Smart Grid in the Danube Region Countries

An Assessment Report

Smart Grids Task Force, 18th SC meeting

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Overview of the presentation

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

Aims of the project

- 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

Methods

- State-of-affairs regarding the deployment of smart grids and smart meters in Hungary: national roundtable (Budapest, February 2013)
- Questionnaire (11 countries covered)
- Brussels stakeholder workshop (November 2013)
- Final report: www.danube-energy.eu

Policy goals, smart grid solutions, PI-s

General policy goal	Means	Solutions offered by smart networks	Performance indicators
Competitive retail electricity markets	retail competition	smart meters	• supplier switching rate
	innovative end customer tariffs	smart meters	• existence of ToU tariffs and power quality differentiated tariffs
Sustainability	energy efficiency	smart meters	• current level of energy intensity
	electric vehicles (EV)	recharging infrastructure	• share of EVs • number of public recharging stations
	DG/RES-E	active distribution network, storage	• future RES-E production • future intermittent RES-E capacity
Security	generation adequacy	demand response	• peak shaving potential • electricity demand forecast • RC-ARM • network loss
		smart electrical appliances	
		DG-load profile harmonisation	
		storage	
	secure grid operation	automatic fault detection	• SAIDI, SAIFI • voltage quality
		voltage control	
Additional services	pre-payment option	smart meters	• network loss • commercial loss • pay-as-you service
	theft detection		
	remote metering		
	remote (dis)connection		

Current state-of-affairs in the Danube Region 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
Total	**36**	**54**	**50**	**76**	**75**	**6**	**16**	**12**	**336**

Cumulated smart grid investments by application type until 2012

Source: JRC

Smart grid roadmaps in Europe: 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	UA	SR
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	UA	SR
distribution network (excluding SMs)		✓				✓	✓			✓	
SMs	✓		✓	✓	✓			✓	✓		✓
transmission network											

Smart meters: current levels and rollout plans

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

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

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

Note: green = not applicable

Drivers of smart grid and metering deployment in the Danube Region

Drivers of smart grid deployment

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

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

- Benefits are country-specific
- DSO related issues seems 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

Source: Enerdata, EIA

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 employs network capacity quota of any sort for intermittent RES-E generation?

	CZ	RO	SI	CR	BA	MD	AT	HU	UA	SR	ME
capacity quota		✓		✓	✓			✓		✓	
MW (wind)		2500-3000		400	350			740		500	

Note: green = no 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	UA	SR	ME
No of public charging points		-	50	4	-	-	3295	10	10	18	-

Note: green = no data

Quality of supply: SAIDI values for unplanned interruptions

Source: CEER and national sources

Note: SAIDI/SAIFI not measured yet in Montenegro

Retail competition: supplier switch

In the total consumer segment (2011 or 2012):

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

Note: green = no data

Among households (2010):

Source:ECME

Network loss and commercial loss

Source: IEA

	CZ	RO	SI	CR	BA	MD	AT	HU	UA	SR	ME
Is it a problem?					✓	✓		✓	✓		✓
% ot total distributed amount		7	2		7-14	11		5-8	11.8	2	13

Note: green = no data

Potential for peak shaving

Source: ENTSO-E, 2012 hourly data

Regulatory issues

Regulatory barriers

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

	CZ	RO	SI	CR	BA	MD	AT	HU	UA	SR	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	✓						✓		✓		

Roles of the regulator

	CZ	RO	SI	CR	BA	MD	AT	HU	UA	SR	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		✓					✓				

Note: green = no data

Potential drivers of 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	✓	✓	✓	✓			✓	✓	

Conclusions

- The DS region is very diverse regarding:
  - The current levels of policy development on smart grids and smart meters
  - National views on the potential benefits of future development
- Issues related to network management (supply quality and loss) are just as important as the connection of all users (especially RES-E) to the network
- The primary role of national regulators is the initiation of stakeholder discussion
- Major barriers identified:
  - High investment cost
  - Lack of regulatory policies, including the incentives for DSOs
- Need for capacity building and cooperation among interested companies and regulators

Thank you for your attention!

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