



Developing an LCA software in Hungary for a more sustainable production



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*27th LCA Discussion Forum
November 17, 2005, Swiss Federal Institute of Technology Zürich*



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SOME WORDS ABOUT PREMISES...

- In Hungary LCA application in children shoes
- Softwares developed in other countries could appoint false results



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- „Development of a national LCA database for supporting environmentally sound development of Hungarian enterprises”
- Bay Zoltán Foundation for Applied Research
- University of Miskolc
- Economic Competitiveness Operative Program (GVOP)
- Finance of the project:
 - 75% EU,
 - 25% Hungarian government



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■ **Keynote:**

- Results in international research (SimaPro, GaBi)
- Consideration of Hungarian conditions

■ **Objectives**

- On-line database
- Focusing to
 - Waste management
 - Energy sector
- *normalisation data* ???
- To use in education and research

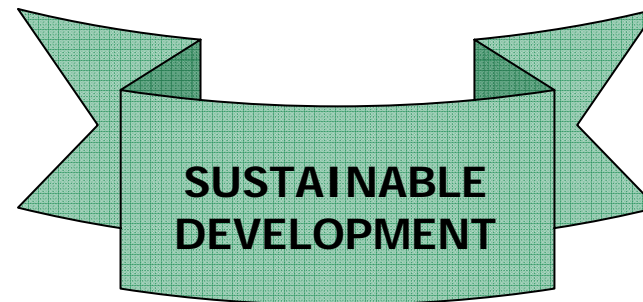


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TARGET AUDIENCE

- Environmental conscious customer
- Environmental conscious producer





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PROCEDURE OF THE RESEARCH

- Estimating domestic energy-sector
- Data collection
- Determining system boundaries
- Function of production system
- Life cycle inventory

- Transportation

- Road transport
- Railway
- Air
- Waterway
- Hydraulic

Transport kilometre, materials



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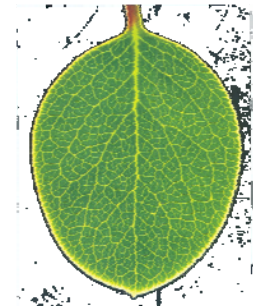


CLASSIFICATION OF HUNGARIAN POWER PLANTS:

- Nuclear Power Plants
- Coal – fired power plants
- Natural gas- and oil fired power stations
- Natural gas burning power plants (peak-load plants)
- Wind energy power plants
- Incinerators
- Biomass burning power plants



NUCLEAR POWER PLANT PAKS



Input:

- Fuel elements
- Adsorbent rod
- Saline solutions for regeneration of ion-exchange resins
- Condenser water
- Chemicals, greasing materials

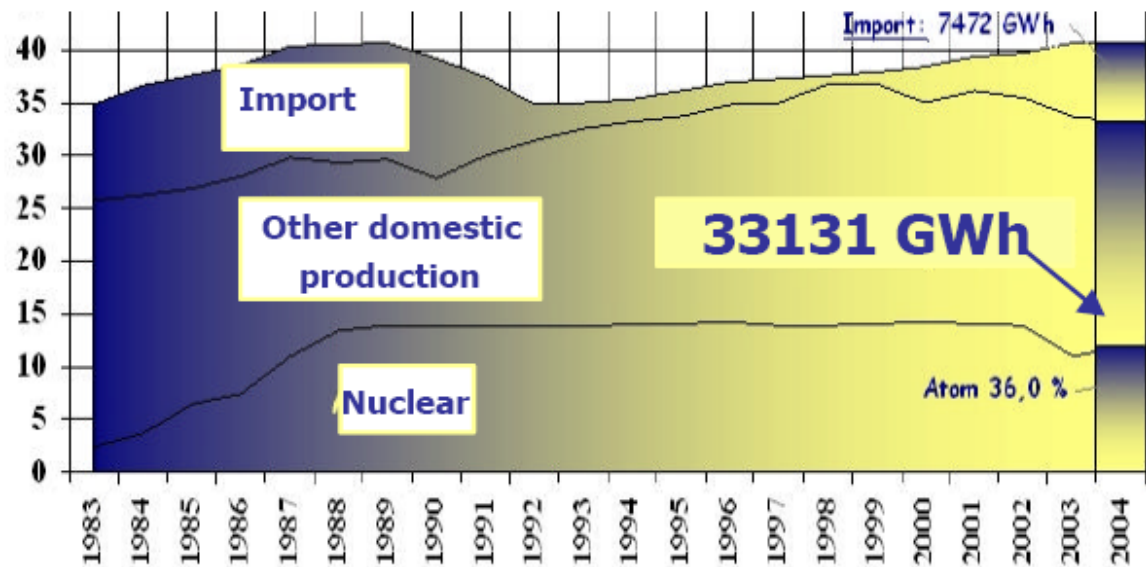
Output:

- Electricity, heat
- Nuclear wastes
- Condenser water
- Spent oils
- Noise and vibration

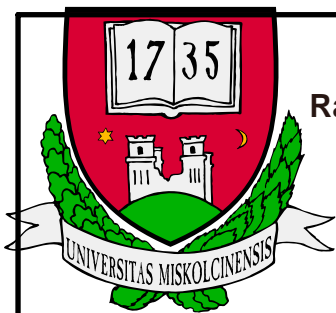
Total capacity: **1729 MW**

Participation from Hungarian electricity production: **39,1 %**

Hungarian electricity production



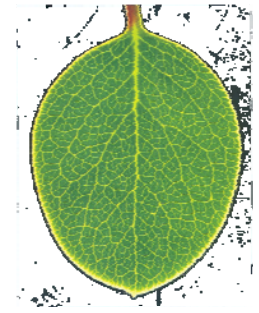
source: Nuclear Power Plant, Paks

 Radionuclide	<i>Paks</i> [GBqGW _e ⁻¹ év ⁻¹]	<i>PWR</i> [GBqGW _e ⁻¹ év ⁻¹]
	2003	1995-1997
Emissions to air		
Total aerosol	4,4 x 10 ⁰	1,3 x 10 ⁻¹
¹³¹Iodine equivalence	2,6 x 10 ²	1,7 x 10 ⁻¹
Total inert gas	3,1 x 10 ⁵	1,3 x 10 ⁴
Total tritium	5,0 x 10 ³	2,4 x 10 ³
Total radiocarbon	4,3 x 10 ²	2,2 x 10 ^{2***}
Fluent emissions		
Corrosive and cleavageproduct	5,8 x 10 ⁻¹	8,1 x 10 ⁰
Tritium	1,0 x 10 ⁴	1,9 x 10 ⁴

Source: UNSCEAR Report, 2000



COAL BURNING POWER PLANTS

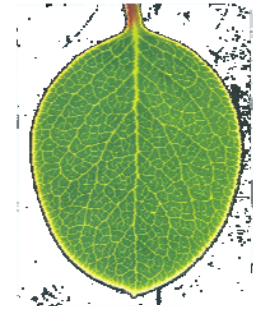


Input:

- *Fuel: black coal, brown coal, lignite*
- *Industrial water*
- *Lime*
- *Ammonia or methane*
- *Electric energy*
- *Subsituation of the used up ion exchange resin*
- *lubricants*

Output:

- *Slag*
- *Dust-ash*
- *Gypsum*
- *Used up ion-exchange resin*
- *heat*



- *Natural gas firing: peak – load plant*

- *Hydroelectric power stations*
(hydroaccumulation plants,
hydroaccumulationless plants)



Input: water, oil

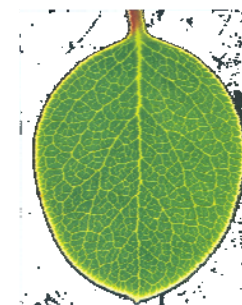
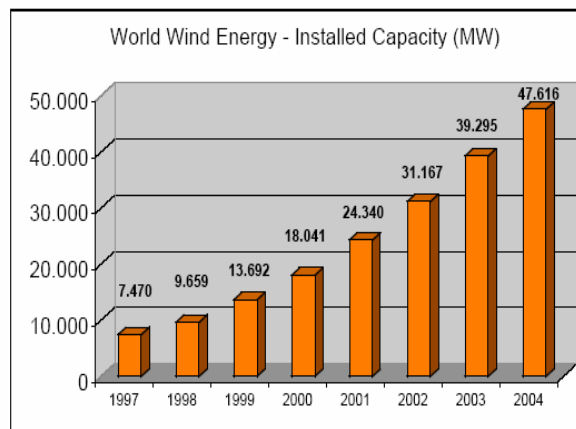


Output: water, slop oil, (methane)

- *Incinerator*

- *Biomass burning plants*

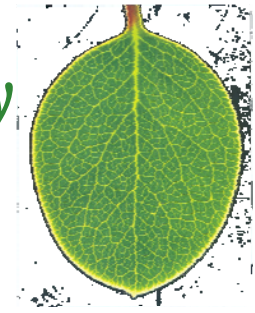
- *Silvicultural and woodworking waste*
- *Secondary products and wastes of traditional agricultural corps*
- *Cultivated plants with the aim of energetic*
- *Secondary biomass*
- *biogas*



Wind power plants	Capacity (kW)	Date of commissioning	Produced electricity (kWh)	Avoided emissions		
				CO ₂ (t)	NO _x (kg)	SO _x (kg)
Inota power plant	250	2000	1013840	983,4	740	1500
Kulcs power plant	600	2001	3858456	3693	2779	5635
Monosszolnoki power plant	2x600	2002.12.20-2004.12.31.	1894720 (hours run:12494) 1912730 (hours run :12312)	3693	2779	5635
Mosonmagyaróvári power plant	2x600	2003.07.01-2004..12.3	1448234 (hours run:10629) 1456215 (hours run:10699)	2817	2120	4299



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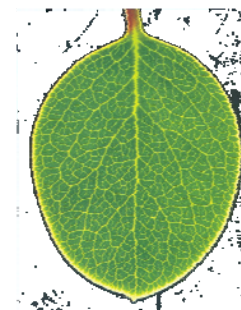


NEXT STEPS

- *Parameters and trends of Hungarian energy-sector*
- *input – output analyses of energy production*
- *Developing normalization data regarding to energy sector*

- *Parameters and trends of waste management*
- *Waste management systems and specific processes*
- *Creating normalization data regarding to waste-management sector*

- *Life cycle assessment for energy and waste systems*
- *Web development, software development*



Thank you for your attention!

