International Conference on Smart Energy Systems and 4th Generation District Heating
Copenhagen, 25-26 August 2015

Is there room for renewables in 2030?

– analysing the effects of a new nuclear power plant in Hungary

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Introduction – Hungarian energy mix

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30 TWh prod. + 12 TWh imp. = 42 TWh total supply

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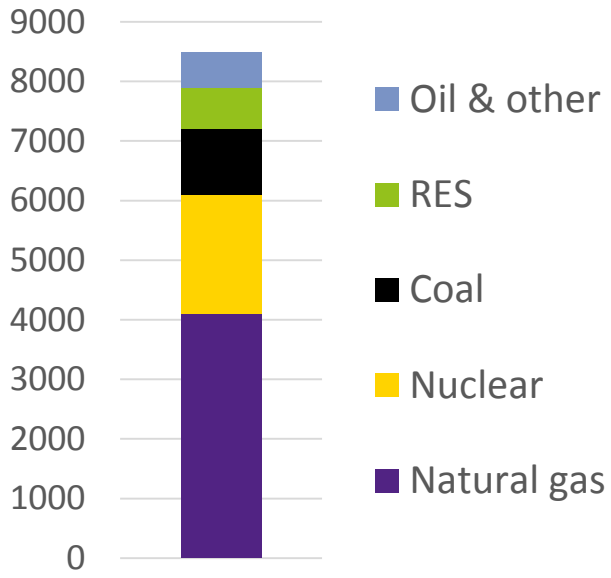
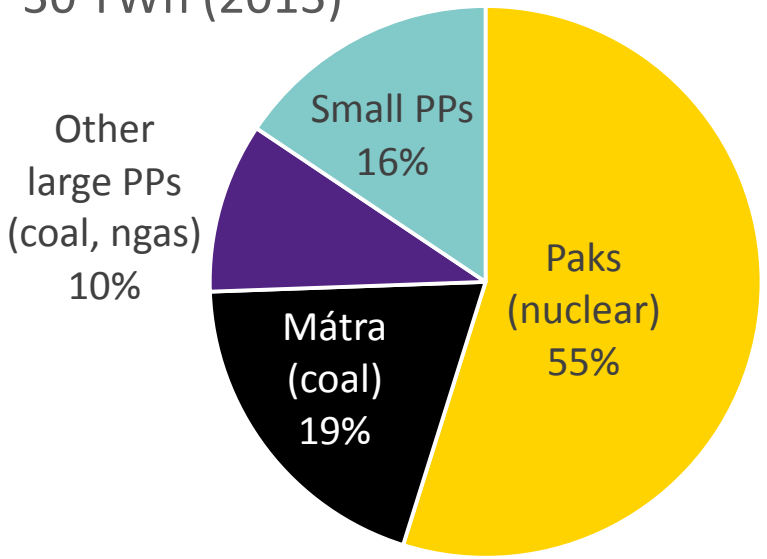
PP capacities



Gross electricity production

30 TWh (2013)



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About the Paks II project

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- **14-01-2014: Rosatom builds new nuclear PP in Paks**
- **2400 MW, 12,5 billion EUR (10 bill EUR Russian loan)**
- **No tender, no background analyses available, contracts are secret for 30 years**
- **Economics: not feasible (Romhányi 2014, Felsmann 2015)**
- **Fixing centralised system, hindering RES and EE?**
- **Between 2026-2032 4400 MW nuclear capacity working together (Paks I + Paks II)**

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ENERGIAKLUB's Energy Vision

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- **Decentralised energy system, small-scaled units**
- **Use of local renewable energy sources**
- **Sufficiency and Efficiency are fundamental aims**
- **Opportunity for community energy production**
- **Provide complex solutions through local economical and societal benefits**

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Modelling with EnergyPLAN

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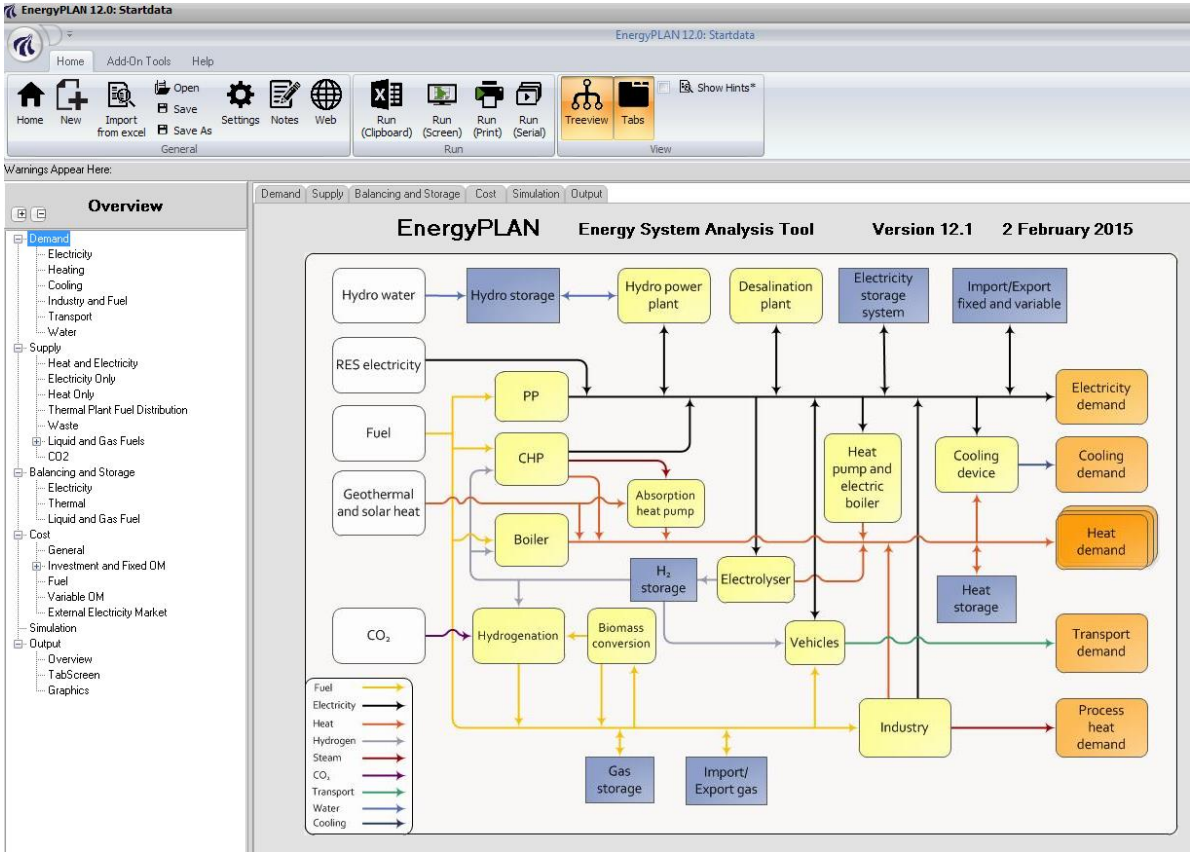

EnergyPLAN
Advanced energy system analysis computer model

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3 models compared

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		EK2030	MAVIR	HYBRID
Nuclear capacity	MW	2 000	4 400	4 400
Wind	MW	2 800	850	2 800
Solar	MW	1 400	90	1 400
New peak PP	MW	500	1200	1200
Total capacity	**MW**	**12 008**	**10 840**	**14 100**
Electricity demand	TWh	47,1	47,1	47,1

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Main results

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		EK2030	MAVIR	HYBRID
Fuel Total	TWh	252,18	272,91	268,67
RES PES share	%	13,40	6,90	8,60
RES electr. share	%	27,10	10,30	22,20
Import	TWh	0,47	0	0
Export	TWh	0,02	0,53	2,35
CO_2 corr.	Mt	40,79	35,2	31,68

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CEEP analysis

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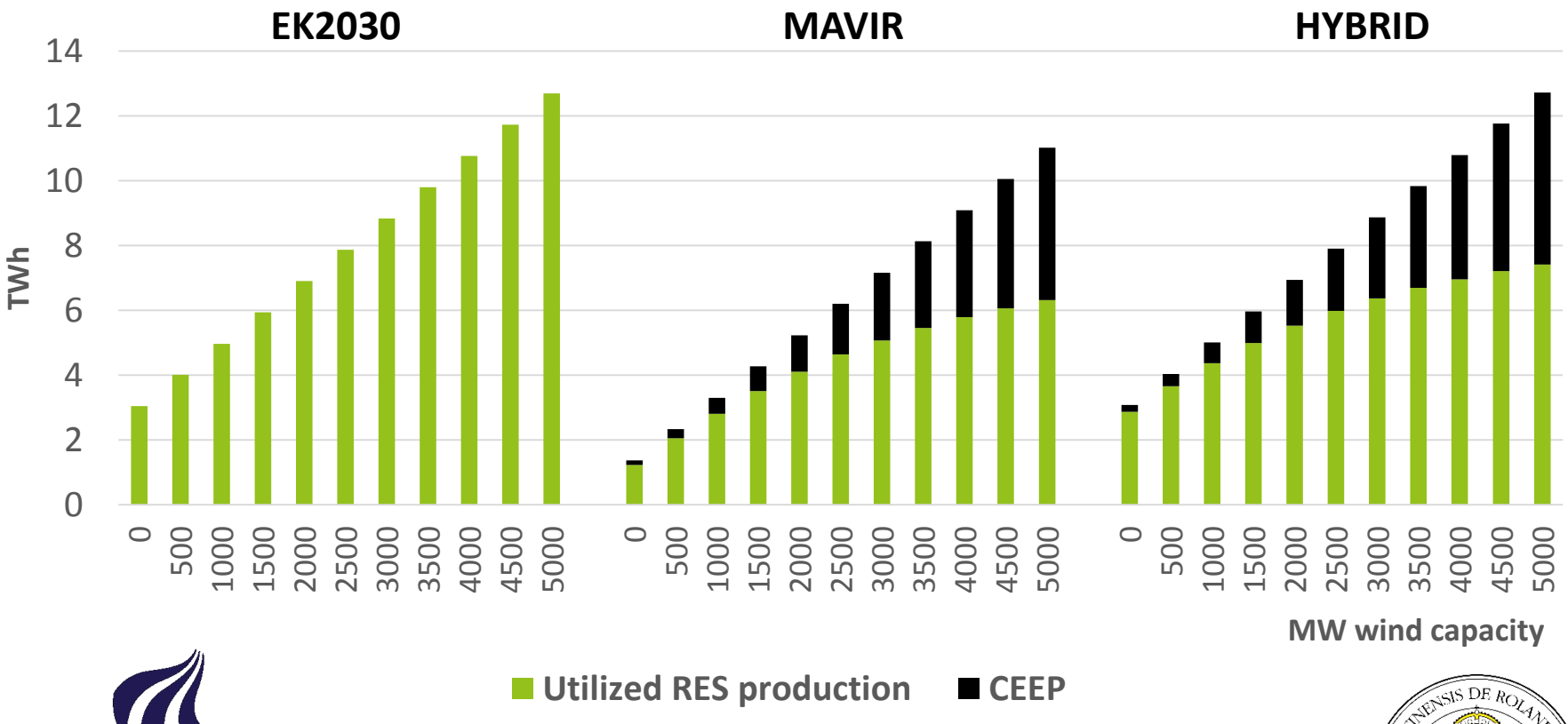
CEEP as part of RES production



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What happens in details?

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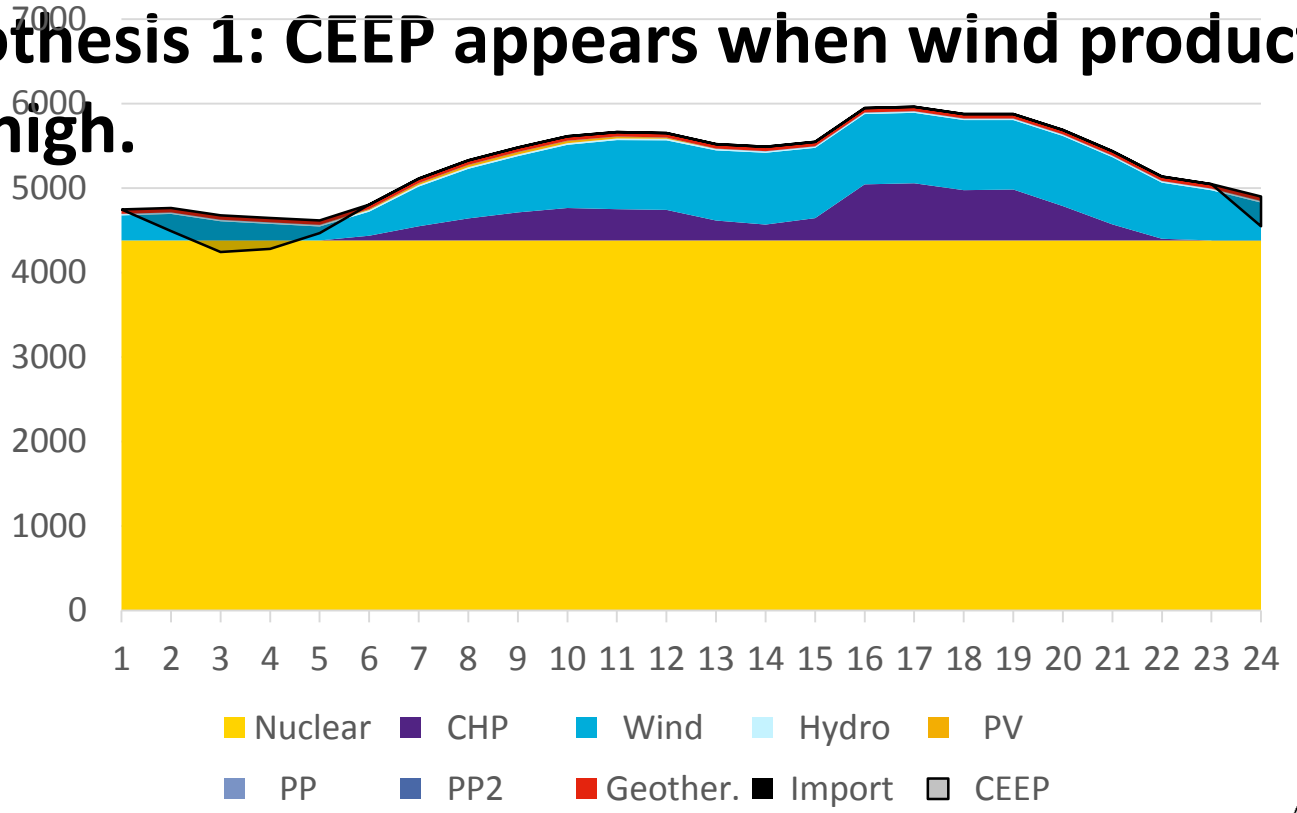
MAVIR at maximum wind power production

Hypothesis 1: CEEP appears when wind production is high.



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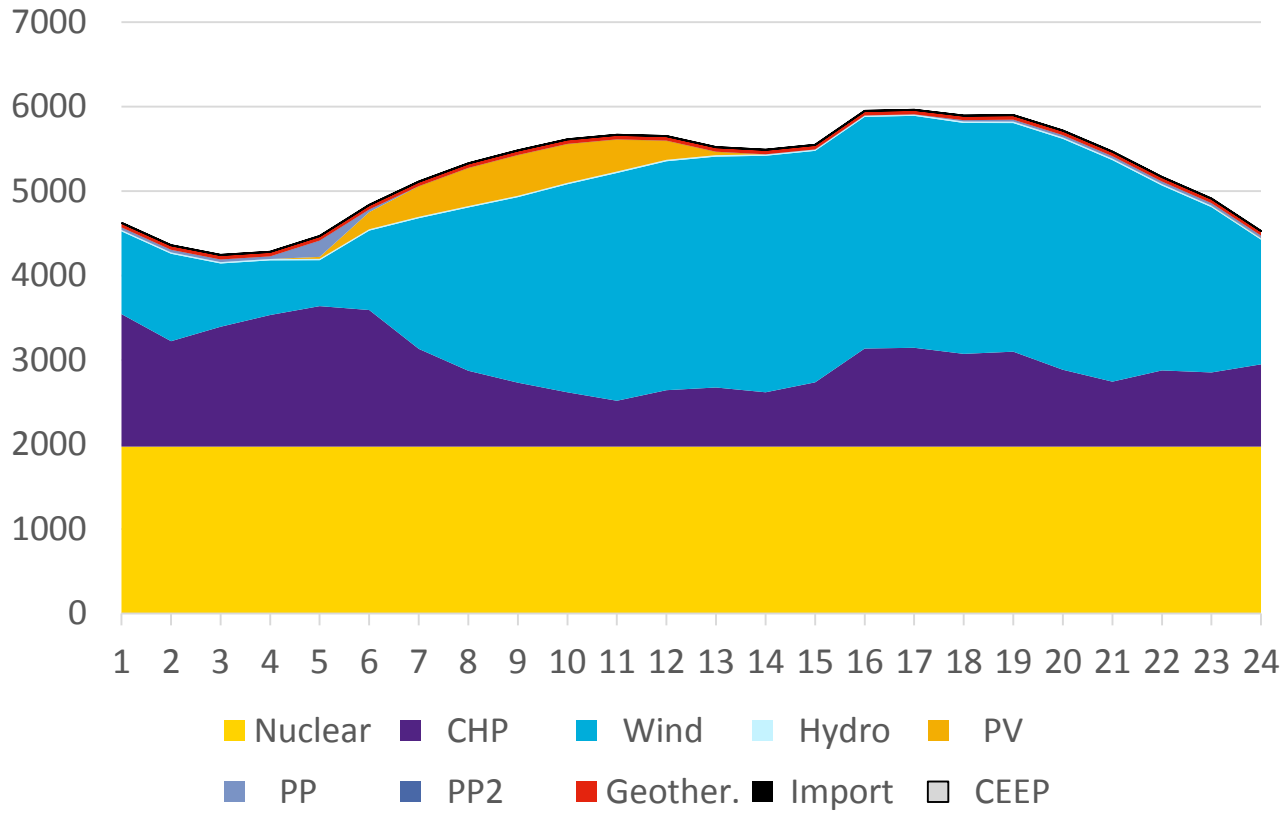
EK2030 at maximum wind power production



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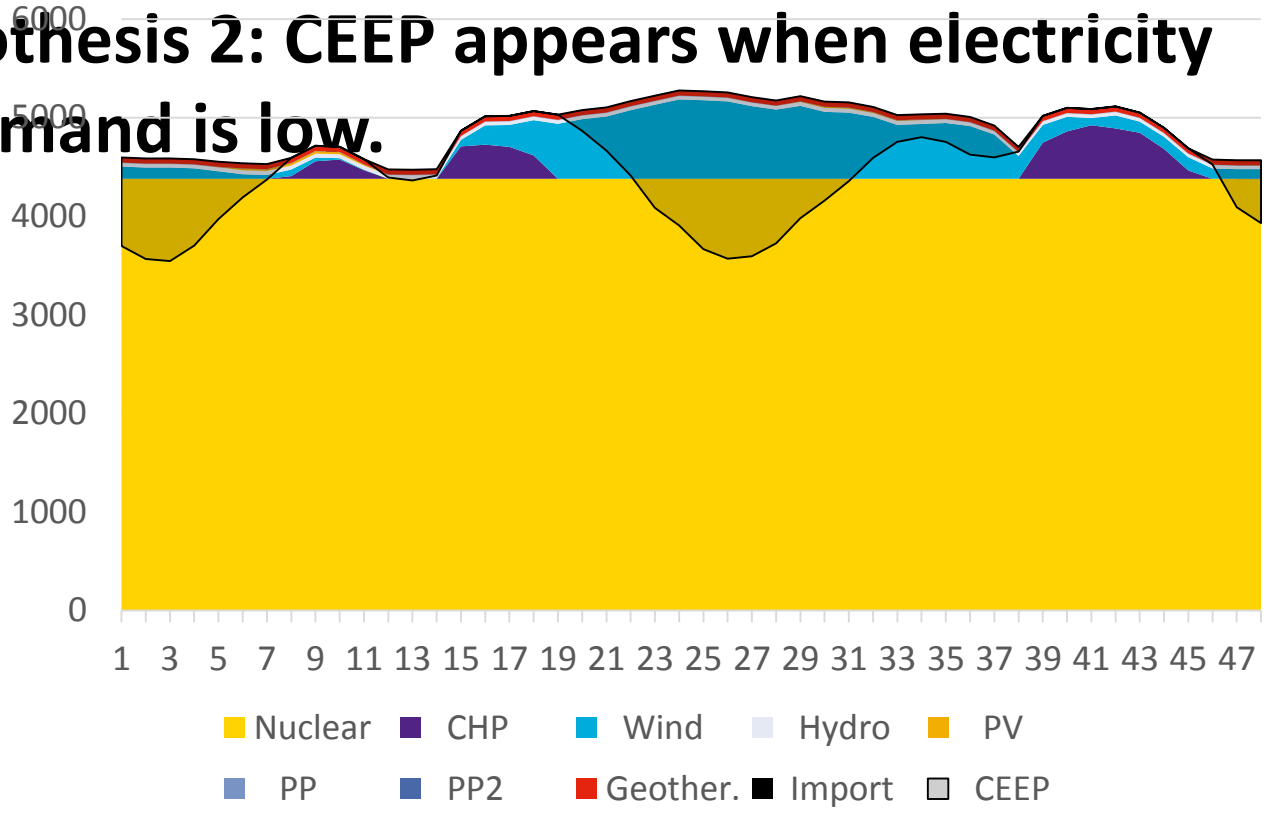
MAVIR at maximum CEEP

Hypothesis 2: CEEP appears when electricity demand is low.



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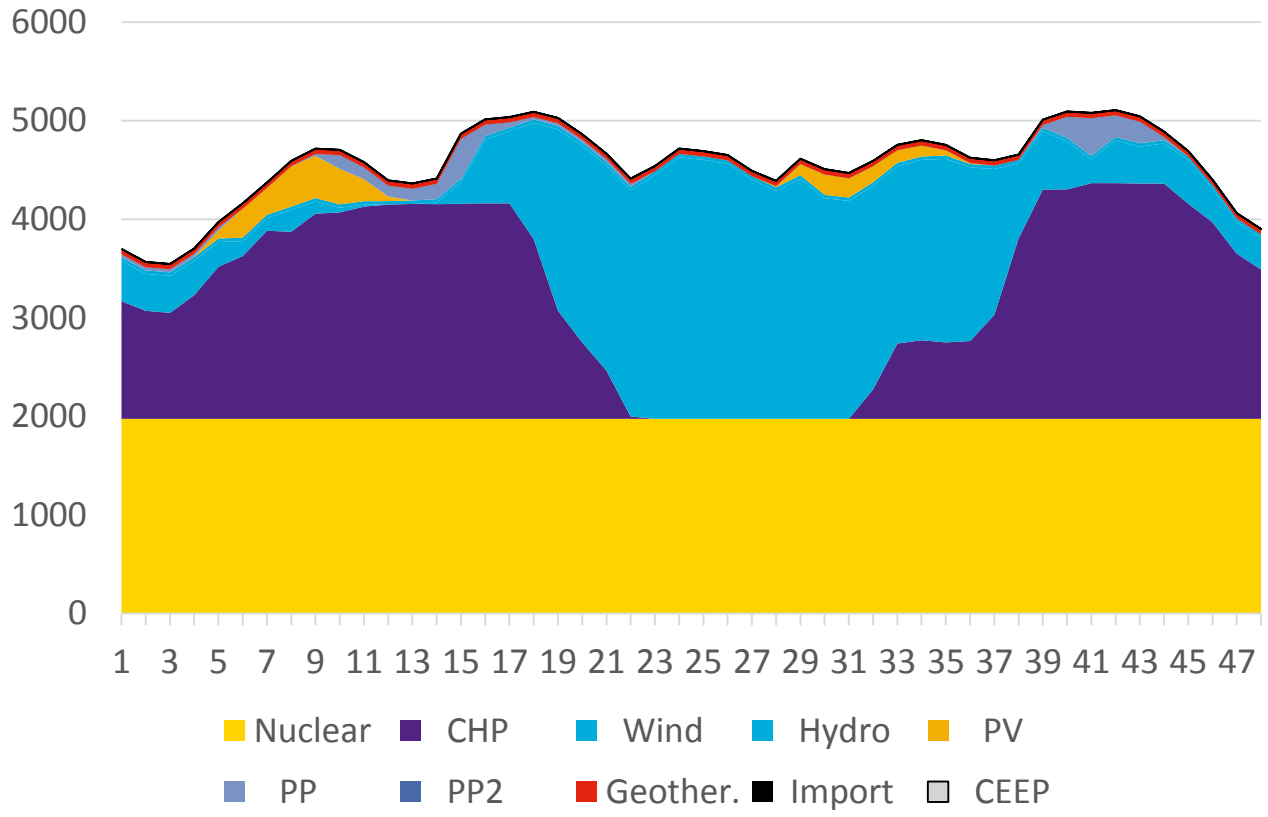
EK2030 at the same period (max. CEEP)



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Possible solutions – 3+1 ways

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A. **Regulation of CHP, PP and PP2 (current)**
   Problem: shutting down power plants
B. **Regulation of nuclear power plant**
   Problem: not feasible investment
C. **Regulation of RES**
   Problem: answers our main question
D. **Export excess electricity**
   Problem: there is night at neighbours as well

Conclusions

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- **The new nuclear power plant is too large for the current/future Hungarian energy system**
- **The regulation method of the energy system is unknown for 6 years – not only renewable energy production, but all power plants are endangered**
- **Utilization of local energy sources, renewables, energy efficiency investments etc. will be hindered for 60-80 years**

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THANK YOU FOR YOUR ATTENTION!

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