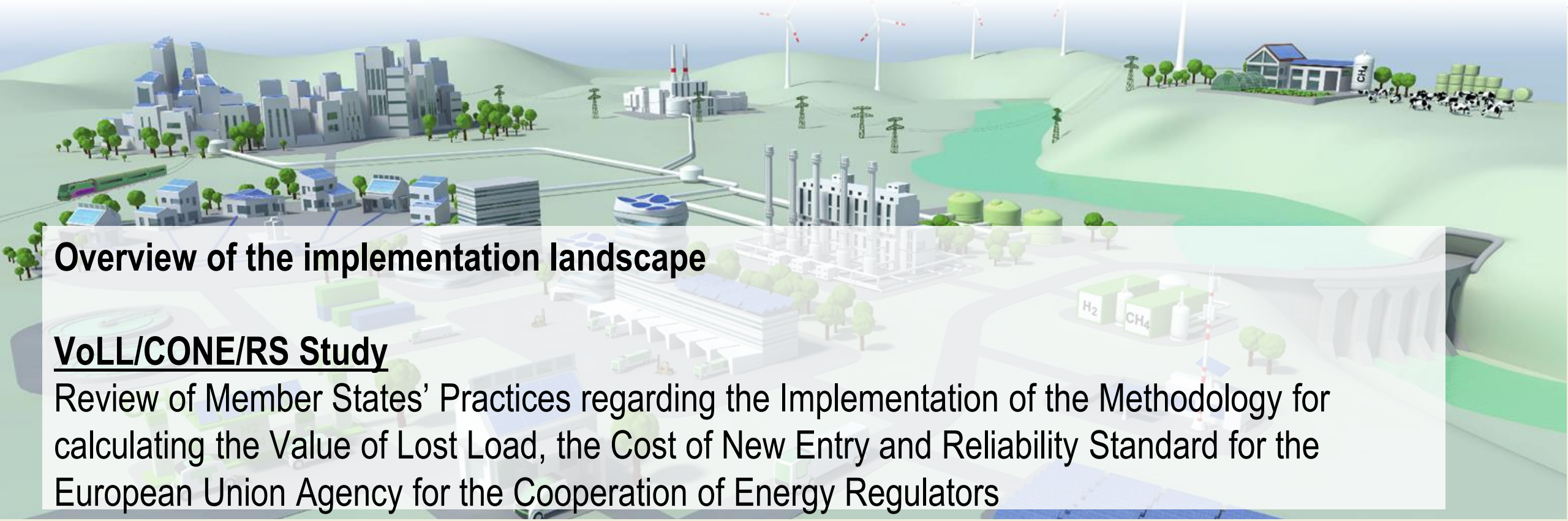

Overview of the implementation landscape

VoLL/CONE/RS Study

Review of Member States' Practices regarding the Implementation of the Methodology for calculating the Value of Lost Load, the Cost of New Entry and Reliability Standard for the European Union Agency for the Cooperation of Energy Regulators

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29.05.2024

Overview

Summary of the high-level findings

- Introduction
- Value of Lost Load
  - Summary of deviations from Methodology
  - Single VOLL and used approaches
  - Sectoral VOLL and consumer categories
  - Weights for consumer categories
  - Questions as per ACER Methodology
- Cost of New Entry and Reliability Standard
  - Summary of implementation status of main CONE-related components per reference technology
  - Summary further CONE-related components
  - Summary of RS-related components

Introduction

- Results of the evaluation of the VOLL/CONE/RS reports of the member states of Table 1
- The evaluation is based on a set list of methodological components derived from the Methodology
- This deliverable aims to summarise high-level findings incl.:
  - Implementation status of the components
  - Deviations from the Methodology
  - Approaches and results of VOLL
  - References technologies and results of CONE

Country	VOLL	CONE	RS
Belgium	YES	YES	YES
Czech Republic	YES	YES	YES
Finland	YES	YES	YES
France	YES	YES	YES
Germany/Luxembourg	YES	YES	YES
Greece	YES	YES	YES
Ireland	YES	YES	YES
Italy	YES	YES	YES
Sweden	YES	YES	YES
Slovenia	YES	YES	YES
Spain	YES	YES	YES
Poland	YES	YES	NO
Netherlands	YES	NO	NO

Table 1: Geographical scope per metric

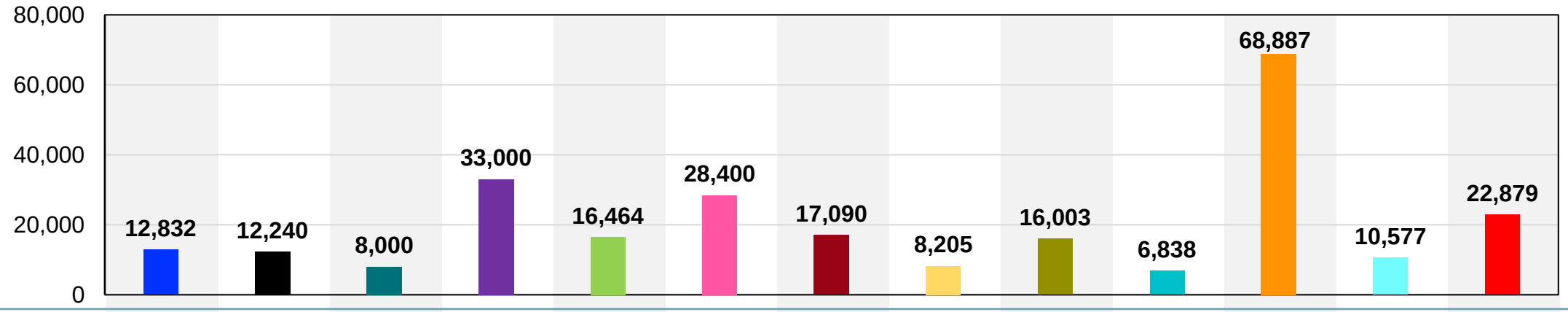
Value of Lost Load

VOLL – Summary of deviations from methodology

Methodological component	Requirements met								Requirements partially met				Requirements not met		Optional	
ID.1: Multiple bidding zones	Unified	1	Not unified	2	NAP	10										
ID.2: Multiple MS	Unified	2	NAP	11												
ID.3: Societal costs included	Yes	6							Insufficient information	4			No	3		
ID.4: Consumer categories included	All included	4											Categories missing	9		
ID.5: Additional consumer categories	Yes	3	No	10												
ID.6: Consumer aggregation	Yes, w/ justification	10	No	3												
ID.7: Load shedding scenarios	Yes	6							Insufficient information	2			No	5		
ID.8: Definition of VOLL parameters	All defined	9							Parameters missing	2			None defined	2		
ID.9 & 10: VOLL survey conducted	For all sectors	7	Alternative study used	4									No survey	2		
ID.11: Statistical representative samples	For all sectors	5							For some sectors	4			For none of the sectors	4		
ID.12: Question set included in survey	All included	0							Some questions missing	10			None included	2	Insufficient information	1
ID.13: Survey objective explained	Yes	6							Insufficient information	4			No	3		
ID.14: Supply interruption scenarios	Defined	10							Insufficient information	1			Not defined	2		
ID.15: Sensitivity interruption scenarios	Included	7	Not included	5											Insufficient information	1
ID.16: Willingness to pay method	Used	9							For some sectors	1			Not used	3		
ID.17: Other methods used	WTA	4	Direct worth	2	Macro data	1	WTA & direct worth	3							No other method used	2
ID.18: Conversion w/ consumption profiles	Yes	8							Insufficient information	2			No	2		
ID.19: Sectoral VOLL uncertainty range	Yes	4	No	9												
ID.20: Validation with macro-data	Yes	6	No	7												
ID.21: Exclusion of flexible consumption	Yes	2							No, w/ justification	1	Insufficient information	6	No	4		
ID.22: Exclusion of protected consumers	Yes	5							Some consumers	1	Insufficient information	3	No	4		
ID.23: Single VOLL based on Art. 7(4)	Yes	11											No	2		
ID.24: Consumer category weights	Marginal reduction	0	Ave. load-shedding share	7									Electricity consumption	6		
ID.25: VOLL uncertainty range	Yes	3	No	10												
ID.26: Minimum publication requirements	Met	2							Some requirements not met	10			Not met	1		
A.1: Specific answer option in survey	Yes	1	In some questions	1	No	9									Insufficient information	2

Reported single VOLL and used approaches

Reported single VOLL [EUR/MWh]



Single VOLL of used approaches [EUR/MWh]

	BE	DE-LU	FI	FR	IR	IT	PO	SE	CZ	GR	NL	SI	ES
WTP	12 827		7 523	9 000	16 464	X	X	X	11 308	X	68 887		
WTA	55 024		20 924	46 000		X	X		58 260	X			22 879
Direct cost				33 000		X		X				10 577	
Macro data		12 240							X				

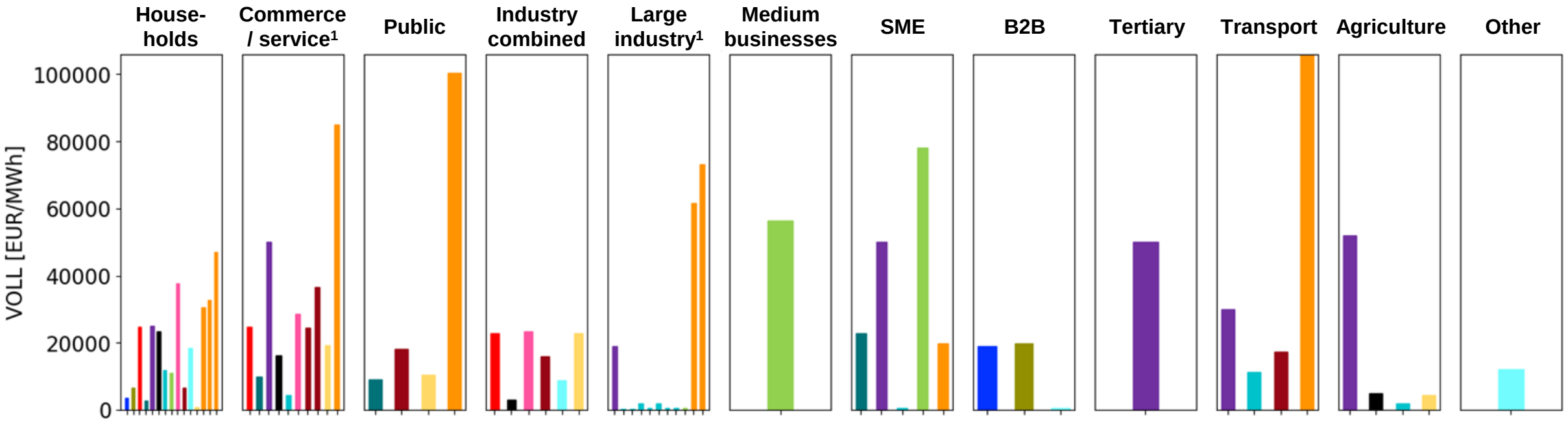
X : Approach used but no value reported

Substantial different VOLL values across countries

Various methodological approaches for VOLL estimations applied

Sectoral VOLL and consumer categories – by categories

[1]Further subdivisions of the sectors summarized



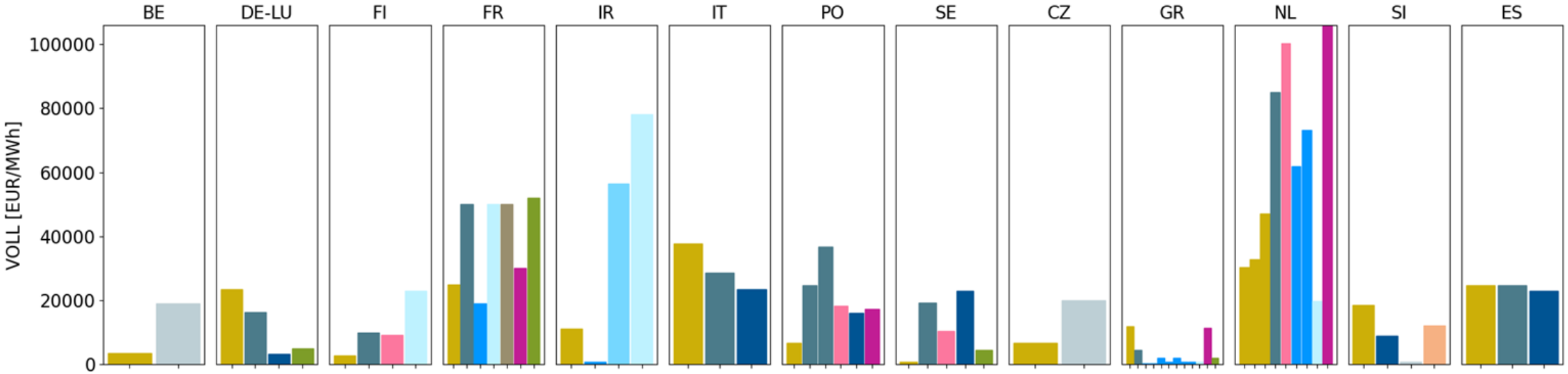
Countries:

Belgium	Spain	France	Greece	Italy	Slovenia	The Netherlands	
Czech Republic	Finland	Germany/Luxembuorg	Ireland	Poland	Swenden		

Divergence from predefined consumer categories for sectoral VOLL with aggregated or further disaggregated sectors

Considerable variations of sectoral VOLL

Sectoral VOLL and consumer categories – by countries



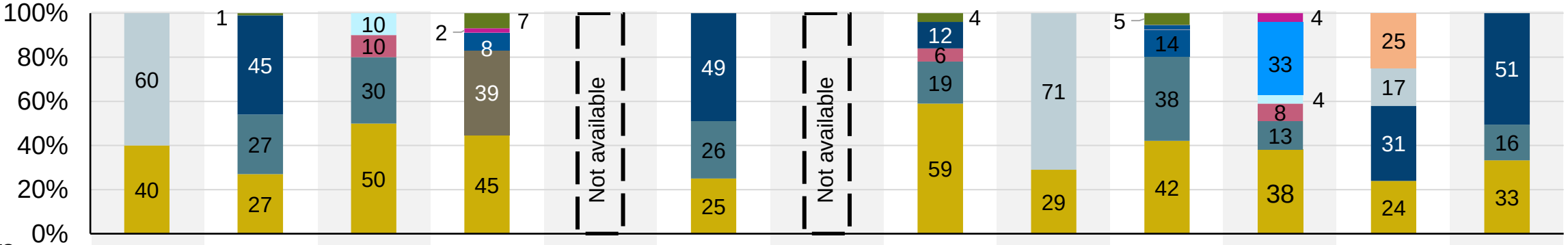
Consumer categories (partly aggregated for visualisation):

Households	Industry combined	SMEs	Transport
Commerce or service sector	Large industry enterprises	B2B	Argiculture
Public service	Medium size business	Tertiary sector	Other

Heterogeneous picture of sectoral VOLL reported by countries

Disparities in magnitude and quantity of reported sectoral VOLL

Weights for consumer categories



Weights based on:	BE	DE-LU	FI	FR	IR	IT	PO	SE	CZ	GR	NL	SI	ES
Average load-shedding	X		X		X			X		X	X	X	
Electricity consumption[1]		X		X		X	X		X				X

[1]Deviation from methodology

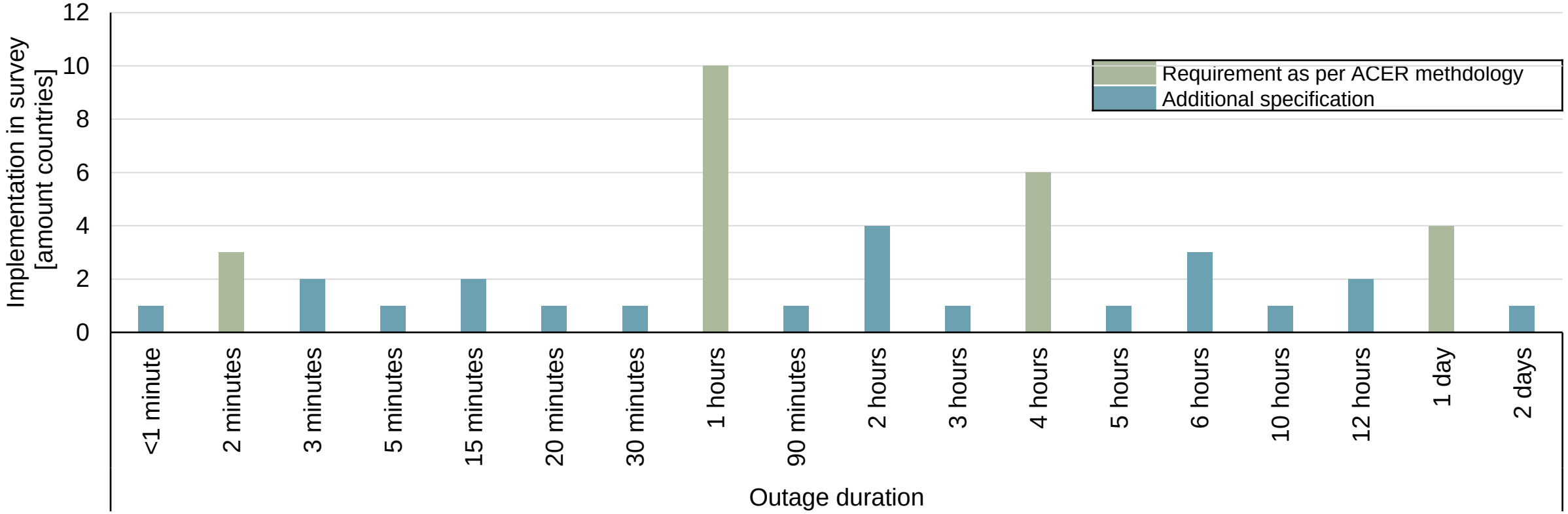
Consumer categories (partly aggregated for visualisation):

Households	Industry combined	SMEs	Transport
Commerce or service sector	Large industry enterprises	B2B	Argiculture
Public service	Medium size business	Tertiary sector	Other

Differences in weights assigned to sectors across countries

Depending on country-specific load-shedding or electricity consumption

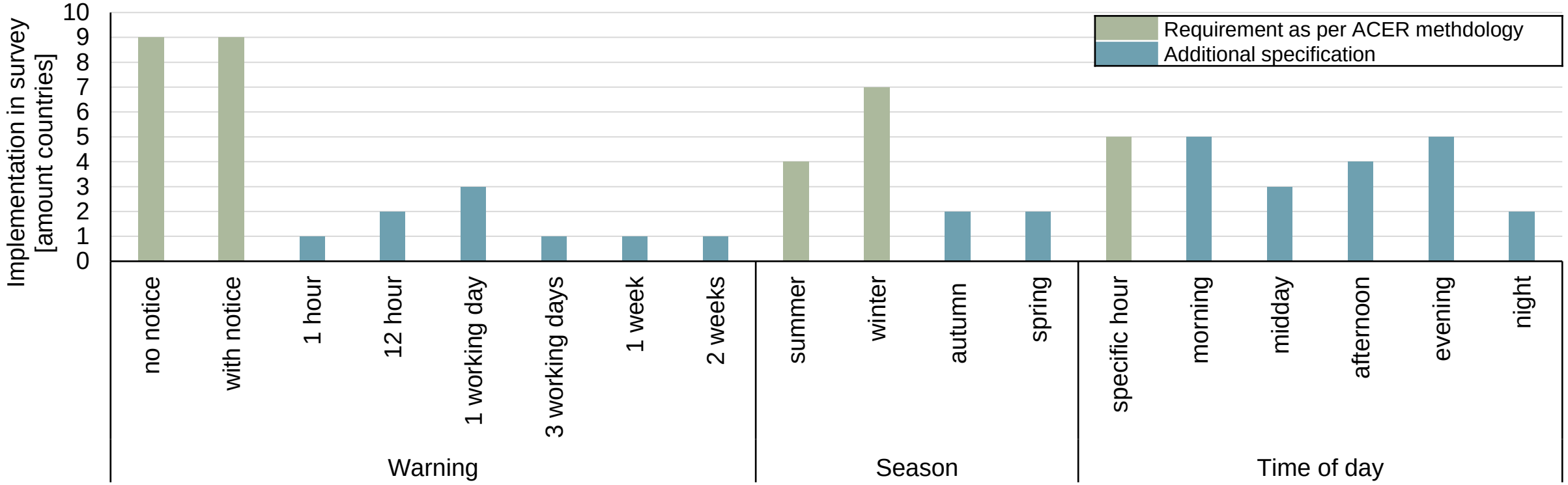
Questions as per ACER methodology – surveyed outage durations



Different outage durations surveyed across countries

Required outage duration as per ACER methodology only partially surveyed

Questions as per ACER methodology – surveyed outage scenarios

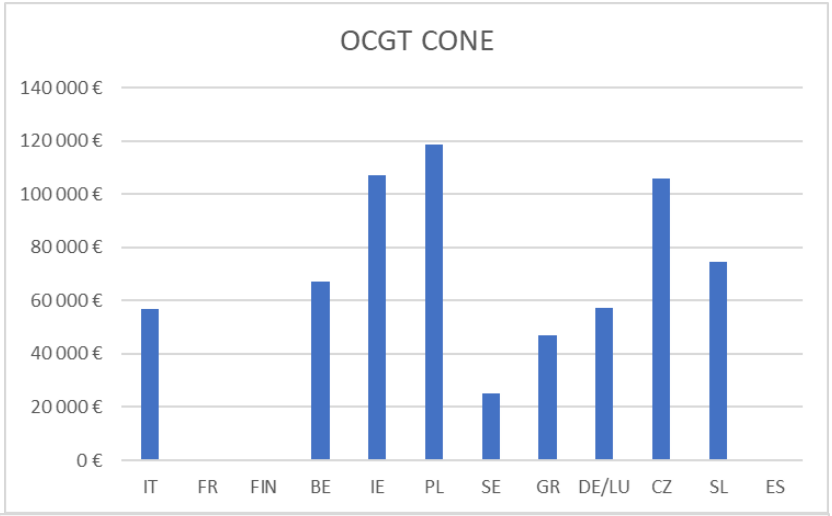


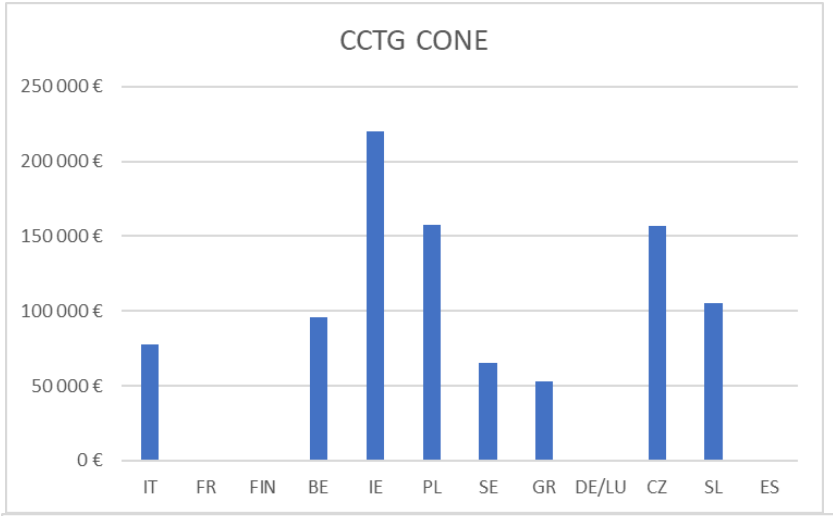
Required outage scenarios as per ACER methodology only partially surveyed

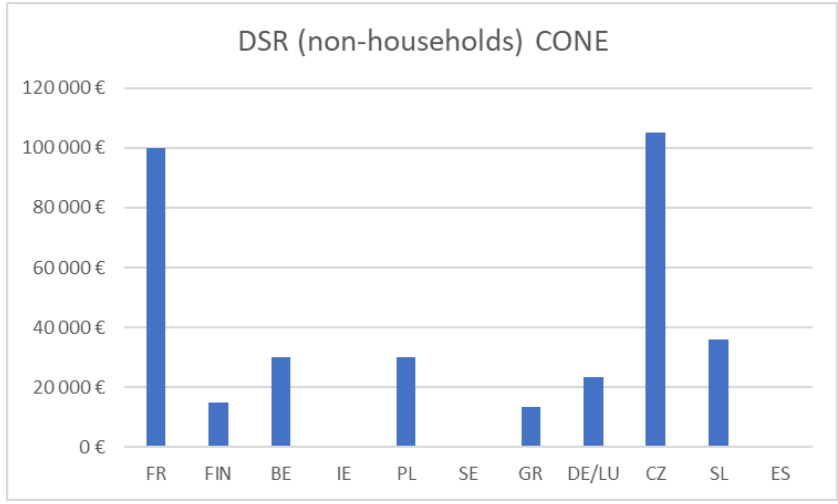
Definition of outage scenarios in alignment with country-specific peak-load times

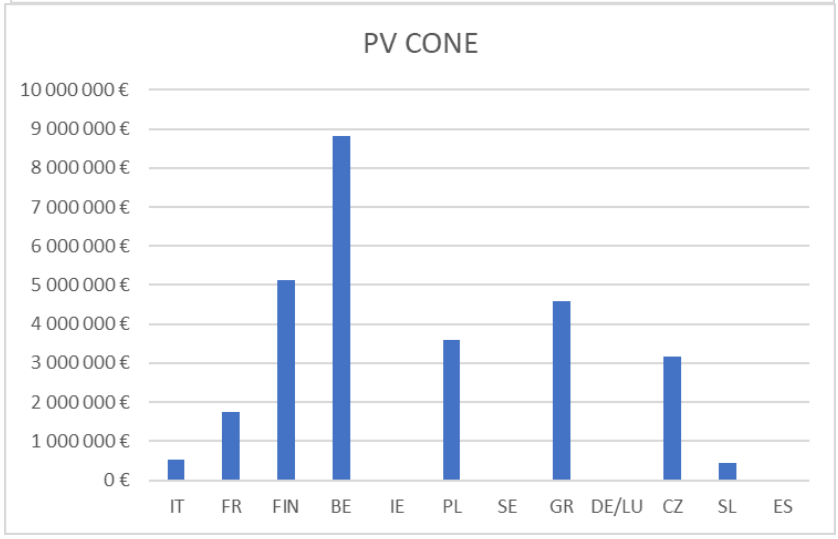
Cost of New Entry and Reliability Standard

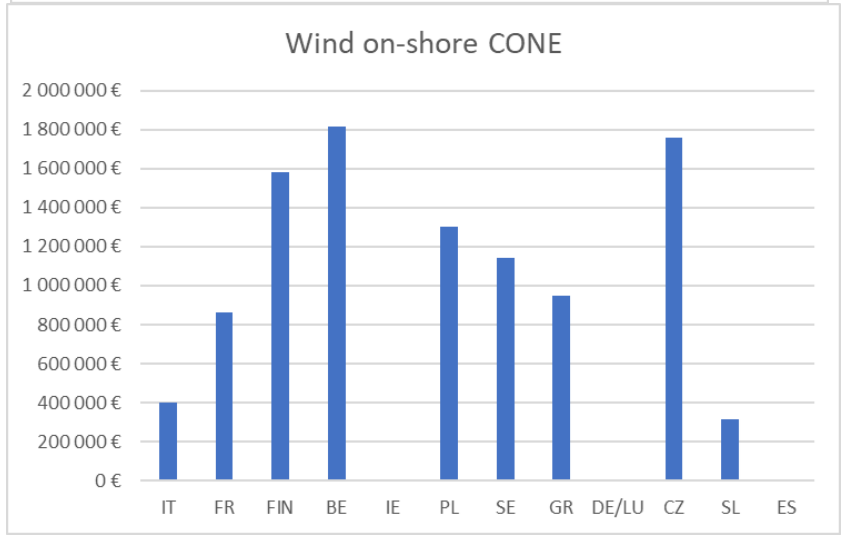
CONE fixed per technology and country for popular technologies (€ per MW)

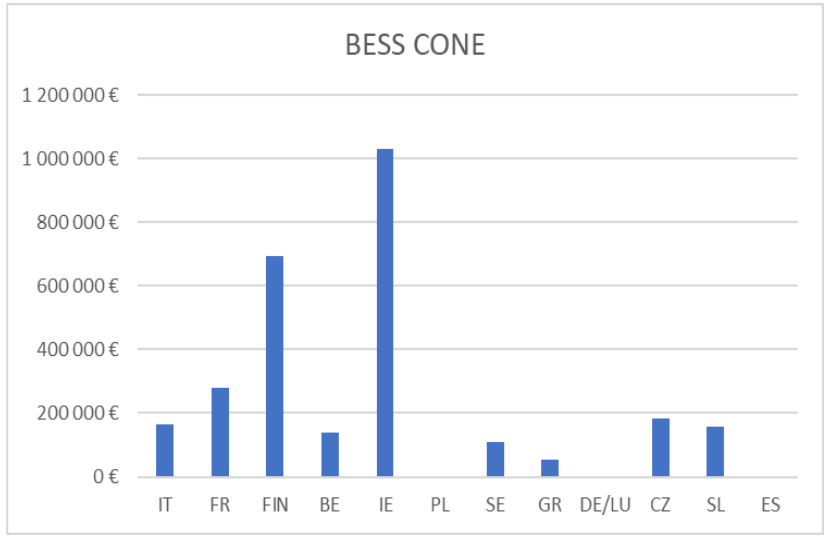












Overview of implementation status of main CONE related components per technology

12 CONE countries	Open cycle gas turbine	Combined cycle gas turbine	Internal combustion engine	Combined heat and power	PV	Wind onshore	Wind offshore	Other generation	DSR	BESS	Pumped hydro	Prolongation
Reference technology identified	**9**	**8**	**4**	**4**	**9**	**10**	**6**	**8**	**9**	**10**	**4**	**2**
De-rating factor	9	8	4	4	8	9	5	6	9	9	3	2
WACC	9	8	4	4	8	9	5	7	9	8	3	x
Capital costs	9	8	4	4	8	9	5	7	9	9	3	x
Annual fixed costs	9	8	4	4	8	9	5	7	8	9	3	2
Potential identified	6	5	2	2	5	6	2	6	7	6	3	1
CONE variable	7	5	3	3	5	6	3	5	8	4	1	1
LOLE threshold	8	5	3	2	6	7	4	7	8	7	2	2
CONE fixed based on Article 15	9	8	4	4	8	9	5	7	9	9	3	2

- For the 12 CONE countries, see Table 1
- Example: 9 out of 12 countries defined OCGT as reference technology, 6 countries identified its potential capacity, etc.
- *Other generation* includes: Nuclear, biomass, hydro, emergency power system, and H2 electrolyzers

Color scale

Highest value

Median value

Lowest value

Overview of implementation status of main CONE related components

- Good coverage of generation, DSR and storage options
- Renewal or prolongation options have largely not been explored, only in two cases
- Lack of identification of capacity potential per reference technology
- Main CONE fixed calculation input components (de-rating, WACC, Capital Costs, Annual Fixed Costs) and CONE fixed itself have been identified thoroughly, except in the case of Spain
- Lack of identification of CONE variable especially for generation and storage units, but this has mostly been justified
- Lack of identification (or at least lack of report) of LOLE values especially for generation and storage units. However, LOLE values might have often been calculated, but were then simply not reported (as some interviews have revealed)

Overview of implementation status of further CONE related components

Methodological component	YES	NO	PARTLY	NAP	NA
Calculation of different CONE values per year	0	12	0	0	0
Justification, if RES and/or DSR and/or storage were not included	2	1	1	8	0
Uncertainty range for capital cost and the annual fixed cost	2	9	0	1	0
Use of existing WACC values	6	4	0	0	2
Calculation of WACC based on the method in Annex 2	3	5	0	1	3
Uncertainty range for WACC values	2	9	0	1	0
Uncertainty range for fixed CONE/CORP	3	9	0	0	0
Justification for exclusion of reference technology	3	5	0	4	0
Minimum publication requirements:					
- fuel cost (specify fuels and years if applicable)	2	9	1	0	0
- CO2 costs (specify years if applicable)	2	9	1	0	0
- potential per reference technology	6	6	0	0	0
- technical characteristics per reference technology and sources	6	6	0	0	0
- de-rating CFs per reference technology	11	1	0	0	0
- CAPEX and annual fixed costs per reference technology	9	3	0	0	0
- WACC per reference technology and main assumptions	6	6	0	0	0
- cost elements for variable CONE/CORP	5	5	1	1	0
- fixed and variable CONE/CORP per reference technology	8	4	0	0	0

Overview of implementation status of other CONE related components

- CONE values are never calculated for every year of the considered period
- Varying strategies to identify WACC: previous studies, own calculations that are sometimes based on the method proposed by the Methodology
- Mostly no uncertainty ranges provided for capital costs, annual fixed costs, WACC, fixed CONE
- Minimum publications requirements are often not fully met regarding main information on technical characteristics of reference technologies, de-rating factors, capital costs, annual fixed costs, WACC and in general lack detailed descriptions

Overview of implementation status of RS related components

Methodological component	YES	NO	PARTLY	NAP	NA
Reliability standard set based on a proposal by the national regulatory authority	9	1	0	0	1
Reliability standard calculated at bidding zone level	3	3	0	5	0
Joint reliability standard for bidding zones covering multiple MS	2	0	0	9	0
Definition of minimum capacity need	10	1	0	0	0
Minimum capacity need based on the latest NRAA	3	4	0	1	3
Minimum capacity need is lower or equal to the max. ENS observed in the latest NRAA	1	0	0	3	7
Calculation of the reliability standard as per Art. 20(5)	9	2	0	0	0
Calculation of the reliability standard for each reference year	1	9	0	1	0
Uncertainty range for the reliability standard	2	9	0	0	0
Minimum publication requirements					
- fixed CONE/CORP (with uncertainty if applicable) (specify)	11	0	0	0	0
- variable CONE/CORP (with uncertainty if required) (specify)	7	4	0	0	0
- LOLE threshold per reference technology (specify)	7	4	0	0	0
- Conditions of validity	2	8	0	0	1
- potential per reference technology (specify)	6	5	0	0	0
- single VOLL for reliability standard	11	0	0	0	0
- minimum capacity need and assumptions	7	4	0	0	0
-the reliability standard	11	0	0	0	0
Public consultation					
for methodology to estimate the capacity need	3	2	0	0	6
for methodology to address validity conditions issues	1	4	0	0	6
of amendments to the methodology	1	2	0	0	8