PANTERA project-A Pan European Technology Energy Research Approach towards synergies facilitation on smart grids

Status of smart grid evolution in the region that generate open R&I needs (Bulgaria/Romania/ Greece)

assoc. prof. Dr. Rad Stanev
rstanev@tu-sofia.bg

Content

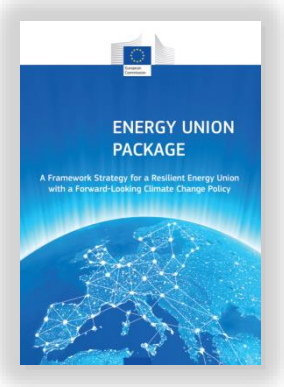
- Background
- Driving forces
- Smart grid projects outlook
- Targets and achievements
- Future challenges
- Conclusion

Background

- **(2008) SET Plan (binding)**
  - -20 % GHG Emissions*
  - 20% Renewable Energy
  - 20 % Energy Efficiency**

- **(2014) SET Plan : Towards an Integrated Roadmap (non binding)**
  - -40 % GHG Emissions*
  - 27% Renewable Energy
  - 27 % Energy Efficiency**
  - Individual technologies
  - Policy challenges
    - Energy efficiency (demand)
    - Consumer centric
    - System optimization

- **(2015) Energy Union – Priorities**
  - Low carbon society
  - Energy Security, Solidarity , Trust
  - Completely Integrated energy Market
  - Energy efficiency first: demand moderation



* Compared to 1990 ; ** compared to BAU

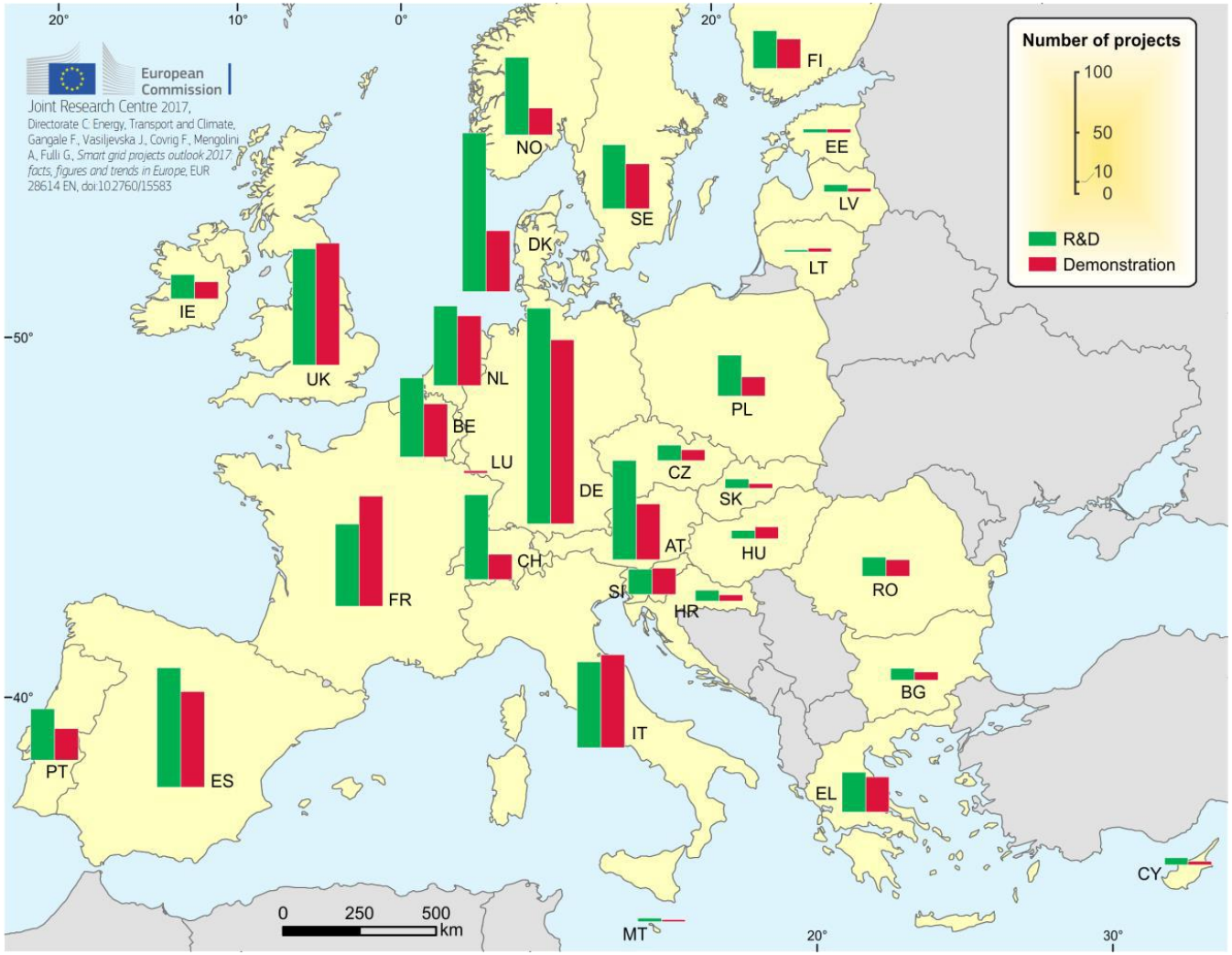
EU H2020 Programme GA No. 824389

Driving forces

- **Polytical**
  - EU incentives
  - National incentives
  - Regional incentives
- **Technology, Market and Socio driven**
  - Low cost technologies (power generation, automation, ICT)
  - Low cost load flexibility and storage solutions
  - (Cost)- Efficient:
    - information and knowledge sharing;
    - research;
    - DIY.

Smart grid projects outlook

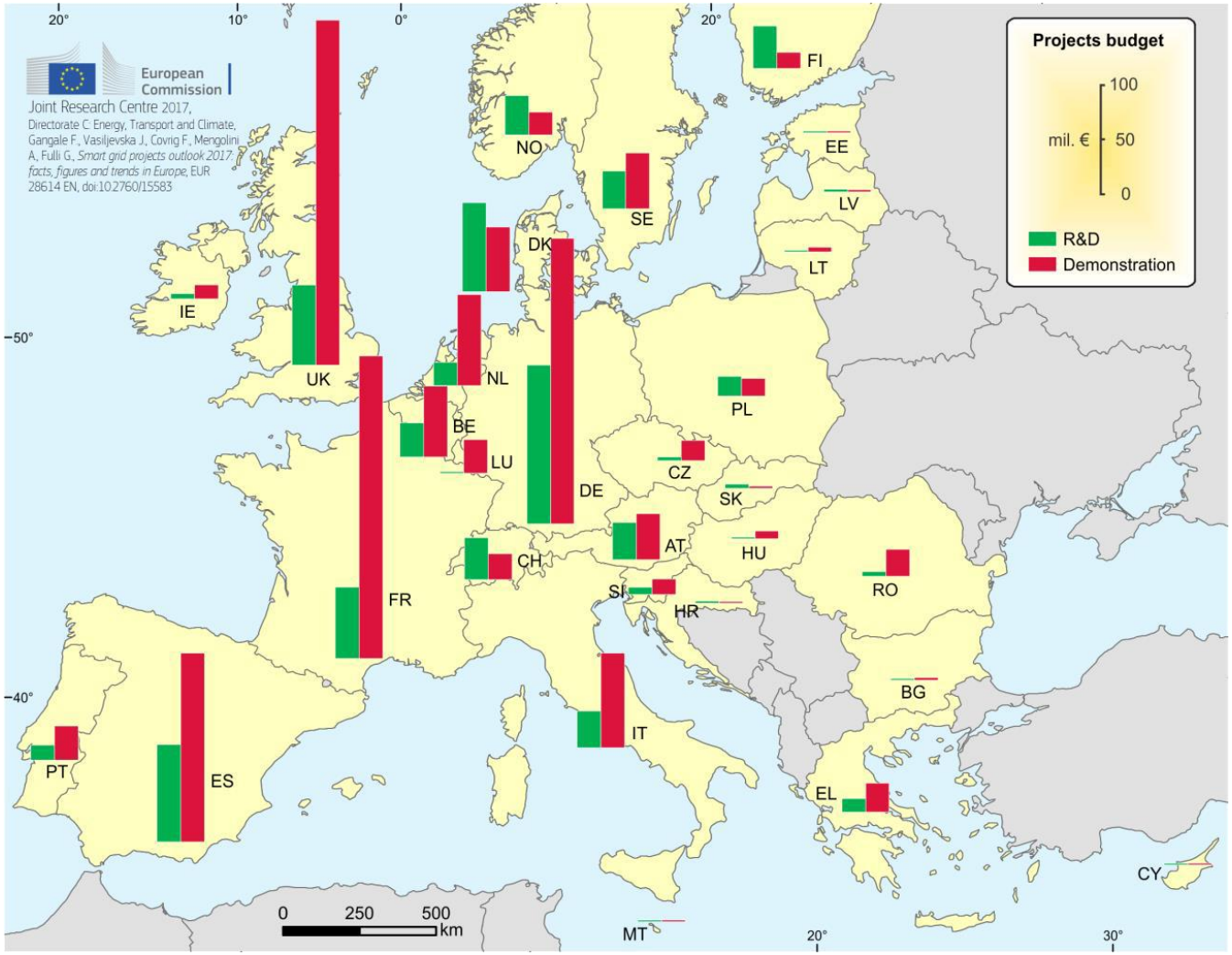
Number of R & D and demonstration projects in the EU *



* JRC Science for Policy Report, Smart grid projects outlook 2017

Smart grid projects outlook

Investment in R & D and demonstration projects in the EU *

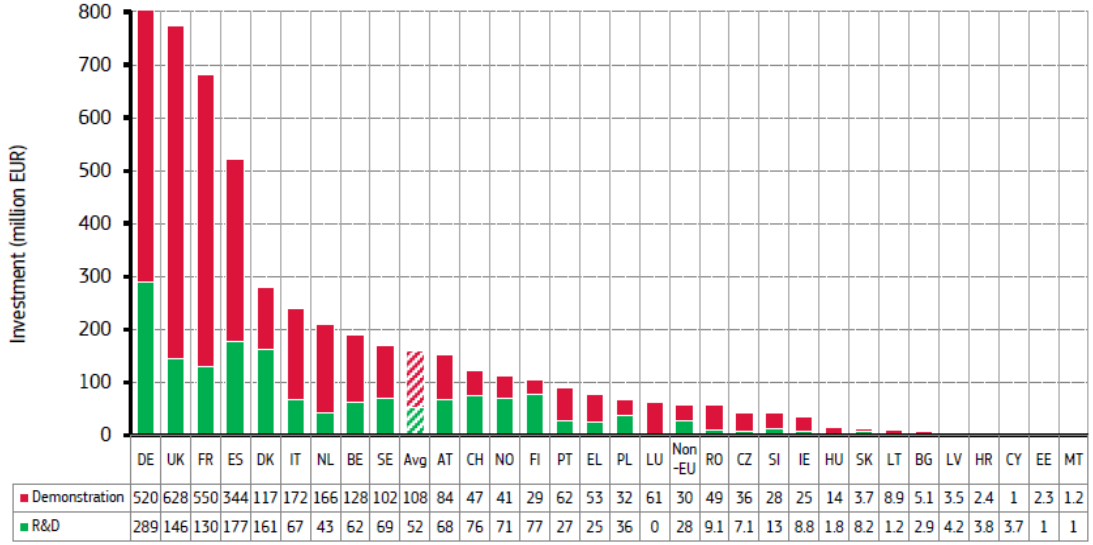


- The investments in Research and Development are not even among the EU members.
- 15 European countries account for less than 5% of the EU research and innovation funds.
- In order to secure EU targets & sustainable goals, smart grids investments throughout Europe needs to be boosted and equalized among members.

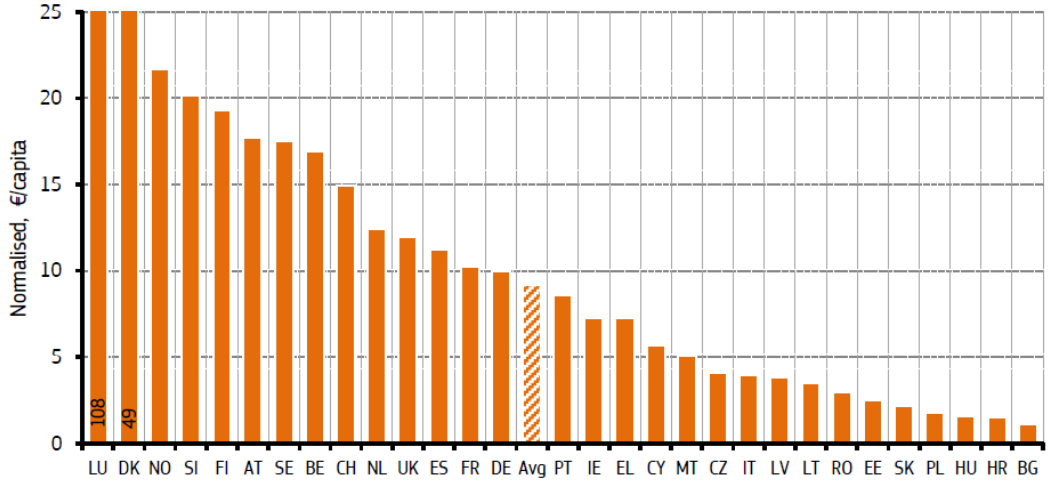
* JRC Science for Policy Report, Smart grid projects outlook 2017

Smart grid projects outlook

Investment in R & D and demonstration projects in the EU *



	DE	UK	FR	ES	DK	IT	NL	BE	SE	Avg	AT	CH	NO	FI	PT	EL	PL	LU	Non-EU	RO	CZ	SI	IE	HU	SK	LT	BG	LV	HR	CY	EE	MT
Demonstration	520	628	550	344	117	172	166	128	102	108	84	47	41	29	62	53	32	61	30	49	36	28	25	14	3.7	8.9	5.1	3.5	2.4	1	2.3	1.2
R&D	289	146	130	177	161	67	43	62	69	52	68	76	71	77	27	25	36	0	28	9.1	7.1	13	8.8	1.8	8.2	1.2	2.9	4.2	3.8	3.7	1	1



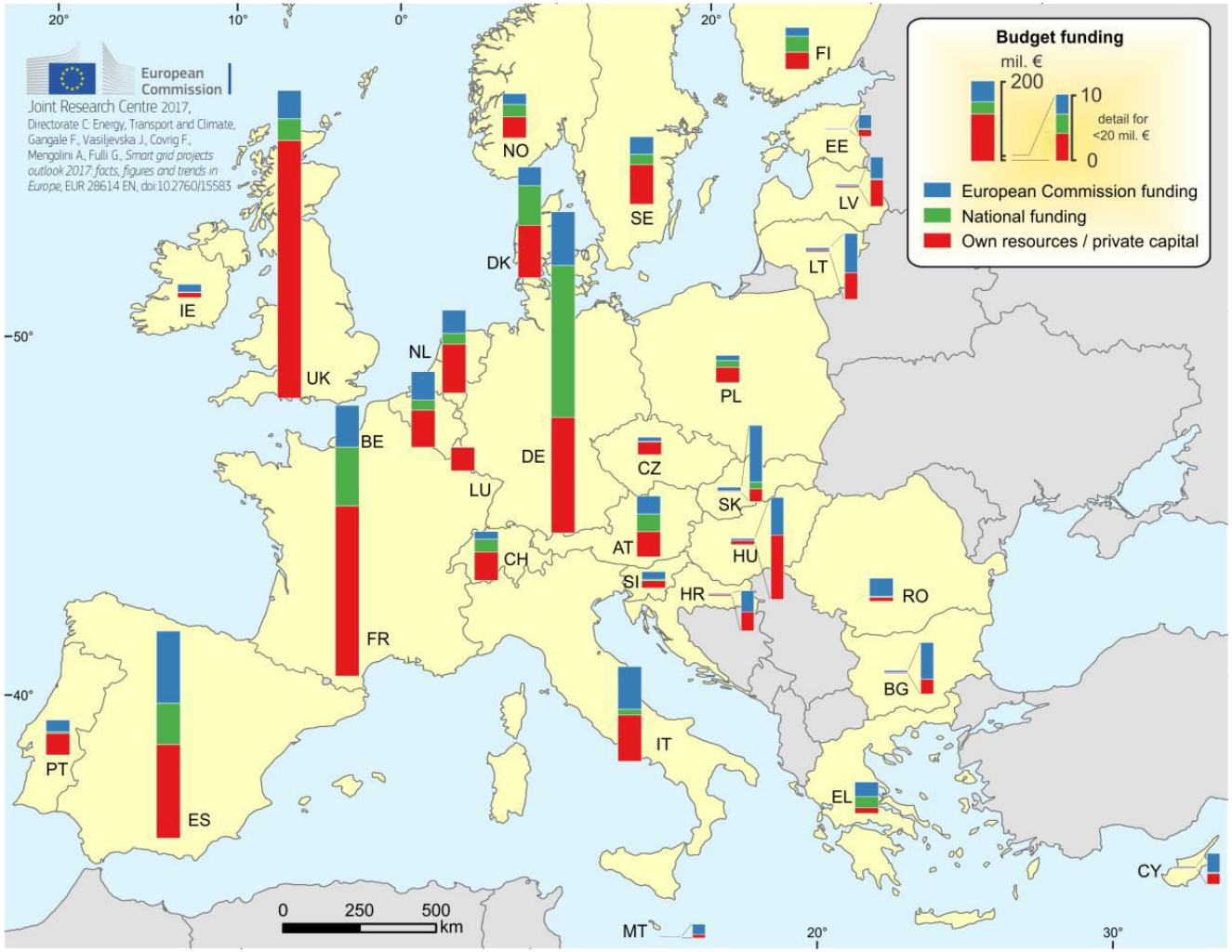
- High share of demonstration projects compared to R&I in Romania.
- lowest per capita investments in Bulgaria.

* JRC Science for Policy Report, Smart grid projects outlook 2017

EU H2020 Programme GA No. 824389

Smart grid projects outlook

Investment by source of financing in the EU *



- Low national funding rates in BG and RO
- Low level of linking and integrity between individual projects

* JRC Science for Policy Report, Smart grid projects outlook 2017

Achievements

- **National targets* and achievements** for the share of energy from renewable sources in gross final consumption of energy in 2020

	Share of energy from renewable sources in gross final consumption of energy, 2005 (S_{2005})	**Target** for share of energy from renewable sources in gross final consumption of energy, 2020 (S_{2020})	**Achievement** for share of energy from renewable sources in gross final consumption of energy, proxy 2017
Bulgaria	9,4 %	16 %	18,81%
Greece	6,9 %	18 %	15,89%
Romania	17,8 %	24 %	28,58

* https://eur-lex.europa.eu

** www.eea.europa.eu

Future challenges

- A holistic power system architecture* is an architecture in which all relevant components of the power system are merged into one single structure. These components could comprise of the following:
  - Electricity producer (regardless of technology or size, e.g. big power plants, distributed generations, etc.),
  - Electricity storage (regardless of technology or size, e.g. pumped power plants, batteries, etc.),
  - Electricity grid (regardless of voltage level, e.g. high-, medium- and low voltage grid),
  - Customer plants, and
  - Electricity market

* "Holistic architectures for future power systems" ETIP SNET, March 2019

EU H2020 Programme GA No. 824389

Future challenges

- Self healing nano, mini and micro grids with:
  - prosumer centric behavior;
  - environmentally friendly grid support action;
  - increased DC / decreased AC power share;
- Reduced system inertia;
- Flexibility as cost efficient storage;
- Reduced importance of the classical power systems;
- Self establishing real time minimum data electricity markets;

Conclusion

- The smart grid evolution in the region is developing slowly;
- High potential for value added ;

THANK YOU FOR YOUR ATTENTION!

Contact information:

assoc. prof. Dr. Rad Stanev

rstanev@tu-sofia.bg