ENTSO-E
Ancillary Services Working Group

Survey on Ancillary Services Procurement and Balancing Market Design

March 2014

entsoe

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Table of Contents

Introduction (1)

ENTSO-E Survey on Ancillary Services Procurement and Balancing Market Design

The purpose of this survey is to provide an overview of the different market arrangements in place throughout Europe regarding ancillary services procurement and balancing market design.

The maps illustrate how different approaches have been taken to the design elements across Europe.

The ENTSO-E Ancillary Services Working Group members who responded to the questionnaire are as follows:

Austria, Belgium, Bosnia & Herzegovina, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland & NI, Italy, Latvia, Lithuania, Norway, Poland, Portugal, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, The Netherlands, United Kingdom.

Introduction (2)

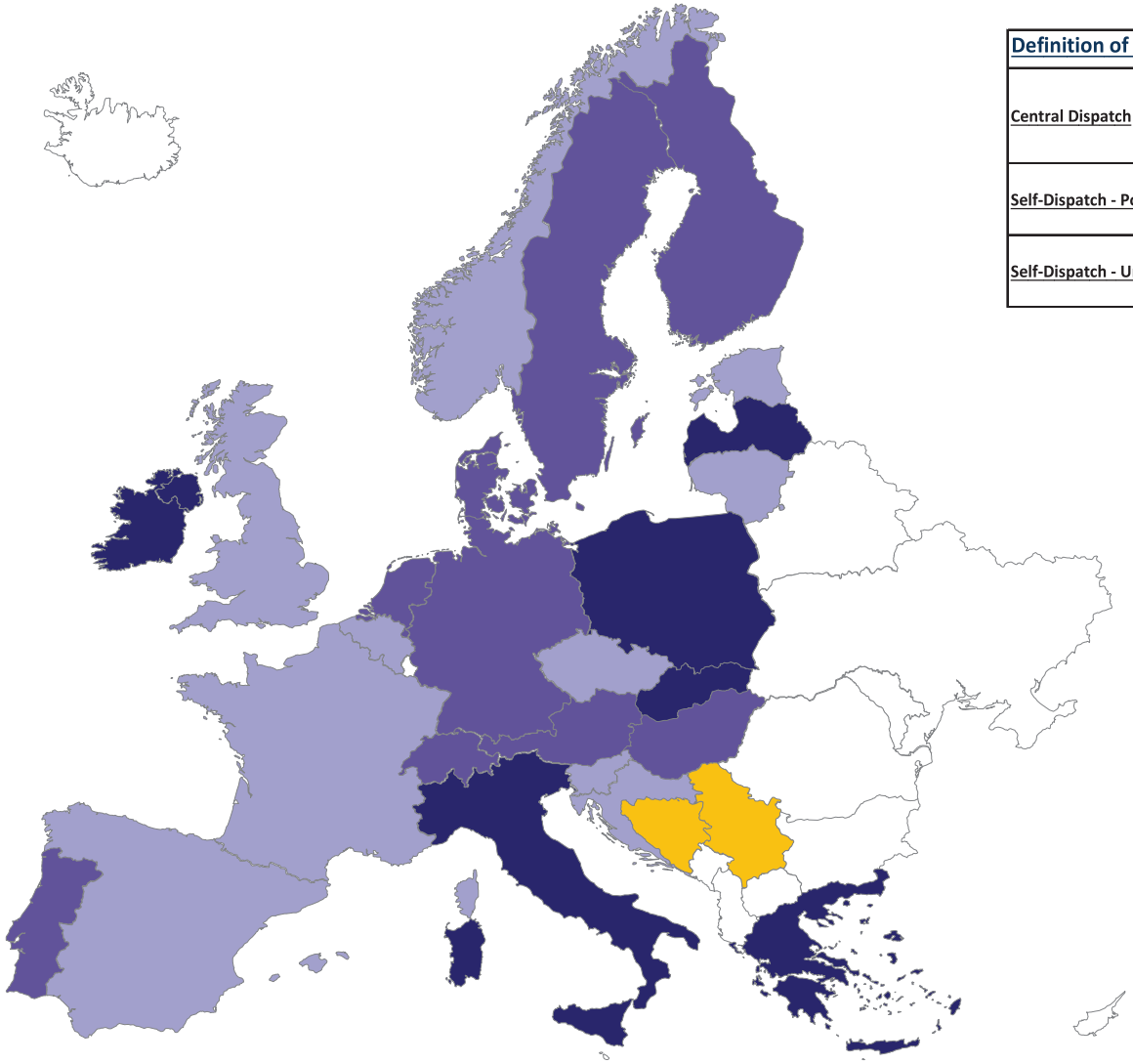
This document is expected to help with the introduction of the Network Code on Electricity Balancing and is meant as quite a comprehensive, but user-friendly set of information on the existing arrangements.

Caveats:

- This is a relatively high-level exercise (not all details are captured).
- In the development of a single set of definitions for the purpose of this survey, we experienced some difficulty to match the various concepts used in different countries. As a consequence, in some specific cases, the position of a country in a certain group might be debatable.
- This is based on information updated in November 2013 and describes the mechanisms in place in 2013, irrespective of any updates which might already be foreseen for the future.
- For each TSO who responded to the questionnaire but did not have answer to the certain question, they are marked with “N/A”. For a TSO who did not respond to the questionnaire they are marked with “Missing data”.

Note: please print in colour for distinction between answers!

What is the balancing process in place?

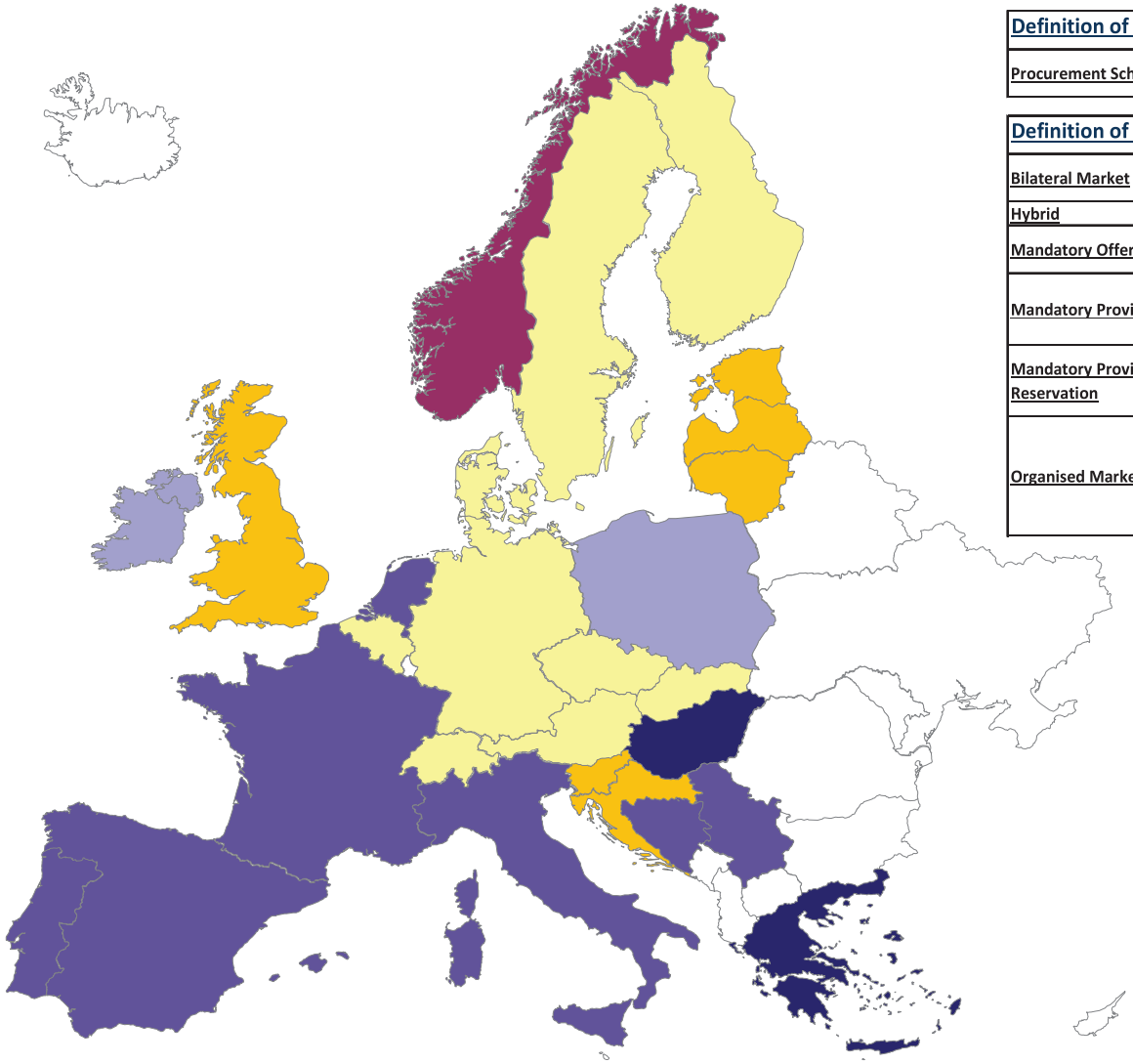


Definition of answer	
Central Dispatch	Central dispatch means a dispatch arrangement in a Relevant Area where the Transmission System Operator determines the commitment and output of a majority of generation or demand and issues dispatch instructions directly to them.
Self-Dispatch - Portfolio Based	A portfolio of units/generators (or other plant types) follow an aggregated schedule of actions to start/stop/increase output/decrease output in real time.
Self-Dispatch - Unit Based	Generators (or other plant types) following their own schedules of actions to start/stop/increase output/decrease output in real time.

Key:

- Missing data
- N/A
- Central Dispatch
- Self-Dispatch - Portfolio Based
- Self-Dispatch - Unit Based

Frequency Containment Reserve - Capacity - Procurement Scheme



Definition of question	
Procurement Scheme	Background of the offer, which is closest to the real operation time.

Definition of answer	
Bilateral Market	A grid user and TSO negotiate a contract regarding the offered service and price/price system.
Hybrid	Combination.
Mandatory Offers	Generators connected to the grid are obligated to offer the remaining capacity/available capacity.
Mandatory Provision	Generators connected to the grid are obligated to reserve a certain amount of capacity in order to meet TSO requirements, for a fixed price set by TSO, NRA or for free.
Mandatory Provision without Reservation	It is mandatory for dispatchable units to be able to provide frequency cintainment reserve, but these units are not required to reserve capacity to provide this service.
Organised Market	There is no contract or obligation for a grid user to offer the reserve (before the offer). The grid user can voluntary participate in the market (e.g. tender, auction, market platform (like PX)) and bid a price or customize his offer (e.g. the volume, timeframe). The market result may lead to a bilateral contract.

Key:

- Missing data
- N/A
- Mandatory Offers
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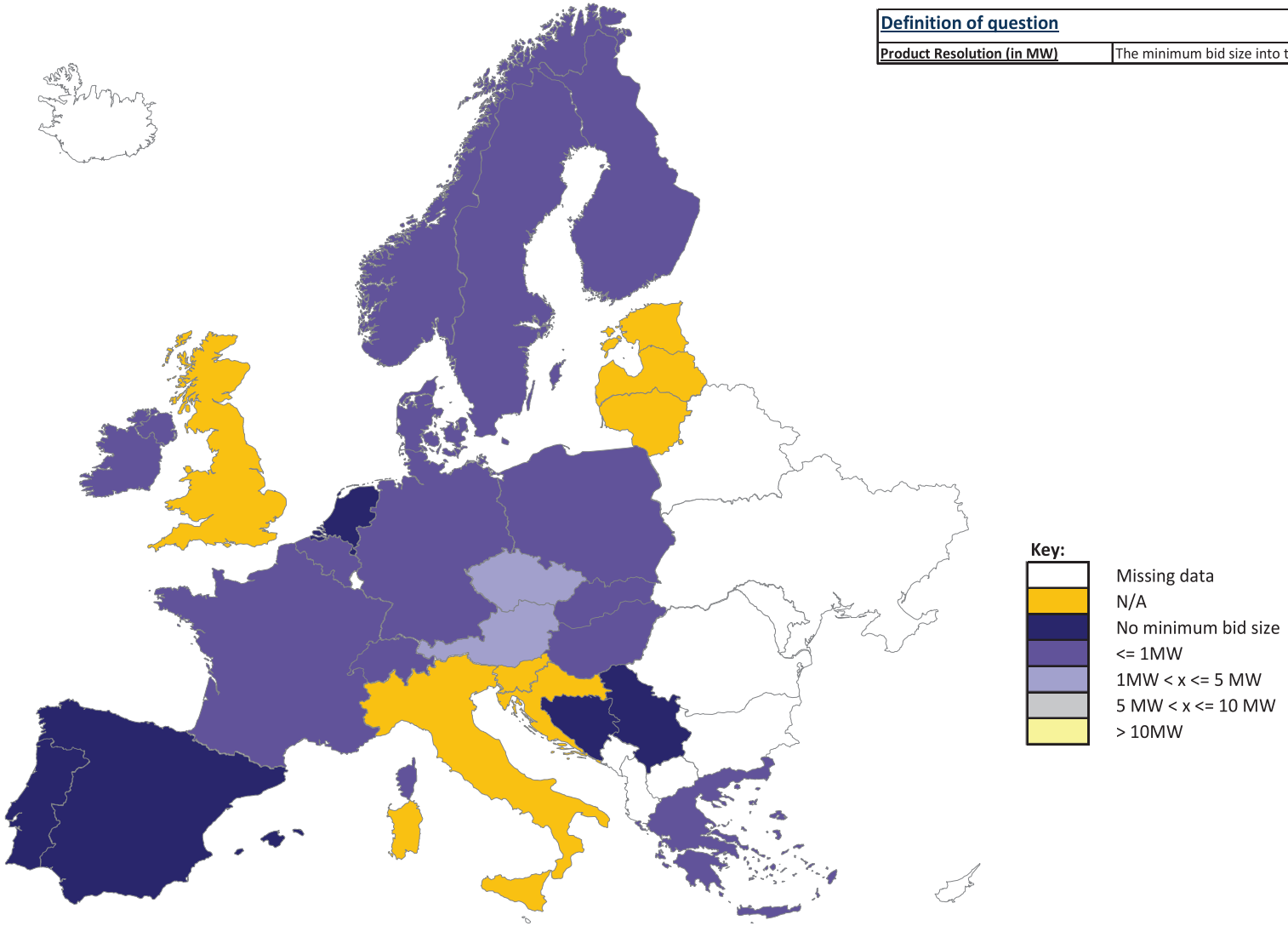
Frequency Containment Reserve - Capacity - Product Resolution (in MW)

Definition of question	
Product Resolution (in MW)	The minimum bid size into the balancing market.



Frequency Containment Reserve - Capacity - Product Resolution (in time)

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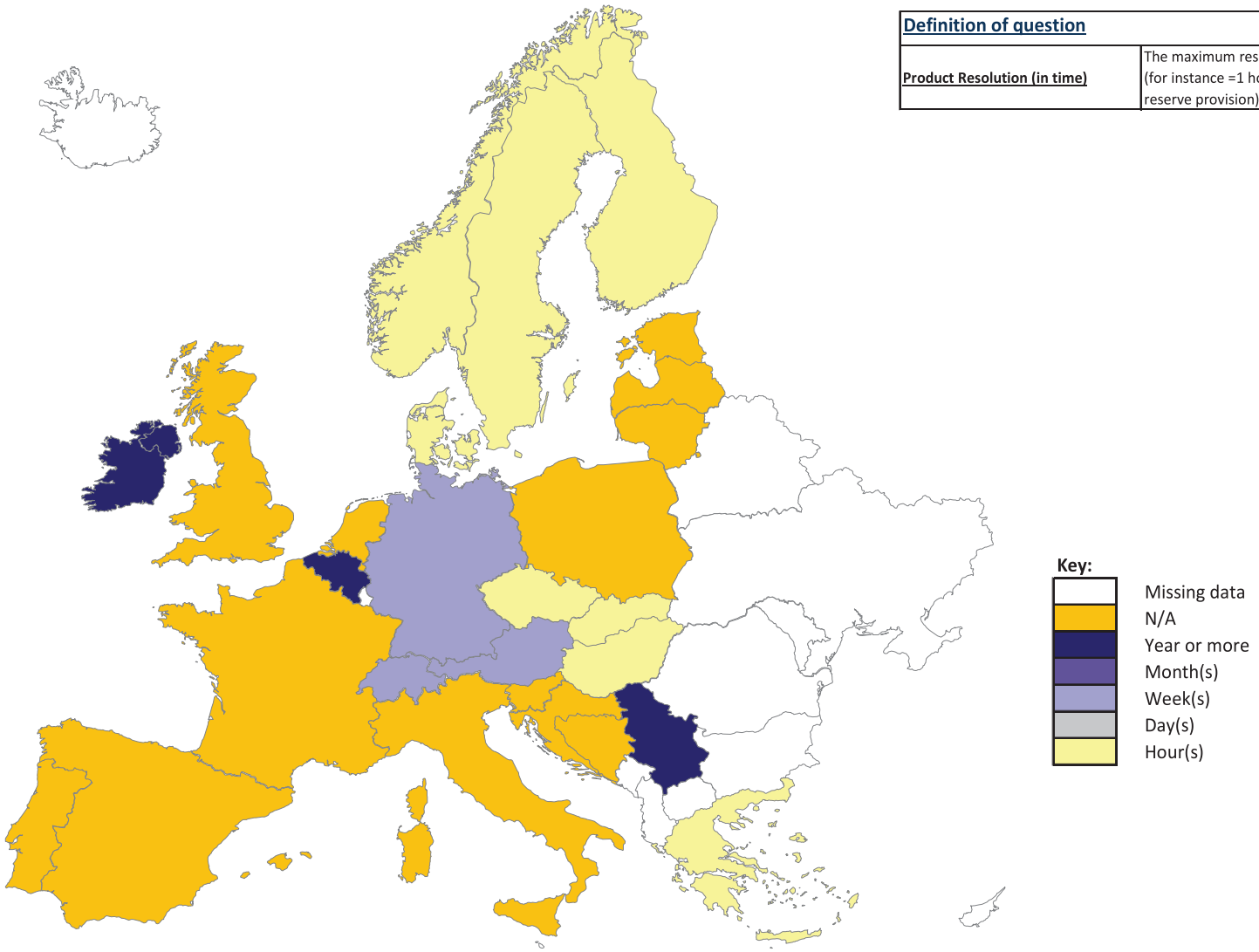

Frequency Containment Reserve - Capacity - Distance to real time of reserve products auctions

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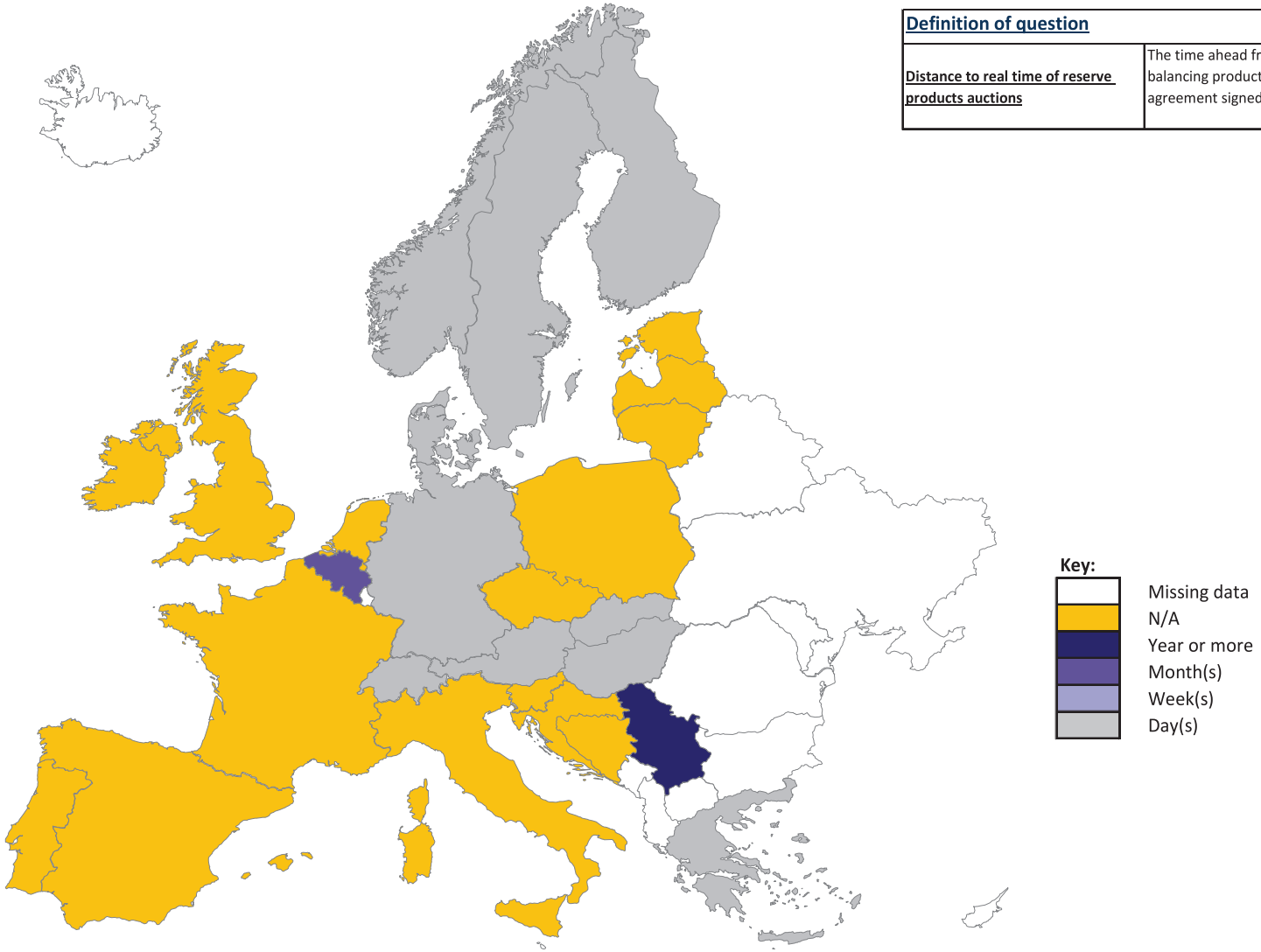
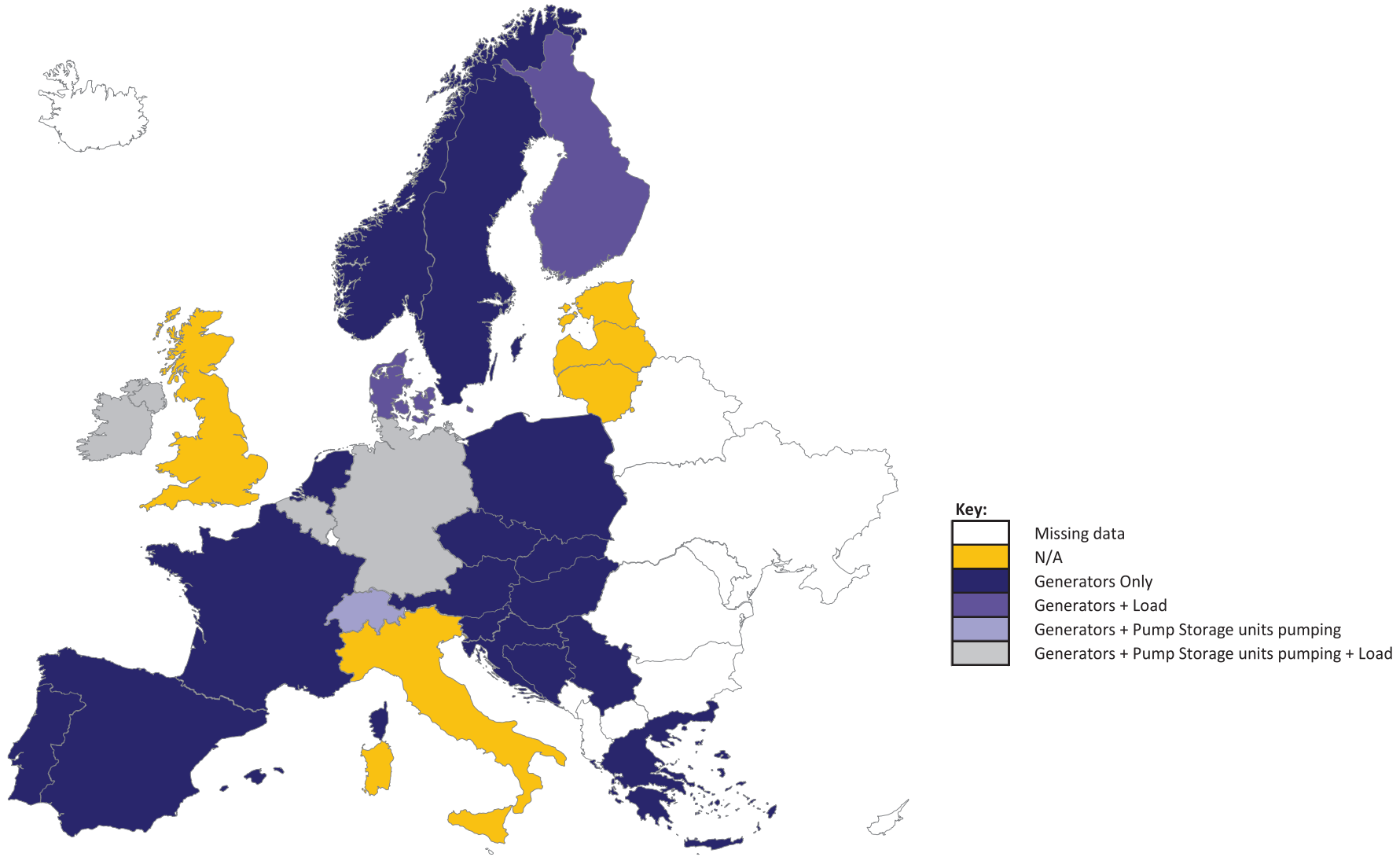


Frequency Containment Reserve - Capacity - Provider



Frequency Containment Reserve - Capacity - Symmetrical Product

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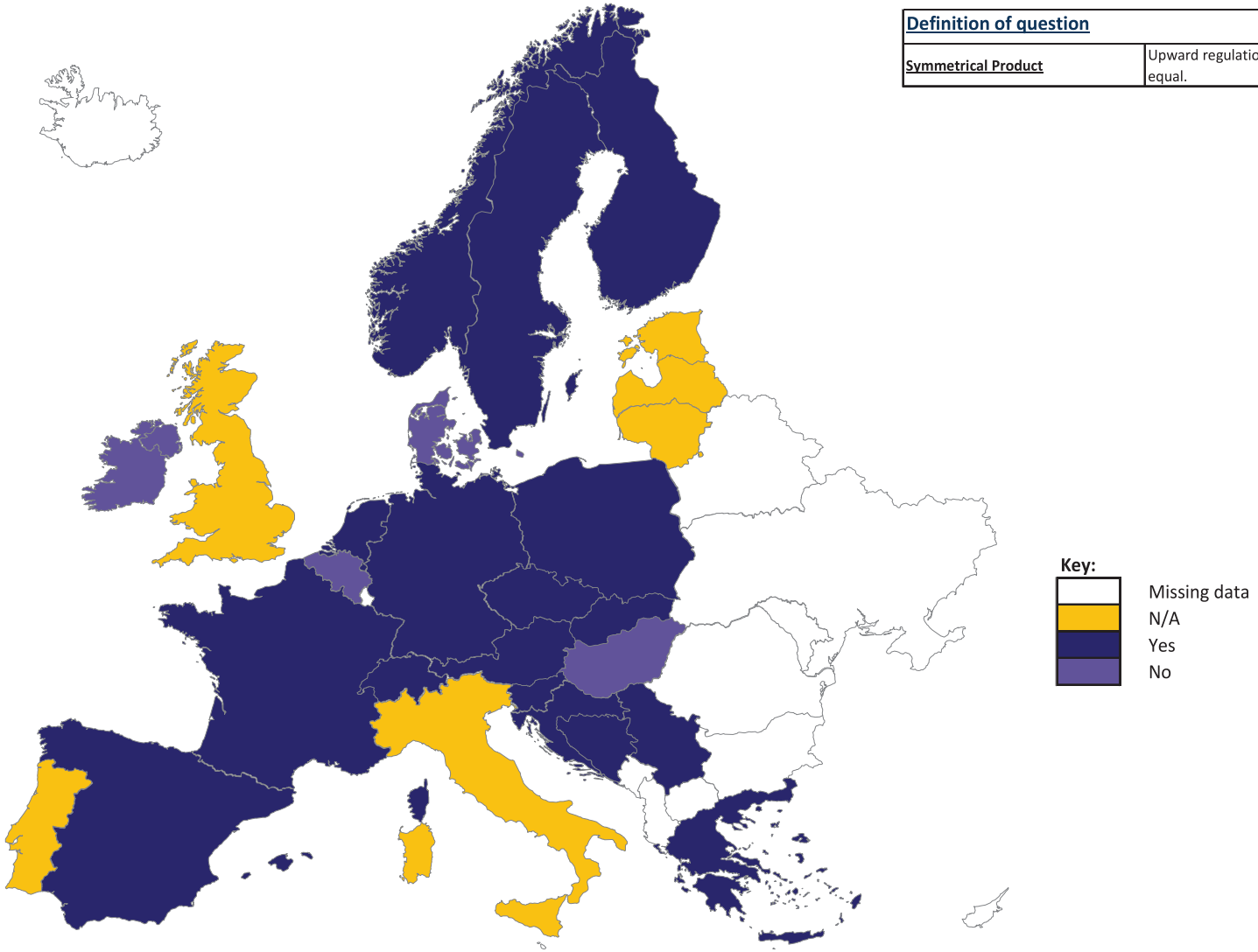
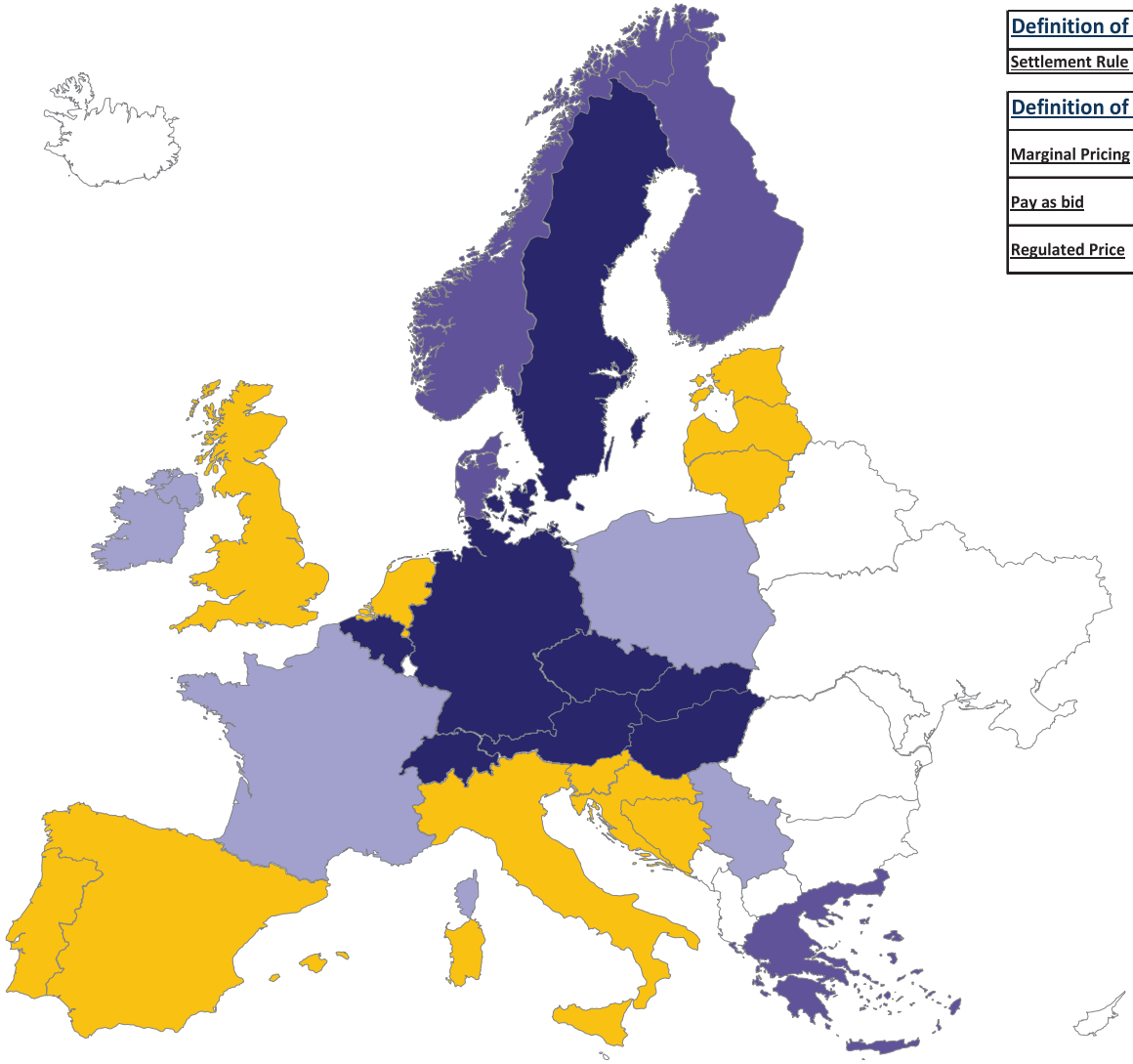


Frequency Containment Reserve - Capacity - Settlement Rule



Definition of question	
Settlement Rule	The pricing rules for settlement.

Definition of answer	
Marginal Pricing	Marginal pricing is the change in total cost that arises when the quantity produced changes by one unit.
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Key:

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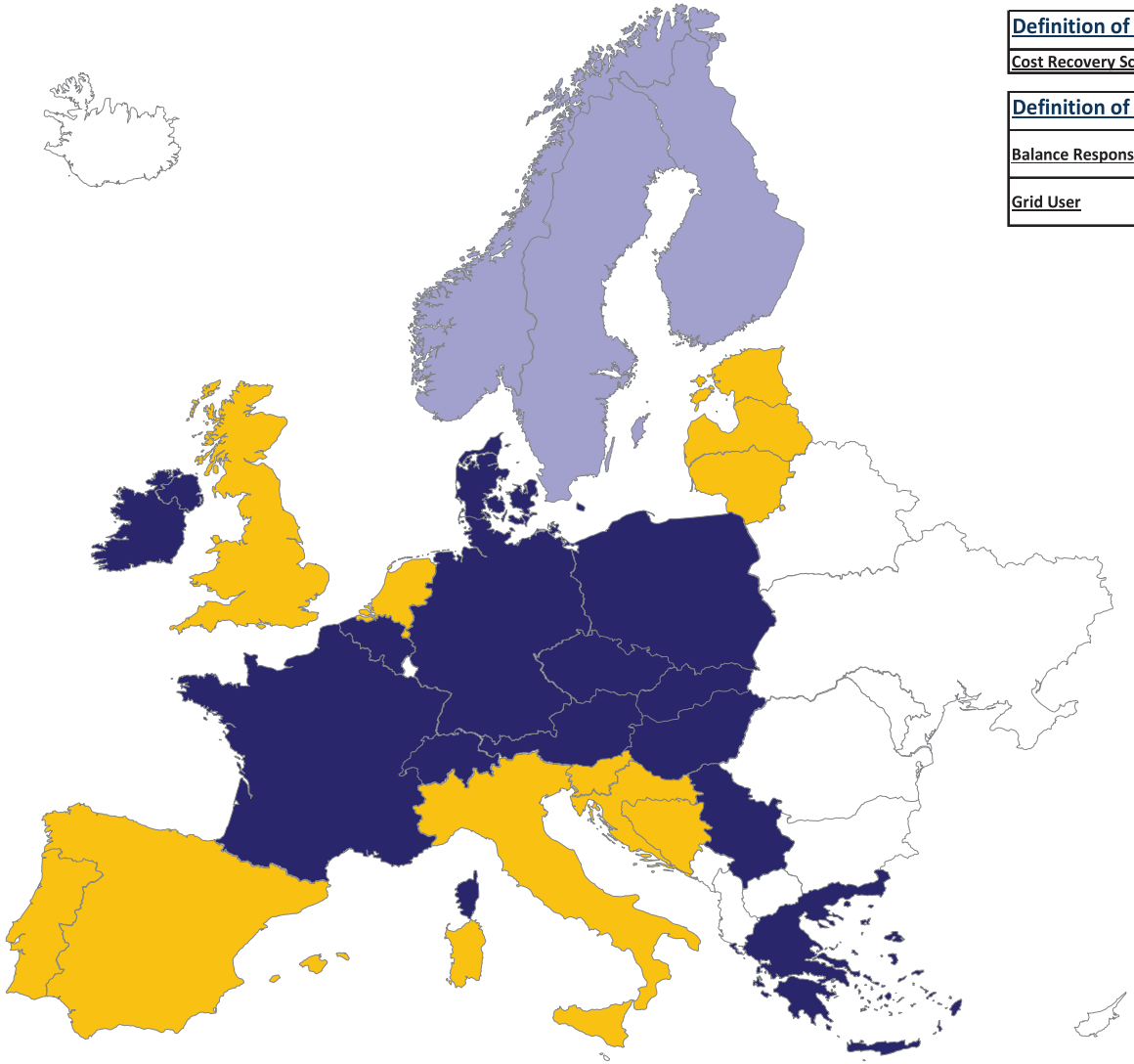
- Marginal Pricing
- Regulated Price

Frequency Containment Reserve - Capacity - Cost Recovery Scheme



Definition of question	
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Balance Responsible Party (BRP)	Balancing Responsible Party means a market participant or its chosen representative responsible for its Imbalances.
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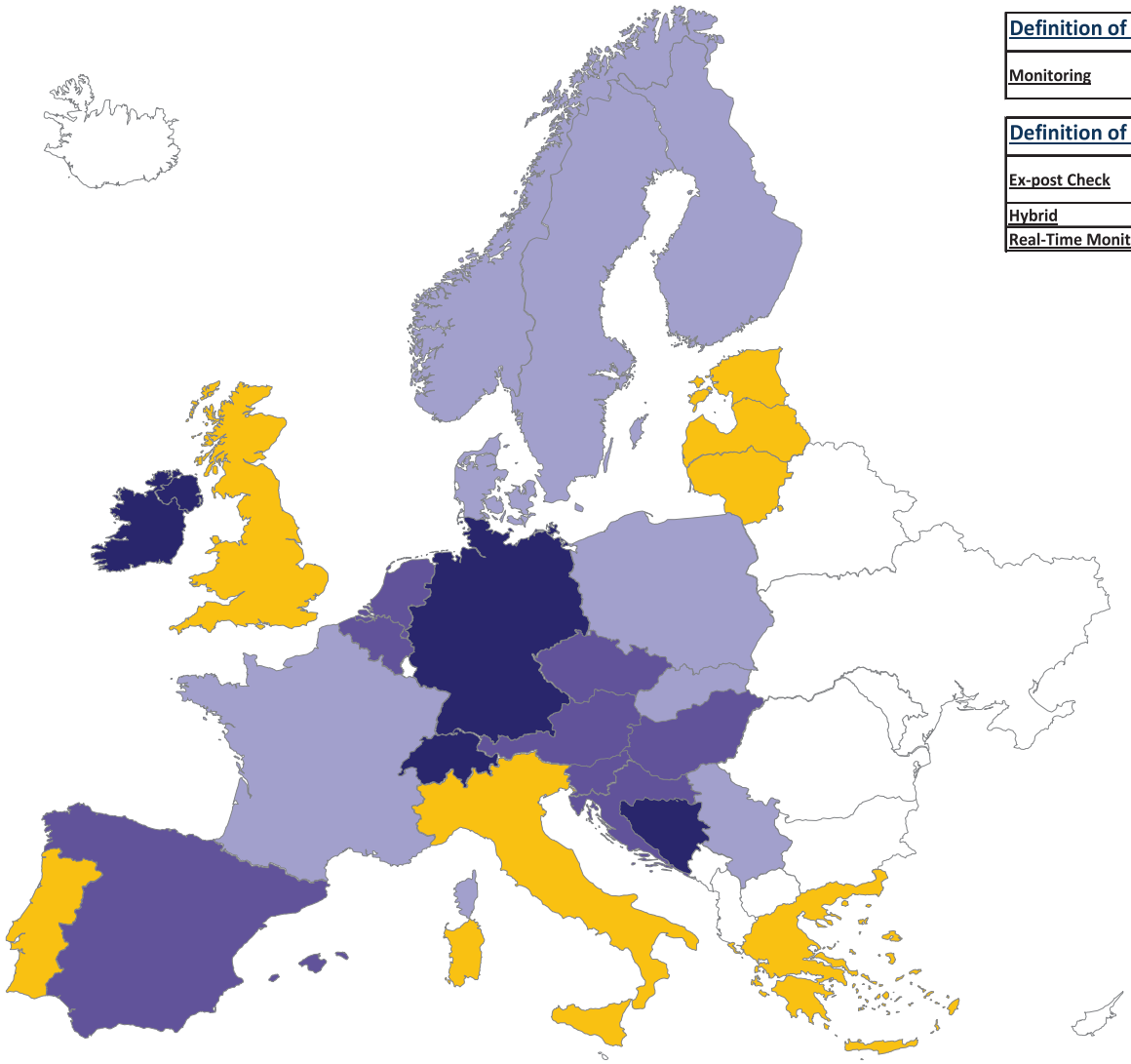
- Generators
- Consumers

Frequency Containment Reserve - Capacity - Monitoring



Definition of question	
Monitoring	Refers to the type of monitoring in place by the system operator to ensure performance of plant.

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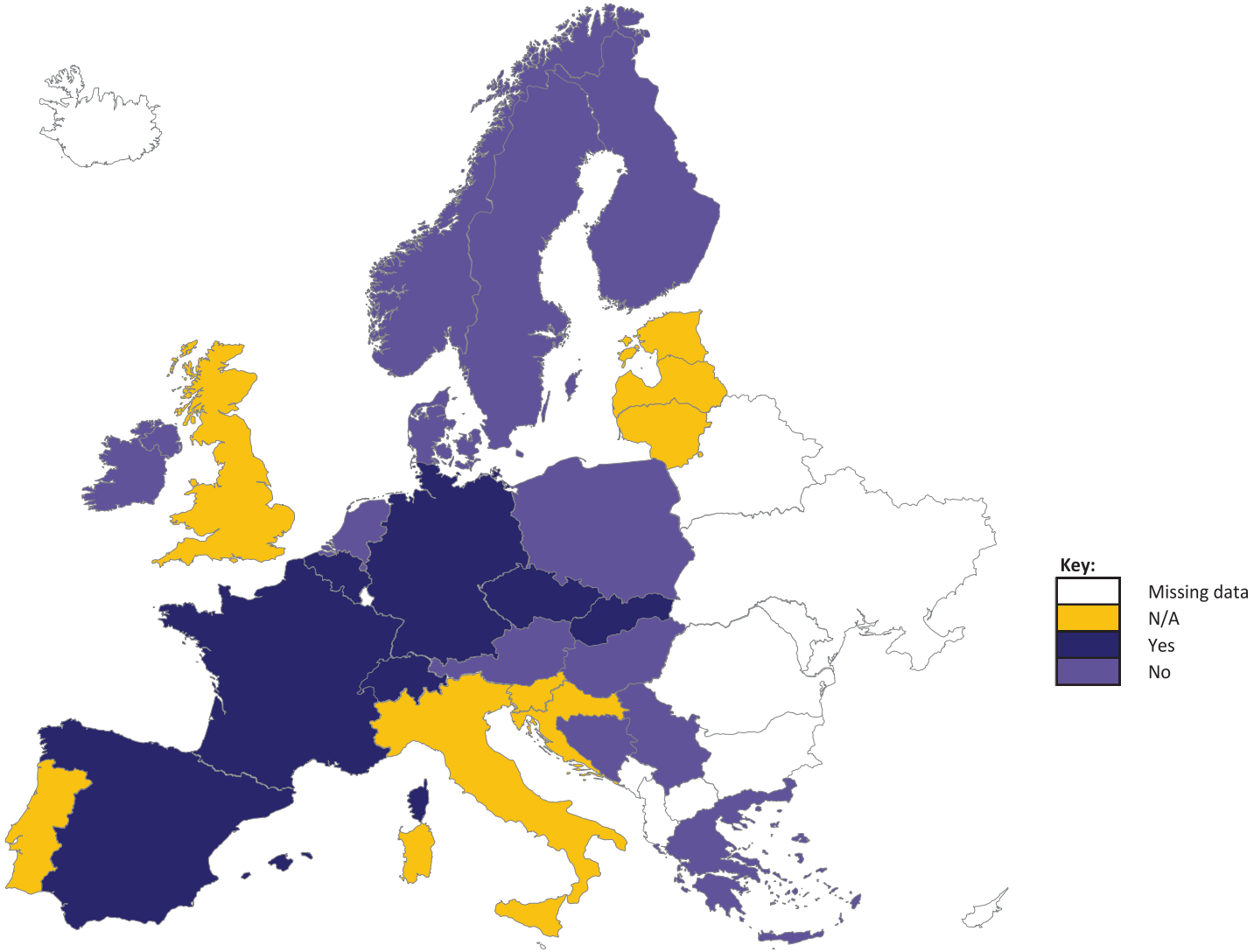
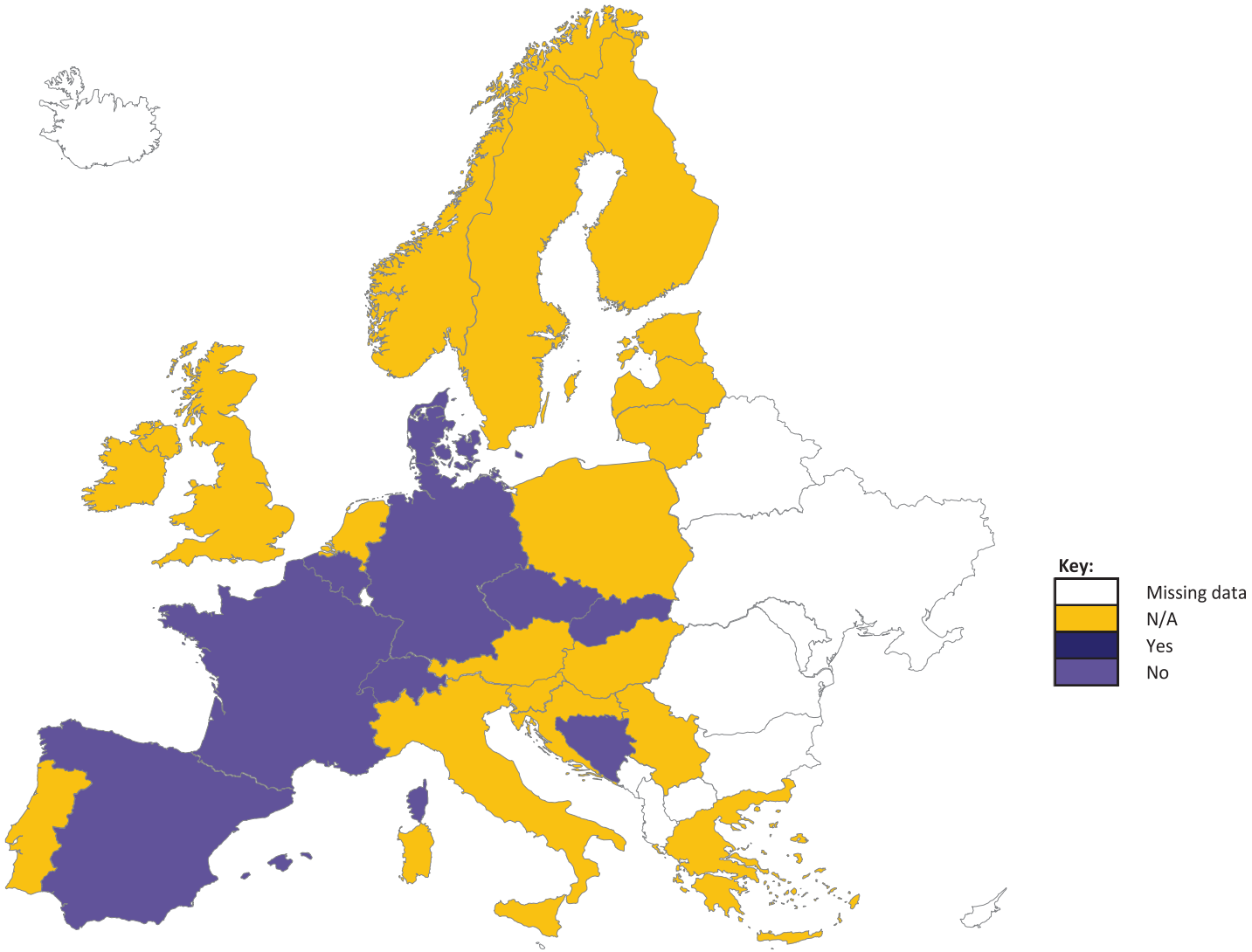
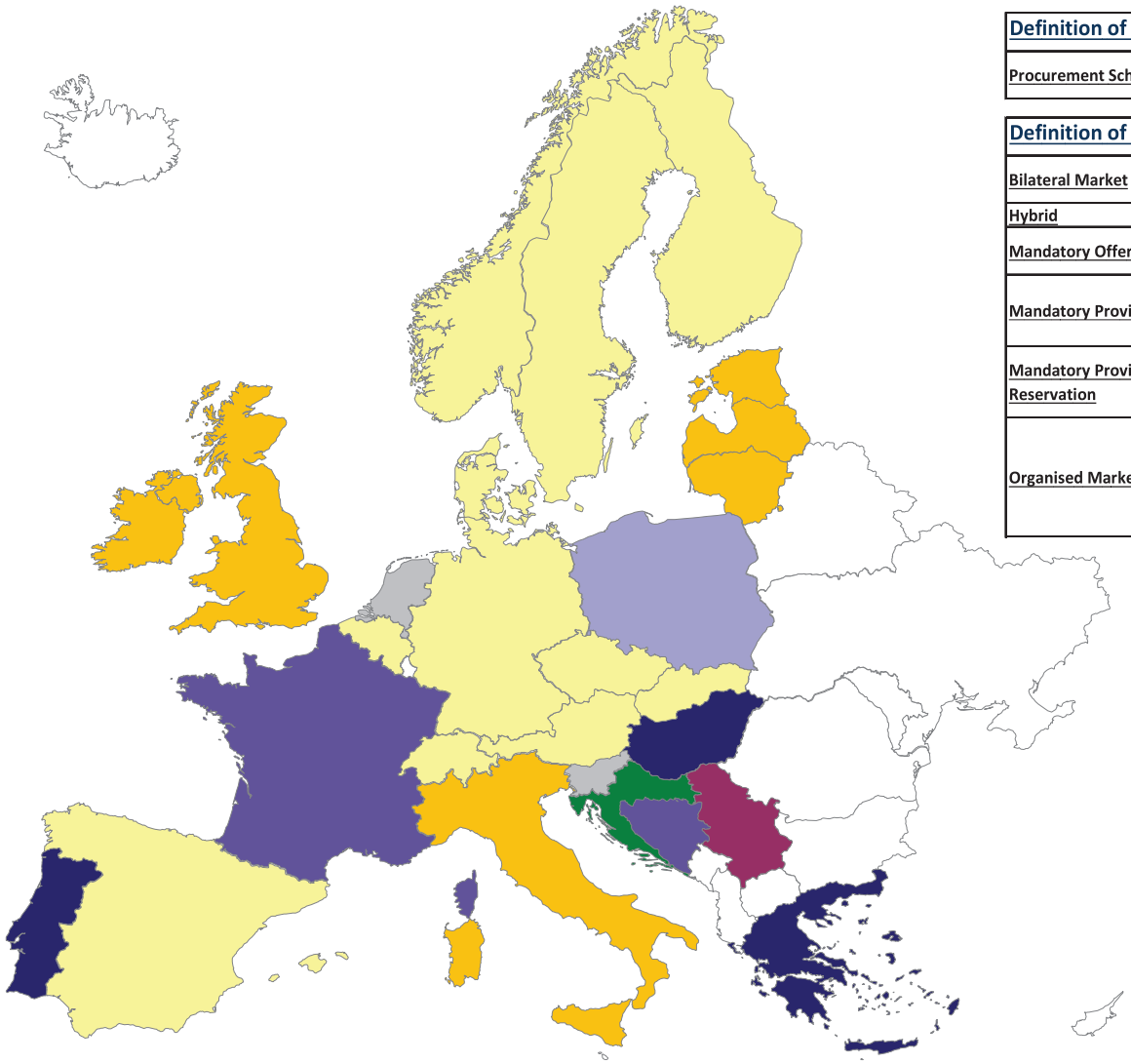
Frequency Containment Reserve - Capacity - Transfer of obligation allowed



Frequency Containment Reserve - Capacity - Obl. allowed, organised secondary market exists



Frequency Restoration Reserve (Automatic) - Capacity - Procurement Scheme



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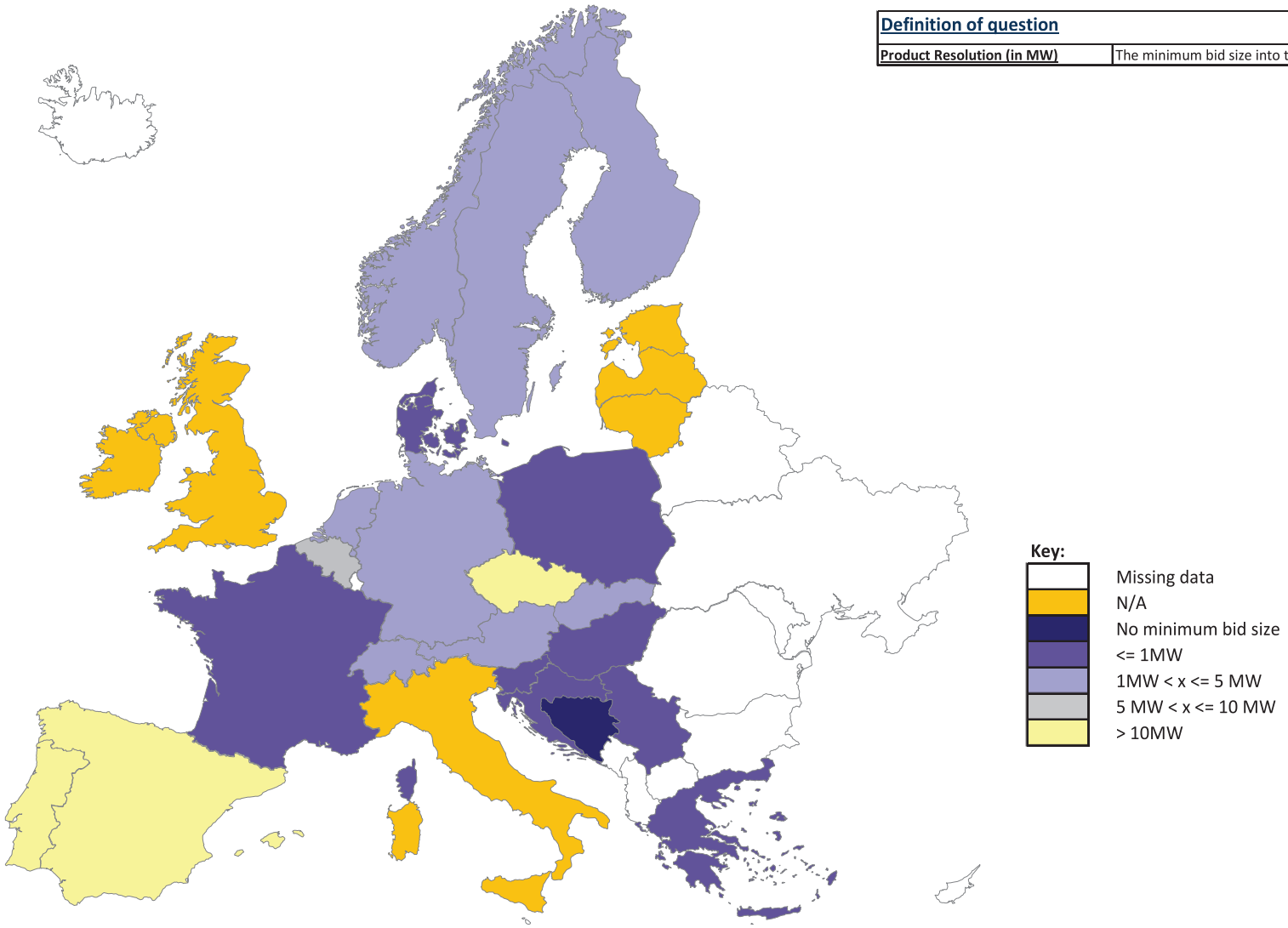

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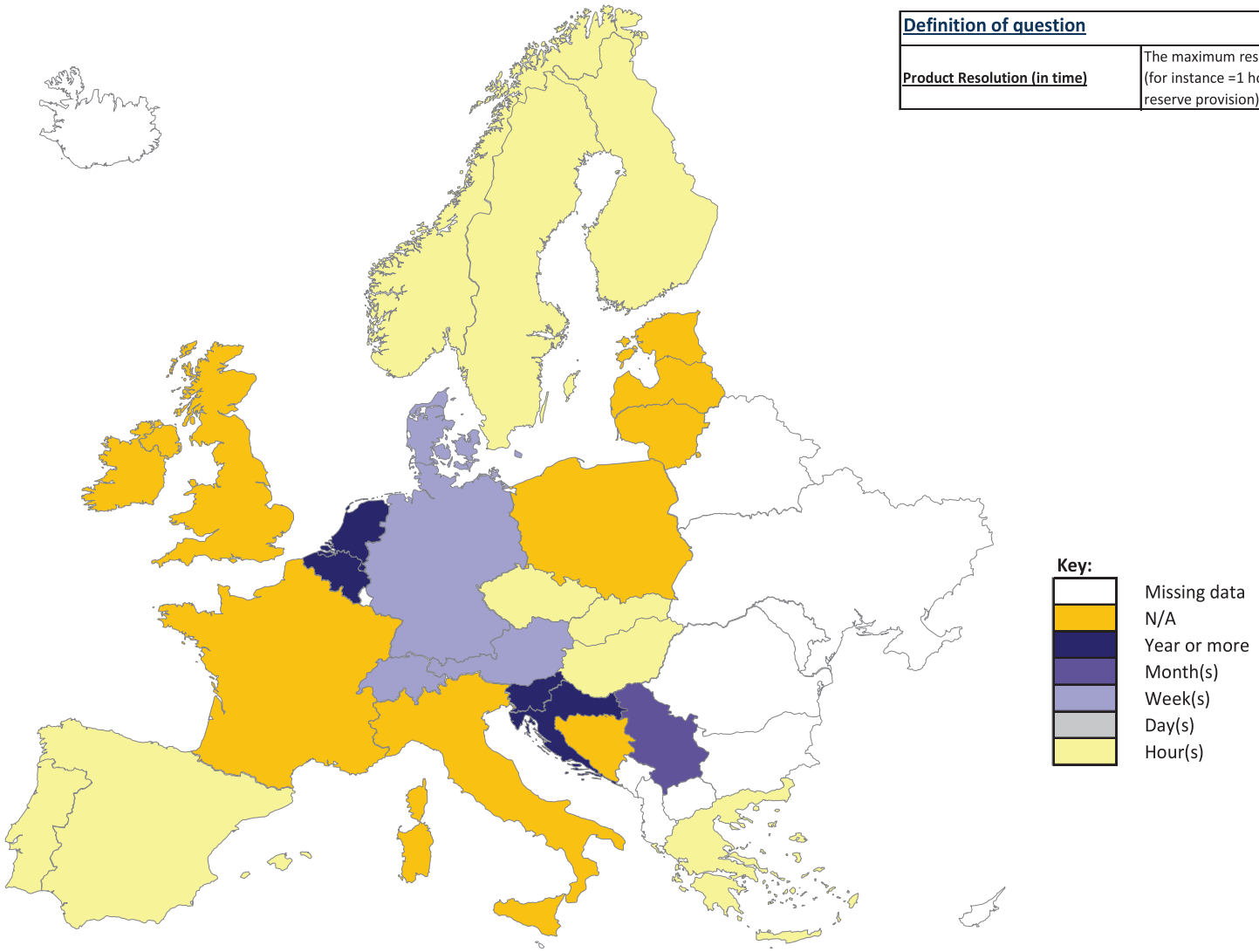
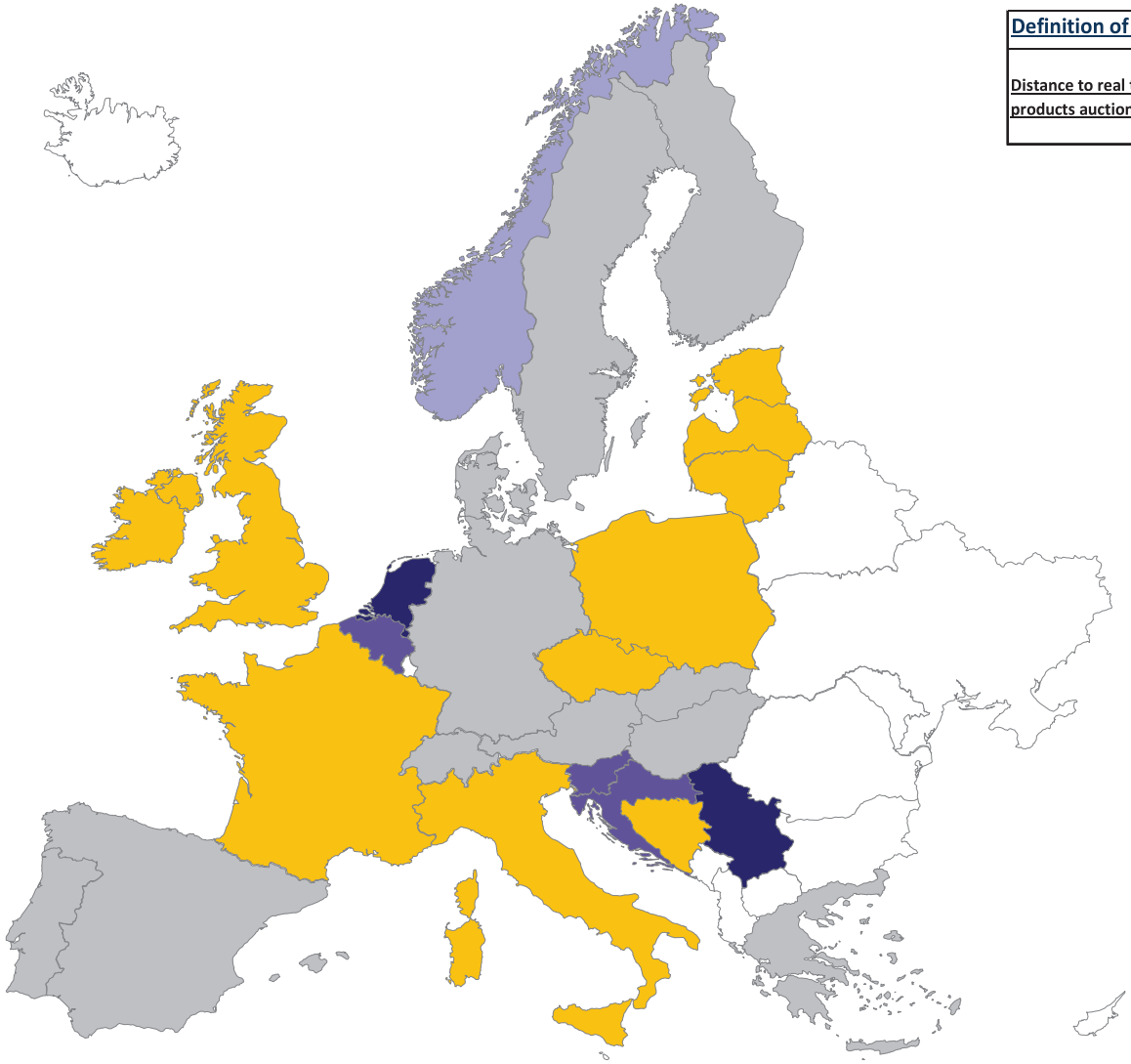


Frequency Restoration Reserve (Automatic) - Capacity - Distance to real time of reserve products auctions



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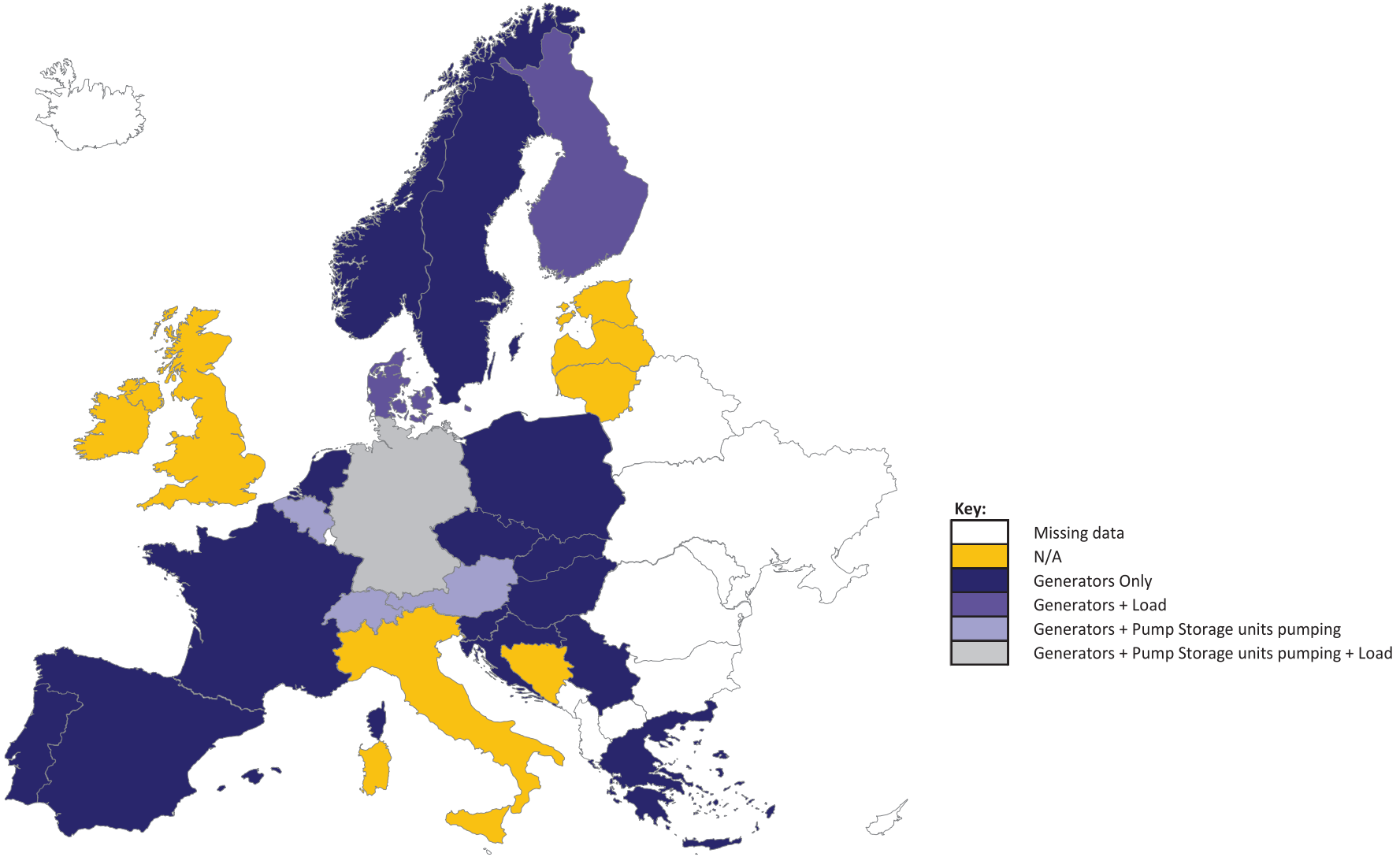

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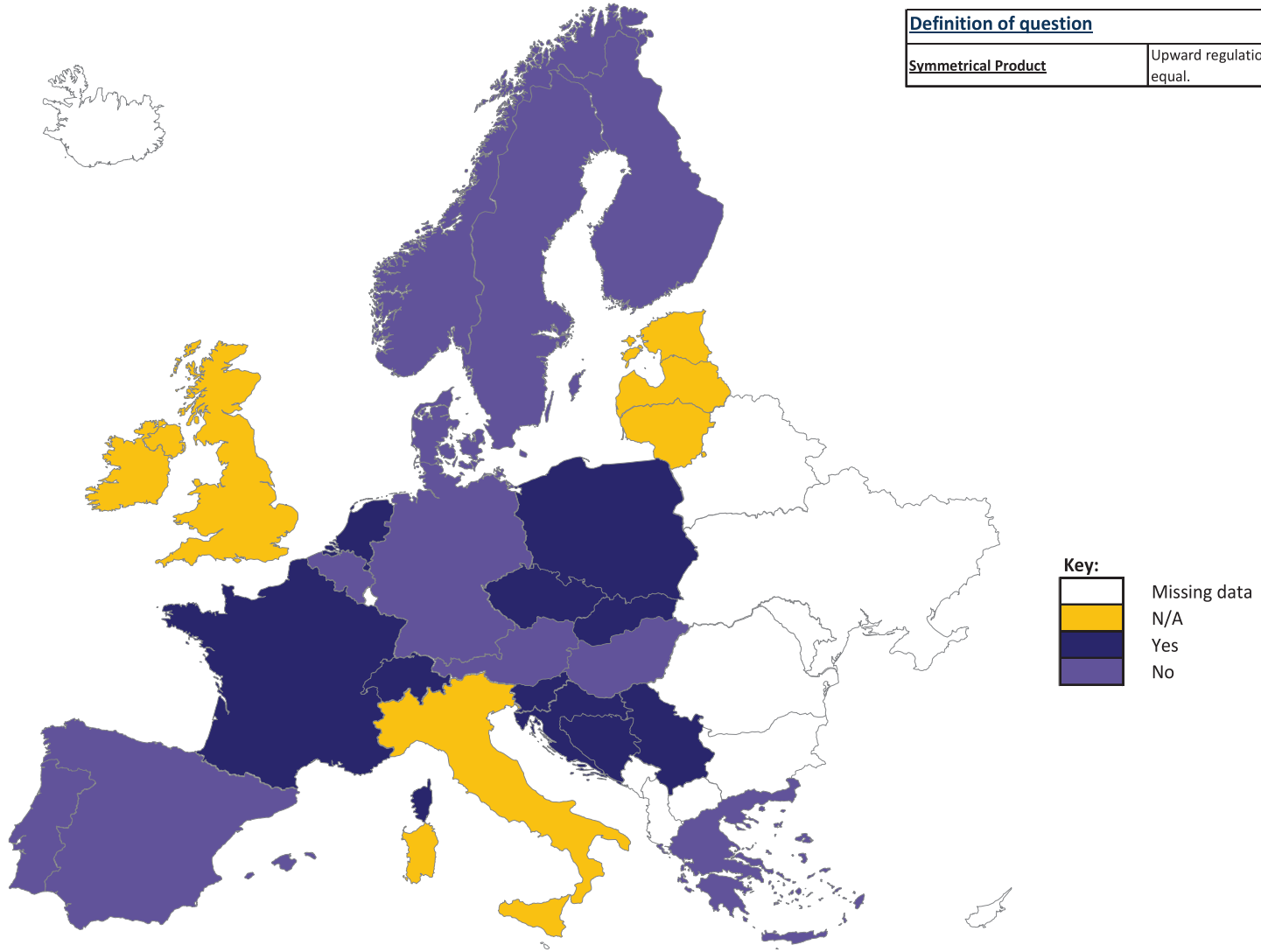
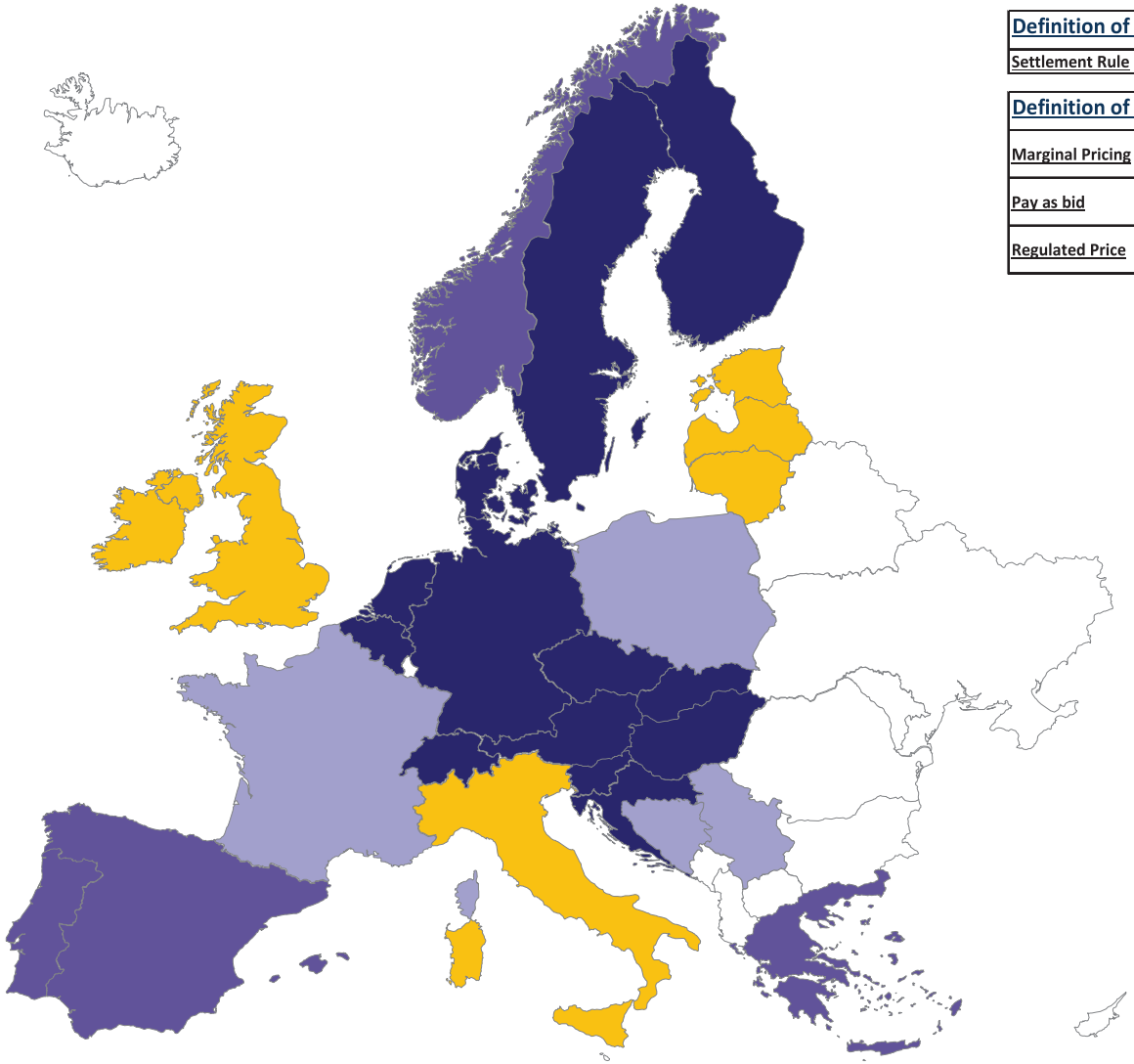


Frequency Restoration Reserve (Automatic) - Capacity - Settlement Rule



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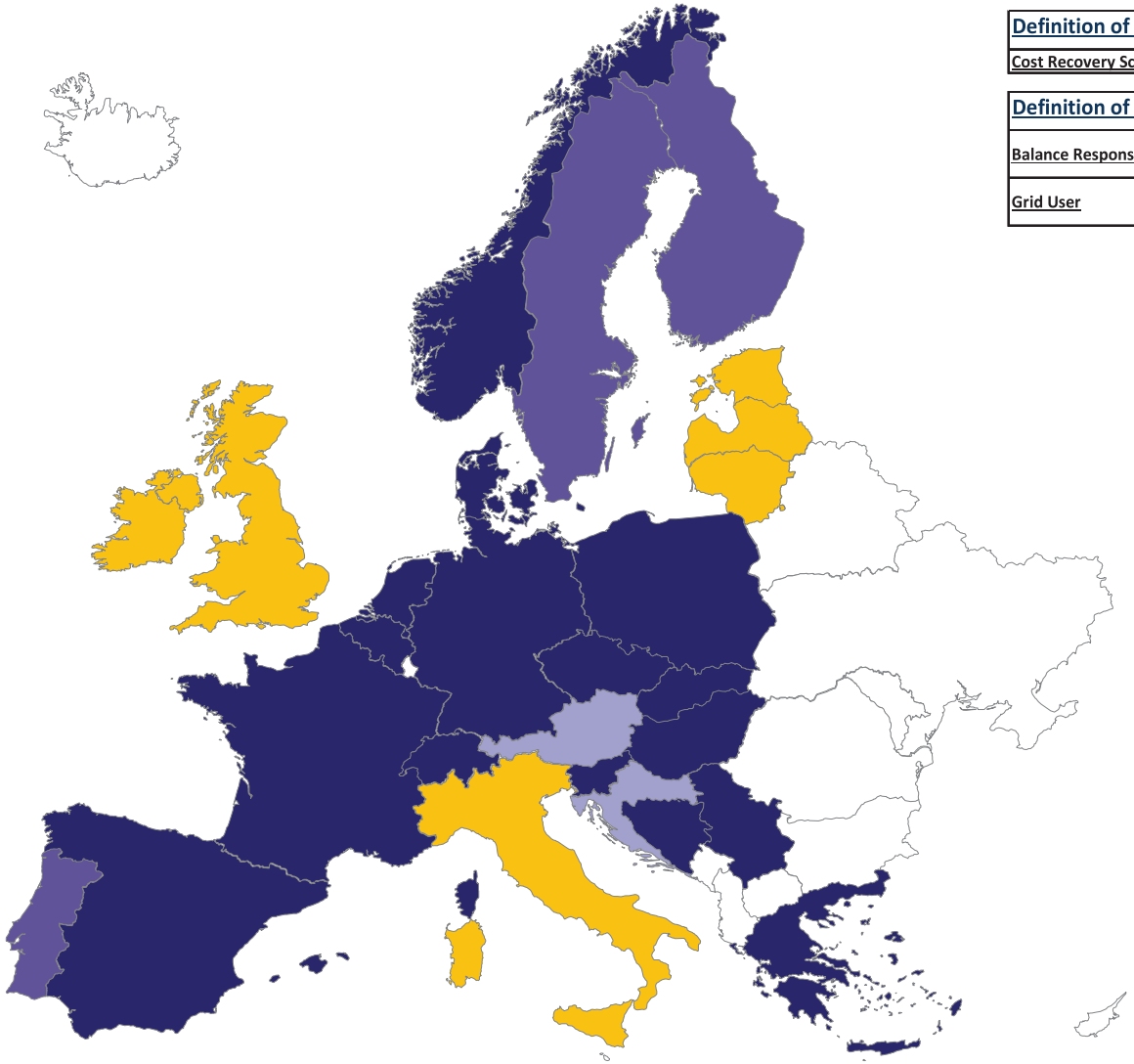
Frequency Restoration Reserve (Automatic) - Capacity - Cost Recovery Scheme



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Cost Recovery Scheme	From whom are the costs recovered.

Definition of answer	
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Grid User	The natural or legal person supplying to, or being supplied with active and/or reactive power by a TSO or DSO.

Key:

- Missing data
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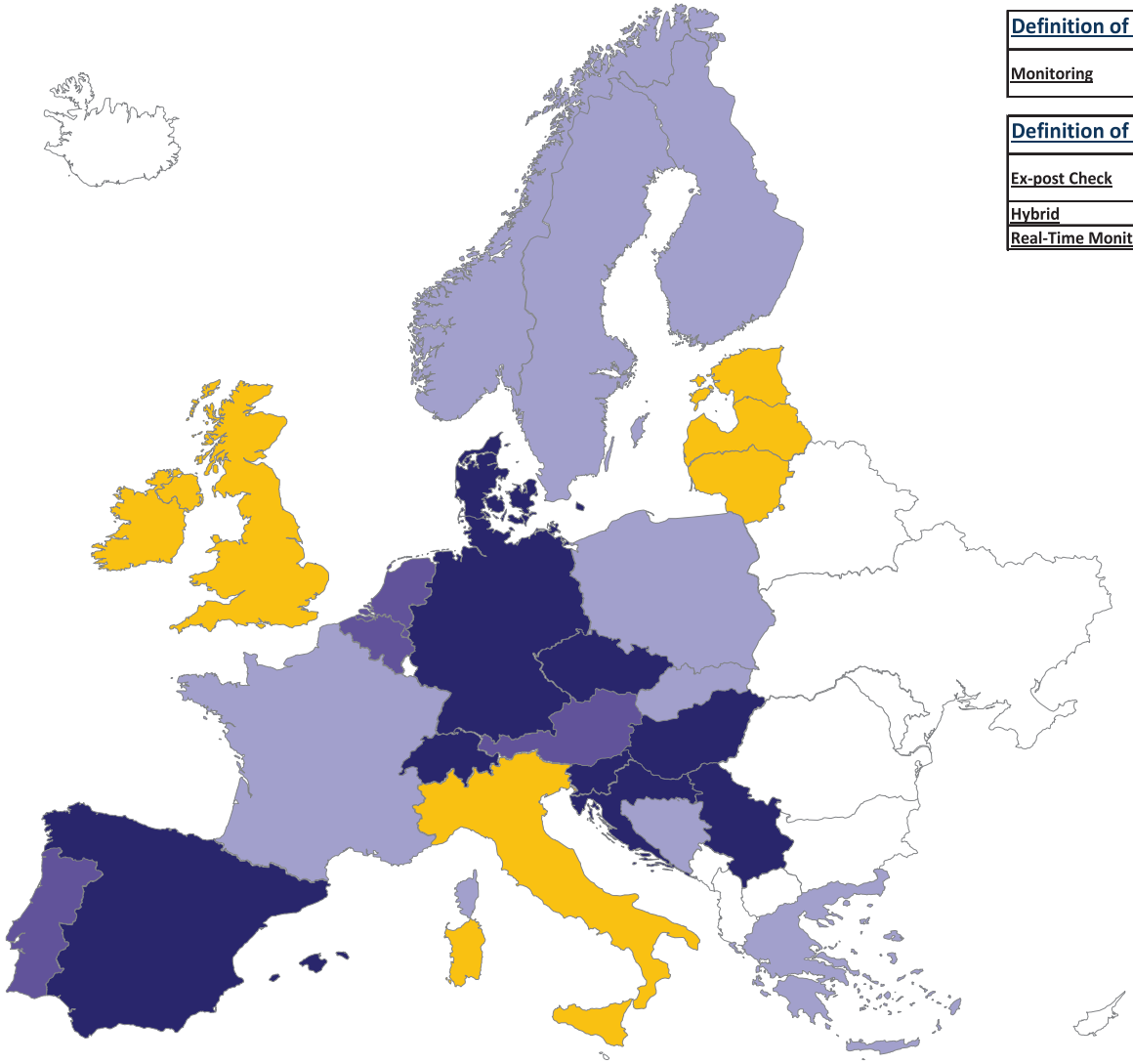
- 100% Grid Users
- 100% BRP
- Mix of Grid Users and BRP
- Mix of generators and BRPs

Frequency Restoration Reserve (Automatic) - Capacity - Monitoring



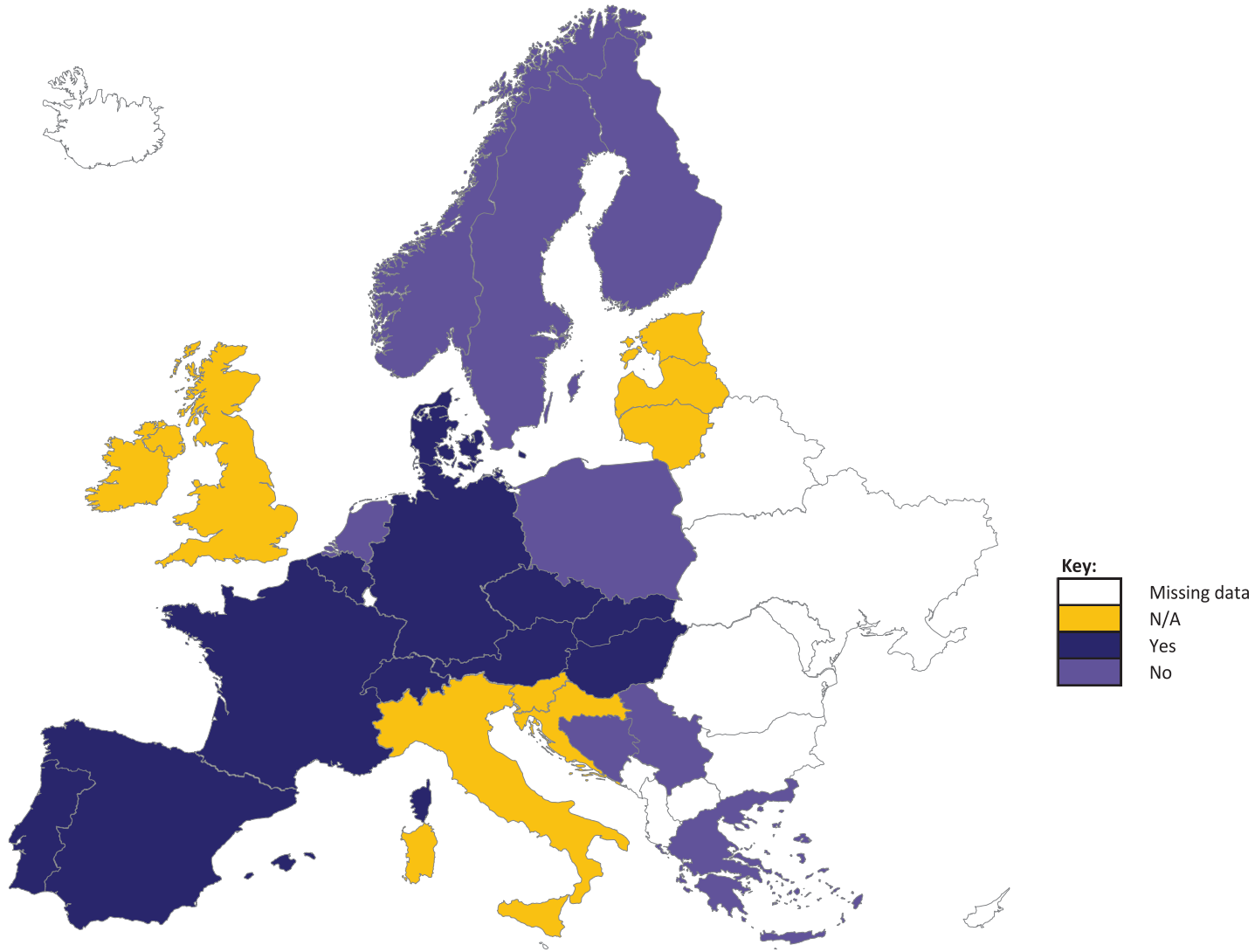
Definition of question	
Monitoring	Refers to the type of monitoring in place by the system operator to ensure performance of plant.

Definition of answer	
Ex-post Check	When the monitoring of performance of plant carried out after the event.
Hybrid	Combination.
Real-Time Monitoring	Monitoring of delivery of ancillary services in real time.

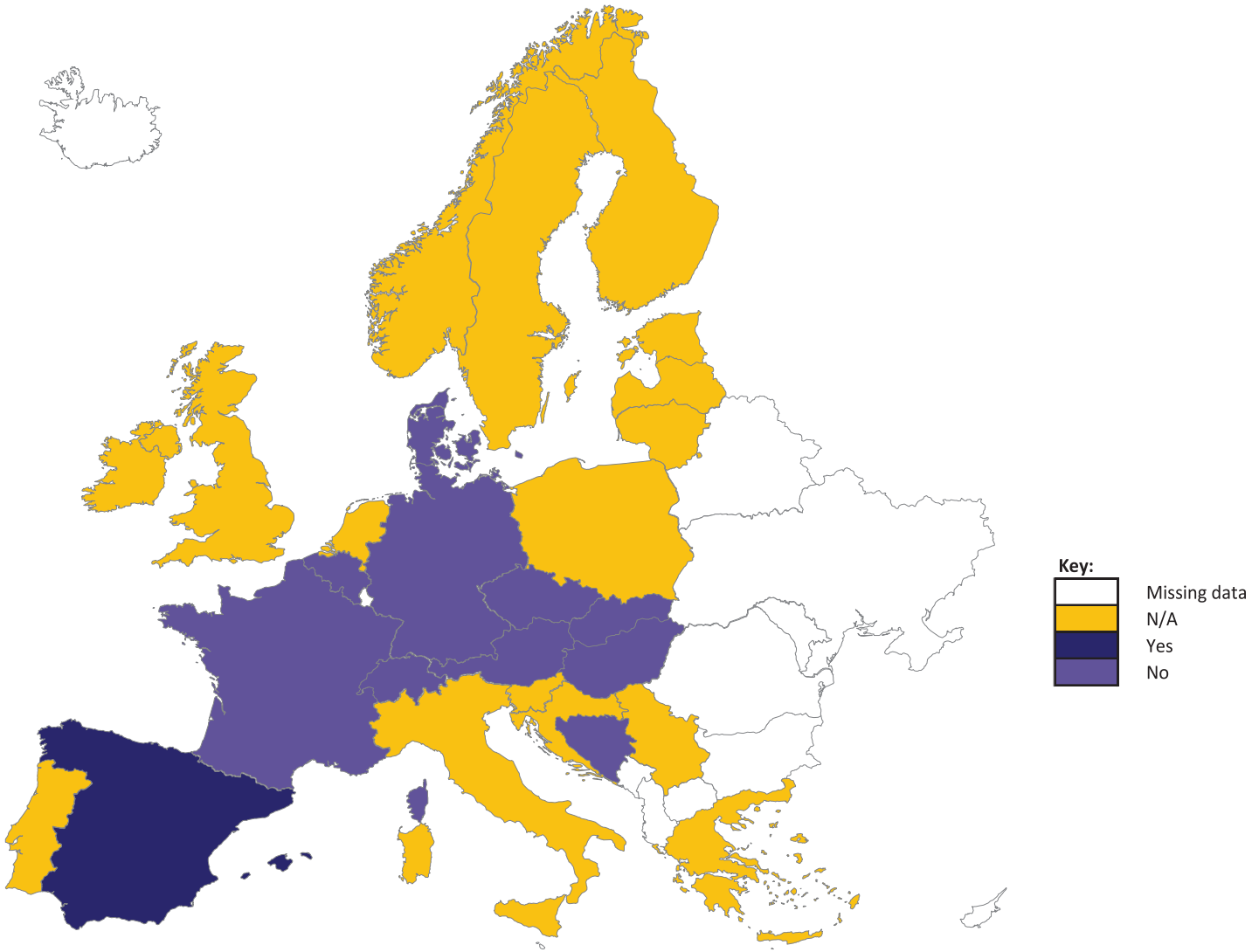
Key:

- Missing data
- N/A
- Real-Time Monitoring
- Ex-Post Check
- Hybrid

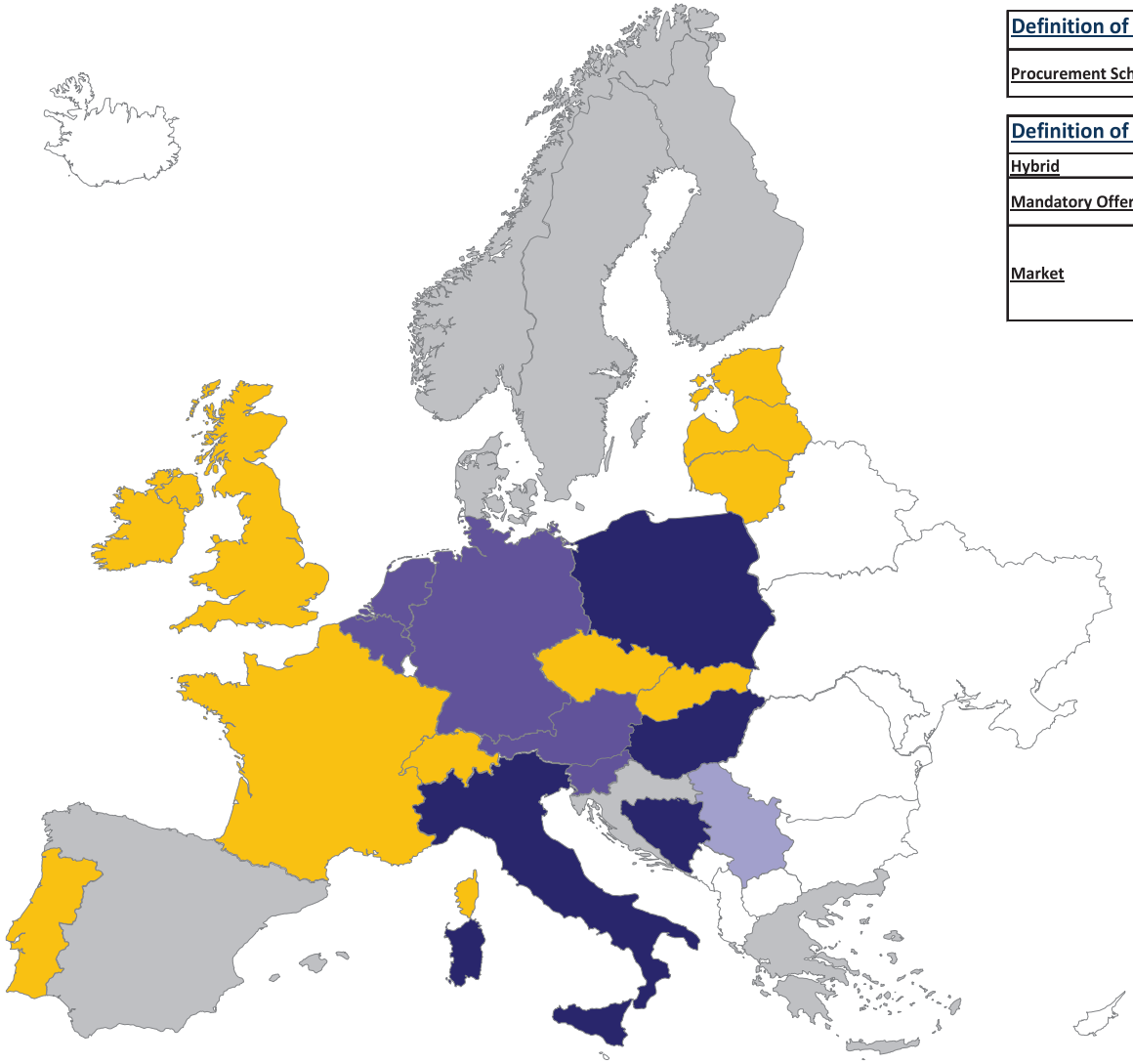
Frequency Restoration Reserve (Automatic) - Capacity - Transfer of obligation allowed



Frequency Restoration Reserve (Automatic) - Capacity - Obl. allowed, organised secondary market exists



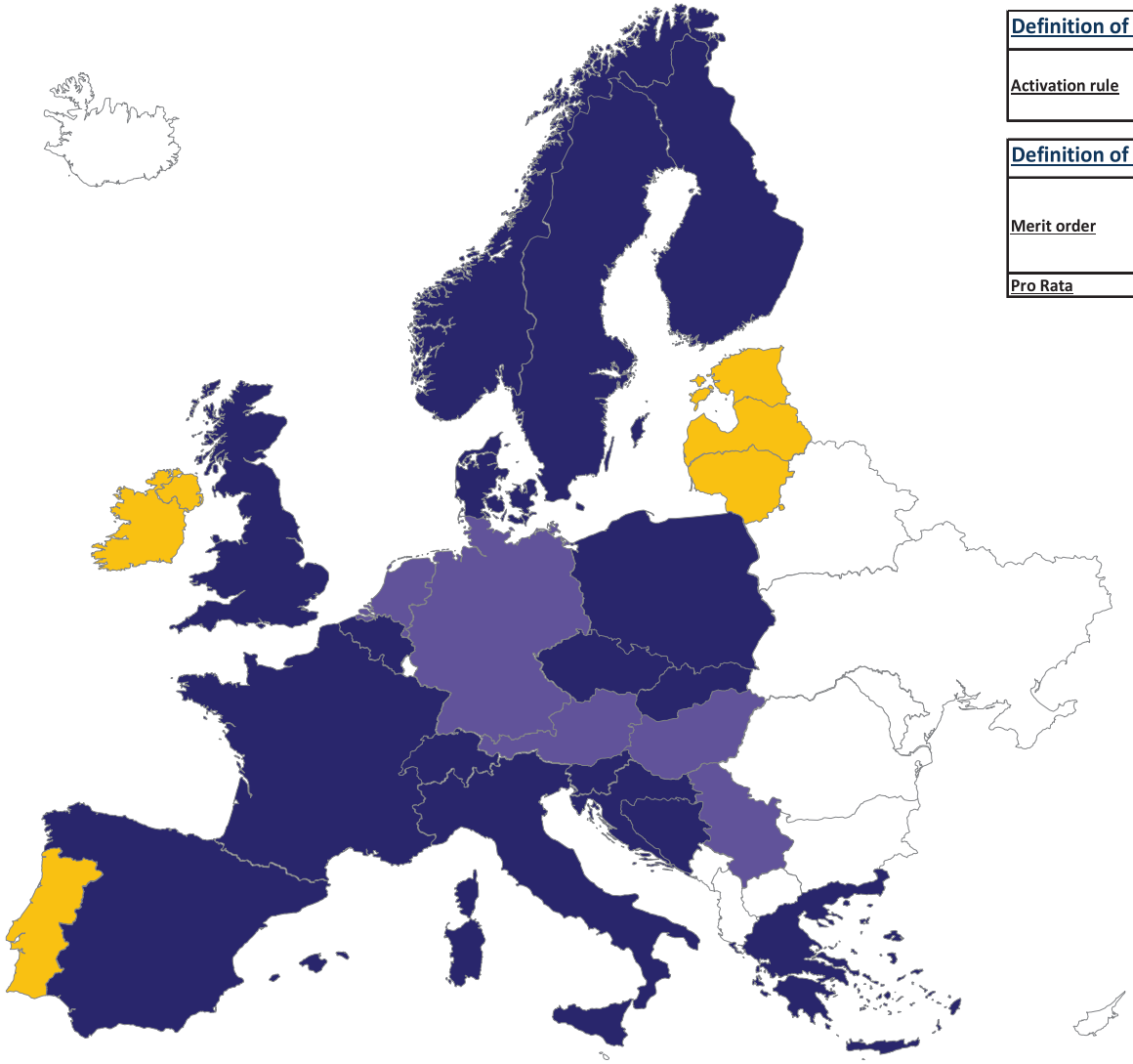
Frequency Restoration Reserve (Automatic) - Energy - Procurement Scheme



Definition of question	
Procurement Scheme	Background of the offer, which is closest to the real operation time.

Definition of answer	
Hybrid	Combination.
Mandatory Offers	Generators connected to the grid are obligated to offer the remaining capacity/available capacity.
Market	There is no contract or obligation for a grid user to offer the energy (before the offer). The grid user can voluntary participate in the real-time energy market and bid a price or customize his offer (e.g. the volume, timeframe).

Frequency Restoration Reserve (Automatic) - Energy - Activation Rule



Definition of question	
Activation rule	How the frequency restoration reserves are activated i.e. by a Pro-Rata system or on the basis of a Merit Order (cheapest being activated first).

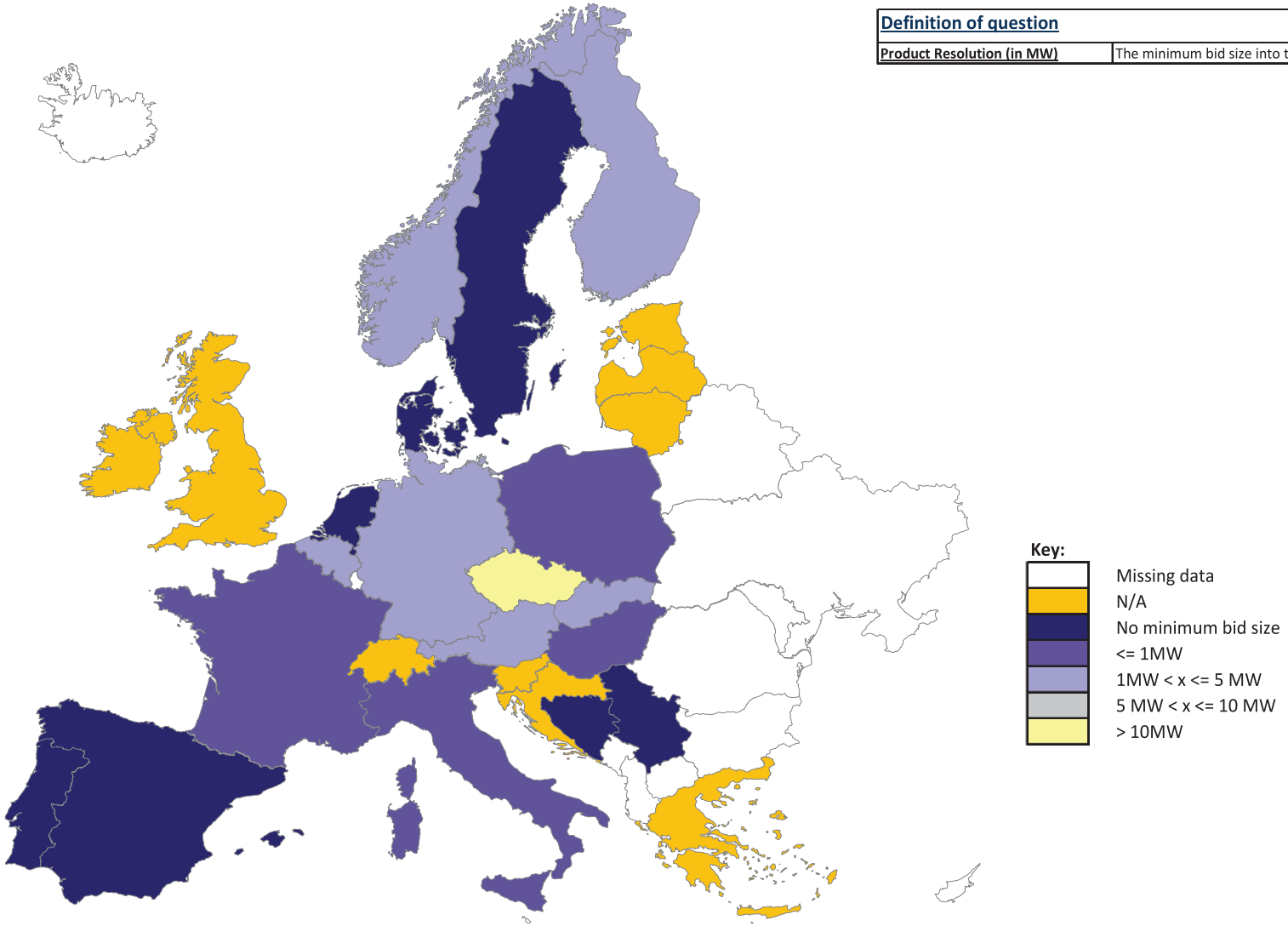
Definition of answer	
Merit order	A merit order is a way of ranking available sources of energy in ascending order of their short run marginal costs of production, so that those with the lowest marginal costs are the first ones to be brought online to meet demand.
Pro Rata	In Proportion (Parallel Activation).

Key:

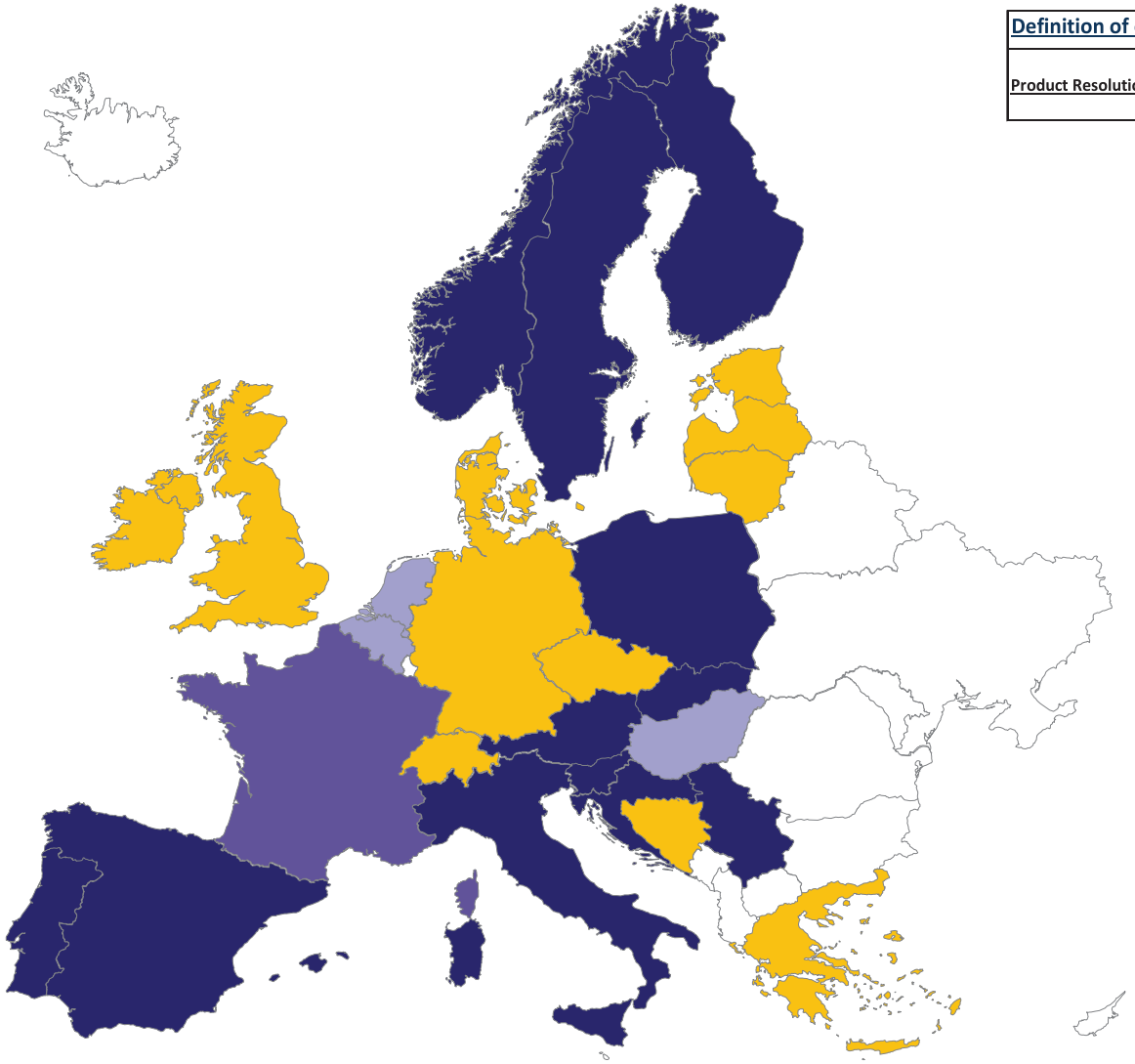
- Missing data
- N/A
- Pro Rata (Parallel Activation)
- Merit order

Frequency Restoration Reserve (Automatic) - Energy - Product Resolution (in MW)

Definition of question	
Product Resolution (in MW)	The minimum bid size into the balancing market.



Frequency Restoration Reserve (Automatic) - Energy - Product Resolution (in time)



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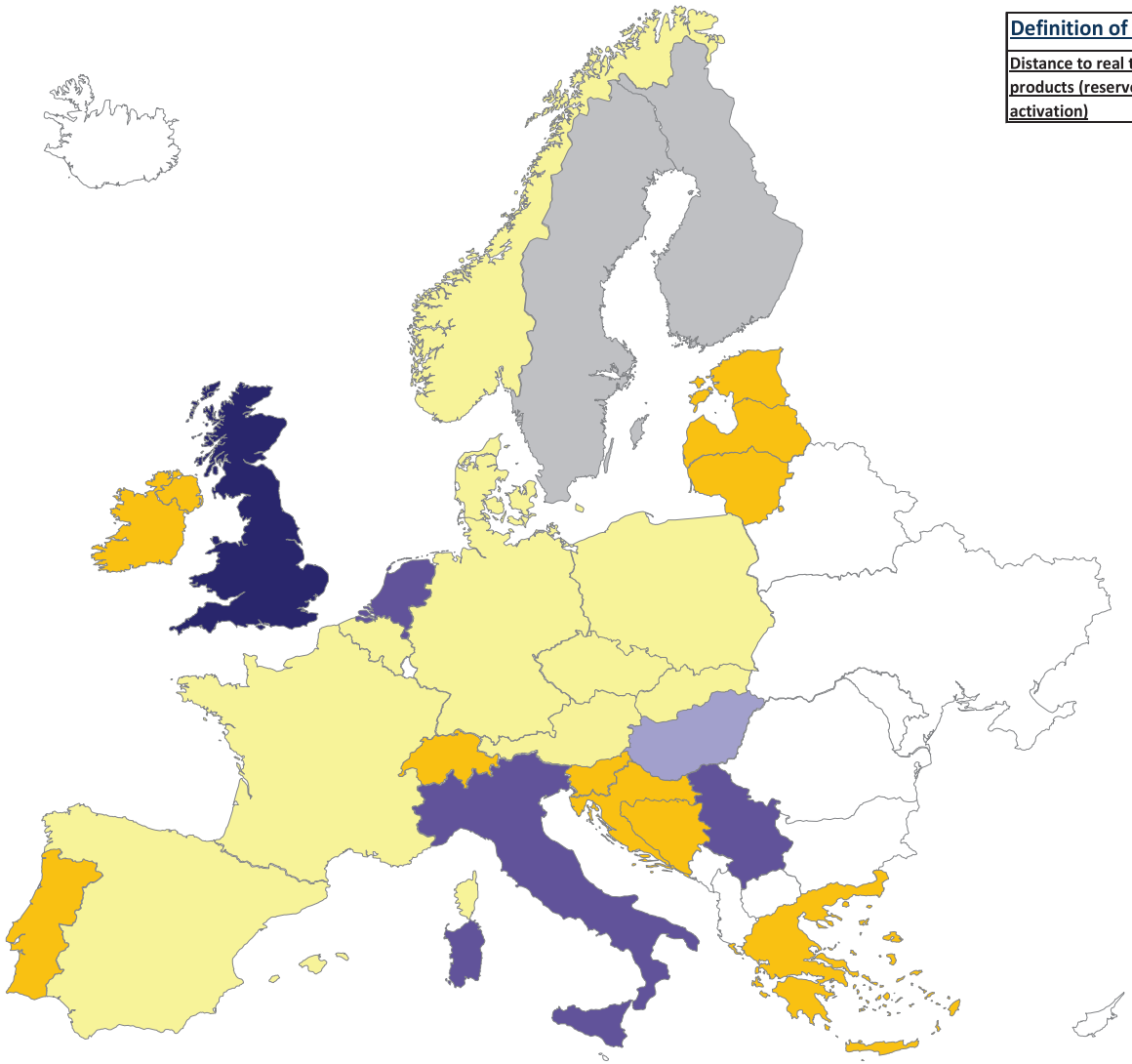
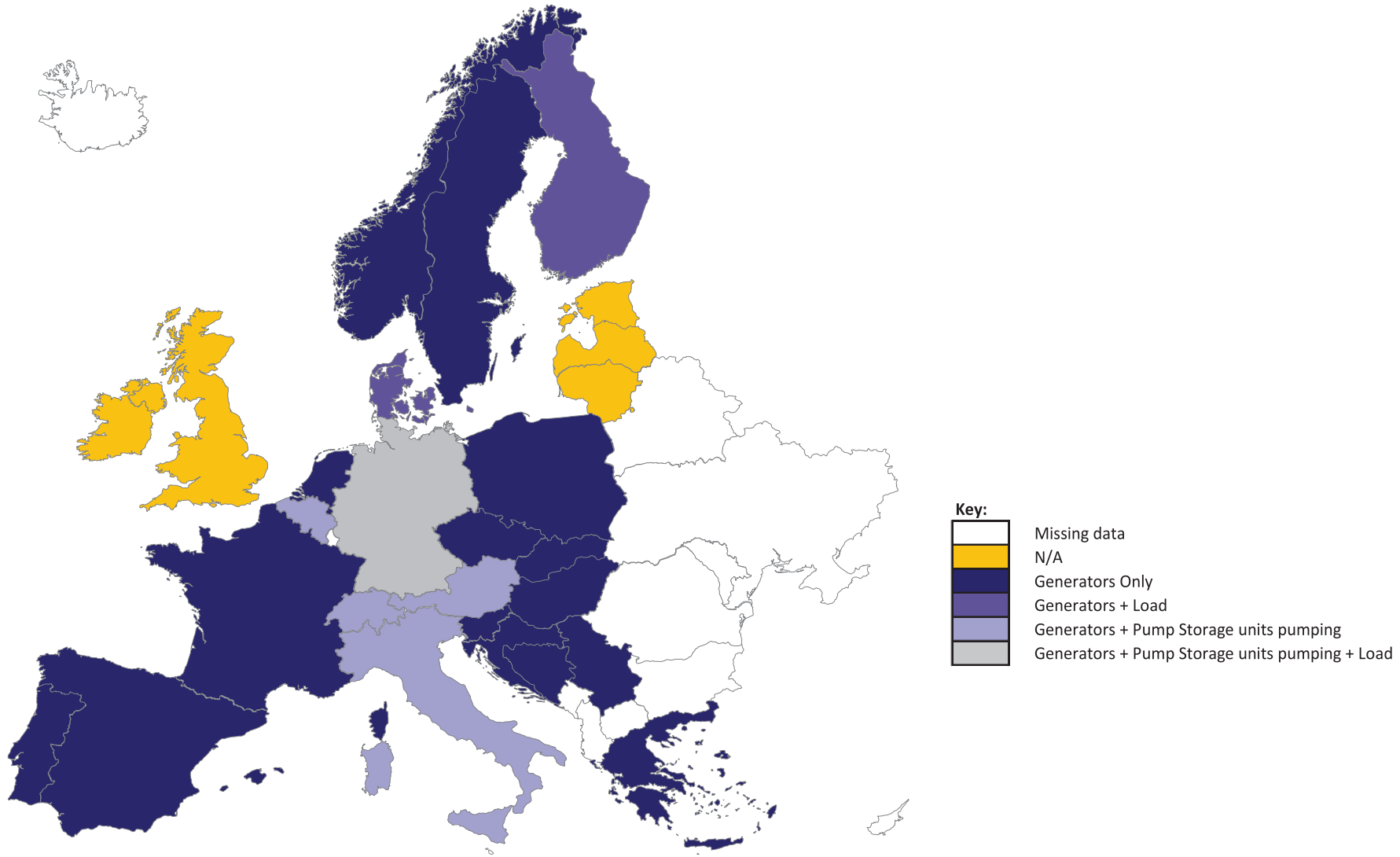
Frequency Restoration Reserve (Automatic) - Energy - Distance to real time of energy products

Definition of question	
Distance to real time of energy products (reserve products activation)	The time ahead from real time when TSO activates a given product (for instance 15 minutes in the case of mFRR/tertiary energy).



Frequency Restoration Reserve (Automatic) - Energy - Provider



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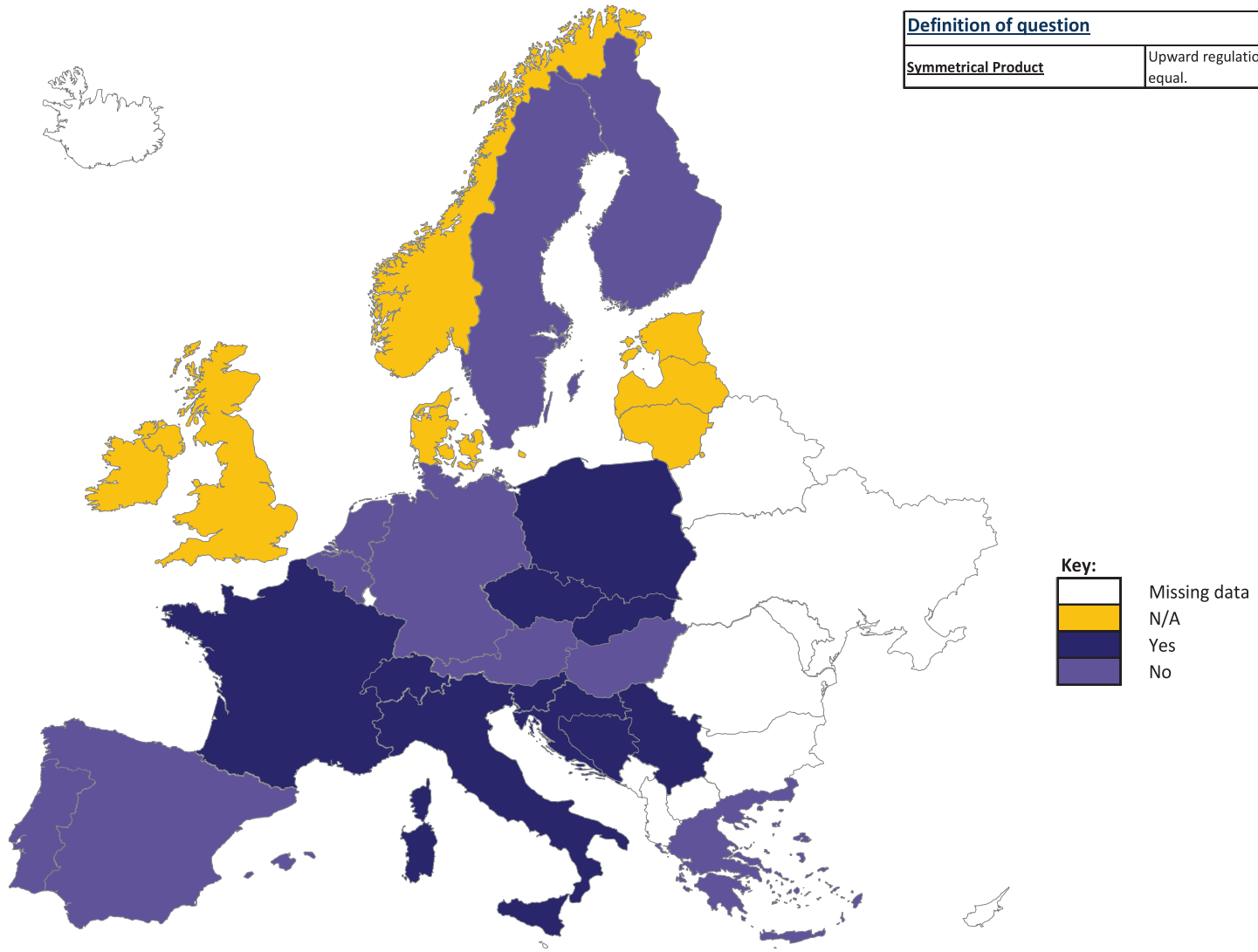
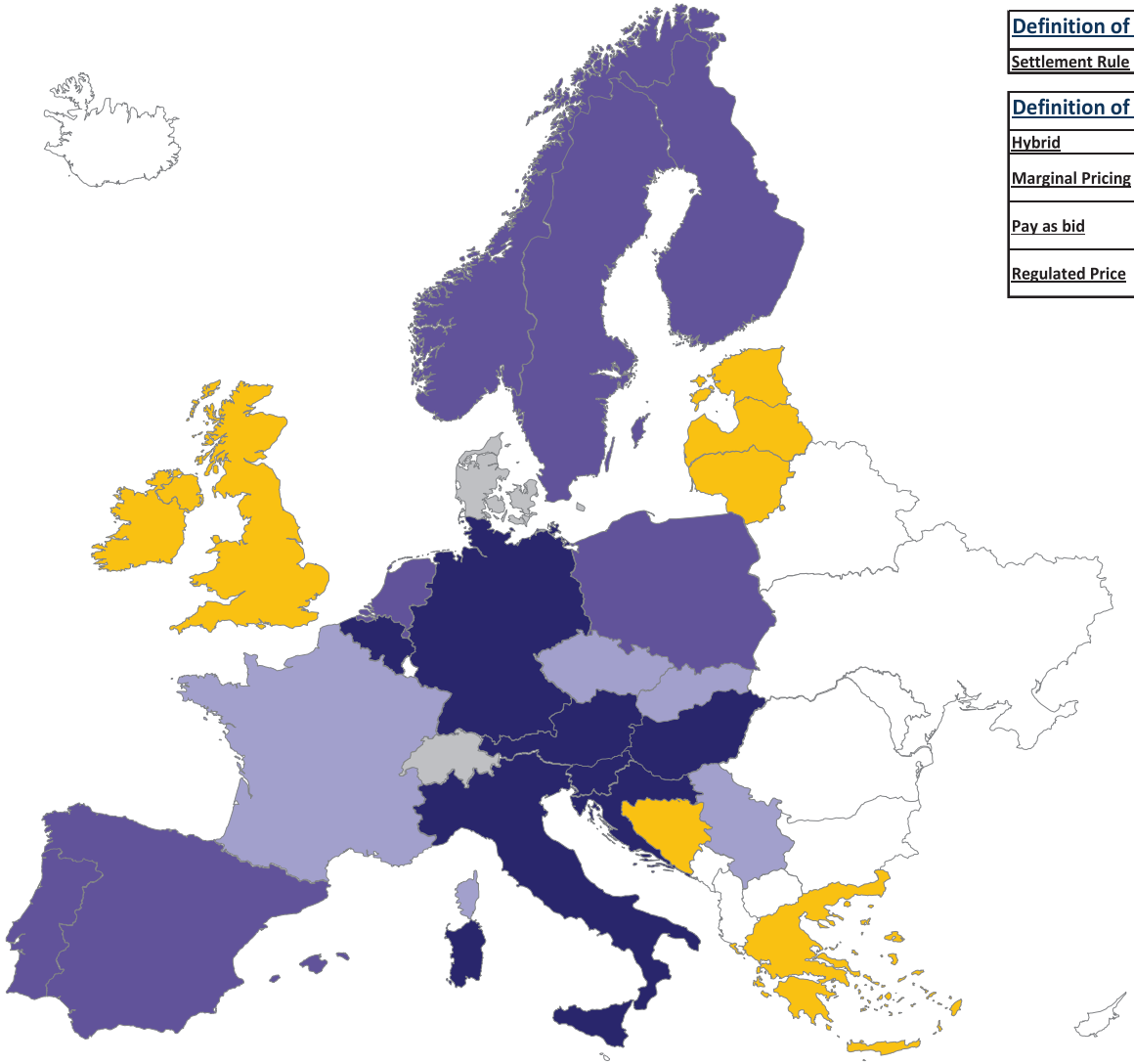


Frequency Restoration Reserve (Automatic) - Energy - Settlement Rule



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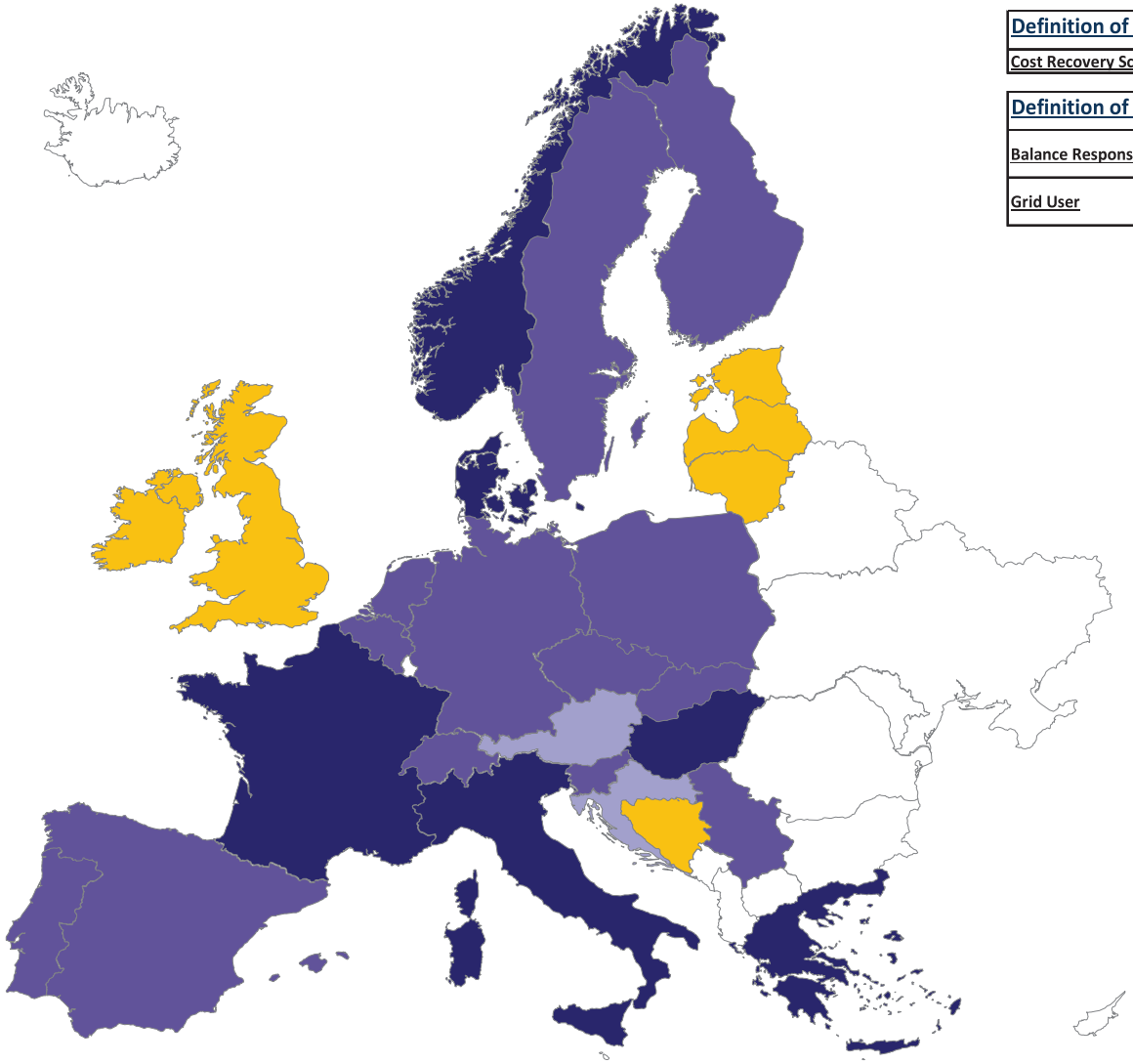
Frequency Restoration Reserve (Automatic) - Energy - Cost Recovery Scheme



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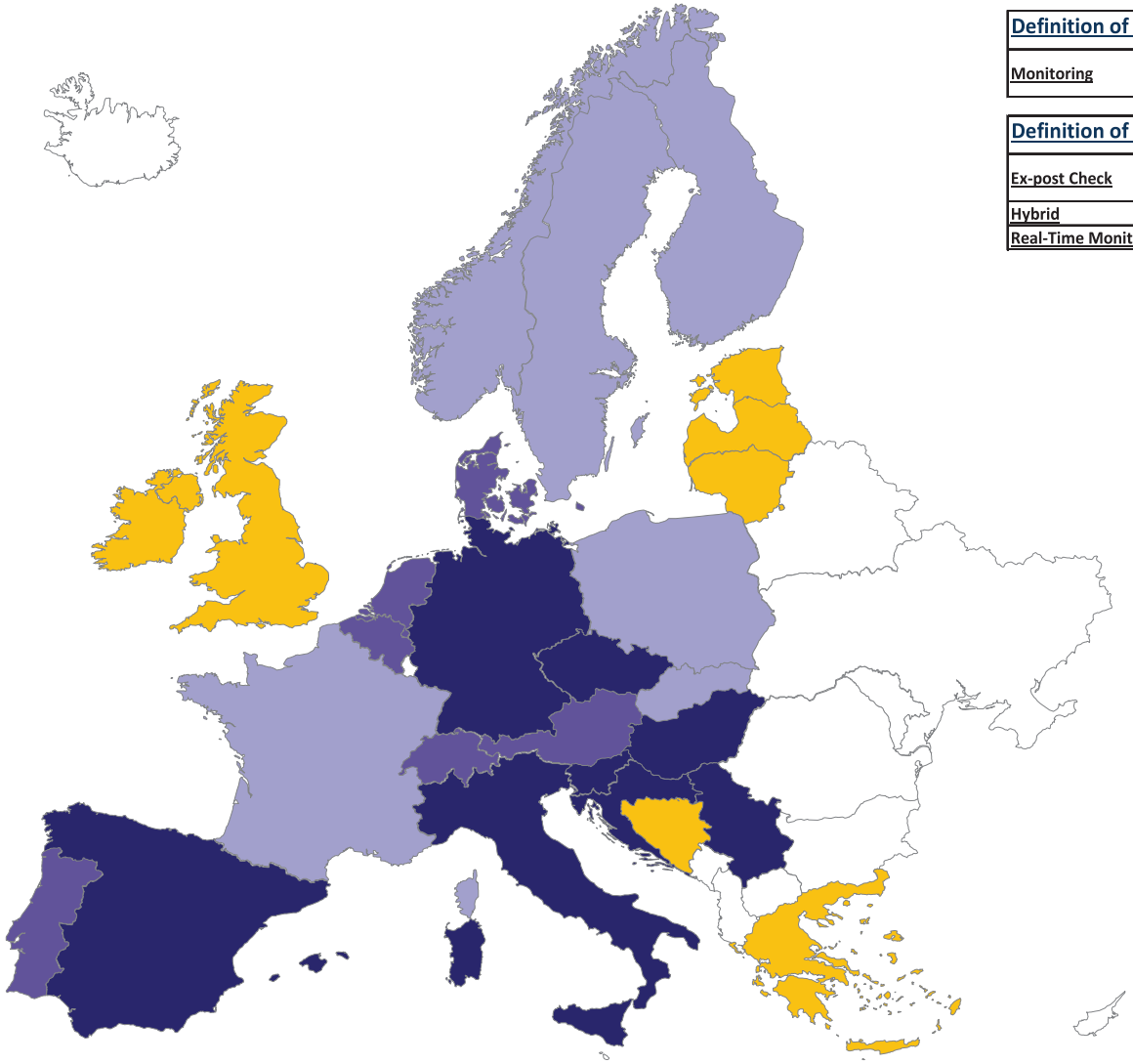
Frequency Restoration Reserve (Automatic) - Energy - Monitoring



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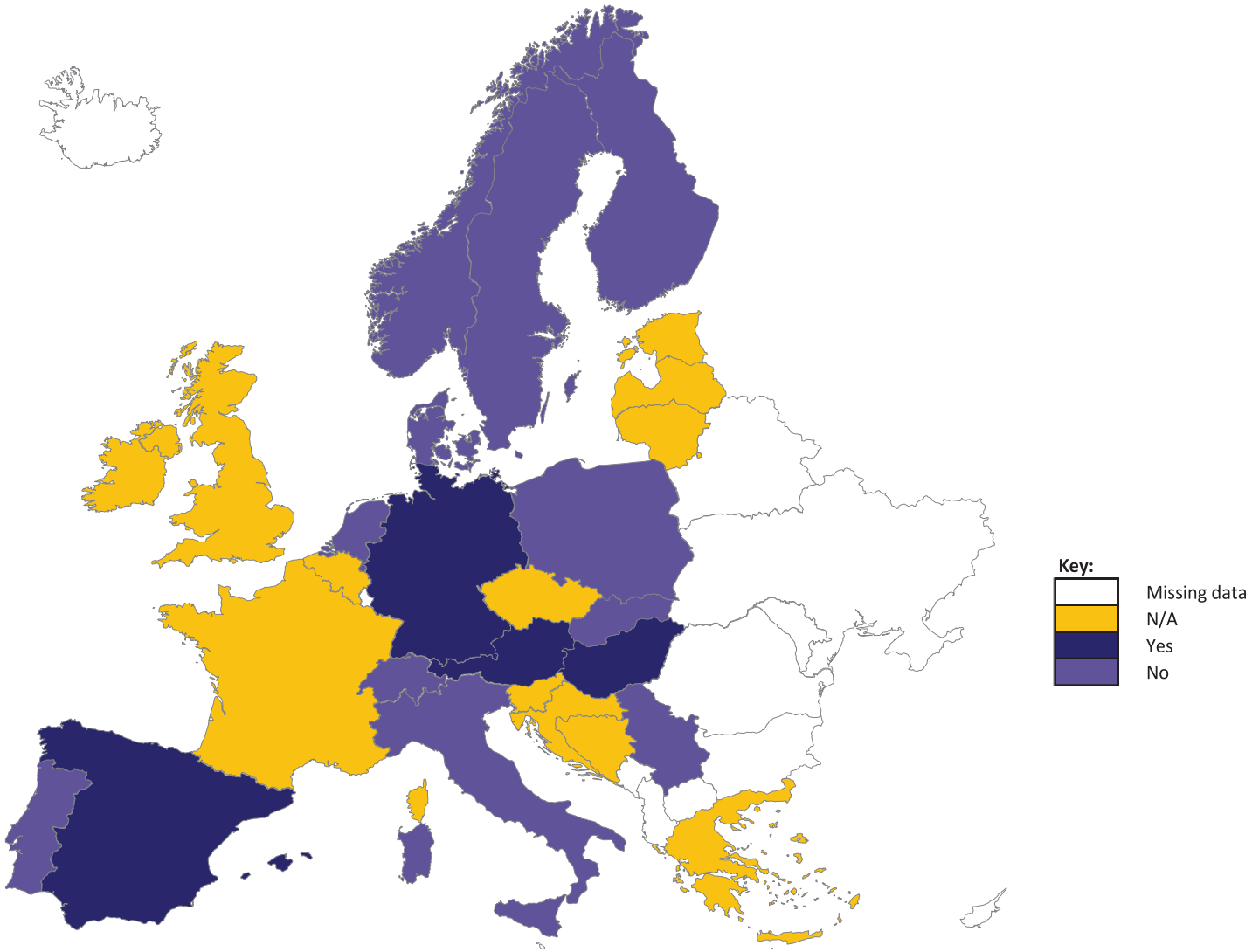
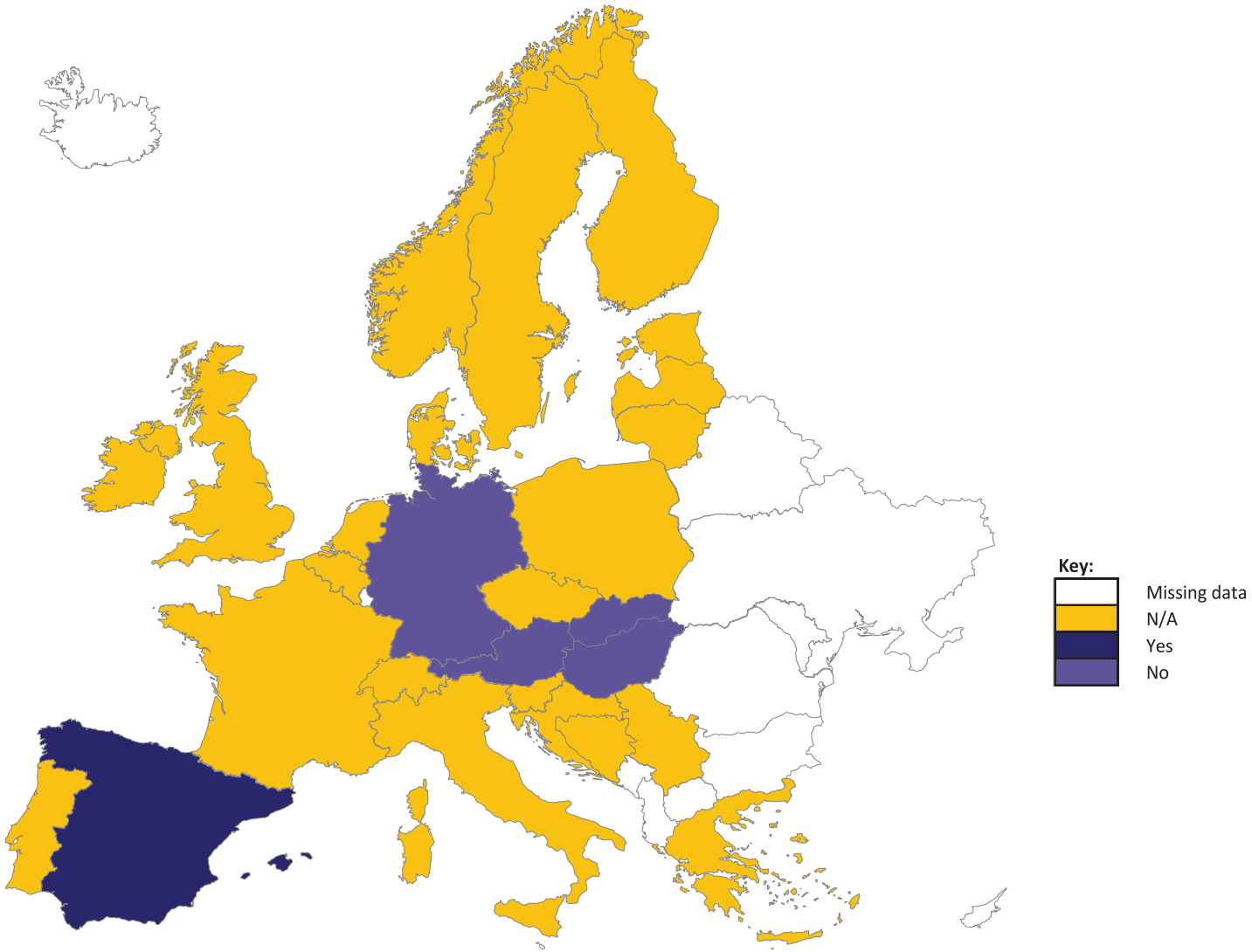
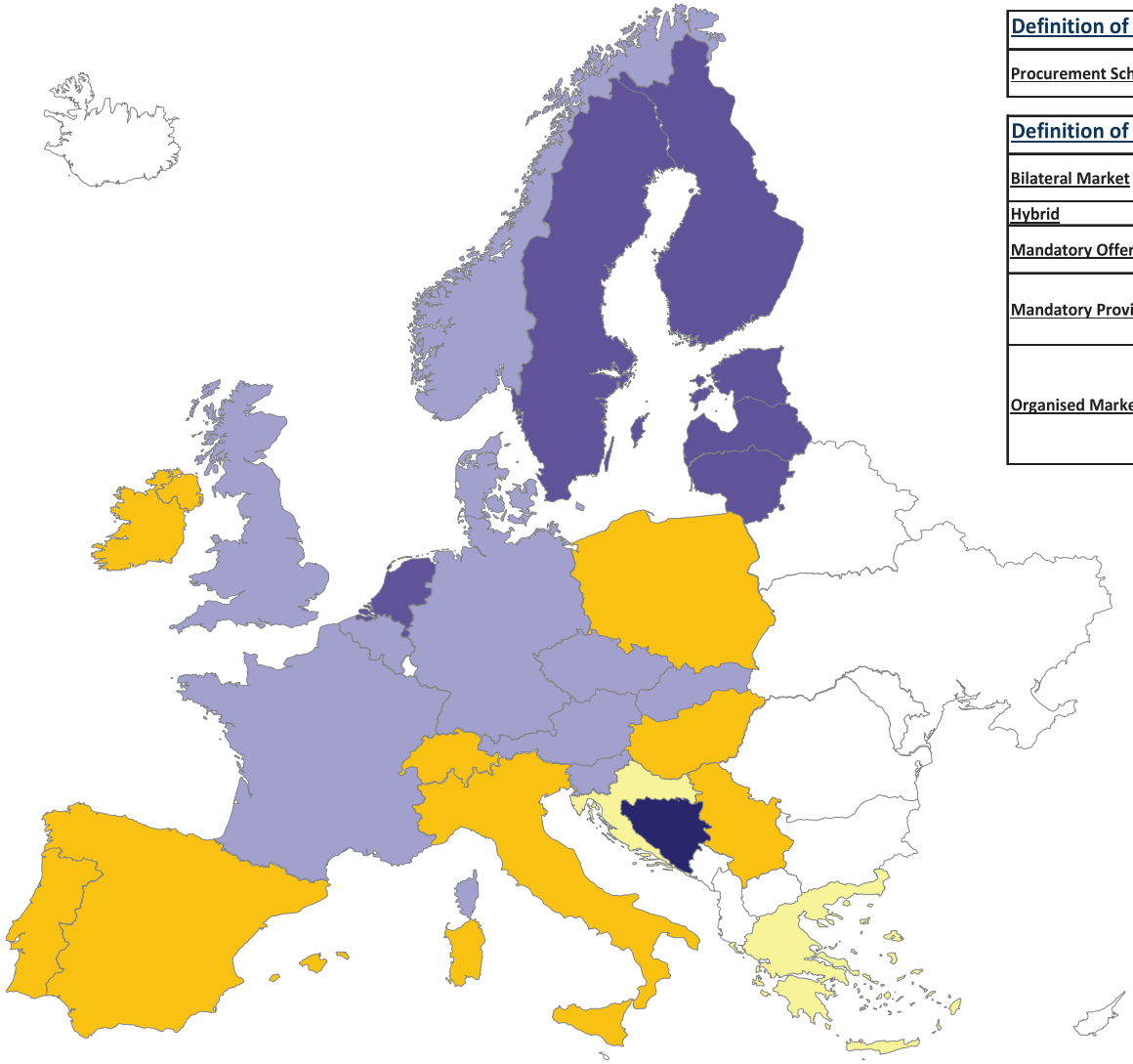
Frequency Restoration Reserve (Automatic) - Energy - Transfer of obligation allowed



Frequency Restoration Reserve (Automatic) - Energy - Obl. allowed, organised secondary market exists



Frequency Restoration Reserve (Manual) - Capacity - Procurement Scheme



Definition of question	
Procurement Scheme	Background of the offer, which is closest to the real operation time.

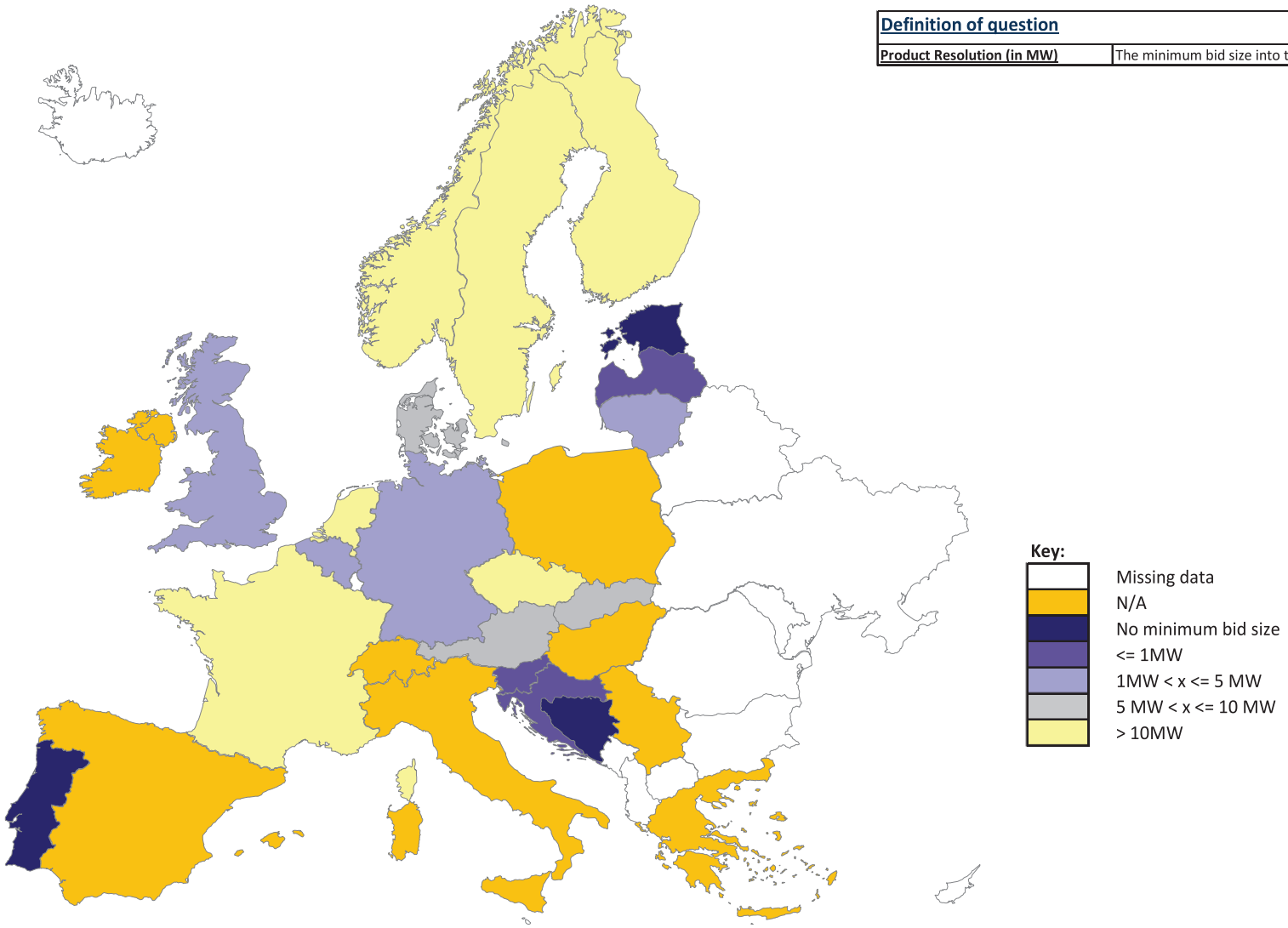
Definition of answer	
Bilateral Market	A grid user and TSO negotiate a contract regarding the offered service and price/price system.
Hybrid	Combination.
Mandatory Offers	Generators connected to the grid are obligated to offer the remaining capacity/available capacity.
Mandatory Provision	Generators connected to the grid are obligated to reserve a certain amount of capacity in order to meet TSO requirements, for a fixed price set by TSO, NRA or for free.
Organised Market	There is no contract or obligation for a grid user to offer the reserve (before the offer). The grid user can voluntary participate in the market (e.g. tender, auction, market platform (like PX)) and bid a price or customize his offer (e.g. the volume, timeframe). The market result may lead to a bilateral contract.

Key:

- Missing data
- N/A
- Mandatory Provision
- Bilateral Market
- Organised Market
- Hybrid
- Other
- Mandatory Offers

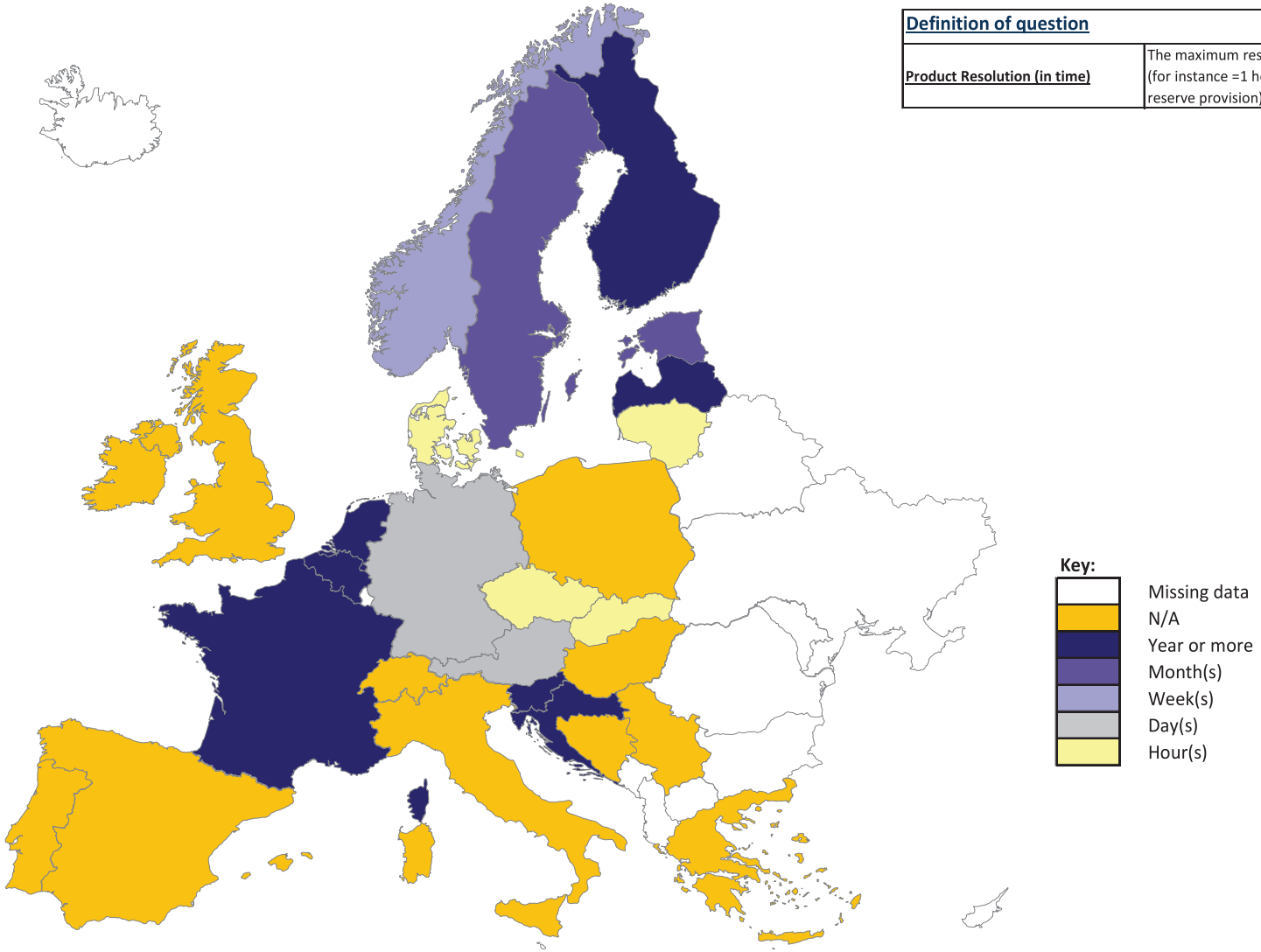
Frequency Restoration Reserve (Manual) - Capacity - Product Resolution (in MW)

Definition of question	
Product Resolution (in MW)	The minimum bid size into the balancing market.

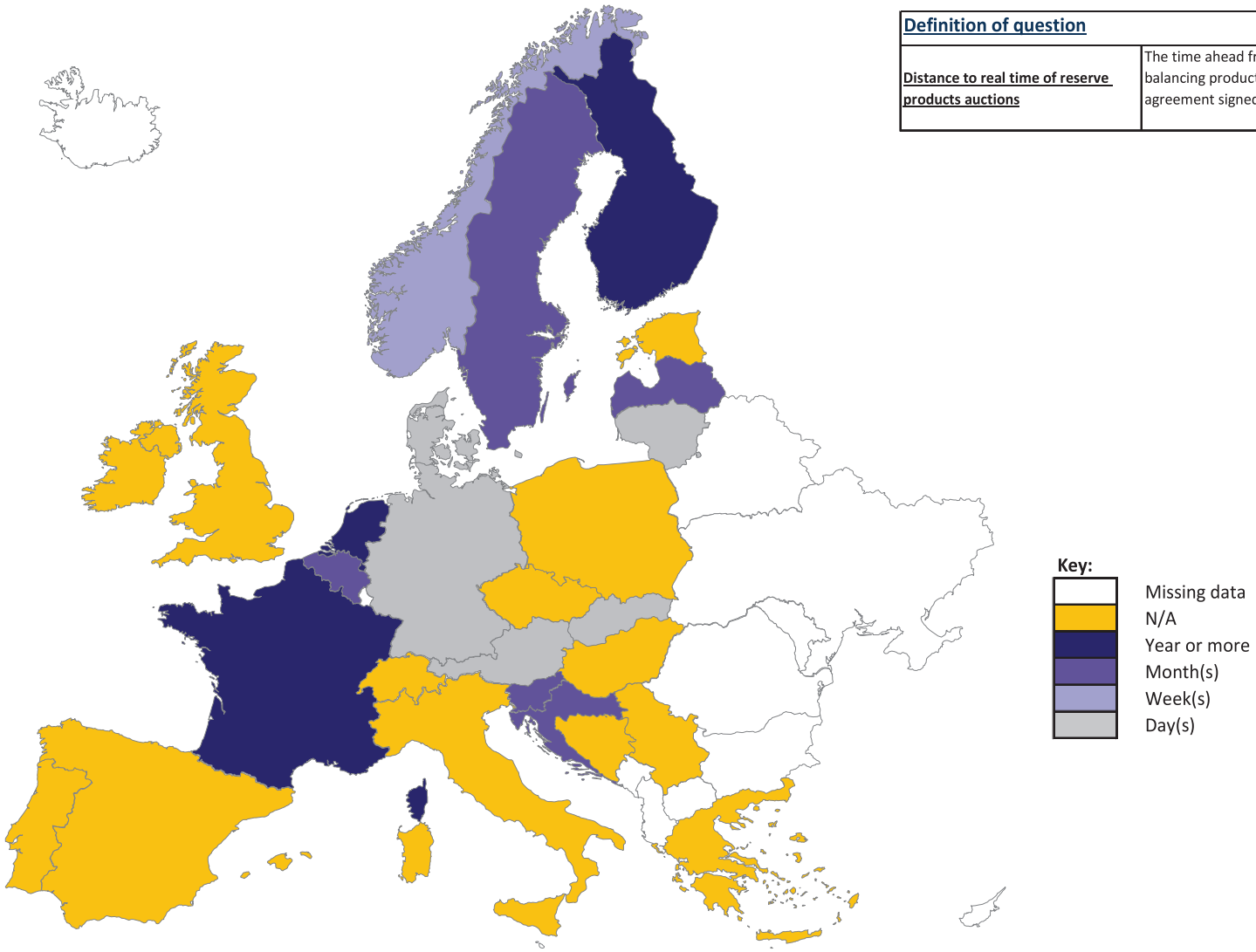


Frequency Restoration Reserve (Manual) - Capacity - Product Resolution (in time)

Definition of question	
Product Resolution (in time)	The maximum resolution for which the product can be bid into the market (for instance =1 hour in the case of a 24 auctions day ahead market for reserve provision).

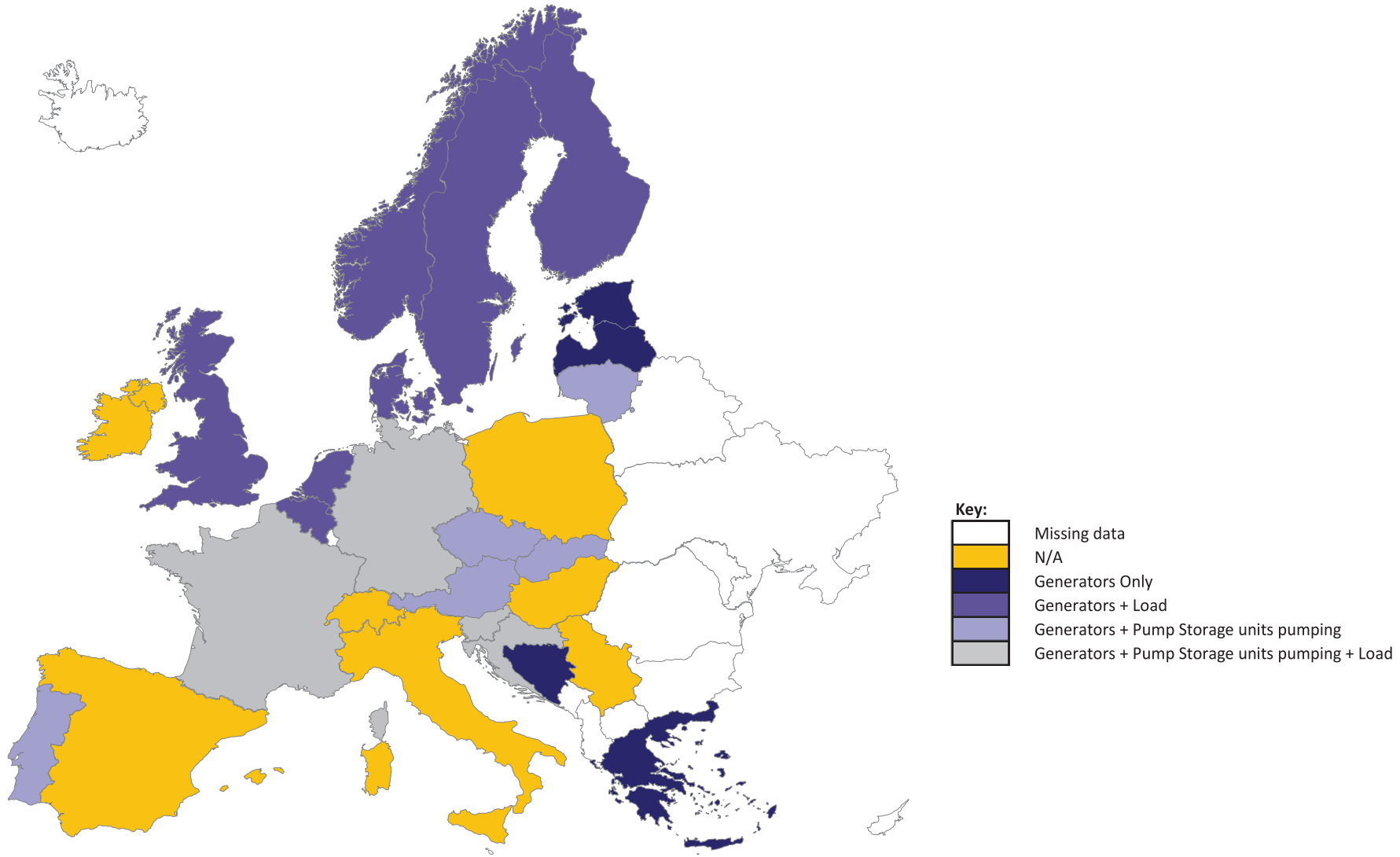


Frequency Restoration Reserve (Manual) - Capacity - Distance to real time of reserve products auctions



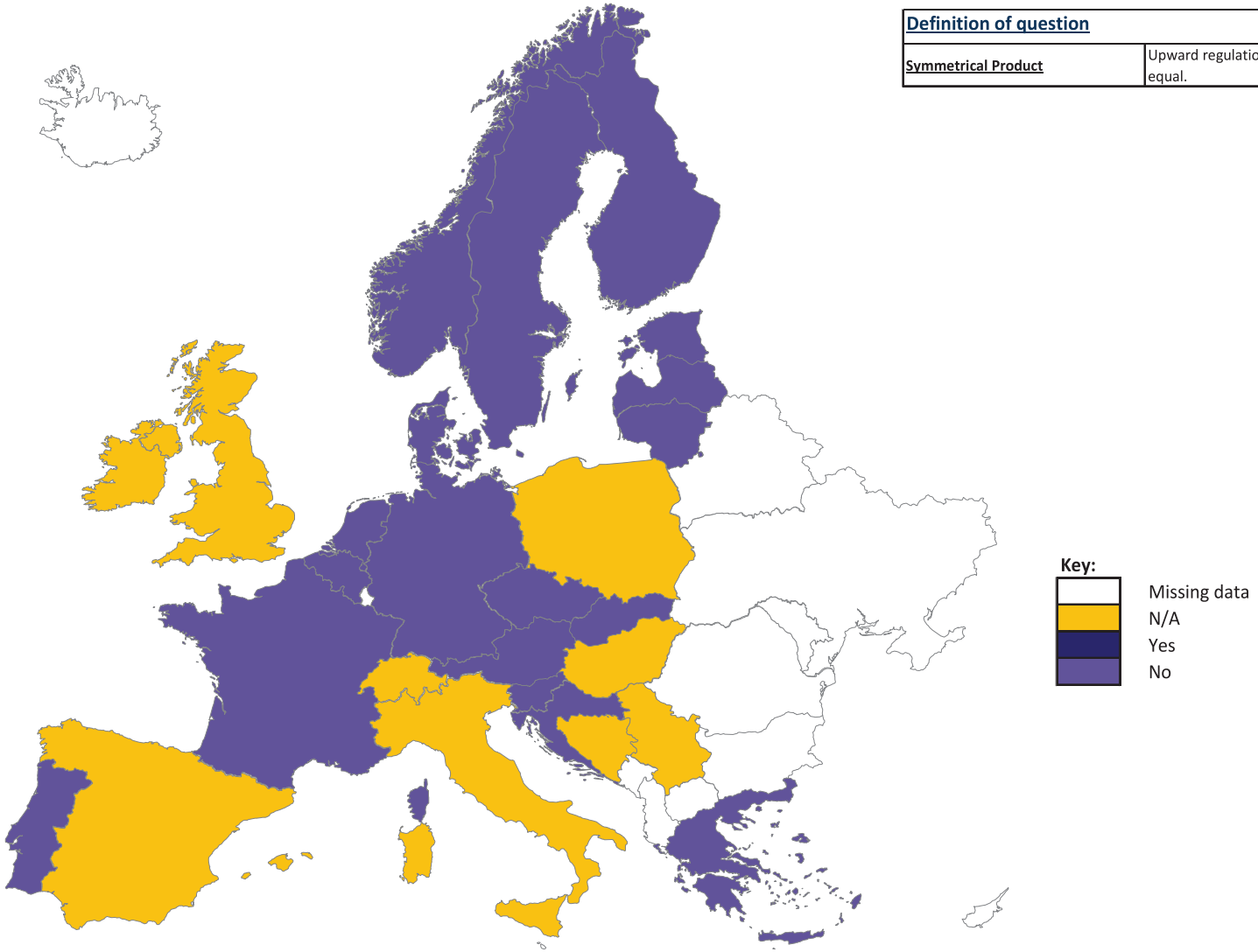
Definition of question	
Distance to real time of reserve products auctions	The time ahead from real time when auction/agreement for an specific balancing product takes place (for instance = 1 year in the case of a reserve agreement signed 1 year ahead of real time).

Frequency Restoration Reserve (Manual) - Capacity - Provider

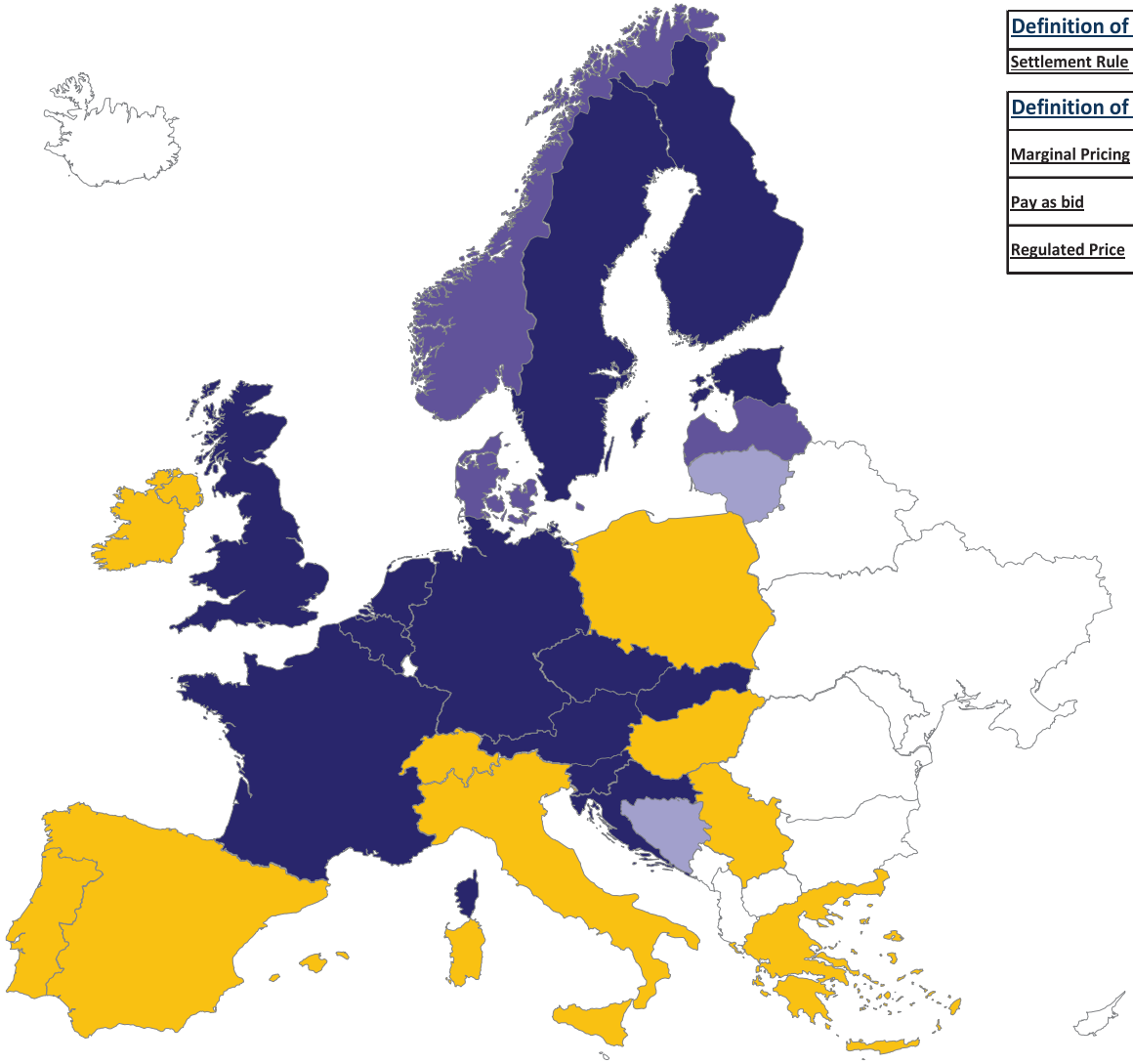


Frequency Restoration Reserve (Manual) - Capacity - Symmetrical Product

Definition of question	
Symmetrical Product	Upward regulation volume and for downward regulation volume has be equal.



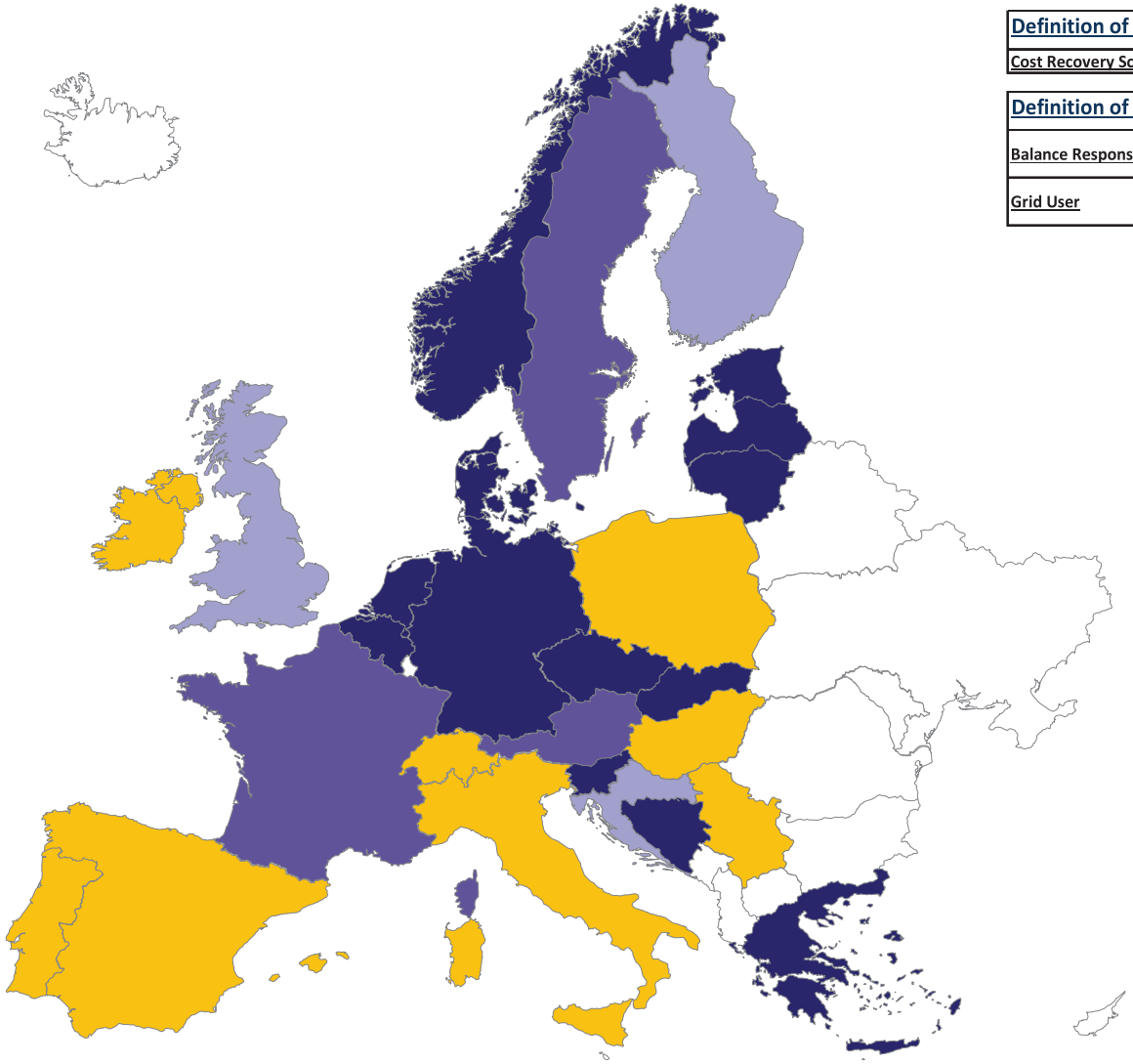
Frequency Restoration Reserve (Manual) - Capacity - Settlement Rule



Definition of question	
Settlement Rule	The pricing rules for settlement.

Definition of answer	
Marginal Pricing	Marginal pricing is the change in total cost that arises when the quantity produced changes by one unit.
Pay as bid	Contracted parties who provide a service are paid based on their offer price.
Regulated Price	Price for this service is based on a price that is set by the relevant regulatory authority.

Frequency Restoration Reserve (Manual) - Capacity - Cost Recovery Scheme



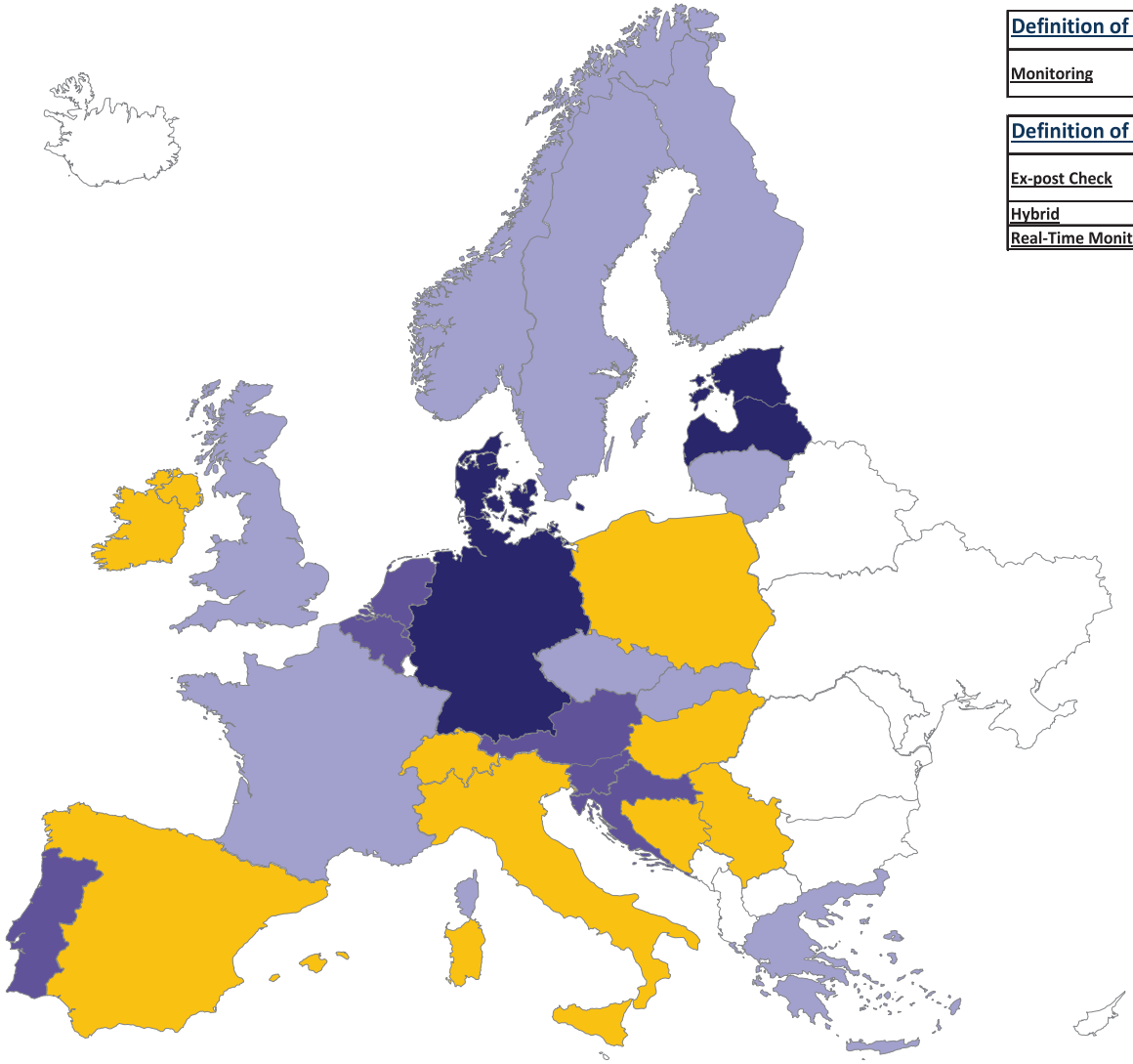
Definition of question	
Cost Recovery Scheme	From whom are the costs recovered.

Definition of answer	
Balance Responsible Party (BRP)	Balancing Responsible Party means a market participant or its chosen representative responsible for its Imbalances.
Grid User	The natural or legal person supplying to, or being supplied with active and/or reactive power by a TSO or DSO.

Key:

- Missing data
- N/A
- 100% Grid Users
- 100% BRP
- Mix of Grid Users and BRP

Frequency Restoration Reserve (Manual) - Capacity - Monitoring



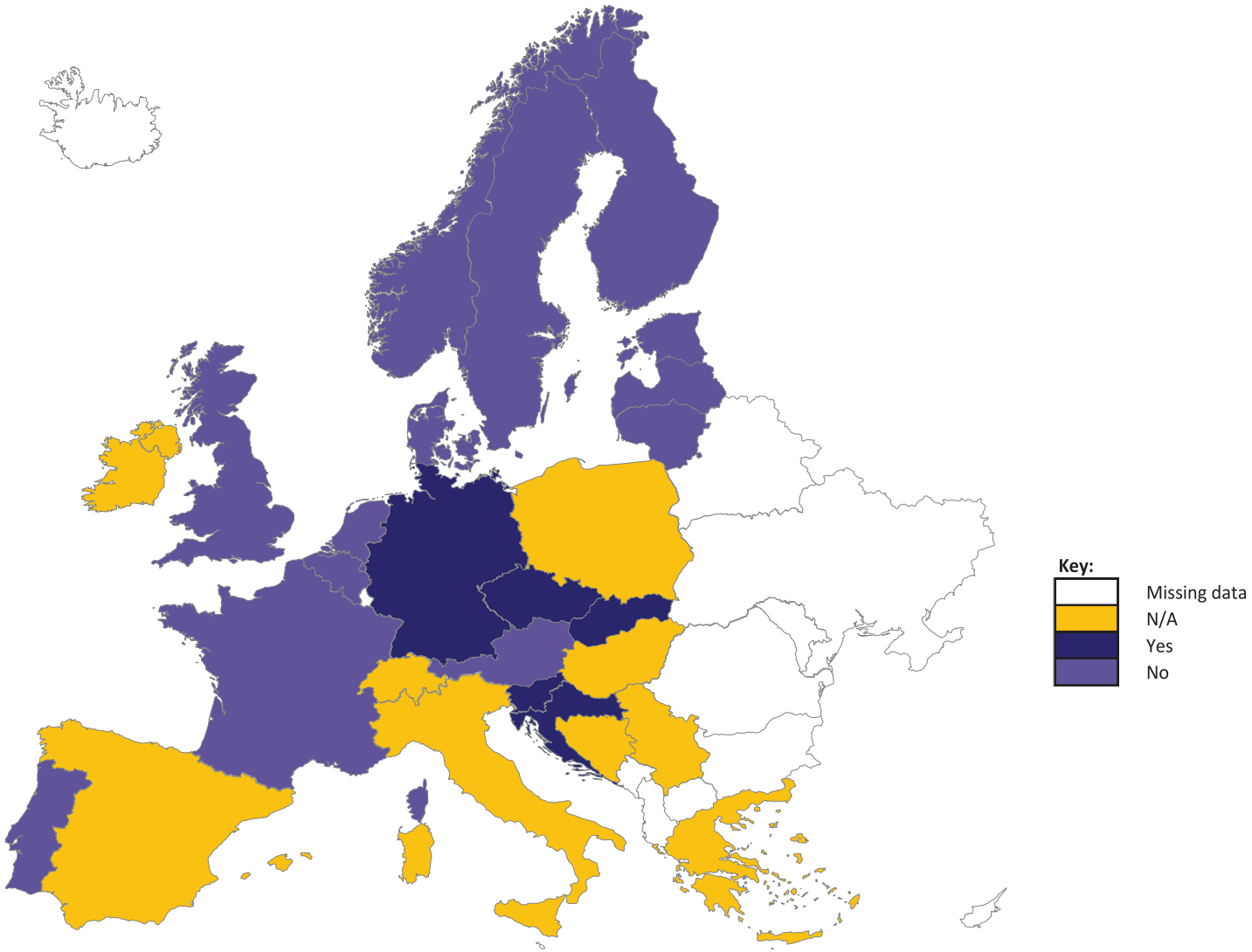
Definition of question	
Monitoring	Refers to the type of monitoring in place by the system operator to ensure performance of plant.

Definition of answer	
Ex-post Check	When the monitoring of performance of plant carried out after the event.
Hybrid	Combination.
Real-Time Monitoring	Monitoring of delivery of ancillary services in real time.

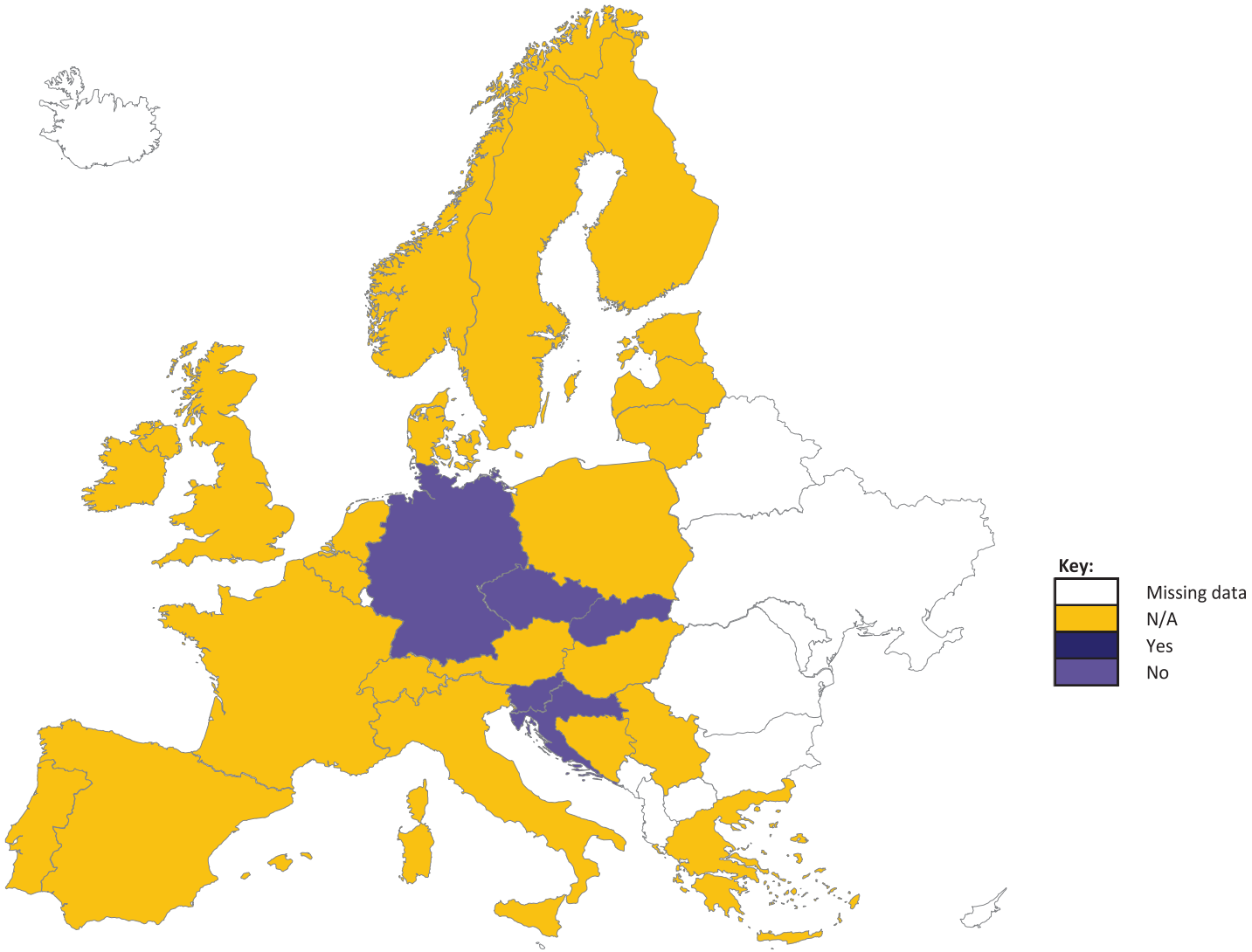
Key:

- Missing data
- N/A
- Real-Time Monitoring
- Ex-Post Check
- Hybrid

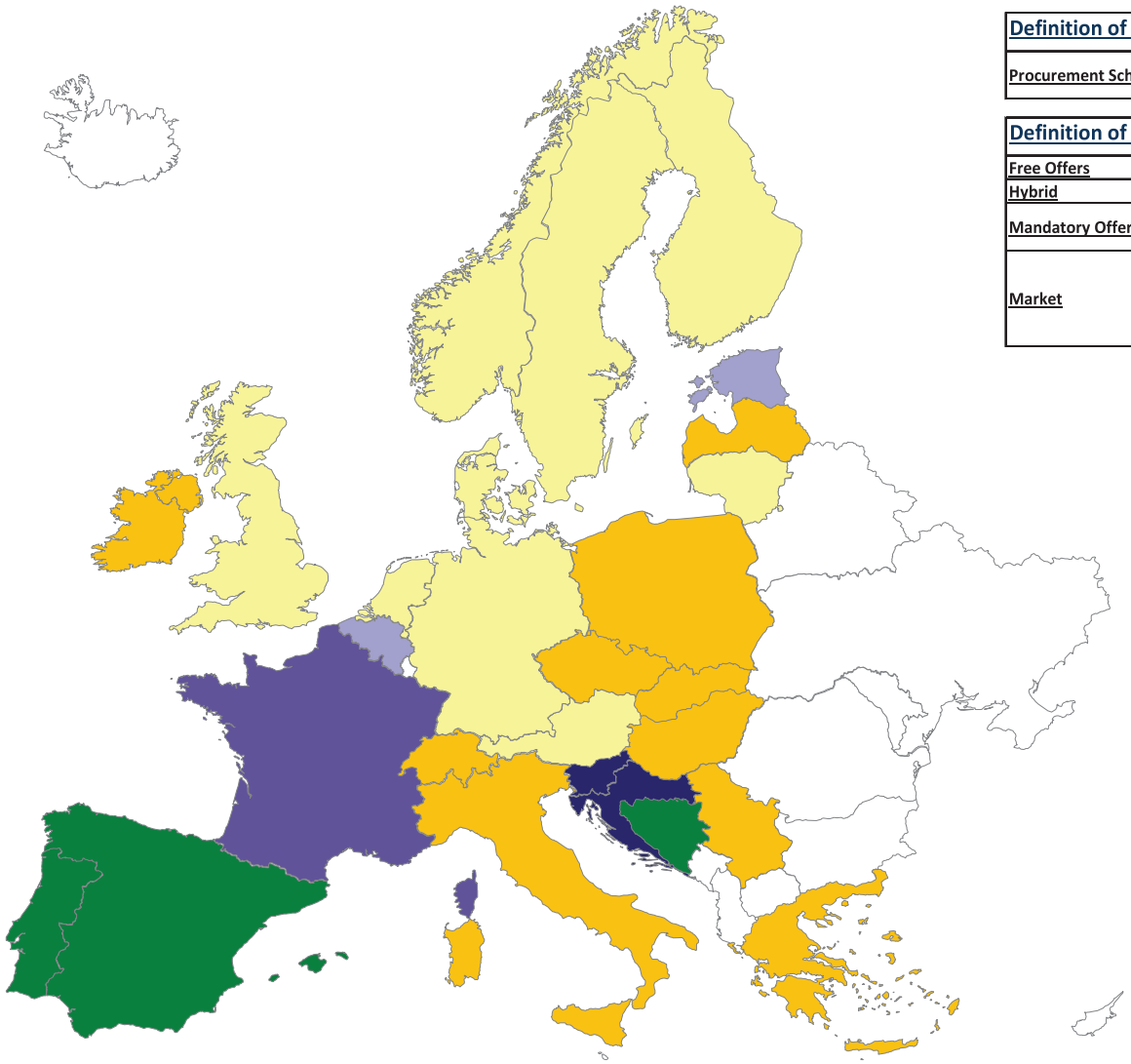
Frequency Restoration Reserve (Manual) - Capacity - Transfer of obligation allowed



Frequency Restoration Reserve (Manual) - Capacity - Obl. allowed, organised secondary market exists



Frequency Restoration Reserve (Manual) - Energy - Procurement Scheme



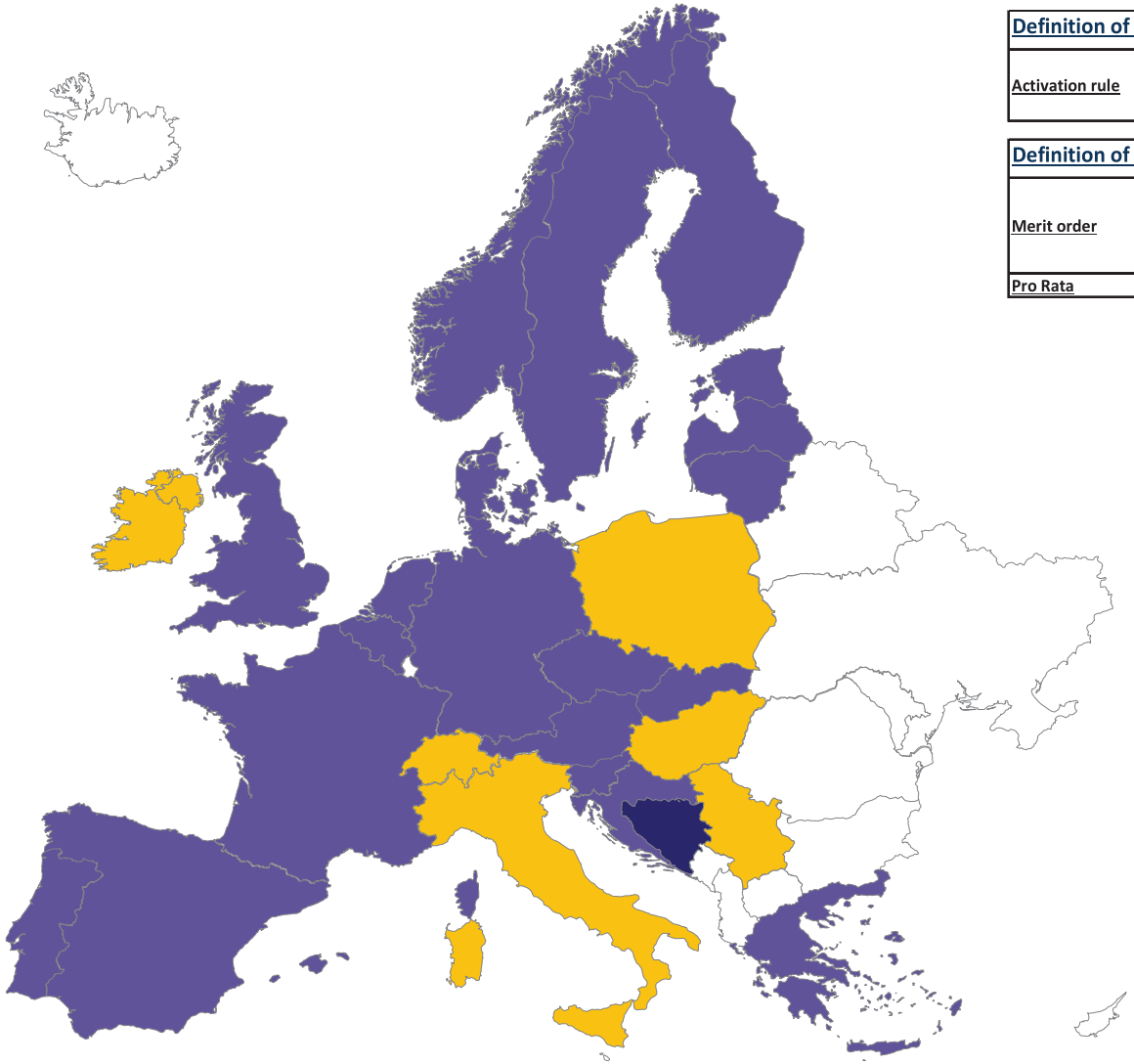
Definition of question	
Procurement Scheme	Background of the offer, which is closest to the real operation time.

Definition of answer	
Free Offers	Non-regulated offers.
Hybrid	Combination.
Mandatory Offers	Generators connected to the grid are obligated to offer the remaining capacity/available capacity.
Market	There is no contract or obligation for a grid user to offer the energy (before the offer). The grid user can voluntary participate in the real-time energy market and bid a price or customize his offer (e.g. the volume, timeframe).

Key:

- Missing data
- N/A
- Pre-contracted Offers only
- Pre-contracted and Mandatory Offers
- Pre-contracted and Free Offers
- Hybrid
- Market
- Other
- Mandatory Offers

Frequency Restoration Reserve (Manual) - Energy - Activation Rule



Definition of question	
Activation rule	How the frequency restoration reserves are activated i.e. by a Pro-Rata system or on the basis of a Merit Order (cheapest being activated first).

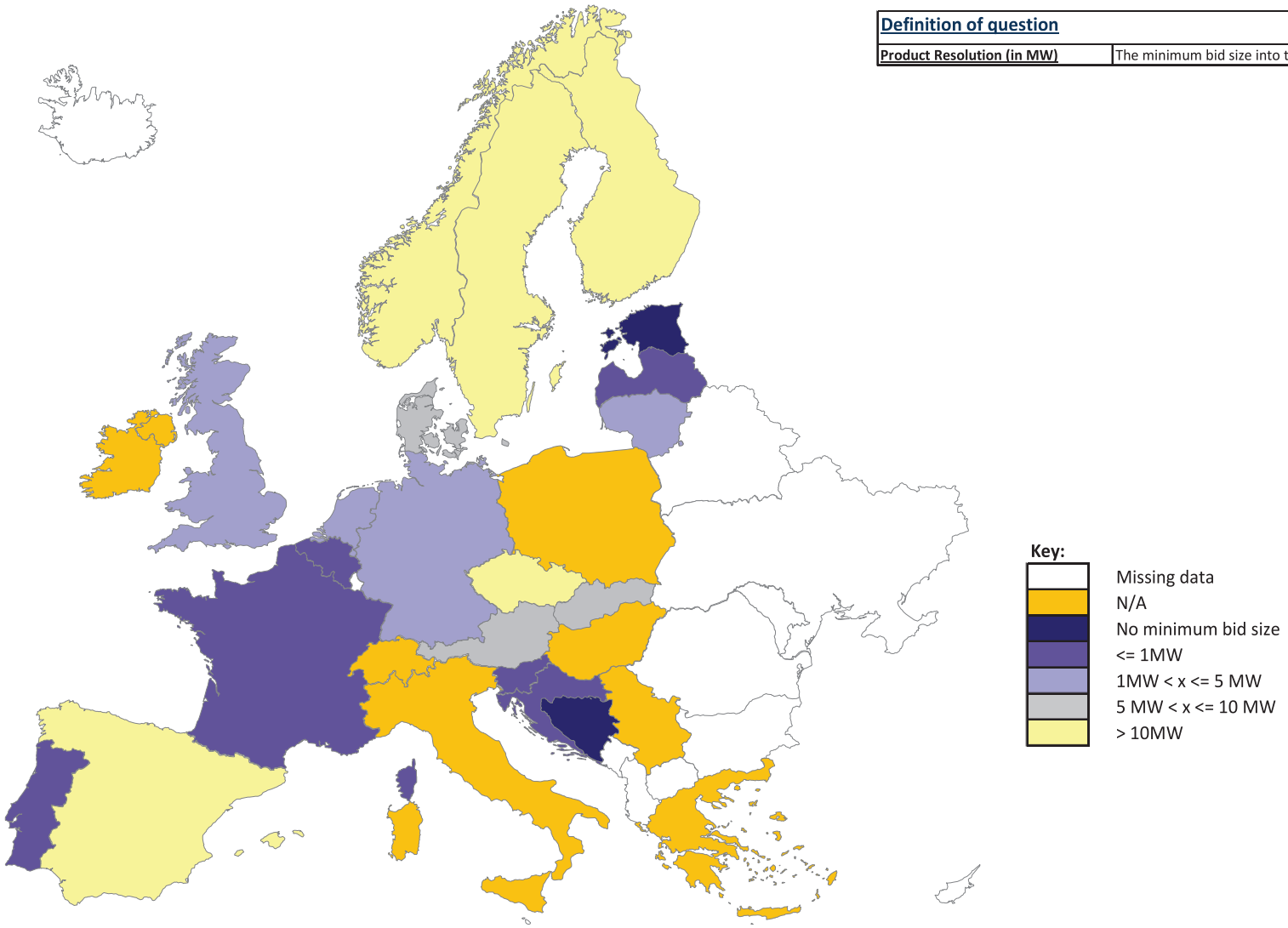
Definition of answer	
Merit order	A merit order is a way of ranking available sources of energy in ascending order of their short run marginal costs of production, so that those with the lowest marginal costs are the first ones to be brought online to meet demand.
Pro Rata	In Proportion (Parallel Activation).

Key:

- Missing data
- N/A
- Pro Rata (Parallel Activation)
- Merit order

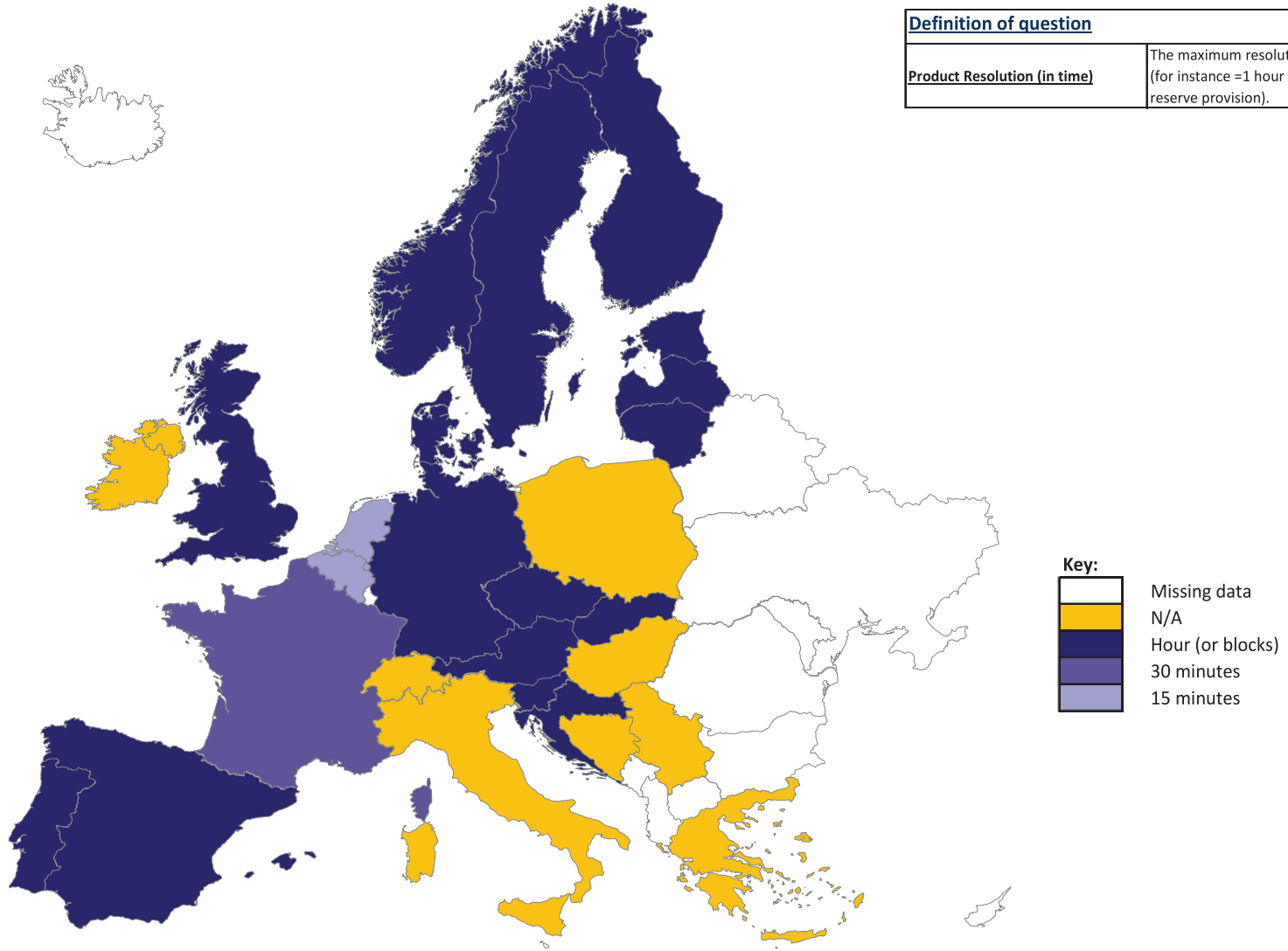
Frequency Restoration Reserve (Manual) - Energy - Product Resolution (in MW)

Definition of question	
Product Resolution (in MW)	The minimum bid size into the balancing market.



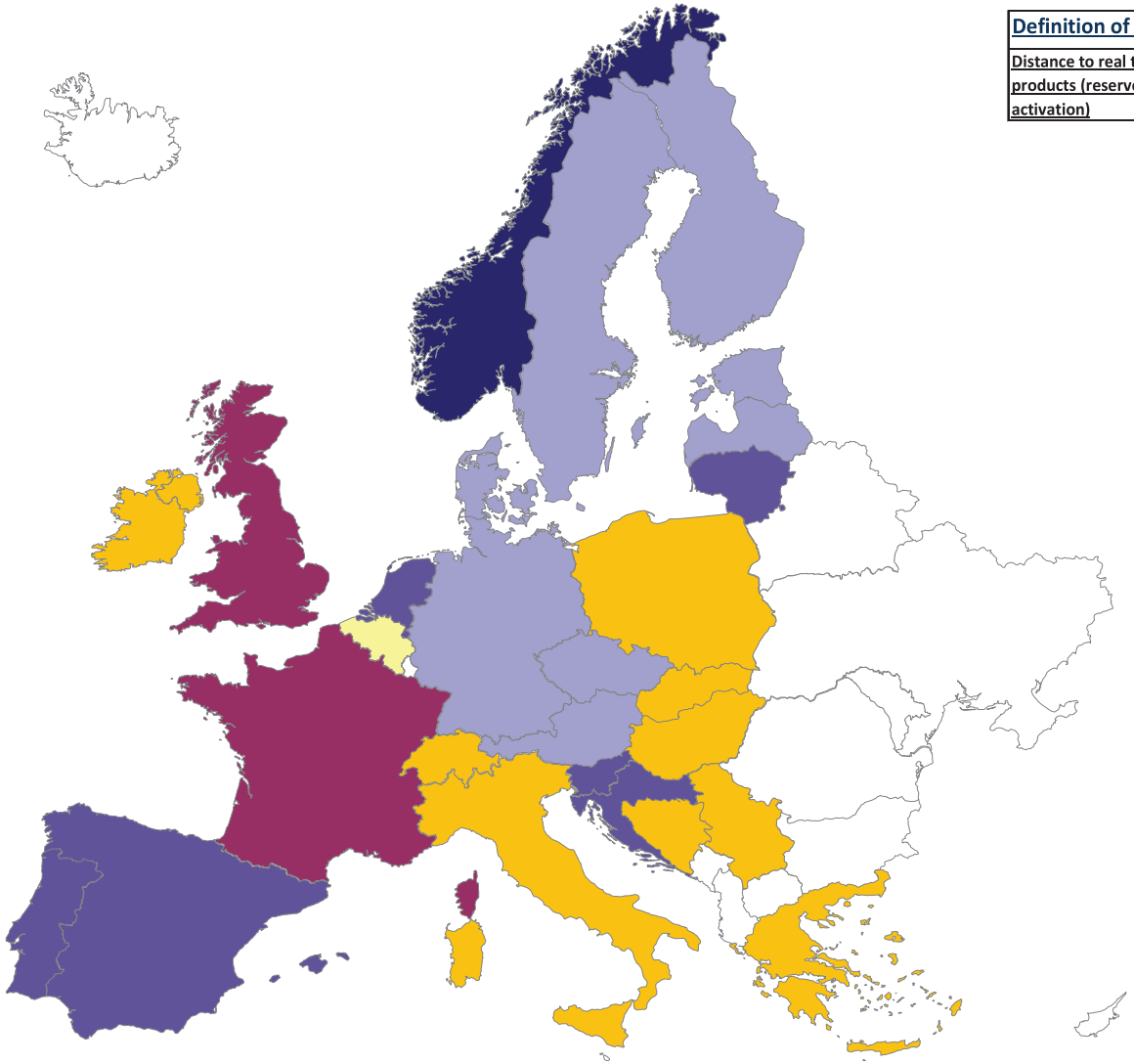
Frequency Restoration Reserve (Manual) - Energy - Product Resolution (in time)

Definition of question	
Product Resolution (in time)	The maximum resolution for which the product can be bid into the market (for instance =1 hour in the case of a 24 auctions day ahead market for reserve provision).

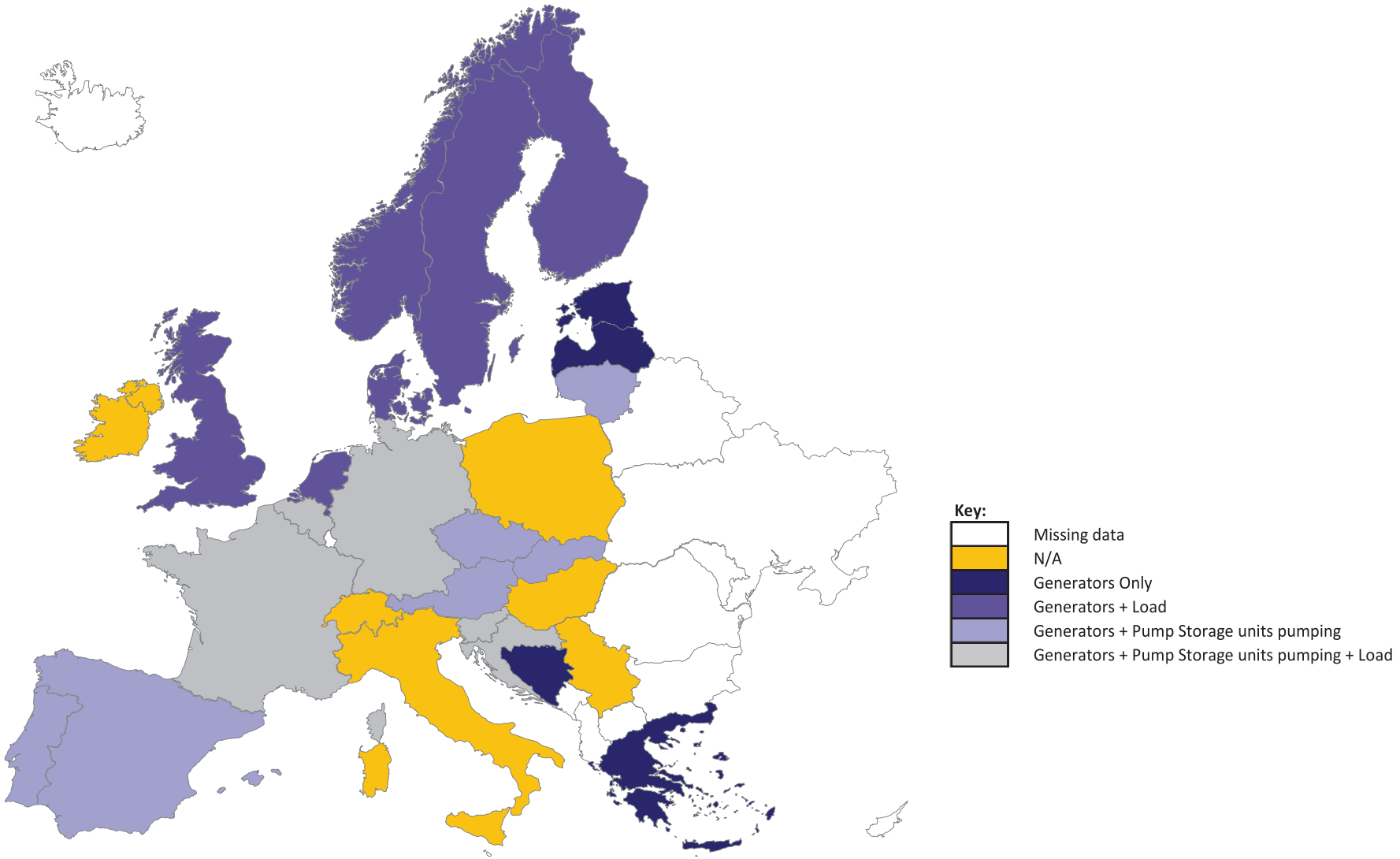


Frequency Restoration Reserve (Manual) - Energy - Distance to real time of energy products

Definition of question	
Distance to real time of energy products (reserve products activation)	The time ahead from real time when TSO activates a given product (for instance 15 minutes in the case of mFRR/tertiary energy).

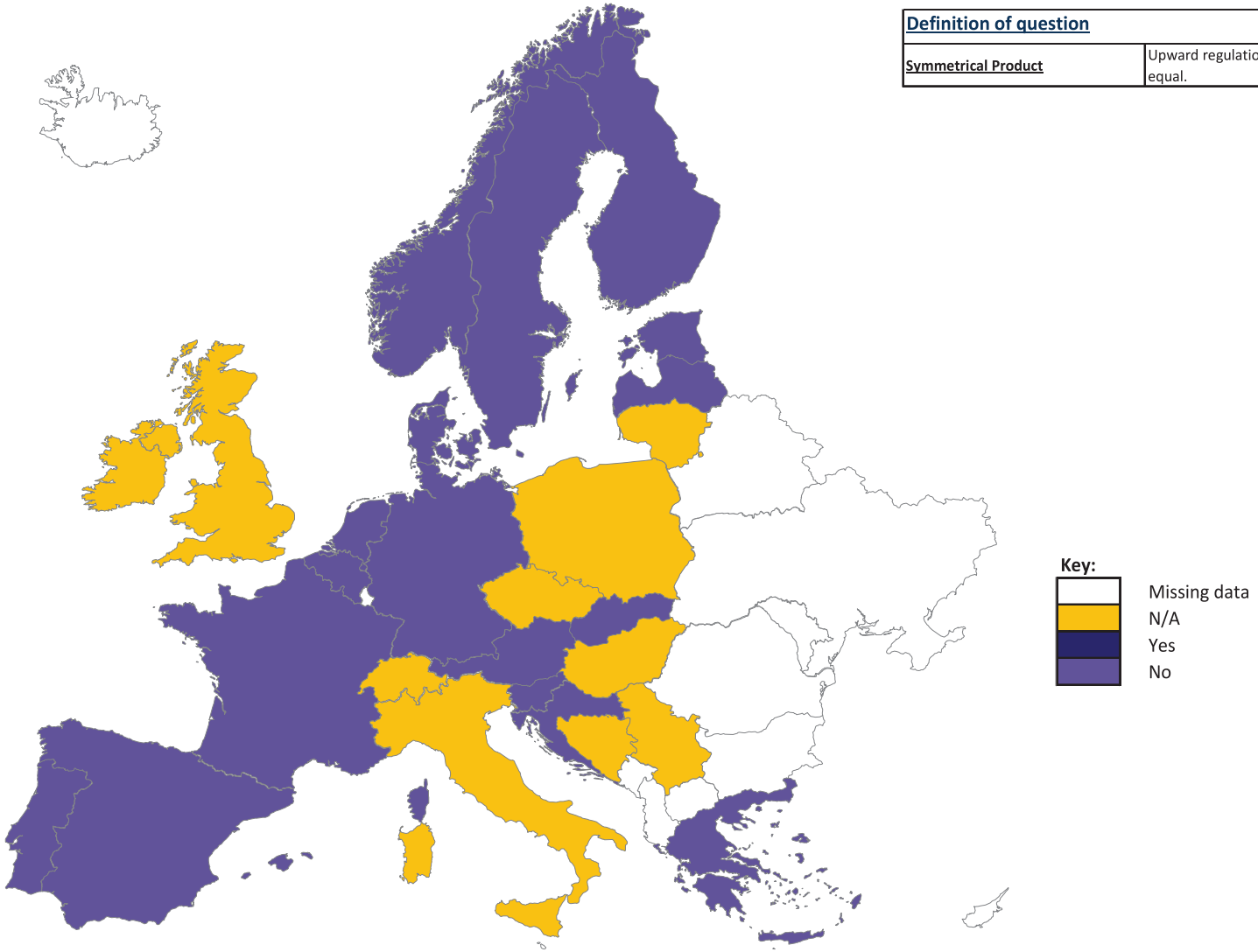


Frequency Restoration Reserve (Manual) - Energy - Provider

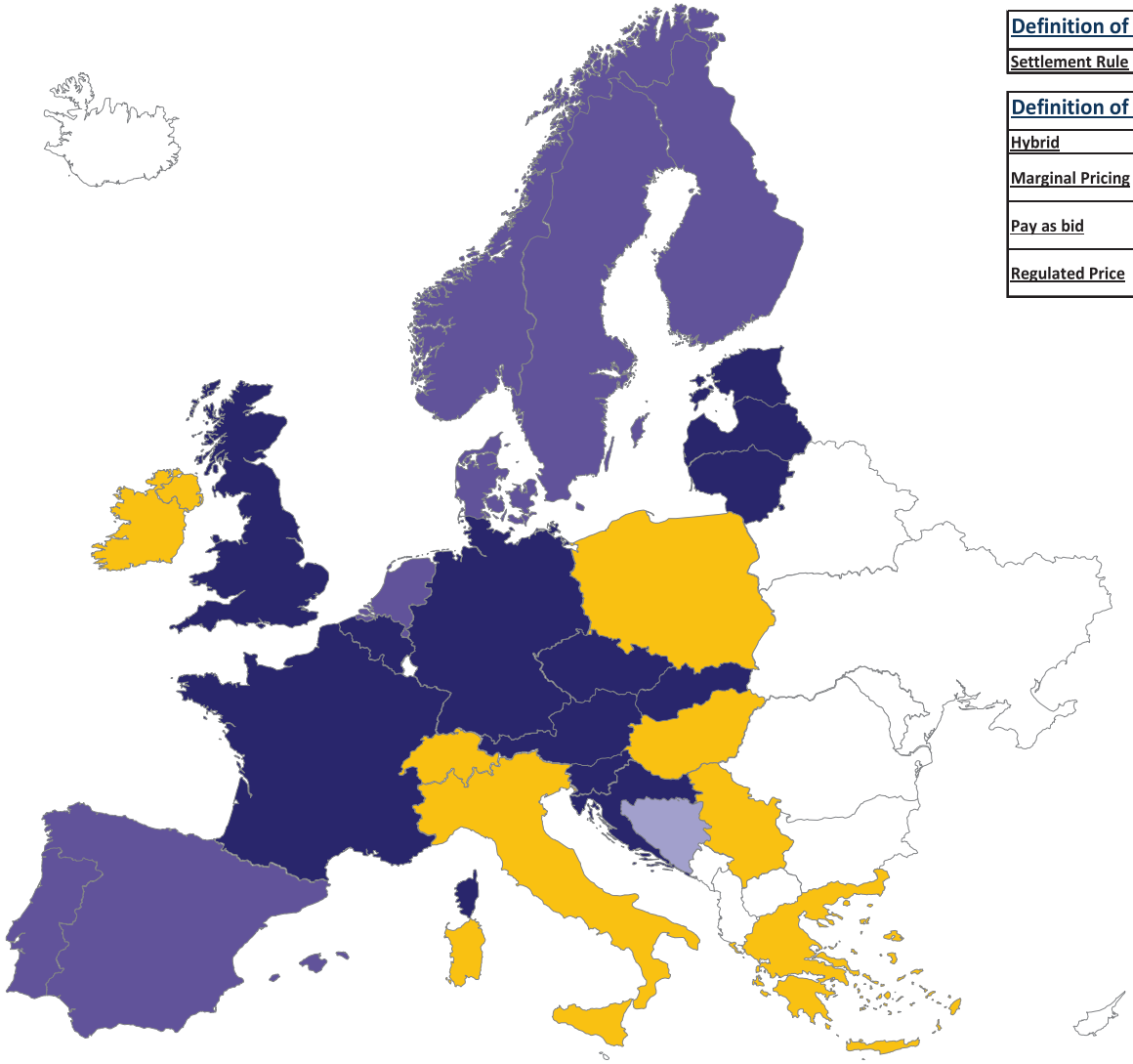


Frequency Restoration Reserve (Manual) - Energy - Symmetrical Product

Definition of question	
Symmetrical Product	Upward regulation volume and for downward regulation volume has be equal.



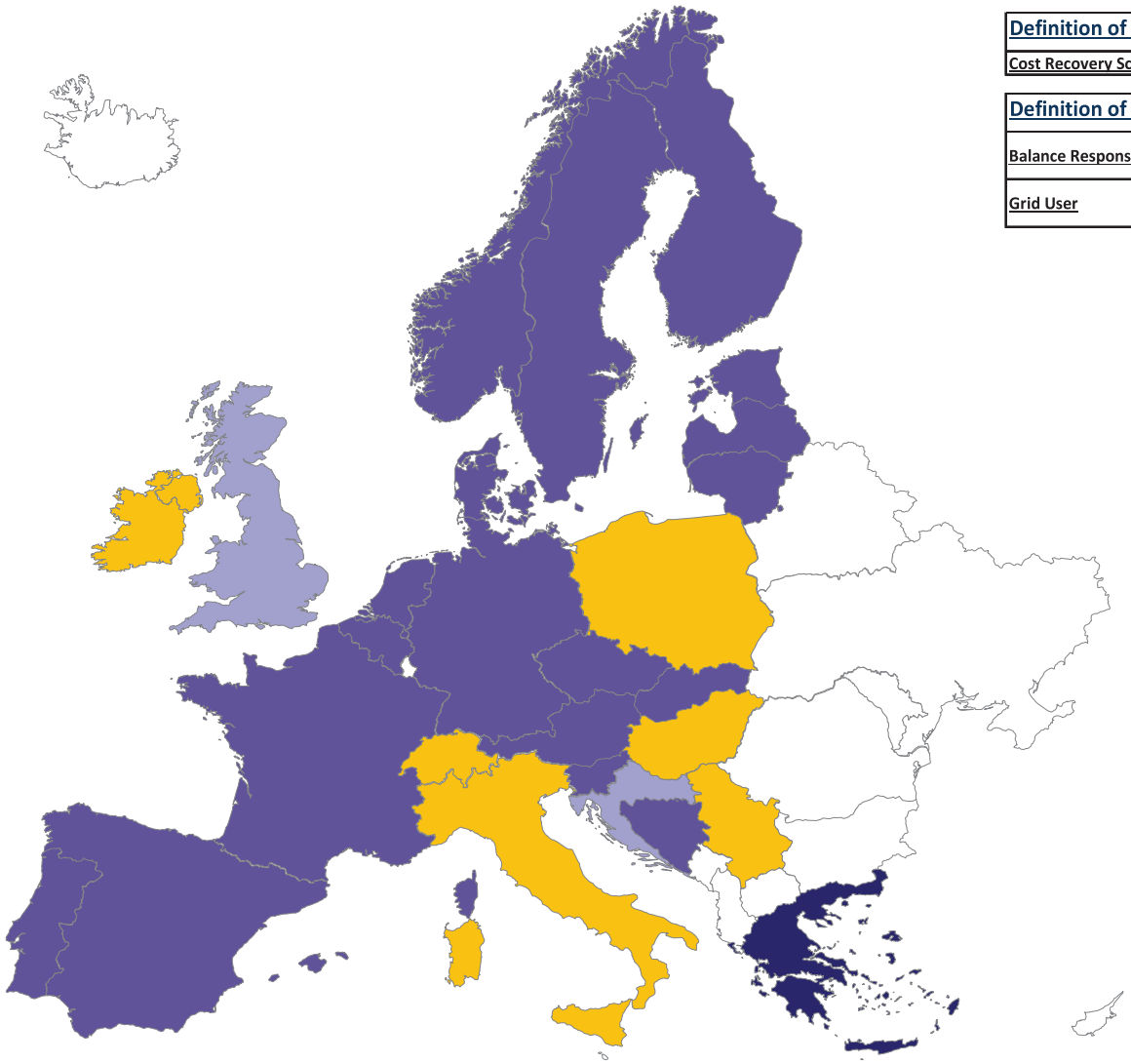
Frequency Restoration Reserve (Manual) - Energy - Settlement Rule



Definition of question	
Settlement Rule	The pricing rules for settlement.

Definition of answer	
Hybrid	Combination.
Marginal Pricing	Marginal pricing is the change in total cost that arises when the quantity produced changes by one unit.
Pay as bid	Contracted parties who provide a service are paid based on their offer price.
Regulated Price	Price for this service is based on a price that is set by the relevant regulatory authority.

Frequency Restoration Reserve (Manual) - Energy - Cost Recovery Scheme



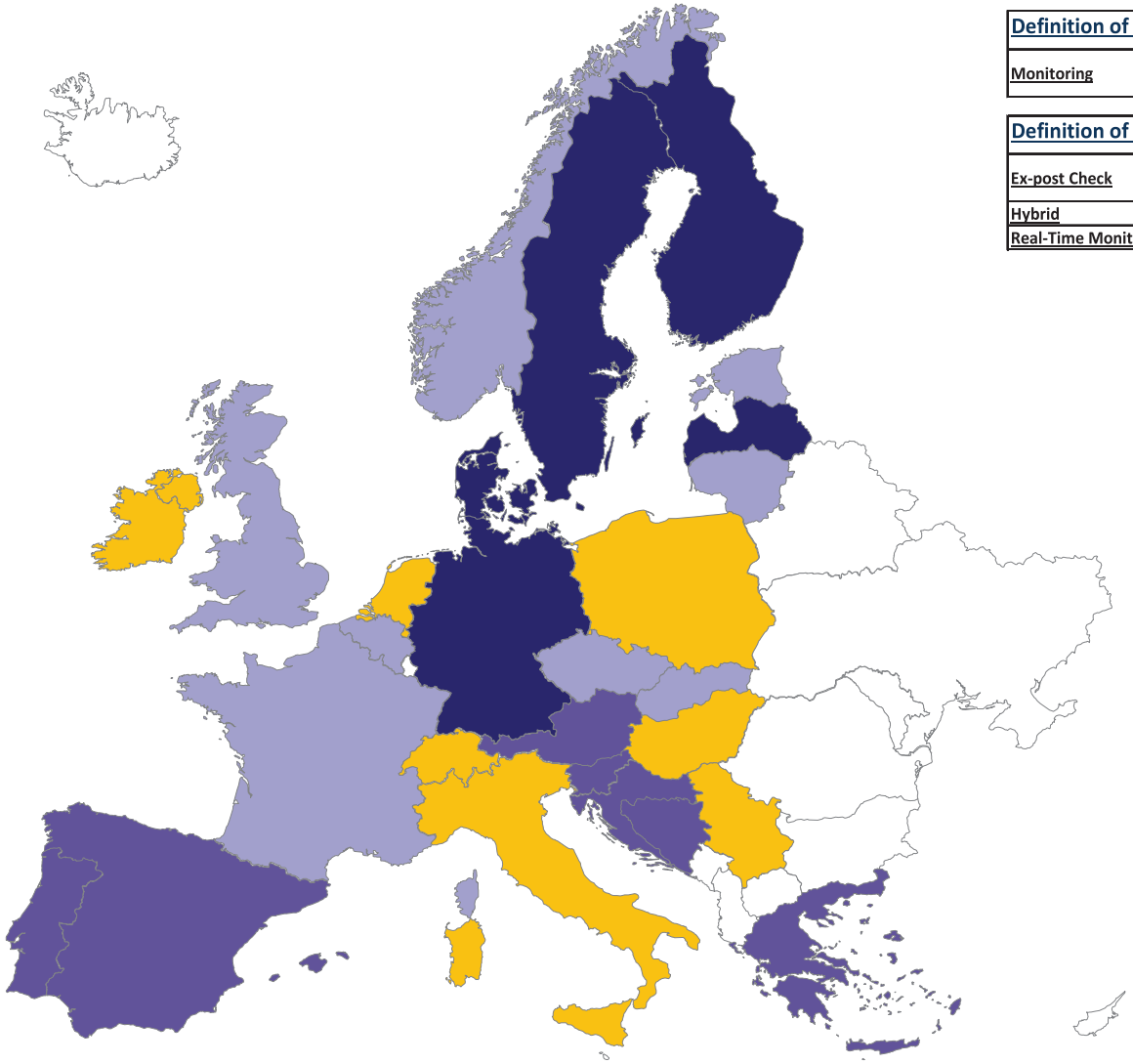
Definition of question	
Cost Recovery Scheme	From whom are the costs recovered.

Definition of answer	
Balance Responsible Party (BRP)	Balancing Responsible Party means a market participant or its chosen representative responsible for its Imbalances.
Grid User	The natural or legal person supplying to, or being supplied with active and/or reactive power by a TSO or DSO.

Key:

- Missing data
- N/A
- 100% Grid Users
- 100% BRP
- Mix of Grid Users and BRP

Frequency Restoration Reserve (Manual) - Energy - Monitoring



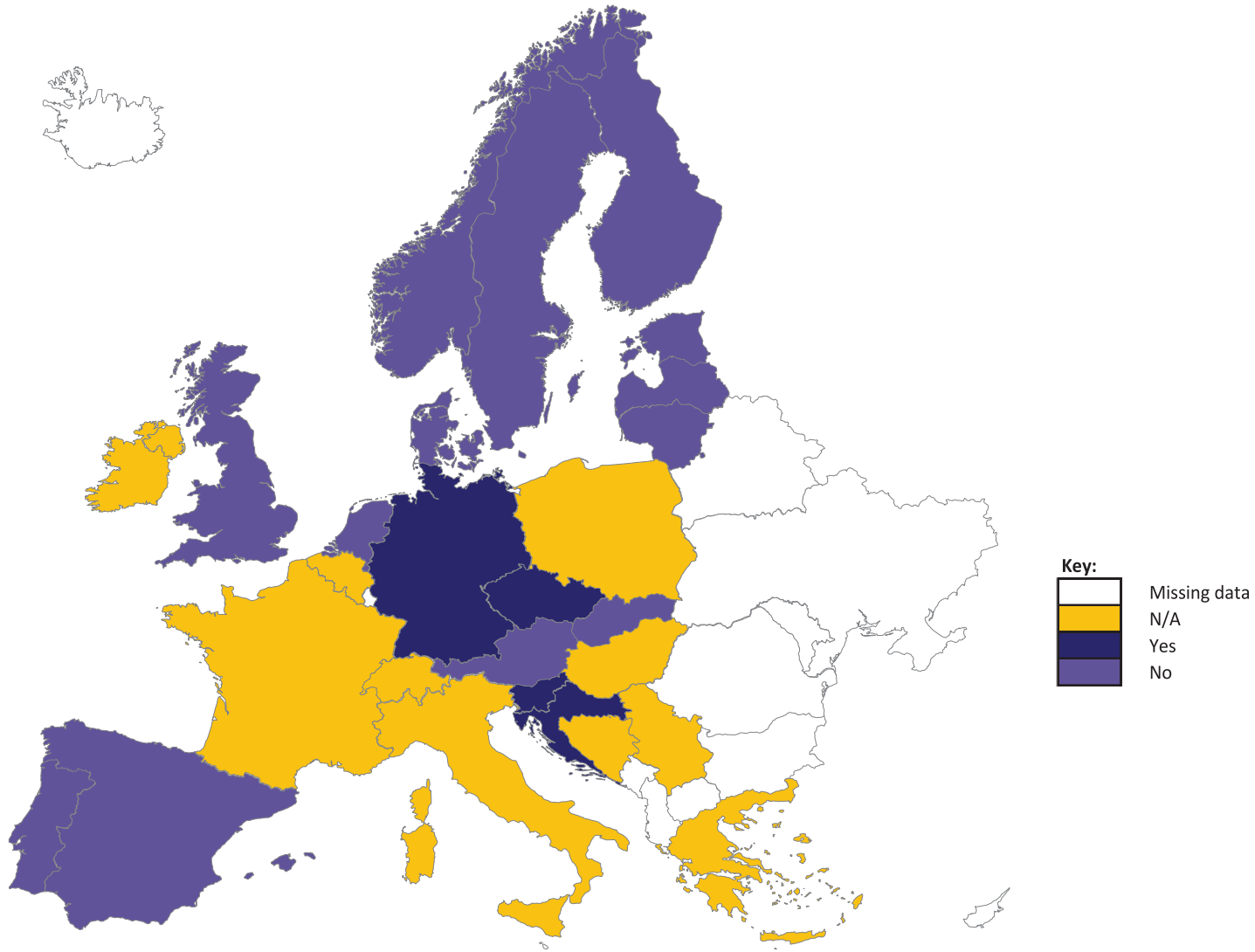
Definition of question	
Monitoring	Refers to the type of monitoring in place by the system operator to ensure performance of plant.

Definition of answer	
Ex-post Check	When the monitoring of performance of plant carried out after the event.
Hybrid	Combination.
Real-Time Monitoring	Monitoring of delivery of ancillary services in real time.

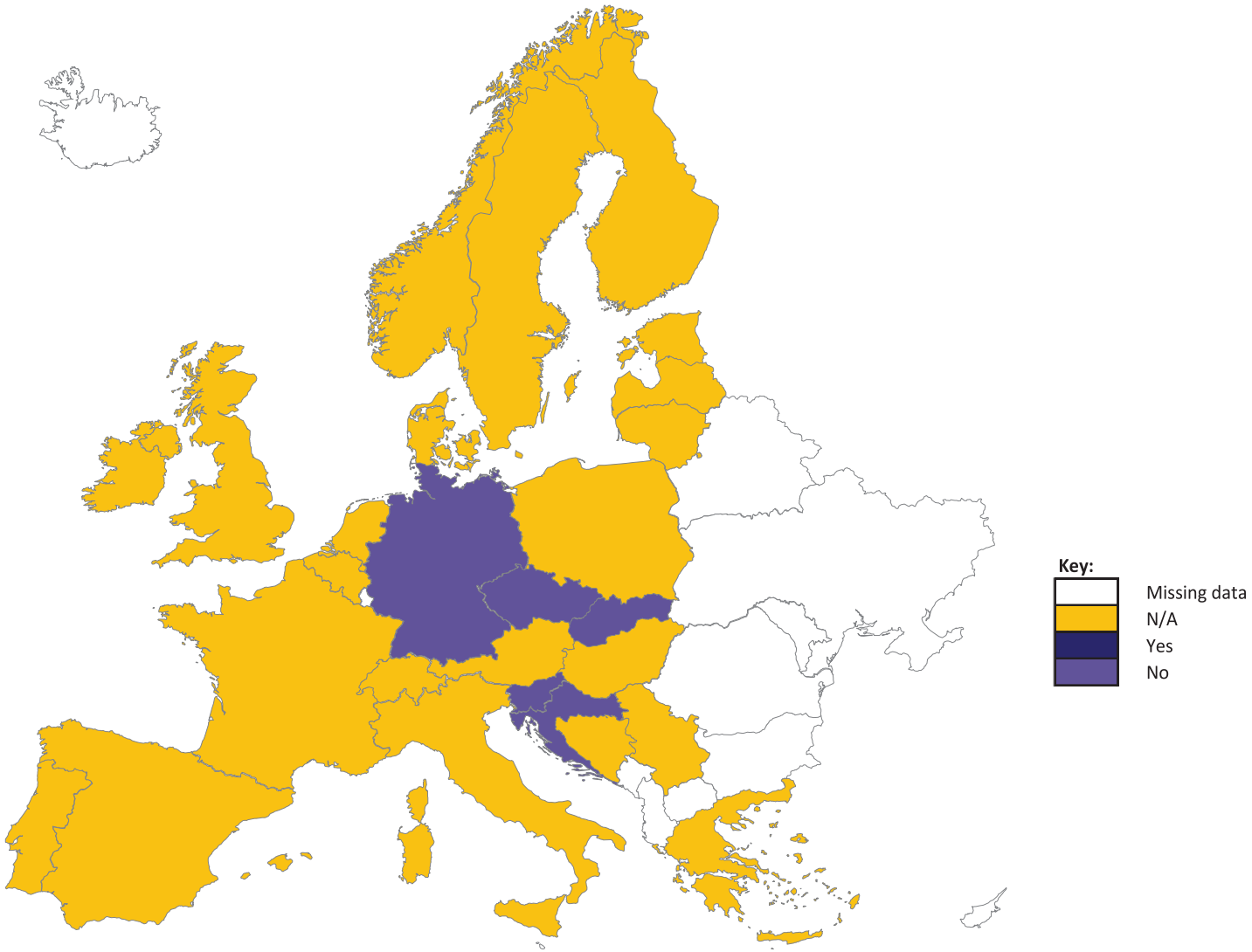
Key:

- Missing data
- N/A
- Real-Time Monitoring
- Ex-Post Check
- Hybrid

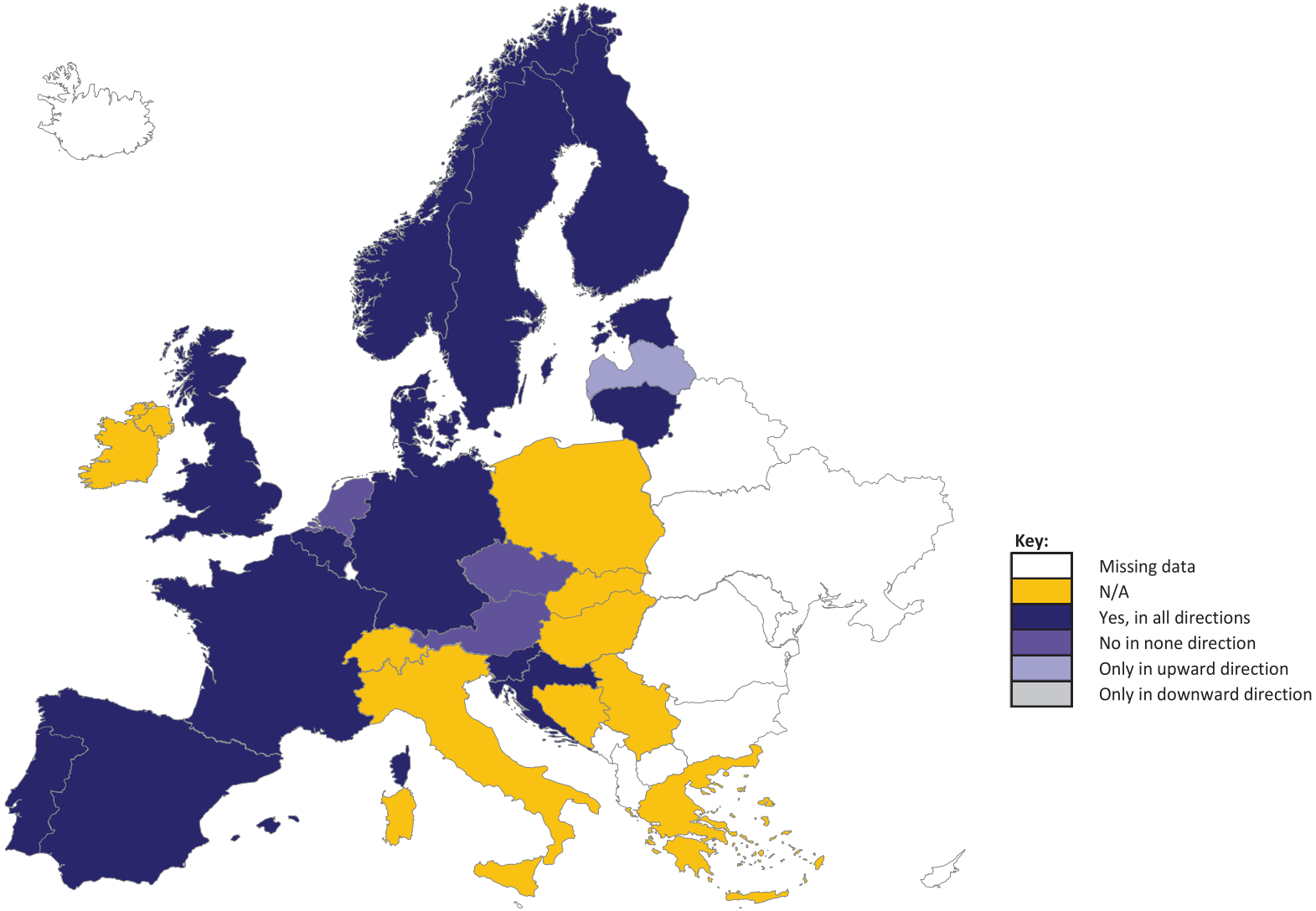
Frequency Restoration Reserve (Manual) - Energy - Transfer of obligation allowed



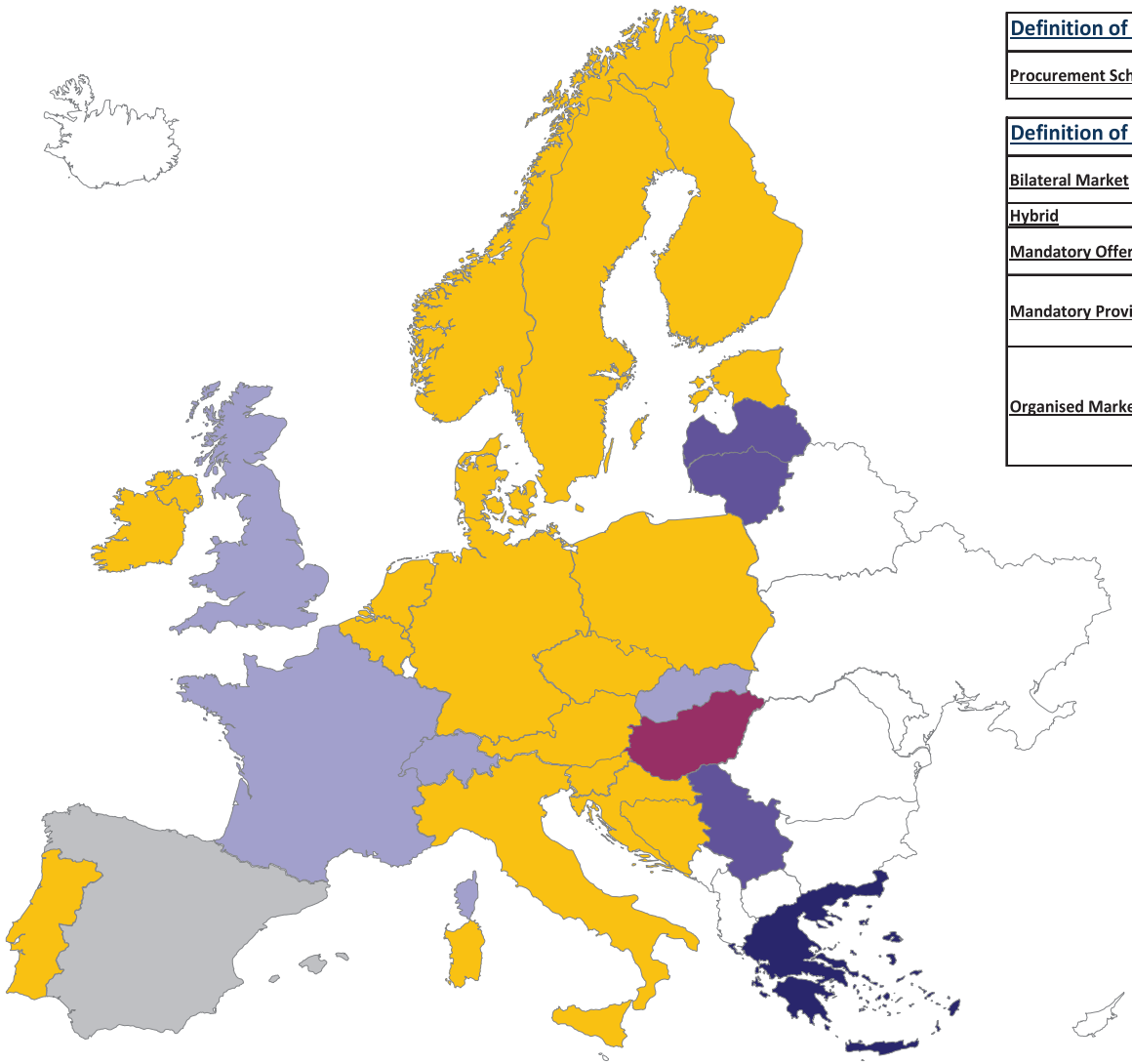
Frequency Restoration Reserve (Manual) - Energy - Obl. allowed, organised secondary market exists



Frequency Restoration Reserve (Manual) - Energy - Partially activated product



Replacement Reserve - Capacity - Procurement Scheme



Definition of question	
Procurement Scheme	Background of the offer, which is closest to the real operation time.

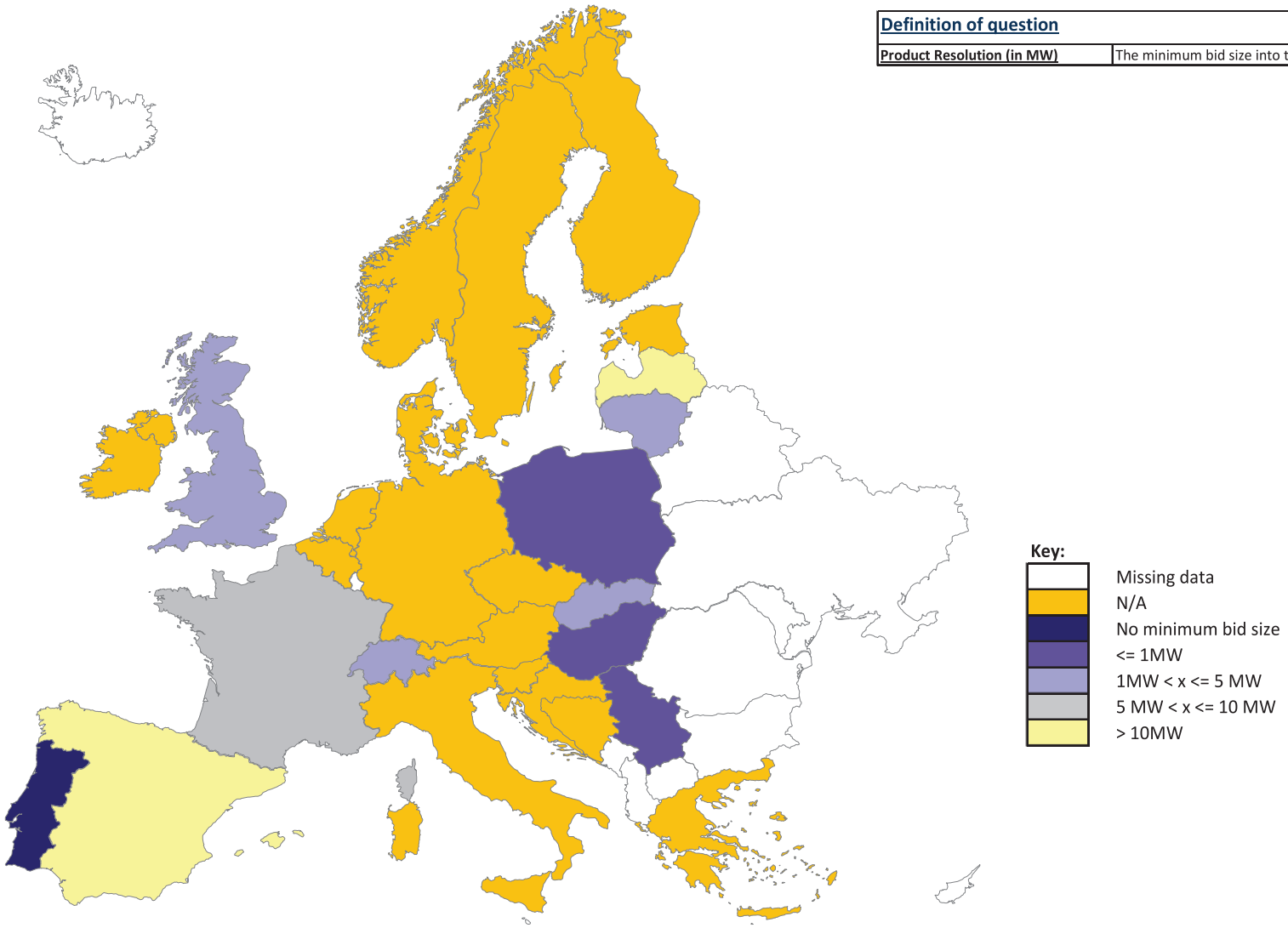
Definition of answer	
Bilateral Market	A grid user and TSO negotiate a contract regarding the offered service and price/price system.
Hybrid	Combination.
Mandatory Offers	Generators connected to the grid are obligated to offer the remaining capacity/available capacity.
Mandatory Provision	Generators connected to the grid are obligated to reserve a certain amount of capacity in order to meet TSO requirements, for a fixed price set by TSO, NRA or for free.
Organised Market	There is no contract or obligation for a grid user to offer the reserve (before the offer). The grid user can voluntary participate in the market (e.g. tender, auction, market platform (like PX)) and bid a price or customize his offer (e.g. the volume, timeframe). The market result may lead to a bilateral contract.

Key:

- Missing data
- N/A
- Mandatory Provision
- Bilateral Market
- Organised Market
- Hybrid
- Other
- Mandatory Offers

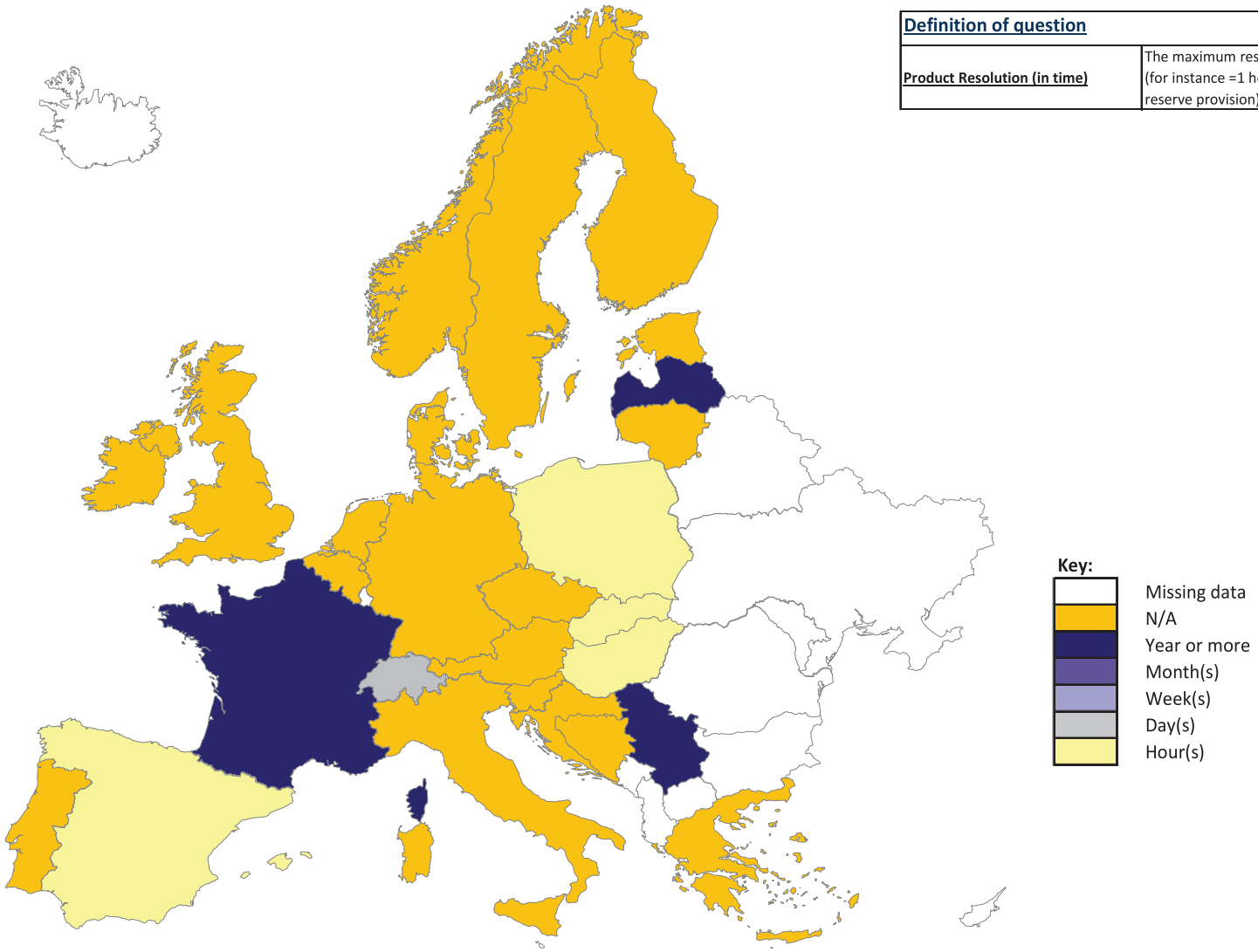
Replacement Reserve - Capacity - Product Resolution (in MW)

Definition of question	
Product Resolution (in MW)	The minimum bid size into the balancing market.



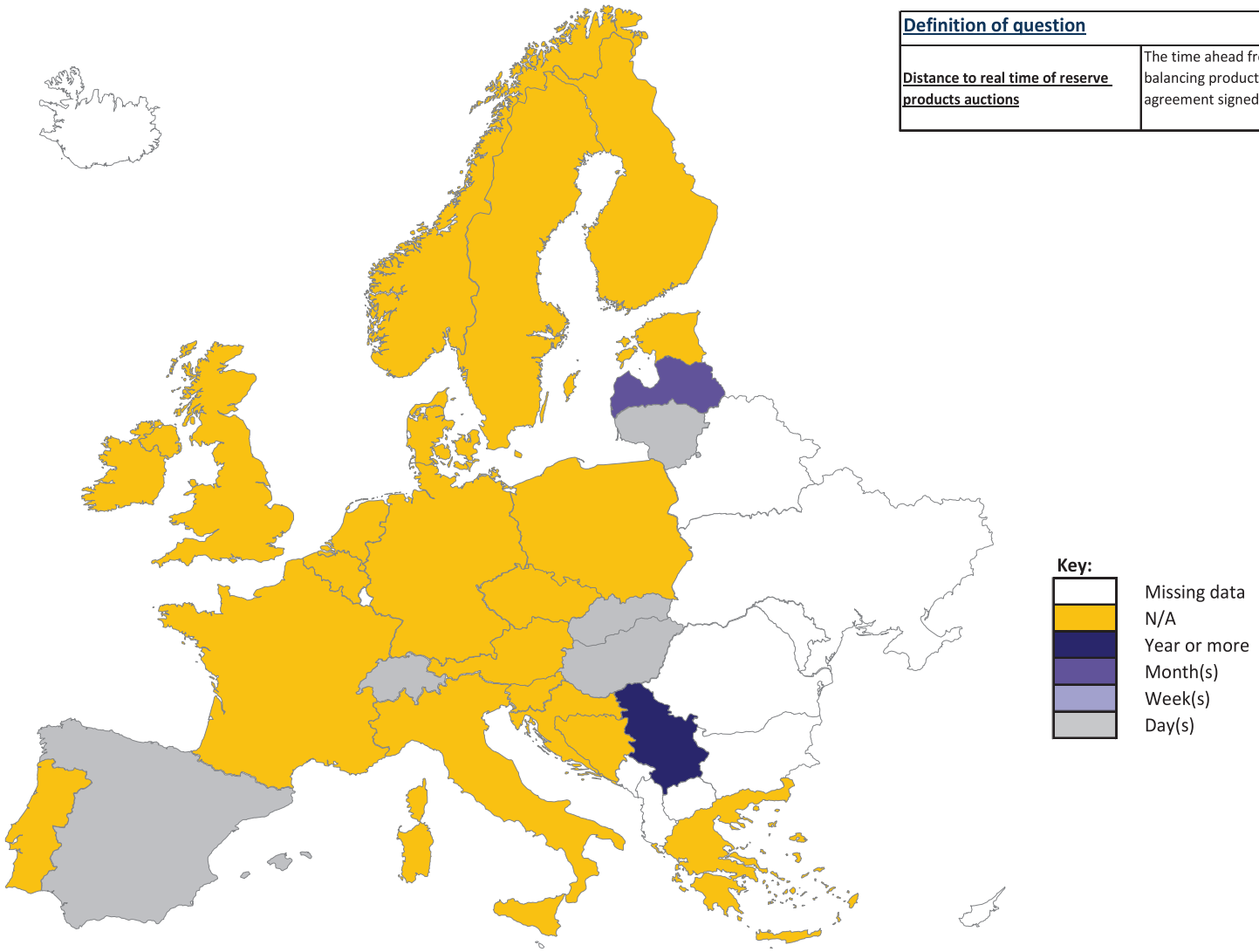
Replacement Reserve - Capacity - Product Resolution (in time)

Definition of question	
Product Resolution (in time)	The maximum resolution for which the product can be bid into the market (for instance =1 hour in the case of a 24 auctions day ahead market for reserve provision).

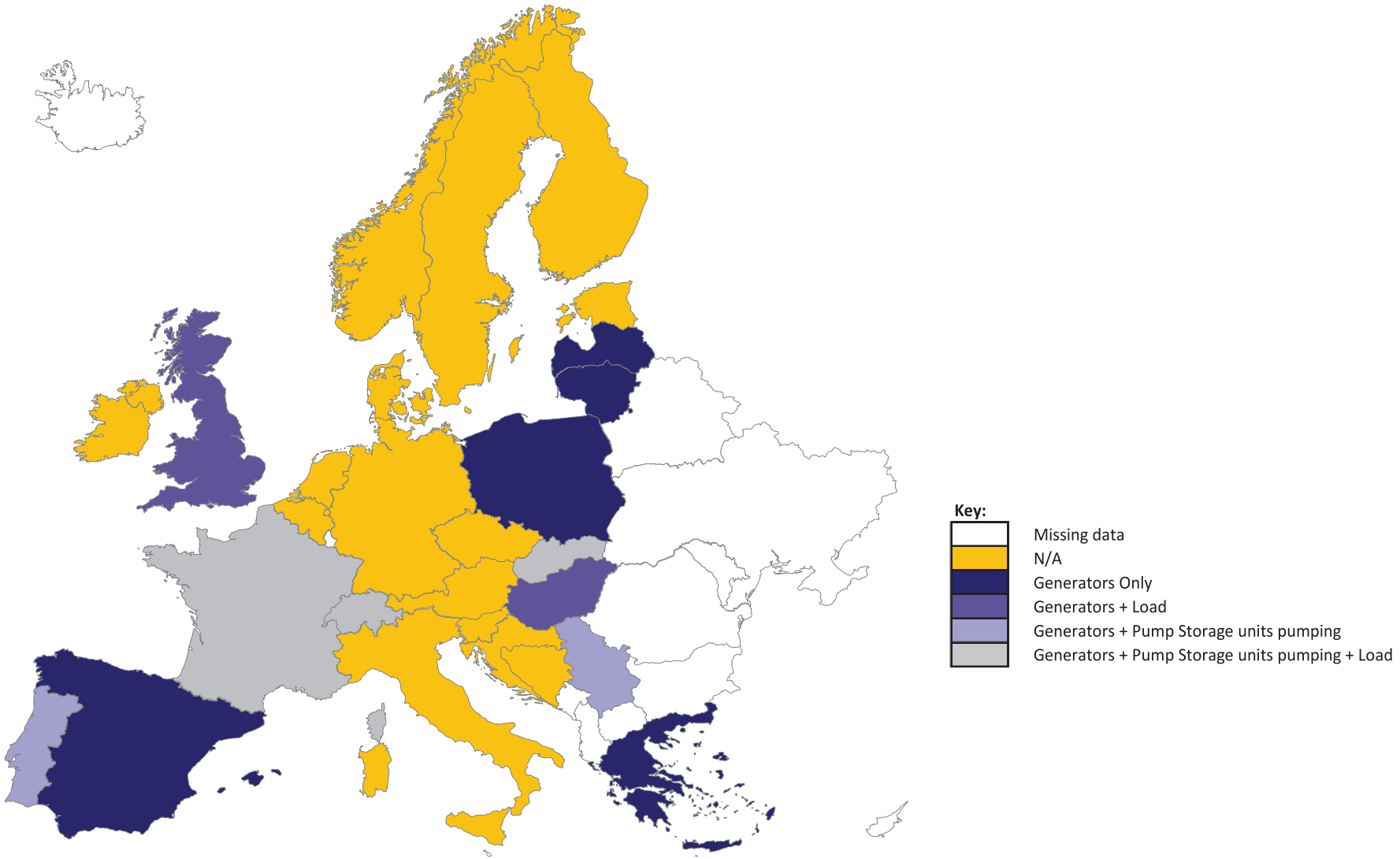


Replacement Reserve - Capacity - Distance to real time of reserve products auctions

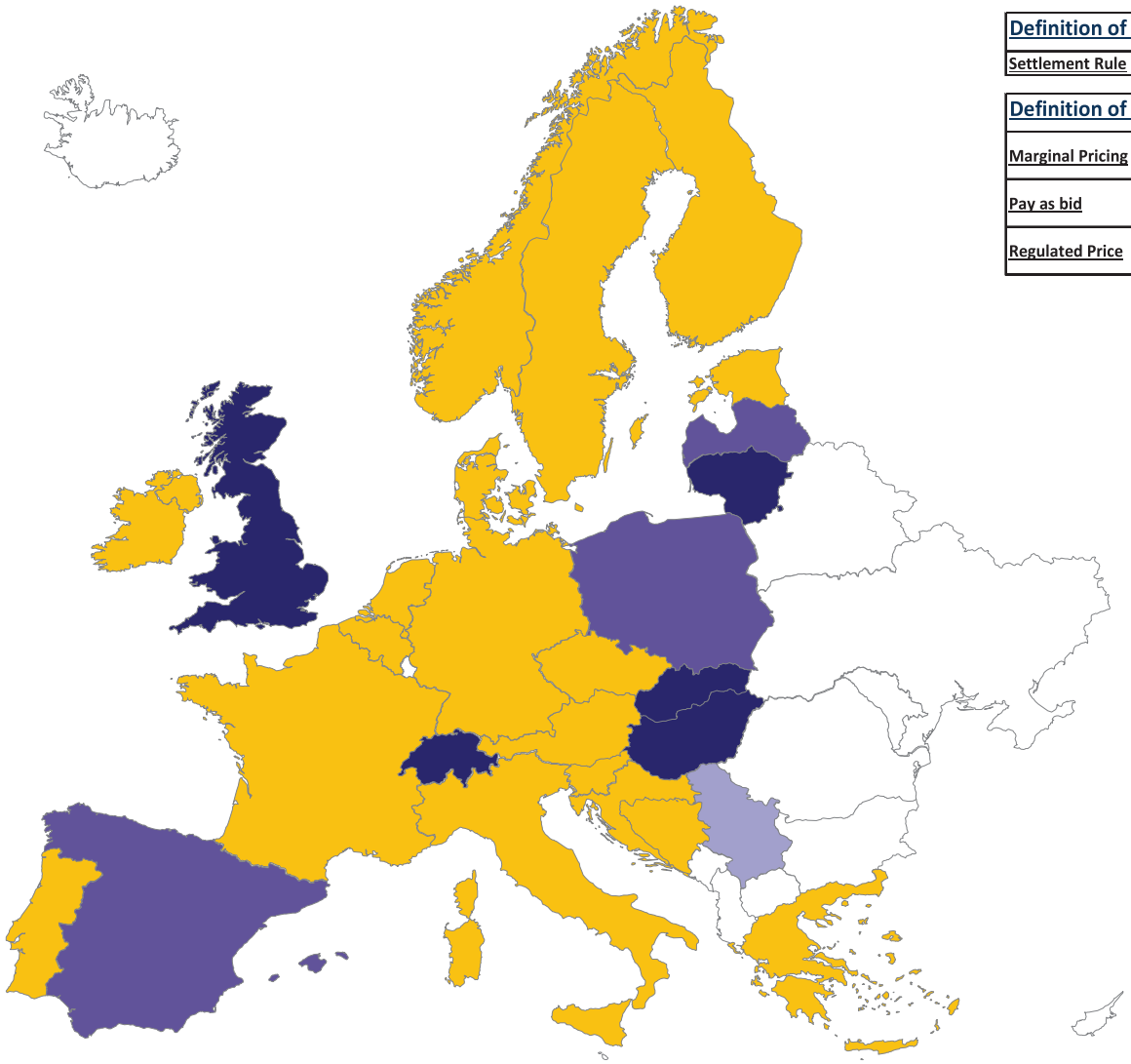
Definition of question	
Distance to real time of reserve products auctions	The time ahead from real time when auction/agreement for an specific balancing product takes place (for instance = 1 year in the case of a reserve agreement signed 1 year ahead of real time).



Replacement Reserve - Capacity - Provider



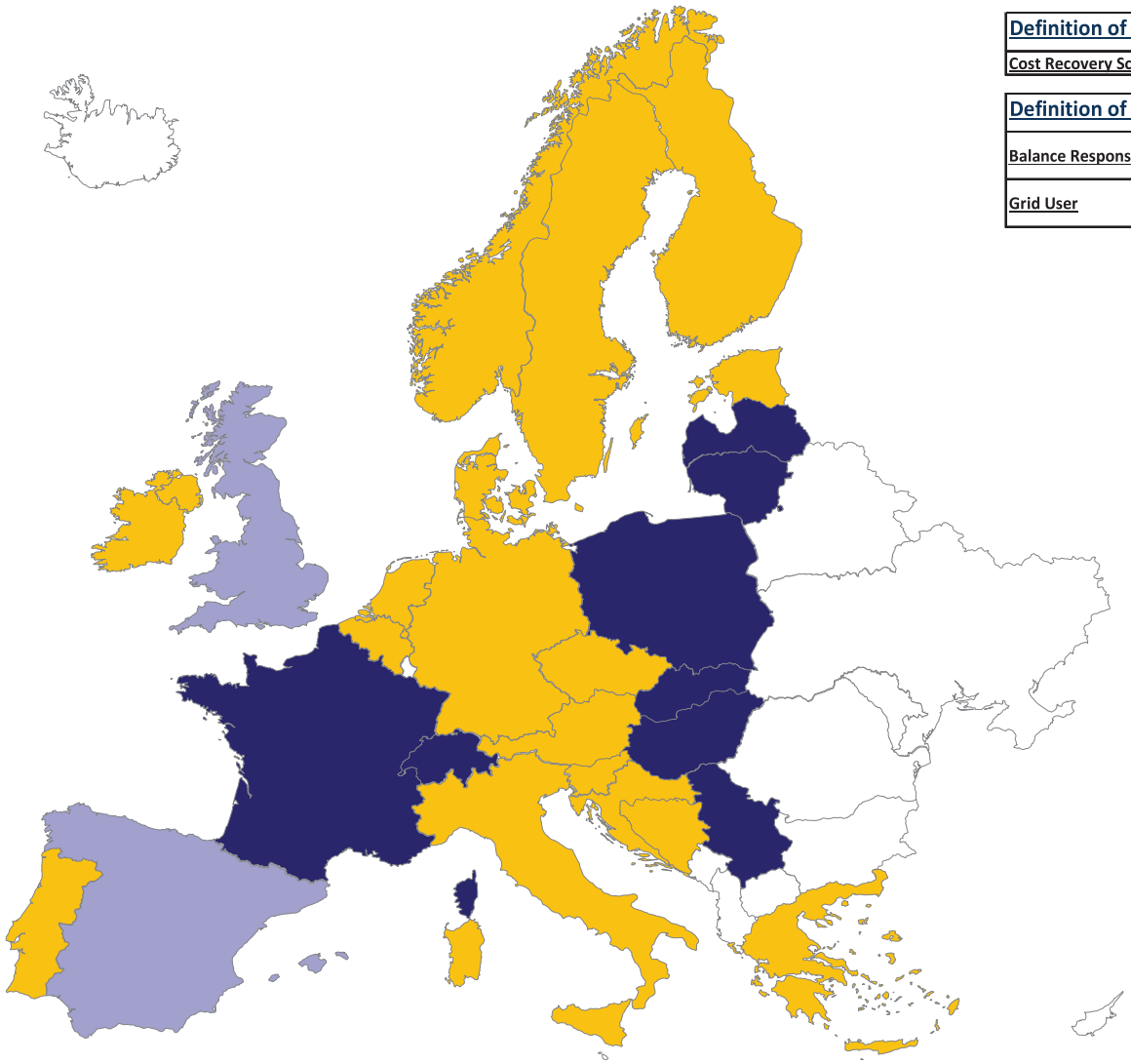
Replacement Reserve - Capacity - Settlement Rule



Definition of question	
Settlement Rule	The pricing rules for settlement.

Definition of answer	
Marginal Pricing	Marginal pricing is the change in total cost that arises when the quantity produced changes by one unit.
Pay as bid	Contracted parties who provide a service are paid based on their offer price.
Regulated Price	Price for this service is based on a price that is set by the relevant regulatory authority.

Replacement Reserve - Capacity - Cost Recovery Scheme



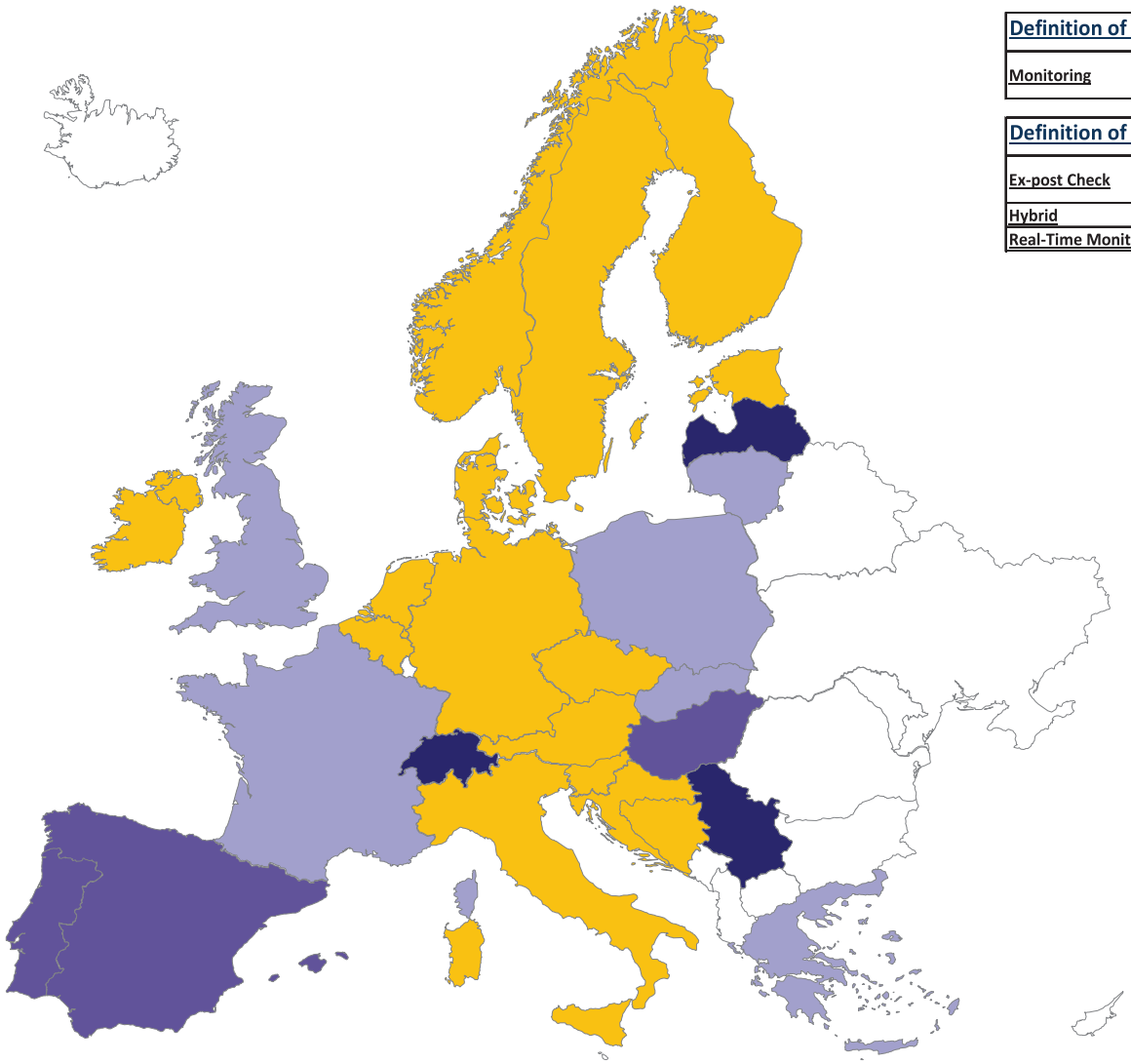
Definition of question	
Cost Recovery Scheme	From whom are the costs recovered.

Definition of answer	
Balance Responsible Party (BRP)	Balancing Responsible Party means a market participant or its chosen representative responsible for its Imbalances.
Grid User	The natural or legal person supplying to, or being supplied with active and/or reactive power by a TSO or DSO.

Key:

- Missing data
- N/A
- 100% Grid Users
- 100% BRP
- Mix of Grid Users and BRP

Replacement Reserve - Capacity - Monitoring



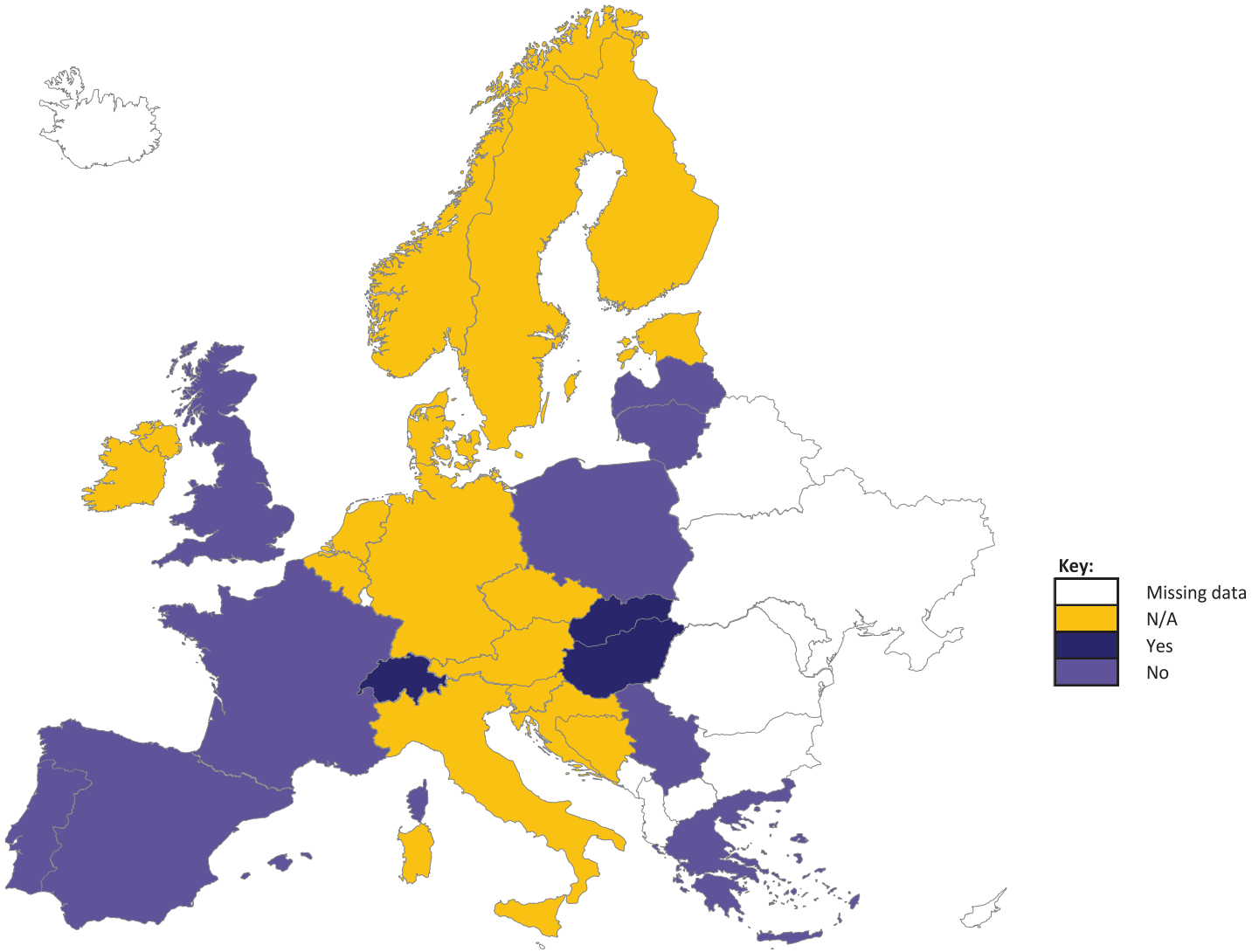
Definition of question	
Monitoring	Refers to the type of monitoring in place by the system operator to ensure performance of plant.

Definition of answer	
Ex-post Check	When the monitoring of performance of plant carried out after the event.
Hybrid	Combination.
Real-Time Monitoring	Monitoring of delivery of ancillary services in real time.

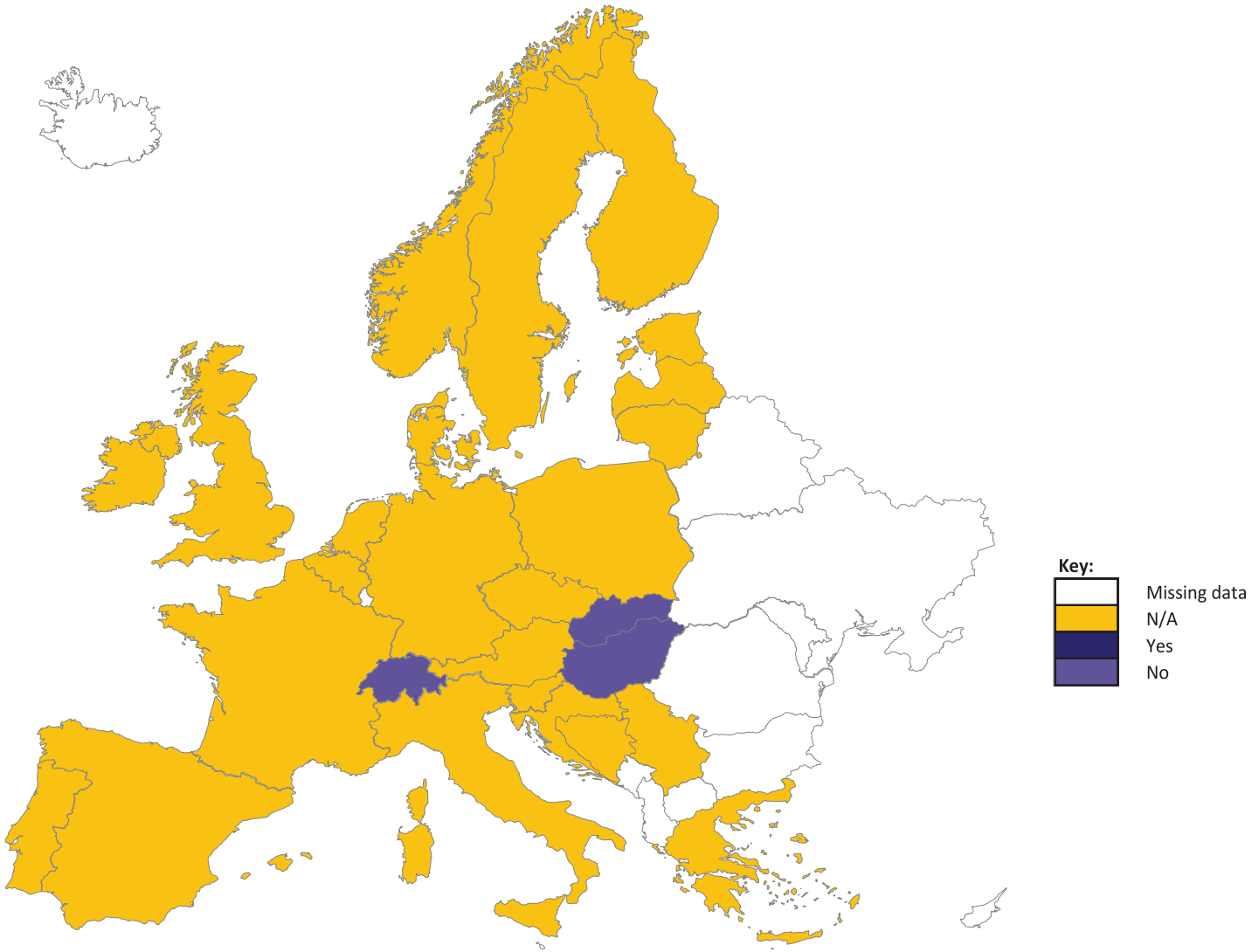
Key:

- Missing data
- N/A
- Real-Time Monitoring
- Ex-Post Check
- Hybrid

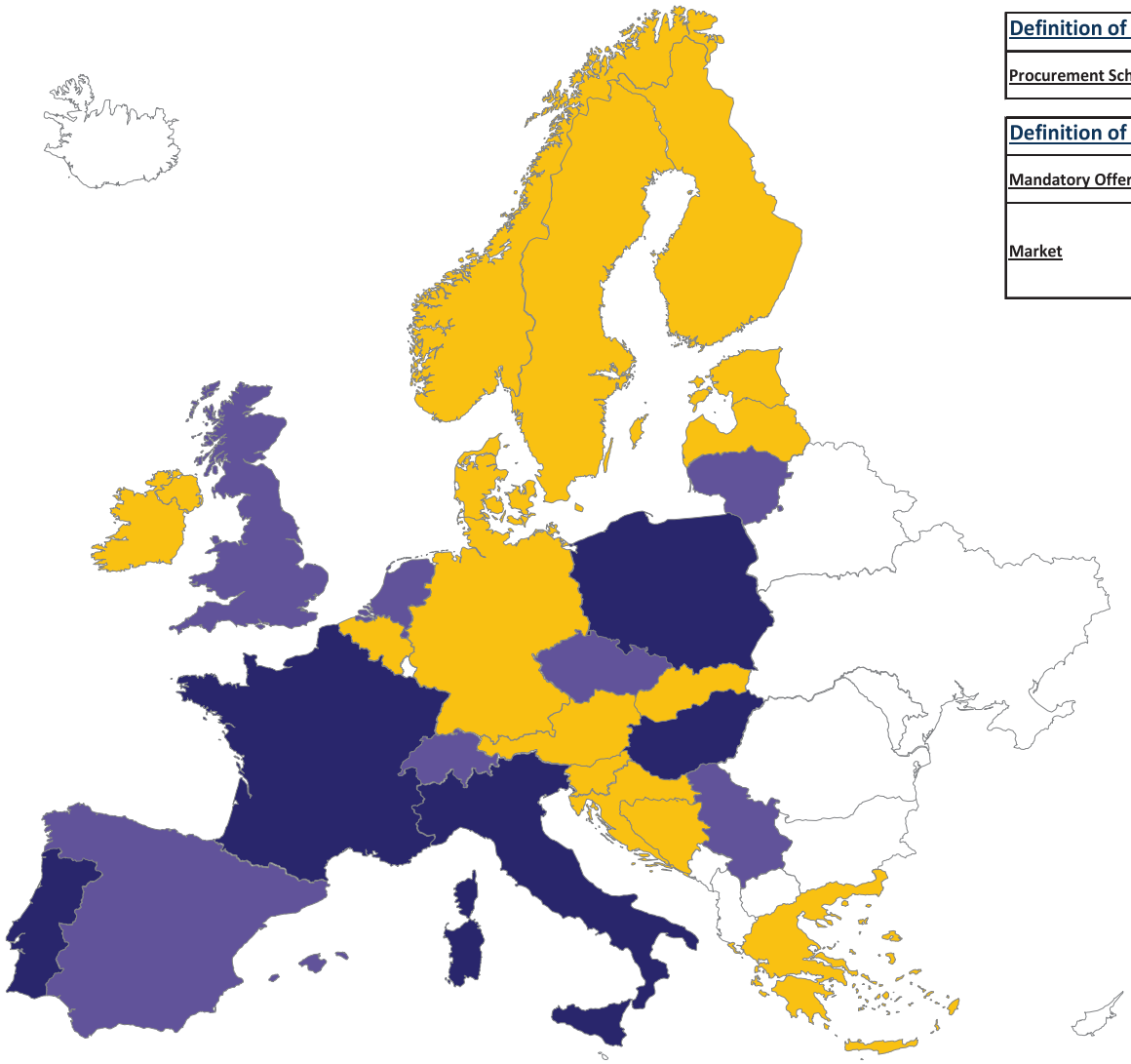
Replacement Reserve - Capacity - Transfer of obligation allowed



Replacement Reserve - Capacity - Obl. allowed, organised secondary market exists



Replacement Reserve - Energy - Procurement Scheme



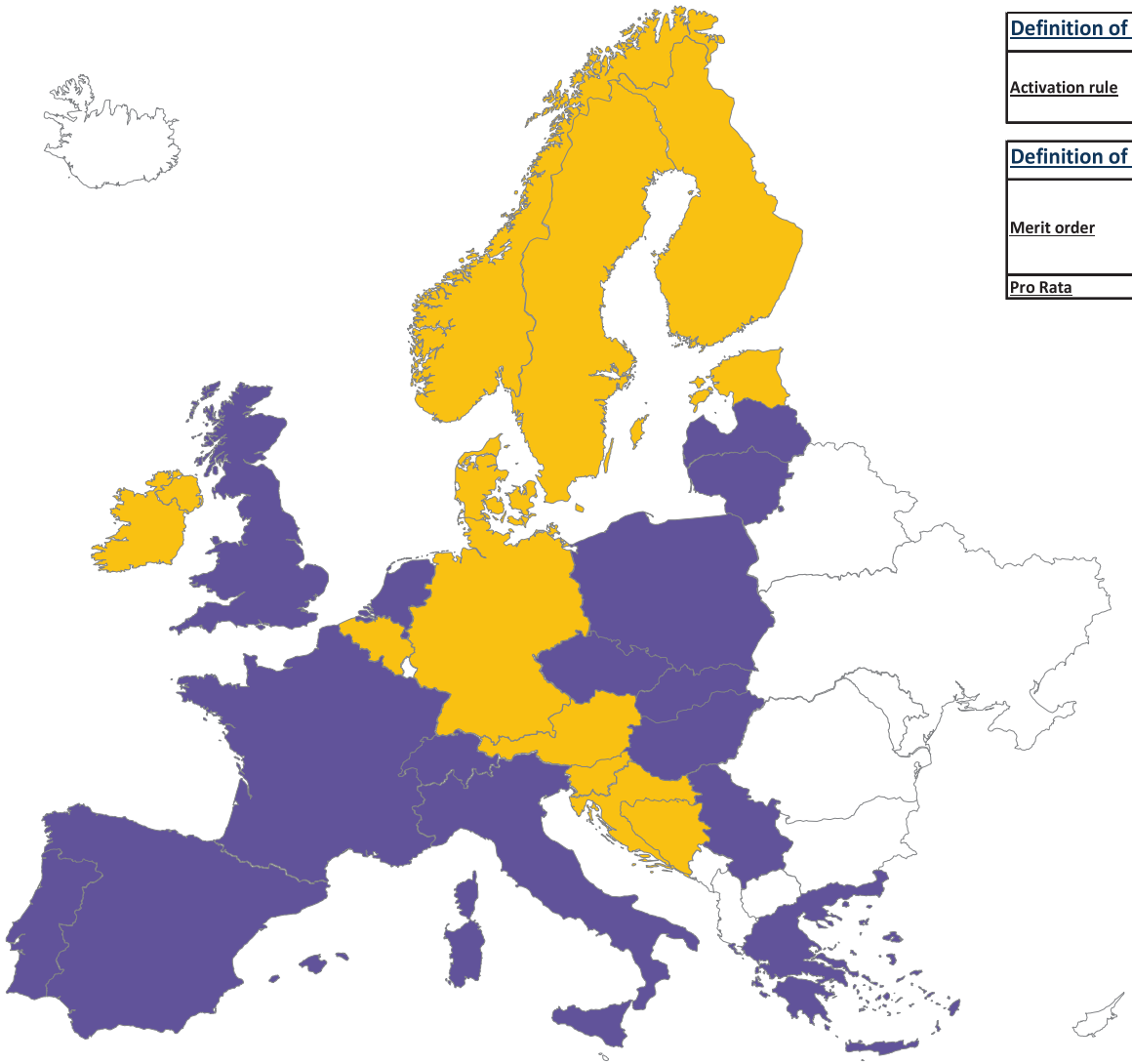
Definition of question	
Procurement Scheme	Background of the offer, which is closest to the real operation time.

Definition of answer	
Mandatory Offers	Generators connected to the grid are obligated to offer the remaining capacity/available capacity.
Market	There is no contract or obligation for a grid user to offer the energy (before the offer). The grid user can voluntary participate in the real-time energy market and bid a price or customize his offer (e.g. the volume, timeframe).

Key:

- Missing data
- N/A
- Mandatory Offers
- Market
- Other

Replacement Reserve - Energy - Activation Rule



Definition of question	
Activation rule	How the frequency restoration reserves are activated i.e. by a Pro-Rata system or on the basis of a Merit Order (cheapest being activated first).

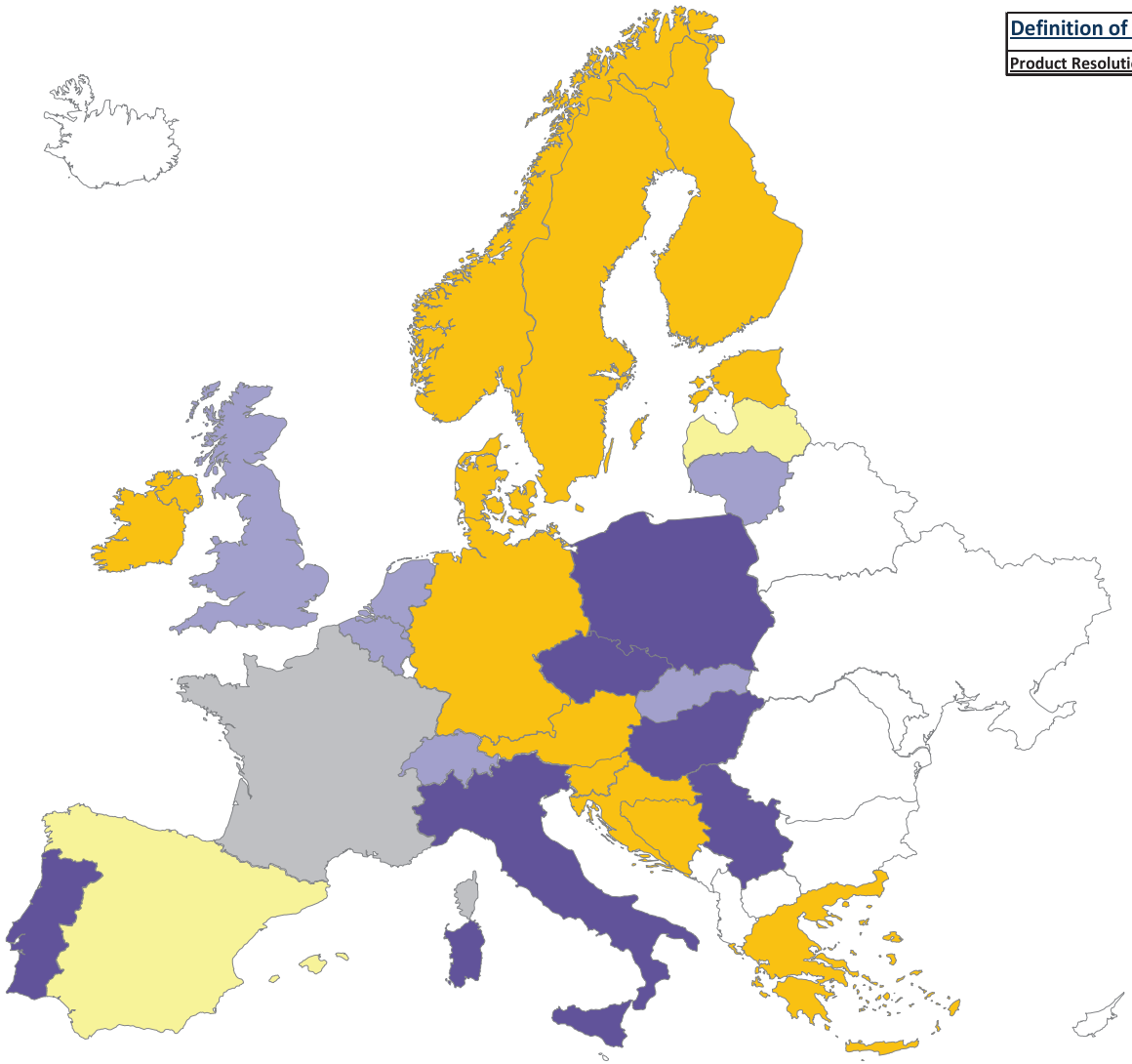
Definition of answer	
Merit order	A merit order is a way of ranking available sources of energy in ascending order of their short run marginal costs of production, so that those with the lowest marginal costs are the first ones to be brought online to meet demand.
Pro Rata	In Proportion (Parallel Activation).

Key:

- Missing data
- N/A
- Pro Rata (Parallel Activation)
- Merit order

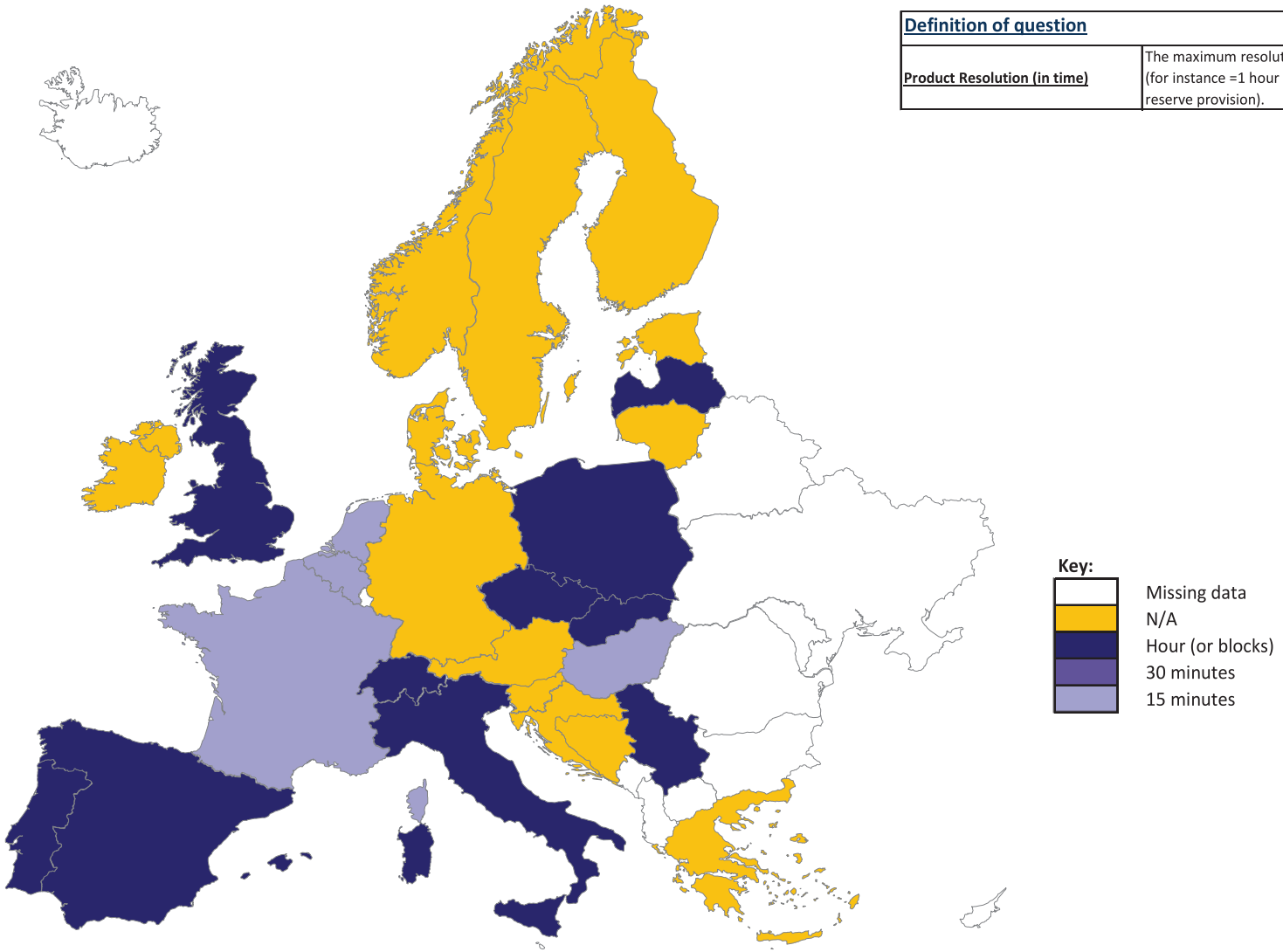
Replacement Reserve - Energy - Product Resolution (in MW)

Definition of question	
Product Resolution (in MW)	The minimum bid size into the balancing market.



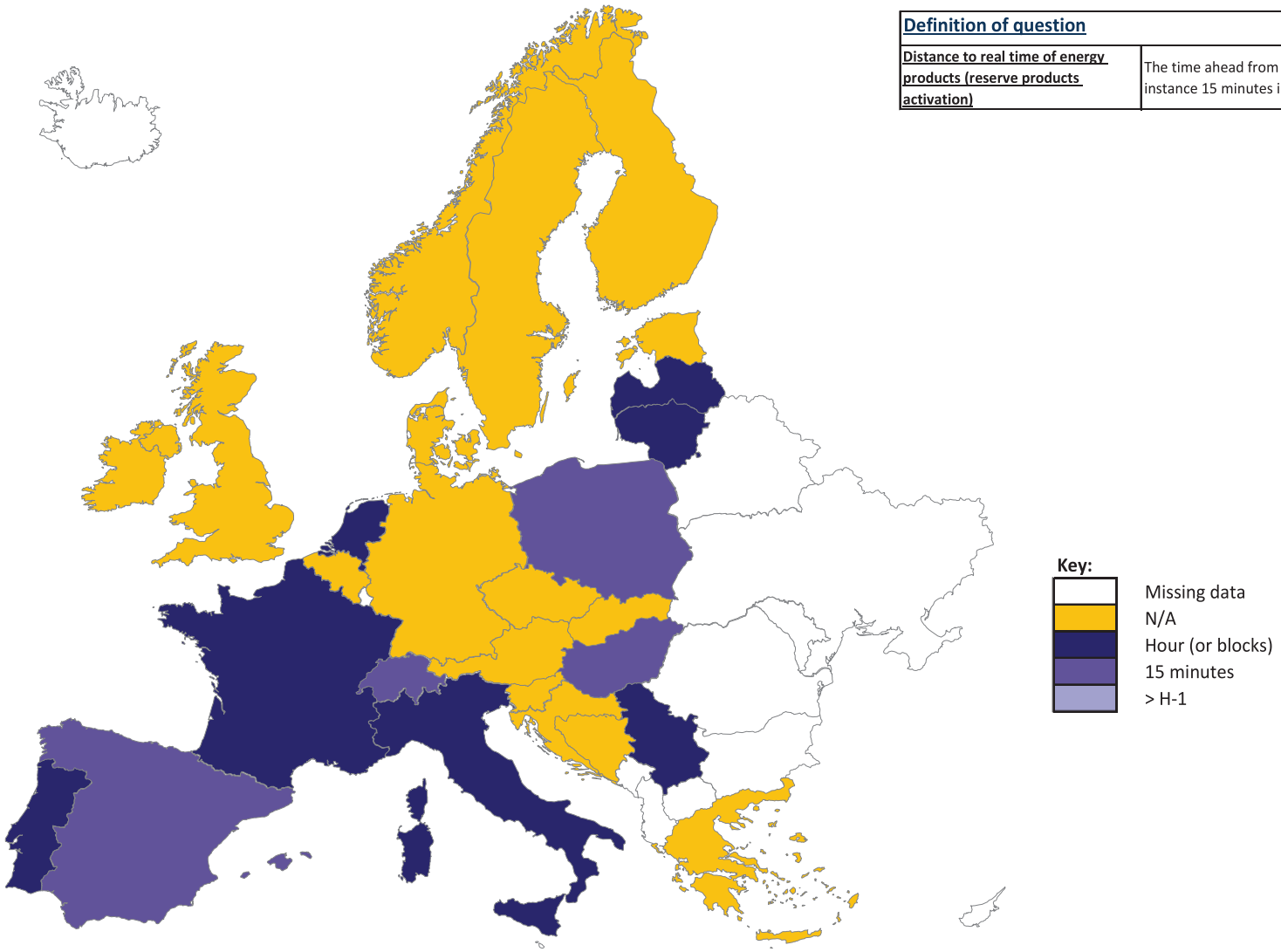
Replacement Reserve - Energy - Product Resolution (in time)

Definition of question	
Product Resolution (in time)	The maximum resolution for which the product can be bid into the market (for instance =1 hour in the case of a 24 auctions day ahead market for reserve provision).

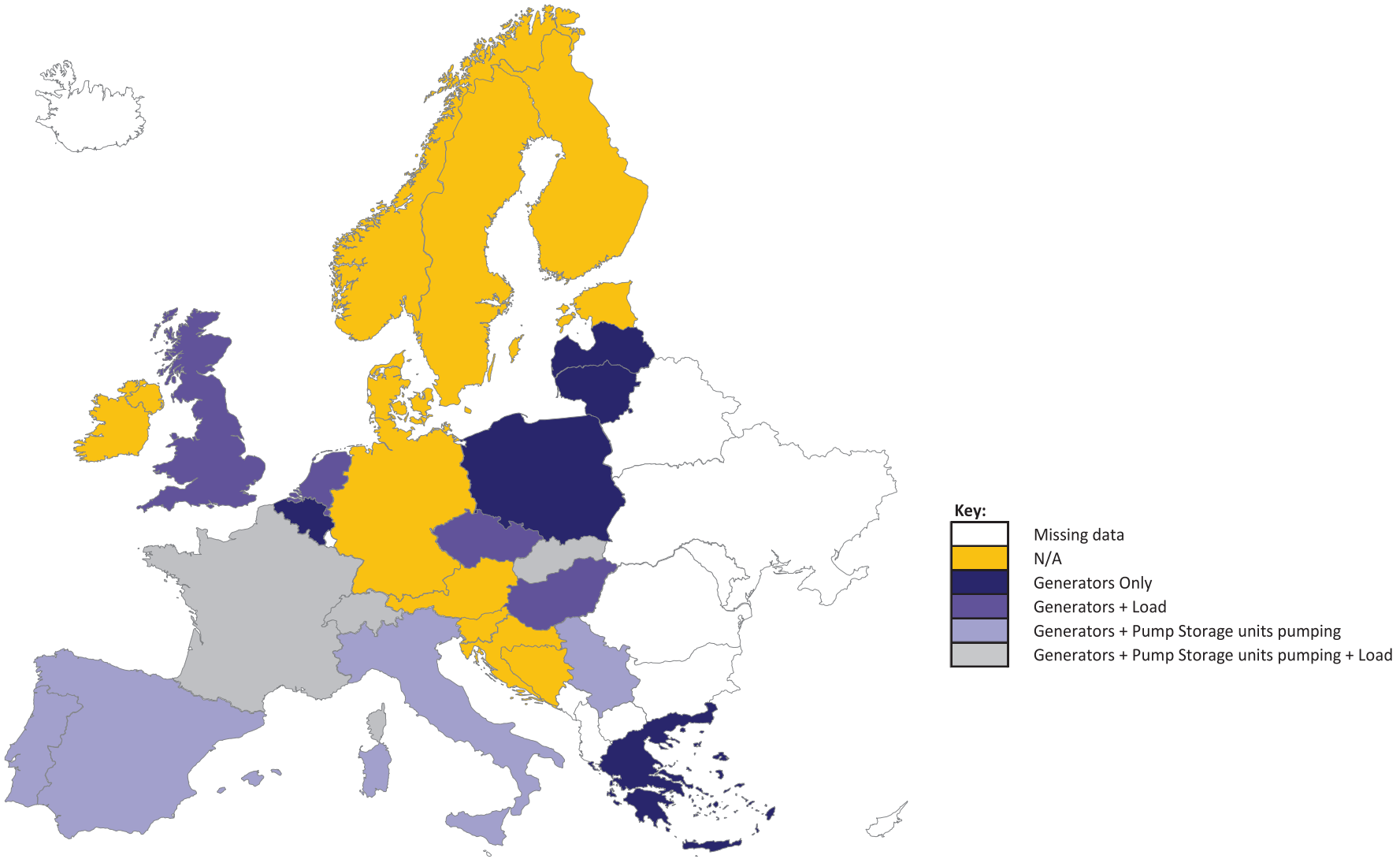


Replacement Reserve - Energy - Distance to real time of energy products

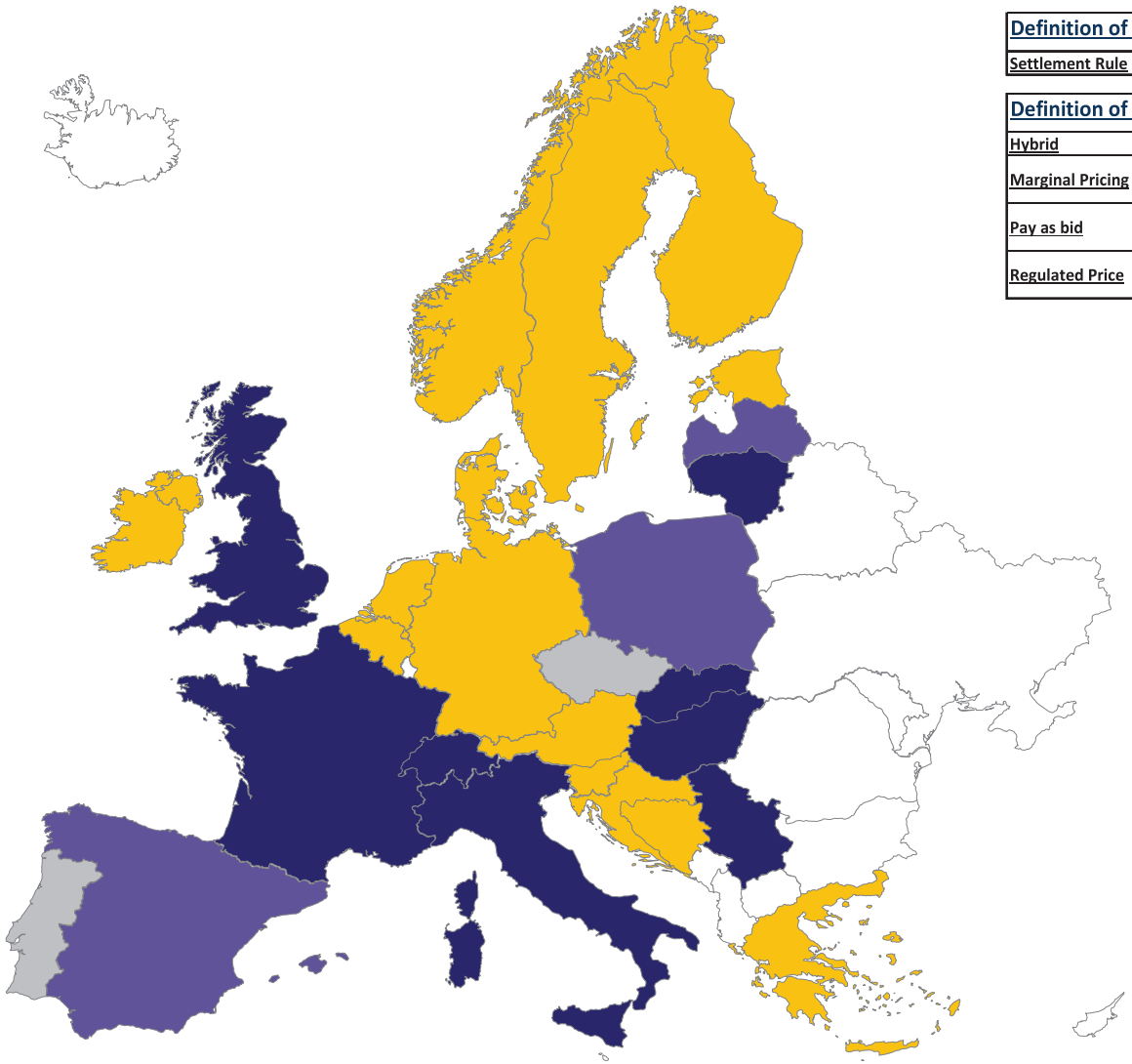
Definition of question	
Distance to real time of energy products (reserve products activation)	The time ahead from real time when TSO activates a given product (for instance 15 minutes in the case of mFRR/tertiary energy).



Replacement Reserve - Energy - Provider



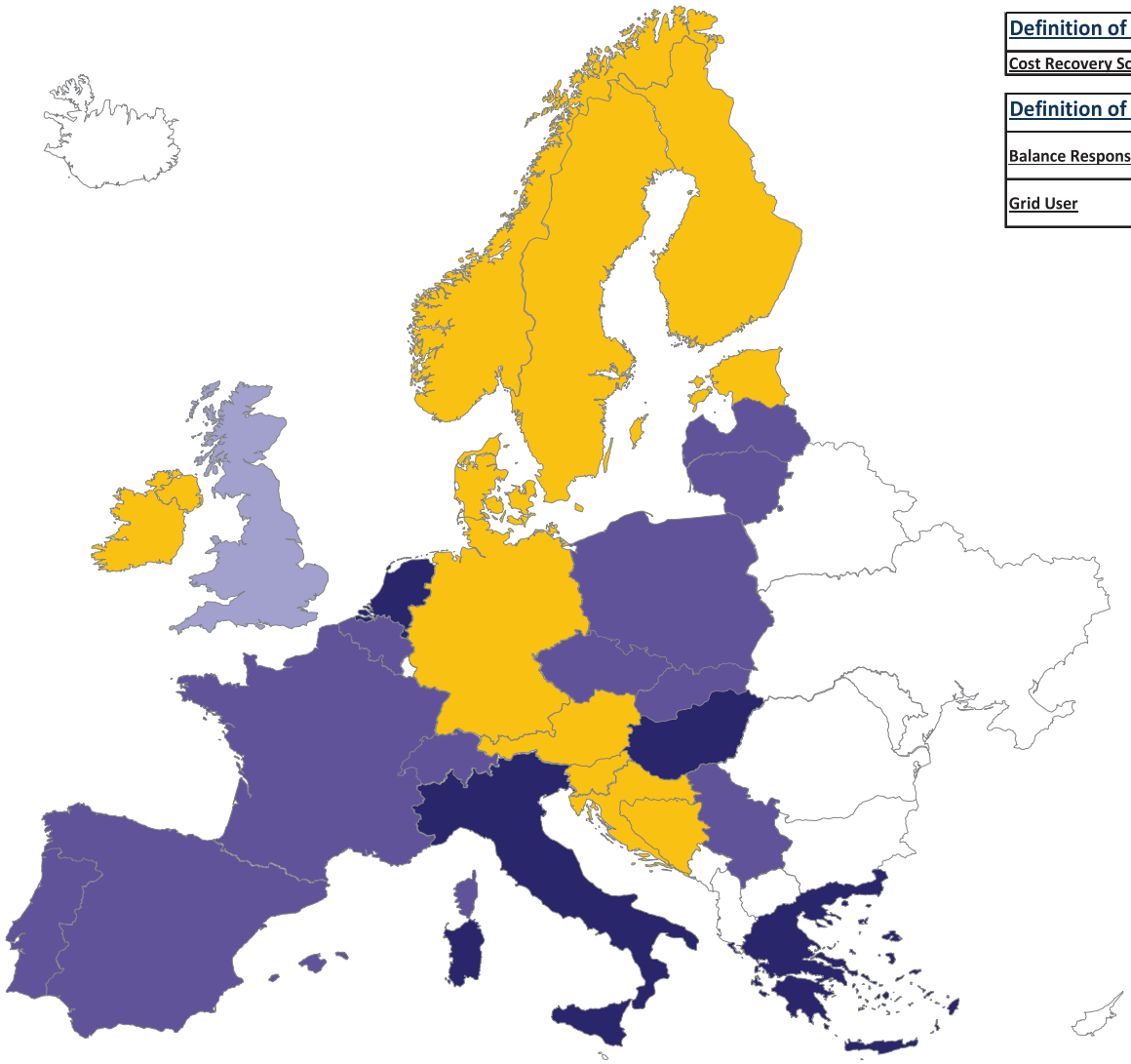
Replacement Reserve - Energy - Settlement Rule



Definition of question	
Settlement Rule	The pricing rules for settlement.

Definition of answer	
Hybrid	Combination.
Marginal Pricing	Marginal pricing is the change in total cost that arises when the quantity produced changes by one unit.
Pay as bid	Contracted parties who provide a service are paid based on their offer price.
Regulated Price	Price for this service is based on a price that is set by the relevant regulatory authority.

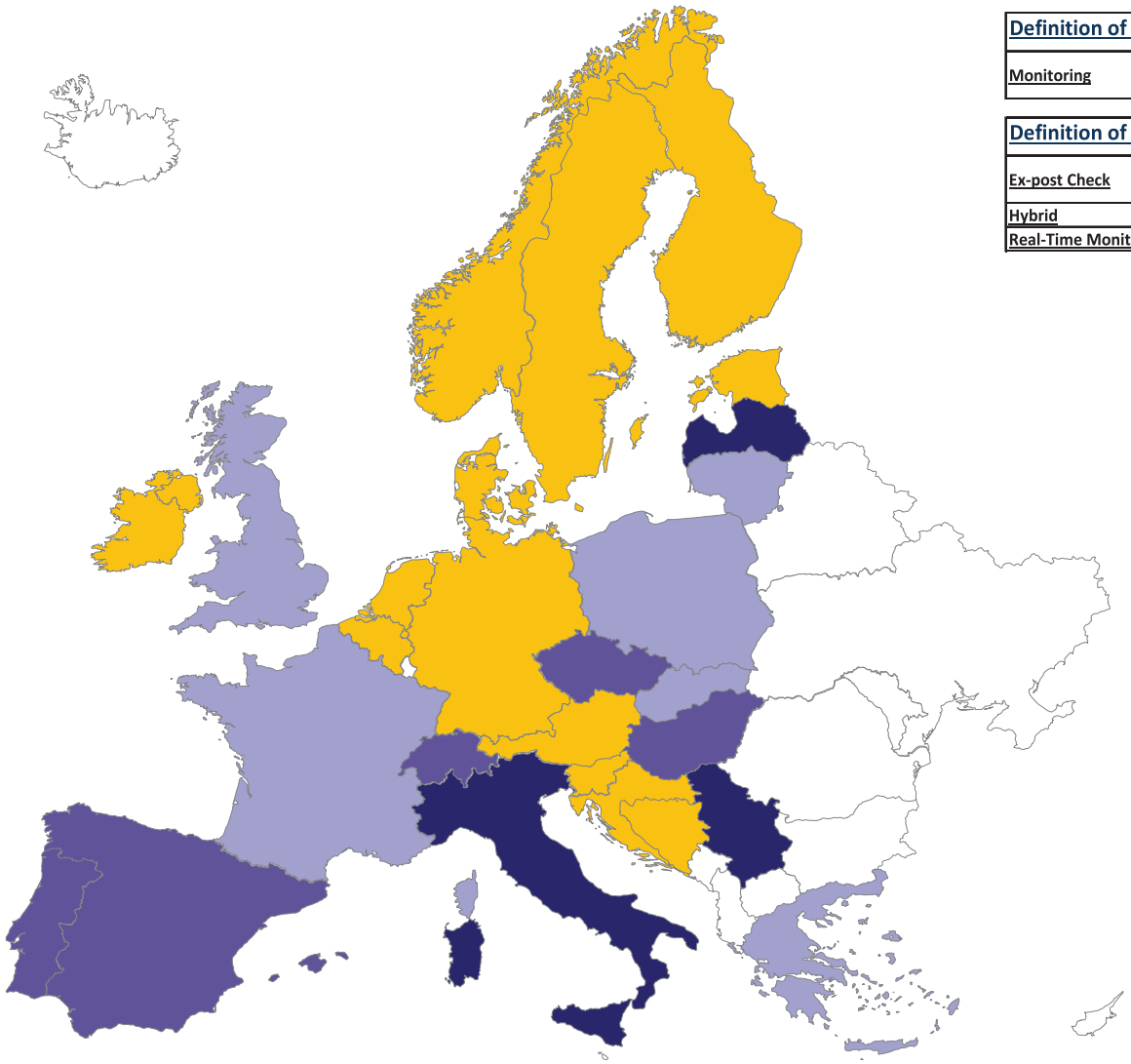
Replacement Reserve - Energy - Cost Recovery Scheme



Definition of question	
Cost Recovery Scheme	From whom are the costs recovered.

Definition of answer	
Balance Responsible Party (BRP)	Balancing Responsible Party means a market participant or its chosen representative responsible for its Imbalances.
Grid User	The natural or legal person supplying to, or being supplied with active and/or reactive power by a TSO or DSO.

Replacement Reserve - Energy - Monitoring



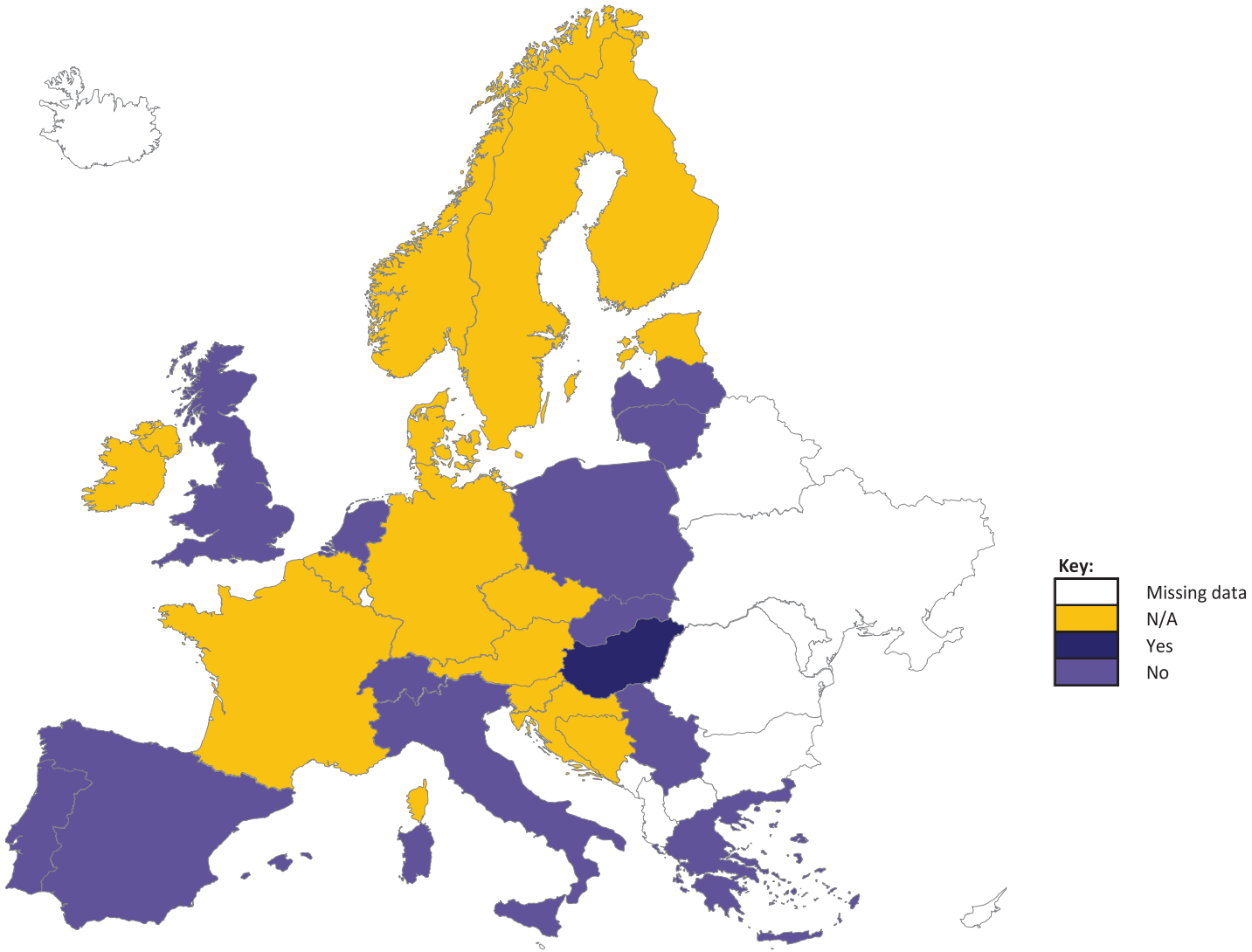
Definition of question	
Monitoring	Refers to the type of monitoring in place by the system operator to ensure performance of plant.

Definition of answer	
Ex-post Check	When the monitoring of performance of plant carried out after the event.
Hybrid	Combination.
Real-Time Monitoring	Monitoring of delivery of ancillary services in real time.

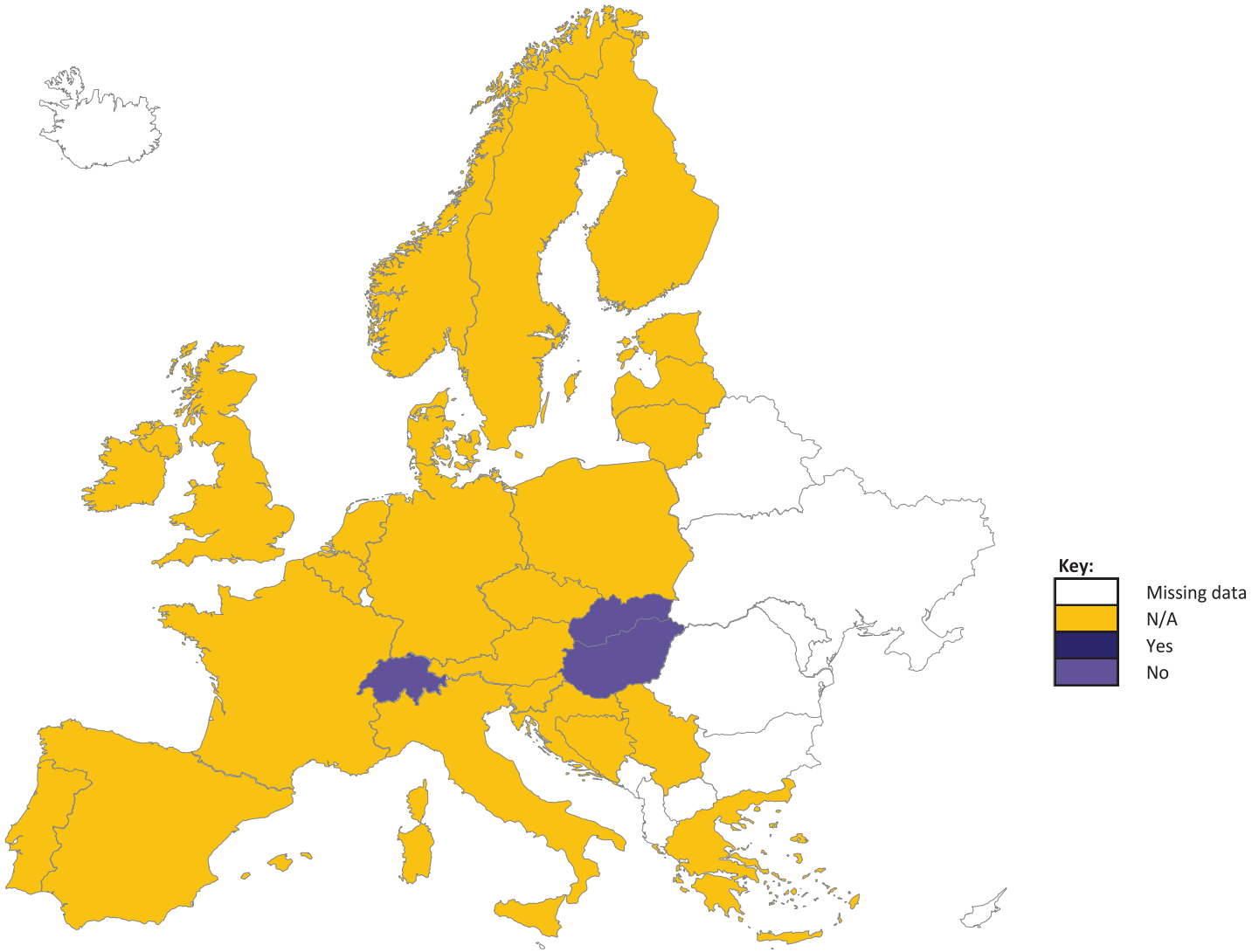
Key:

- Missing data
- N/A
- Real-Time Monitoring
- Ex-Post Check
- Hybrid

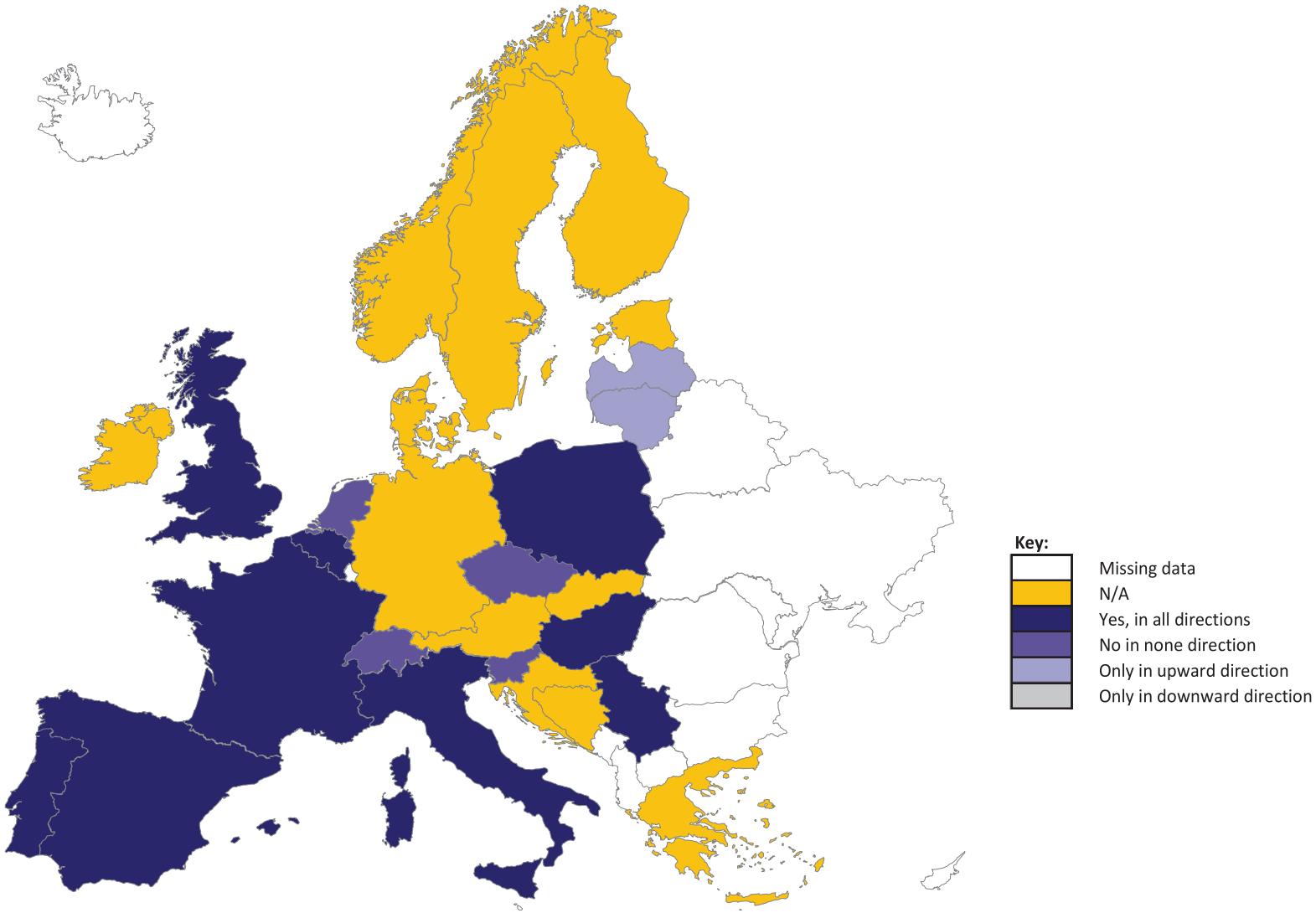
Replacement Reserve - Energy - Transfer of obligation allowed



Replacement Reserve - Energy - Obl. allowed, organised secondary market exists

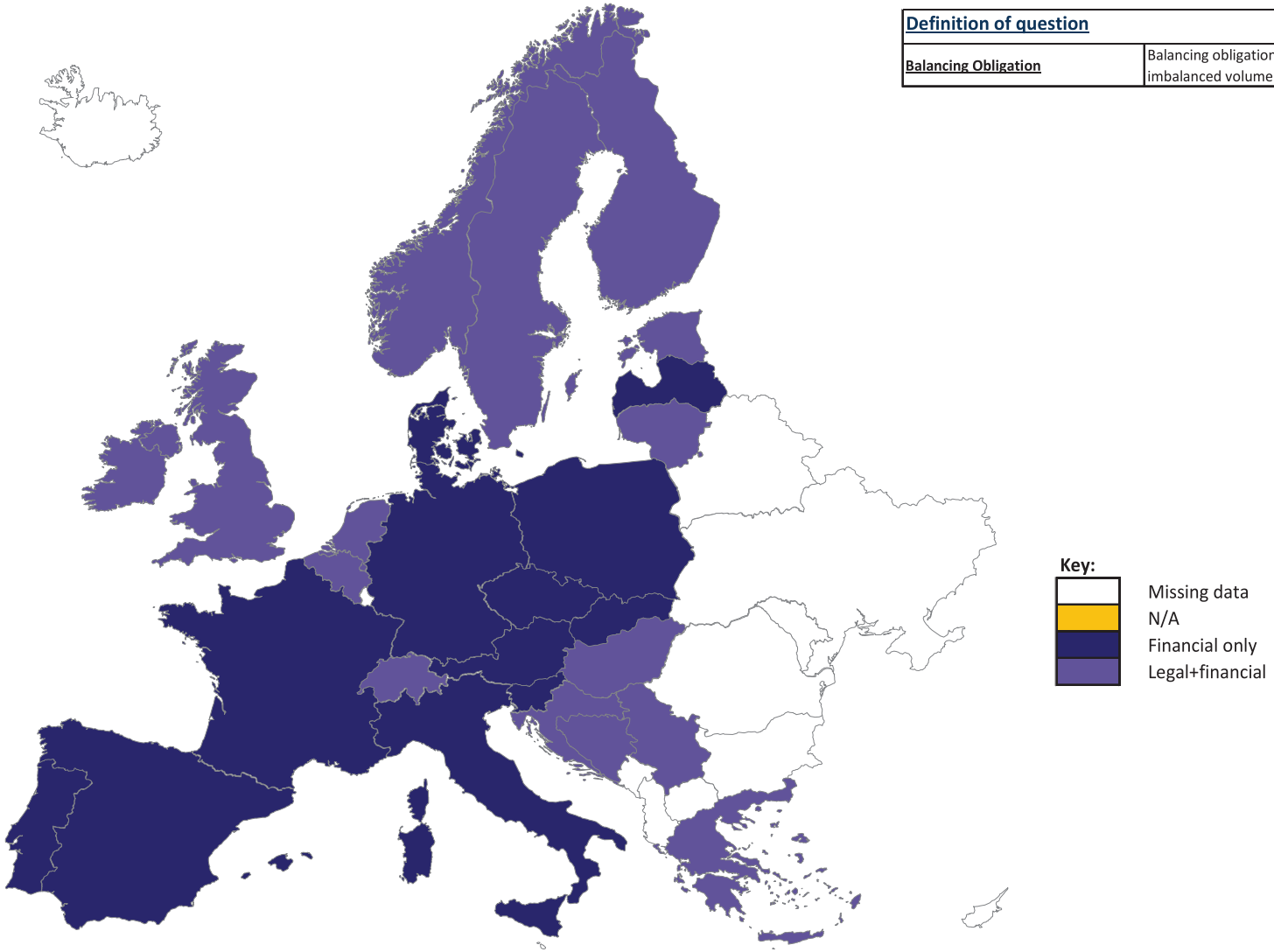


Replacement Reserve - Energy - Partially activated product



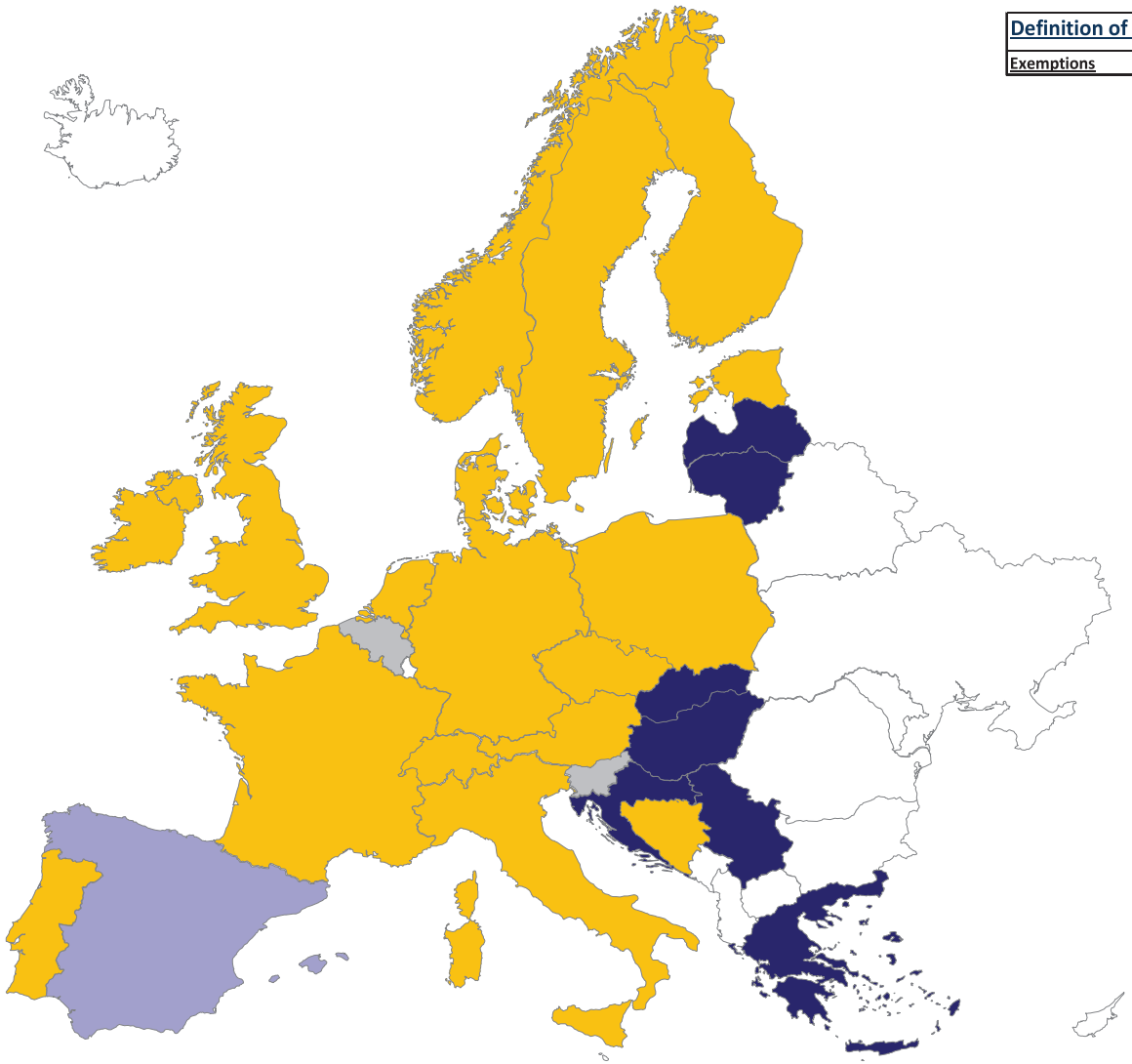
Imbalance settlement - Nature of the Balancing Obligation

Definition of question	
Balancing Obligation	Balancing obligation may apply, when the Balance Responsible Party makes imbalanced volume.



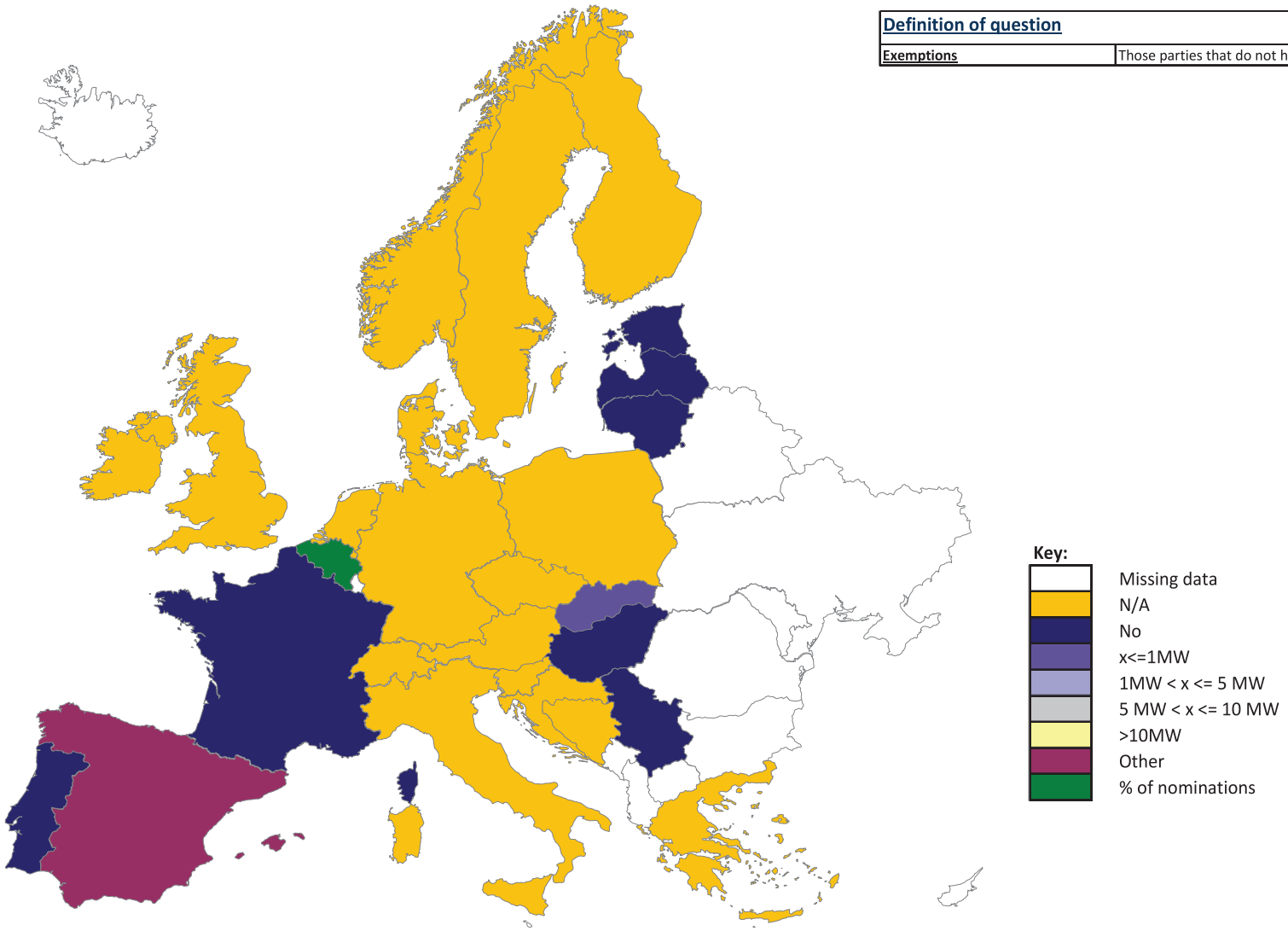
Imbalance settlement - Exemptions

Definition of question	
Exemptions	Those parties that do not have a balancing obligation.

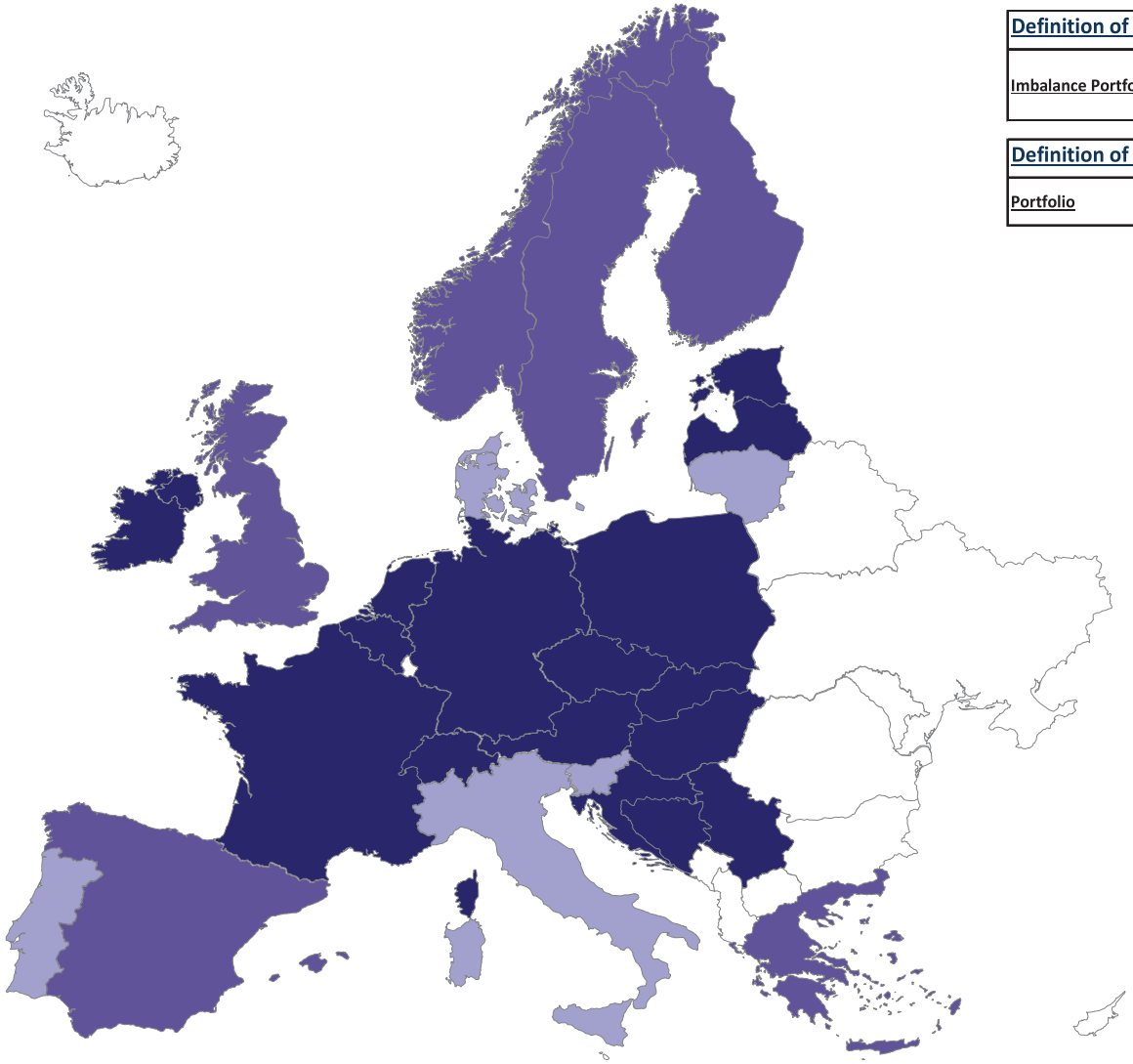


Imbalance settlement - Limit to exemption

Definition of question	
Exemptions	Those parties that do not have a balancing obligation.



Imbalance settlement - Number of Imbalance Portfolios

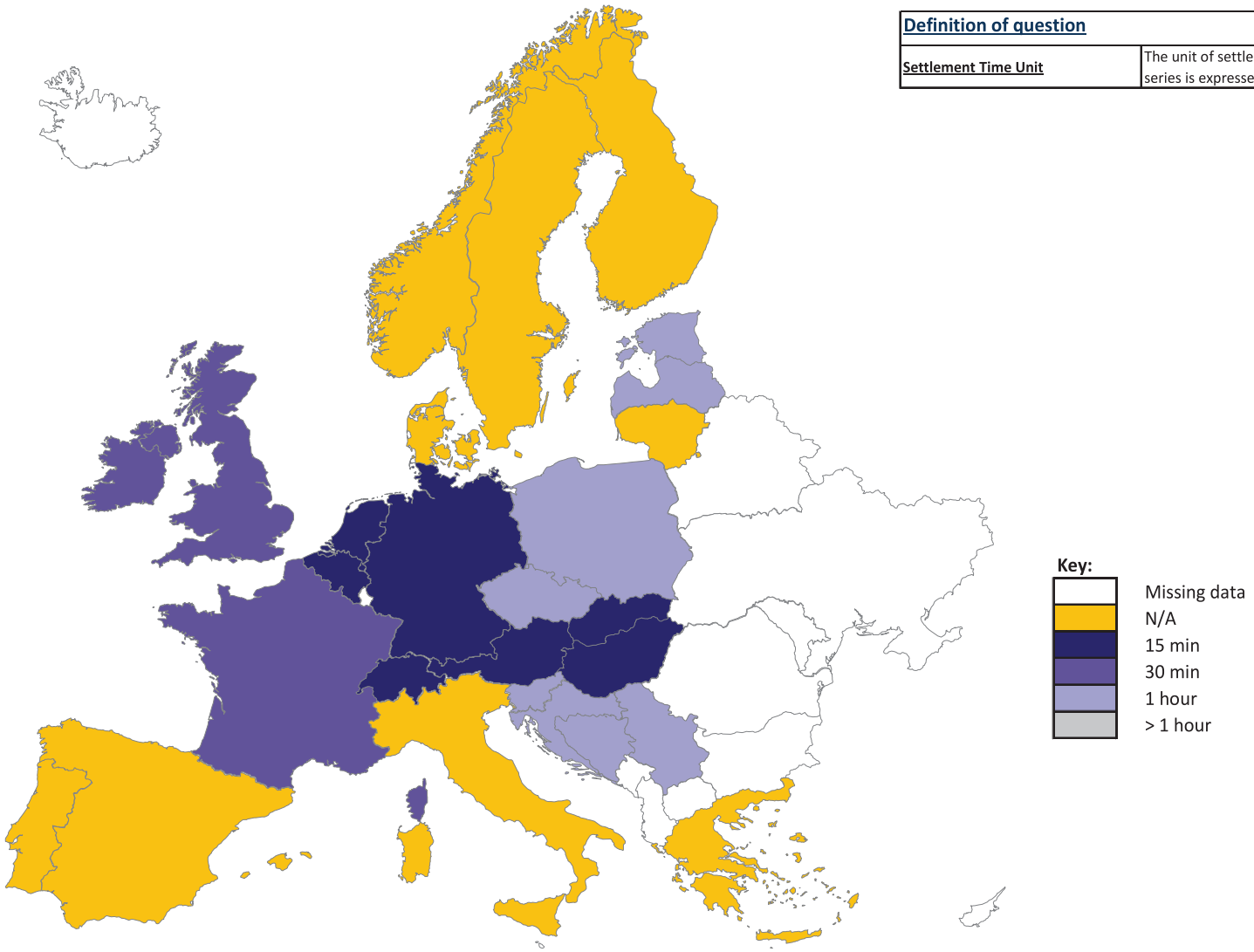


Definition of question	
Imbalance Portfolios	A fundamental property of local market design is the number of Imbalance Volumes to be calculated, attributed and charged to BRP's (Market) per settlement time unit.

Definition of answer	
Portfolio	A group of plant which could be a mix of generation, demand etc., which bid in aggregate into the relevant market.

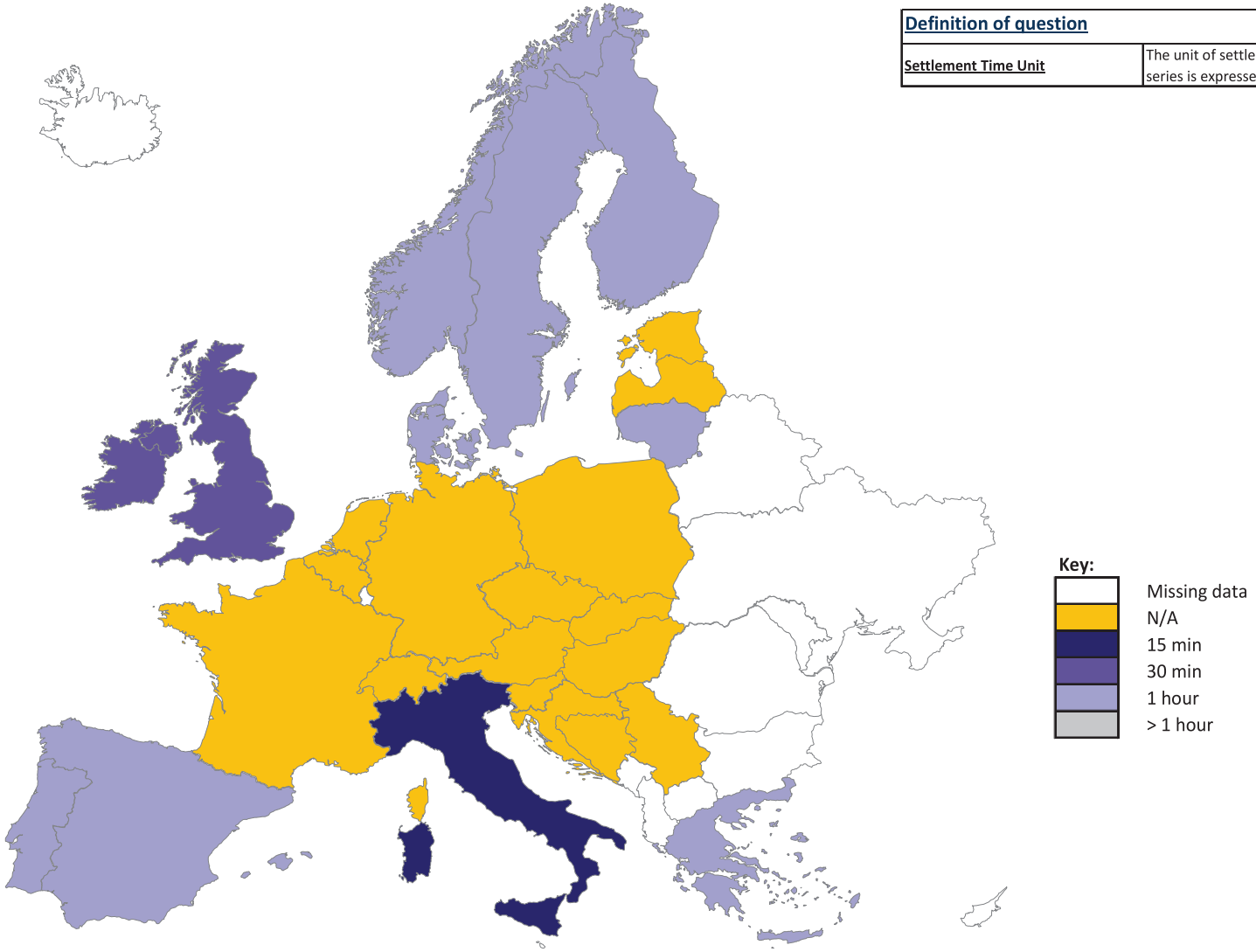
Imbalance settlement - Settlement Time Unit - 1 volume

Definition of question	
Settlement Time Unit	The unit of settlement that is applied to the quantities in which the time series is expressed.



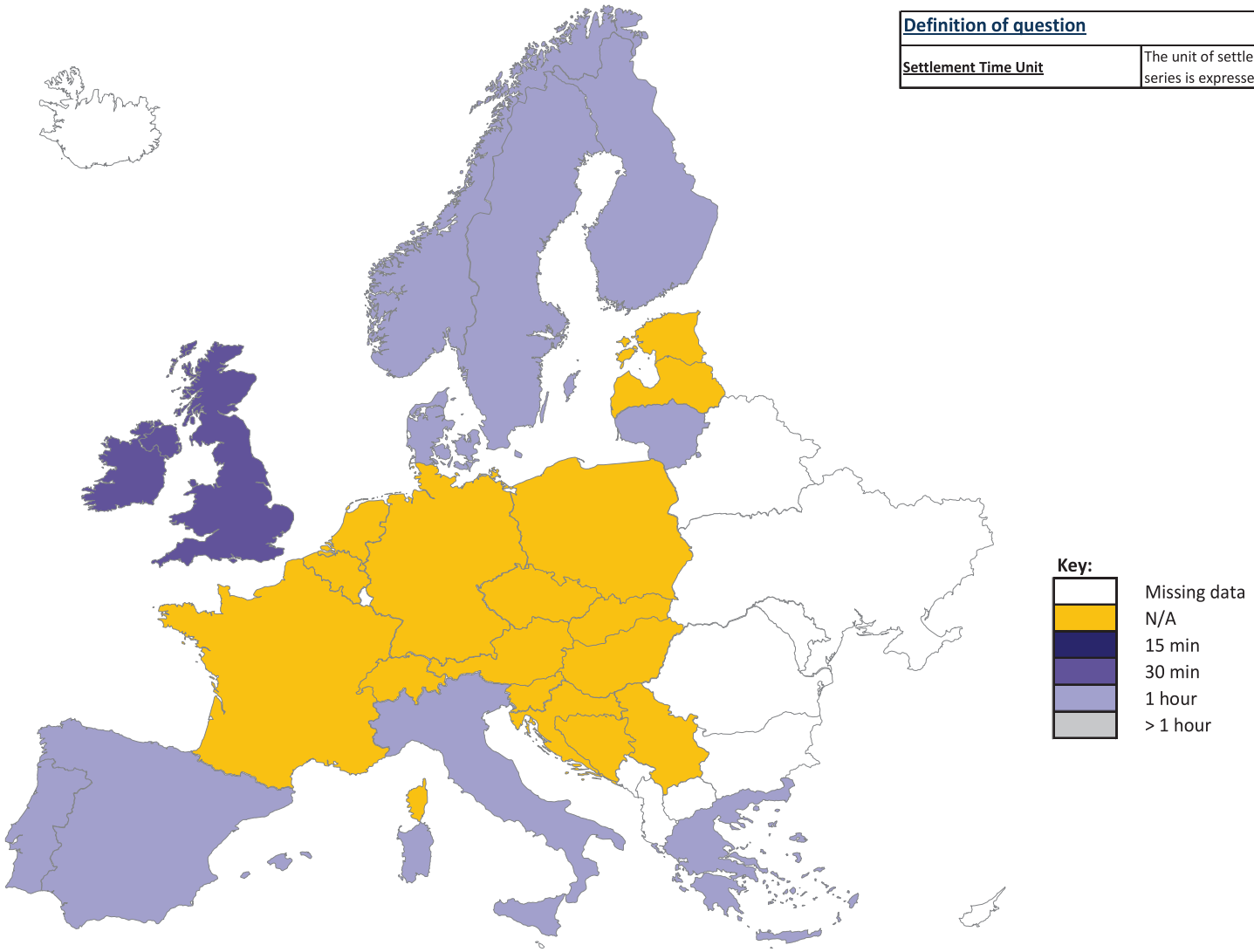
Imbalance settlement - Settlement Time Unit - If 2 volumes- Generation

Definition of question	
Settlement Time Unit	The unit of settlement that is applied to the quantities in which the time series is expressed.

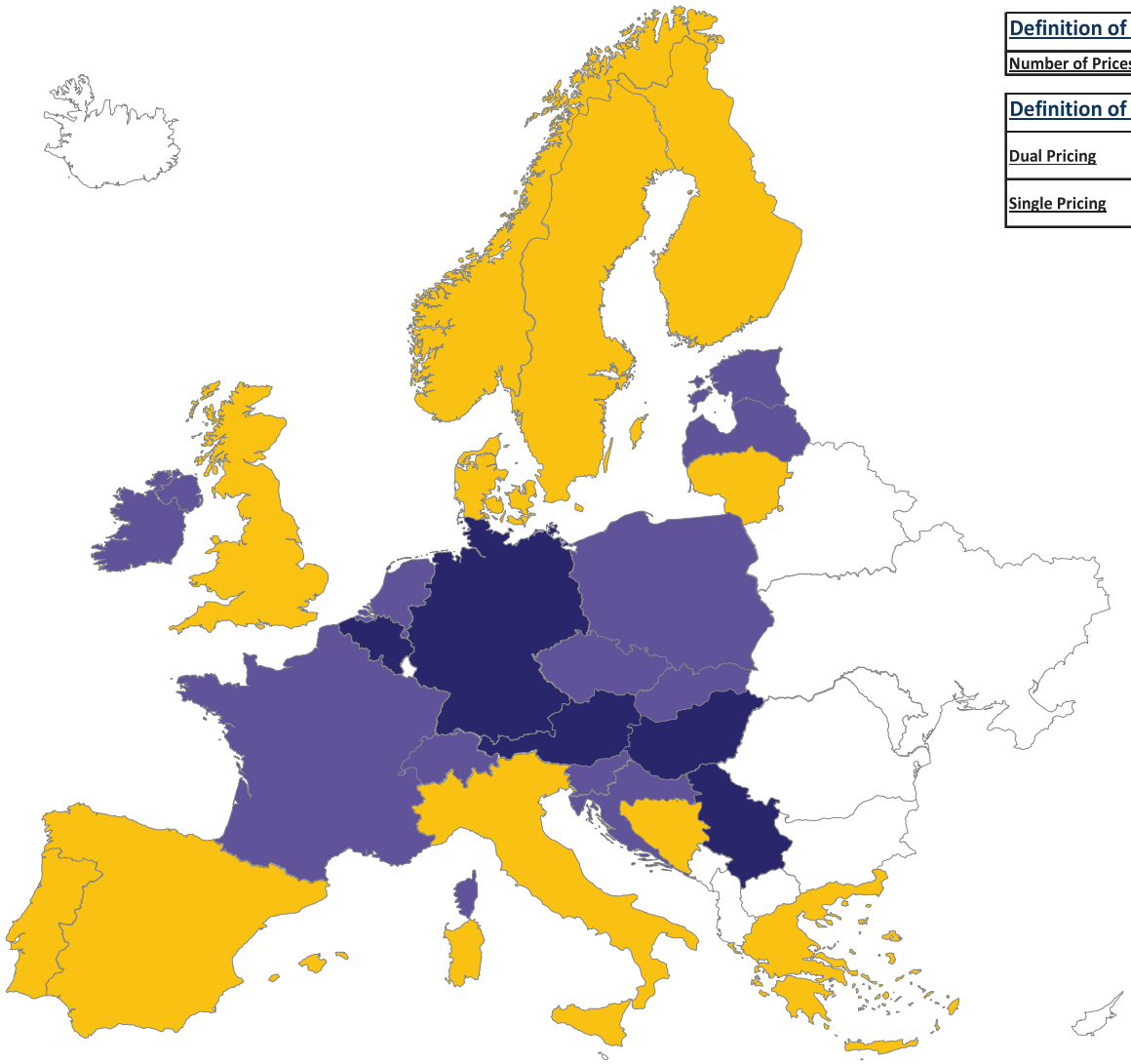


Imbalance settlement - Settlement Time Unit - If 2 volumes- Consumption

Definition of question	
Settlement Time Unit	The unit of settlement that is applied to the quantities in which the time series is expressed.



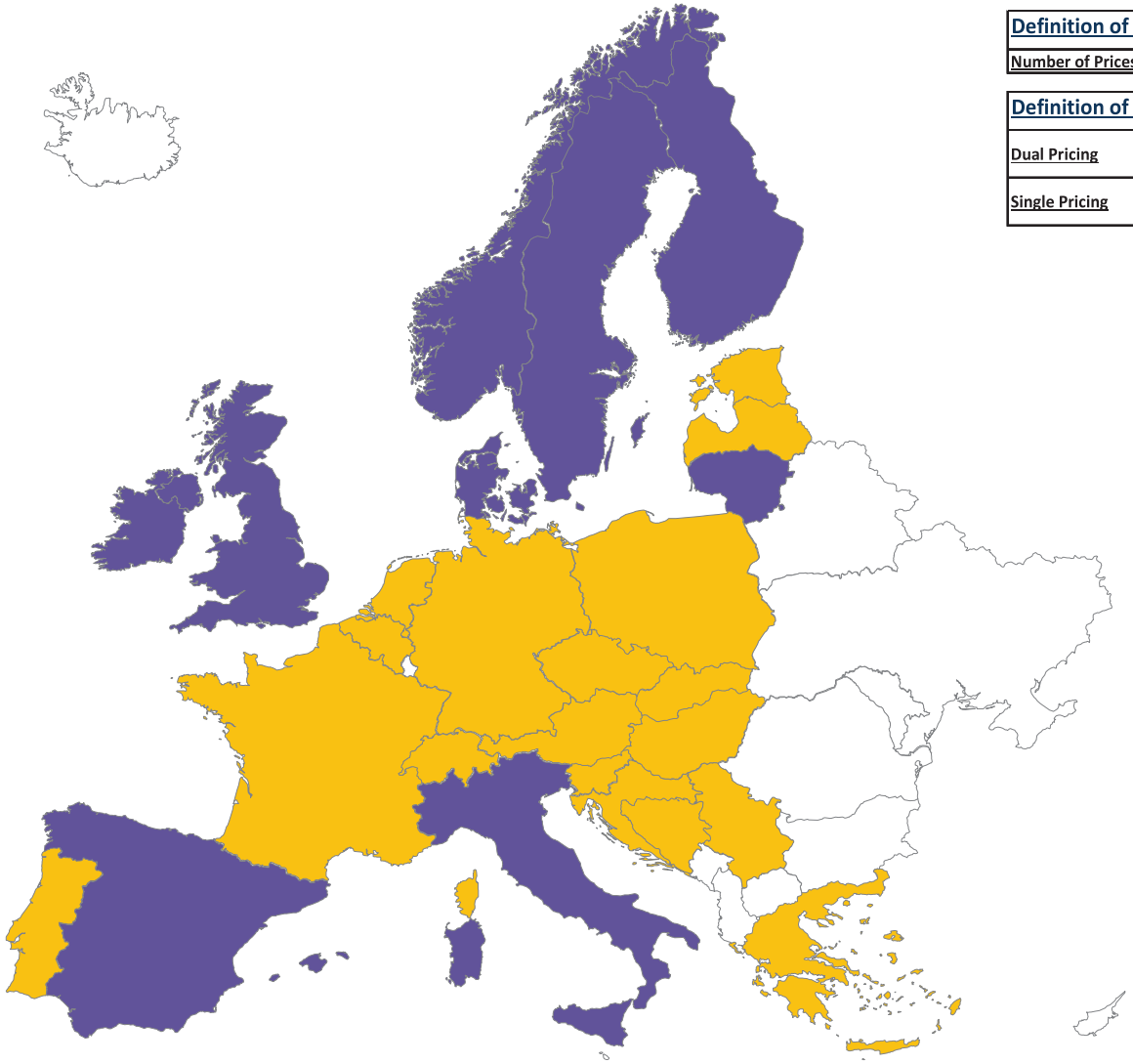
Imbalance settlement - Number of Prices- If 1 portfolio



Definition of question	
Number of Prices	Number of prices which are owed by the portfolio(s).

Definition of answer	
Dual Pricing	Prices dependent on deviation direction of specific BRP type and deviation direction of System or Control Area Imbalance.
Single Pricing	Price independent from deviation direction, one side pays, the other gets paid.

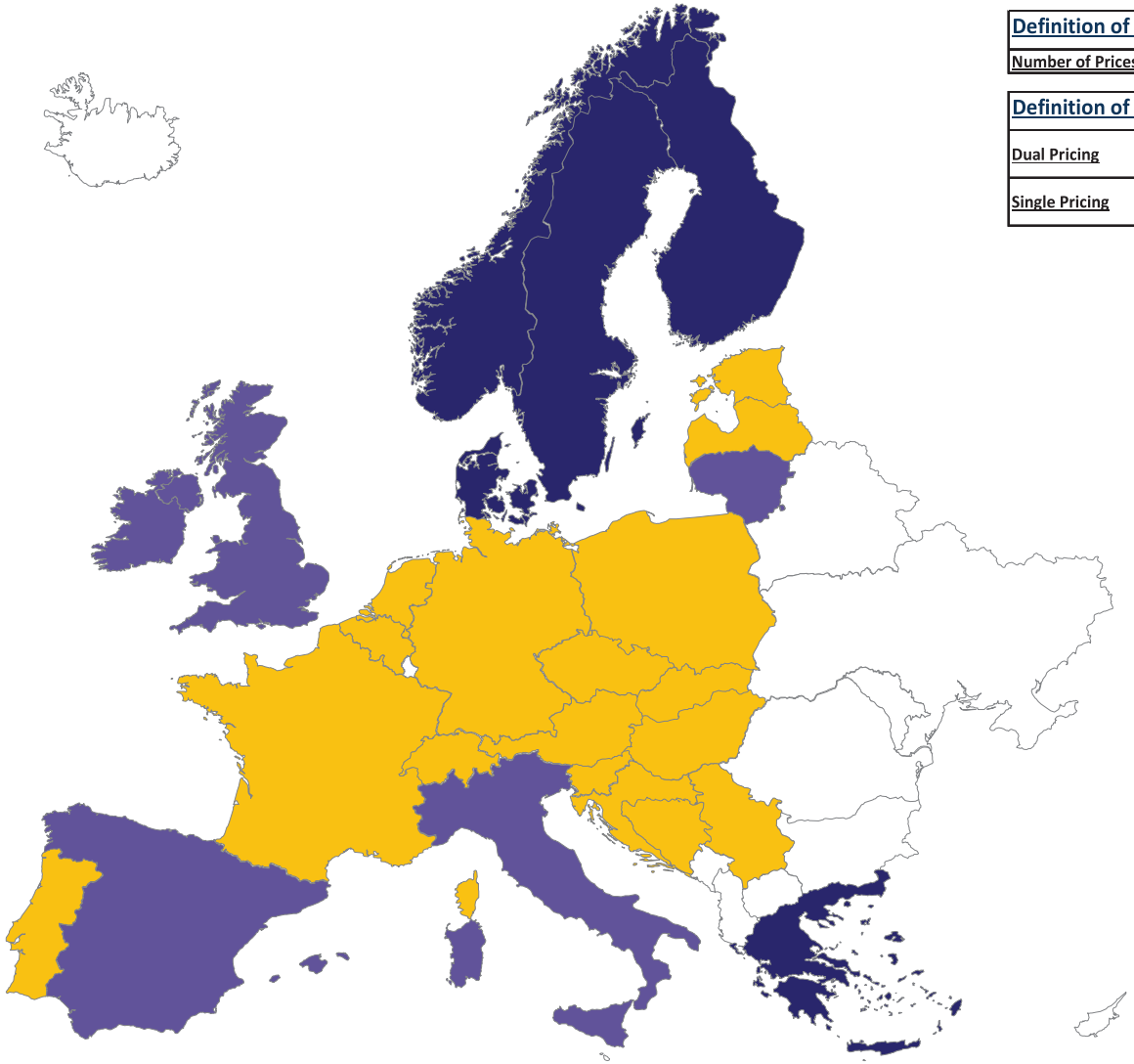
Imbalance settlement - Number of Prices- If 2 portfolios - Generation



Definition of question	
Number of Prices	Number of prices which are owed by the portfolio(s).

Definition of answer	
Dual Pricing	Prices dependent on deviation direction of specific BRP type and deviation direction of System or Control Area Imbalance.
Single Pricing	Price independent from deviation direction, one side pays, the other gets paid.

Imbalance settlement - Number of Prices- If 2 portfolios - Consumption



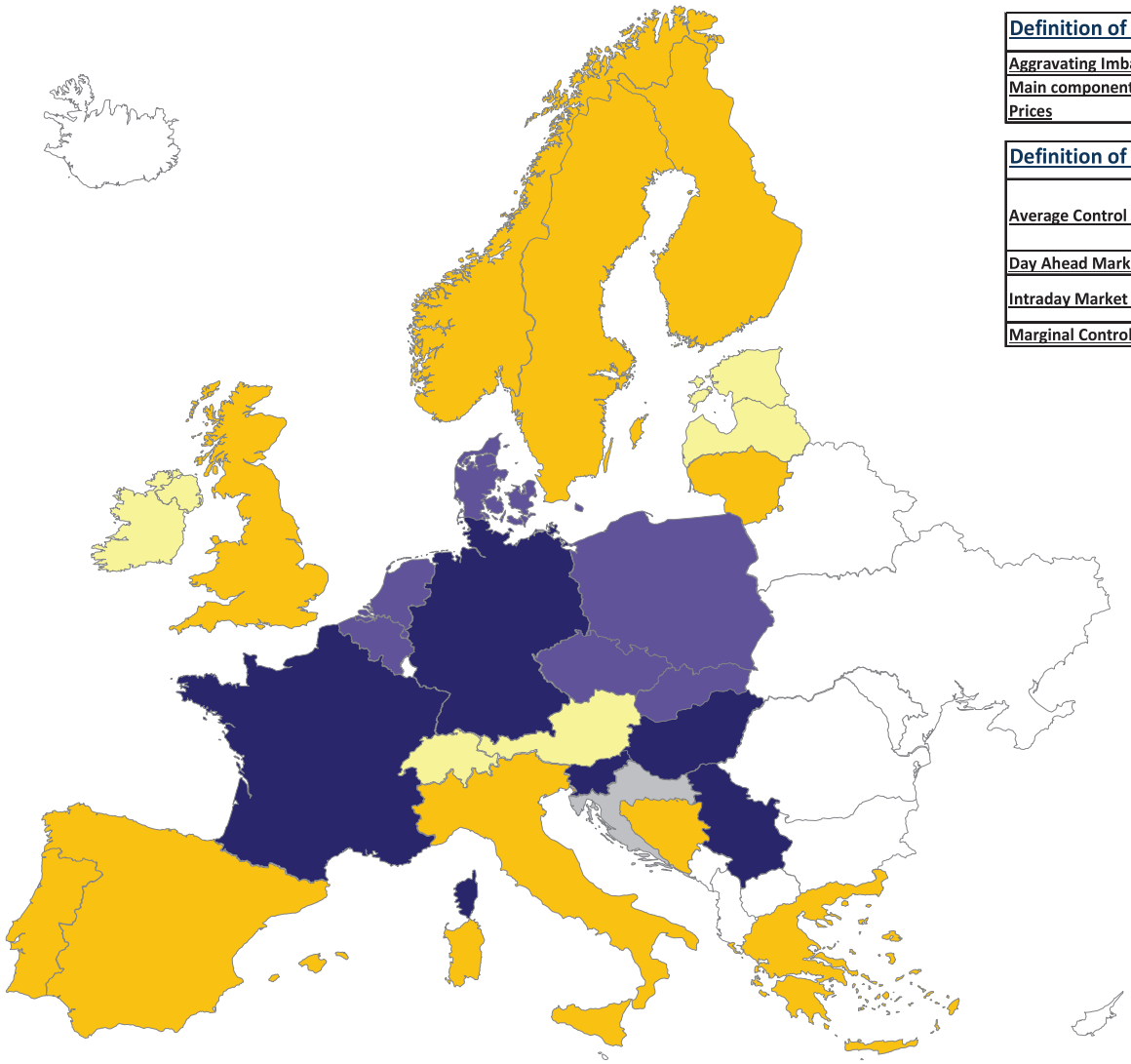
Definition of question	
Number of Prices	Number of prices which are owed by the portfolio(s).

Definition of answer	
Dual Pricing	Prices dependent on deviation direction of specific BRP type and deviation direction of System or Control Area Imbalance.
Single Pricing	Price independent from deviation direction, one side pays, the other gets paid.

Key:

- Missing data
- N/A
- Single Pricing
- Dual Pricing
- Other

Imbalance settlement - Main comp. of Imb. Prices - If 1 portfolio - Aggravating imb.



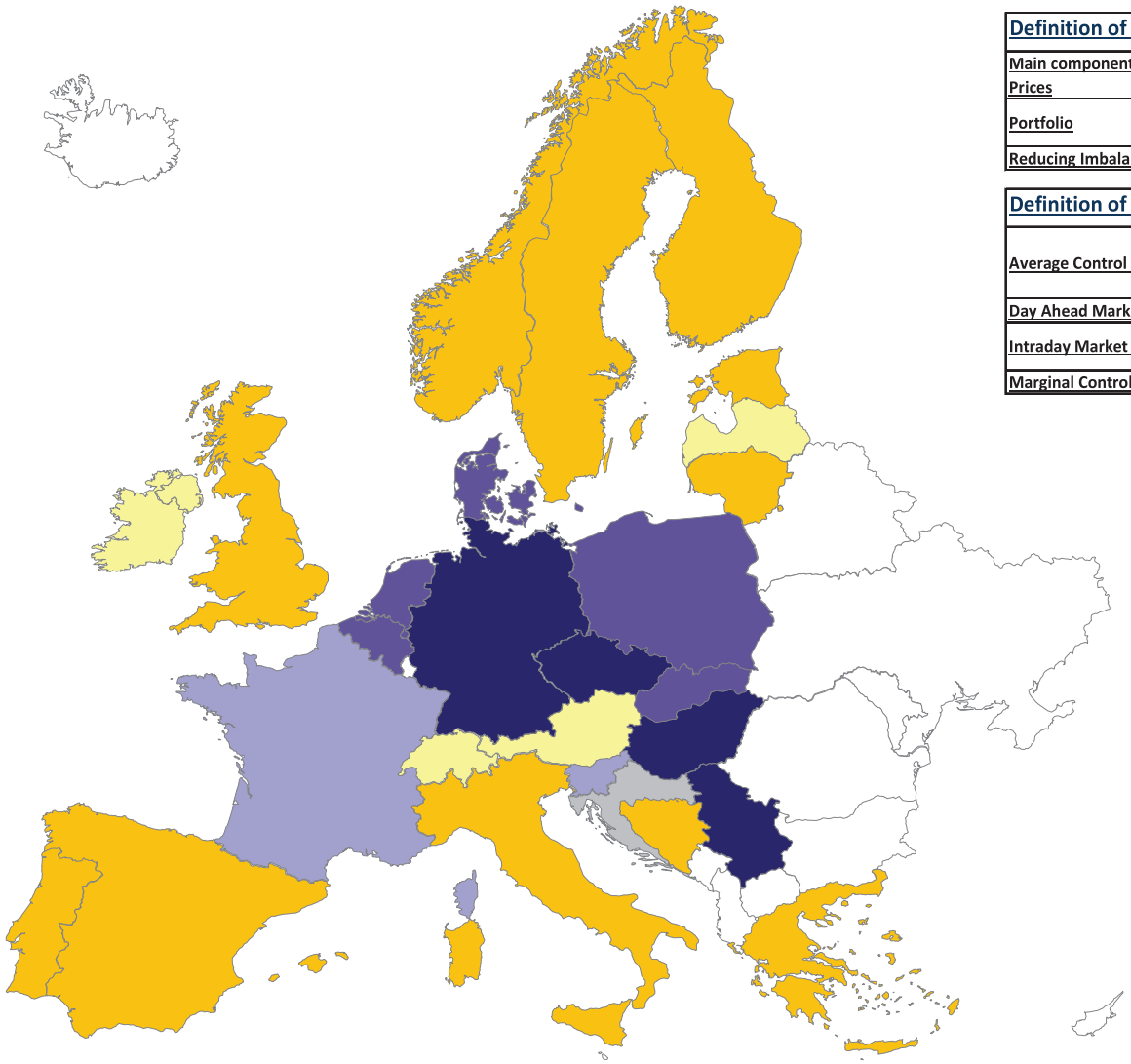
Definition of question	
Aggravating Imbalance	Imbalance volumes are increasing.
Main component of Imbalance Prices	The component that determines imbalance charges most of the time.

Definition of answer	
Average Control Energy Price	Average Control Energy Price is calculated by taking the sum of the control energy prices and dividing it by the number of the prices being examined.
Day Ahead Market Price	Price which evolved on the day ahead market.
Intraday Market Price	The price of the market within regular business hours, short-term prices.
Marginal Control Energy Price	The highest price, which can be acceptable.

Key:

- Missing data
- N/A
- Average Control Energy Price
- Marginal Control Energy Price
- Day-Ahead Market Price
- Intraday Market Price
- Other

Imbalance settlement - Main com. of Imb. Prices - If 1 portfolio - Reducing Imb.



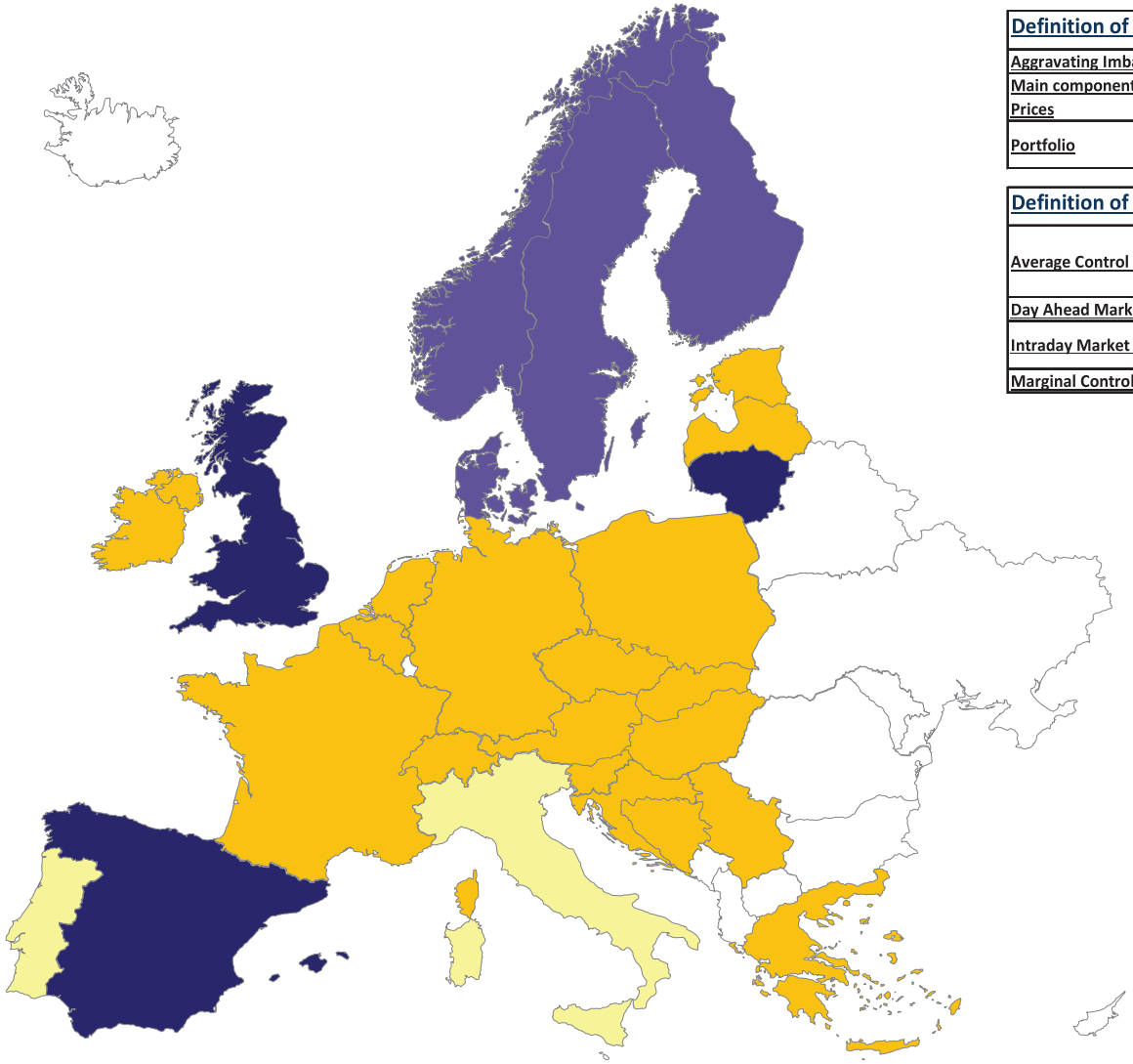
Definition of question	
Main component of Imbalance Prices	The component that determines imbalance charges most of the time.
Portfolio	A group of plant which could be a mix of generation, demand etc., which bid in aggregate into the relevant market.
Reducing Imbalance	Imbalance volumes are decreasing.

Definition of answer	
Average Control Energy Price	Average Control Energy Price is calculated by taking the sum of the control energy prices and dividing it by the number of the prices being examined.
Day Ahead Market Price	Price which evolved on the day ahead market.
Intraday Market Price	The price of the market within regular business hours, short-term prices.
Marginal Control Energy Price	The highest price, which can be acceptable.

Key:

- Missing data
- N/A
- Average Control Energy Price
- Marginal Control Energy Price
- Day-Ahead Market Price
- Intraday Market Price
- Other

Imbalance settlement - Main comp. of Imb. Prices - If 2 portfolios - For generation "aggravating imb."



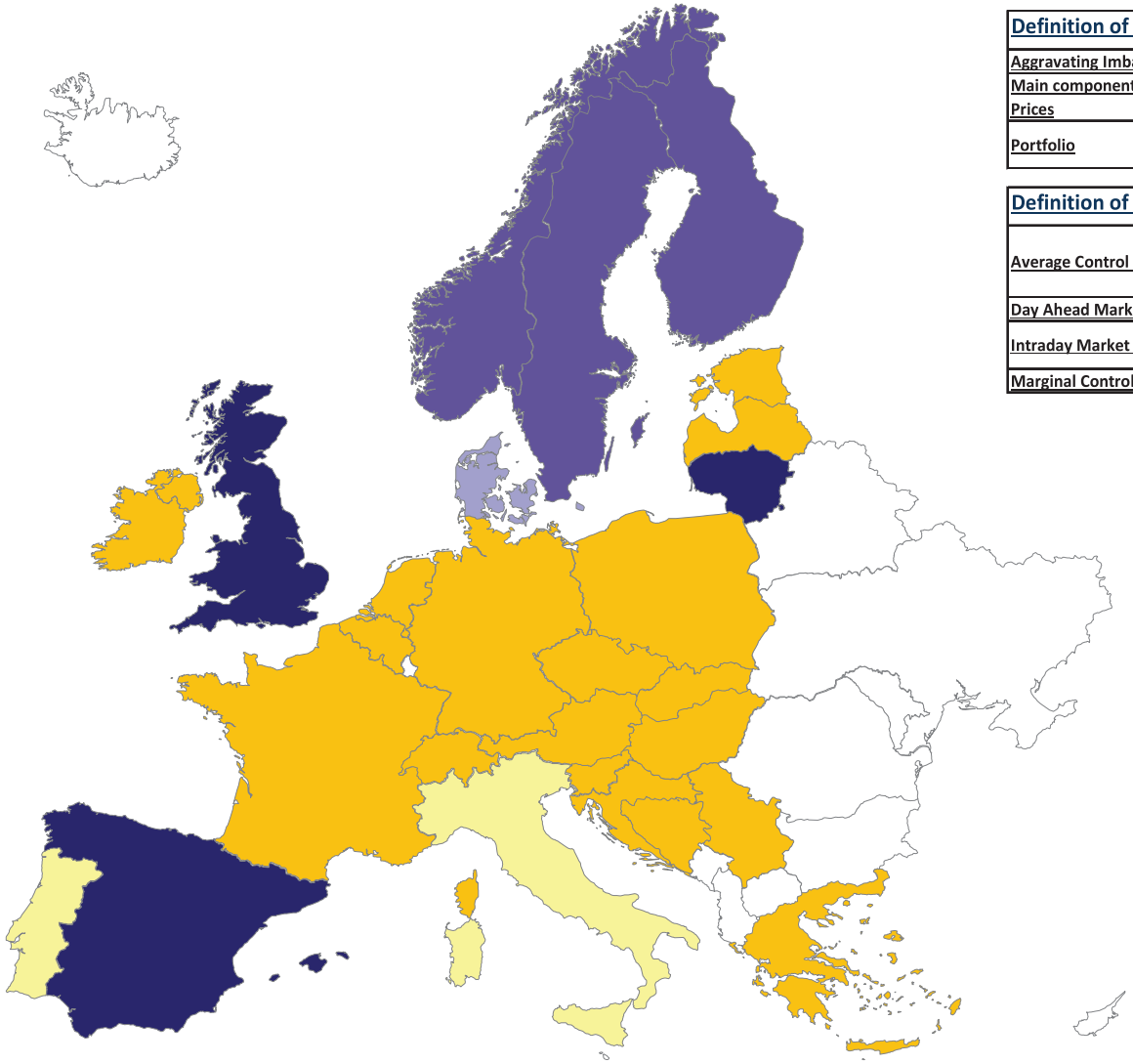
Definition of question	
Aggravating Imbalance	Imbalance volumes are increasing.
Main component of Imbalance Prices	The component that determines imbalance charges most of the time.
Portfolio	A group of plant which could be a mix of generation, demand etc., which bid in aggregate into the relevant market.

Definition of answer	
Average Control Energy Price	Average Control Energy Price is calculated by taking the sum of the control energy prices and dividing it by the number of the prices being examined.
Day Ahead Market Price	Price which evolved on the day ahead market.
Intraday Market Price	The price of the market within regular business hours, short-term prices.
Marginal Control Energy Price	The highest price, which can be acceptable.

Key:

- Missing data
- N/A
- Average Control Energy Price
- Marginal Control Energy Price
- Day-Ahead Market Price
- Intraday Market Price
- Other

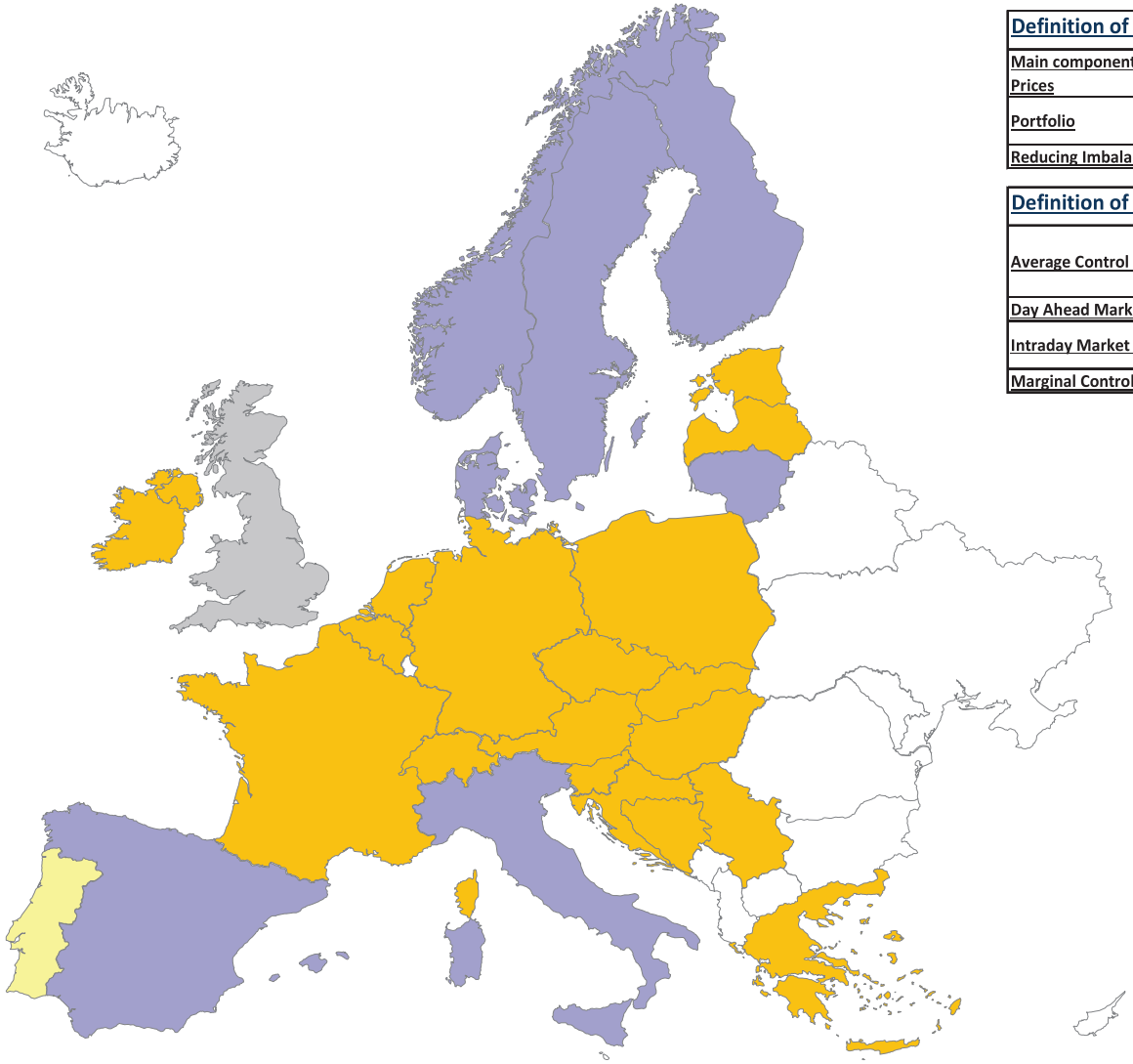
Imbalance settlement - Main comp. of Imb. Prices - If 2 portfolios - For consumption "aggravating imb."



Definition of question	
Aggravating Imbalance	Imbalance volumes are increasing.
Main component of Imbalance Prices	The component that determines imbalance charges most of the time.
Portfolio	A group of plant which could be a mix of generation, demand etc., which bid in aggregate into the relevant market.

Definition of answer	
Average Control Energy Price	Average Control Energy Price is calculated by taking the sum of the control energy prices and dividing it by the number of the prices being examined.
Day Ahead Market Price	Price which evolved on the day ahead market.
Intraday Market Price	The price of the market within regular business hours, short-term prices.
Marginal Control Energy Price	The highest price, which can be acceptable.

Imbalance settlement - Main comp. of Imb. Prices - If 2 portfolios - For generation “reducing imb."



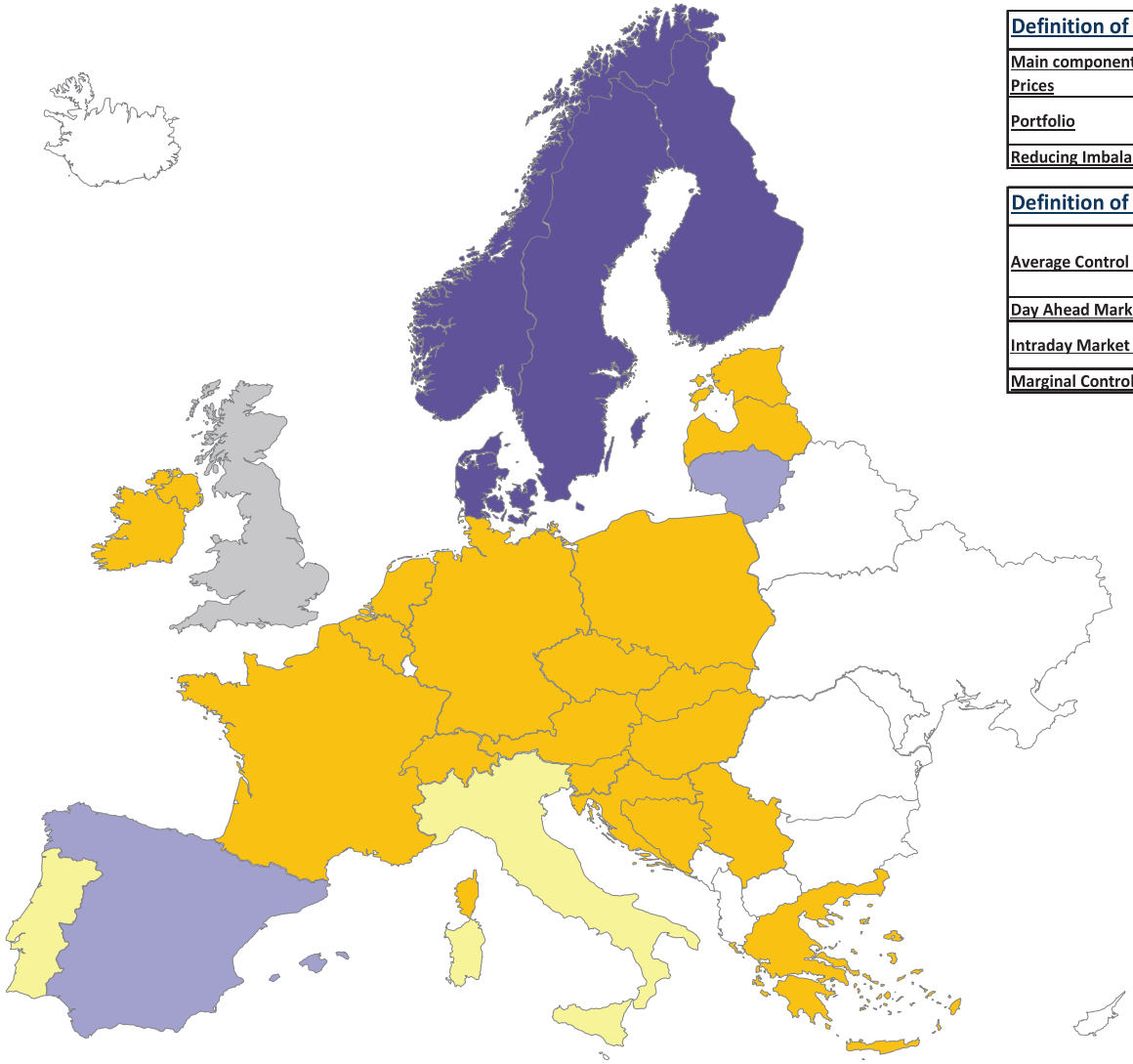
Definition of question	
Main component of Imbalance Prices	The component that determines imbalance charges most of the time.
Portfolio	A group of plant which could be a mix of generation, demand etc., which bid in aggregate into the relevant market.
Reducing Imbalance	Imbalance volumes are decreasing.

Definition of answer	
Average Control Energy Price	Average Control Energy Price is calculated by taking the sum of the control energy prices and dividing it by the number of the prices being examined.
Day Ahead Market Price	Price which evolved on the day ahead market.
Intraday Market Price	The price of the market within regular business hours, short-term prices.
Marginal Control Energy Price	The highest price, which can be acceptable.

Key:

- Missing data
- N/A
- Average Control Energy Price
- Marginal Control Energy Price
- Day-Ahead Market Price
- Intraday Market Price
- Other

Imbalance settlement - Main comp. of Imb. Prices - If 2 portfolios - For consumption “reducing imb."

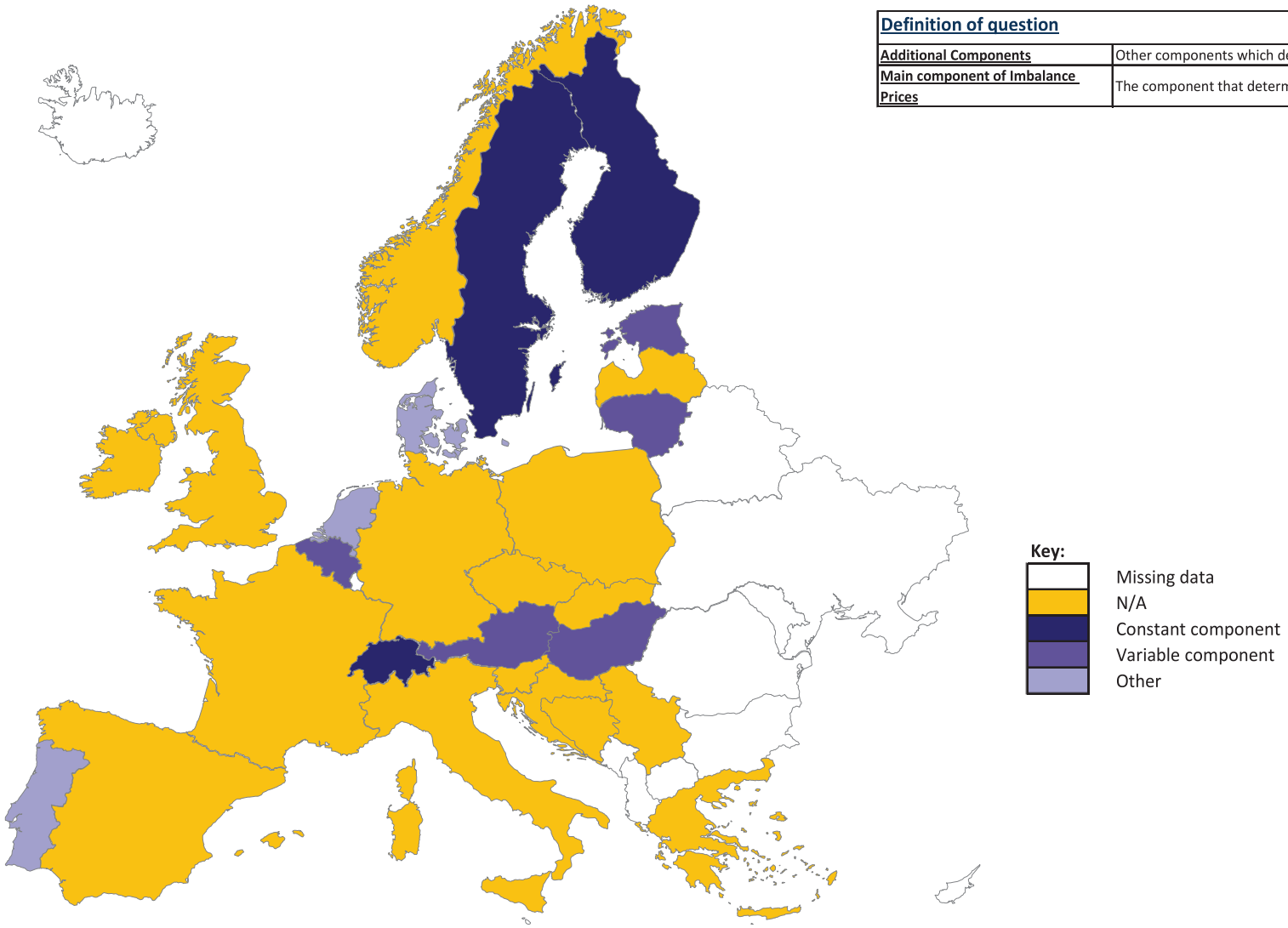


Definition of question	
Main component of Imbalance Prices	The component that determines imbalance charges most of the time.
Portfolio	A group of plant which could be a mix of generation, demand etc., which bid in aggregate into the relevant market.
Reducing Imbalance	Imbalance volumes are decreasing.

Definition of answer	
Average Control Energy Price	Average Control Energy Price is calculated by taking the sum of the control energy prices and dividing it by the number of the prices being examined.
Day Ahead Market Price	Price which evolved on the day ahead market.
Intraday Market Price	The price of the market within regular business hours, short-term prices.
Marginal Control Energy Price	The highest price, which can be acceptable.

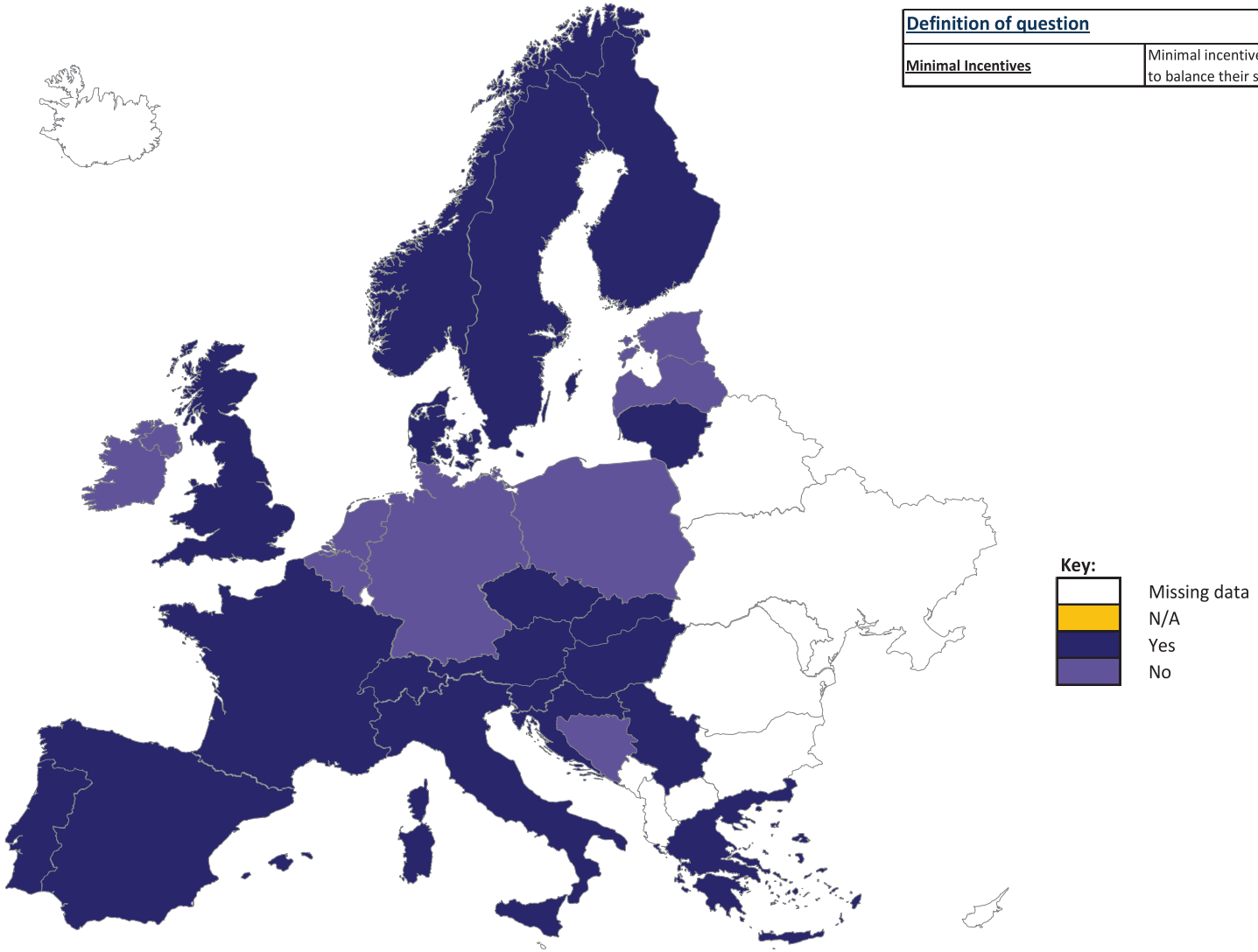
Imbalance settlement - Main comp. of Imb. Prices - Additional Components

Definition of question	
Additional Components	Other components which determine imbalance charges.
Main component of Imbalance Prices	The component that determines imbalance charges most of the time.

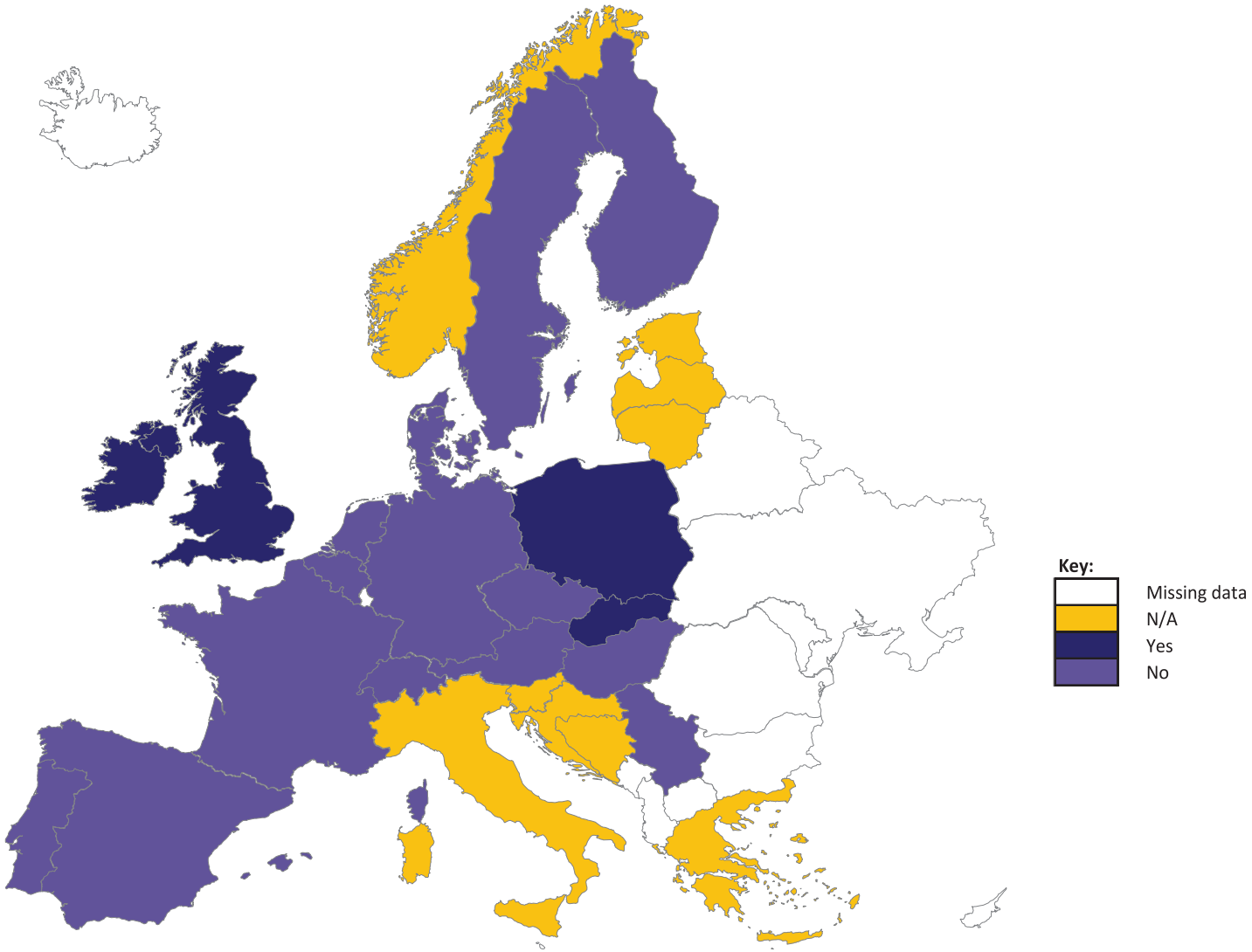


Imbalance settlement - Is there a minimal incentive?

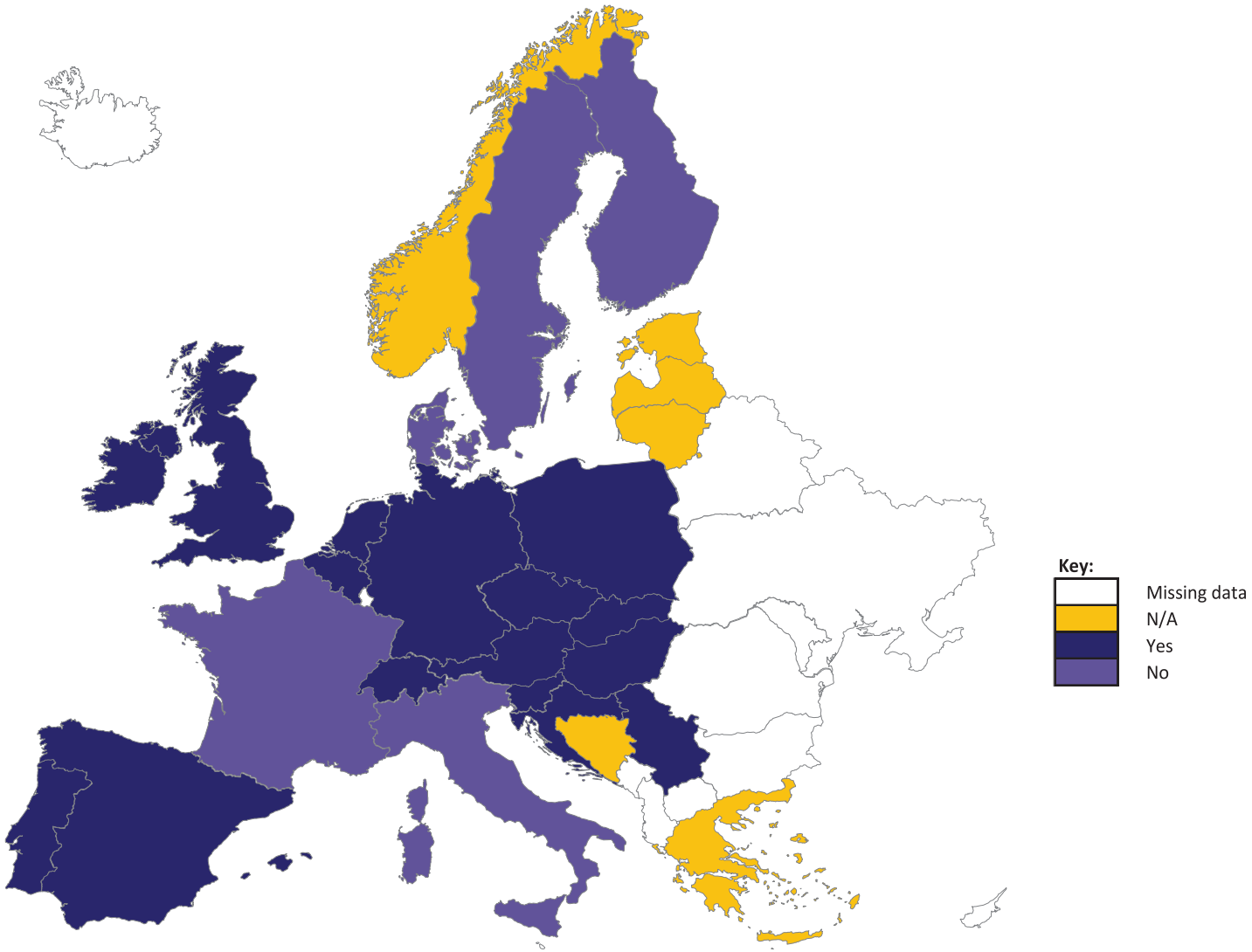
Definition of question	
Minimal Incentives	Minimal incentives means that there is some method which leads the BRPs to balance their schedules.



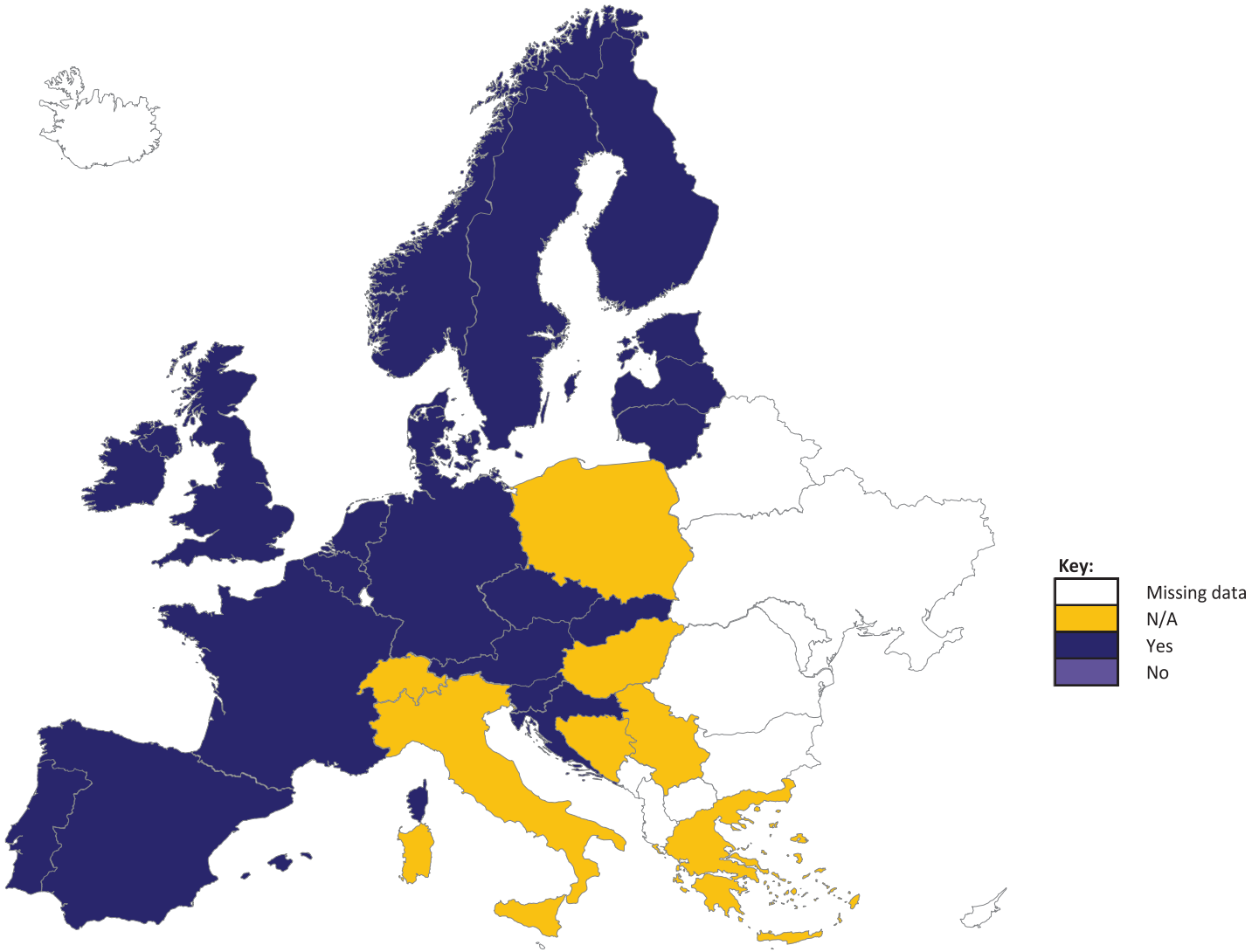
Imbalance settlement - Control Energy Prices used - FCR



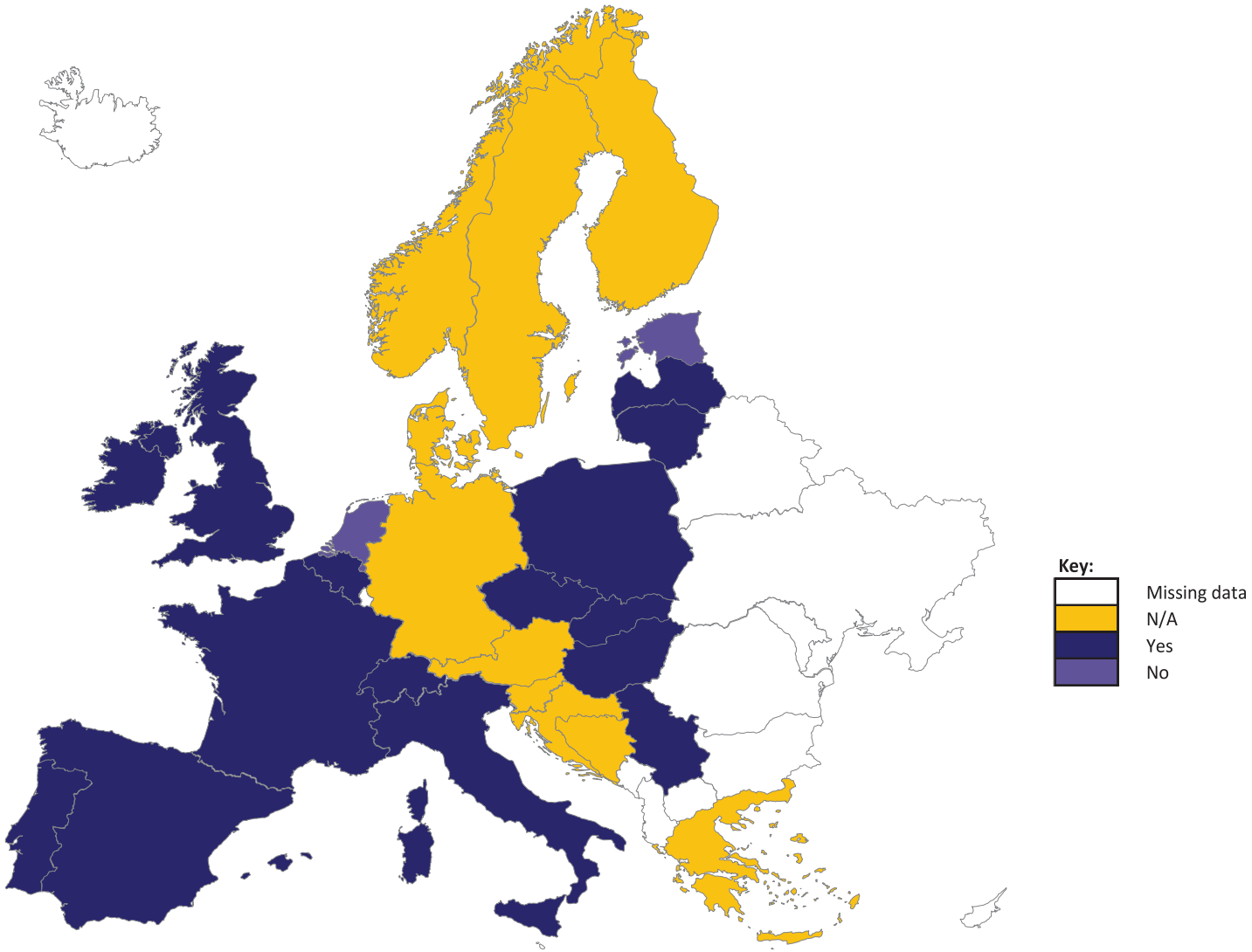
Imbalance settlement - Control Energy Prices used - FRR (Automatic)



Imbalance settlement - Control Energy Prices used -FRR (Manual)

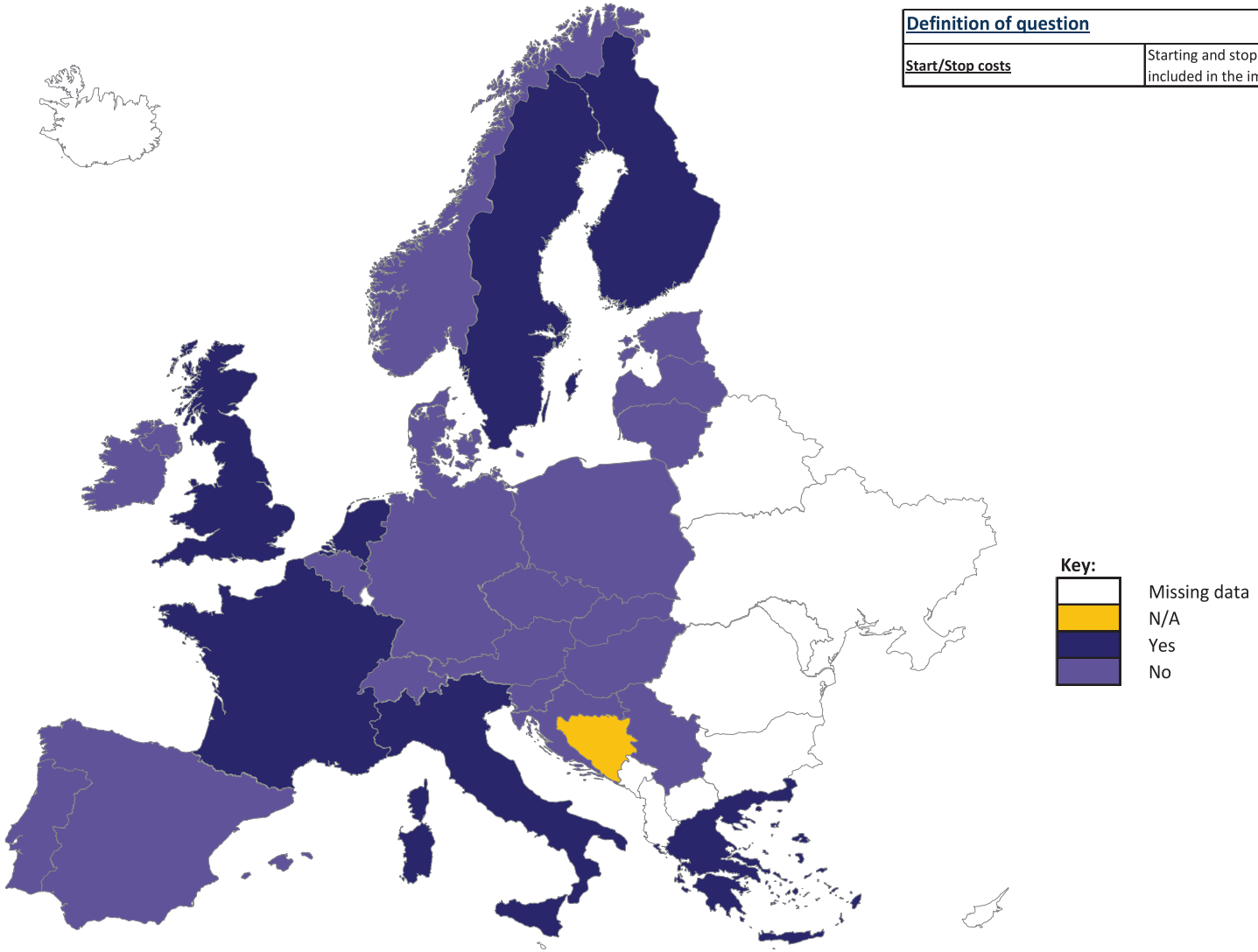


Imbalance settlement - Control Energy Prices used - RR



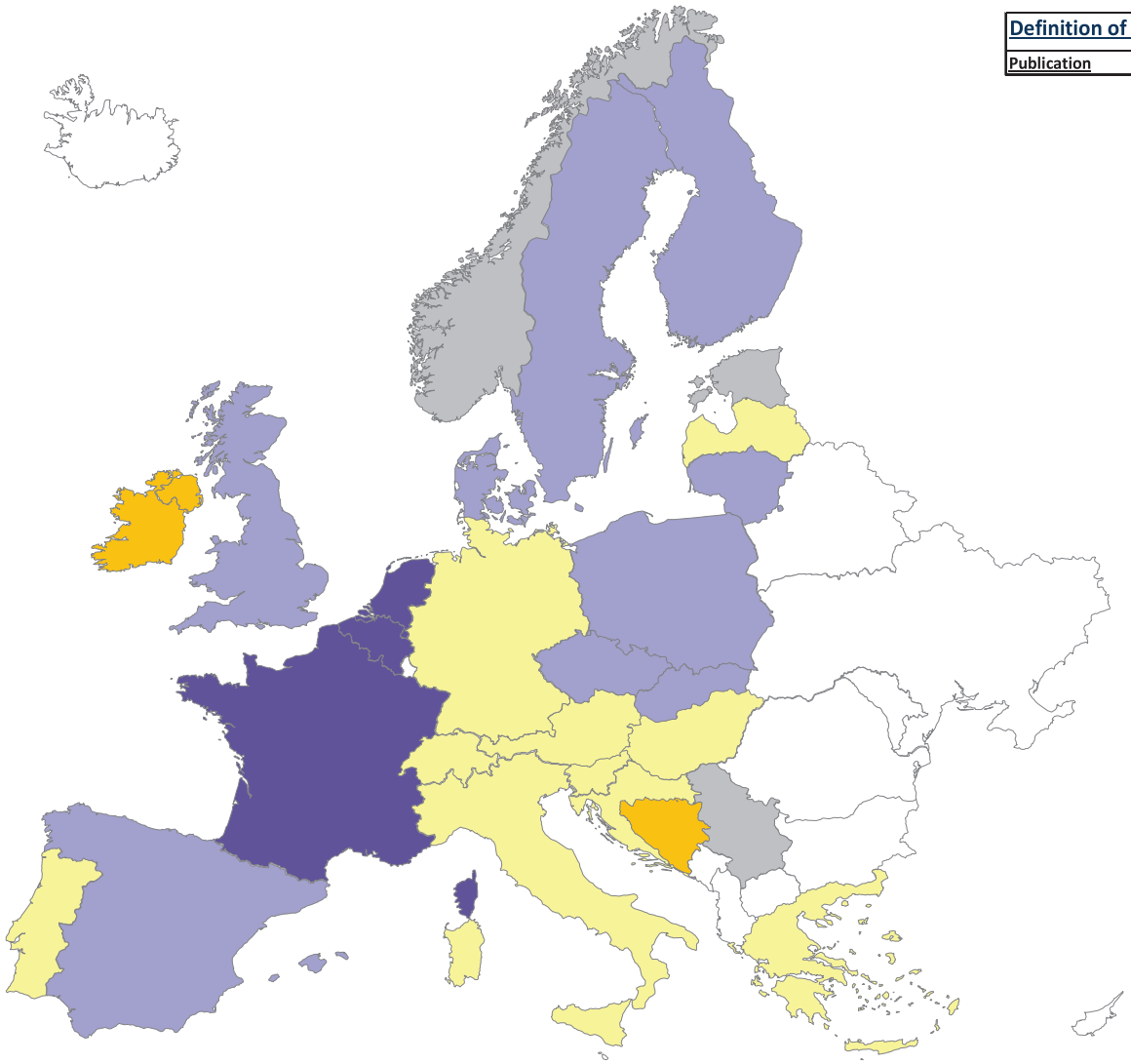
Imbalance settlement - Start/Stop costs in Imbalance Charges

Definition of question	
Start/Stop costs	Starting and stoppping of the power plants have costs, which can be included in the imbalance charges.



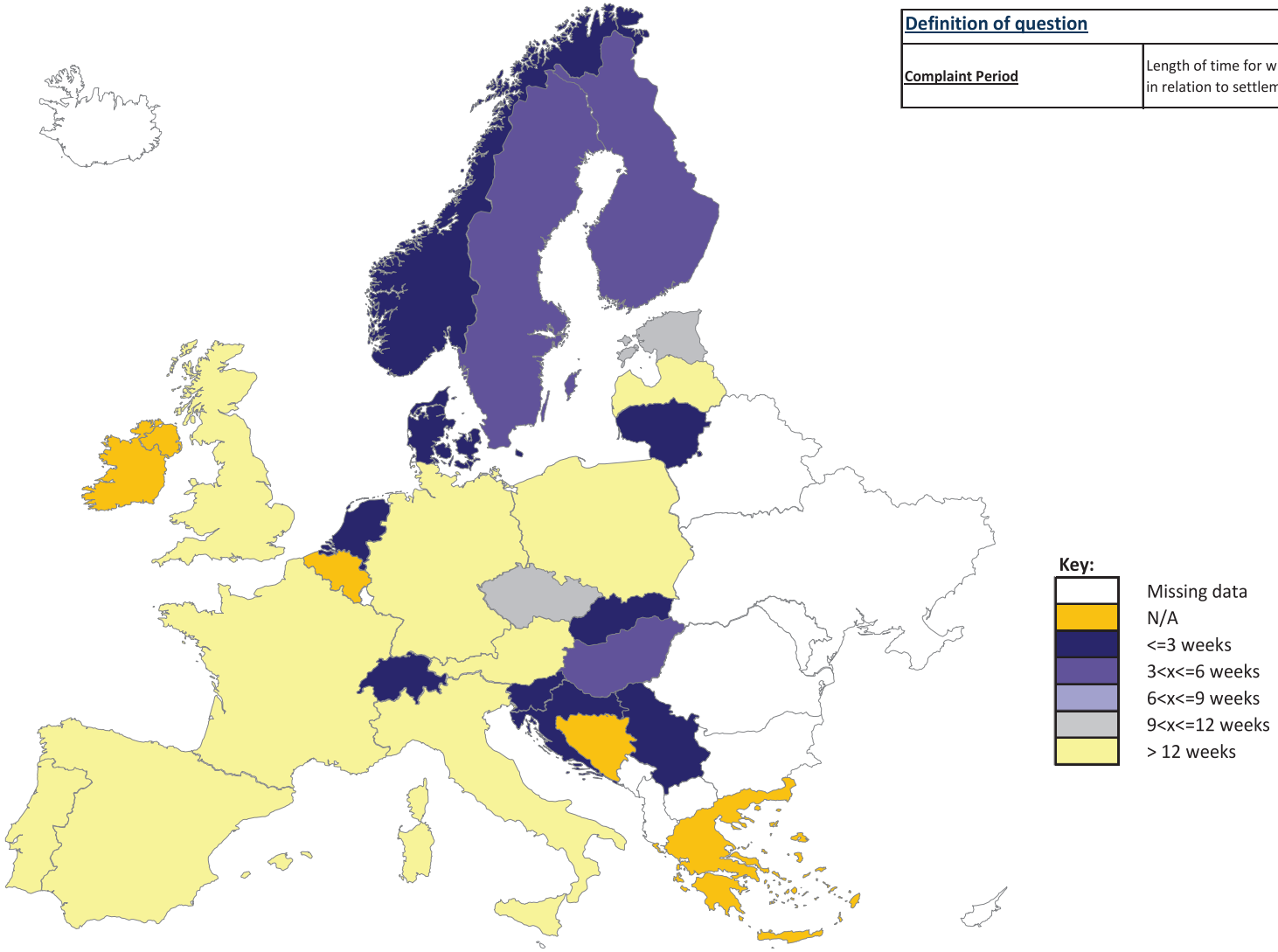
Imbalance settlement - Publication

Definition of question	
Publication	Definitive imbalance charges are published.

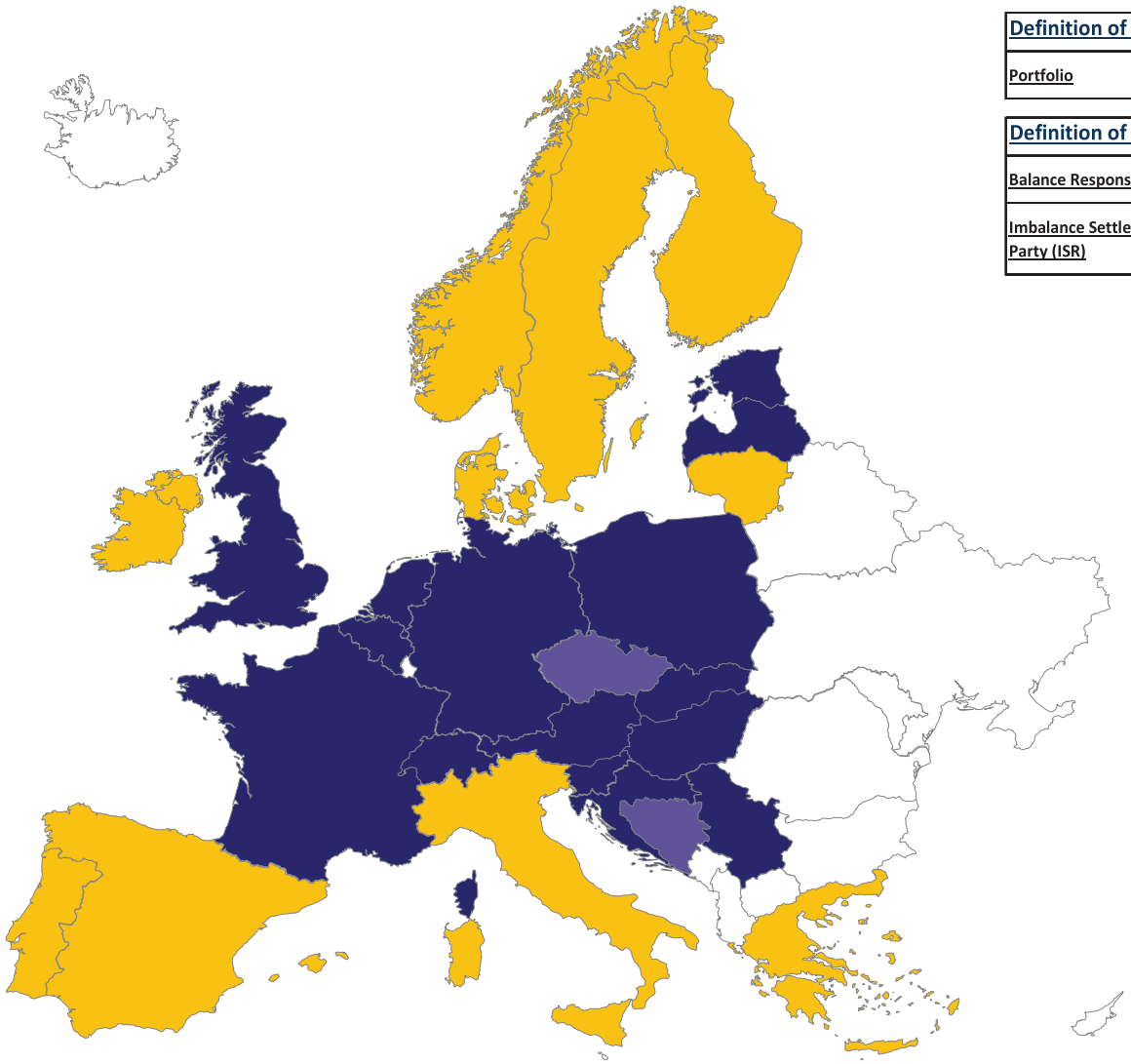


Imbalance settlement - Complaint Period

Definition of question	
Complaint Period	Length of time for which complaints can be made which will be considered in relation to settlement (after the finalised data are produced).



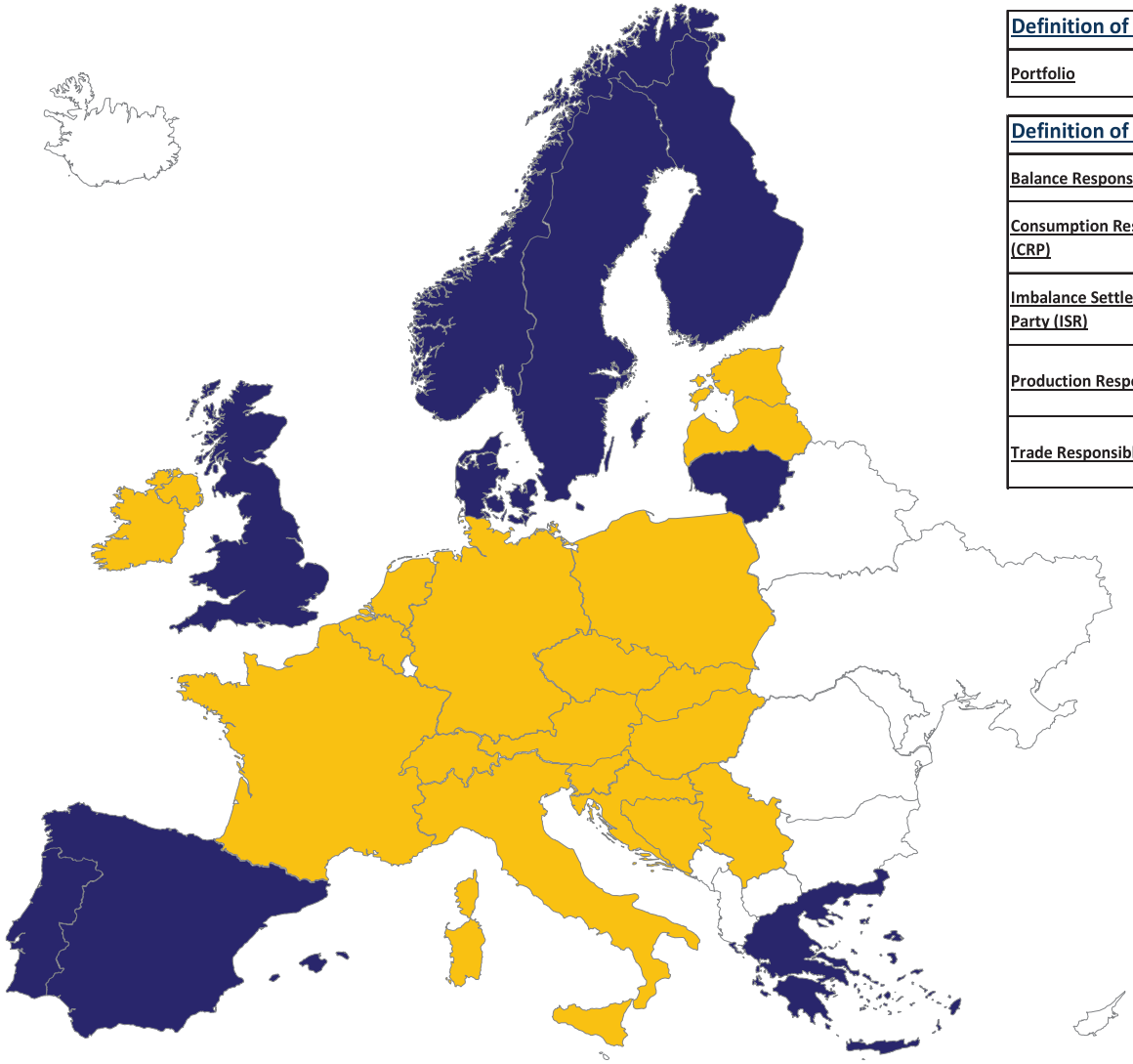
Imbalance settlement - Settlement - If 1 portfolio



Definition of question	
Portfolio	A group of plant which could be a mix of generation, demand etc., which bid in aggregate into the relevant market.

Definition of answer	
Balance Responsible Party (BRP)	Balancing Responsible Party means a market participant or its chosen representative responsible for its Imbalances.
Imbalance Settlement Responsible Party (ISR)	A party that is responsible for settlement of the difference between the contracted quantifies and the realized quantifies of energy products for the BRPs in a Market Balance Area.

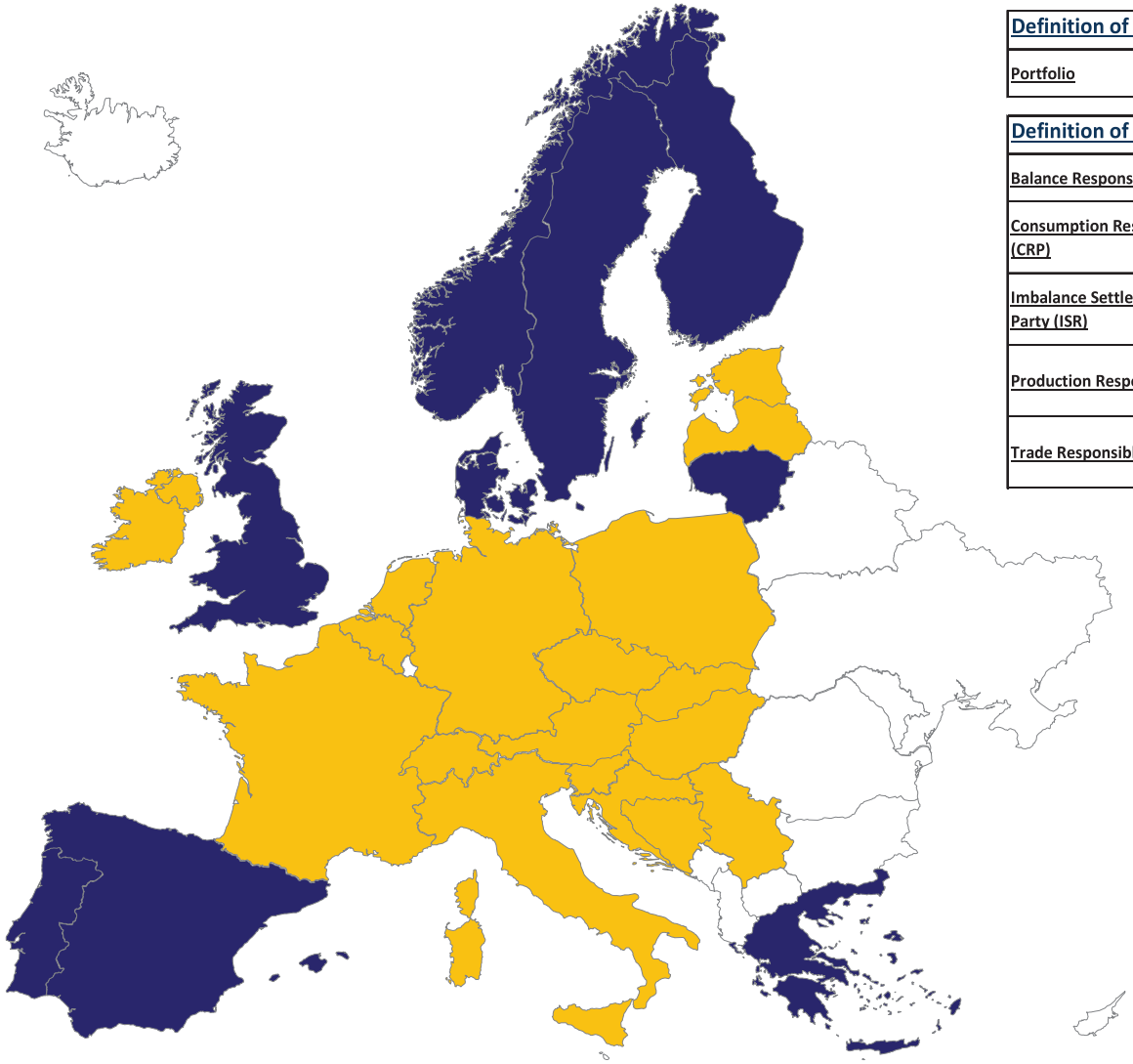
Imbalance settlement - Settlement - If 2 portfolios - Generation



Definition of question	
Portfolio	A group of plant which could be a mix of generation, demand etc., which bid in aggregate into the relevant market.

Definition of answer	
Balance Responsible Party (BRP)	Balancing Responsible Party means a market participant or its chosen representative responsible for its Imbalances.
Consumption Responsible Party (CRP)	A party who can be brought to rights, legally and financially, for any imbalance between energy nominated and consumed for all associated Accounting Points.
Imbalance Settlement Responsible Party (ISR)	A party that is responsible for settlement of the difference between the contracted quantifies and the realized quantifies of energy products for the BRPs in a Market Balance Area.
Production Responsible Party (PRP)	A party who can be brought to rights, legally and financially, for any imbalance between energy nominated and produced for all associated Accounting Points.
Trade Responsible Party (TRP)	A party who can be brought to rights, legally and financially, for any imbalance between energy nominated and consumed for all associated Accounting Points.

Imbalance settlement - Settlement - If 2 portfolios - Consumption



Definition of question	
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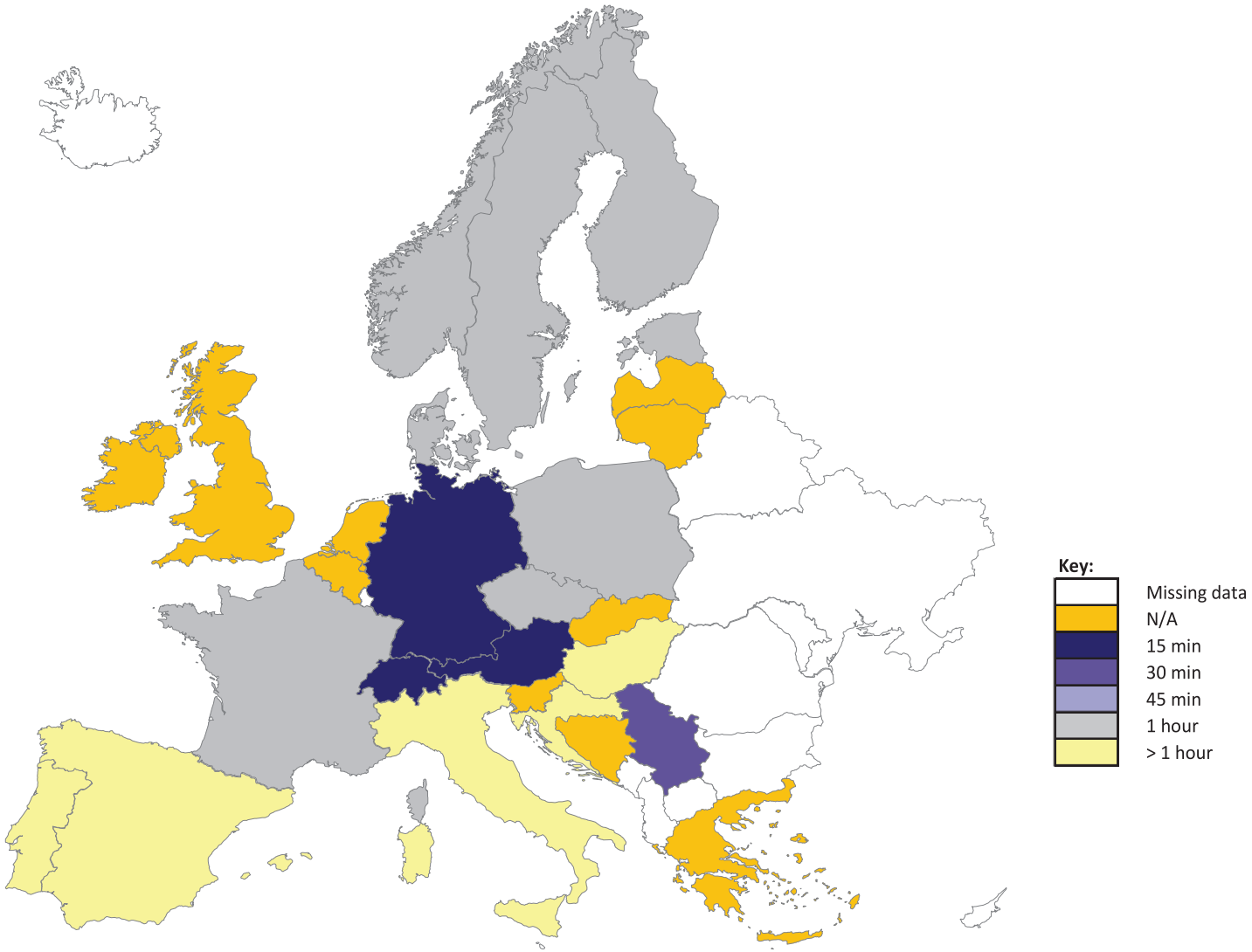
Trade Responsible Party (TRP)	A party who can be brought to rights, legally and financially, for any imbalance between energy nominated and consumed for all associated Accounting Points.

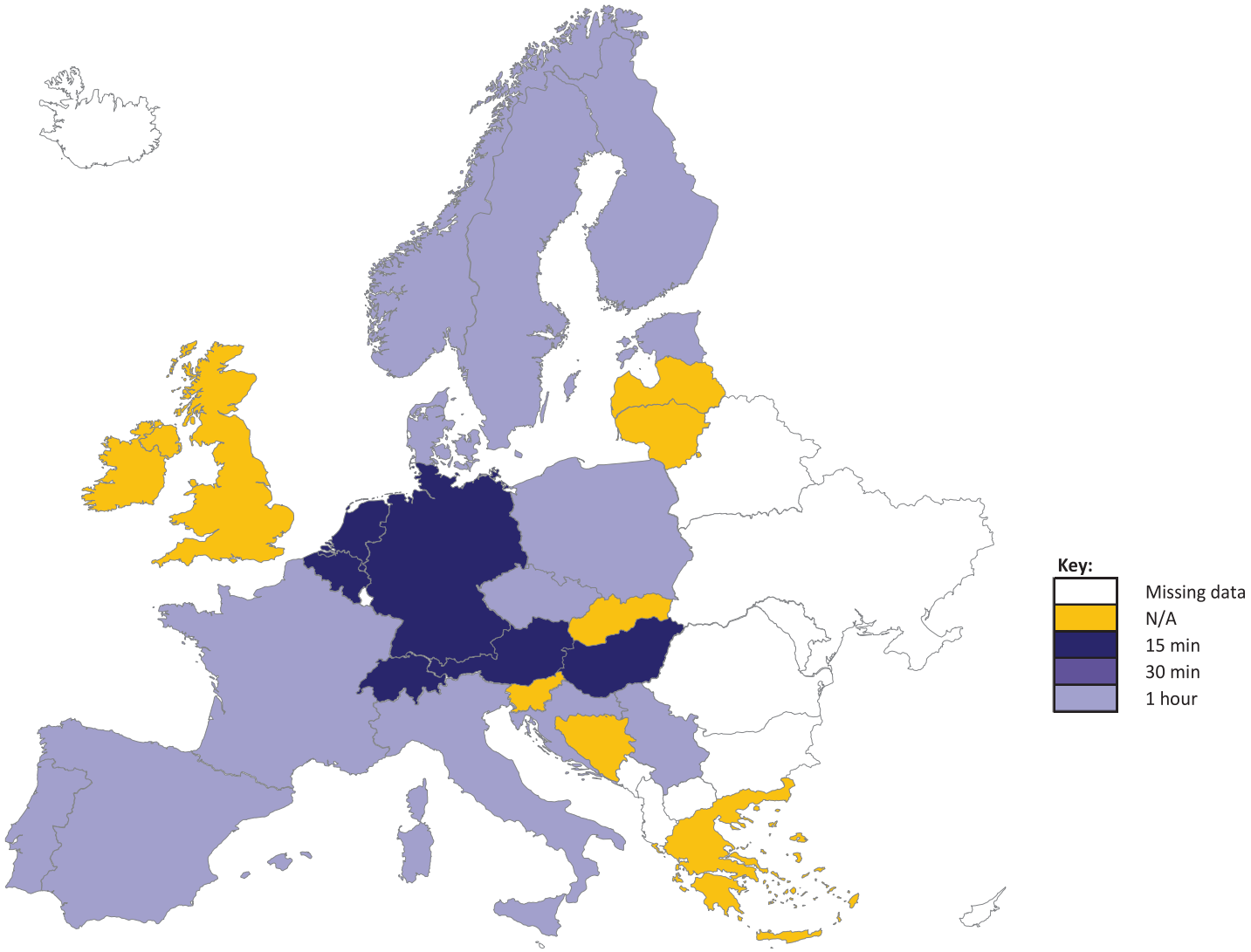
Key:

- Missing data
- N/A
- BRP
- ISR
- TRP
- PRP
- CRR

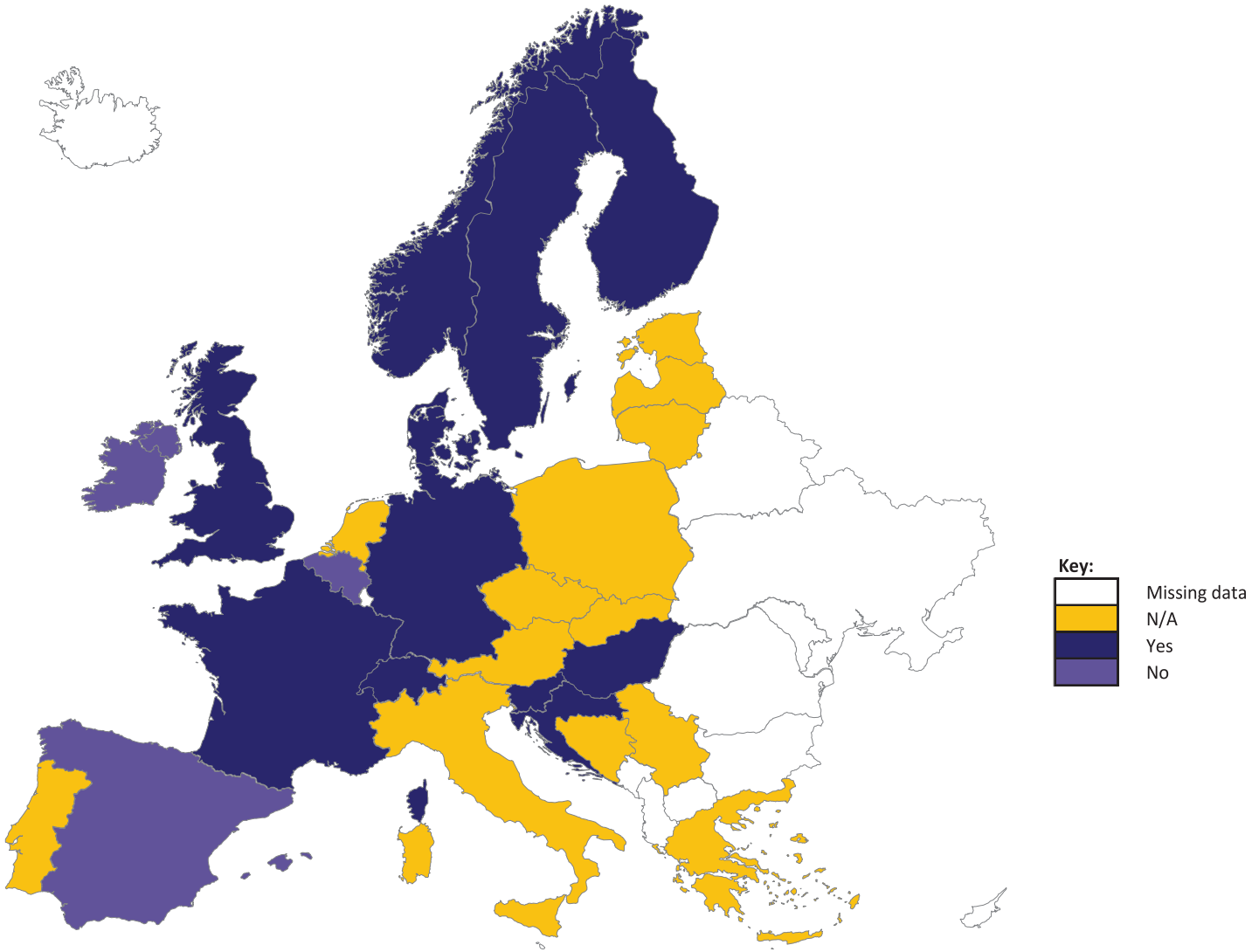
Imbalance settlement - Time before real time for BRP to carry out a re-schedule in Internal ID market



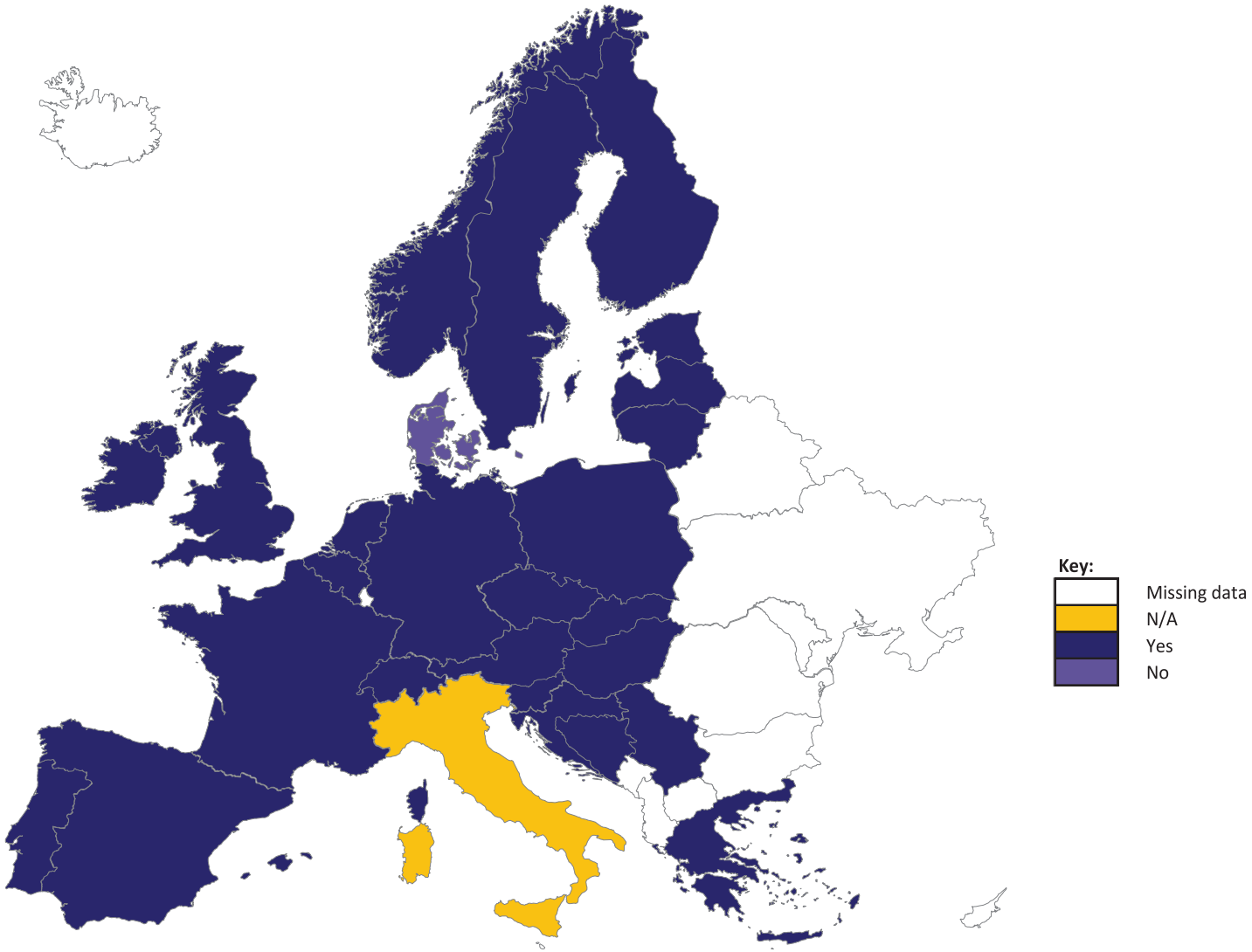
Imbalance settlement - Internal Intra Day Market time period



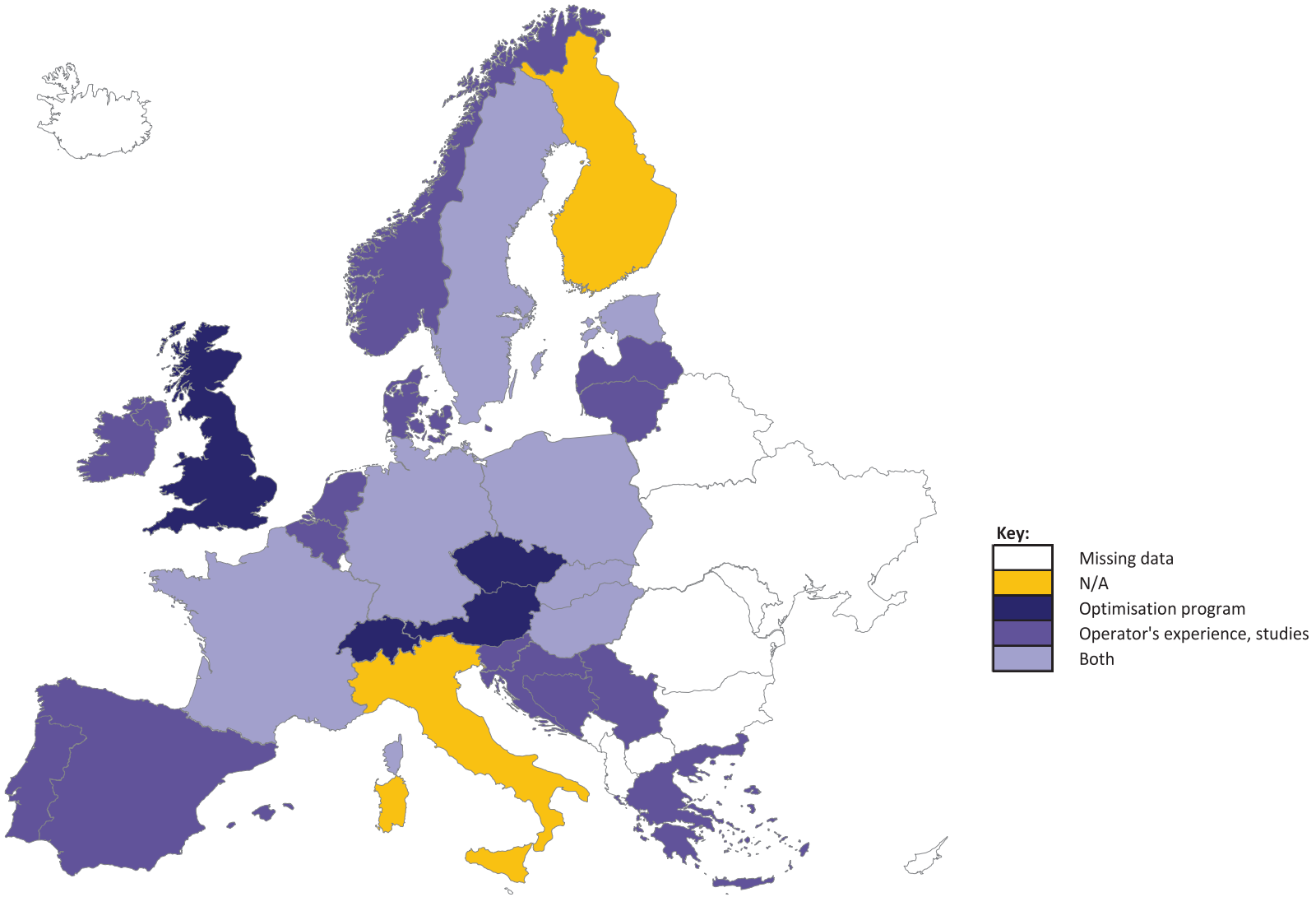
Load participation - Load providers use the same market mech. and act. proc. as generation (cap.&energy)



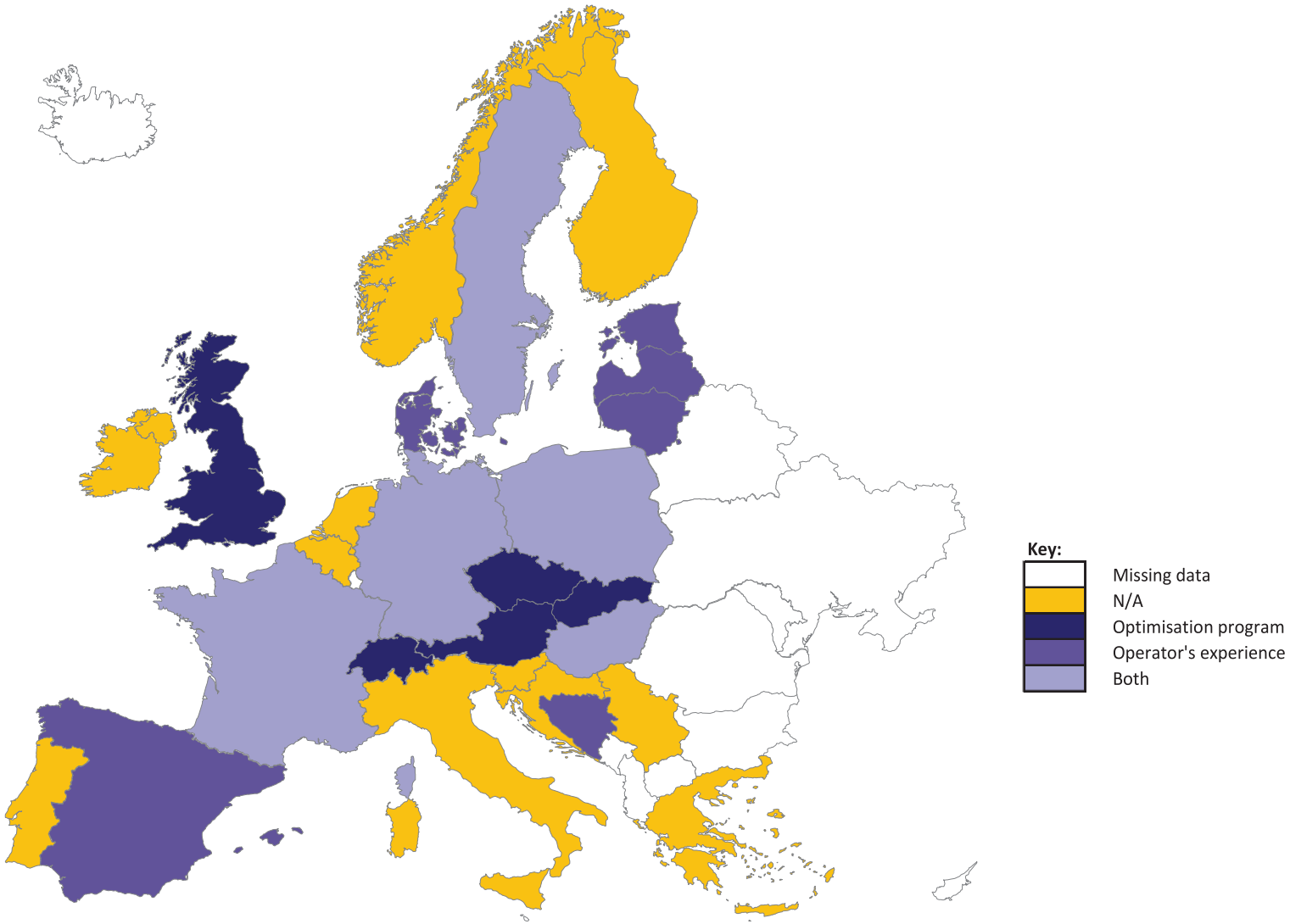
Additional questions - Voltage support as part of ancillary services



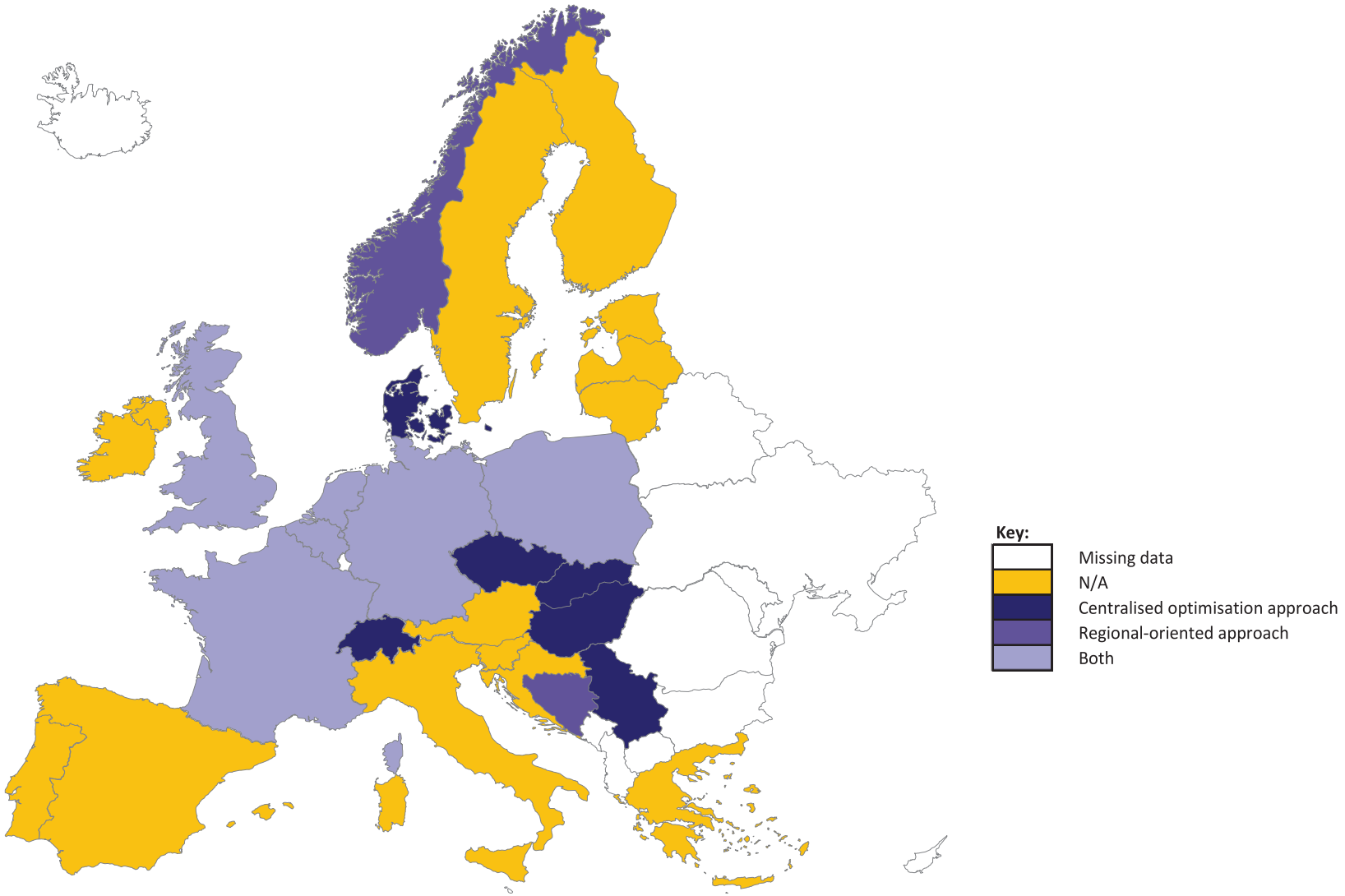
Additional questions - Determination the optimal use of reactive energy



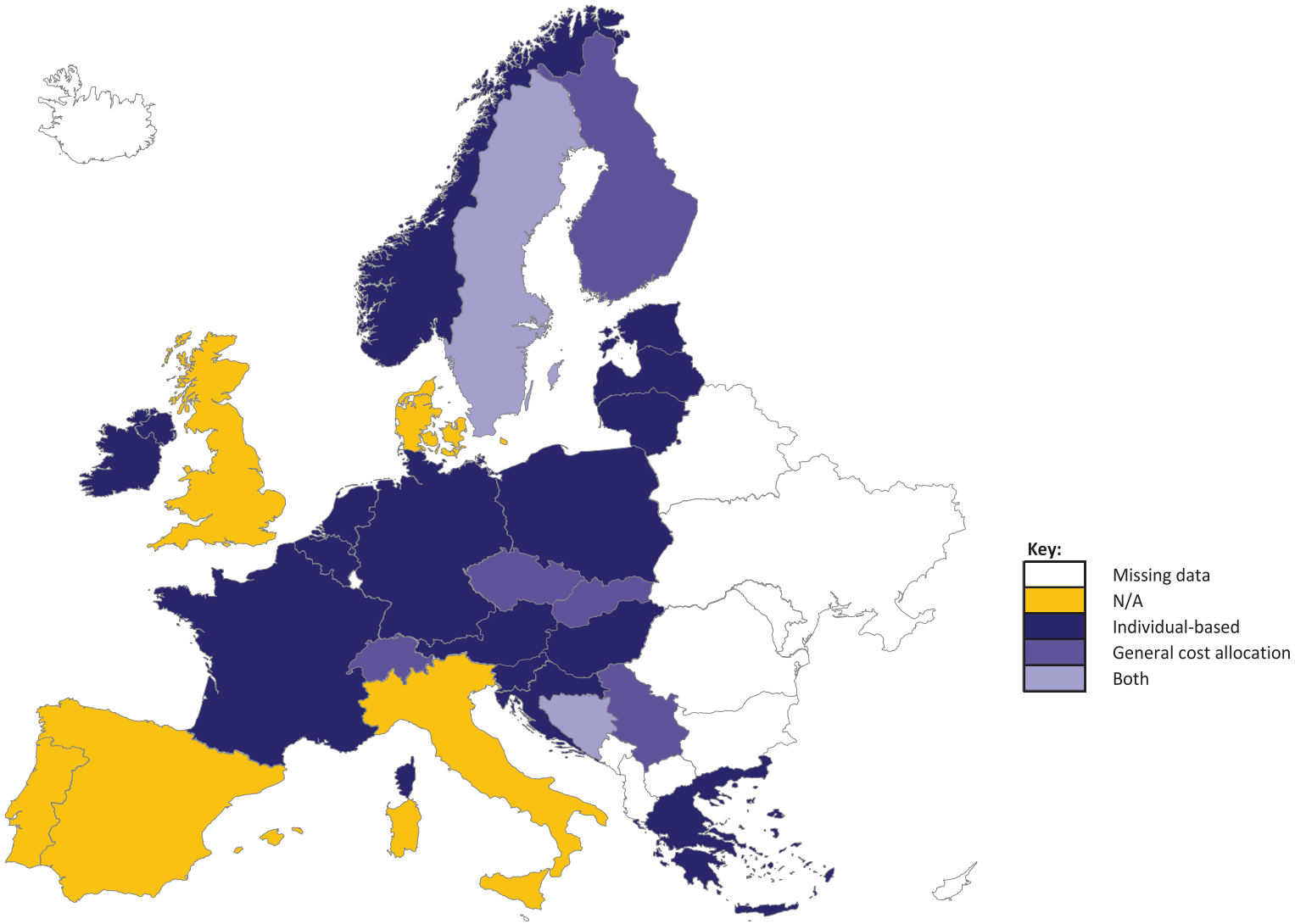
Additional questions - In case of opt.problem - objective function



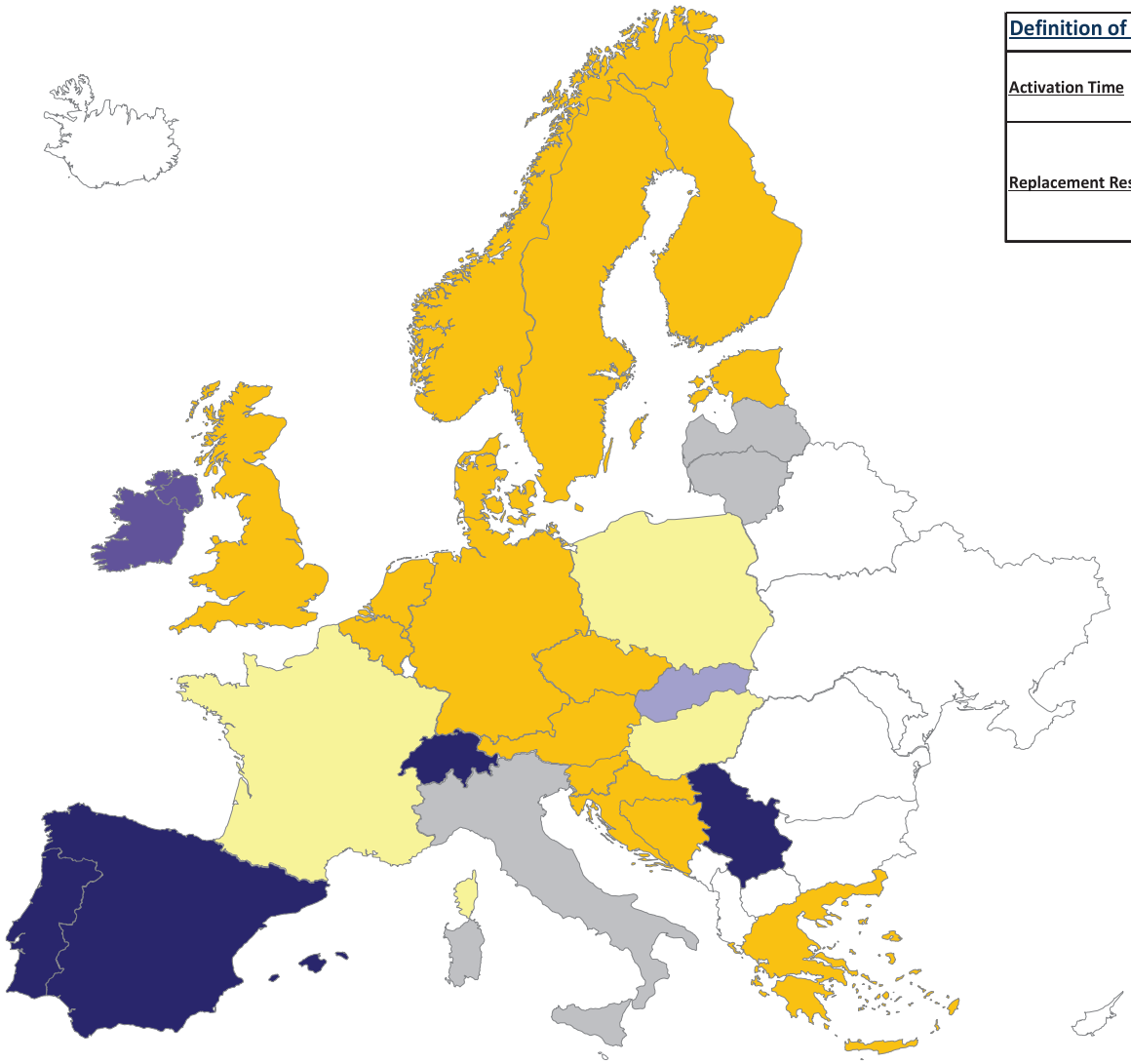
Additional questions - Type of optimization approach



Additional questions - Covering of the costs for voltage support / reactive energy



Additional questions - Activation time of RR from 0 to max



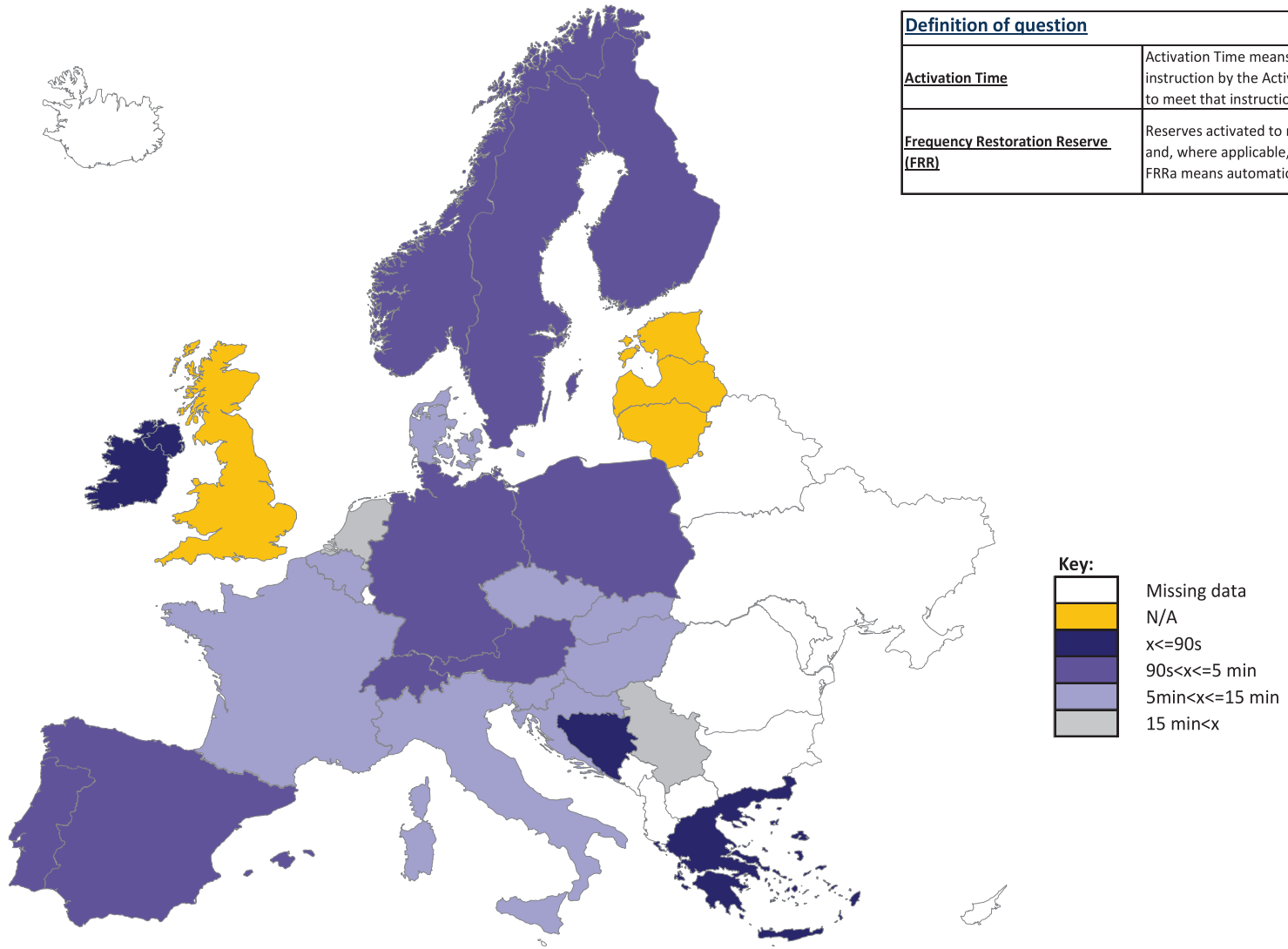
Definition of question	
Activation Time	Activation Time means the period of time between receipt of a valid instruction by the Activation Optimisation Function and the end of ramping to meet that instruction.
Replacement Reserve (RR)	Replacement Reserves (RR) means the reserves used to restore/support the required level of FRR to be prepared for further system imbalances. This category includes operating reserves with activation time from Time to Restore Frequency up to hours.

Key:

- Missing data
- N/A
- x<=15 min
- 15min<x<=20 min
- 20min<x<=1 hour
- 1 hour<x
- Depends on the unit

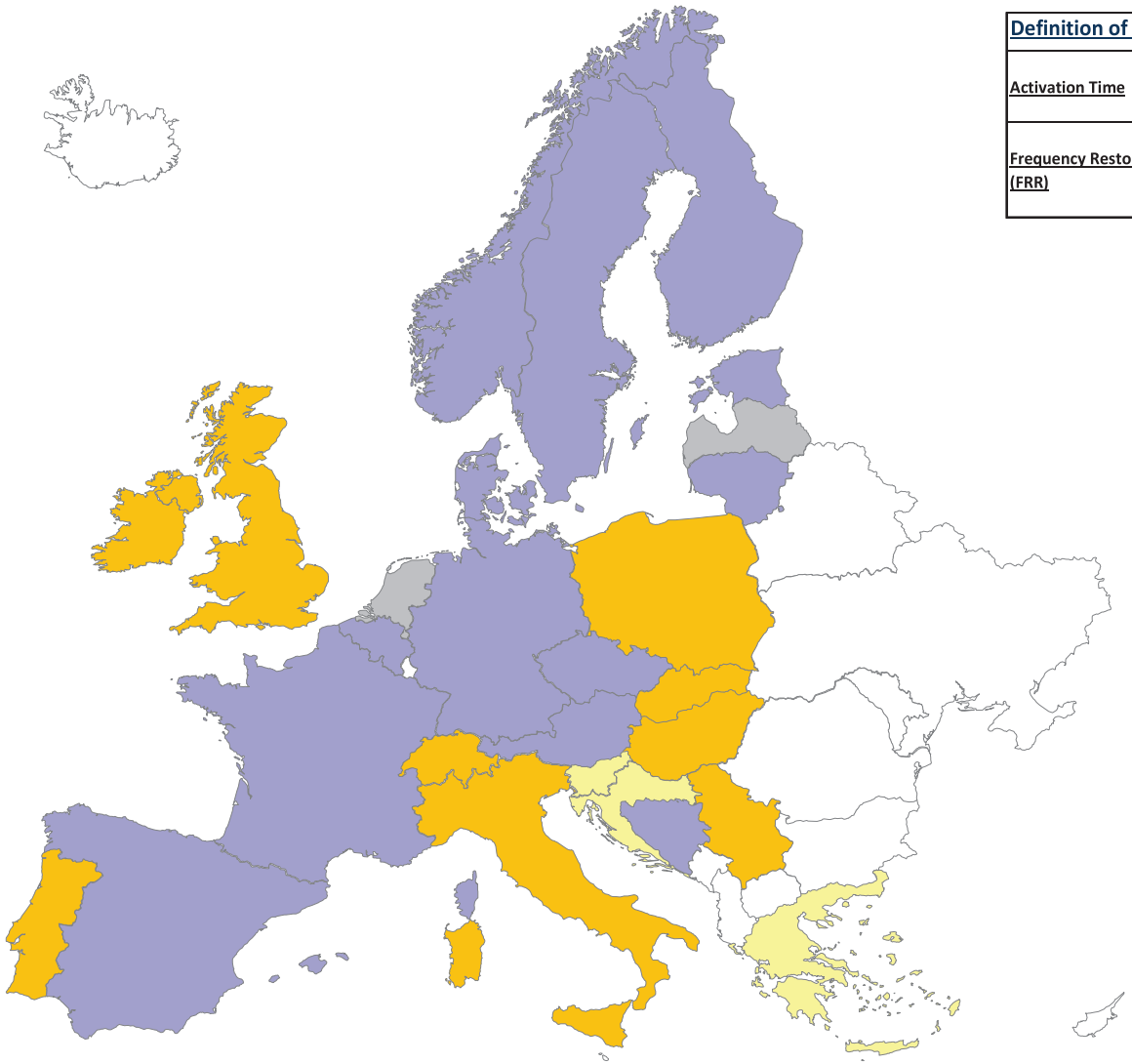
Additional questions - Activation time of FRRa from 0 to max

Definition of question	
Activation Time	Activation Time means the period of time between receipt of a valid instruction by the Activation Optimisation Function and the end of ramping to meet that instruction.
Frequency Restoration Reserve (FRR)	Reserves activated to restore System Frequency to the Nominal Frequency and, where applicable, power balance to the scheduled value. FRRa means automatic FRR, FRRm means manual FRR.

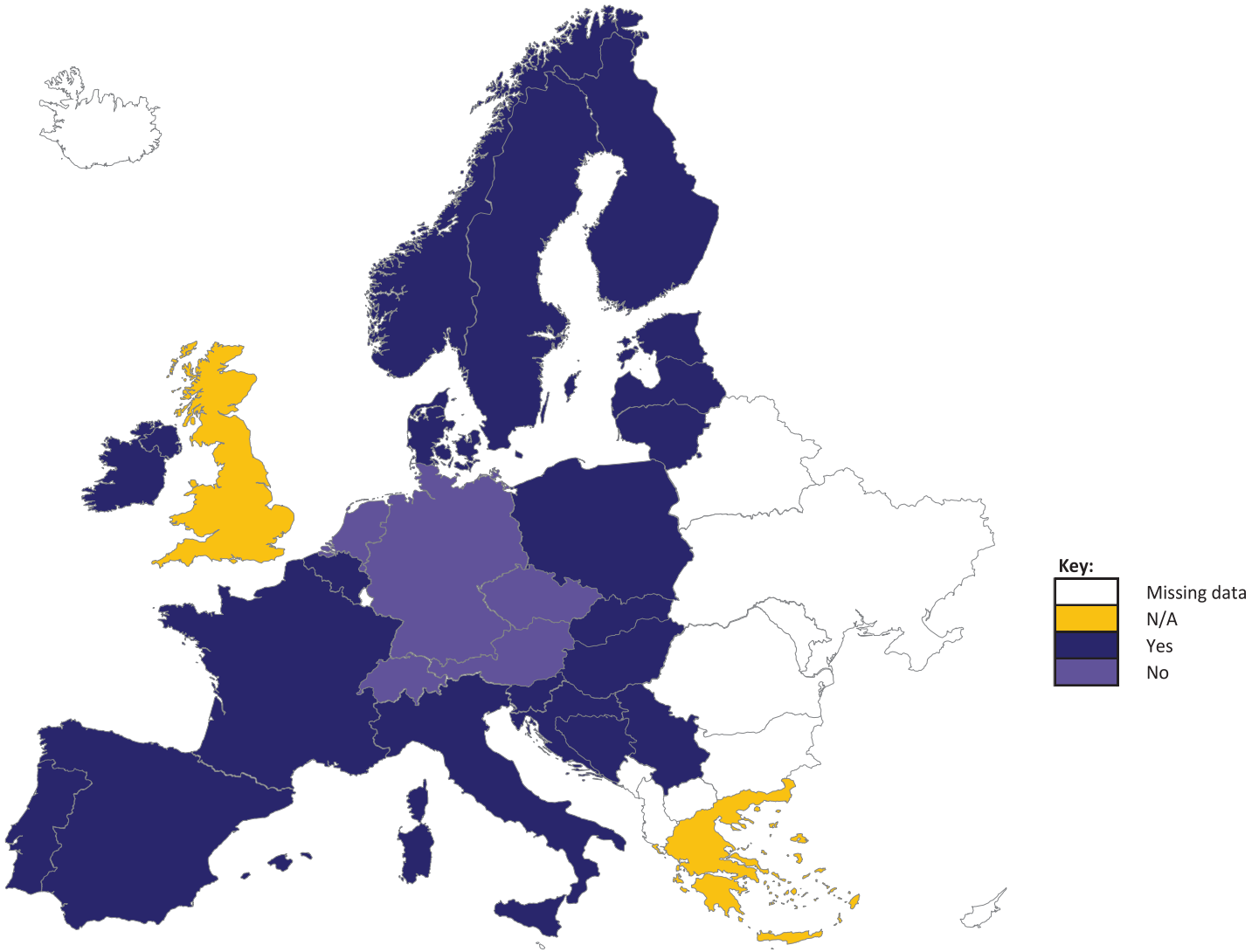


Additional questions - Activation time of FRRm from 0 to max

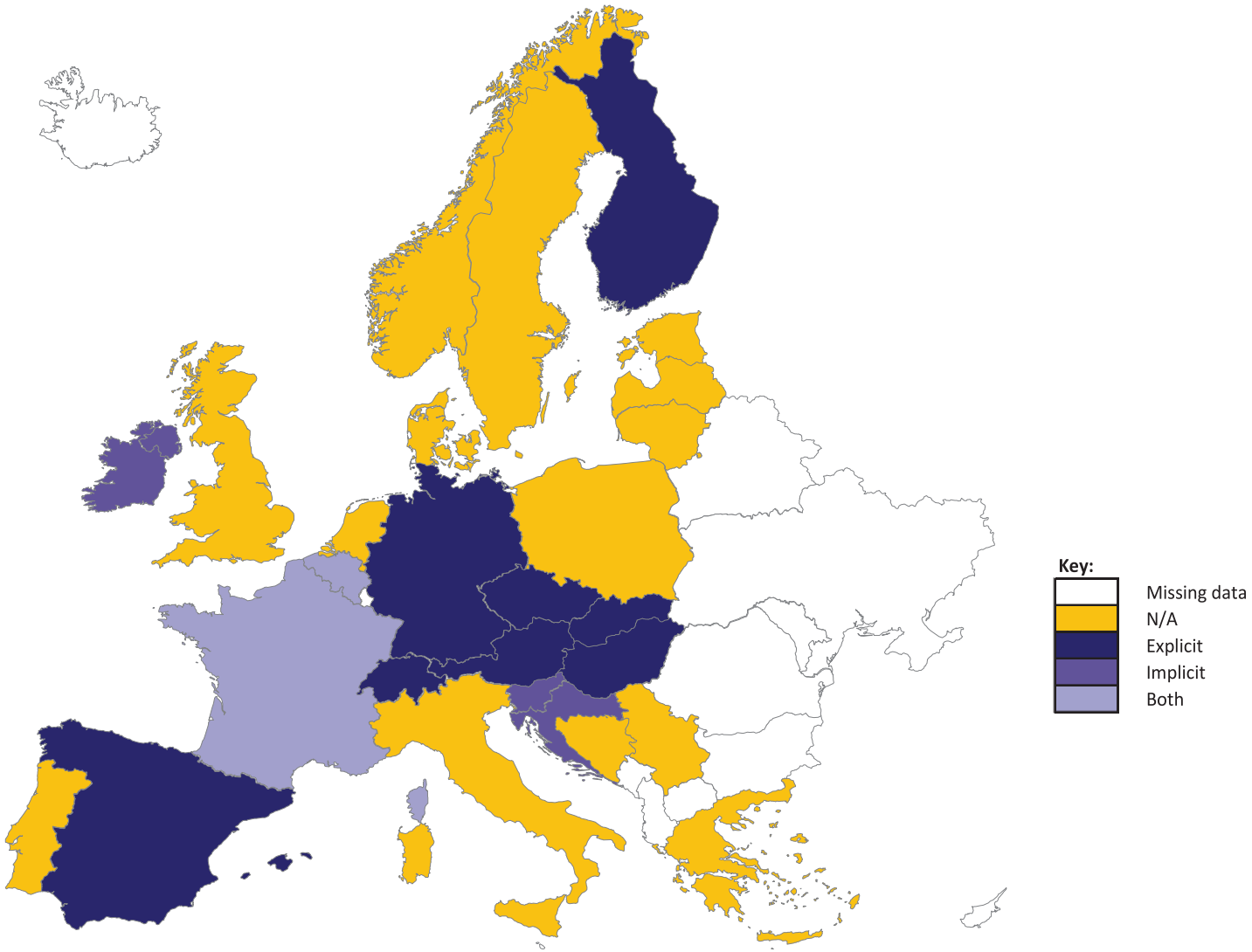
Definition of question	
Activation Time	Activation Time means the period of time between receipt of a valid instruction by the Activation Optimisation Function and the end of ramping to meet that instruction.
Frequency Restoration Reserve (FRR)	Reserves activated to restore System Frequency to the Nominal Frequency and, where applicable, power balance to the scheduled value. FRRa means automatic FRR, FRRm means manual FRR.



Additional questions - Using the energy of balancing in the redispatching / countertrading actions



Additional questions - Implicit / explicit offers bids from BSP



Additional questions - Owning (or partly owning) and operating of reactive power comp. systems