Perspectives of Wind Energy in the Danube Region

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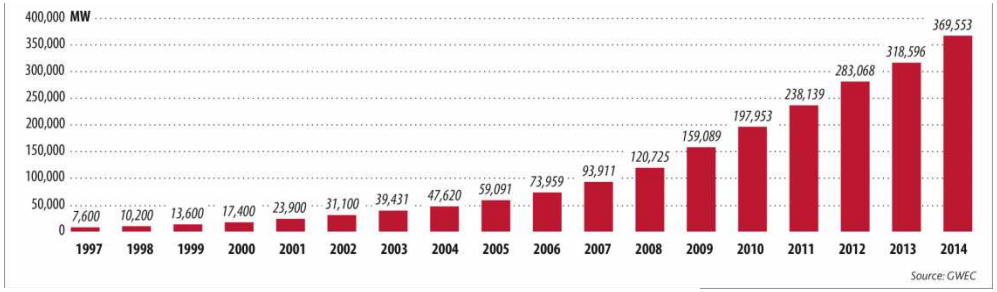
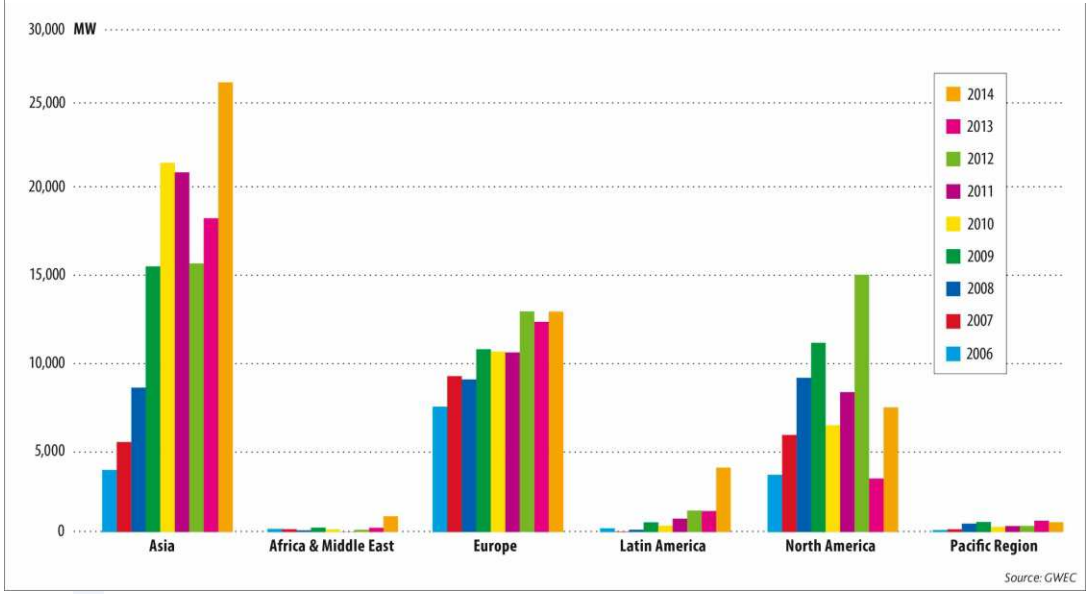
Alapítva: 1870

GWEC statistics 2014

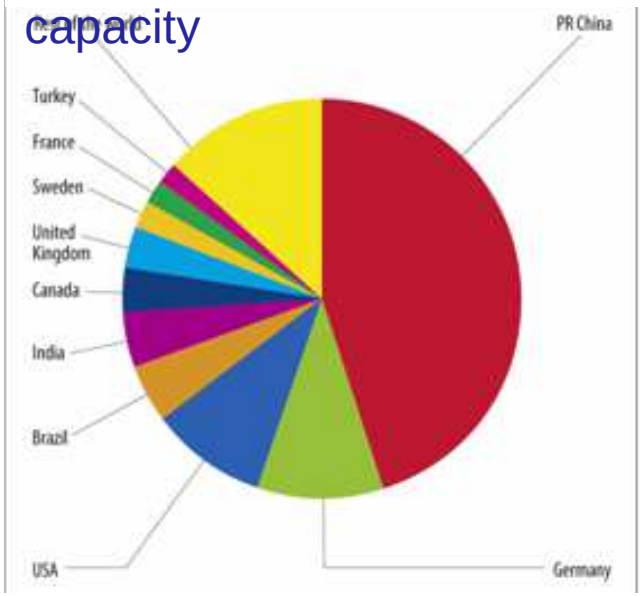
Global cummulative installed wind capacity



Annual installed capacity by region (2005-2013)

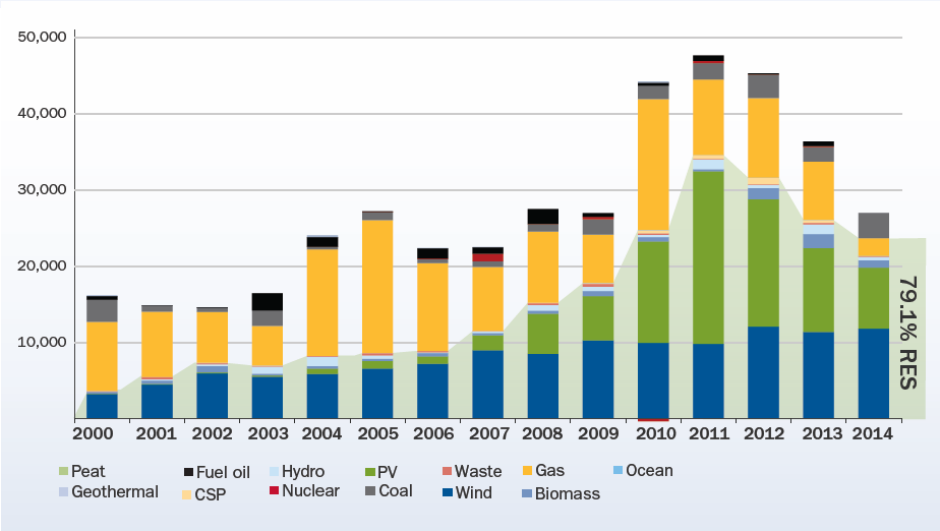


Top ten new installed capacity

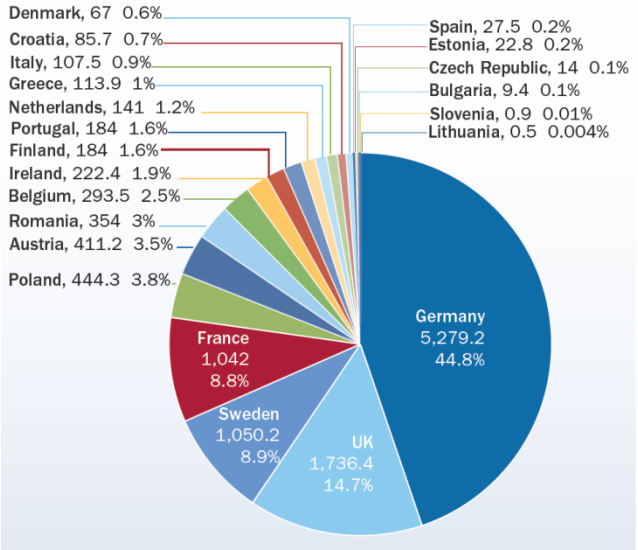


Annual market grows by 44%, passes 50 GW for the first time in 2014

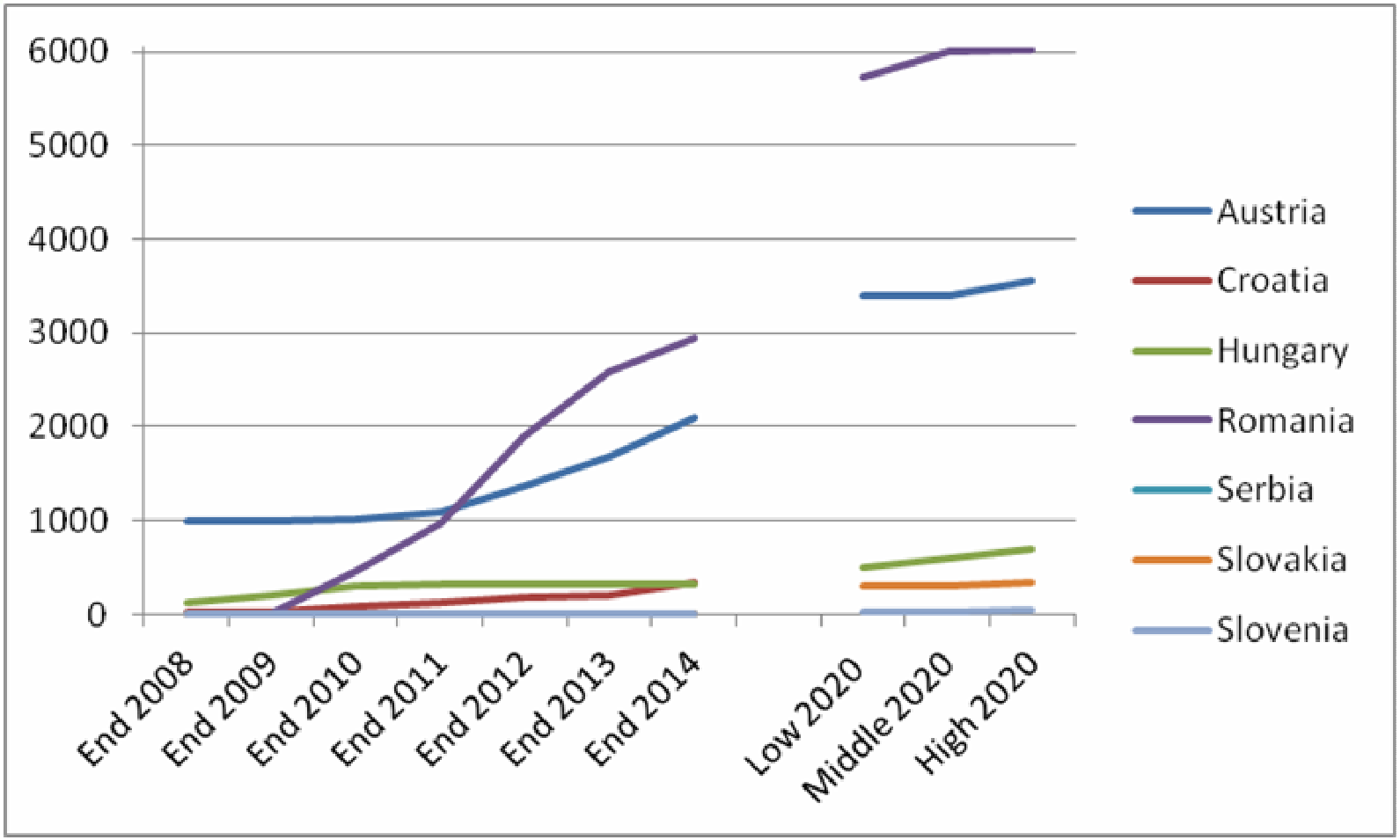
EWEA statistics 2014



Installed power capacity per year (MW) and renewable share (%)



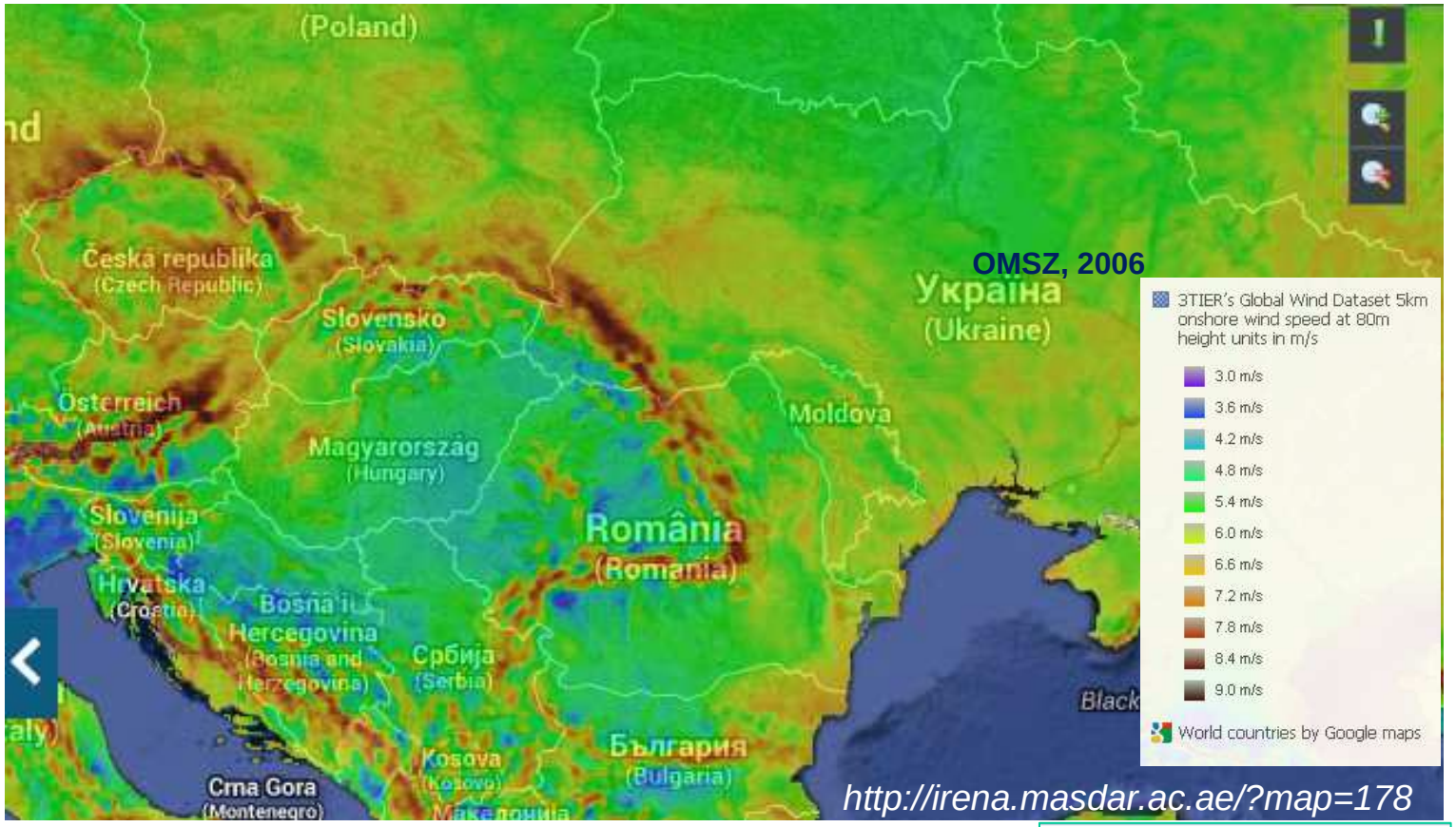
Status and scenarios for Danube Region



Based on EWEA data

Potential in Danube Region

Wind speed at 80 m



Large potential: mountains, sea
Small or moderate potential: valley, shadow

IRENA
International Renewable Energy Agency

Wind energy potential of Hungary

Restricted area: 65,3% (60758km^2)

H=75m (D=75m)

ΣE=56,85TWh/year=204PJ/year,

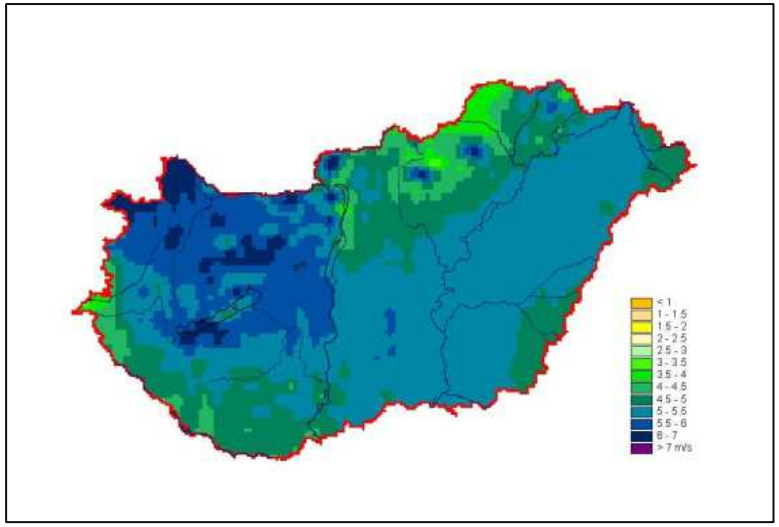
P=6489 MW

H=**100m** (D=100m) :

ΣE=77,6TWh/év=**279,4 PJ/year**

P =**8856 MW**

NKFP-3A/0038/2002-2005



4,5% of Hungary (windiest area, v_{100m}> 6 m/s) would be enough to cover the half of the energy demand of the country.

Source: M. Hunyar, K. Veszpremi, G.Szepszo, 2006

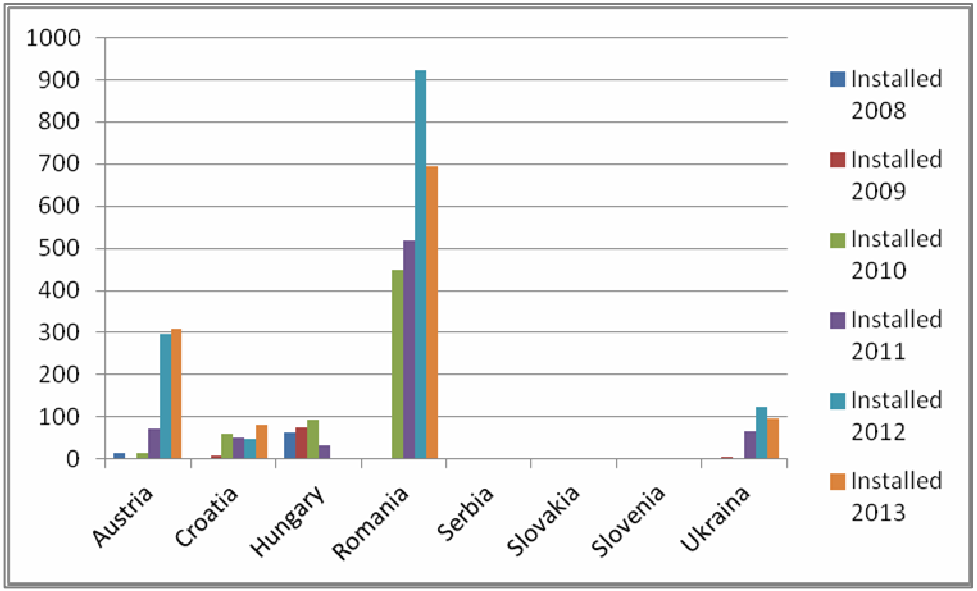
Nándor Csikós, Péter Szilassy: Optimalisation of the wind farm location planning with GIS based on Hungarian case study area (Csongrád county)

Béla Munkácsy, Ádám Harmat, Dániel Meleg: The limits of wind energy in Hungary – The geographical aspects

Conclusions of preliminary Conference

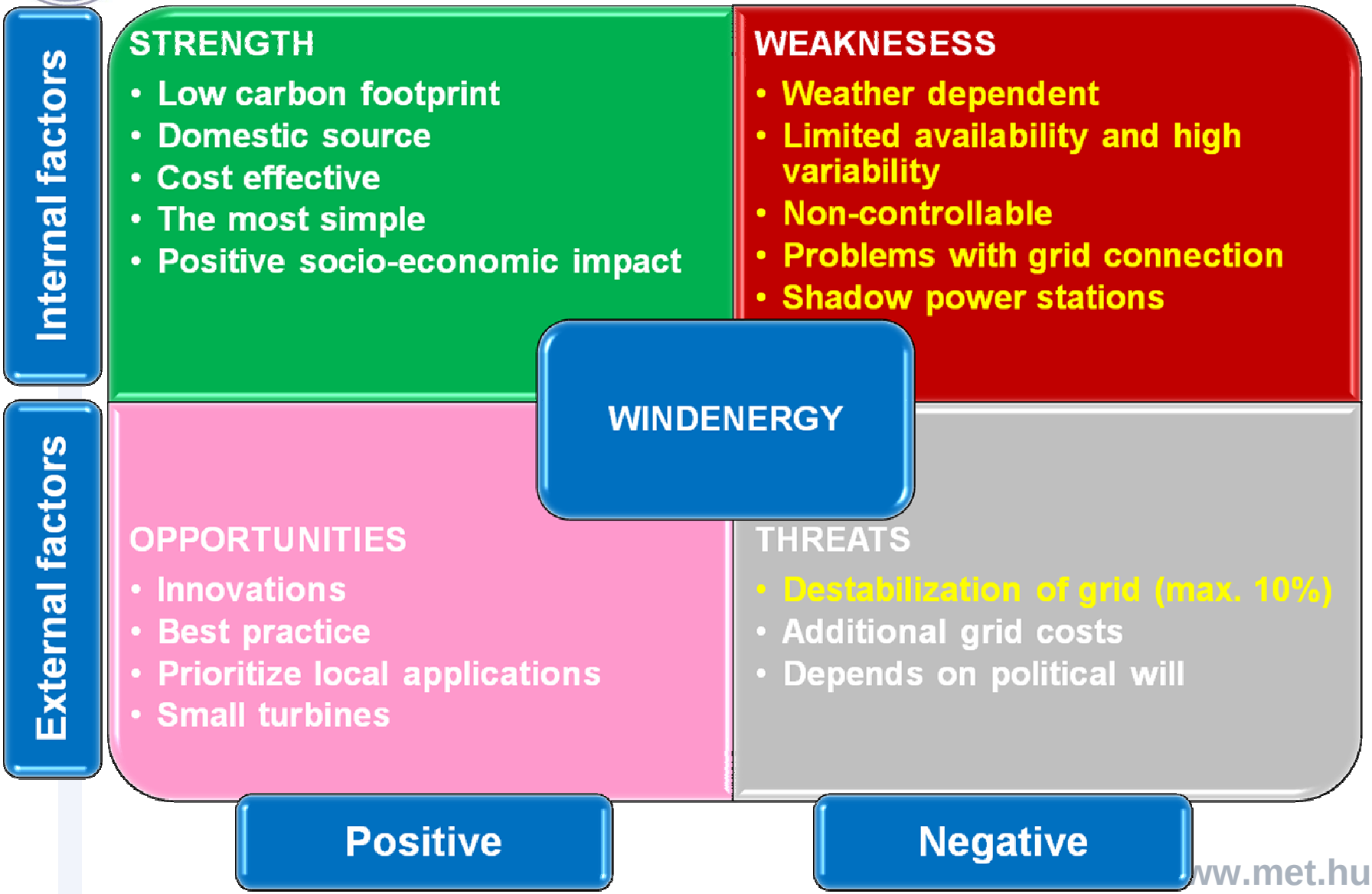
Perspectives of renewable Energy in Danube Region
26 September, 2014, Pécs

	Potential	Support	Problem
Romania	good	good	Grid integration
Croatia	good	at beginning	Grid integration
Hungary	poor	only for small turbines (<50 kW)	Grid integration



Based on EWEA data

SWOT in European Countries



Key problems

„Wind power prediction is a critical component of grid and system control” (e.g. Denmark, Germany, Spain, UK…)

Inteligent integration of wind power

into the existing electricity supply

Purposes: max revenue and system stability with min. penalty

Short term prediction of wind turbine power outputs

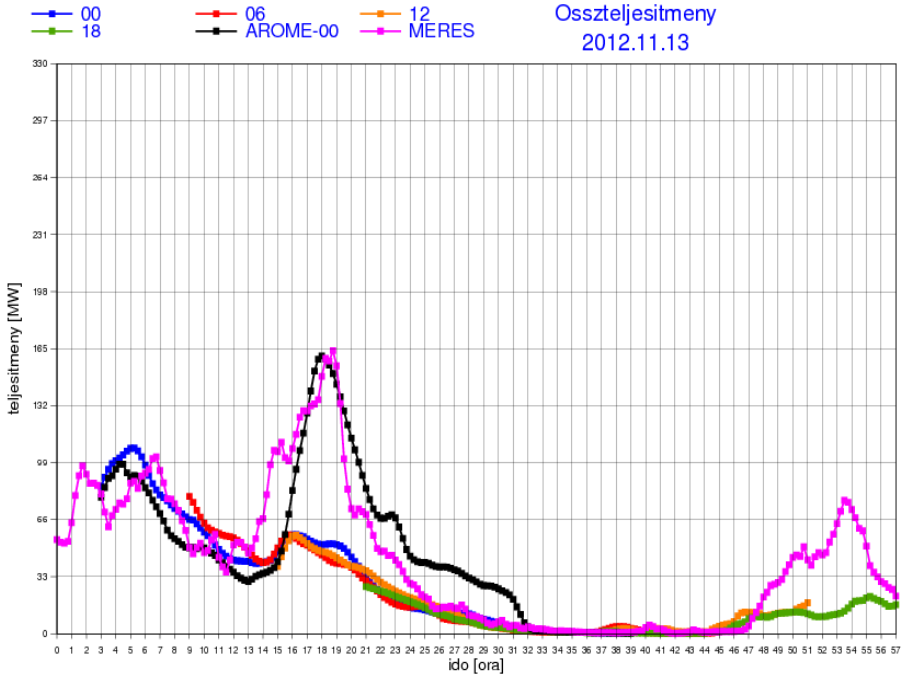
48 hours ahead (15 min, hourly) is essential

Source: G.K.Venayagamoorthy, K. Rohring, I. Erlich, 2012

Károly Tar: Statistical estimation of next day’s average wind speed and wind power

Wind forecast with numerical models

Modell	Grid (km)	Number of vertical layers
ALADIN	8	49
ALADIN –DADA	5	49
AROME	2.5	60

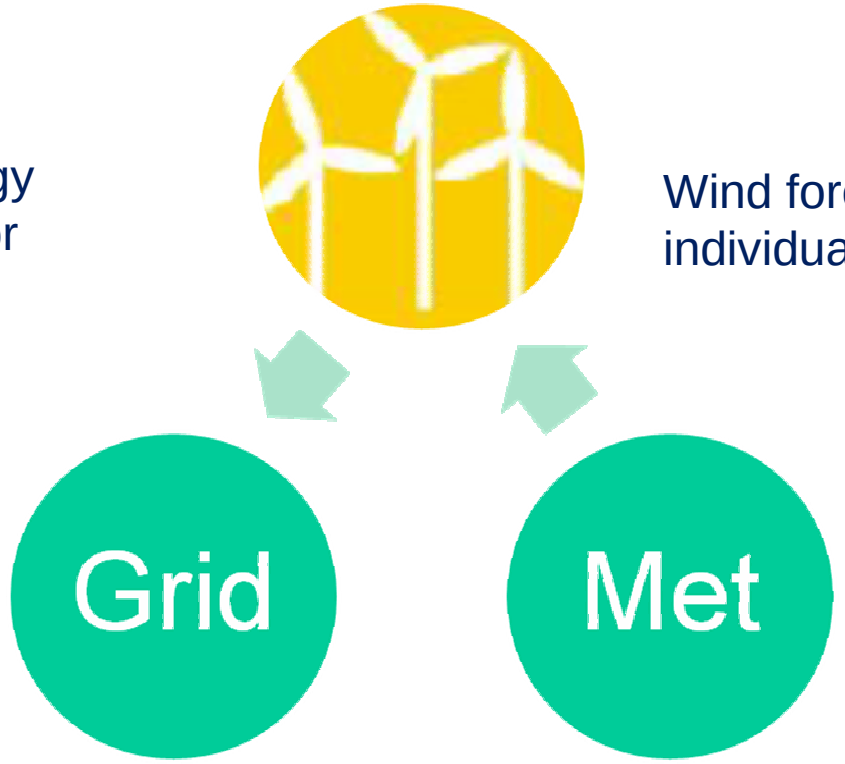


Improvements (2013): cross-validation, linear regression, Kalman Filter, etc.

Gap for R&D

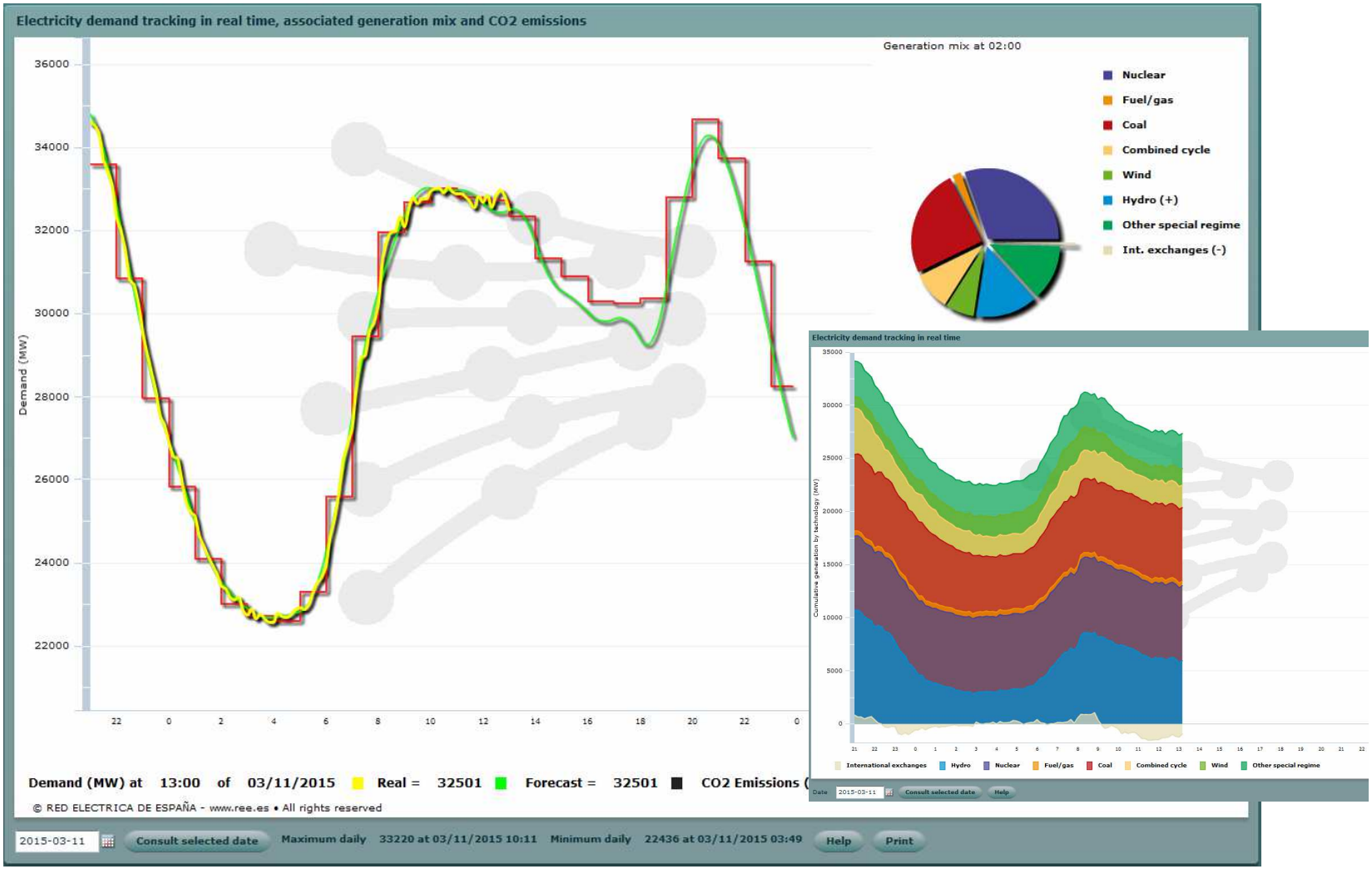
Improve methods for balancing supply and demands
on country/ regional level

Windenergy
forecast for
time table
(KÁT)



Wind forecast for
individual wind powers

Best practices



https://demanda.ree.es/demandaEng.html

Thank you for your attention!

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