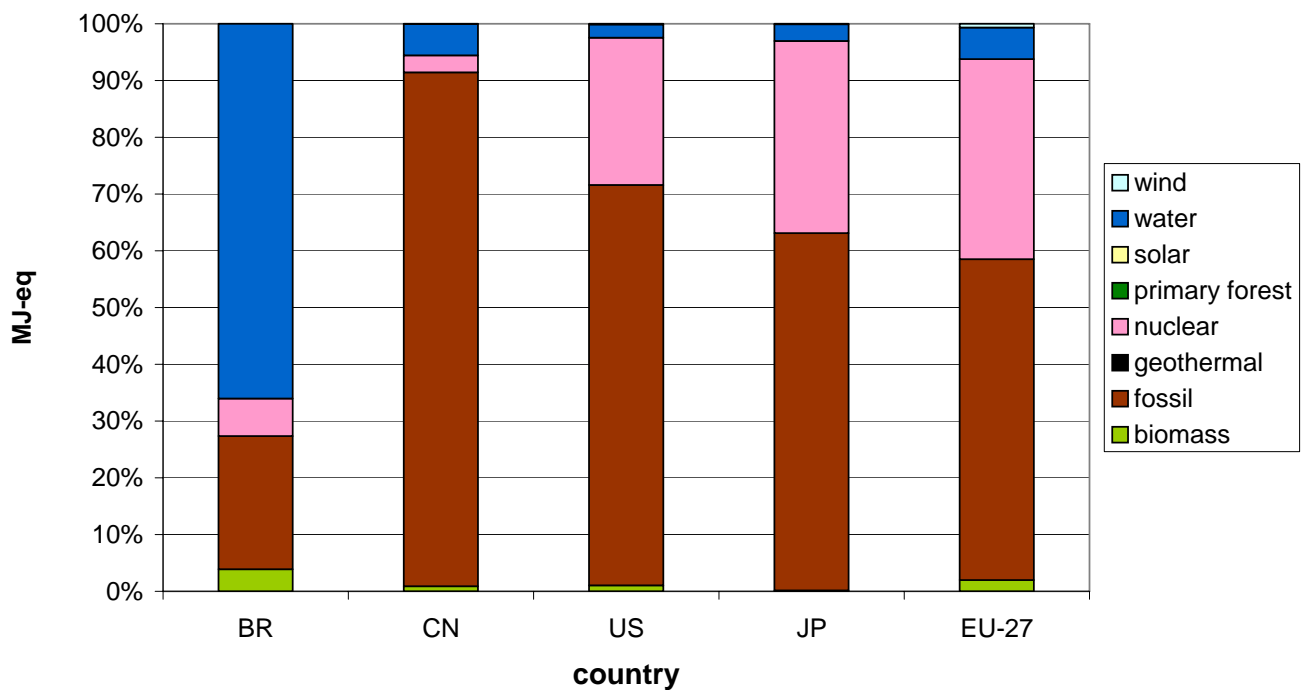
# Comparison electricity supply mixes



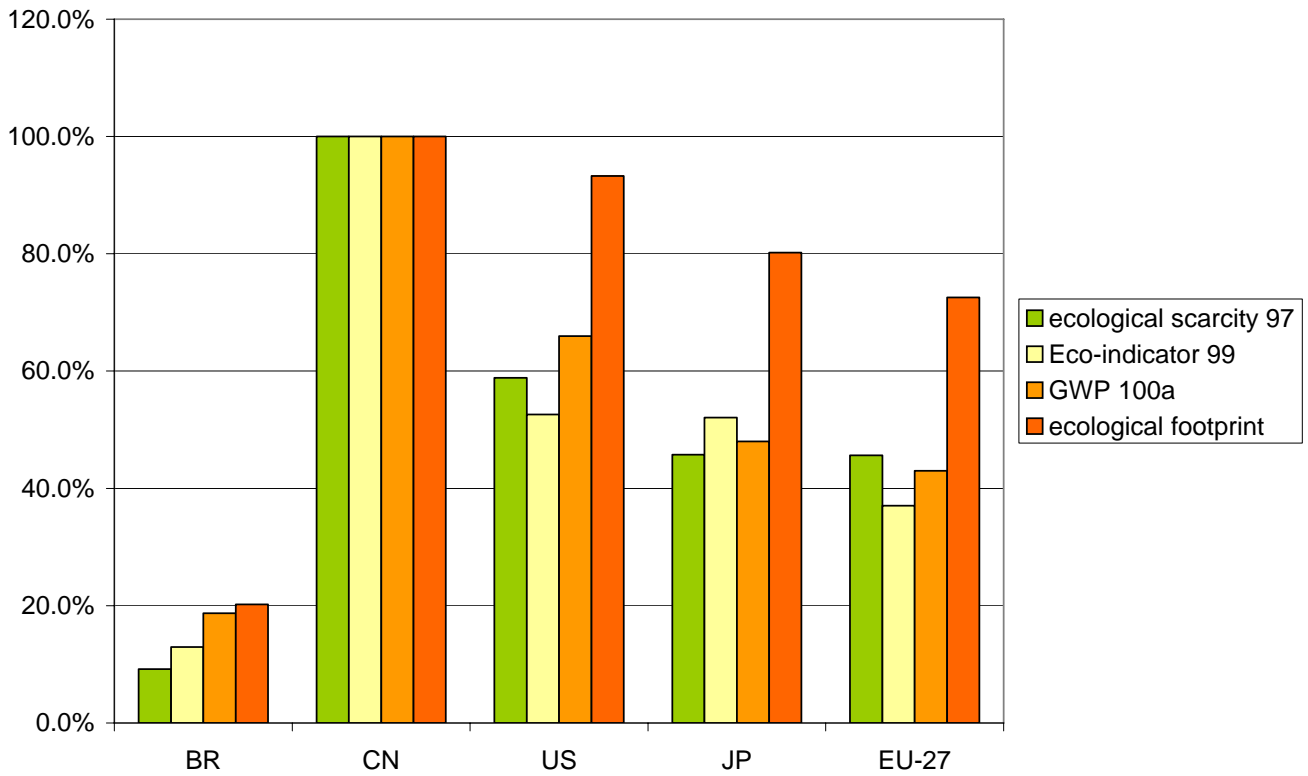
# CED electricity supply mix



production mix, per kWh<sub>el</sub>



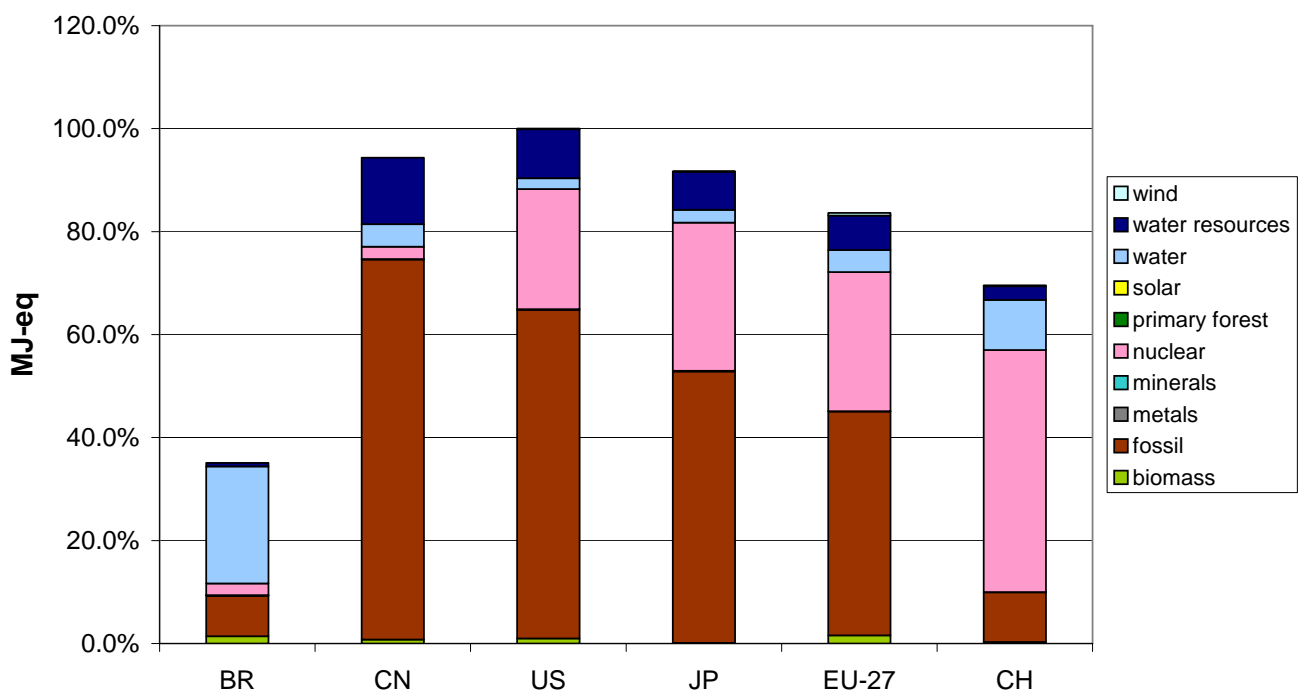
# Comparison electricity supply mixes



# Cumulative Exergy Demand (CExD)



production mix, per kWh<sub>el</sub>





# Differences LCIA-results ecoinvent v2.01 vs. v1.3



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per kWh	UBP'97	EI'99 (H,A)	GWP 100
DE	-4.5%	4.2%	-2.4%
FR	0.5%	0.2%	-4.8%
PL	-18.2%	-15.6%	-1.3%
GB	-3.5%	1.2%	3.2%
UCTE	-2.9%	6.0%	9.1%
CENTREL	-16.4%	-15.3%	-4.1%

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## How to choose the correct dataset



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- Relevant for LCAs: **Supply** mix  
-> Data sets with name „electricity, medium voltage, at grid“  
NOT „electricity, medium voltage, production SE, at grid“
- Except for countries / networks with no electricity imports:  
-> „production mix“
- If electricity demand anywhere in Europe:  
use the NEW EU 27 electricity mix  
„electricity, medium voltage, production RER, at grid“

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