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Preliminary Findings From CEER Report On Network Losses

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The Council of European Energy Regulators (CEER)

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- CEER is the voice of Europe's national regulators of electricity and gas at EU and international level
- Members and Observers are from 33 European MS
- Based in Brussels, CEER deals with a broad range of energy issues including retail markets and consumers, distribution networks, smart grids, flexibility, sustainability, and international cooperation
- Through CEER, NRAs cooperate and develop common position papers, advice and forward-thinking recommendations to improve the electricity and gas markets for the benefit of consumers and businesses

CEER Report On Network Losses

- The first CEER report on losses
- Is being drafted by the Electricity Quality Of Supply Task Force (EQS TF)
- Will primarily be based on answers to 2016 questionnaire on network losses

2016 Questionnaire On Network Losses

- Questionnaire was sent to NRAs and stakeholders
- EQS-TF / CEER received responses by NRAs of 27 countries
- 21 responses from Stakeholders
- Answers provide a good insight into differing views on this topic
- According to the questionnaire we identified four major topics for the report:

i. Definition of Losses
ii. Calculation of Losses (and corresponding values)
iii. Procurement of Losses
iv. Regulatory treatment of Losses

Topics To Be Addressed (1)

- In addition to giving an overview of major topics, the Report will cover special issues, such as:

  - Connection to energy efficiency
  - Impact of smart meters
  - Impact of distributed generation

- Might include recommendations for the future (e.g. potential harmonization of definitions to facilitate comparison among Member States, setting the right incentives…)

Topics To Be Addressed (2)

- To what extent do smart meters help reduce (non-technical) losses?
- Impact of increased distributed generation on network losses
- Energy efficiency directive is linked directly to network losses to ensure energy efficiency targets. The question then is how a reduction in network losses can help in fulfilling the energy efficiency targets

Agreed Structure Of The Report

- 1. Introduction: aim of the report, work that has been done so far
- 2. Inventory: current situation, definition, calculation, procurement and regulatory treatment of losses
- 3. Important Issues: distributed generation, smart meters….
- 4. Future difficulties: lack of harmonization, setting the right incentives
- 5. (Possible) Recommendations

Technical Losses

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- Technical losses: power dissipation due to current flows

- Depend on grid's configuration such as voltage level, circuit length, temperature, location of load and generation, penetration of distributed generation…

Non-technical Losses

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- Are usually calculated

- Non-technical losses depend on socio-economic aspects

- Some examples:
  - theft
  - metering inaccuracies
  - unmetered energy
  - in-house consumption (lighting and building consumption in substations)?
  - public lighting?

Determining Network Losses

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- Power losses can be determined in different ways: either by direct metering of the injected and withdrawn energy or by estimating the losses by calculation
- On high and extra high voltage levels, most countries determine losses by measurement since energy flows on these voltage levels are usually metered. On medium and low voltage levels, losses are mostly calculated
- Sometimes, the decision to meter or calculate depends on type of customer on that voltage level
- A lot of countries do not determine losses for each individual voltage level

Obligation To Have Meters

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- Most countries have obligations to have meters at all connection points (18 Vs 6)
- Even in countries with such legal obligations, not every customer is required to have a meter
- Cases of exemption from this requirement: emergency sirens, railway security systems, billboards, traffic management, CCTV, communication repeaters or those who pay a lump sum for electricity

- Smart meters would reduce inadequate estimation of consumption of residential customers

Incentives

- Majority of Member States employ incentives to reduce network losses (17 do, 9 do not)
- Incentives used in: Austria, Czech Republic, Denmark, France, Germany, Hungary, Italy, Lithuania, The Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden, UK
- Incentives not used in: Croatia, Cyprus, Estonia, Finland, Greece, Iceland, Ireland, Latvia, Malta
- Uncertain: Belgium (multiple NRAs provided conflicting answers)

Definition Of Losses

- Varies among Member States, different components might be included
- Losses are usually defined as the difference between injected and withdrawn energy, but there are exceptions
- Is there a need to harmonize the definition?
- Responding stakeholders are slightly in favor of harmonization (9 for, 7 against)
- Even if definition of losses were to be harmonized, definitions of voltage levels differ across Europe which could result in difficulty comparing losses per voltage level
- Alternative to full harmonization: agree to various components of reported network losses

For which voltage levels are losses determined and how?

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- Status quo:

Voltage level	Yes	No	Measured	Estimated	Both
EHV	18	7	11	5	1
EHV/HV	20	4	12	6	2
HV	22	5	13	5	2
HV/MV	17	6	7	7	3
MV	21	4	5	10	4
MV/LV	18	5	6	9	4
LV	19	6	3	12	3

- Stakeholders mostly in favor of determining losses for every voltage level

Open Issues

- Missing:

I. Denmark: losses in distribution network

II. Sweden: transmission losses in 2010 and 2015

III. Italy: separate values for transmission and distribution losses

IV. The Netherlands: energy withdrawals in all years

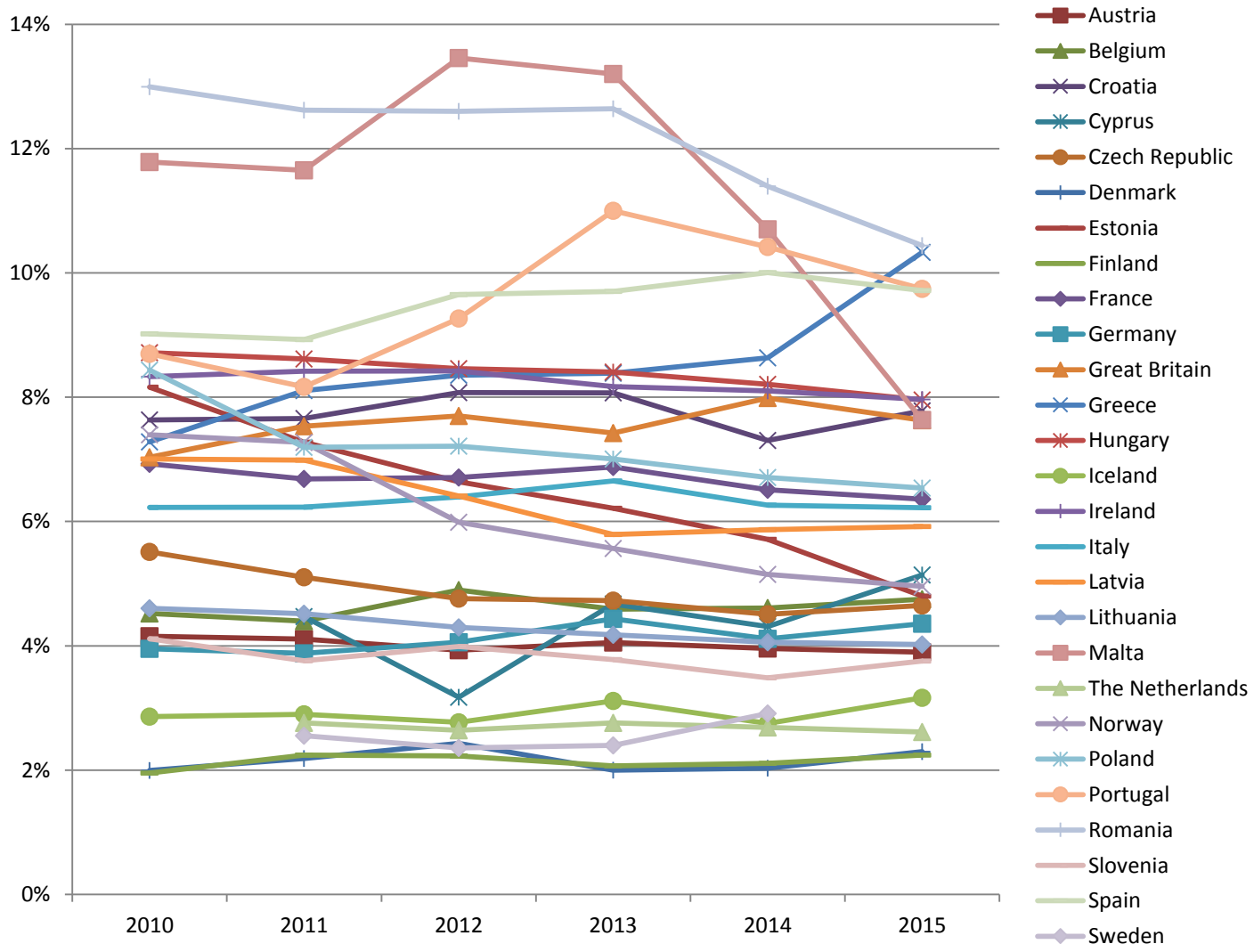
- Unclear:

I. Iceland: transmission losses higher than losses in distribution

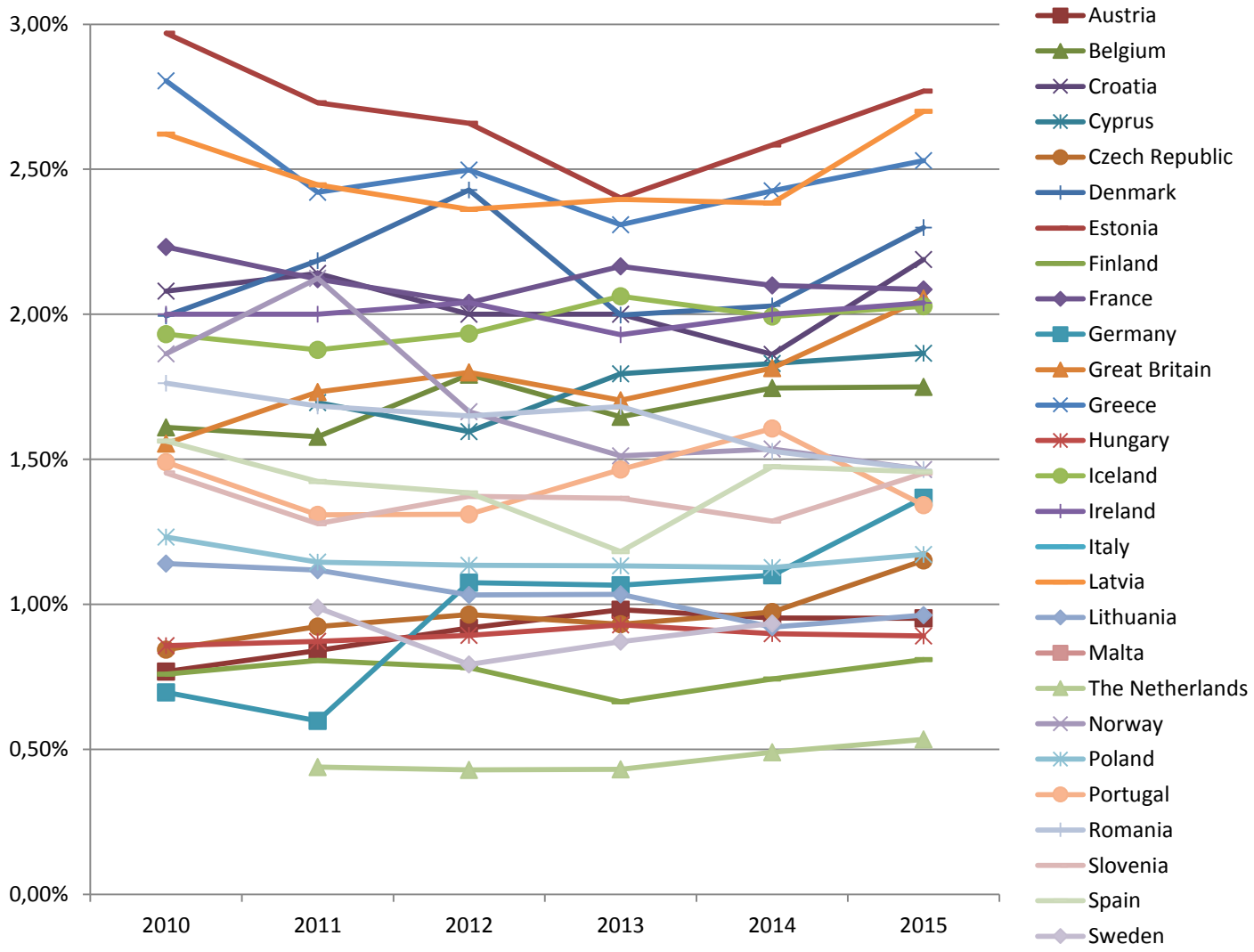
Losses As % Of Injected Energy

- The losses are presented as percentages of injected energy, the values of which were provided by the European regulators for the 2016 CEER questionnaire
- We do not have information on whether all countries include imports and exports in their injected and withdrawn energy, respectively. Adding / subtracting imports / exports from injected / withdrawn energy would *decrease / increase losses as percentage*
- Losses in transmission and distribution systems were calculated as percentage of *total* injected energy in each Member State due to anticipated difficulties in obtaining separate values for injected energy in distribution and transmission

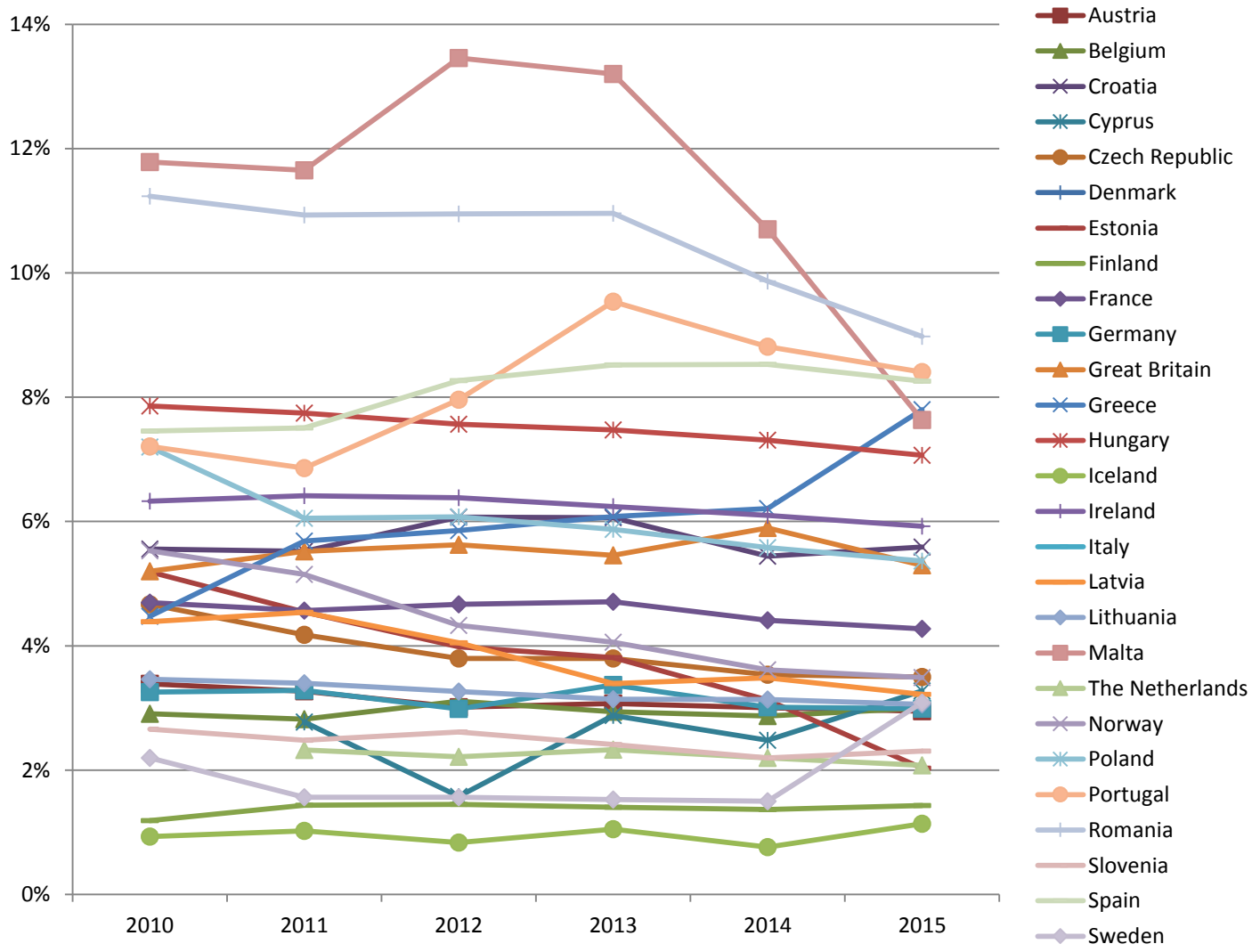
Total Losses As % Of Injected Energy



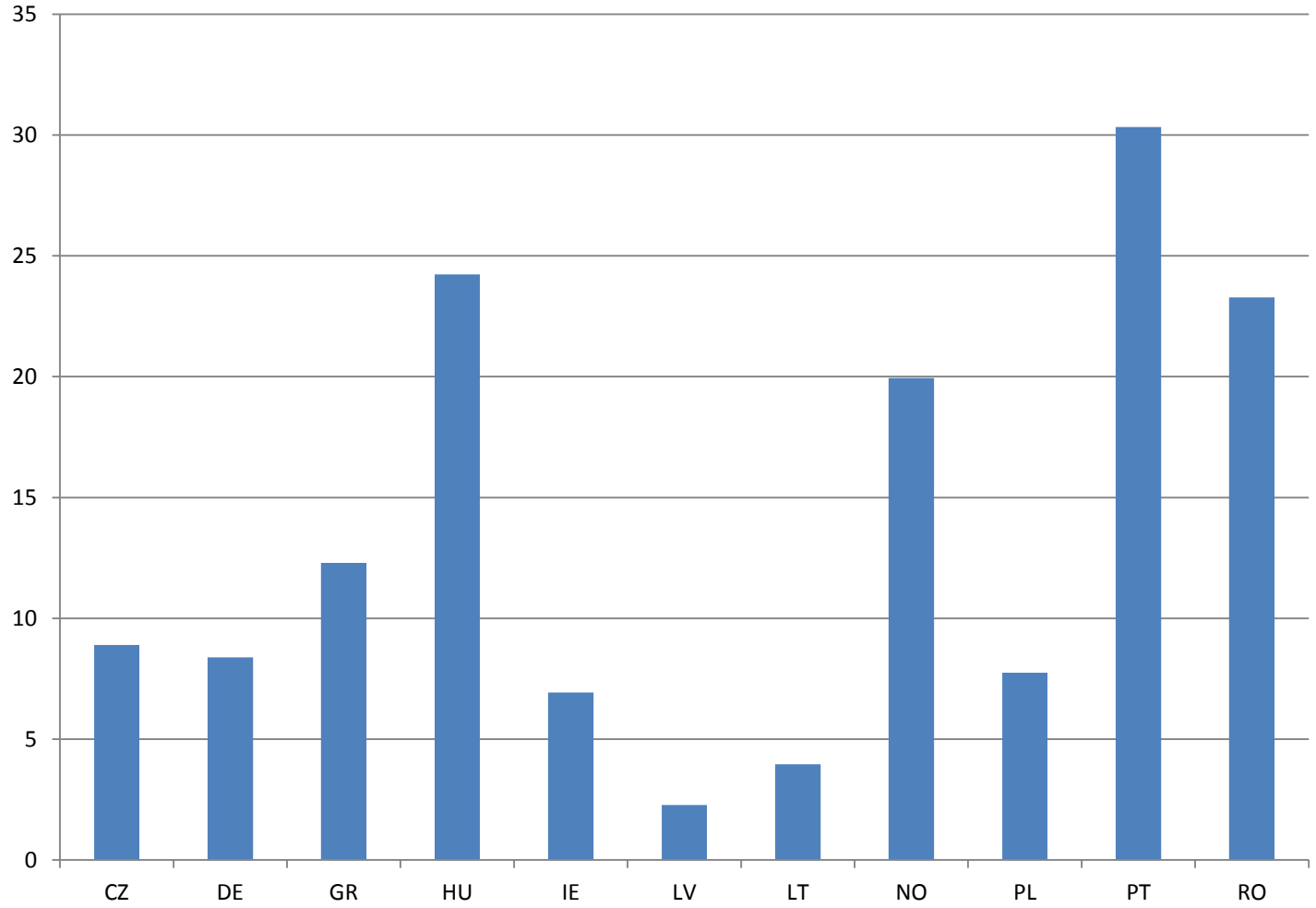
TSO Losses As % Of Injected Energy



DSO Losses As % Of Injected Energy



LV Losses / LV Circuit Length (MWh/km)



Publication Of The Report

- DS WG and GA approval necessary
- Will only be published online (no paper format)
- Date of publication: TBD (summer?)

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