



# *Introduction to the Danube Smart Grid Initiative*

*Regional Workshop on Smart Grid Deployment in the Danube Region  
Brussels, 18<sup>th</sup> November 2013*

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# Overview of the presentation

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- ▶ Aim of the Danube Region Smart Grid project
- ▶ Current state-of-affairs in the DR regarding smart grid and metering deployment
- ▶ Potential drivers of smart grid and metering deployment
- ▶ The role of the regulator

# Aims of the Danube Region Smart Grid project

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- ▶ Assess the current state-of-affairs regarding the deployment of smart grids and smart meters
- ▶ Identify potential drivers of future deployment
- ▶ Initiate discussion among the policy makers, regulators, research organisations, DSOs and TSOs of the respective countries
- ▶ Identify common problems and best practices
- ▶ Identify innovative regulatory practices to incentivise DSOs to invest in smart grid solutions
- ▶ Identify issues of future cooperation

# Method

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- ▶ State-of-affairs regarding the deployment of smart grids and smart meters in Hungary: national roundtable (Budapest, February 2013)
- ▶ Questionnaire survey (so far 9 countries covered from the 14)
- ▶ Brussels stakeholder workshop (Nov. 2013)
- ▶ Scoping report to be published by the end of 2013

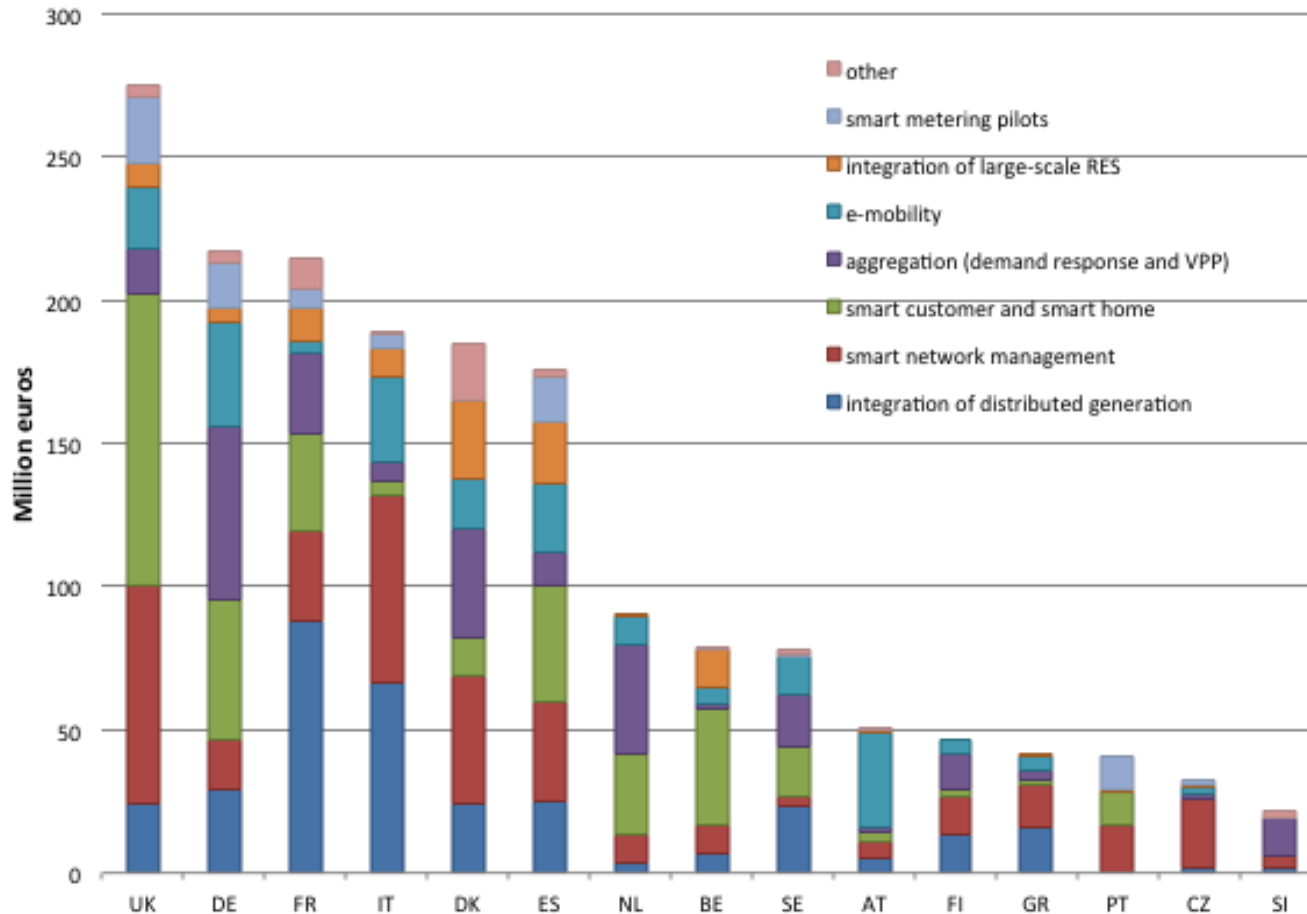
# Policy goals, smart grid solutions, PIs

General policy goal	Means	Solutions offered by smart networks	Performance indicators
Competitive retail electricity markets	retail competition	smart meters	<ul style="list-style-type: none"> <li>supplier switching rate</li> </ul>
	innovative end customer tariffs	smart meters	<ul style="list-style-type: none"> <li>existence of ToU tariffs and power quality differentiated tariffs</li> </ul>
Sustainability	energy efficiency	smart meters	<ul style="list-style-type: none"> <li>current level of energy intensity</li> </ul>
	electric vehicles (EV)	recharging infrastructure	<ul style="list-style-type: none"> <li>share of EVs</li> <li>number of public recharging stations</li> </ul>
	DG/RES-E	active distribution network, storage	<ul style="list-style-type: none"> <li>future RES-E production</li> <li>future intermittent RES-E capacity</li> </ul>
Security	generation adequacy	demand response	<ul style="list-style-type: none"> <li>peak shaving potential</li> <li>electricity demand forecast</li> <li>RC-ARM</li> <li>network loss</li> </ul>
		smart electrical appliances	
		DG-load profile harmonisation	
	storage		
secure grid operation	automatic fault detection	<ul style="list-style-type: none"> <li>SAIDI, SAIFI</li> <li>voltage quality</li> </ul>	
	voltage control		
Additional services	pre-payment option	smart meters	<ul style="list-style-type: none"> <li>network loss</li> <li>commercial loss</li> <li>pay-as-you service</li> </ul>
	theft detection		
	remote metering		
	remote (dis)connection		

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# Current state-of-affairs in the DR regarding smart grid and metering deployment

# SG investment in Europe



Cumulated smart grid investments by application type until 2012

Source: JRC

SG investment is concentrated in a few countries many of them with large RES-E capacities.

# SG investment in the DR countries, mEUR

	integration of distributed generation	smart network management	smart customer and smart home	aggregation (demand response and VPP)	e-mobility	integration of large-scale RES	smart metering pilots	other	sum
DE	29	17	48	60	36	5	15	3	216
AT	5	6	2	1	33	0	0	1	51
CZ	1	23	0	1	2	1	1	0	32
SI	1	4	0	13	0	0	0	3	21
HU	0	4	0	0	4	0	0	0	10
SK	0	0	0	0	0	0	0	5	5
RO	0	0	0	1	0	0	0	0	1
<b>Total</b>	<b>36</b>	<b>54</b>	<b>50</b>	<b>76</b>	<b>75</b>	<b>6</b>	<b>16</b>	<b>12</b>	<b>336</b>

Cumulated smart grid investments by application type until 2012

Source: JRC



# Smart grid roadmaps in Europe: government and industry-led initiatives

Country	Year	Responsible	Stakeholders involved
Austria	2010	National Technology Platform Smart Grids Austria	DSOs, energy suppliers and other members from the industry.
Germany	2012	German Association of Energy and Water Industries (BDEW); German Electric and Electronic Manufacturers' Association (ZVEI)	BDEW and ZVEI member companies
Slovenia	2012	consortium	DSOs, The University of Ljubljana and Electroinstitute Milna Vidmar: it has no official status.
Ireland	2011	Sustainable Energy Authority of Ireland	The Sustainable Energy Authority of Ireland; electricity regulator; electricity transmission system operator; electricity distribution system operator; Department of Energy, Communications and Natural Resources; Science Foundation of Ireland; Smart Grid Ireland (consumers)
Denmark	2010	Energynet.dk and Danish Energy Association	member companies of the Danish Energy Association
France	2009	French Environment and Energy Management Agency	TSO (RTE), the main DSO (ERDF, 95% of distribution networks), the association of distribution network owners (FNCCR), several French energy companies, experts from universities and ministries
UK	2009	Electricity Networks Strategy Group	a high-level forum which brings together key stakeholders in electricity networks and has been tasked by DECC and Ofgem to produce a high level smart grid vision and routemap

# Current state of affairs – smart grid policy in the DR

How would you characterise the current development phase regarding smart grid investments in your country?

	CZ	RO	SI	CR	BA	MD	AT	HU	ME
Leading role							✓		
Advanced role									
Average role									
At the beginning		✓	✓	✓	✓				✓
Not started yet	✓					✓		✓	

In which field – do you expect – the biggest SG investment need?

	CZ	RO	SI	CR	BA	MD	AT	HU	ME
distribution network (excluding SMs)		✓				✓	✓		
SMs	✓		✓	✓	✓			✓	✓
transmission network									

# Smart meters: current levels and rollout plans in the DR

What is the level of smart meter rollout as a % of all meters?

	CZ	RO	SI	CR	BA	MD	AT	HU	ME
0-10%	✓	✓		✓	✓	✓	✓	✓	
10-50%			✓						✓
50-90%									
90-100%									

	CZ	RO	SI	CR	BA	MD	AT	HU	UA	SR	ME	Source:
SM rollout plan		✓			✓		✓					survey
full rollout		2022										
interim target		80%/2020			70%/2020		95%/2019					
CBA prepared	✓	✓	✓				✓	✓		✗		Landscape report
CBA result	-	+	+				+	+				

Note: green = not applicable

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# Drivers of smart grid and metering deployment in the DR

# Drivers of smart grid deployment

What are the key benefits/services you associate with smart grid development in your country?

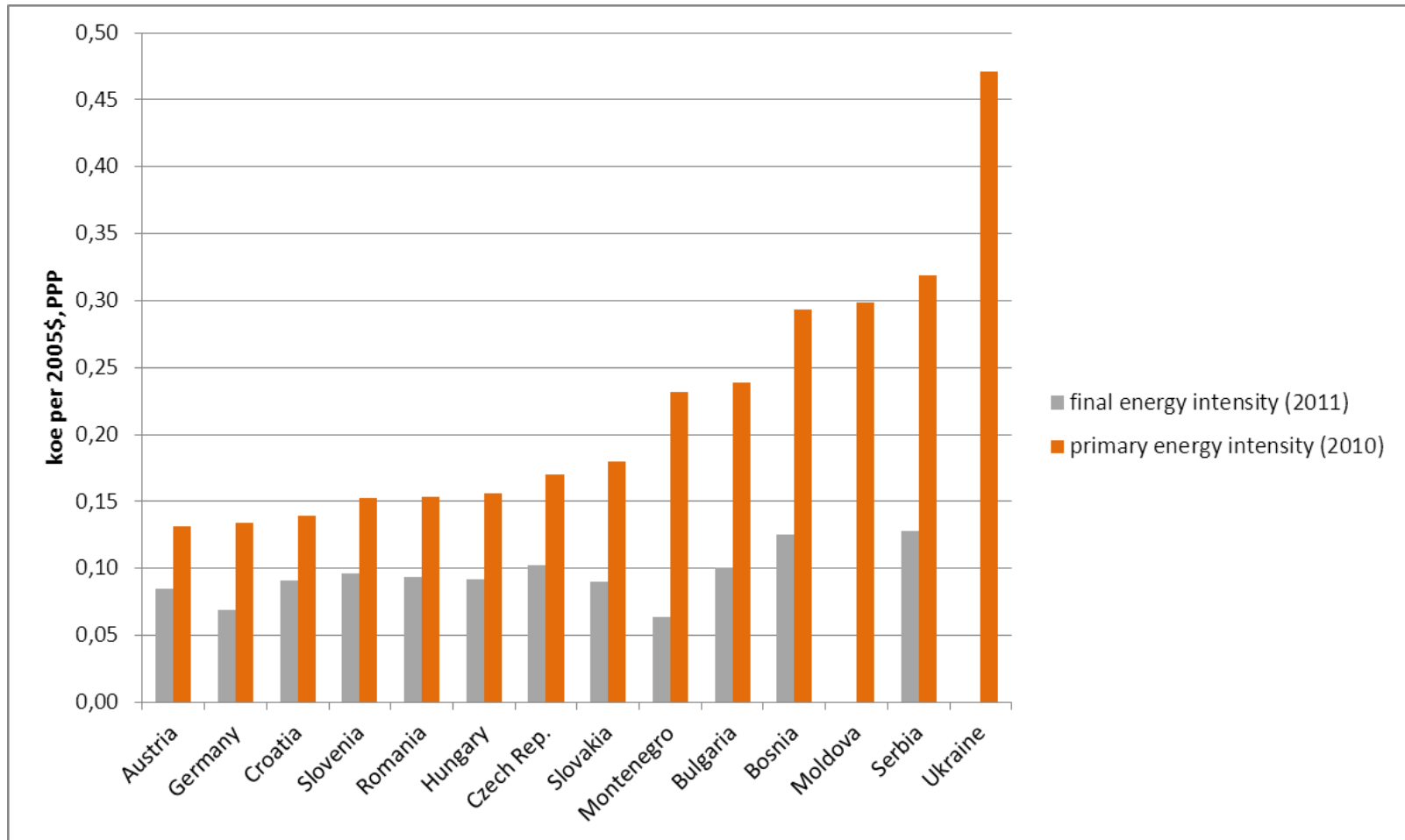
beneficiary		CZ	RO	SI	CR	BA	MD	AT	HU	ME
consumer	Active customers	✓		✓				✓	✓	✓
	Integration of all network users	✓					✓	✓		
	Enables markets	✓		✓				✓		
DSO	Power quality based market segmentation									
	Optimizes asset management	✓	✓	✓	✓	✓		✓		✓
	Self healing network	✓	✓		✓	✓			✓	
	Commercial loss reduction		✓			✓			✓	

- Benefits are country-specific
- DSO related issues seem to be equally important as the 20-20-20 target related ones

# Electricity demand forecast

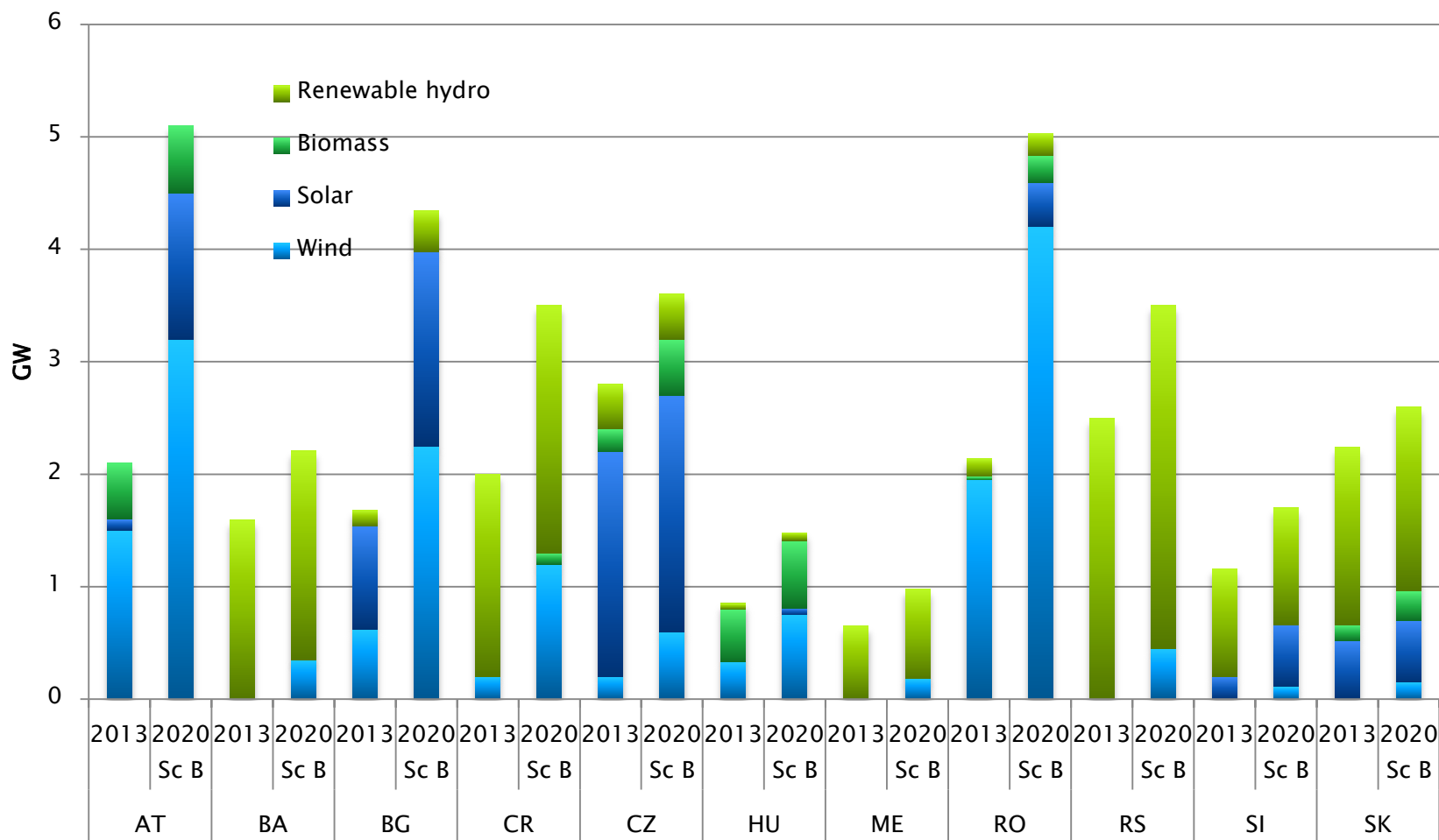
	2012/2020	rate of annual increase	source
AT	15%	1,9%	NREAP
BG	12%	1,5%	NREAP
CZ	17%	2,1%	NREAP
DE	1%	0,1%	NREAP
HU	15%	1,9%	NREAP
RO	27%	3,4%	NREAP
SR	15%	1,9%	NREAP
SI	9%	1,1%	NREAP
BA	34%	4,2%	Energy Community
CR	20%	2,5%	Energy Community
MD	39%	4,9%	Energy Community
ME	20%	2,6%	Energy Community
RS	6%	0,7%	NREAP, 2013
UA	38%	4,7%	Ministry of Energy and Coal Industry

# Energy efficiency potential: mainly in the SEE countries



Source: Enerdata, EIA

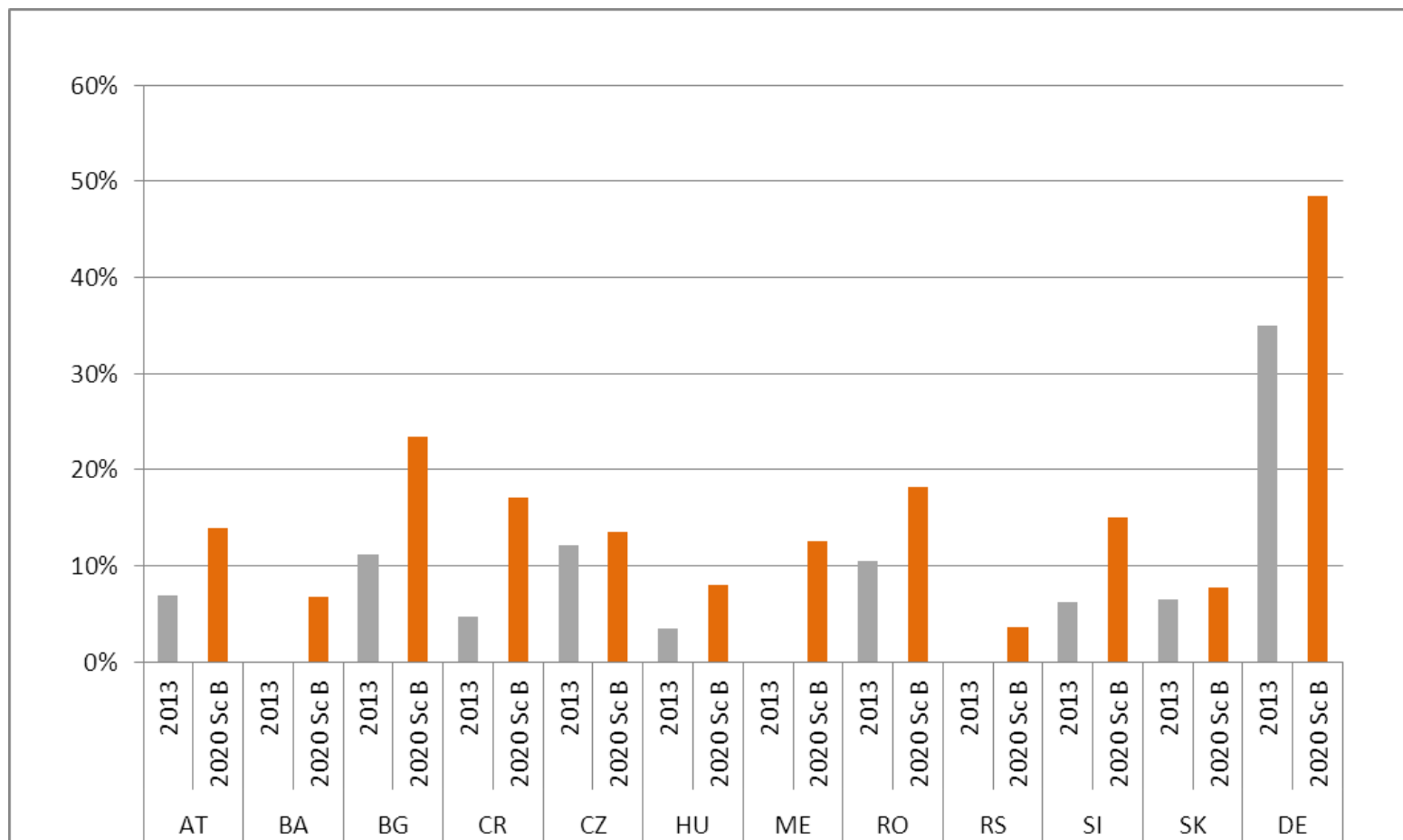
# RES-E capacity forecast (without large hydro)



Source: ENTSO-E



# The share of intermittent RES-E capacity in net generational capacity



Source: ENTSO-E

# RES-E curtailment and capacity limitations

RES-E curtailment is not common. On the other hand, most countries have set limits for new wind capacities. This limitation of capacities reduces the need for intermittent RES-E curtailment.

Does your country employ network capacity quota of any sort for intermittent RES-E generation?

	CZ	RO	SI	CR	BA	MD	AT	HU	ME
capacity quota		✓		✓	✓			✓	
MW (wind)		2500-3000		400	350			740	

*Note: green = not data*

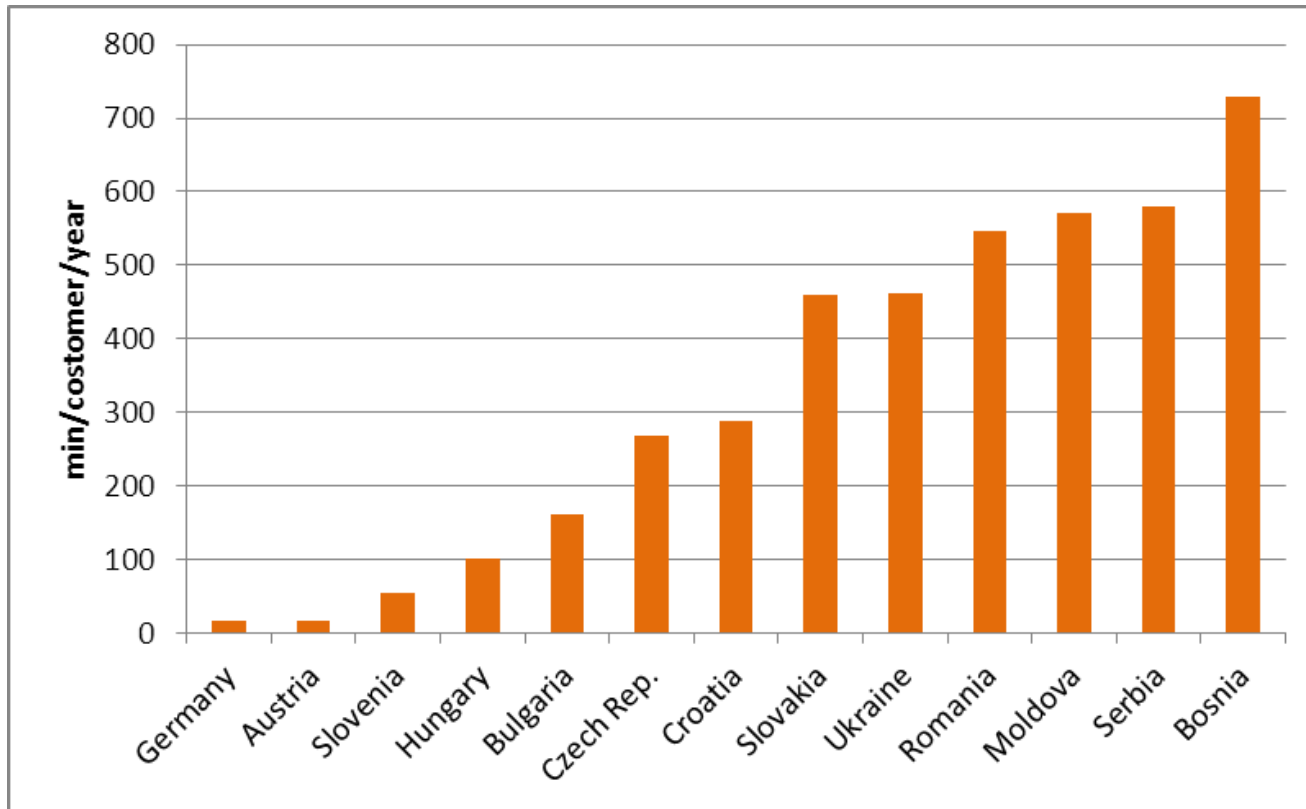
# Electric vehicles

- ▶ The share of EVs and plug-in hybrid electric vehicles (PHEVs) in the total light-duty vehicles (personal cars) is still negligible in the DR countries.
- ▶ The charging infrastructure is sparse.

How many public charging points are in operation?

	CZ	RO	SI	CR	BA	MD	AT	HU	ME
No of public charging points		-	50	4	-	-	3295	10	-

# Quality of supply: SAIDI values for unplanned interruptions



Note: SAIDI/SAIFI not measured yet in Montenegro

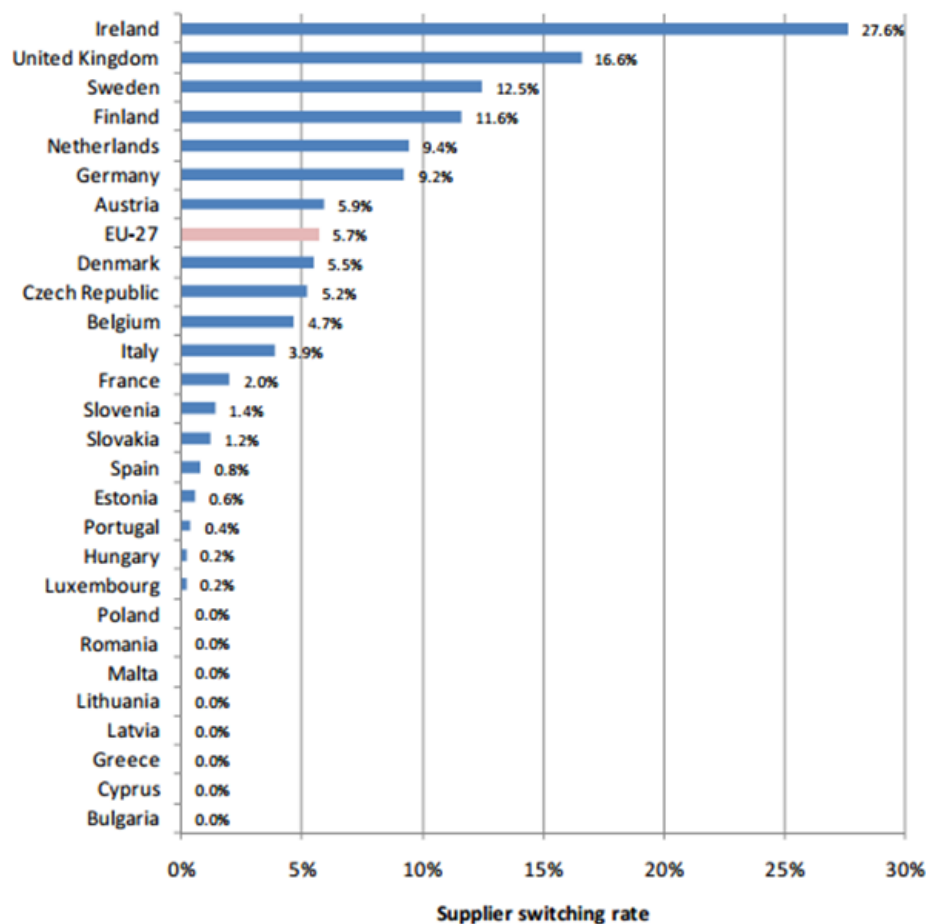
Source: CEER and national sources

# Retail competition: supplier switch

In the total consumer segment (2011 or 2012):

	CZ	RO	SI	CR	BA	MD	AT	HU	ME
%	DNK	1%	5%	1%	0%	0%	14%	13%	0%

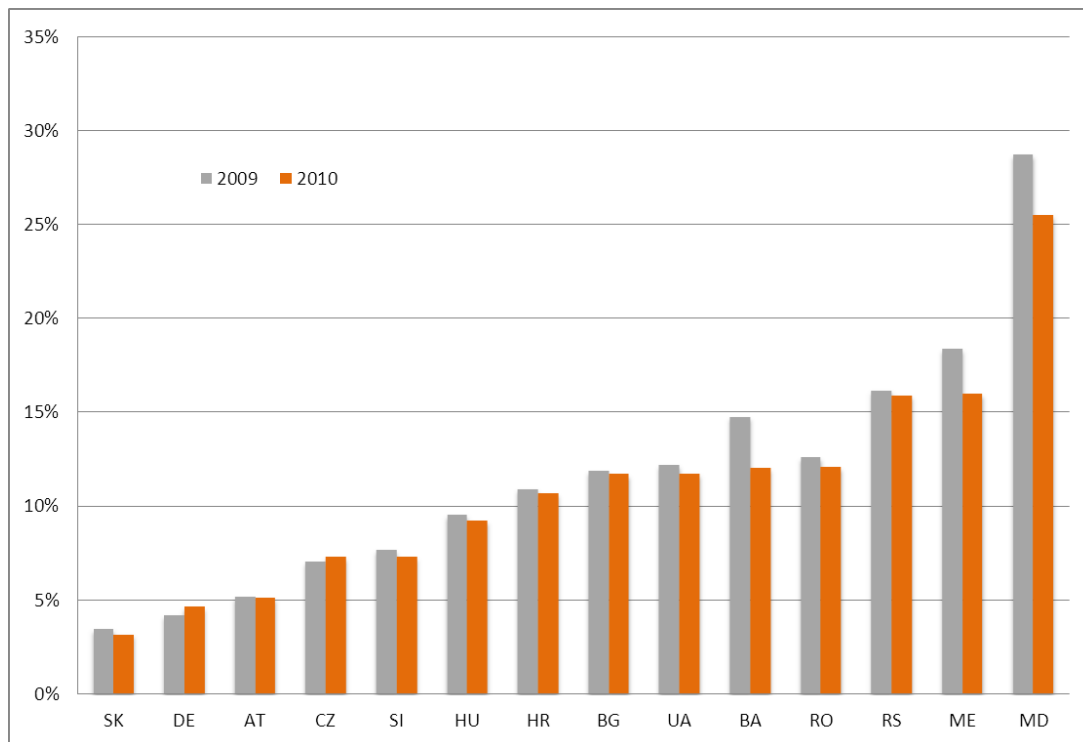
Among households  
(2010):



Source:ECME



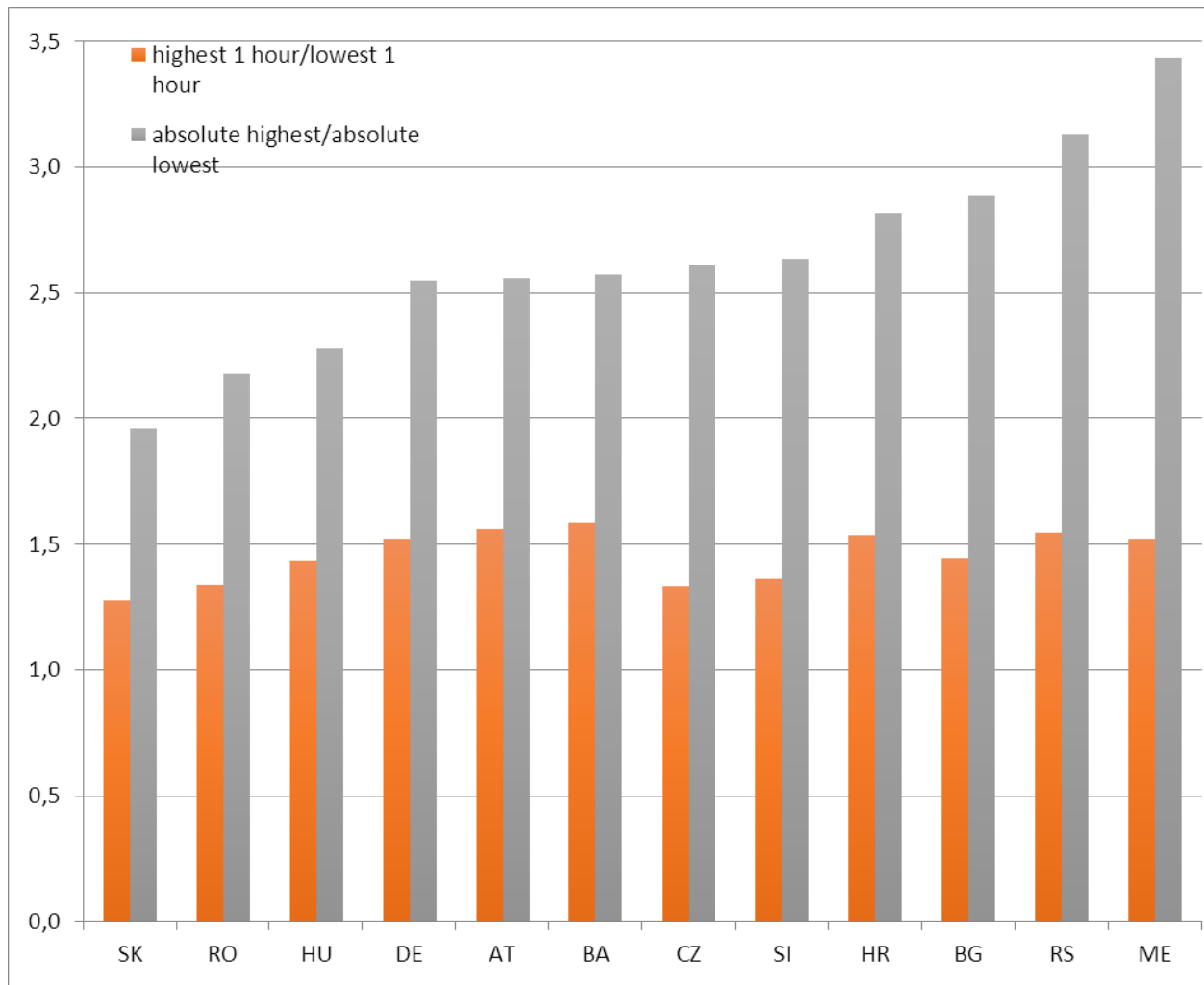
# Network loss and commercial loss



Source: IEA

	CZ	RO	SI	CR	BA	MD	AT	HU	ME
Is it a problem?					✓	✓		✓	✓
% of total distributed amount		7	2		7-14	11		5-8	13

# Potential for peak shaving



Source: ENTSO-E

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# Regulatory issues



# Regulatory barriers

What – do you think – are the barriers of smart grid deployment?

	CZ	RO	SI	CR	BA	MD	AT	HU	ME
High costs for SG infrastructure – questionable ROI				✓	✓			✓	✓
Inadequate incentives	✓	✓	✓		✓		✓	✓	
IT security		✓		✓					
Lack of regulatory polices	✓	✓	✓			✓			
Lack of public education and awareness	✓						✓		✓
Fear of change (Utilities/Customers)	✓	✓					✓		
Increase of workers lay off									
Immature technology									
Lack of technology standards	✓								

# Role of the regulator

	CZ	RO	SI	CR	BA	MD	AT	HU	ME
provide incentives for network operators to invest in innovative SG technologies		✓				✓			✓
changing balancing market rules for the better integration of intermittent RES-E production		✓		✓					
initiate stakeholder discussion to ignite national policy development		✓	✓		✓			✓	
provide regulator push for smart meter roll-out		✓							

# Potential drives behind smart grid deployment

	CZ	RO	SI	CR	BA	MD	AT	HU	ME
RES-E		✓	✓	✓	✓		✓	✓	✓
Electric vehicles									
Energy efficiency					✓	✓			✓
Peak shaving				✓					✓
Network loss		✓			✓	✓			✓
Supply quality		✓			✓	✓			✓
Commercial loss					✓	✓		✓	✓
Retail competition	✓	✓	✓	✓			✓	✓	

## Scope for future Danube Region assistance:

- Develop a SG regulatory guideline for the DR
- Promote regulatory cooperation in this field
- Promote the development of country level SG roadmaps
- Assist voluntary, sub-group level pilot initiatives
- ...



**Thank you for your  
attention!**

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# Main issues for discussion

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- ▶ How ambitious is your country regarding smart grid development?
  - Is it on the policy agenda?
  - Is it discussed with stakeholders?
- ▶ What are the drivers behind the ambitions?
  - Renewable integration?
  - Commercial loss?
  - Voltage problems?
  - ...
- ▶ What benefits are expected from such development? Are these alternative solutions? What are they?
- ▶ What are the barriers of smart grid development?
- ▶ Are there incentives in place?
- ▶ What is the role of regulators in this respect?
- ▶ What kind of cooperation among the DR region countries could move forward smart grid deployment in your country?