

# Qualitative Assessment of Disclosure and GO system

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*Monitoring Report (Draft)*

*Deliverable 2.2 of Work Package 2 from the RE-DISS II project*

*A report prepared as part of the IEE project*

*"Reliable Disclosure Systems for Europe Phase II (RE-DISS II)"*

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# 1 Introduction

The RE-DISS II project (RE-DISS II, 2013) aims at improving significantly the reliability and accuracy of the information given to consumers of electricity in Europe regarding the origin of the electricity they are consuming. Such information is given to all consumers through the regime of electricity source disclosure, which is a requirement on all European suppliers of electricity.

The first phase of the RE-DISS project was launched in mid-April 2010 and ended in October 2012. RE-DISS I (RE-DISS I, 2010) resulted in the recommendations called the RE-DISS Best Practice Recommendations (BPR) on how to implement and correctly use guarantees of origin which are the disclosure tools that were created by the RES Directive and the Cogeneration Directive. The BPR document was developed throughout the RE-DISS project by the project partners and the involved competent bodies for guarantees of origin (GO) and for electricity disclosure of participating domains and provides recommendations on how the GO systems and electricity disclosure should be implemented in order to ensure the provision of accurate and reliable information to consumers. With this the BPR aimed at minimising the main problems with regard to accuracy of electricity disclosure, which can be classified as follows: (1) double counting in different explicit tracking mechanism, (2) double counting of attributes in implicit tracking, (3) double counting within individual supplier's portfolio, (4) loss of disclosure information and (5) intransparency for consumers, and (6) leakage of attributes and/or arbitrage<sup>1</sup>; and as additional problem (7) unintended market barriers. The implementation of these BPR resulted in important improvements in the electricity tracking systems (guarantees of origin and disclosure) in several Member States which were detailed in the Final Report of the project (RE-DISS I, 2012).

Although several improvements were registered during RE-DISS I, by the end of the first phase of the project, shortfalls in coordination and implementation of related policies still remained, and thus RE-DISS II (the second project phase) was launched in April 2013 in order to overcome those in the EU28, Norway, Switzerland and Iceland.

This report aims at measuring the actual progress made in the implementation of the BPR across the EU28, Norway, Switzerland and Iceland during RE-DISS II (2013-2015). This assessment is carried out for these countries per domain, totalling the analysis of 32 domains<sup>2</sup>. This report assesses the impacts of the implementation of the BPR v2.1<sup>3</sup>, looking at:

- The status-quo of the implementation of the BPRs at the start of RE-DISS II;

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<sup>1</sup> In this paper arbitrage is related to the selling of GO to a „buyer of last resort“. That is the sale of GO that are about to expire in one domain, to another domain with a later expiry date where rules for disclosure are different.

<sup>2</sup> For most of the countries within the assessment, domain is the same as the country with the exception of Belgium for which 2 domains were assessed: Belgium Flanders and Belgium-Wallonia as they have different legislation in terms of disclosure and GO.

<sup>3</sup> BPR v2.1 was the one used for this assessment, as it was the one used in the Baseline Report (RE-DISS II, 2014) and at the end of RE-DISS I in which a similar assessment as this one was carried out for 17 domains.



- The actual progress made throughout the project in adapting the tracking regulations within the 32 domains; and
- The actual progress made in solving the disclosure related problems.

The assessment makes use of: the *Qualitative Assessment of Disclosure and GO Systems: Baseline Report* (RE-DISS II, 2014) where the status-quo of the 32 countries was analysed; the two rounds of qualitative data collection carried out during the project phase (carried out in 2014 and 2015); the Residual Mix calculations carried out during the project (2013, 2014 and 2015) and the domain's Country Profiles from 2014 and 2015. The Country Profiles provide details on implementation of the disclosure, GO systems and of the BPR as well as tailor made recommendations for improving the systems in place for each of the 32 domains and should be used to supplement this analysis.

Moreover this report also provides an historical overview, covering the entire RE-DISS project (including RE-DISS I and RE-DISS II), on the implementation of the BPR and in solving the disclosure related problems for the 17 domains<sup>4</sup> assessed in RE-DISS I. For this assessment the information inventoried during the entire RE-DISS project was used

This report presents in Section 2 the need, adopted development process and main contents of the RE-DISS BPR. The methodology used for the qualitative and quantitative analysis carried out in this report and the domains analysed are presented in Section 3 and 4. Sections 5, 6 and 7 present the results of the assessment in terms of the implementation of the disclosure and GO system; the qualitative improvements in the implementation of the RE-DISS BPR and the quantitative improvements.

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<sup>4</sup> The 17 domains assessed in RE-DISS I, for which the historical overview is provided in this report, are: Austria, Belgium-Flanders, Belgium-Wallonia, Netherlands, Norway, Luxemburg, Denmark, Finland, Sweden, Switzerland, Italy, Ireland, France, Germany, Portugal, Slovenia and Spain.

## 2 RE-DISS Best Practice Recommendation (BPR)

### 2.1 Need and development process of the RE-DISS BPR

Disclosure enables consumers to make informed choices about their energy supply based on other criteria than price. Depending on the details of the national regulations, this can for example include the combination of energy sources compared with national average, information on the environmental impact of the supplied mix and the national origin of the electricity supplied (national production or imported electricity). The consumer choice can be made in principle at two different levels: supplier mix information and specific products (optional).

For consumers to make an informed decision on their energy supplier, it is crucial that the information provided to the consumer is reliable. For that, the tracking system should avoid all forms of double counting (especially of green attributes) and should assure that one produced MWh of energy is assigned to consumers only once. In general, disclosure should also aim at:

- Providing meaningful information to the users, enabling consumer's choice;
- Being robust against errors and fraud by actors involved;
- Being compatible with existing economic, socioeconomic regulatory and legislative framework;
- Being cost-efficient, by providing the services required at reasonable costs;
- Being flexible enough to adapt to changing framework conditions.

Reliable tracking can only be done by decoupling attributes from electricity produced and by creating two distinct markets: exchange of physical electricity and exchange of attributes.

Guarantees of Origin (GOs) for RES-E were first created in the RES Directive 2001/77/EC. However the lack of stringent requirements resulted in different implementation in different Member States. The new RES Directive 2009/28/EC provided clarifications in Article 15 on: how the GO system should be implemented; on its function (that GOs should only be used for disclosure); its form (GO should be an electronic document) and lifecycle (12 months of lifetime); and that the mechanism for managing GOs should be accurate, reliable and fraud resistant. On this ground, the RES Directive 2009/28 also referred that the GOs should be recognised by other Member States (MS), unless they are found not to be veracious, reliable or accurate.

Although the EU Directives define the fundamental principles of GO and disclosure systems, MS need to interpret the measures necessary to make GOs and disclosure reliable, accurate and fraud-resistant as well as they are required to recognise GOs from other MS (unless there are well funded doubts about the accuracy, reliability or veracity of the GO). Moreover, national energy markets are closely internationally interconnected in both physical and "virtual" energy flows and the reliability of disclosure information provided to consumers is dependent on information provided from other countries. Thus a coordinated implementation of GO and disclosure schemes is crucial for all national Competent Bodies.

In this sense, the RE-DISS project has put forward the Best Practice Recommendations (BPR) that were extensively discussed with Competent Bodies of MS and in the end has been generally approved by them to provide further guidance on the establishment of

reliable, accurate and fraud resistant GO and disclosure systems in Europe. The BPR aims at providing guidance for developing and revising national primary and secondary legislation and to advise Competent Bodies how further practical details of GO and disclosure systems could be implemented.

As the rules for implementing GO and disclosure schemes are governed by the EU and national legislation and regulations, the actual use of the BPR is subject to national legislation and thus is not binding.

The BPRs' main purpose is to try to solve/minimise the problems related to disclosure systems, which can be classified as follows:

1. Double counting in different explicit tracking mechanism,
2. Double counting of attributes in implicit tracking,
3. Double counting within individual supplier's portfolio,
4. Loss of disclosure information
5. Intransparency for consumers;
6. Leakage of attributes and/or arbitrage; and
7. Unintended market barriers.

The BPR was developed between the RE-DISS project partners and the participating competent bodies. The BPR is an active document which has been continuously updated. The RE-DISS partners have proposed a series of recommendations on GO and disclosure systems and these recommendations have been in-depth discussed and agreed with the participating Competent Bodies through a series of Domain Workshops (DW):

- 6 domain workshops carried out within RE-DISS I;
- 3 domain workshop carried out within RE-DISS II (named 7<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> RE-DISS Workshops).

During RE-DISS II two versions of the BPR have been adopted: BPR v2.2 and BPR v2.3<sup>5</sup>, being the most recent one from July 2015. BPR v2.3 is available for download in the project website.

## 2.2 Main contents of the BPR

The BPR aims at providing guidance for developing and revising national primary and secondary legislation and to advise Competent Bodies how further practical details of GO and disclosure systems could be implemented.

The BPR used in this monitoring assessment was BPR v2.1, which was the one used in the Baseline Report (RE-DISS II, 2014) and at the end of RE-DISS I in which a similar assessment as this one was carried out for 17 domains. This was the one chosen and not the latest version of the BPR (BPRv2.3), because it is the one that can be used (a) to monitor progress achieved through RE-DISS II for the 32 domains and (ii) to monitor progress since RE-DISS I for the 17 domains assessed.

The BPR are divided in different categories, depending of what they target:

- "12 Month Lifetime Rule" for GO

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<sup>5</sup> RE-DISS BPR 2.3 of July 2015: [http://www.reliable-disclosure.org/upload/183-RE-DISS\\_Best\\_Practice\\_Recommendations\\_v2.3\\_Final\\_31-07-15.pdf](http://www.reliable-disclosure.org/upload/183-RE-DISS_Best_Practice_Recommendations_v2.3_Final_31-07-15.pdf)

- Usage of EECS
- Issuing of GO for different energy sources and generation technologies
- GO as the unique “tracking certificate”
- Recognition of GO
- Disclosure Schemes and other Reliable Tracking Systems (RTS)
- Calculation of Residual Mixes
- Contract Based Tracking
- Timing for Disclosure
- Further Recommendation on Disclosure

As in the Baseline Assessment (RE-DISS II, 2014), in this Monitoring Report, in order to analyse in detail the implementation of the BPR several BPR were split up as they call for the implementation of several aspects within the same item. The following table shows how the BPR have been split up as well as their content (that is under analysis in this report). It is important to refer that in further versions of the BPR (v2.2 and V2.3), the split up of the BPRs was adopted and some of the BPRs below were split up even further, for example to include specification of criteria for the recognition of GO and other specific information deemed relevant.

Table 1: Split up of the BPR (Version 2.1) which partly addressed several recommendations within one “numbered item) into various individual BPR, addressing only one aspect at a time.

Set of BPR	BPR ID	Content of the BPR Analysed
<b>"12 Month Lifetime Rule" for GO</b>	1a	The metered production periods for purposes of issuing GOs should not be longer than a calendar month.
	1b	The metered production periods for purposes of issuing GOs should not run across the start and end of disclosure periods. Longer intervals up to one year are acceptable for very small plants, for example.
	2	If possible, the issuing of GOs should be done without delay after the end of each production period
	3a	The lifetime of GOs should be limited to 12 months after the end of the production period.
	3b	GOs which have reached this lifetime should be collected into the Residual Mix.
	4	An extension to this lifetime can be granted if a GO could not be issued for more than six months after the end of the production period for reasons which were not fully under the control of the plant operator. In this case, the lifetime of the GO might be extended to six months after issuing of the GO.
	5a	Cancellations of GOs relating to production periods in a given year X which take place until a given deadline in year X+1 should count for disclosure in year X. Later cancellations should count for disclosure in year X+1. (In case that disclosure periods differ from the calendar year (see item [31]), the deadline should be defined accordingly.)
	5b	Deadline is set on 31 March X+1
	6	The disclosure information from expired GOs (see item [3]) can be allocated either to the production year of the corresponding energy unit or to the year when the GOs have expired, depending on the methodology used for Residual Mix calculation in the respective domain.
<b>Usage of EECS</b>	7	The implementation of GO in all countries in Europe should be based on the European Energy Certificate System (EECS) operated by the Association of Issuing Bodies (AIB) If national GO systems are established outside of EECS, then EECS should at least be used for transfers between registries.
	7a	Is the GO system in the country established exclusively according to EECS?
	7b	Does the domain utilise the AIB Hub for international transfers?

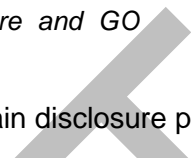
Set of BPR	BPR ID	Content of the BPR Analysed
	8	If not all European countries are members of EECS, appropriate connections between the EECS system and non-EECS members as well as in between different non-EECS members will need to be established. These include inter alia procedures for assessing the reliability and accuracy of the GOs issued in a certain country and interfaces for the electronic transfer of GOs.
	9	So-called ex-domain cancellations of GO, where a GO is cancelled in one registry and a proof of cancellation is then transferred to another country in order to be used there for disclosure purposes, should only be used if there is no possibility for a secure electronic transfer and if there is an agreement on such ex-domain cancellations between the competent bodies involved. Statistical information on all ex-domain cancellations should be made available in order to support Residual Mix calculations.
<b>Issuing of GOs for different energy sources and generation technologies</b>	10	GOs should generally be issued only for the net generation of a power plant, i.e. gross generation minus the consumption of all auxiliaries related to the process of power production. For hydro power plants involving pumped storage this means that GOs should be issued only for the net generation which can be attributed to natural inflow into the reservoir.
	11	The GO system should be extended beyond RES & cogeneration to all types of electricity generation.
	12	All types of GO should be handled in one comprehensive registry system per country. (For an exception from this recommendation see the coexistence of national GO systems and EECS in item [7])
	13	All GO should be linked to disclosure.
	14 a	There should be no issuing of more than one GO for the same unit of electricity.
	14 b	If multiple certificates are to be issued, e for example, a GO for disclosure and a support certificate for management of a support system, then these should be legally separated.
	15 a	This also applies to cogeneration plants which are using RES as the energy source: Only one GO should be issued per unit of electricity
	15 b	This GO should combine the functionalities of a RES-GO and a cogeneration GO.
<b>GO as the unique "tracking certificate"</b>	16	GO should be the only "tracking certificate" used. Any other tracking systems of a similar purpose and function as GO should be converted to GO.
	17	Besides GO, only Reliable Tracking Systems (which may include contract-based tracking) and the Residual Mix should be available for usage for disclosure. No other tracking mechanisms should be accepted.
	18	Green power quality labels should use GO as the unique tracking mechanism.
	19	European countries should clarify whether and under which conditions the use of GOs by end consumers is allowed. Such GO use should not be based on ex-domain cancellations performed in other countries. If consumers are allowed to use GOs themselves, a correction should be implemented in the disclosure scheme which compensates for any "double disclosure" of energy consumed.
<b>Recognition of GO imported from other countries</b>	20	Any such rejection should only relate to the actual use of cancelled GOs for disclosure purposes in the respective country and should not restrict the transfers of GOs between the registries of different countries. This means that the decision about the recognition of a GO should not hinder its import into a specific country.
	21	Within the rules set by the respective Directives, European countries should consider to reject the recognition of GO from other countries for disclosure in case that these countries have not implement adequate measures which avoid double counting, e.g. a proper determination of a Residual Mix for disclosure
<b>Disclosure Schemes and other Reliable Tracking Systems</b>	22	Full disclosure schemes should be implemented, including the disclosure of CO2 emissions and radioactive waste.

Set of BPR	BPR ID	Content of the BPR Analysed
	23	(Other) Reliable Tracking Systems (RTS) should be defined where appropriate based on criteria of added value, reliability and transparency.
	24	RTS can comprise, where applicable: <ul style="list-style-type: none"> <li>- Homogeneous disclosure mixes for regulated market segments where no choice of supplier or different products exists,</li> <li>- Support systems whose interaction with disclosure requires a certain allocation of the attributes of supported generation (e.g. a pro-rata allocation to all consumers in a country where RES electricity is supported by a feed-in tariff),</li> <li>- Contract based tracking</li> </ul>
<b>Calculations of Residual Mixes</b>	25	All countries should provide a Residual Mix as a default set of data for disclosure of energy volumes for which no attributes are available based on cancelled GO or based on other Reliable Tracking Systems. The use of uncorrected generation statistics (e.g. on national or UCTE, Nordel etc. levels) should be avoided.
	26a	The calculation of the Residual Mix should follow the methodology developed in the RE-DISS project.
	26b	As part of this methodology, competent bodies from all countries in Europe should cooperate in order to adjust their Residual Mixes in reflection of cross-border transfers of physical energy, GO and RTS.
	27	For purposes of this cross-border adjustment, competent bodies should use data provided by RE-DISS. They should also support the collection of input data for the related calculations by the RE-DISS project team.
	28	As a default, the Residual Mix should be calculated on a national level. However, if the electricity markets of several countries are closely integrated (for example in the Nordic region), a regional approach to the Residual Mix may be taken. This should only be done after an agreement has been concluded between all countries in this region which ensures a coordinated usage of the regional Residual Mix.
<b>Contract based tracking</b>	29	If contract-based tracking is allowed in a country, it should be regulated clearly.
	30	Such regulations should ensure that <ul style="list-style-type: none"> <li>- The rules of the tracking system are transparent and comprehensive and are clearly understood by all participants in the system.</li> <li>- Double counting of attributes and loss of disclosure information is minimised within the contract based tracking scheme and also in the interaction of the contract based tracking scheme to GO and other RTS (if applicable). As a precondition for this, the contract based tracking scheme should be able to provide comprehensive statistics about the volumes and types of electricity attributes which are tracked through it.</li> <li>- The relevant information for disclosure purposes should be available in time to meet the timing requirements</li> </ul>
	31	If suppliers of electricity intend to use contract-based tracking in order to fulfil claims made towards consumers regarding the origin of a certain electricity product (for example a "green" energy product), GOs should be used in addition to the contract (see also item [38]).
	32	If a country implements a system in which generation attributes are allocated to suppliers and consumers of electricity "ex post" based on the contracts concluded in the electricity market, then such a system should fulfil the requirements mentioned above in order to qualify as a Reliable Tracking System (see item [23]). This includes the need to produce reliable statistics about the attributes allocated by this system.
<b>Timing of Disclosure</b>	33	Electricity disclosure should be based on calendar years.
	34	The deadline for cancelling GO for purposes of disclosure in a given year X should be 31 March of year X+1 (see BPR 5b).
	35	The timing of the calculation of the Residual Mix should be coordinated across Europe: <ul style="list-style-type: none"> <li>- By 30 April X+1 all countries should determine their preliminary domestic Residual Mix and whether they have a surplus or deficit of attributes.</li> <li>- By 15 May X+1, the European Attribute Mix should be determined.</li> <li>- By 31 May X+1, the final national Residual Mixes should be published.</li> <li>- As of 1 July X+1 the disclosure figures relating to year X can be published by suppliers.</li> </ul>
<b>Further Recommendations</b>	36	All countries should clarify the relation between their support schemes for RES & cogeneration on the one side and GOs and disclosure schemes on the other side. Where necessary, the support schemes should be defined as RTS (see item [23]).

Set of BPR	BPR ID	Content of the BPR Analysed
on Disclosure	37	If support schemes in a country are using transferable certificates, then these certificates should be separated from GOs and should not be used for disclosure (see also item [14]).
	38	All electricity products offered by suppliers with claims regarding the origin of the energy (e.g. green or low-carbon power) should be based exclusively on cancelled GO. No other tracking systems should be allowed, with the exception of mechanisms defined by law, e.g. a pro-rata allocation of generation attributes to all consumers which is related to a support scheme (see item [24])
	39	Suppliers offering two or more products which are differentiated regarding the origin of the energy should be required to give product-related disclosure information to all their customers, including those which are buying the “default” product of the supplier.
	40	There should be clear rules for the claims which suppliers of, for example, “green” power can make towards their consumers. There should be rules how the “additionality” of such products can be measured (the effect which the product has on actually reducing the environmental impact of power generation), and suppliers should be required to provide to consumers the rating of each product based on these rules.
	41	Claims made by suppliers and consumers of green or other low-carbon energy relating to carbon emissions or carbon reductions should also be regulated clearly. These regulations should avoid double counting of low-carbon energy in such claims. A decision needs to be taken whether such claims should adequately reflect whether the energy purchased was “additional” or not.
	42	If suppliers are serving final consumers in several countries rules must be developed and consistently implemented in the countries involved on whether the company disclosure mix of these suppliers should relate to all consumers or only to those in a single country.
	43a	The following recommendations should be followed with respect to the relation of disclosure to cooperation mechanisms (Art 6 - 11 of Directive 2009/28/EC): a) If EU member states or member states and other countries agree on Joint Projects, such agreements should also clarify the allocation of attributes (via GOs, RTS or Residual Mix) issued from the respective power plants.
	43b	b) If EU member states agree on Joint Support Schemes, such agreements should also clarify the allocation of attributes (via GOs, RTS or Residual Mix) issued from the power plants supported under these schemes.

As already referred the RE-DISS BPR was developed to address the main disclosure problems identified by RE-DISS since the beginning of RE-DISS I. Figure 1 correlates the main contents of the RE-DISS BPR v2.1 with the main disclosure problems that they aim to address (reasoning behind the BPR), showing which RE-DISS BPR should be implemented to solve/minimise the identified problems.

Figure 1: Relation between the main disclosure problems and the RE-DISS BPR v2.1



		"12 months lifetime rule" for GO	Usage of the EECS	Issuing of GO for different energy sources	GO as the unique "tracking certificate"	Recognition of imported GO	Disclosure Schemes and RTS	Calculations of Residual Mixes (RM)	Contract based tracking (CBT)	Timing of Disclosure	Further Recommendations on Disclosure
<b>1. Double counting in different explicit tracking instruments</b>		7, 7a, 7b, 8, 9	10, 11, 12, 13, 14a, 14b, 15a, 15b	16, 17, 18	21	23, 24		29, 30, 31, 32		36, 37, 38	
<b>2. Double counting of attributes in implicit tracking mechanisms</b>	5a, 5b, 6	9	11, 13		21	23, 24	25, 26a, 26b, 27, 28	29, 30, 32		43a, 43b	
<b>3. Double counting within individual supplier's portfolio</b>										39, 42	
<b>4. Loss of disclosure information,</b>	3b		11, 13, 15b	19	22					39	
<b>5. Intransparency for consumers</b>			11, 12, 13			23				39, 40, 41, 42	
<b>6. Leakage of attributes and/or arbitrage</b>	1a, 1b, 2, 3a, 5a, 5b, 6	9	13	19			28		33, 34, 35		
<b>7. Unintended market barriers</b>	4	7, 7a, 7b, 8, 9			20, 21						



## 3 Methodology

### 3.1 Analysis of the Qualitative Improvement

The analysis of the improvements on the disclosure and GO systems during RE-DISS II carried out in this monitoring report was based on qualitative data collected from the 31 countries (32 domains) during the beginning of 2014 and 2015, which aimed at assessing the implementation of:

- Disclosure systems: assessment if a disclosure system was implemented at national level with legislation and competent body assigned for disclosure;
- GO systems in place (RES-GO and CHP-GO systems): assessment if RES-GO and CHP-GO systems were in place at national level with national legislation and competent bodies assigned;
- Article 3(9) of the IEM Directive: detailed analysis of the transposition of items (a) and (b) of this article into the disclosure system in place;
- Art. 15 of the RES Directive: detailed analysis of the transposition to national law of all items of Art.15 of the RES Directive (with a special focus on RES-GO);
- RE-DISS BPR: detailed analysis of the implementation of the RE-DISS BPR;
- Disclosure related problems: detailed analysis on the improvements on the resolution of the main disclosure problems.

A similar procedure as the one used in the RE-DISS I report “*Improvements Achieved by the Project on the BPR*” was used in this report in order to provide a structured overview of the status quo/evolution of GO and disclosure systems:

- “*in line*”: when the situation in the domain was in line with the RE-DISS BPR and/or the disclosure/GO/items of Art.15 of the RES Directive are implemented;
- “*almost in line*”: when the situation was almost in line with the BPR and/or the disclosure/GO/items of Art.15 of the RES Directive are almost in place (for some of the BPR, this classification is also used to demonstrate that although the domain is not fully in line with a and/or the disclosure/GO/items of Art.15 of the RES Directive some progress has been made towards that goal)
- “*not in line*”: when the situation in the domain is not in line with the RE-DISS BPR and/or the disclosure/GO/items of Art.15 of the RES Directive are not implemented
- “*not applicable*” or “*no longer applicable*”: when the RE-DISS BPR is not or no longer applicable
- “*not known*”: in case it has not been possible to fully clarify the situation in the domain regarding the RE-DISS BPR and or the implementation of disclosure/GO/items of Art.15 of the RES Directive are not known.

To guarantee that the implementation of each BPR was analysed always in the same way, a procedure with specific instructions was developed which indicated the classification criteria that should be used in the qualitative analysis of the implementation of each of the BPR. This was important to ensure consistency in the evaluation, independently of who was evaluating and revising (project partner and competent authorities).

To facilitate the visualisation of this qualitative analysis the classifications above were converted into a colour scheme or code, with which matrixes were developed to:

- Analyse the general implementation of disclosure and GO systems;
- Analyse the implementation of items (a) and (b) of Art. 3(9) of the IEM Directive;
- Analyse the implementation of the BPR at the “start/2014” and “end/2015” of RE-DISS II.

The colour scheme or code attributed to each of the classification in the different matrixes was the following:

- “in- line” (dark green), “almost in line” (light green) and “not in line” (red) and
- “not applicable” or “no longer applicable” (NA) or “not known” (NK)

Beside the evaluation matrixes, score-points were attribute to each one of the classifications in order to analyse the level of:

- Implementation of Article 15 of the RES Directive across the 32 domains;
- Implementation of all RE-DISS BPR across the 32 domains;
- Implementation of the different categories of RE-DISS BPR on each of the 32 domains;
- Improvements in addressing the disclosure problems on the 32 domains

These four different assessments were carried out in a scale of 0% to 100%, where a scoring of 0% represents no implementation of the RE-DISS BPR and 100% full implementation of the BPR. Each of the BPR has been assigned different priorities of implementation on a level of 1-4. This prioritisation is depending on the respective relevance of the BPR for affecting the consistency and reliability of the international trading systems and has been reflected by attributing different weights to the BPR evaluation in the assessment. High priority has been given to those BPR which are relevant in order to assure sound coordination on international level and minimisation of negative impacts for other countries’ national systems. The priorities attributed to the BPR are the ones highlighted in Table 2. Table 3 shows the weights attributed to the different priorities in this assessment.

Table 2: Prioritisation of RE-DISS BPR

Priority of BPR	RE-DISS BPR
1	BPR: [3a], [3b], [5a], [5b], [6], [9], [13], [14a], [14b], [15a], [15b], [22], [25], [33], [34], [36], [37], [43a], [43b]
2	BPR: [1a], [1b], [7], [7a], [7b], [10], [12], [16], [17], [23], [24], [29], [30], [31]
3	BPR: [2], [8], [20], [21], [26a], [26b], [27], [28], [35], [38], [39]
4	BPR: [4], [11], [18], [19], [32], [40], [41], [42]

Table 3: Weights attributed in the evaluation according to BPR priorities

Priority of the BPR	Weights attributed in the evaluation for the BPR according to the priority
1	1.00
2	0.75

3	0.50
4	0.25

Besides the analysis of the improvements achieved during RE-DISS II, we also provide an historical overview on the improvements achieved during the entire RE-DISS project (including phase I and phase II) for the 17 domains assessed in RE-DISS I. This analysis provides a general overview on the overall improvements in terms of: (i) general implementation of disclosure and GO systems (Section 5.5); (ii) implementation of all BPRs in those domains and in the resolution of the main disclosure problems (Section 6.4). The historical analysis of the implementation of the BPR followed the same procedure (score points and weighting system) used for the assessment of the improvements achieved during RE-DISS II at BPR level.

### 3.2 Analysis of the Quantitative Improvements

The quantitative analysis simulated residual mix calculation of each of the 31 countries<sup>6</sup> with the methodology containing the issues (see below) relevant for the respective country. The simulation was made with the 2014 data set as collected by RE-DISS for calculation of residual mixes and the European Attribute Mix. The simulation included three cases for each country: before RE-DISS I (2010), after RE-DISS I (2012) and after RE-DISS II (2015). The benchmark was implicit disclosure according to RE-DISS BPR.

Data collection for the quantitative improvement analysis was conducted through 7 extra questions in the qualitative data collection sheet, where respondents were asked to specify e.g. whether uncorrected generation statistics are used for implicit disclosure, whether the calculation is coordinated with other countries as well as the exact calculation formula. Based on these answers the emergence of 5 implicit disclosure issues in the 31 countries was assessed:

- Issue 1: Uncorrected generation statistics used for implicit disclosure

Using uncorrected generation statistics to disclose untracked consumption is a very basic and severe case of double counting. It occurs, if renewable attributes are tracked explicitly and disclosed to consumers without being subtracted from the mix disclosed to other consumers. In other words no calculation of residual mix takes place.

The previous means that all explicitly tracked electricity is implicitly double counted and thus electricity from renewable energy sources disclosed to consumers exceeds the amount of electricity generation from renewable energy sources. It is clear that, if residual mix is not calculated and used, but instead an uncorrected generation mix is used for implicit disclosure, the very basis of reliable electricity disclosure deteriorates.

- Issue 2: Contract-based tracking (CBT) is used

Often electricity suppliers disclose the origin of electricity to consumers based on existing financial contracts with electricity producers (or based on own production in case of producer-supplier). These volumes are thus explicitly tracked and should be deducted from

<sup>6</sup> And not the 32 domains, thus Belgium is not subdivided in Belgium-Wallonia and Belgium-Flanders.

the mix disclosed to other consumers in the country. However, due to the unofficial nature of contract-based tracking, it is challenging to collect data on explicit tracking through contracts. Hence, contract-based tracking is only in seldom cases deducted from the residual mix and leads to double counting.

- Issue 3: Residual mix calculation is not harmonized with the rest of Europe

Virtual transfer of generation attributes (through GO) along with physical transfer of electricity between countries produce an imbalance between the generation attributes available in a country usable for disclosure and the amount of consumption to be disclosed. For example if country A has 50TWh of electricity production and 60TWh of consumption, it has an attribute deficit of 10TWh (not enough generation attributes exist in the country to disclose the origin of the entire consumption). If we further assume that the country net exports 30TWh of the yearly generation attributes through GOs, the deficit grows to 40TWh. In such case, without harmonization of the calculation across Europe, the country could either deem the energy origin of consumption largely (40 TWh of total 60 TWh) as “unknown origin” or expand the existing 20 TWh of attributes to account for three times more consumption than they physically are. Both of these solutions would lead to significant disclosure errors.

However, as we know, electricity production and consumption in the whole area of Europe are equal (if also the physical net import from / export to outside Europe is considered). This means that in Europe, a balance exists between generation attributes and consumption, but this is just unevenly spread between individual countries. To correctly balance the deficits and surpluses of different countries, the residual mix calculation needs to be harmonized across Europe, which is a major responsibility of the RE-DISS project.

- Issue 4: Geographical domains for implicit disclosure overlap

According to RE-DISS Best Practice Recommendations, the residual mix should be calculated for individual countries, unless a group of countries have a highly unified power market (e.g. Denmark, Finland, Norway and Sweden). It is critical, however, that in such case all countries forming a common residual mix agree to use it. Disclosure is not reliable, if some countries of the area use the domestic residual mix and others use the residual mix of the area.

This is troublesome, since if the area residual mix is “greener” than the residual mix of the countries using an area approach, these countries are “benefitting” from RES attributes of the countries using a national. In the opposite situation, loss of green attributes occurs.

Many central European countries use the so-called ENTSOe-mix (European Network of Transmission System Operators) instead of only including national generation. Hence the same error occurs if other countries of the region use a national approach.

- Issue 5: Residual mix only considers explicit tracking of the reference production year attributes

This rather recently discovered problem occurs when not all GO which reflect production attributes of year X are cancelled in time for the residual mix calculation of year X and when the residual mix calculation of year X+1 fails to account for those late cancellations. If this is the case, all production attributes of year X reflected by GO, which are cancelled or exported after the disclosure deadline for year X, are double counted.

For example, if a country does not use a residual mix for implicit disclosure (Issue 1 above) in the analysis this is treated as though non-explicitly tracked electricity consumption is

disclosed with the uncorrected production mix of the country. The impact of issues in implicit disclosure was examined on the total supplier mix of the country, which demonstrates all attributes disclosed in the country (both tracked and untracked). The volume of the total supplier mix is the volume of total electricity consumption in the country.

The examined energy source attributes were renewables (RES), nuclear (NUC) and fossil (FOS). Important settings and assumptions of the analysis were that:

- The input data in all three cases (before RE-DISS I, after RE-DISS I and after RE-DISS II) is the same: Data collected for the 2014 residual mix calculation
- Only implicit disclosure errors on a national level were examined, not e.g. those on the individual supplier portfolio-level
- If contract-based tracking was allowed by the disclosure practices of the country, it was assumed that 50% of otherwise available RES attributes were tracked based on contracts and 20% of NUC and FOS attributes. These volumes were assumed to be tracked without this being accounted for in the residual mix in cases where contract-based tracking was not controlled.
  - available RES, NUC and FOS attributes for CBT are those which are not tracked with other explicit tracking instruments.
- If it can be foreseen that a new legislation will be implemented in the near future, after RE-DISS II analysis was performed according to the new legislation. This is relevant for Greece, for example.
- Finally, two relevant terms need to be clarified:
  - Positive disclosure error signifies that the energy source is over-reflected in disclosure in the simulated situation (before RE-DISS I, after RE-DISS I, after RE-DISS II) compared to RE-DISS BPR. For example a positive disclosure error of RES means that too much RES resides in the total supplier mix of the country, hence double counting of RES occurs due to implicit disclosure errors.
  - Negative disclosure error signifies that the energy source is under-reflected in disclosure.

Finally, it is important to note, that the positive disclosure error of certain energy source(s) in a country always equals the negative disclosure error of other energy source(s) in the country. Logically, if an energy source is over-reflected, it automatically leads to another energy source being under-reflected, as the total electricity consumption to be disclosed is in all cases the electricity consumption of 2014.

## 4 Domains assessed in this report

The implementation of the disclosure, GO systems and BPR analysed in this report was carried out for 32 domains which have been the target group of RE-DISS II.

Figure 2: The 32 domains under analysis in this evaluation<sup>7</sup>



The historical assessment for the entire RE-DISS project only covers 17 domains out of the 32 (Austria, Belgium-Flanders, Belgium-Wallonia, Netherlands, Norway, Luxemburg, Denmark, Finland, Sweden, Switzerland, Italy, Ireland, France, Germany, Portugal, Slovenia an Spain), as those were the ones analysed during RE-DISS I.

<sup>7</sup> Map created in:  
[http://www.amcharts.com/visited\\_countries/#AT,BE,BG,CH,CY,CZ,DE,DK,EE,ES,FI,FR,GB,GR,HR,HU,IE,IS,IT,LT,LU,LV,NL,NO,PL,PT,RO,SE,SI,SK,MT](http://www.amcharts.com/visited_countries/#AT,BE,BG,CH,CY,CZ,DE,DK,EE,ES,FI,FR,GB,GR,HR,HU,IE,IS,IT,LT,LU,LV,NL,NO,PL,PT,RO,SE,SI,SK,MT)

## 5 Implementation of Disclosure and GO systems

### 5.1 General implementation of Disclosure and GO systems during RE-DISS II

Table 4 summarises the results of the analysis carried out on the evolution of the implementation of Disclosure and GO system across the domains. For the disclosure system it has been assessed whether the domains had a disclosure system implemented and operational, including legislation on disclosure (for the fuel mix including environmental information and a methodology for the calculation of the energy mix in the domain) and competent body assigned. In terms of GO, the existence and operability of both RES and CHP GO systems were assessed. Moreover, information is displayed regarding the existence of an electronic registry system for RES-GO.

In terms of the Disclosure system, at the end of the RE-DISS II:

- 22 out of the 32 domains had a full disclosure system implemented and operational with legislation in place, a competent body assigned and an electronic system for GO.
- 8 out of the 32 domains had an “almost in line” disclosure system in place. Reasons for that are:
  - No legislation and or guidelines on the calculation of the energy supplier mix applied to the domain. In the case of Czech Republic every single supplier uses its own methodology for its own disclosure. In Greece although there is legislation in place regarding disclosure, there is no legal provision for the methodology for the calculation of the energy mix.
  - Disclosure does not include environmental indicators (case of Croatia, Italy and Switzerland)
  - Disclosure system is not linked with an electronic register for GO (case of Malta and Slovakia)
  - Disclosure is not provided on supplier mix but on product mix and on the Competent Body website instead of being sent in bills to the costumers (case of Norway);
- 2 out of the 32 domains although with a competent body assigned for GO, had no disclosure system in place and no national legislation on disclosure: the case of Bulgaria and Cyprus.

In terms of RES-GO systems, at the end of RE-DISS II:

- 29 out of the 32 domains had a RES-GO system in place and operational, with legislation in place and a competent body assigned for the issuing, transferring and cancelling GO.
- 3 out of the 32 domains had a RES-GO system “almost in line”. Reasons for that are:
  - GO are issued for internal use but they are not cancelled. This is the case of Poland.
  - RES-GO system created by law but not operational. This is the case of Portugal.
  - Although the GO are distinguished from other certificates and only used for disclosure, they are not electronic certificates (case of Slovakia).

Table 4: Matrix on the Implementation of Disclosure and GO Systems during RE-DISS II

Domains	Disclosure System						RES-GO System						CHP-GO						Electronic System for GO	
	Implemented & Operational		Legislation in Place		Competent Body Assigned		Implemented & Operational		Legislation in Place		Competent Body Assigned		Implemented & Operational		Legislation in Place		Competent Body Assigned			
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Austria					E-Control	E-Control					E-Control	E-Control					E-Control	E-Control		
Belgium-Wallonia					CWaPE	CWaPE					CWaPE	CWaPE					CWaPE	CWaPE		
Belgium-Flanders					VREG	VREG					VREG	VREG					VREG	VREG		
Bulgaria					SEWRC	SEWRC					SEDA	SEDA					SEWRC	SEWRC		
Croatia					HERA	HERA/HROTE					HROTE	HROTE					HROTE	HROTE		
Cyprus					CERA	CERA					CERA / TSO-Cy	CERA / TSO-Cy					CERA / TSO-Cy	CERA / TSO-Cy		
Czech Republic					ERU	ERU					OTE	OTE					NA	NA		
Denmark					Energinet.dk	Energinet.dk					Energinet.dk	Energinet.dk					Energinet.dk	Energinet.dk		
Estonia					Elering AS	Elering AS					Elering AS	Elering AS					Elering AS	Elering AS		
Finland					Energy Authority	Energy Authority					Fingrid	Fingrid					Fingrid	Fingrid		
France					Ministry of Energy	Ministry of Energy					Powernext	Powernext					Powernext	Powernext		
Germany					BNetzA	BNetzA					UBA	UBA					BAFA	BAFA		
Greece					LAGIE	LAGIE					LAGIE / HDNO / CRES	LAGIE / HDNO / CRES					LAGIE / HDNO / CRES	LAGIE / HDNO / CRES		
Hungary					MEKH	MEKH					MEKH	MEKH					MEKH	MEKH		
Iceland					National Energy Authority	National Energy Authority					Landsnet	Landsnet					Landsnet	Landsnet		
Ireland					CER	CER					SEMO	SEMO					NA	SEMO		
Italy					GSE	GSE					GSE	GSE					GSE	GSE		



Domains	Disclosure System						RES-GO System						CHP-GO						Electronic System for GO	
	Implemented & Operational		Legislation in Place		Competent Body Assigned		Implemented & Operational		Legislation in Place		Competent Body Assigned		Implemented & Operational		Legislation in Place		Competent Body Assigned			
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015		
Latvia					Ministry of Economics	Ministry of Economics					Ministry of Economics	Ministry of Economics					Ministry of Economics	Ministry of Economics		
Lithuania					Litgrid AB	Litgrid AB					Litgrid AB	Litgrid AB					Litgrid AB	Litgrid AB		
Luxembourg					ILR	ILR					ILR	ILR					ILR	ILR		
Malta					Malta Resources Authority	Malta Resources Authority					Malta Resources Authority	Malta Resources Authority					Malta Resources Authority	Malta Resources Authority		
Norway					NVE	NVE					Statnett	Statnett					Statnett	Statnett		
Poland					Ministry of Economy	Ministry of Economy					ERO	ERO					NA	NA		
Portugal					ERSE	ERSE					REN	DGEG					REN	DGEG		
Romania					ANRE	ANRE					ANRE	ANRE					NK	NK		
Slovakia					URSO	URSO					URSO	URSO					URSO	URSO		
Slovenia					AGEN-RS	Energy Agency					AGEN-RS	Energy Agency					AGEN-RS	Energy Agency		
Spain					CNE	CNE					CNE	CNE					CNE	CNE		
Sweden					Energy Markets Inspectorate	Energy Markets Inspectorate					Swedish Energy Agency & Svenska Kraftnät	Swedish Energy Agency					Swedish Energy Agency & Svenska Kraftnät	Swedish Energy Agency		
Switzerland					BfE/SFOE	BfE/SFOE					Swissgrid	Swissgrid					Swissgrid	Swissgrid		
The Netherlands					ACM	ACM					CertiQ	CertiQ					CertiQ	CertiQ		
Great Britain					DECC/OFGEM	DECC/OFGEM					OFGEM	OFGEM					CHPQA	CHPQA		

Note: the RES-GO system implemented for Bulgaria is for support rather than for disclosure, as Bulgaria has no disclosure system in place

Anyway it is important to refer that all the 32 domains have some sort of RES-GO system in place with competent bodies assigned for issuing, transferring and cancelling GO, although not all meet the requirements of the RES Directive.

In terms of CHP-GO, at the end of RE-DISS II:

- 22 out of the 32 domains have a CHP-GO system in place that is operational.
- 8 out of the 32 domains have an “almost in line” CHP-GO system in place. Reasons for that are:
  - The actual implementation of the CHP-GO system is unclear, which is the case of Bulgaria, Slovakia.
  - Although created by law the system is not operational. This is the case of Sweden.
  - There is no registry available for CHP-GO, which is the case of Italy, Romania, Malta;
  - CHP-GO can be issued however they don't specify all information required by Directive 2012/27/EC. This is the case of Finland, Italy and Switzerland<sup>8</sup>.
- 2 out of the 29 domains do not have a CHP-GO system in place (no legislation or competent body assigned) which is the case of Czech Republic and Poland.

When comparing the state of the disclosure, RES-GO and CHP-GO systems at the start and end of RE-DISS II the following improvements<sup>9</sup> were observed:

- Disclosure system:
  - Croatia improved the legislation in place in term of disclosure. At the end of RE-DISS II Croatia had a RES-Directive compliant disclosure system implemented with legislation in place associated with an electronic register. This was achieved through the approval of the methodology for determining the origin of electricity which was enacted in the country in November 2014 (Official Gazette n. 133/14). Although the legislation is fully compliant, guidance on how to deal with environmental parameters on disclosure still needs to be provided and that is the reason why the system was considered as “almost in line” at the end of RE-DISS II in terms of implementation and operation; and
  - Portugal improved its disclosure system through the creation of an electronic registry for GO.
- RES-GO system:
  - Estonia improved its system through the adoption of an electronic system for handling GO.
  - Luxemburg improved through the adoption of the law on the production of electricity from RES of 1<sup>st</sup> August 2014<sup>10</sup> with which RES-GO started to be issued based on the RES-Directive instead of the 2001 directive;

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<sup>8</sup> In the case of Switzerland GO can be issued for CHP, but they are not formally CHP-GO and they do not specify all information required by Directive 2012/27/EC.

<sup>9</sup> The improvements herein refer for Disclosure, RES-GO and CHP-GO only refer to the very fundamental situation and initial implementation of the systems, but not on the details of the implementation. On the details of implementation there has been a lot more improvements.

<sup>10</sup> “Règlement grand-ducal du 1er Août 2014 relatif à la production d'électricité basée sur les sources d'énergie renouvelables”

- Poland improved its system through the adoption of a new RES Law signed on 11 March 2015, which came into force on 4 May 2015, and the adoption of an electronic register, which made the RES-GO system compliant with the RES-Directive.
- Slovakia, improved its disclosure system with the adoption of the law on RES-GO. Still to be fully compliant with the RES-Directive Slovakia needs to have an electronic register for RES-GO, which is not the case yet.
- CHP-GO systems:
  - As with the RES-GO system Estonia improved its CHP-GO system through the adoption of an electronic system for handling GO.
  - Ireland improved significantly as during RE-DISS II it has created and made a CHP-GO system operational in the country (with legislation, competent body assigned – SEMO – and electronic registry associated). Although the system is set up and ready to start issuing, transferring and cancelling CHP-GO, up until March 2015 SEMO did not receive a request for CHP-GO.
  - Similarly to the RES-GO system, Luxemburg improved its CHP-GO system, through enacting the law on production of electricity from RES of 1<sup>st</sup> August 2014 that made the CHP-GO system implemented in the country RES-Directive compliant.
  - Romania improved its system by enacting secondary legislation on CHP-GO. Nonetheless, an electronic register for CHP-GO still needs to be put in place.

## 5.2 Implementation of Article 3 (9) of the IEM Directive during RE-DISS II

Table 5 summarises the status of implementation of Article 3(9) of the IEM directive. The directive states that MS shall ensure that electricity suppliers specify in or with the bills and in promotional materials made available to consumers the: (a) contribution of each energy source to the overall mix and (b) at least the reference to existing reference sources where information on environmental parameters (CO2 emissions and radioactive waste) can be found.

Table 5: Matrix on the Implementation of Article 3 (9) of the IEM Directive<sup>11</sup>

Domains	Member States shall ensure that electricity suppliers specify in or with the bills and in promotional materials made available to final customers:			
	<i>(a) the contribution of each energy source to the overall fuel mix of the supplier over the preceding year in a comprehensible and, at a national level, clearly comparable manner.</i>		<i>b) at least the reference to existing reference sources such as web pages, where information on environmental impact, in terms of at least CO2 emissions and the radioactive waste resulting from the electricity produced by the overall fuel mix of the supplier over the preceding year is publicly available.</i>	
	Start (2014)	End (2015)	Start (2014)	End (2015)
Austria				
Belgium-Wallonia				
Belgium-Flanders				

<sup>11</sup> The same colour code has in the analysis of the general implementation of disclosure and GO system was used in this analysis: dark green for “in line”, light green for “almost in line” and red for “not in line”.

Domains	Member States shall ensure that electricity suppliers specify in or with the bills and in promotional materials made available to final customers:			
	<i>(a) the contribution of each energy source to the overall fuel mix of the supplier over the preceding year in a comprehensible and, at a national level, clearly comparable manner.</i>		<i>b) at least the reference to existing reference sources such as web pages, where information on environmental impact, in terms of at least CO2 emissions and the radioactive waste resulting from the electricity produced by the overall fuel mix of the supplier over the preceding year is publicly available.</i>	
	Start (2014)	End (2015)	Start (2014)	End (2015)
Bulgaria				
Croatia				
Cyprus				
Czech Republic				
Denmark				
Estonia				
Finland				
France				
Germany				
Greece				
Hungary				
Iceland				
Ireland				
Italy				
Latvia				
Lithuania				
Luxemburg				
Malta				
Norway				
Poland				
Portugal				
Romania				
Slovakia				
Slovenia				
Spain				
Sweden				
Switzerland				
The Netherlands				
Great Britain				

As it can be seen from Table 5 **Error! Reference source not found.**, at the end of RE-DISS II, a big majority of the domains (21/32) followed the requirements set on the Article 3(9) of IEM Directive regarding disclosure. Still, 11/32 domains were not fully aligned with one or both items of Article 3(9) of the IEM directive:

- 5 out of the 32 domains (Croatia, Czech Republic, Cyprus, Malta and Switzerland) were almost in line with both item of Art 3(9) of the IEM Directive:
  - In the disclosure system in place in Croatia's and Czech Republic it is mandatory to annually disclose the suppliers mix but not the environmental parameters, as the system in place is limited to electricity origin and does not address CO2 or radioactive waste. Due to the lack of guidance on the disclosure of environmental parameters, the disclosure systems in both countries at the end of the project was considered almost in line as well (see Section 5.1).

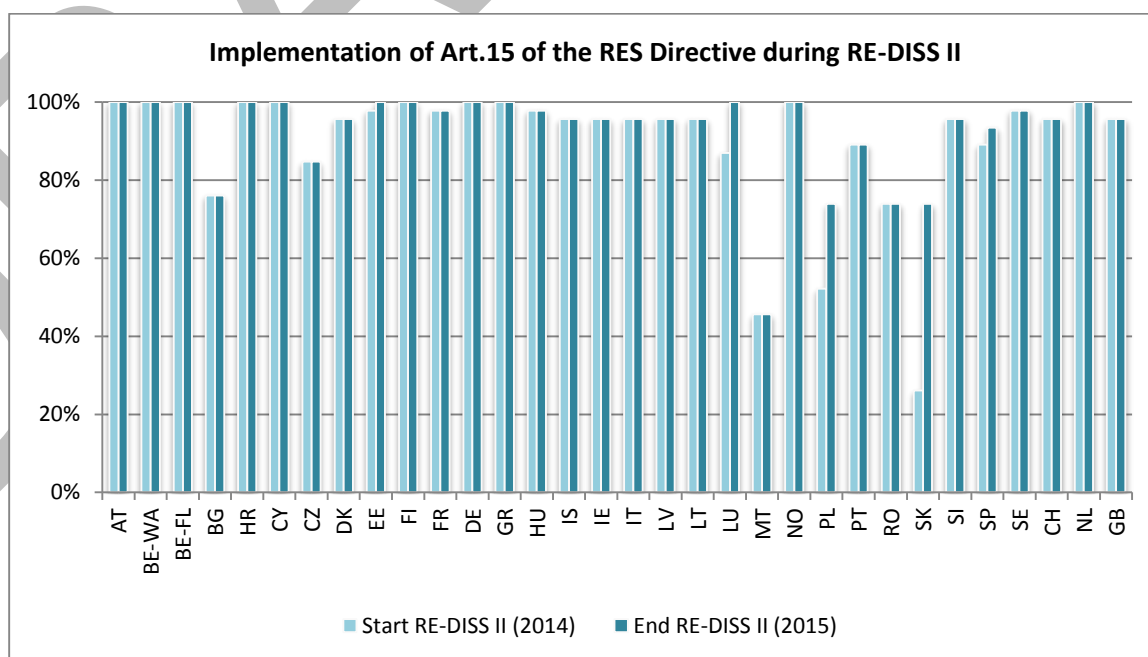
- In the case of Cyprus, although it had not yet a full disclosure system in place, the draft legislation on disclosure (which is envisioned to be approved by the end of 2015) references that electricity suppliers must provide information on their supplier mix and on CO<sub>2</sub> emissions, and does not reference how disclosure of information on radioactive waste should be done.
- The case of Malta is similar to Cyprus (even though it has a disclosure system in place), as the disclosure system in place did not reference how radioactive waste should be disclosed.
- In the case of Switzerland, it is mandatory for electricity suppliers to disclose their electricity supplier mix, but it is not mandatory to include with that disclosure of environmental parameters. It is important to refer that at the end of RE-DISS II the disclosure system in Switzerland was considered “almost in line” (rather than “in line”) because the system did not consider environmental indicators (see Section 5.1)
- 3 out of the 32 had one of the items fully implemented but not the other.
  - In the case of Belgium-Flanders it was mandatory that electricity suppliers disclose their suppliers mix to final consumers including the environmental indicators (in fact the domain had a full disclosure system implemented at the end of RE-DISS II as shown in Section 5.1). However in practice the Ministry still needs to provide reference values for the environmental parameters, and that is why the disclosure system in place was considered almost in line with part b) of Article 3(9) of the IEM Directive.
  - France had a full disclosure system in place where it is mandatory that every supplier disclosed annually his mix to the final consumers together with information on the environmental parameters (both CO<sub>2</sub> emission reductions and radioactive waste). Nevertheless, there is no consistent format for supplying this information thus French electricity suppliers use their own formats for it. This is the main reason why the French disclosure system was considered as almost with line with part a) of Article 3(9) of the IEM Directive.
  - Iceland had a full disclosure system in place (Section 5.1) that is not in line in with point a) of Article 3(9) of the IEM Directive as in Iceland it is mandatory to disclose annually the individual client mix and not the supplier mix.
- 2 out of the 32 had one of the items almost in line but the other lacking implementation. This is the case of Italy that had a disclosure system almost in line (see Section 5.1) in which it was mandatory to disclose annually the supplier mix but not of the environmental parameters. Thus the disclosure system in Italy is almost in line with point a) and not in line with point b) of Art. 3(9) of the IEM Directive. In the case of Norway; (i) disclosure was mandatory for product mix and not supplier mix and was done on NVE website and not on costumers bills (thus not compliant with item (a) of the IEM Directive) and (ii) information on environmental parameters was also only disclosed on the NVE website (thus almost in line with item (b)).
- 1 out of the 32 domains (Bulgaria) did not follow any of the items of the referred directive. At the end of RE-DISS II Bulgaria had no disclosure system in place and thus no disclosure information was being provided to consumers.

### 5.3 Implementation of Article 15 of the RES Directive on GO during RE-DISS II

The RE-DISS II project team also carried out a detailed assessment of the transposition of all items of Art. 15 of the RES Directive. For that, the project team checked if the countries had transposed into their national legislation all the mandatory and non-mandatory items<sup>12</sup>, listed in the referred article, paying special focus on the systems in place for RES-GO.

The analysis presented in this subsection, and summarised by Figure 3, only refers to the transposition of the mandatory items of Art.15 of the RES Directive.

Figure 3: Status in the implementation of Art.15 of the RES Directive during RE-DISS II



From the analysis of Figure 3 it becomes clear that at the end of RE-DISS II:

- 12 out of the 32 domains had fully transposed the mandatory requirements of Article 15 of the RES Directive, being these: Austria, Belgium-Wallonia, Belgium Flanders, Croatia, Cyprus, Estonia, Finland, Germany, Greece, Luxemburg, Norway and the Netherlands.
- 15 out of the 32 domains transposed more than 80% of the mandatory requirements of Art. 15 of the RES Directive, but not all the mandatory requirements. These domains are: Czech Republic, Denmark, France, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Portugal, Slovenia, Spain, Sweden, Switzerland and Great Britain.
- 5 domains (Bulgaria, Malta, Poland, Romania and Slovakia) implemented less than 80% of the mandatory items of Art.15 of the RES Directive.

Reasons for not having implemented fully the mandatory items of the Art. 15 of the RES Directive at the end of RE-DISS II were: the GO system implemented was still based on the

<sup>12</sup> There are items on the Art.15 of the RES Directive which are mandatory and others that are optional thus left for the domains to decide upon)

2001 Directive; the domains are still working in the transposition of the RES-Directive; and or for some of the articles the transposition of a given item was not clear and thus “not known”.

In terms of improvements registered during the project duration, it can be seen that:

- The biggest improvements (more than 45 percentage points) was registered for Slovakia (48 percentage points of improvement).
- Improvements of more than 10 percentage points but less than 45, were registered for Poland (22 percentage points of improvement) and Luxemburg (with 13 percentage points of improvement)
- Small improvements (less than 10 percentage points) were registered for Estonia and Spain.
- For the other 27 domains, no improvements were registered during RE-DISS II. Nonetheless it needs to be said that among these were the domains where the mandatory items of Art.15 of the RES-Directive were almost all or all implemented at the start of RE-DISS II.

Main reasons for the registered improvements were: transposition of several items/almost all items of Art.15 of the RES Directive to national law through passage/revision of primary or secondary legislation (case of Poland, Luxemburg, Spain and Estonia); implementation of a RES-GO system/passage of secondary legislation on the GO system in accordance with the items of Art.15 of the RES Directive (case of Slovakia); and/or adherence to EECS (case of Estonia).

## 5.4 Implementation of H/C-GO system during RE-DISS II

Although not evaluated in Table 4, as it is not mandatory by the RES Directive, the project also analysed if the domains had a GO system in place for Heating and Cooling (H/C). Out of the 32 domains only 9 had implemented legislation that created a system for the issuing, transferring and cancelling H/C-GO. This was the case of: Austria, Bulgaria, Estonia, Hungary, Iceland, Lithuania, Malta, Portugal and The Netherlands. However, according to the information collected, these systems are not operational at the moment, as there are no request for the issuing of these type of GO.

## 5.5 Improvements registered in the general implementation of Disclosure and GO system since the beginning of the RE-DISS project

Table 6 summarises the historical improvements in terms of the general implementation of disclosure and GO systems during the entire RE-DISS project (including Phase I and Phase II) for the 17 domains analysed at the end of RE-DISS I.

As it can be seen, Austria, Belgium-Wallonia, Belgium-Flanders, Denmark, France, Germany, Slovenia, Spain and The Netherlands had already full disclosure and GO systems

in place since the start of RE-DISS I. The other domains registered improvements<sup>13</sup> in the implementation of disclosure and GO systems in both RE-DISS I and II.

Improvements in the disclosure system in place were registered for Finland, Ireland, Italy, Luxemburg, Portugal and Sweden. These improvements were registered between the start and end of RE-DISS I and maintained throughout RE-DISS II which is the case of the referred domains with the exception of Portugal in which the improvement in the disclosure system was registered during RE-DISS II. The improvements registered were mainly associated with the (i) amendment of existing legislation on disclosure; (ii) improvement of GO systems in place and its connection to disclosure and (ii) implementation of an electronic database for GO.

Improvements on the RES-GO system were registered for:

- Ireland: at the beginning of RE-DISS I there was no RES-GO system implemented in Ireland. During RE-DISS I, and through the support of the project, the system was implemented (legislation was passed, competent body was assigned and electronic registry was created and implemented) following most of the RE-DISS BPR on GO.
- Luxemburg: improvements of the RES-GO systems were registered during RE-DISS II mainly due to the revision of the legislation on RES-GO (so that it would become with the Art.15 of the RES Directive).
- Portugal: although still not fully implemented, improvements were registered in the RES-GO system during both phases of the RE-DISS project. During Phase I legislation was enacted to create the RES-GO system at the national level although during that phase of the project no electronic database for RES-GO existed and RES-GO were not issued (and thus RES-GO system was implemented but not operational). During Phase II of the project, the system was further improved through the creation of the electronic registry for RES-GO. Nonetheless for the system to become fully operation there is still the need for the competent body for GO to appoint a third party to manage the electronic registry.

Improvements on the CHP-GO system were registered for:

- Ireland in which the CHP-GO system was created and became operational during RE-DISS II;
- Luxemburg in which the legislation on GO was revised so that the system became compliant with the requisites on GO on Art.15 of the RES-Directive during RE-DISS II;
- Norway wherein a registry for CHP-GO became operational during RE-DISS I;
- Portugal where the legislation in place for CHP-GO was revised and the system in place improved during both phases of RE-DISS.
- Switzerland in which, although still not fully operational, all CHP plants are covered by GO issuing, although these are formally not implemented as CHP GO. Besides that, at the end of RE-DISS II the system still needed further improvement, as the GO for CHP should include all information required by the Cogeneration Directive (2004/8/EC).

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<sup>13</sup> The improvements herein refer for Disclosure, RES-GO and CHP-GO only refer to the very fundamental situation and initial implementation of the systems, but not on the details of the implementation. On the details of implementation there has been a lot more improvements.



Table 6: Matrix on the historical Implementation of Disclosure and GO Systems since the start of the RE-DISS project in 2010 for 17 domains

Domains	Disclosure System								RES-GO System								CHP-GO								Electronic System for GO						
	Implemented & Operational				Legislation in Place				Implemented & Operational				Legislation in Place				Implemented & Operational				Legislation in Place				Phase I		Phase II				
	Phase I		Phase II		Phase I		Phase II		Phase I		Phase II		Phase I		Phase II		Phase I		Phase II		Phase I		Phase II		Phase I		Phase II				
	2010	2012	2014	2015	2010	2012	2014	2015	2010	2012	2014	2015	2010	2012	2014	2015	2010	2012	2014	2015	2010	2012	2014	2015	2010	2012	2014	2015	2010	2012	2014
Austria																															
Belgium-Wallonia																															
Belgium-Flanders																															
Denmark																															
Finland																															
France																															
Germany																															
Ireland																															
Italy																															
Luxemburg																															
Norway																															
Portugal																															
Slovenia																															
Spain																															
Sweden																															
Switzerland																															
The Netherlands																															

## 6 Qualitative Improvements in the Implementation of the RE-DISS Best Practice Recommendations (BPR<sup>14</sup>)

### 6.1 Implementation of the BPR during RE-DISS II

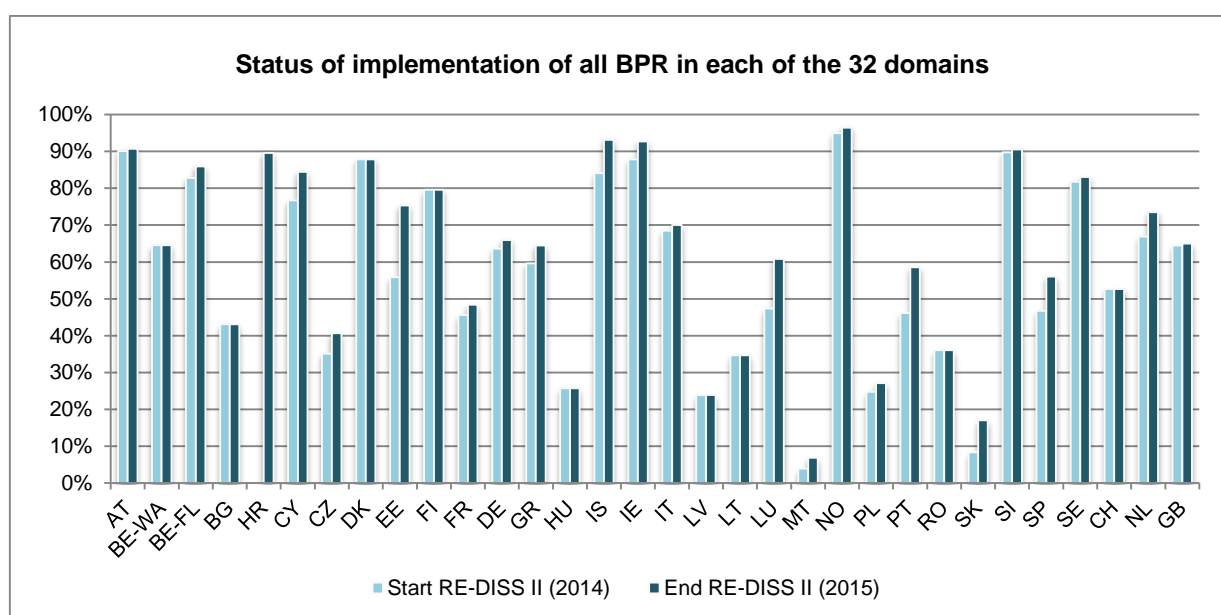
The state of implementation of each BPR at the “start” and “end” of RE-DISS II per country is shown in Table 7. The dark green cells in the table represent BPR which have been fully implemented in the countries. The light green cells represent BPR that have been addressed to some extent, meaning that those countries are “almost in line” with those BPR and red is the colour used for identifying the BPR that were not implemented in the domains. Once again when BPR are not applicable the “NA” has been used, and when no information was found regarding that the Not Known “NK” has been used. As it can be seen below for the 32 countries all of them have most or some of the BPR implemented.

To have a better graphical idea of the status of implementation of the BPR, and the general improvements achieved during RE-DISS II, an assessment of the status of implementation of all BPR across domains was carried out, the results of which are displayed in Figure 4. As it can be seen, at the end of RE-DISS II:

- 22 out of the 32 domains have implemented more than half of the BPR;
- 11 domains have implemented at least 80% of the BPR;
- 10 domains have implemented less than 50% of the BPR.

Moreover improvements on the implementation of the RE-DISS BPR were registered for 23 out of the 32 domains.

Figure 4: Status of implementation of BPR in the 32 domains at Start and End of RE-DISS II



Note: The graphical representation of the results is general. Details on the implementation of each BPR per domain are provided in the RE-DISS Country Profiles available in the project website.

<sup>14</sup> The version of the BPR here under analysis as already referred is the v2.1.

Table 7: Matrix of the Implementation of all BPR for the 32 domains at the Start (2014) and End (2015) of RE-DISS II

BPR ID	AT		BE-WA		BE-FL		BG		HR		CY		CZ		DK		EE		FI		FR		DE		GR		HU		IS		IE			
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015				
"12 Months Lifetime Rule" for GO	1a								NK																									
	1b								NK																									
	2								NK																									
	3a								NK																									
	3b								NK																									
	4							NA	NA	NK																								
	5a							NA	NA	NK																								
5b							NA	NA	NK				NA	NA																				
6							NA	NA	NK																									
Usage of EECS	7								NK																									
	7a								NK																									
	7b								NK																									
	8								NK	NK																								
	9								NK																									
Issuing of GO for different energy sources	10								NK																									
	11								NK																									
	12								NK																									
	13								NK																									
	14 a								NK																									
	14 b							NA	NA	NK		NA	NA	NA	NA		NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	15 a								NK																									
15 b							NA	NA	NK						NK																			
GO as the unique "tracking certificate"	16							NA	NA	NK																								
	17							NA	NA	NK																								
	18							NA	NA	NK				NA	NA																			
	19							NA	NA	NK																								
Recognition of GO	20								NK																									
	21								NK																									
Disclosure schemes and other RTS	22								NK																									
	23							NA	NA	NK			NA																					
	24		NA				NA	NA	NK				NA																					
Calculation of Residual Mixes	25							NA	NA	NK		NA																						
	26a	NA	NA					NA	NA	NK																								
	26b	NA	NA					NA	NA	NK																								
	27							NA	NA	NK																								
	28		NA					NA	NA	NK																								
Contract Based Tracking	29	NA	NA				NA	NA	NK																									
	30	NA	NA				NA	NA	NK																									
	31	NA	NA				NA	NA	NK			NA	NA																					
	32	NA	NA					NA	NA	NK																								
Timing for Disclosure	33							NA	NA	NK																								
	34							NA	NA	NK				NA	NA																			
	35							NA	NA	NK																								
Further Recommendations on Disclosure	36							NA	NA	NK																								
	37							NA	NA	NK		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	38							NA	NA	NK				NA																				
	39	NA	NA					NA	NA	NK		NA																						
	40	NA	NA					NA	NA	NK		NA																						
	41	NA	NA					NA	NA	NK		NA	NA																					
	42	NA	NA					NA	NA	NK		NA	NA																					
	43a	NA	NA					NA	NA	NK		NA																						
43b	NA	NA					NA	NA	NK		NA																							

Note: The graphical representation of the results is general. Details on the implementation of each BPR per domain are provided in the RE-DISS Country Profiles available in the project website.

	BPR ID	IT		LV		LT		LU		MT		NO		PL		PT		RO		SK		SI		SP		SE		CH		NL		GB	
		2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
"12 Months Lifetime Rule" for GO	1a					NK	NK			NA	NA					NA	NA			NK	NK												
	1b					NK	NK			NA	NA					NA	NA			NK	NK					NK							
	2	NK	NK								NA	NA					NA	NA															
	3a															NA	NA			NK	NK												
	3b										NA	NA				NA	NA			NK	NK					NK	NK						
	4															NA	NA			NA	NA												
	5a										NA	NA					NA	NA			NK	NK											
Usage of EECS	5b									NA	NA					NA	NA			NK	NK												
	6									NA	NA					NA	NA			NK	NK												
	7									NA	NA					NA	NA																
	7a															NA	NA																
Issuing of GO for different energy sources	7b														NA	NA																	
	8									NA	NA					NA	NA																
	9									NA	NA					NA	NA																
	10															NA	NA																
	11										NA	NA																					
	12	NK	NK								NA	NA																					
	13	NA									NA	NA																					
GO as the unique "tracking certificate"	14 a									NA	NA																						
	14 b									NA	NA																						
	15 a	NK	NK							NK	NK					NK	NA	NA			NA	NA											
	15 b	NK								NK	NA					NK	NA	NA			NK	NK											
Recognition of GO	16									NA	NA																						
	17									NA	NA																						
	18									NA	NA																						
Disclosure schemes and other RTS	19									NA	NA																						
	20									NA	NA																						
Calculation of Residual Mixes	21									NA	NA																						
	22									NK	NK																						
	23									NK	NK																						
	24	NA	NA							NK	NK																						
Contract Based Tracking	25																																
	26a																																
	26b																																
	27																																
Timing for Disclosure	28																																
	29																																
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Further Recommendations on Disclosure	31																																
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	36																																
	37																																
38																																	
39																																	
40																																	
41																																	
42	NK	NK	NK	NK	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
43a	NK	NK	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
43b	NK	NK	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		

Note: The graphical representation of the results is general. Details on the implementation of each BPR per domain are provided in the RE-DISS Country Profiles available in the project website.

This shows that the BPR have been implemented substantially throughout the domains. Domains lacking in the implementation of the BPR (with less than 30% of the BPR implemented) are: Hungary, Latvia, Malta, Poland and Slovakia. Nevertheless this can be explained by the fact that the GO and Disclosure systems in these countries are still at an embryonic stage and/or are still being developed. Also for these domains there were a lot of BPR for which the information was unknown (“NK”) at the end of RE-DISS II.

Details on the registered improvements on the implementation of BPR categories and in addressing the main disclosure problems are described in the Section 6.2, for the 32 domains as a whole. Details on improvements at domain level are provided in Section 6.3.

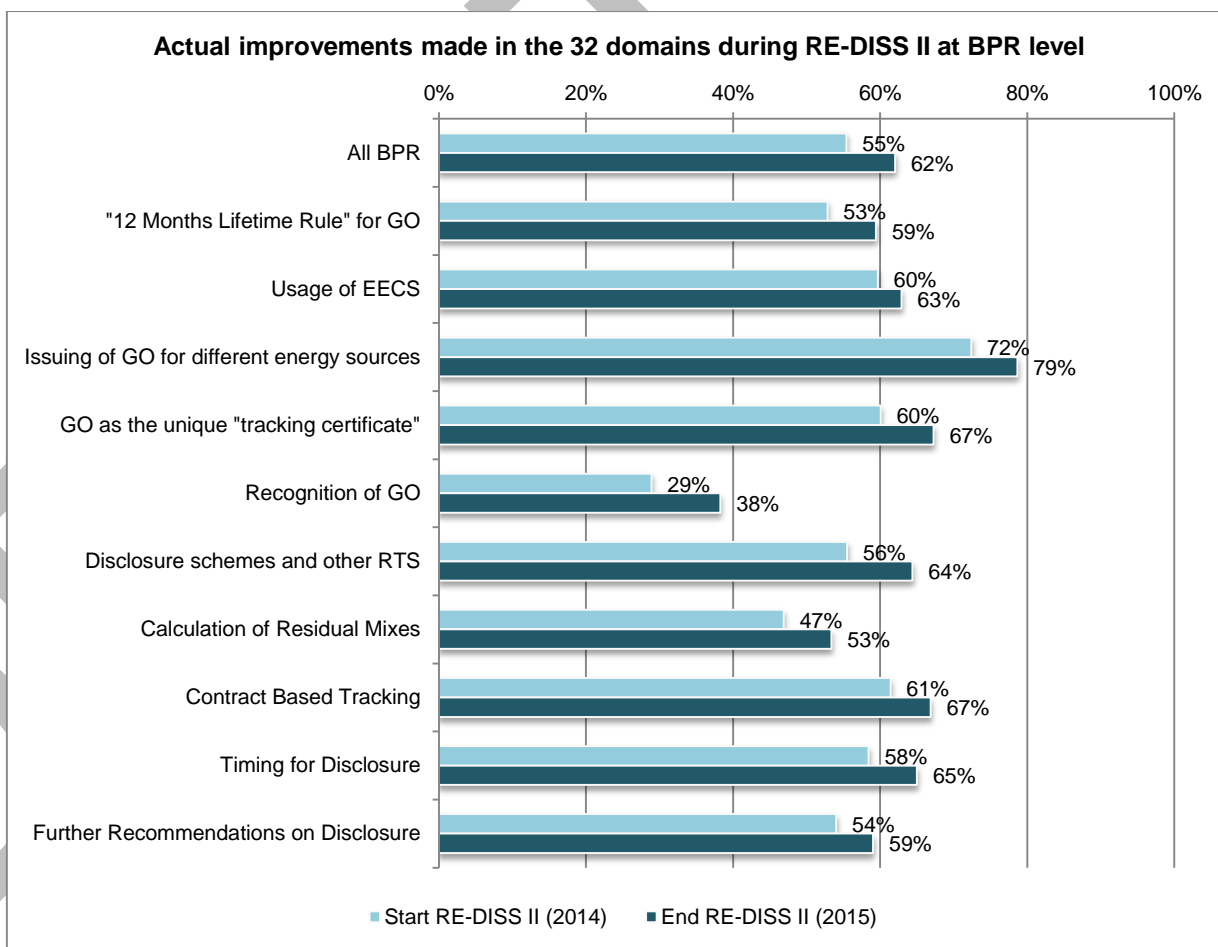
## **6.2 Registered improvements across the 32 domains during RE-DISS II**

### **6.2.1 Registered improvements in the implementation of the BPR categories**

As it can be seen in Figure 5 during RE-DISS II improvements were registered throughout all BPR categories (between 3 and 9 percentage points). The BPR categories with highest improvement registered were the “Recognition of GO” and “Disclosure schemes and RTS” (both with 9% improvement), followed by “12 Months Lifetime Rule for GO”, “GO as the unique tracking certificate”, “Calculation of Residual Mix” and “Timing for disclosure (these four with 7% improvement). 3% improvement was registered for the BPR category “Usage of EECS”. The following reasons explain the moderate improvements registered: (i) a big part of the domains at the start of RE-DISS II had already disclosure and GO systems compliant with a big part of the BPRs and (ii) only few domains enacted laws and largely changed their disclosure and GO systems.

It is important to refer that at the end of RE-DISS II most of the BPR categories, with exception of the category on “Recognition of GO” were more than 50% implemented across the 32 domains. The category of BPR that was more implemented across the 32 domains was the “Issuing of GO for different energy sources” followed by the “GO as the unique tracking certificate” and “Contract Based Tracking”.

Figure 5: Improvements in the implementation of BPR in the 32 domains during RE-DISS II

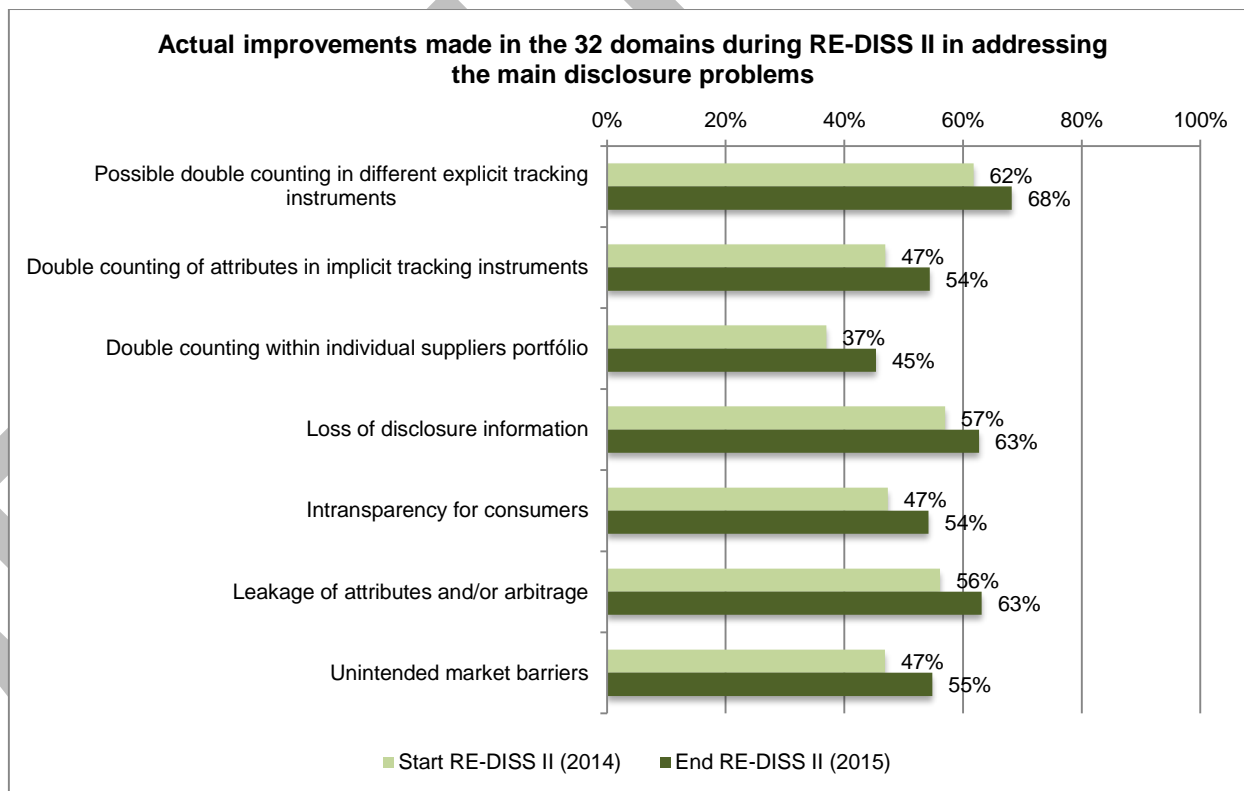


### 6.2.2 Registered improvements addressing the main disclosure problems

Similarly to the improvements in the implementation of the BPR categories across the 32 domains, the improvements registered in addressing the main disclosure problems were also moderate: between 6% and 8% (see Figure 6). The biggest improvements were registered in addressing the problems of “Double counting within individual suppliers portfolio” and “Unintended market barriers” (both with 8% improvement registered between the start and end of RE-DISS II). The smallest improvements were registered in addressing two disclosure problems, “Possible double counting in different explicit tracking instruments” and “Loss of disclosure information” (both with 6% improvement registered).

It is important to refer that most of the main disclosure problems were addressed in the 32 domains to a large extent, as most of them were more than 50% addressed at the end of RE-DISS II (with exception of the disclosure problem “Double counting within individual suppliers portfolio”).

Figure 6: Improvements in addressing the main disclosure problems across the 32 domains during RE-DISS II



### 6.3 Registered improvements during RE-DISS II at domain level

As referred the improvements registered during RE-DISS II in the implementation of the BPR and in addressing the main disclosure problems are moderate. There were domains where large improvements were registered (more than 50% improvement in the implementation of the BPR); domains with registered moderate improvements (between 10 and 50% of improvement in the implementation of the BPR) and domains where the systems stayed the same or where only slight improvements were introduced (less than 10% of improvement).

#### 6.3.1 Domains with registered large improvements

There was only one domain where large improvements were registered during RE-DISS: Croatia where an overall improvement of 90% was registered for all the BPRs.

Croatia was the domain with the largest improvement registered, as at the start of RE-DISS II the state of the implementation of the different BPR was “unknown”. During RE-DISS II Croatia enacted legislation on both disclosure and GO which followed a big majority of the RE-DISS BPR (see Figure 7), became an EECS member country and adopted the RE-DISS methodology for the timing for disclosure and the Residual Mix calculation, just to name a few. In fact all BPR under the categories “GO as the unique tracking certificate”, “Calculation of Residual Mixes”, “Contract Based Tracking” and “Further Recommendations on GO” were 100% implemented in the country at the end of RE-DISS II. The categories with the least

percentage of implementation in Croatia (an already with implementation above 70%) are the “Usage of EECS” and “Recognition of GO”.

This strong alignment with the RE-DISS BPR also explains the strong improvements registered in addressing the main disclosure problems (improvements above 70%) as shown in Figure 8, being the problem of possible “Double counting within individual suppliers portfolio” completely addressed by the end of the project.

Figure 7: Improvements in the implementation of BPR in the Croatia during RE-DISS II

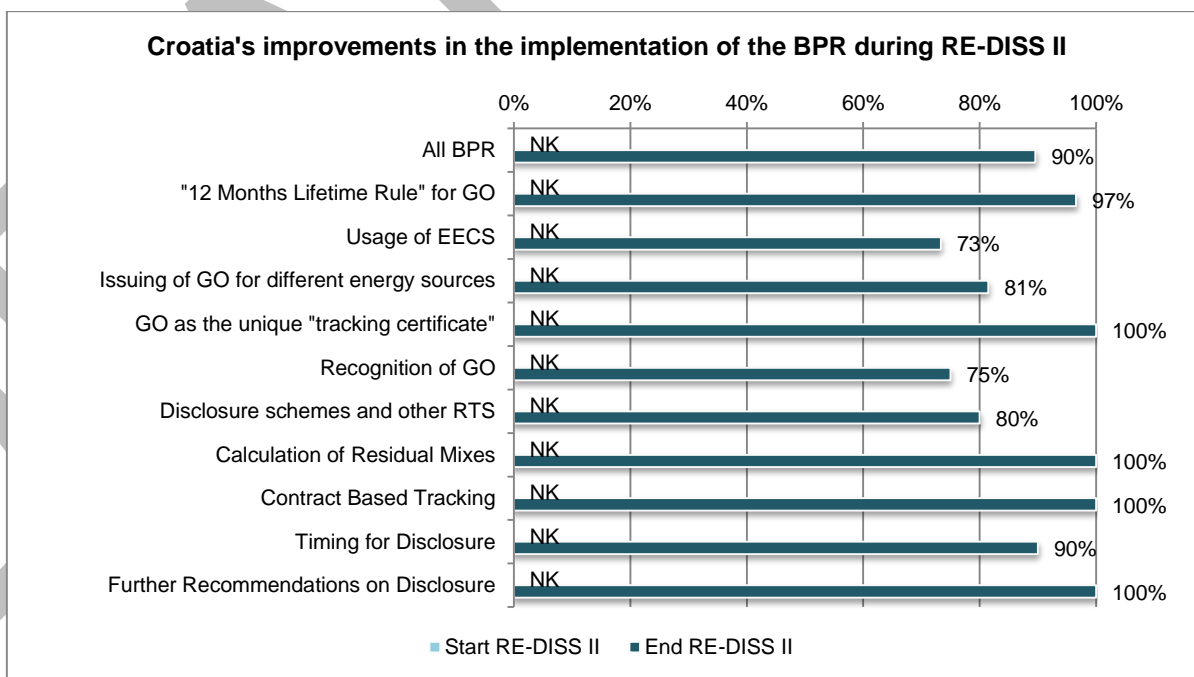
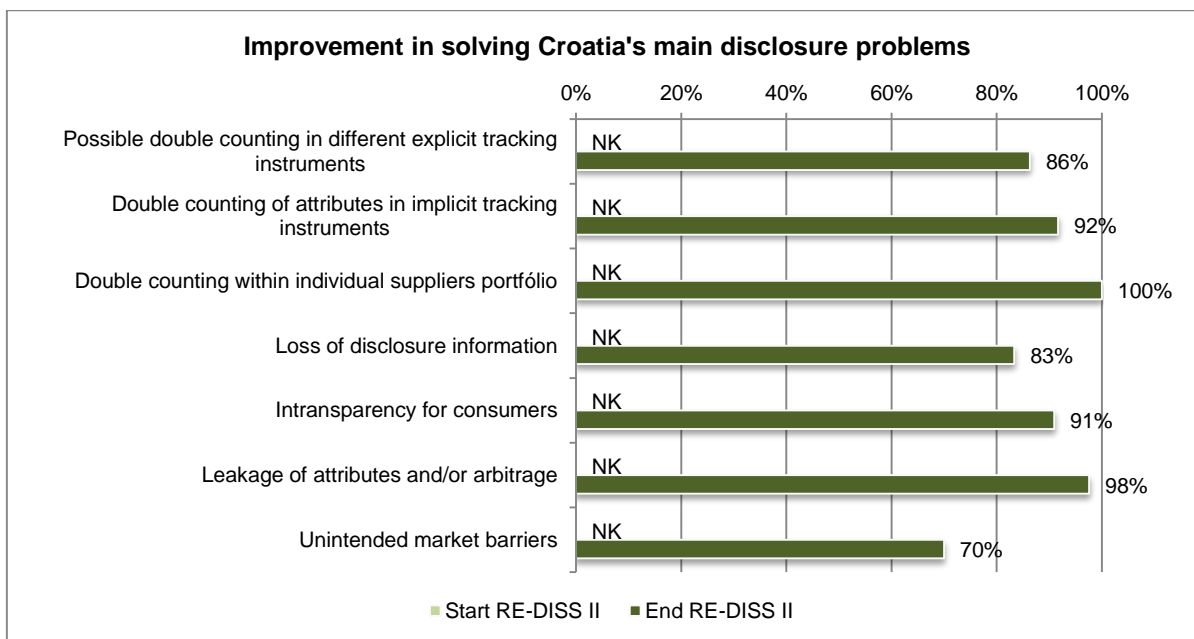


Figure 8: Improvements in addressing the main disclosure problems in Croatia during RE-DISS II





### 6.3.2 Domains with moderate improvements

Domains with moderate improvements are:

- Estonia with around 19% of overall improvement;
- Luxemburg and Portugal with 13% and 12% of overall improvement, respectively.

As it can be seen below the 19% of overall improvement in Estonia was due to improvements in the implementation of all BPR categories except from the following two categories: “GO as the unique tracking certificate” and “Recognition of GO”. Under the BPR category “Recognition of GO”, at the end of RE-DISS II, all BPR of that category were lacking implementation. It is important to refer that during RE-DISS II Estonia fully implemented 2 categories of BPR: “Contract Based Tracking” and “Timing for Disclosure”. This was achieved through the improvement of the legislation on GO which made both the RES-GO system and CHP-GO system aligned with the RES-Directive; the improvement of the GO registry, its alignment with EECS rule and the use of the AIB Hub for electronic transfers of GO just to name a few. Estonia is now developing a methodology for the calculation of the residual mix, which is expected to be aligned with the one proposed by the RE-DISS BPR. By implementing a big part of the RE-DISS BPR, Estonia managed to improve to a large extent all disclosure problems registered in the country at the end of RE-DISS II (see Figure 10). The disclosure problem “Double counting within individual suppliers portfolio” was the only that was not addressed during the project.

Figure 9: Improvements in the implementation of BPR in Estonia during RE-DISS II

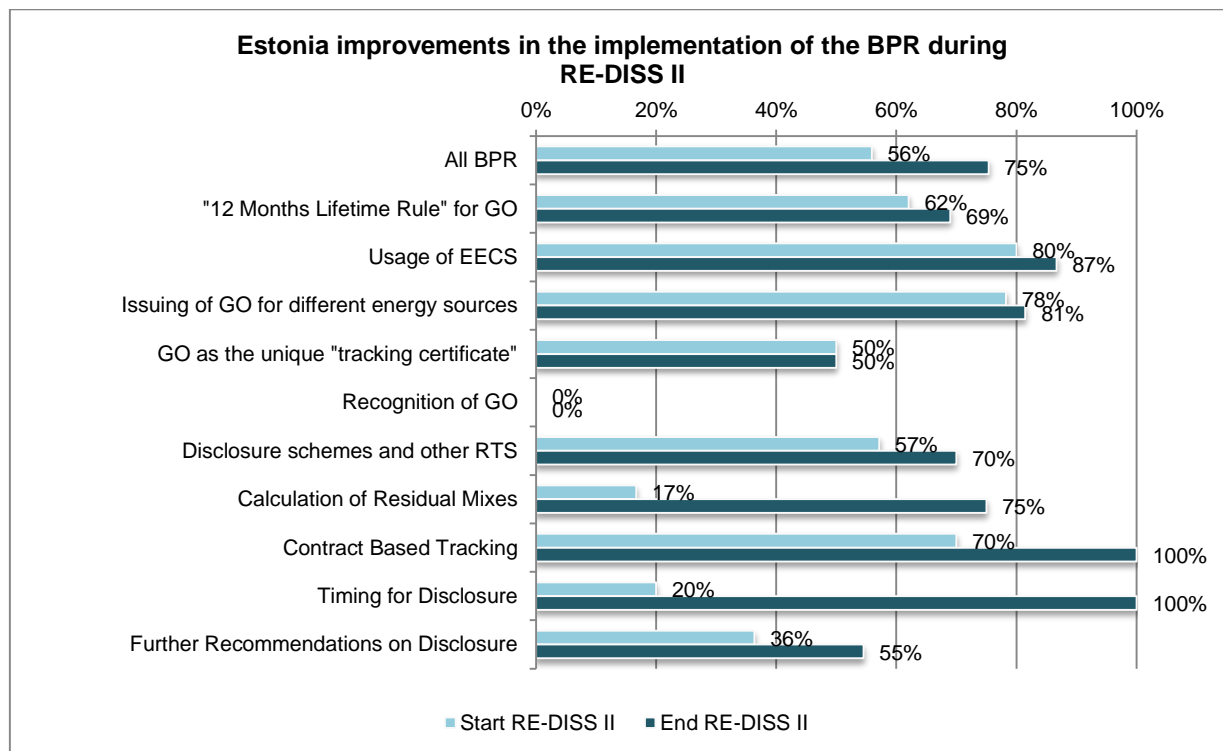
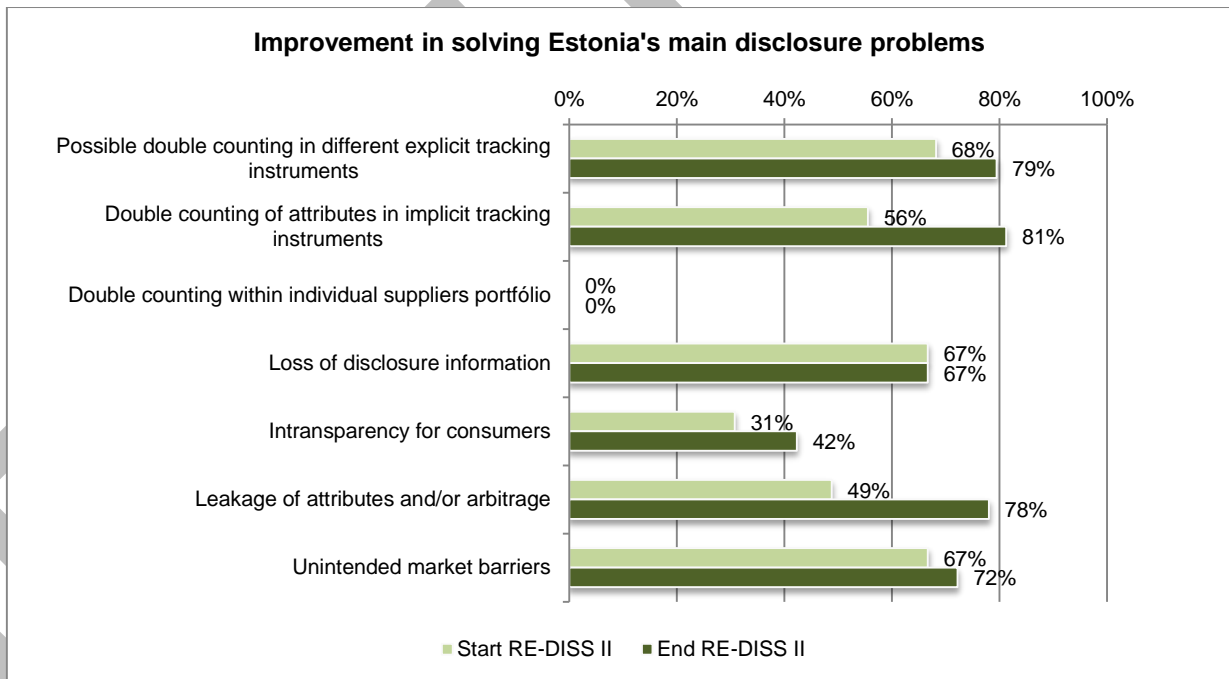


Figure 10: Improvements in addressing the main disclosure problems in Estonia during RE-DISS II



The registered improvements for Luxemburg in the implementation of the BPR were registered in three categories: “12 Months Lifetime Rule for GO”; “Usage of EECS”; “GO as the unique tracking certificate”; and “Contract Based Tracking” (see Figure 11). This was achieved through the passage of new legislation that aligned the GO system in place in the country with the RES Directive as well as by regulating clearly Contract Based Tracking. Consequently, and as it can be seen in Figure 12 improvements in addressing the main disclosure problems were registered for: “Possible double counting in different explicit tracking instruments”, “Double counting of attributes in implicit tracking instruments”, “Leakage of attributes and/or arbitrage” and “Unintended market barriers”.

Figure 11: Improvements in the implementation of BPR in Luxemburg during RE-DISS II

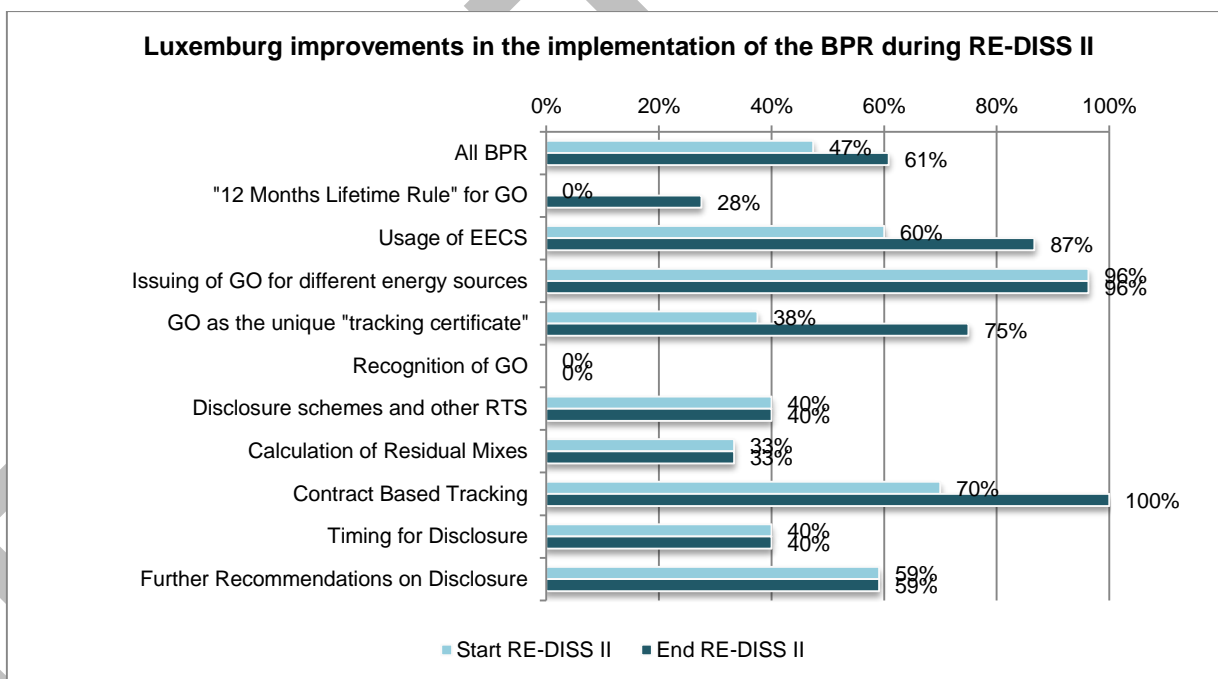
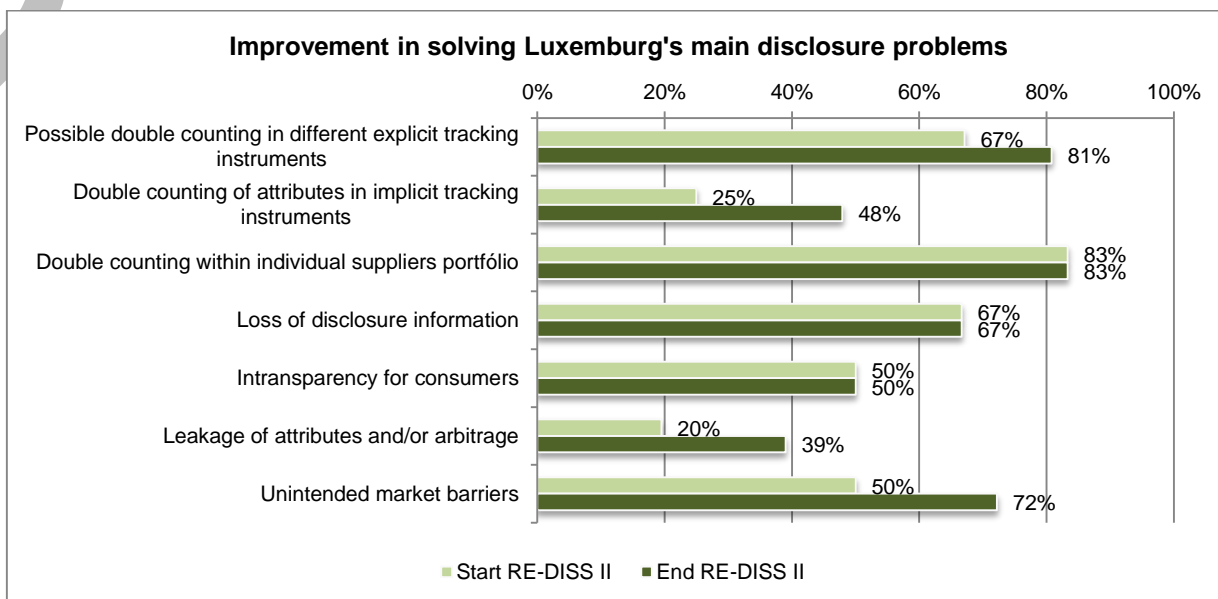


Figure 12: Improvements in addressing the main disclosure problems in Luxemburg during RE-DISS II



For Portugal, improvements in the implementation of the BPR were registered in the categories of: "Issuing of GO for different energy sources", "GO as the unique tracking certificate", "Recognition of GO" and "Disclosure schemes and other RTS" (see Figure 13). Categories of BPRs still lacking any type of implementation by the end of RE-DISS II were "12 Months Lifetime Rule for GO" and the "Usage of EEC". With this the country only managed to address partially 4 out of the 7 main disclosure problems (see Figure 14): "Possible double counting in different explicit tracking instruments", "Double counting of

attributes in implicit tracking information”, “Intransparency for consumers” and “Unintended market barriers”.

Figure 13: Improvements in the implementation of BPR in Portugal during RE-DISS II

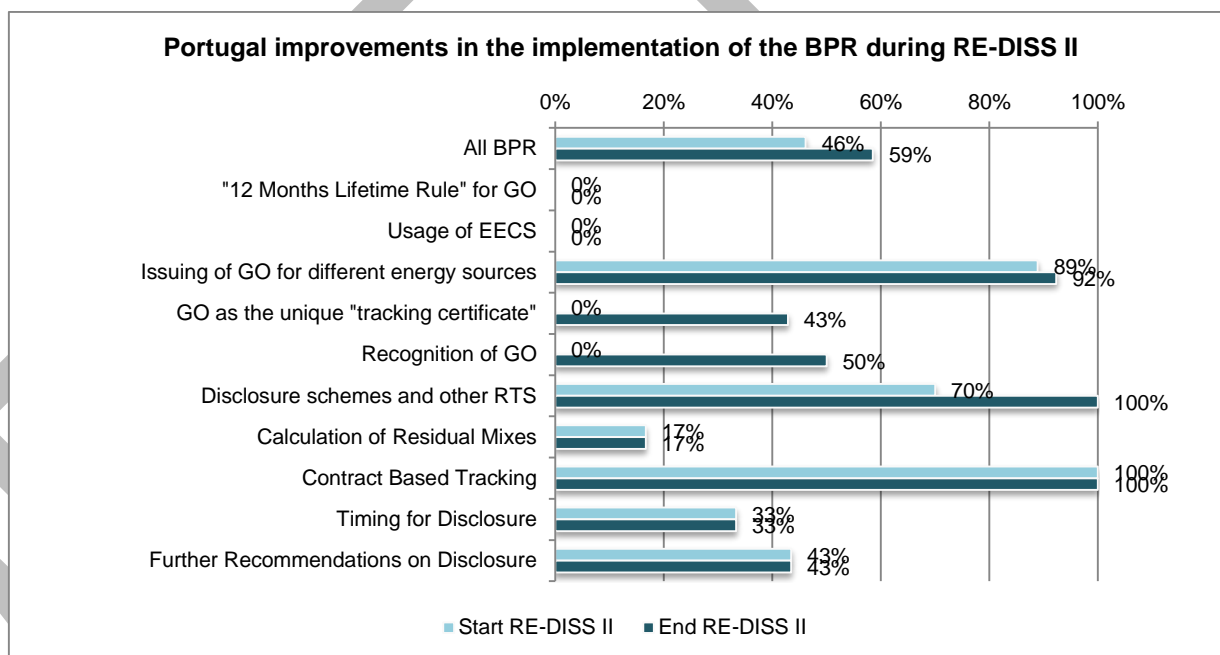
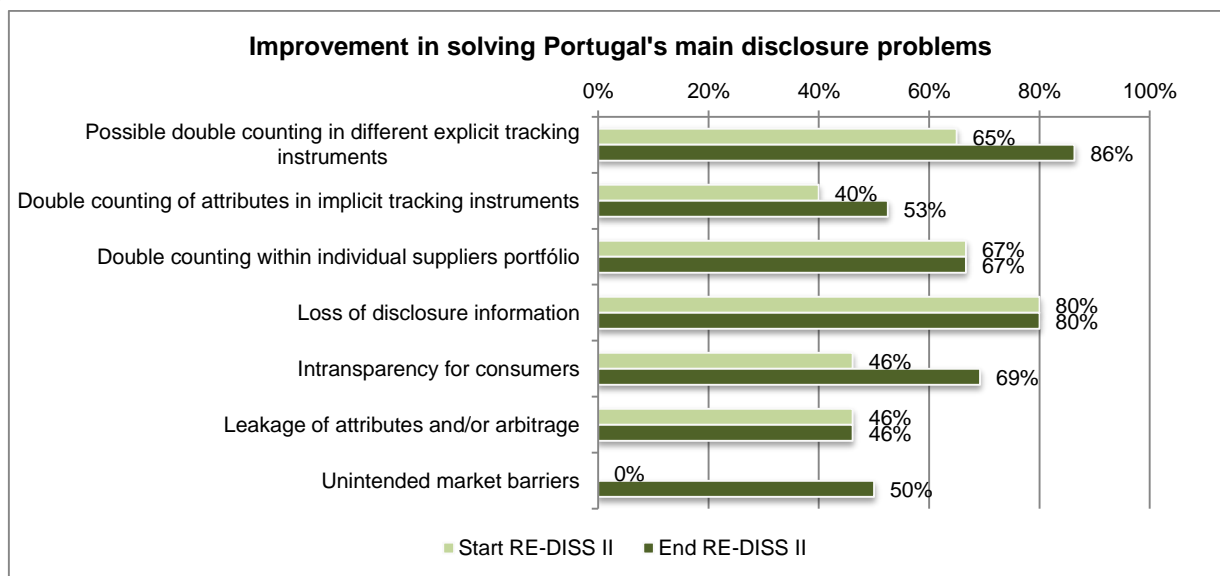


Figure 14: Improvements in addressing the main disclosure problems in Portugal during RE-DISS II



### 6.3.3 Domains with slight or no improvements

Domains with slight improvements (less than 10% improvement in the overall implementation of the BPR) are: Austria, Belgium-Flanders, Cyprus, Czech Republic, France, Germany, Greece, Iceland, Ireland, Italy, Malta, Norway, Poland, Slovenia, Slovakia, Spain, Sweden and The Netherlands. The slight improvements on the referred domains are highlighted in

Table 8. Figure 15 to Figure 50 show the graphical representation of the slight improvements on the implementation of BPR and on addressing the main disclosure problems for each of the referred domains.

Table 8: Slight improvements registered at domain level

Domain	Slight improvements registered
Austria	The slight overall improvement registered in Austria (1% between the start and end of RE-DISS II) was due to a slight improvement made on the BPR category “GO as the unique tracking certificate” as a result of introducing clear regulation that explicitly states that suppliers can only use GO to provide disclosure information for their customers. It is important to mention that Austria is amongst the domains that has implemented the big majority of the BPR (91% of the BPR were implemented at the end of the projects) and has been one of the domains involved in the RE-DISS project. In terms of the disclosure problems, improvements were made on 2 out of the 4 that still remained to be addressed at the start of RE-DISS II, namely on “Loss of disclosure information” and “Leakage of attributes and/or arbitrage”. Figure 15 and Figure 16 show the improvements registered during RE-DISS II in the implementation of the BPR and in addressing the main disclosure problems, respectively.
Belgium-Flanders	A 3% overall improvement in the implementation of the BPR was registered for Belgium-Flanders during RE-DISS II (see Figure 17), due to an improvement in the implementation of the “12 Months Lifetime Rule for GO” BPR category – by taking expired GO into account in the residual mix calculation. This resulted in partially addressing 2 out of the 7 main disclosure problems (“Double counting of attributes in implicit tracking instruments” and “Leakage of attributes and/or arbitrage”) as it can be seen in Figure 18. It is important to mention Belgium-Flanders is one of the domains with a big part of the RE-DISS BPR implemented (86% or all BPR at the end of the project).
Cyprus	In the case of Cyprus, the registered improvements (see Figure 19) were due to the implementation of BPR under the following categories: “12 Months Lifetime Rule for GO”; “Usage of EECS”, “Issuing of GO for different energy sources”; “Issuing of GO for different energy sources” and “Further Recommendations on GO”. At the end of RE-DISS II Cyprus had 4 BPR categories fully implemented, meaning that the domain was aligned with the project on the recommendation on “Calculation of Residual Mixes”, “Contract Based Tracking”, “Timing for Disclosure” and “Further Recommendations on Disclosure”. With this, and as it can be seen in Figure 20 the majority of the disclosure problems in the country were to a large extent addressed, being the one related with “Double counting of individual portfolio” fully addressed by the end of RE-DISS II.
Czech Republic	Czech Republic was one of the domains where, although improvements have been registered (6% overall improvement) still is lagging behind in the implementation of the BPR, as at the end of RE-DISS II only 41% of the BPR were implemented (see Figure 21). The 6% improvement registered was due to improvements in the implementation of four BPR categories: “Usage of EECS”, “Recognition of GO”, “Disclosure schemes and other RTS” and “Further recommendations on disclosure”. The referred improvements contributed to partially address the following disclosure problems (see Figure 22): “Possible double counting in different explicit tracking instruments”, “Double counting of attributes in implicit tracking instruments” and “Unintended market barriers”.
France	For France, only 2% of overall improvement in the implementation of the BPR was registered during RE-DISS II, as it can be seen in Figure 23. This was due to an improvement on the implementation of the BPR category “Further Recommendation on disclosure”. This contributed to minimize the disclosure problem on “Double counting of attributes in implicit tracking instruments”, as depicted in Figure 24. It is important to refer that France is lagging behind in the

Domain	Slight improvements registered
	implementation of the BPR, as by the end of RE-DISS II only had 48% of all BPR implemented.
Germany	A 2% of overall improvement in the implementation of the BPR was registered for Germany, which at the end of the project had implemented 66% of the BPR (see Figure 25). This improvement resulted from an improvement on the BPR category "Calculation of Residual Mixes". Consequently only a partial improvement was registered in addressing the disclosure problem "Double counting of attributes in implicit tracking instruments (see Figure 26).
Greece	In Greece, as shown in Figure 27, a 4% increase in the implementation of the BPR was registered during RE-DISS II, making the domain compliant with 64% of the BPR. This increase was registered due to a big improvement in the implementation of the BPR category on "Disclosure schemes and other RTS". This contributed to partially address 3 out of the 7 main disclosure problems, namely "Possible double counting in different explicit tracking instruments", "Double counting of attributes in implicit tracking instruments" and "Loss of disclosure information" (see Figure 28).
Iceland	In Iceland, as it can be seen in Figure 29 improvements in the implementation of the BPR were registered in the categories of "12 Months Lifetime Rule for GO", "Issuing of GO for different energy sources", "Recognition of GO" and "Further recommendations on disclosure". Thus, the system in Iceland was very much aligned with the RE-DISS BPR (93% of all BPRs implemented) being fully aligned with the recommendation on the "Issuing of GO for different energy sources", "Disclosure schemes and other RTS", "Calculation of Residual Mix", "Contract Based Tracking" and "Timing for disclosure". With this, the main disclosure problems were to a large extent addressed as it can be seen in Figure 30, being the one related with "Double counting of attributes in implicit tracking systems" solved at the end of RE-DISS II.
Ireland	The overall improvement in the implementation of the BPR registered in Ireland (5% between the start and end of RE-DISS II) was due to improvements made on the BPR categories "Usage of EECS" and "issuing of GO for different energy sources". During RE-DISS II Ireland become an EECS member country and GO started to be only issued for the net generation of the power plants. It is important to mention that Ireland is amongst the domains that implemented the big majority of the BPR: 93% of the BPR were implemented at the end of the project. In terms of the disclosure problems, improvements were made on 2 out of the 4 that still remained to be addressed at the start of RE-DISS II, namely on "Possible double counting in different explicit tracking instruments" and "Unintended market barriers". Figure 31 and Figure 32 show the improvements registered during RE-DISS II in the implementation of the BPR and in addressing the main disclosure problems, respectively.
Italy	A 2% of overall improvement in the implementation of the BPR was registered for Italy, which at the end of the project had implemented 70% of the BPR (see Figure 33). This improvement was the result of registered improvements on the BPR categories "Issuing of GO for different energy sources" and "Recognition of GO". Consequently only a partial improvement was registered in addressing the disclosure problems "Double counting of attributes in implicit tracking instruments", "Intransparency for consumers" and "Loss of disclosure information" (see Figure 34).
Malta	Malta is one of the domains where, although improvements have been registered (3% overall improvement) still is lagging behind in the implementation of the BPR, as at the end of RE-DISS II only 7% of all BPR were implemented (see Figure 35). The 3% improvement registered was due to improvements in the implementation of on BPR categories: "Issuing of GO for different energy sources" and "Disclosure schemes and other RTS". The referred improvements contributed to partially address the following disclosure problems (see Figure 36): "Possible

Domain	Slight improvements registered
	double counting in different explicit tracking instruments”, and “Loss of disclosure information”.
Norway	The slight overall improvement registered in Norway (1% between the start and end of RE-DISS II) was due to a slight improvement made on the BPR category “Disclosure schemes and other RTS”. It is important to mention that Norway is amongst the domains that has implemented the big majority of the BPR (96% of the BPR were implemented at the end of the projects). In terms of the disclosure problems, improvements were made on 1 out of the 3 that still remained to be addressed at the start of RE-DISS II, namely on “Loss of disclosure information”. Figure 37 and Figure 38 show the improvements registered during RE-DISS II in the implementation of the BPR and in addressing the main disclosure problems, respectively.
Poland	Poland is one of the domains where, although improvements have been registered (2% overall improvement) still is lagging behind in the implementation of the BPR, as at the end of RE-DISS II only 27% of the BPR were implemented (see Figure 39). The 2% improvement registered was due to improvements in the implementation of on BPR category: “Issuing of GO for different energy sources” The referred improvements contributed to partially address the following disclosure problems (see Figure 40): “Possible double counting in different explicit tracking instruments”, and “Loss of disclosure information”.
Slovenia	The slight overall improvement registered in Slovenia (1% between the start and end of RE-DISS II) was due to a slight improvement made on the BPR category “Further recommendations on disclosure”. It is important to mention that although Slovenia has only registered such a small improvement, it is amongst the domains that has implemented the big majority of the BPR (91% of the BPR were implemented at the end of the project). In terms of the disclosure problems, improvements were made on 1 out of the 5 that still remained to be addressed at the start of RE-DISS II, namely on “Intranparency for consumers”. Figure 41 and Figure 42 show the improvements registered during RE-DISS II in the implementation of the BPR and in addressing the main disclosure problems, respectively.
Slovakia	Slovakia is one of the domains where, although improvements have been registered (9% overall improvement) is still lagging behind in the implementation of the BPR, as at the end of RE-DISS II only 17% of the BPR were implemented (see Figure 43). The 9% improvement registered was due to improvements in the implementation of on BPR category: “12 Months Lifetime Rule for GO”, “Issuing of GO for different energy sources” and “Contract Based Tracking”. The referred improvements contributed to partially address the following disclosure problems (see Figure 44): “Possible double counting in different explicit tracking instruments”, “Double counting of attributes in implicit tracking instruments”, “Loss of disclosure information”, “Intranparency for consumers” and “Leakage of attributes and/or arbitrage”.
Spain	9% overall improvement in the implementation of all BPR was registered for Spain, which at the end of RE-DISS II had in place 56% of the BPR (see Figure 45). This improvement was due to improvements in the following three BPR categories: “12 Months Lifetime Rule for GO”, “Usage of EECS” and “GO as the unique tracking certificate”. The referred improvements contributed to partially address the following disclosure problems (see Figure 46): “Possible double counting in different explicit tracking instruments”, “Double counting of attributes in implicit tracking instruments”, “Leakage of attributes and/or arbitrage” and “Unintended market barriers”.
Sweden	A 1% of overall improvement in the implementation of the BPR was registered for Sweden, which at the end of the project had implemented 83% of the BPR (see Figure 47). This improvement was the result of registered improvements on the

Domain	Slight improvements registered
	BPR categories "Disclosure schemes and other RTS" and "Calculation of Residual Mixes". Consequently only a partial improvement was registered in addressing the disclosure problem "Possible double counting in different explicit tracking instruments" (see Figure 48).
The Netherlands	A 7% of overall improvement in the implementation of the BPR was registered for The Netherlands, which at the end of the project had implemented 74% of the BPR (see Figure 49). This improvement resulted from an improvement on the BPR category "12 Months Lifetime Rule for GO", "Timing for disclosure" and "Further recommendations on disclosure". Consequently improvements were registered in addressing the disclosure problems "Double counting of attributes in implicit tracking instruments", "Double counting within individual suppliers portfolio" and "Intransparency for consumers" (see Figure 50).

Domains with no registered improvement, because no relevant changes were incorporated on their disclosure and GO systems are: Belgium-Wallonia, Bulgaria, Denmark, Finland, Hungary, Latvia, Lithuania, Romania, Switzerland and Great Britain. Figure 51 to Figure 70 show the graphical representation of the implementation of the BPR and on addressing the main disclosure problems for each of the referred domains.

It is important to refer that on the group of domains with no registered improvement there are domains with advanced disclosure and GO systems where more than 60% of the RE-DISS BPR are in place (Belgium-Wallonia, Denmark, Finland and Great Britain) and there are others with underdeveloped systems (Hungary, Latvia, Lithuania and Romania), this last ones with less than 40% of the RE-DISS BPR implemented.

Figure 15: Improvements in the implementation of BPR in Austria during RE-DISS II

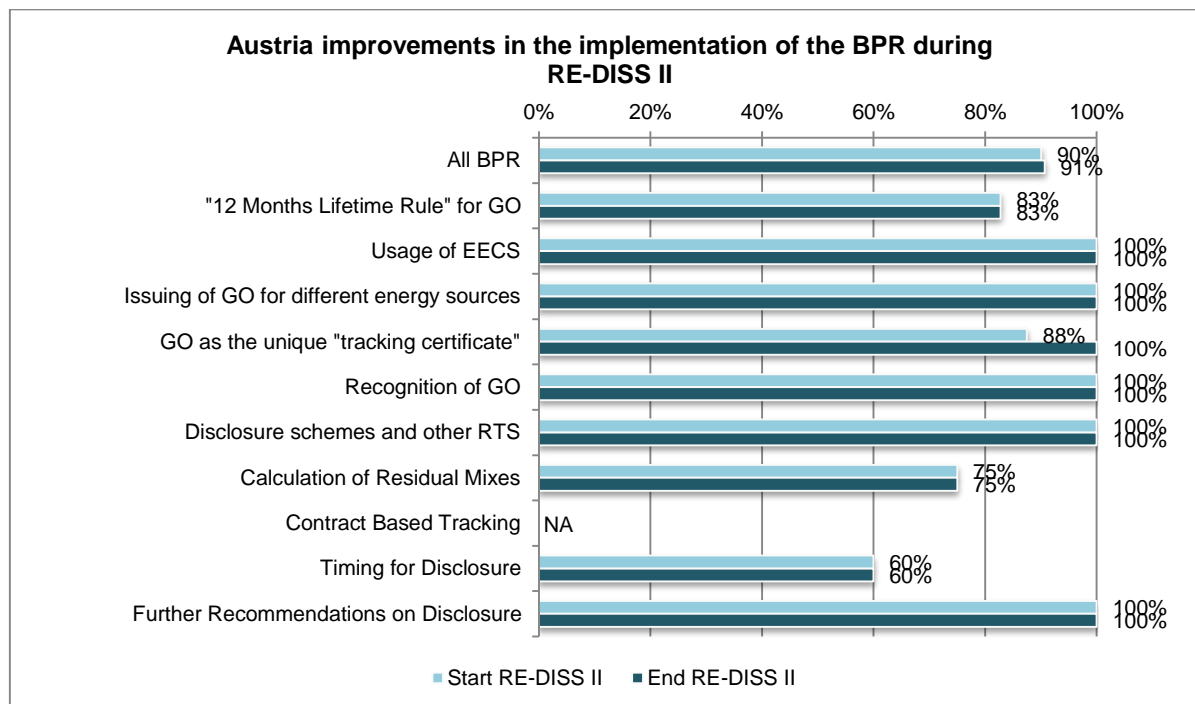




Figure 16: Improvements in addressing the main disclosure problems in Austria during RE-DISS II

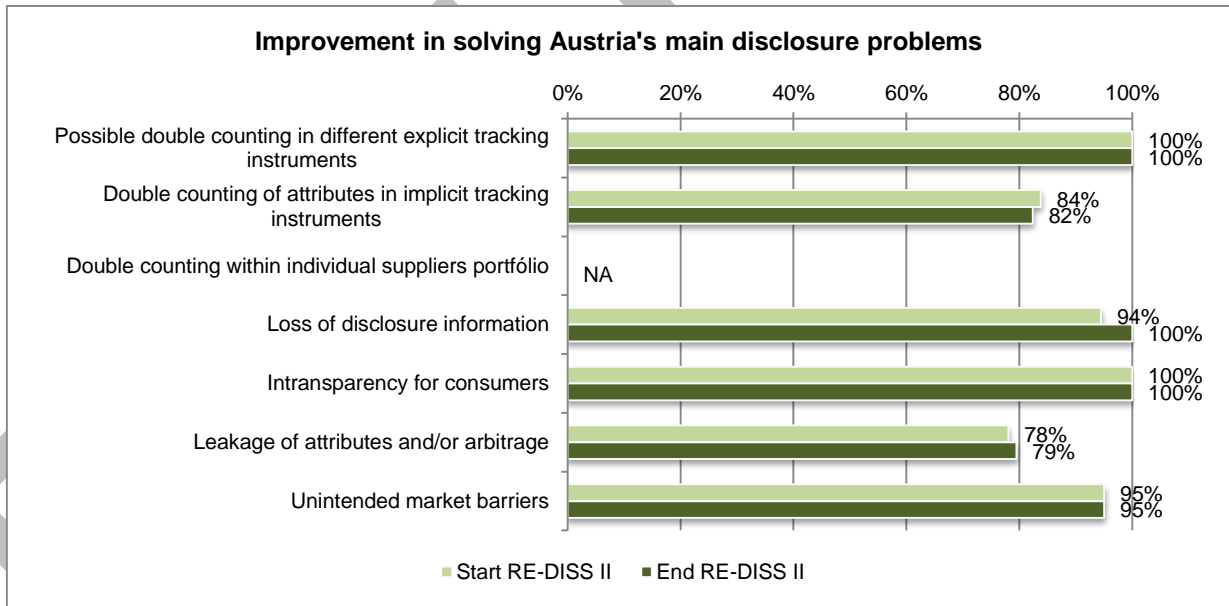


Figure 17: Improvements in the implementation of BPR in Belgium-Flanders during RE-DISS II

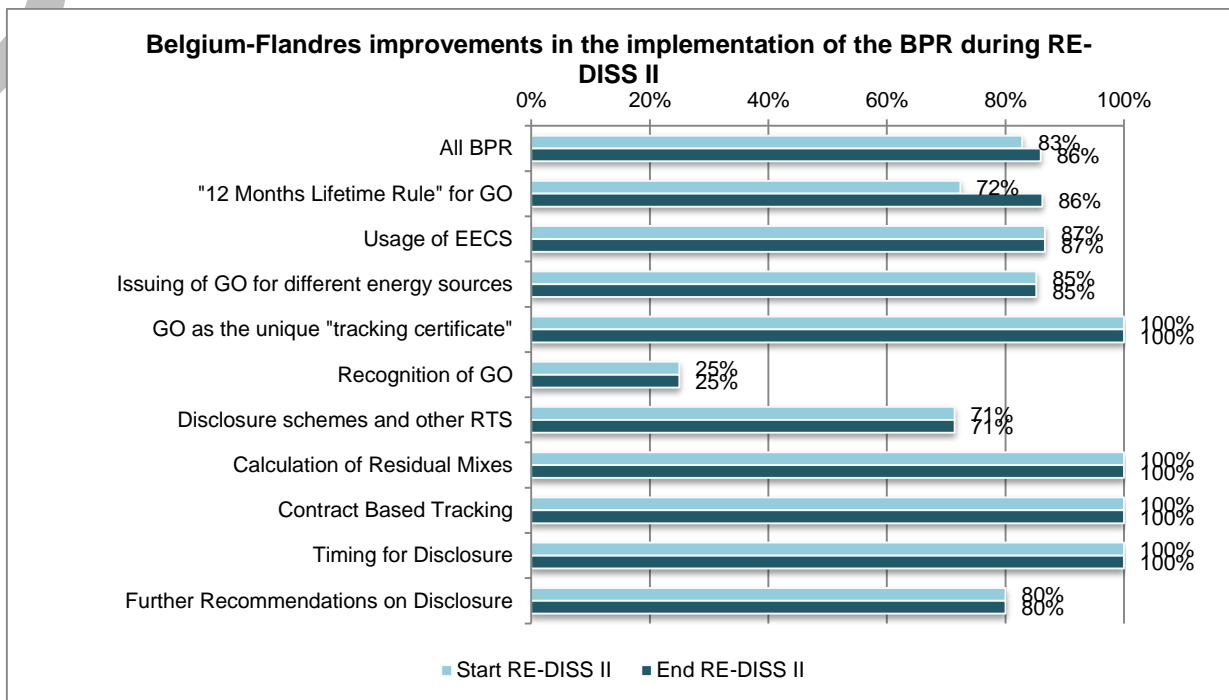


Figure 18: Improvements in addressing the main disclosure problems in Belgium-Flanders during RE-DISS II

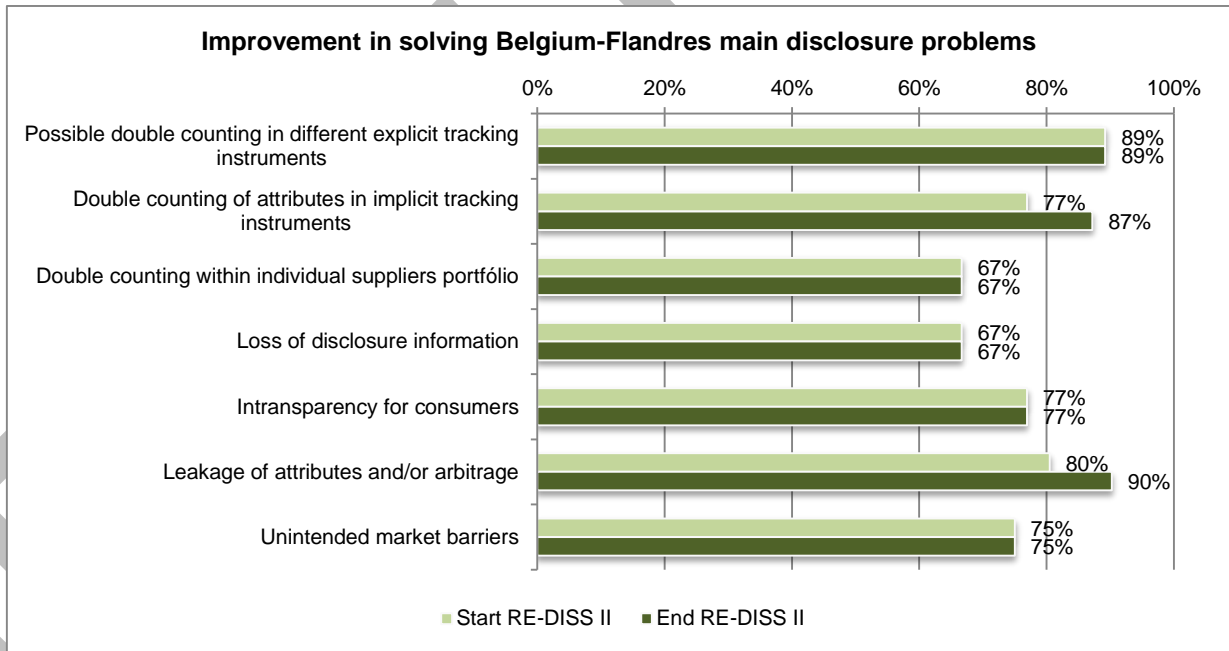


Figure 19: Improvements in the implementation of BPR in Cyprus during RE-DISS II

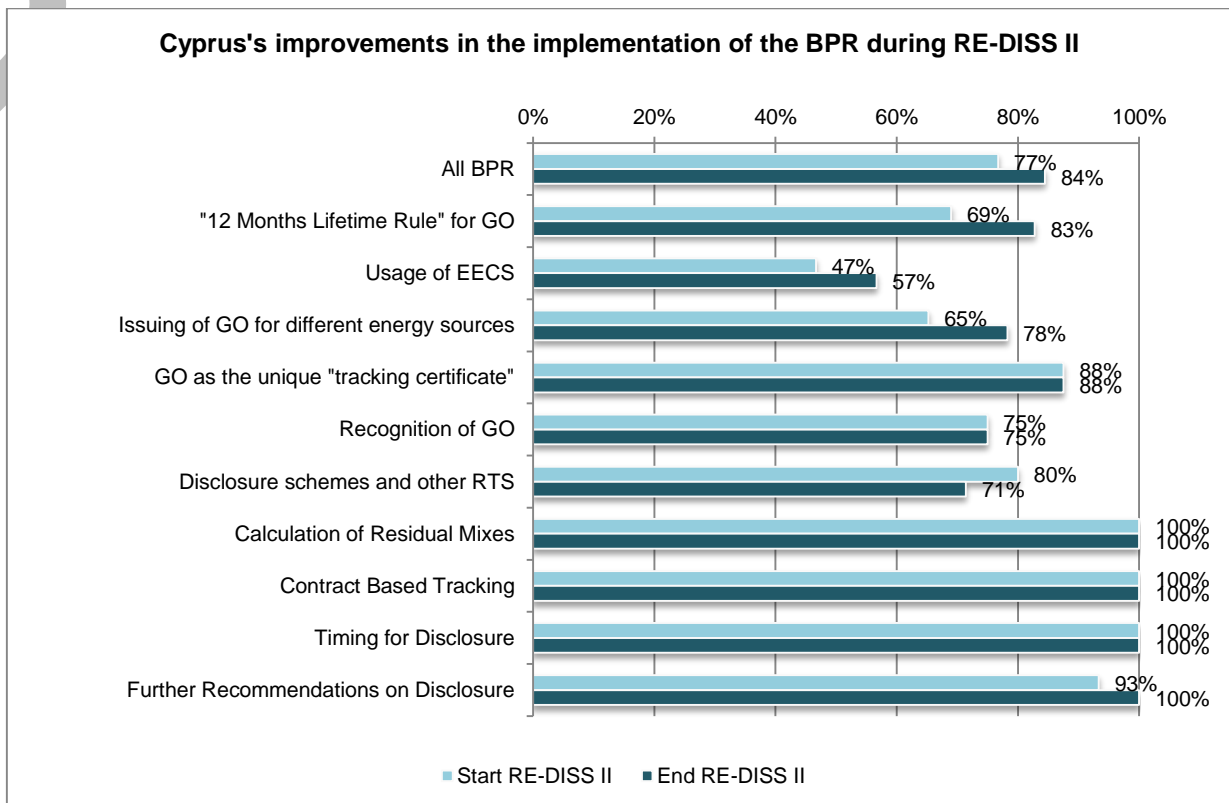


Figure 20: Improvements in addressing the main disclosure problems in Cyprus during RE-DISS II

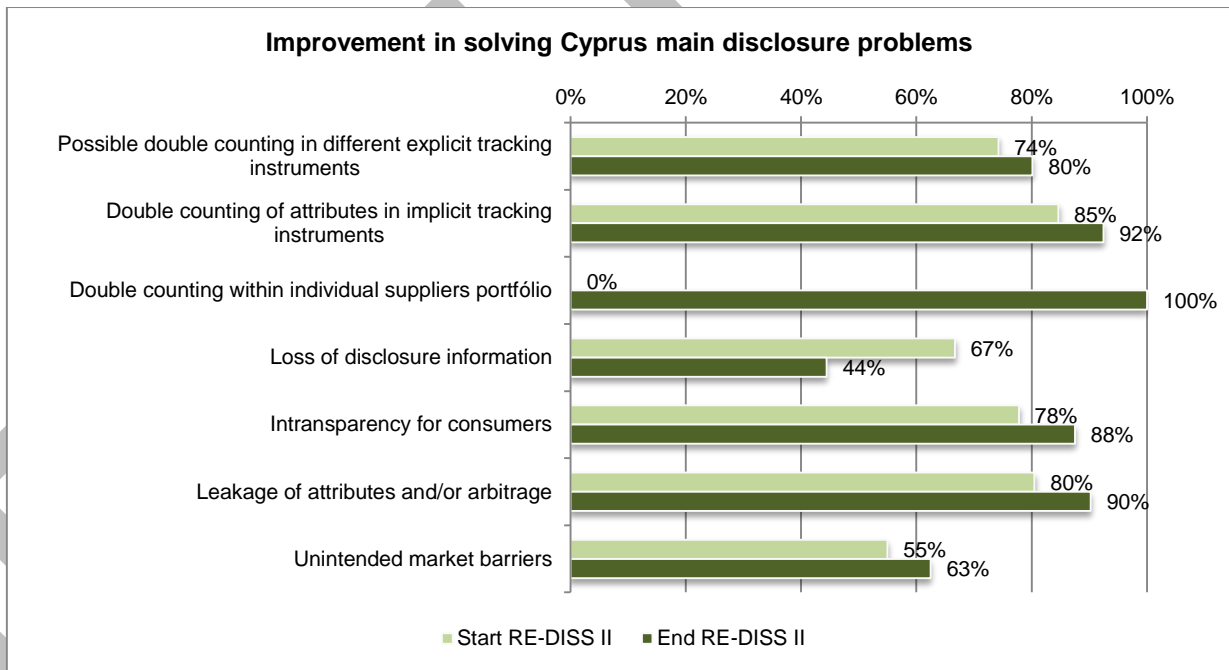


Figure 21: Improvements in the implementation of BPR in Czech Republic during RE-DISS II

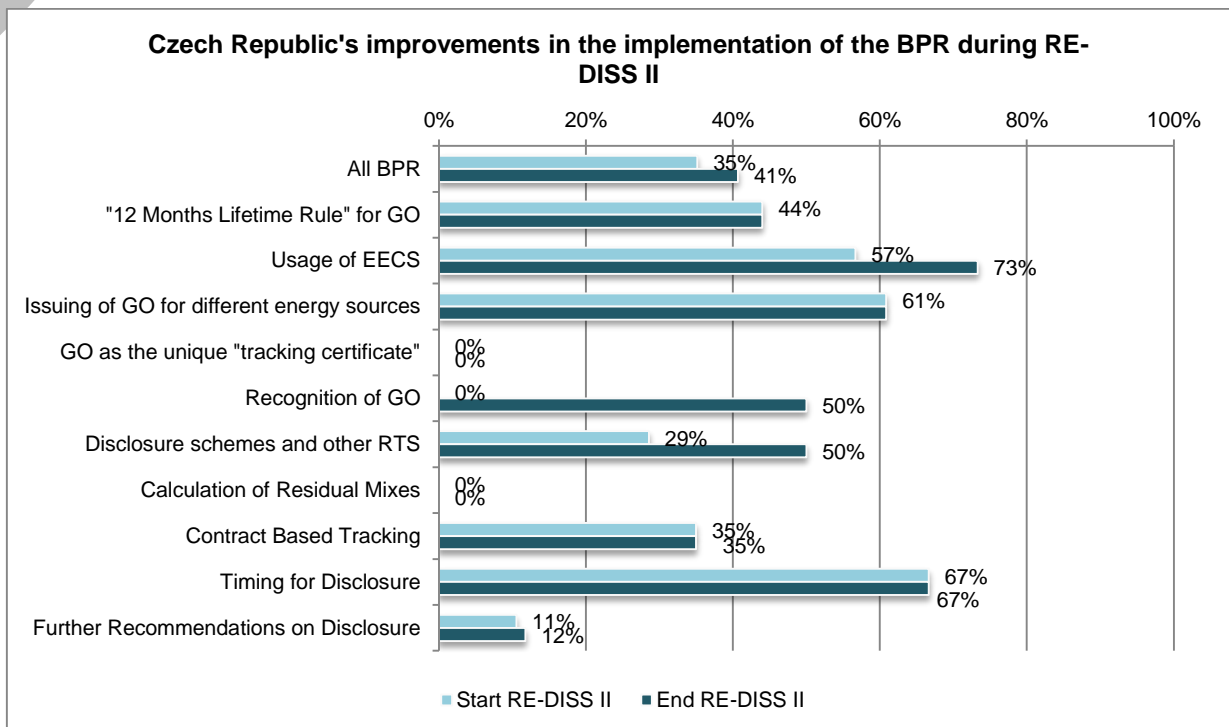


Figure 22: Improvements in addressing the main disclosure problems in Czech Republic during RE-DISS II

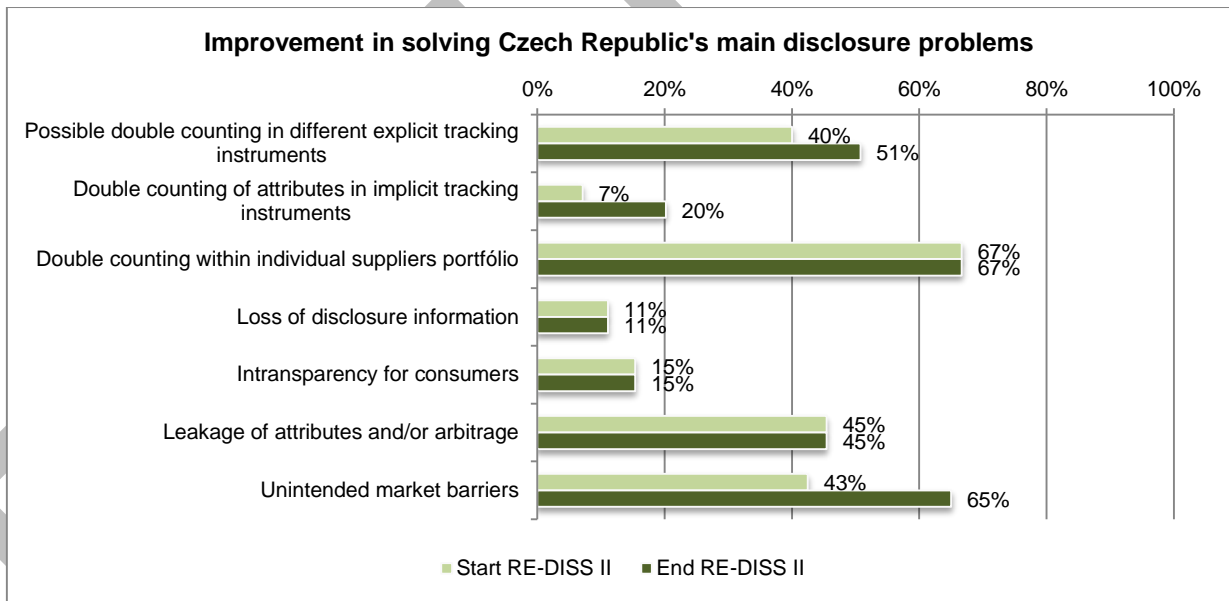


Figure 23: Improvements in the implementation of BPR in France during RE-DISS II

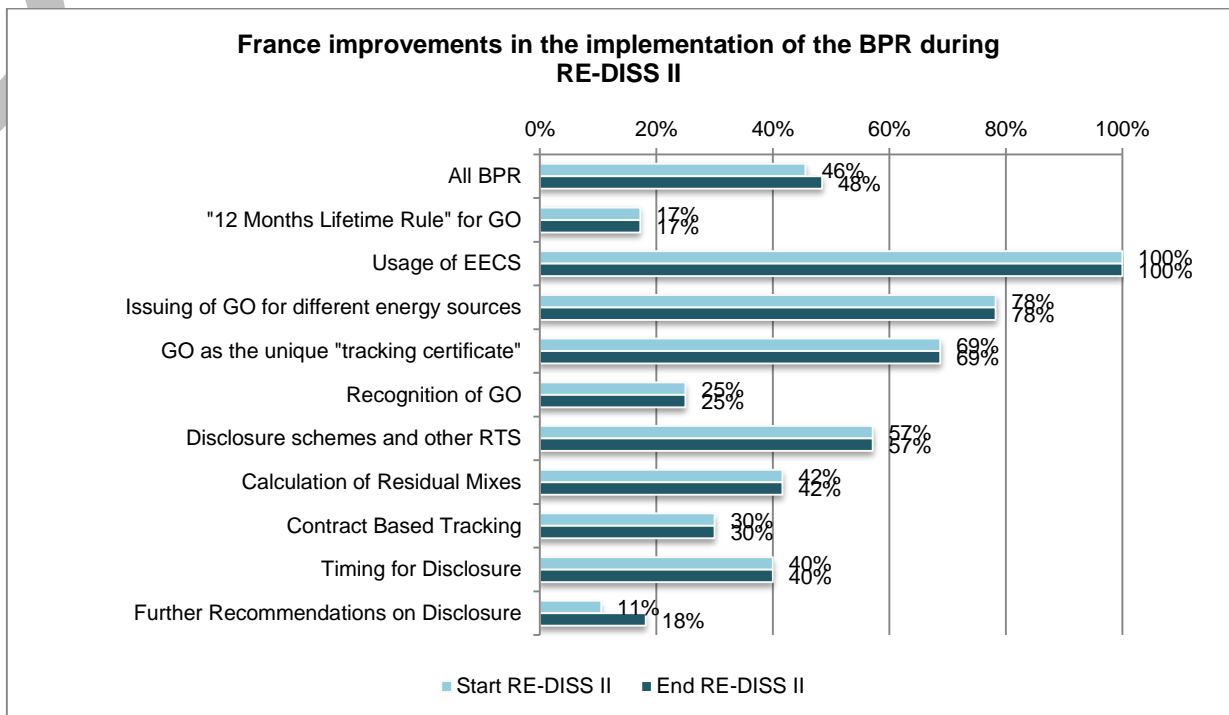


Figure 24: Improvements in addressing the main disclosure problems in France during RE-DISS II

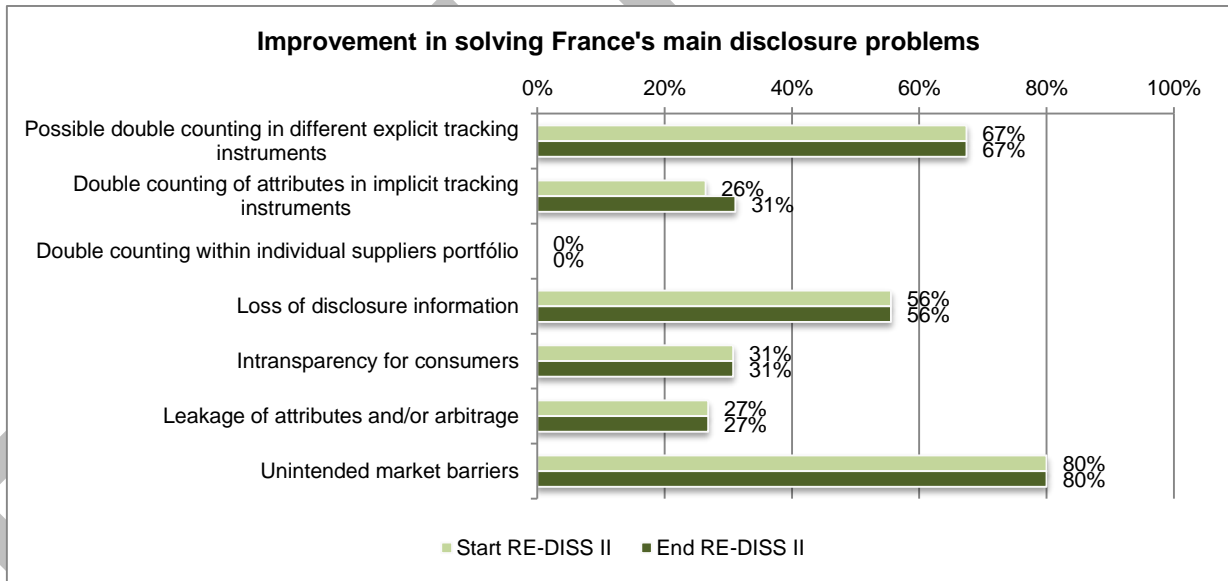


Figure 25: Improvements in the implementation of BPR in Germany during RE-DISS II

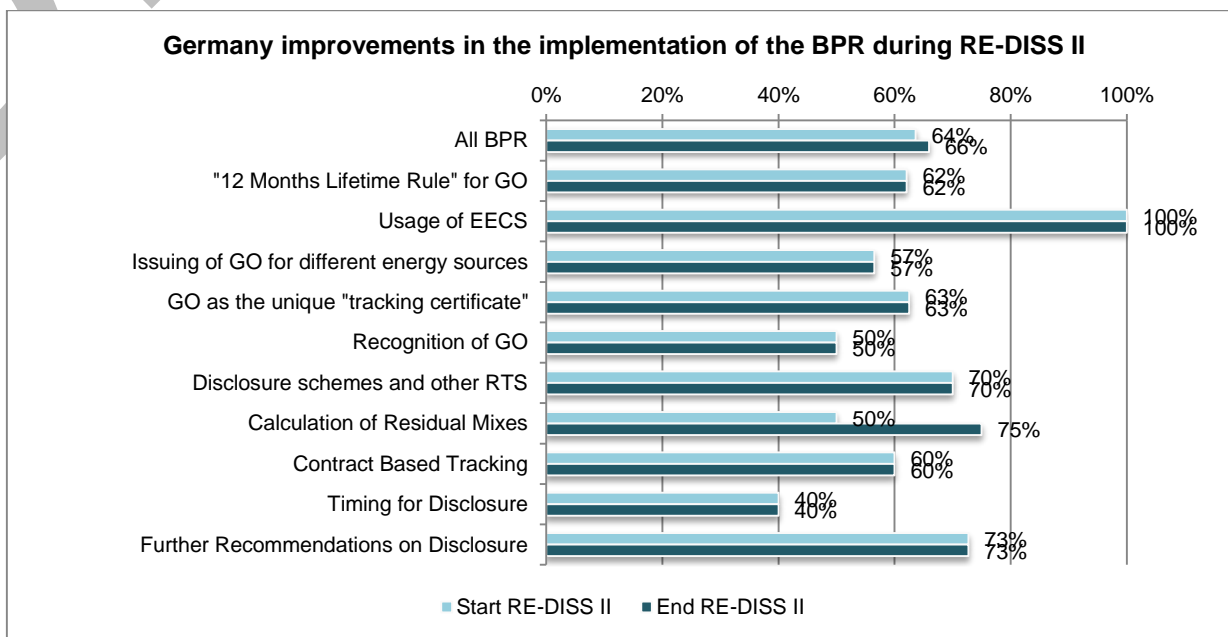


Figure 26: Improvements in addressing the main disclosure problems in Germany during RE-DISS II

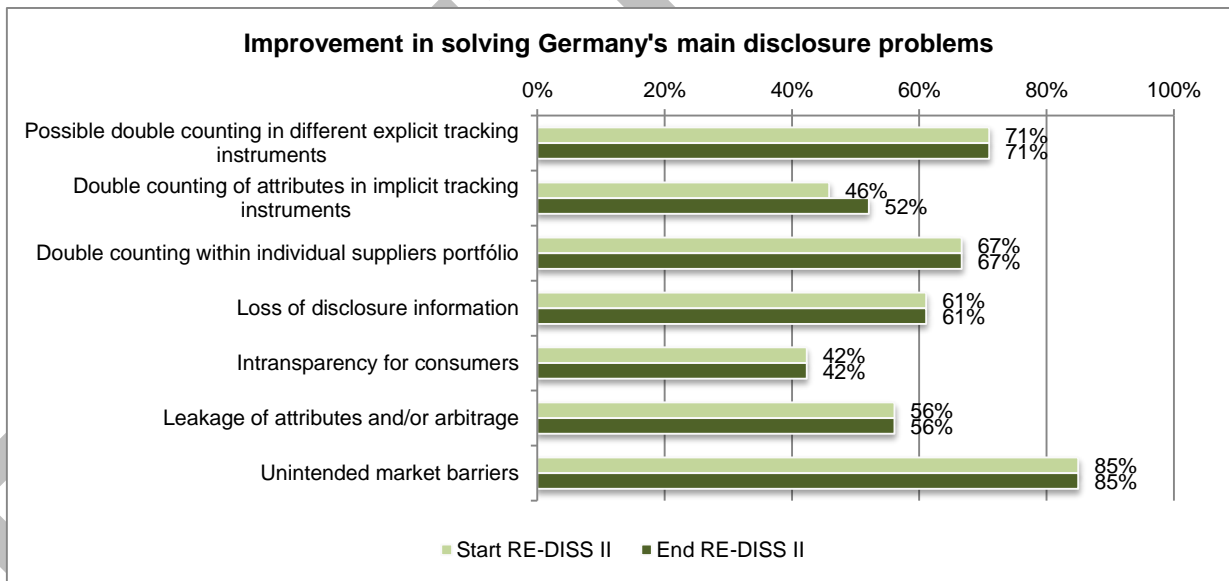


Figure 27: Improvements in the implementation of BPR in Greece during RE-DISS II

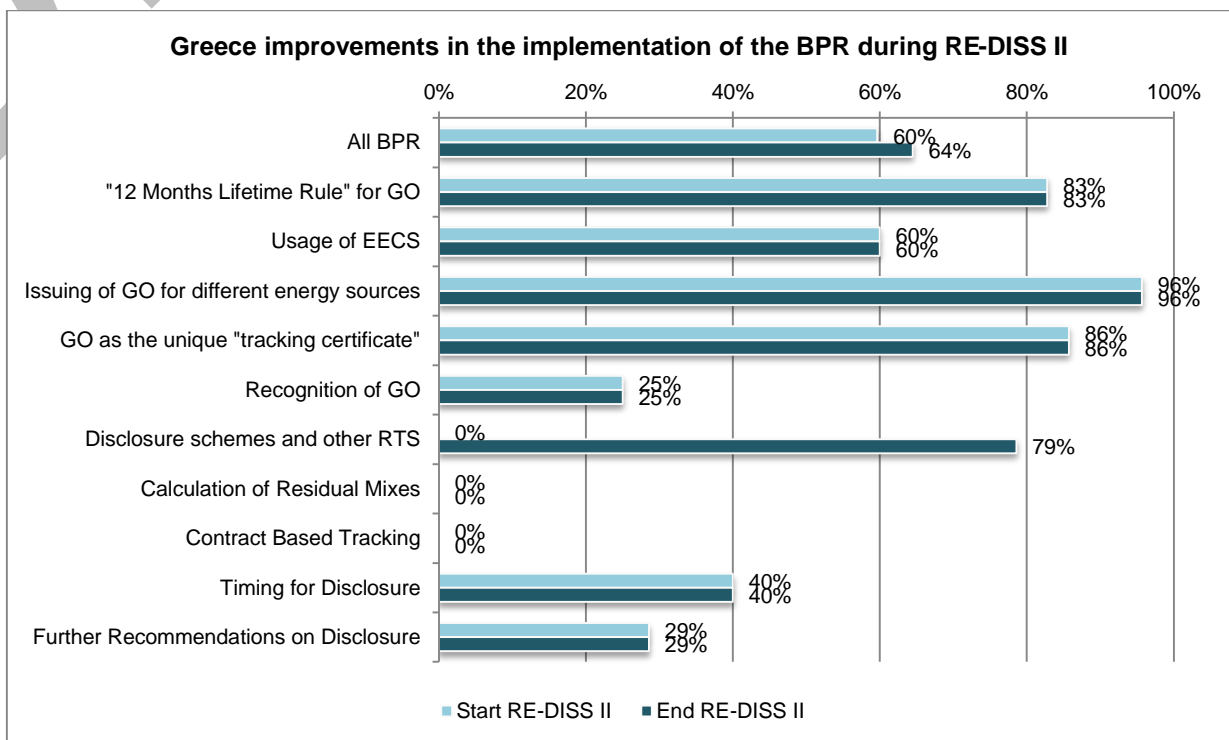


Figure 28: Improvements in addressing the main disclosure problems in Greece during RE-DISS II

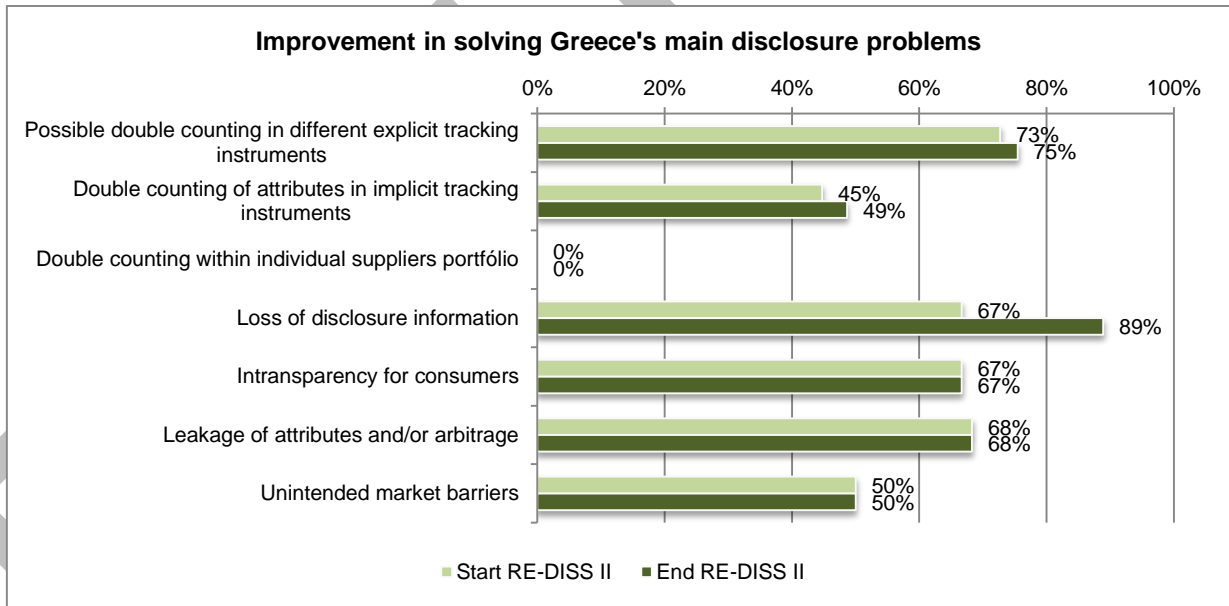


Figure 29: Improvements in the implementation of BPR in Iceland during RE-DISS II

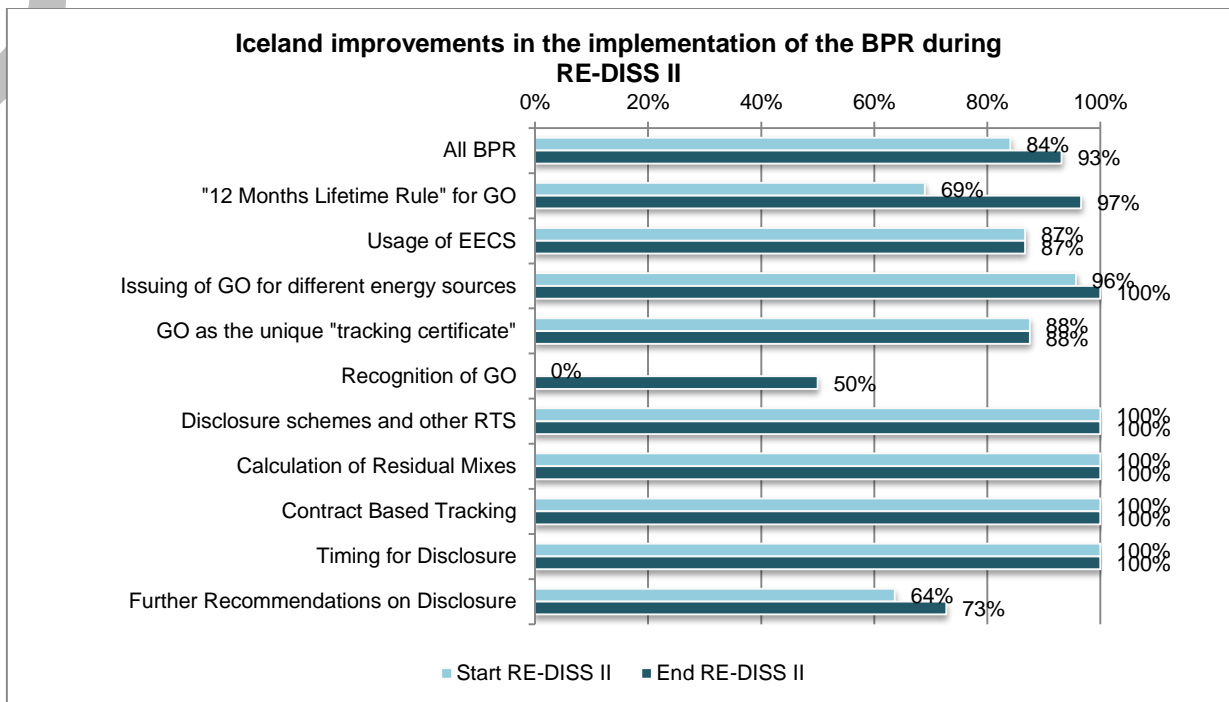


Figure 30: Improvements in addressing the main disclosure problems in Iceland during RE-DISS II

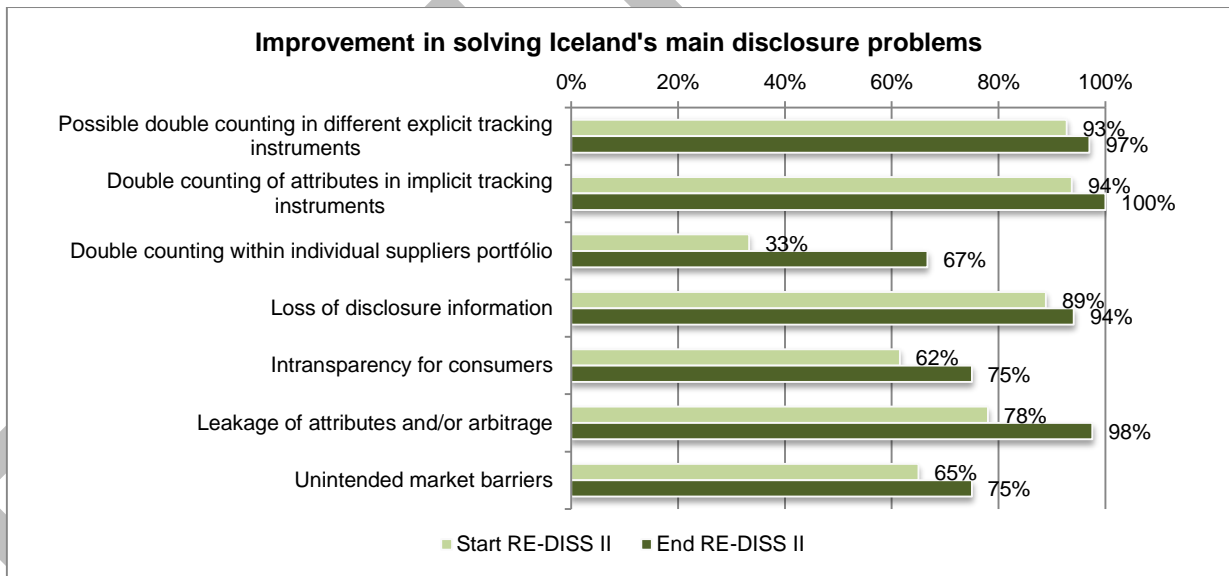


Figure 31: Improvements in the implementation of BPR in Ireland during RE-DISS II

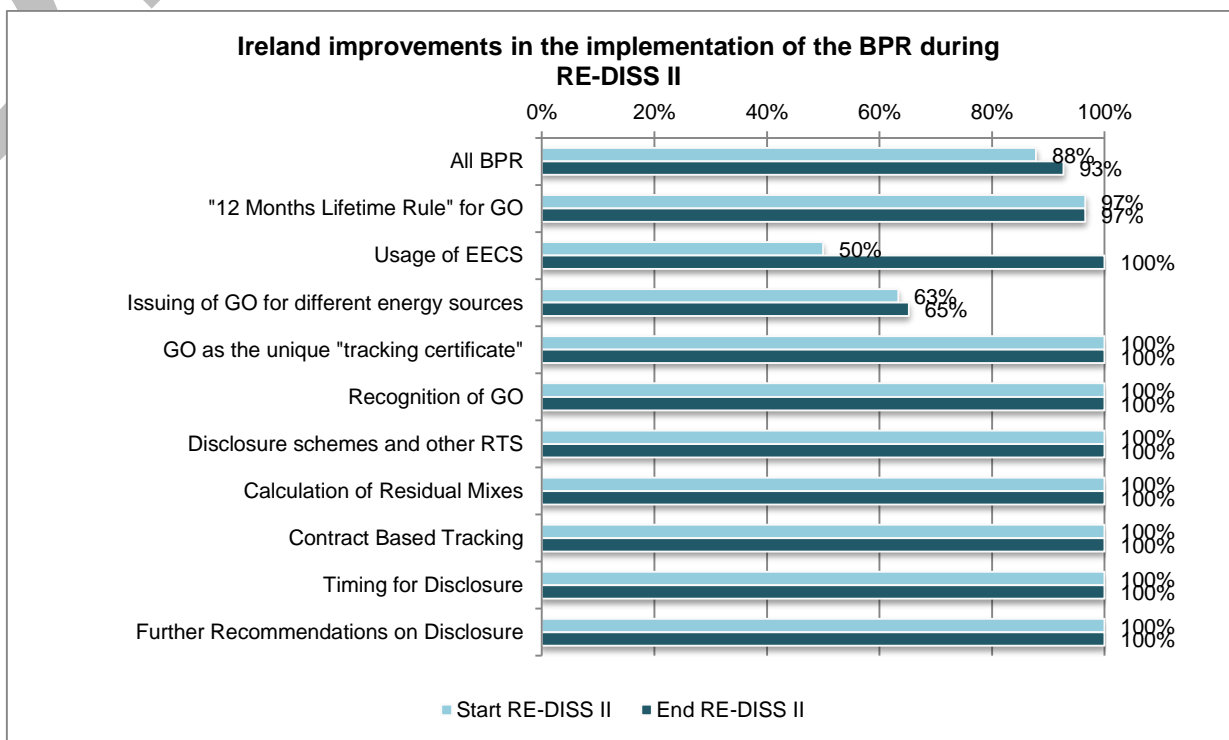




Figure 32: Improvements in addressing the main disclosure problems in Ireland during RE-DISS II

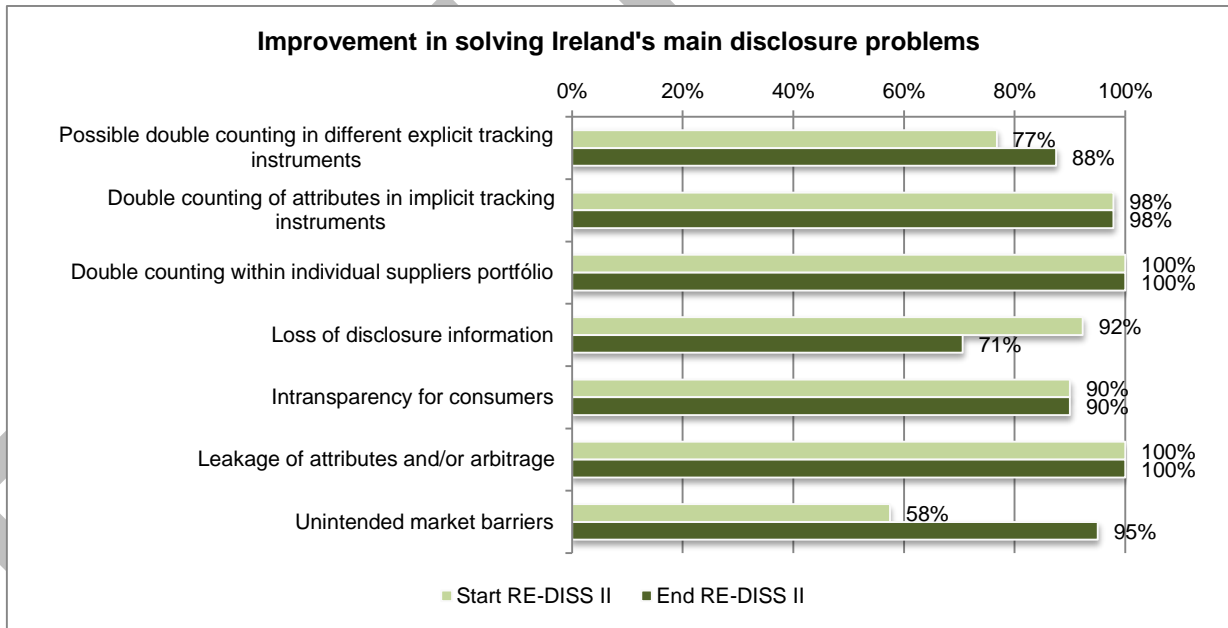


Figure 33: Improvements in the implementation of BPR in Italy during RE-DISS II

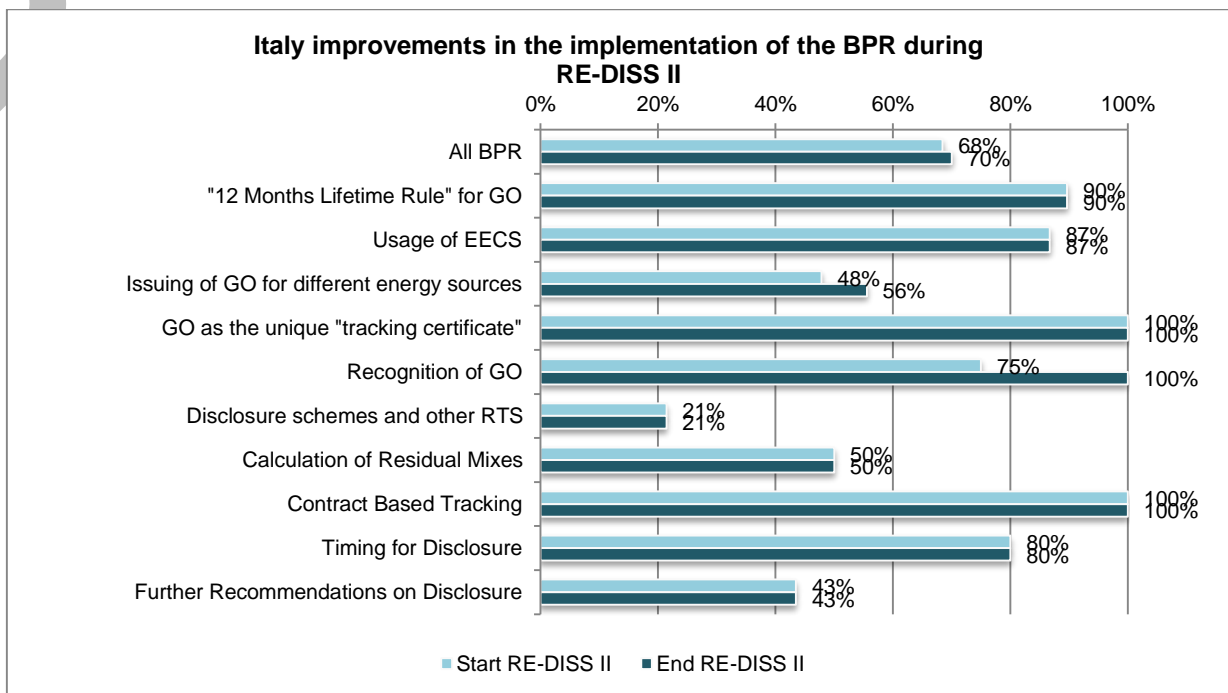


Figure 34: Improvements in addressing the main disclosure problems in Italy during RE-DISS II

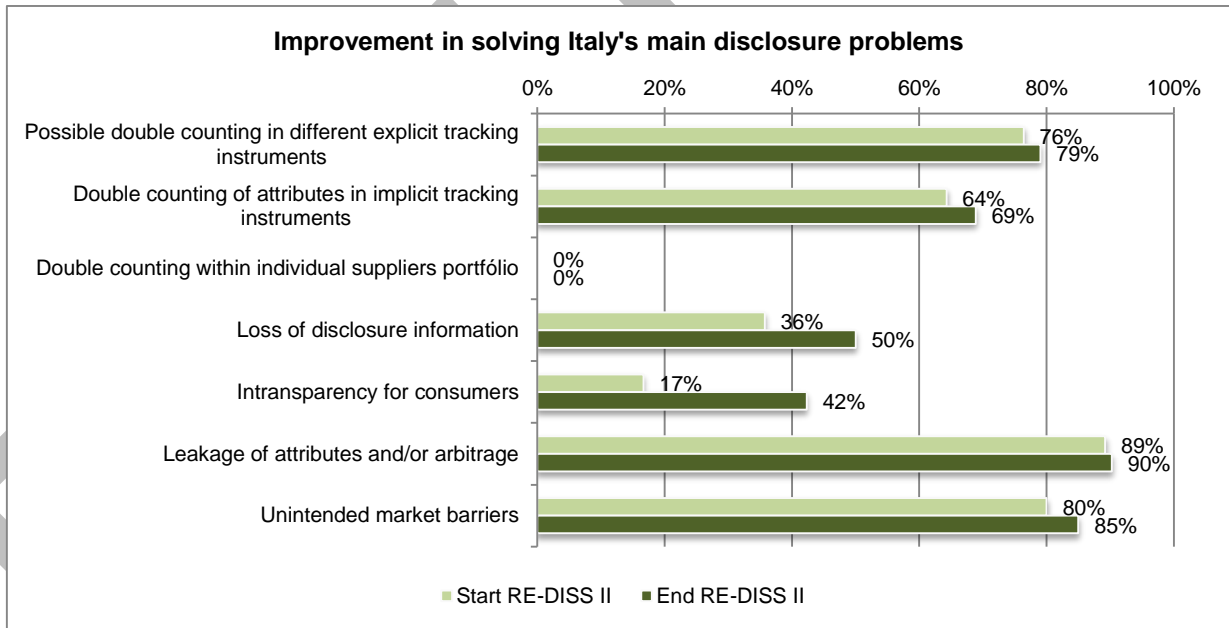


Figure 35: Improvements in the implementation of BPR in Malta during RE-DISS II

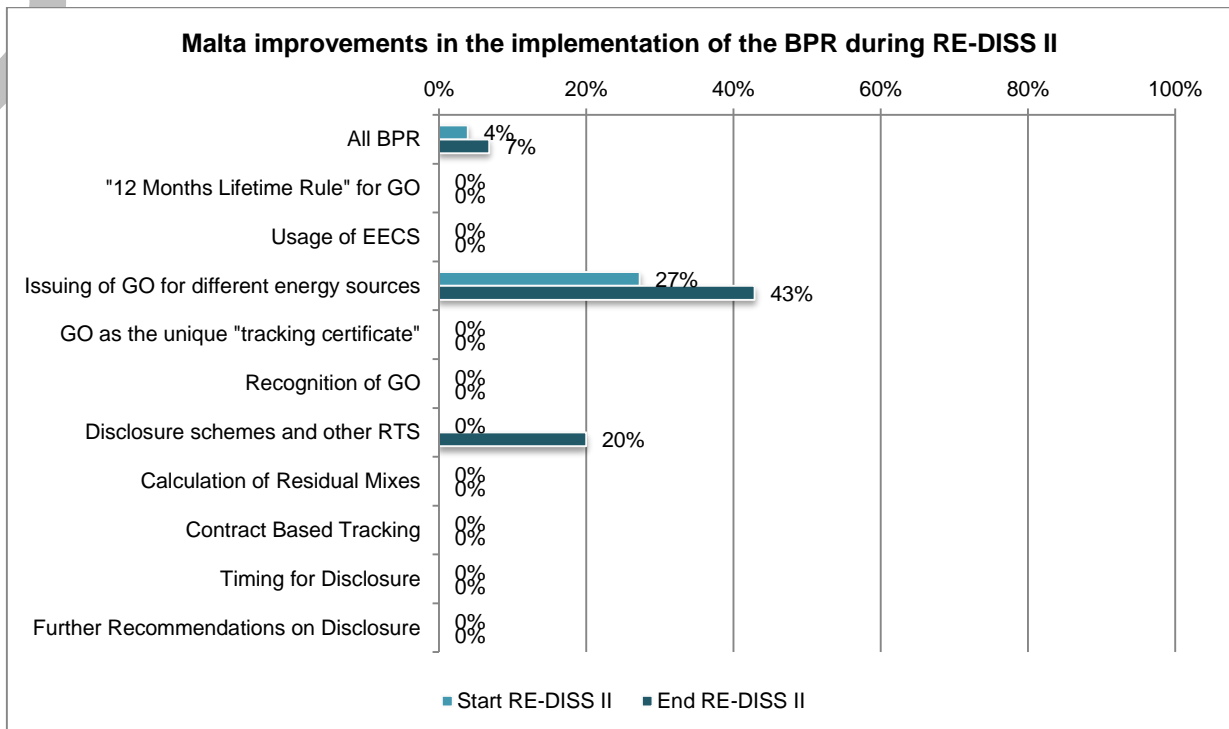


Figure 36: Improvements in addressing the main disclosure problems in Malta during RE-DISS II

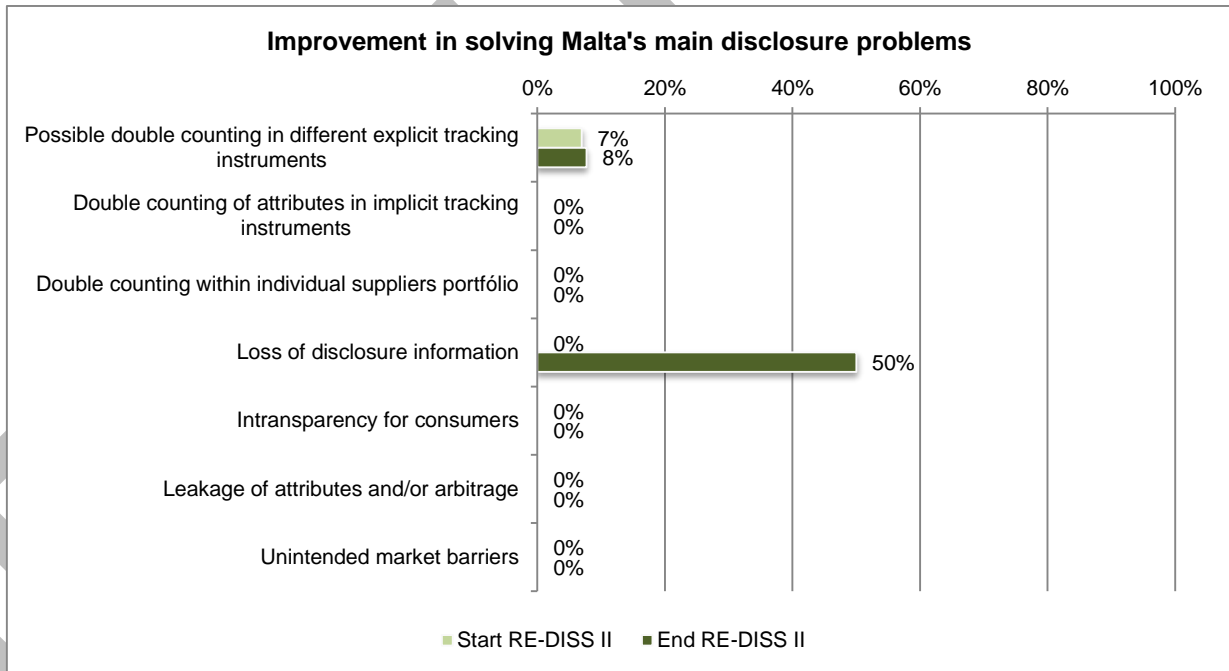


Figure 37: Improvements in the implementation of BPR in Norway during RE-DISS II

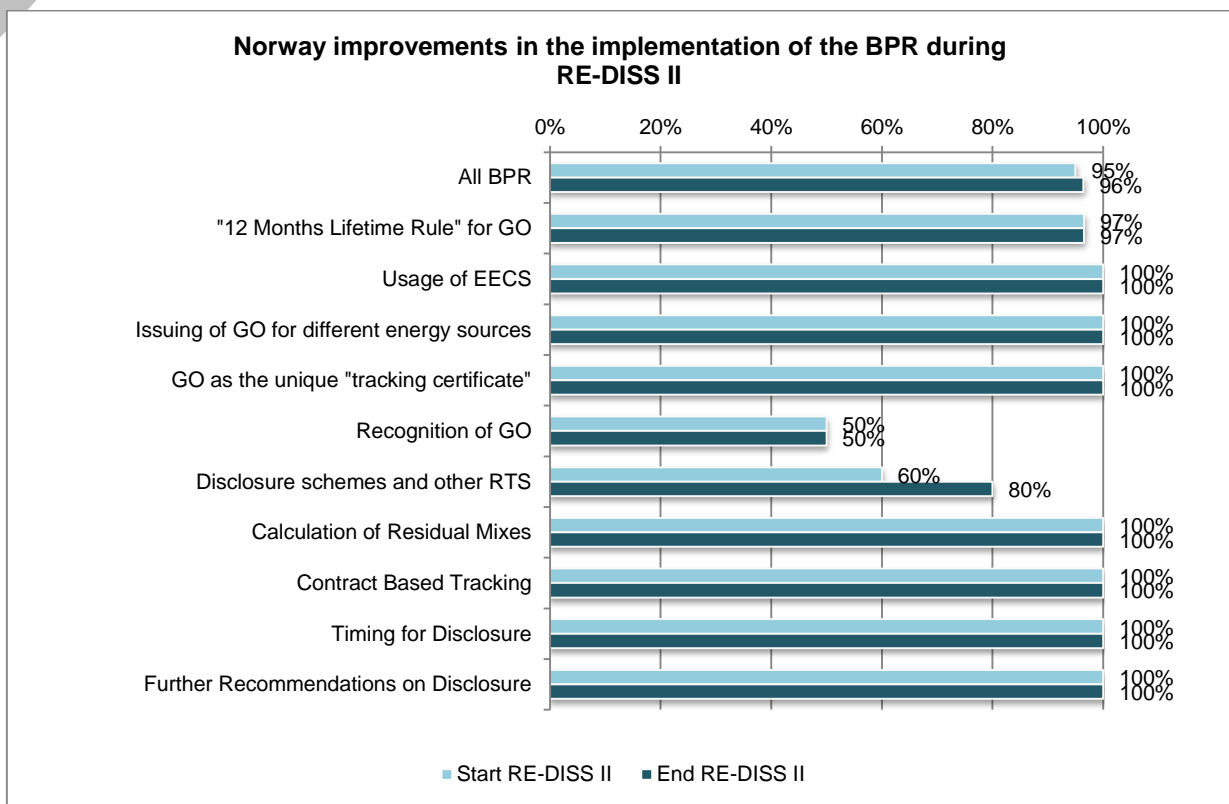


Figure 38: Improvements in addressing the main disclosure problems in Norway during RE-DISS II

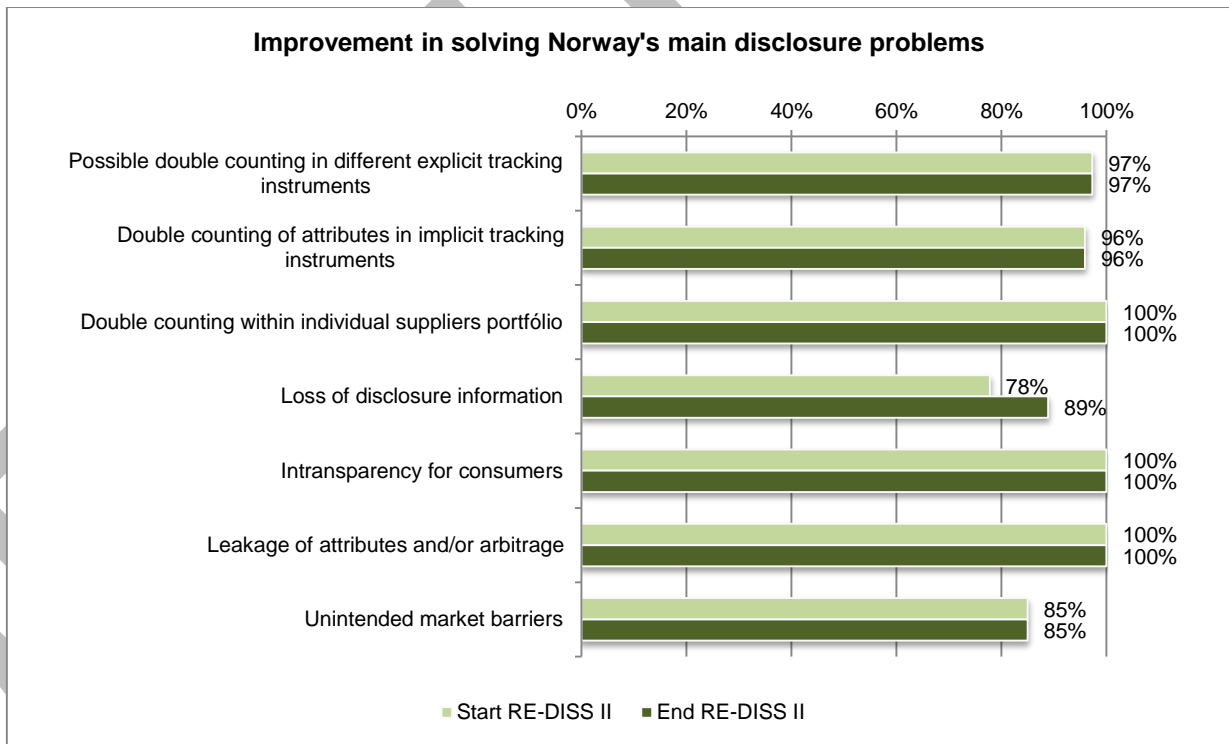


Figure 39: Improvements in the implementation of BPR in Poland during RE-DISS II

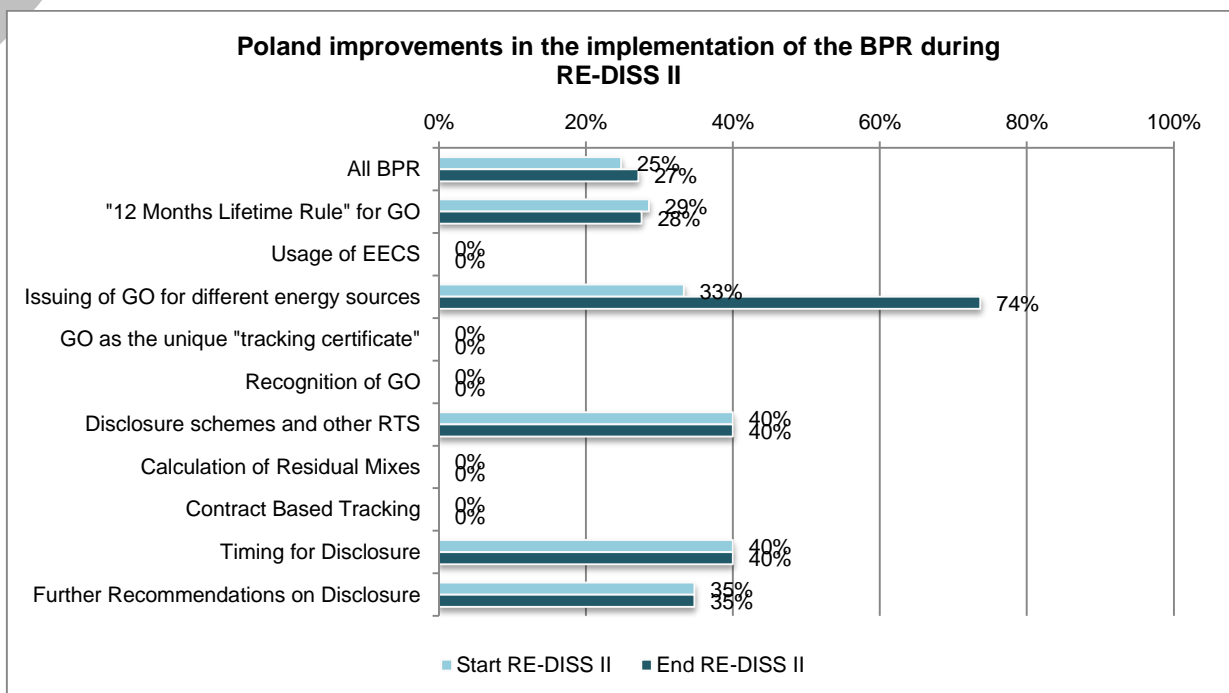


Figure 40: Improvements in addressing the main disclosure problems in Poland during RE-DISS II

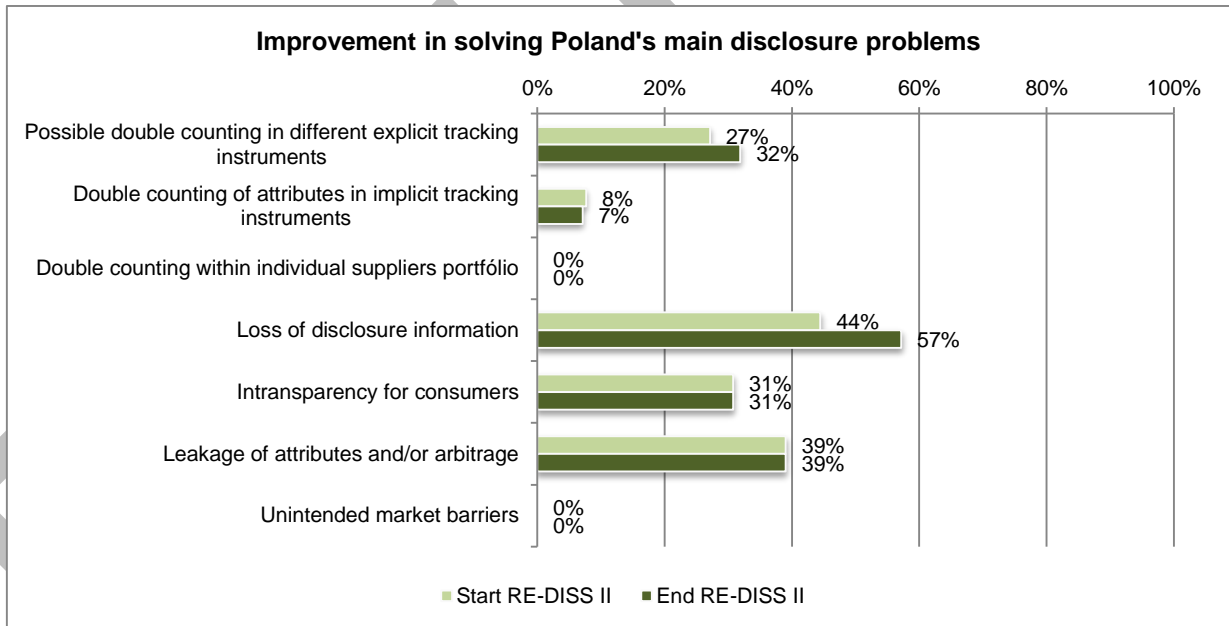


Figure 41: Improvements in the implementation of BPR in Slovenia during RE-DISS II

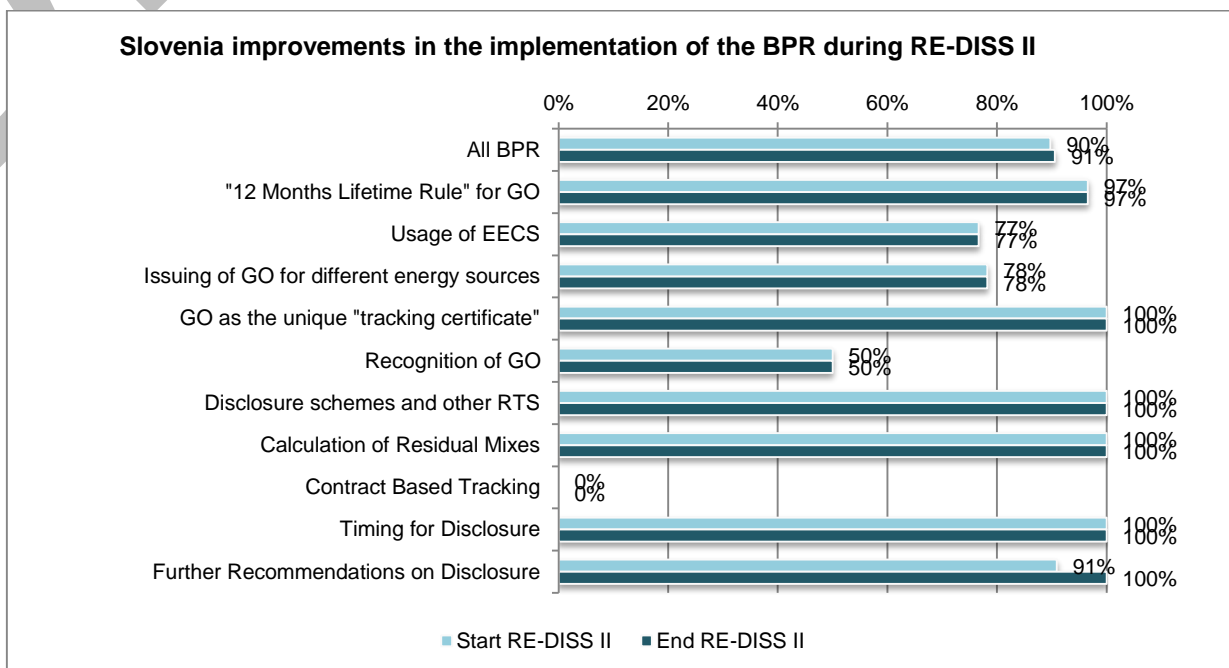


Figure 42: Improvements in addressing the main disclosure problems in Slovenia during RE-DISS II

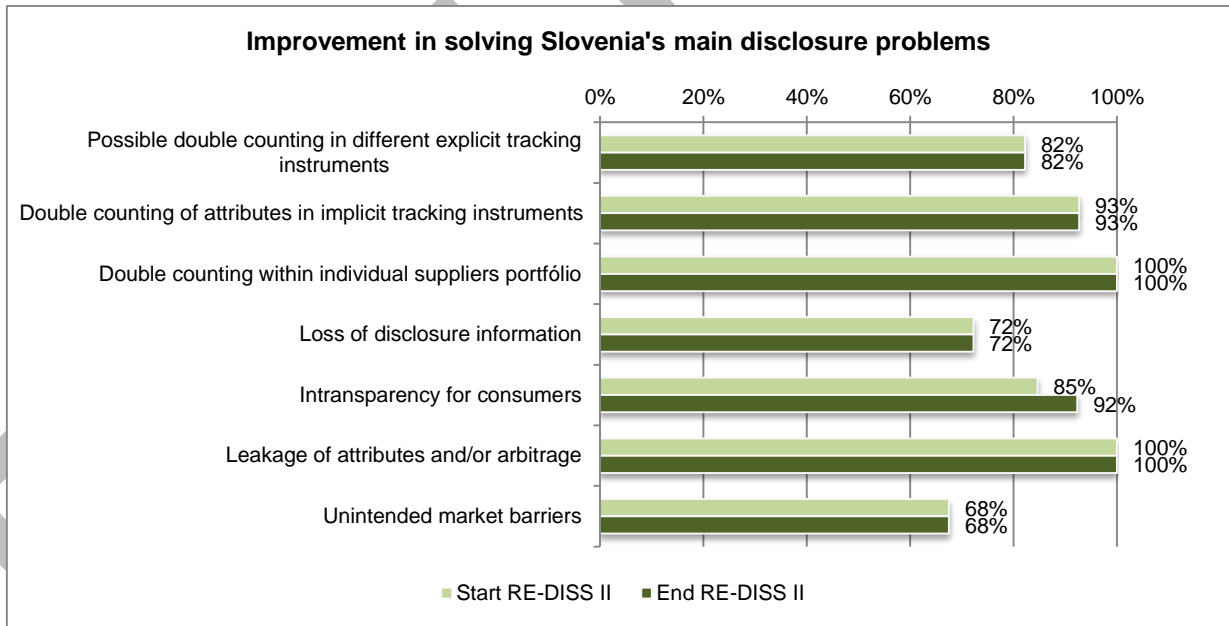


Figure 43: Improvements in the implementation of BPR in Slovakia during RE-DISS II

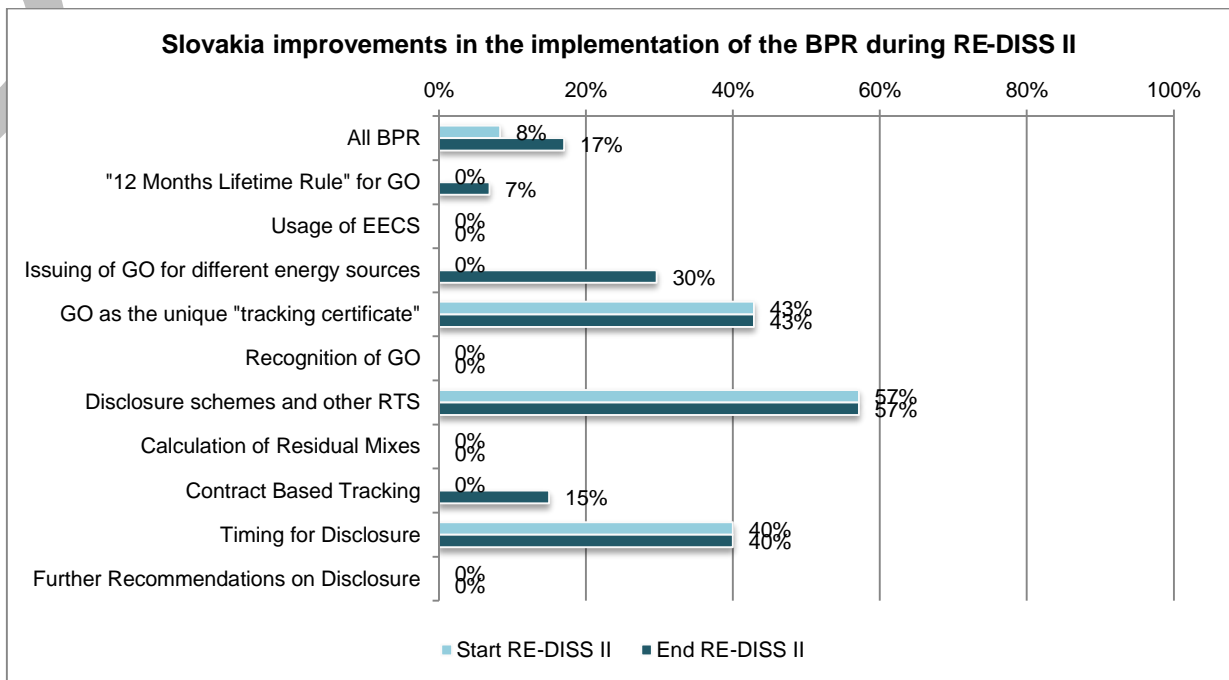


Figure 44: Improvements in addressing the main disclosure problems in Slovakia during RE-DISS II

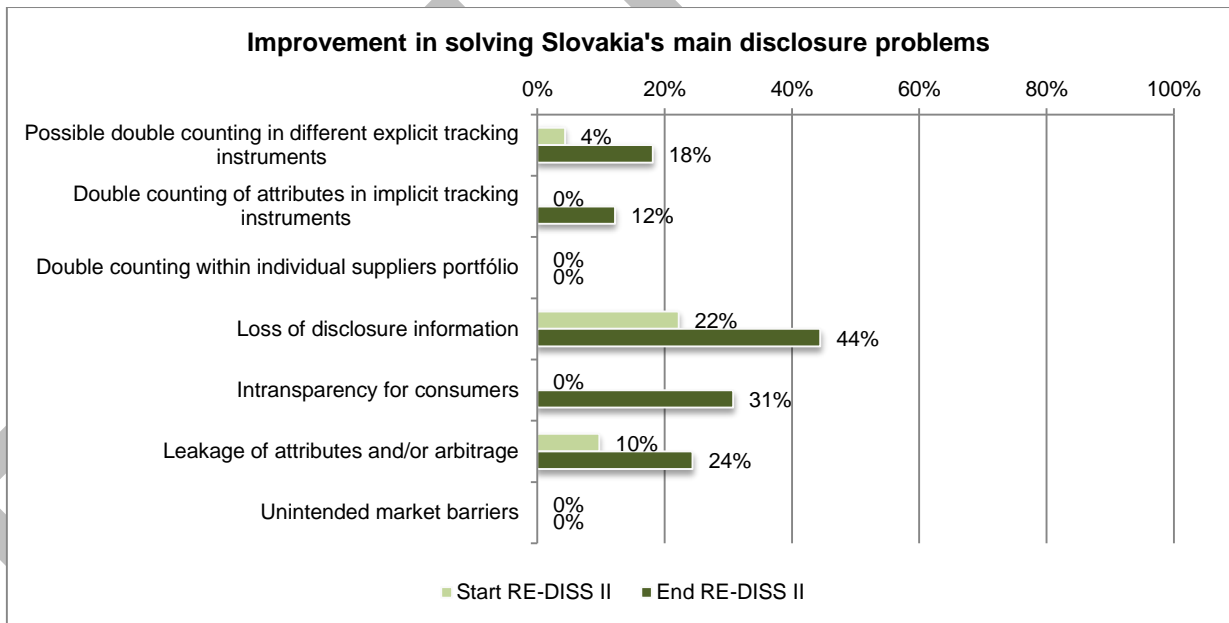


Figure 45: Improvements in the implementation of BPR in Spain during RE-DISS II

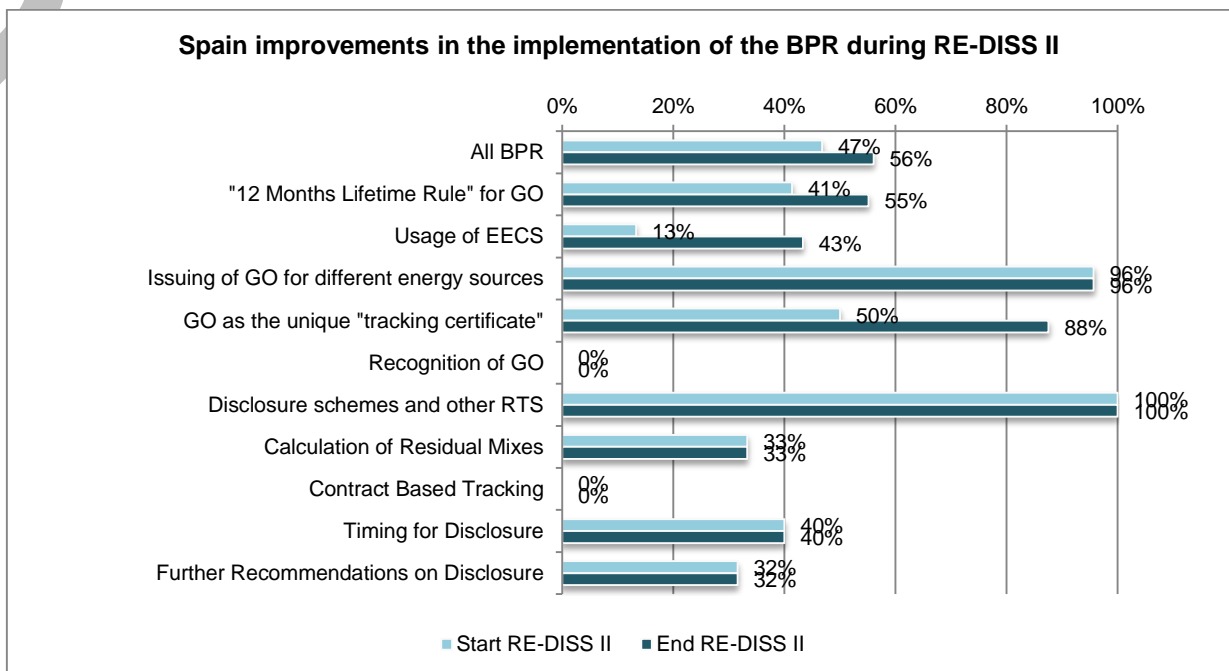


Figure 46: Improvements in addressing the main disclosure problems in Spain during RE-DISS II

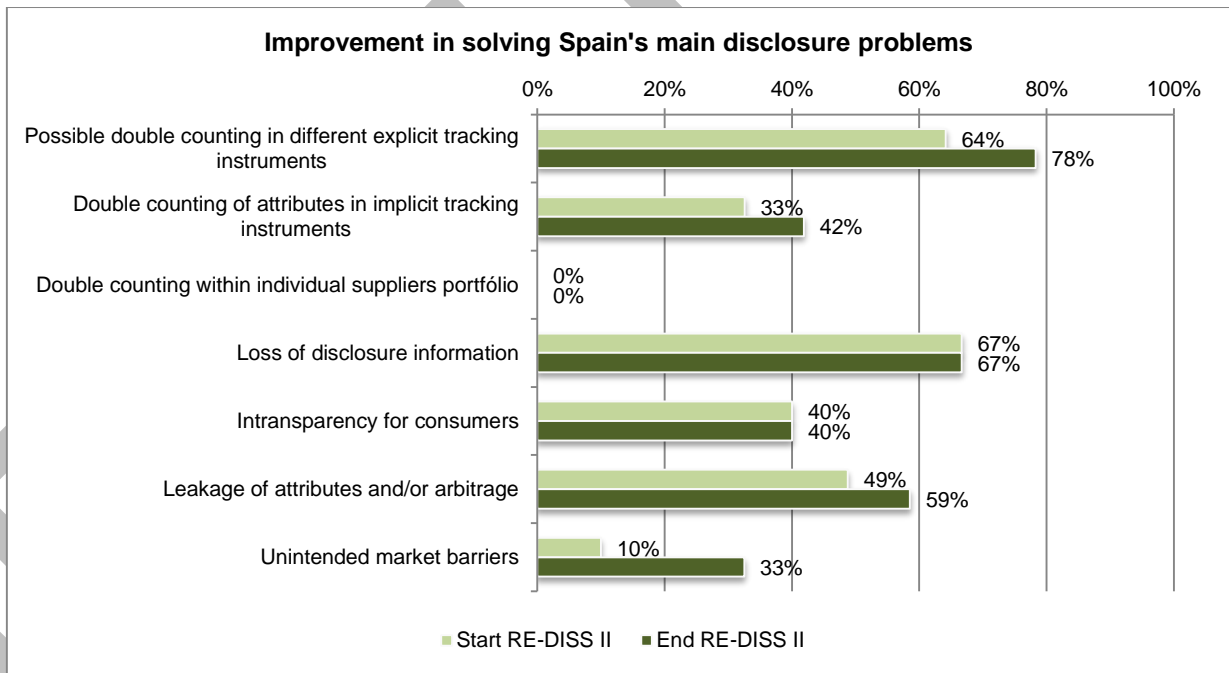


Figure 47: Improvements in the implementation of BPR in Sweden during RE-DISS II

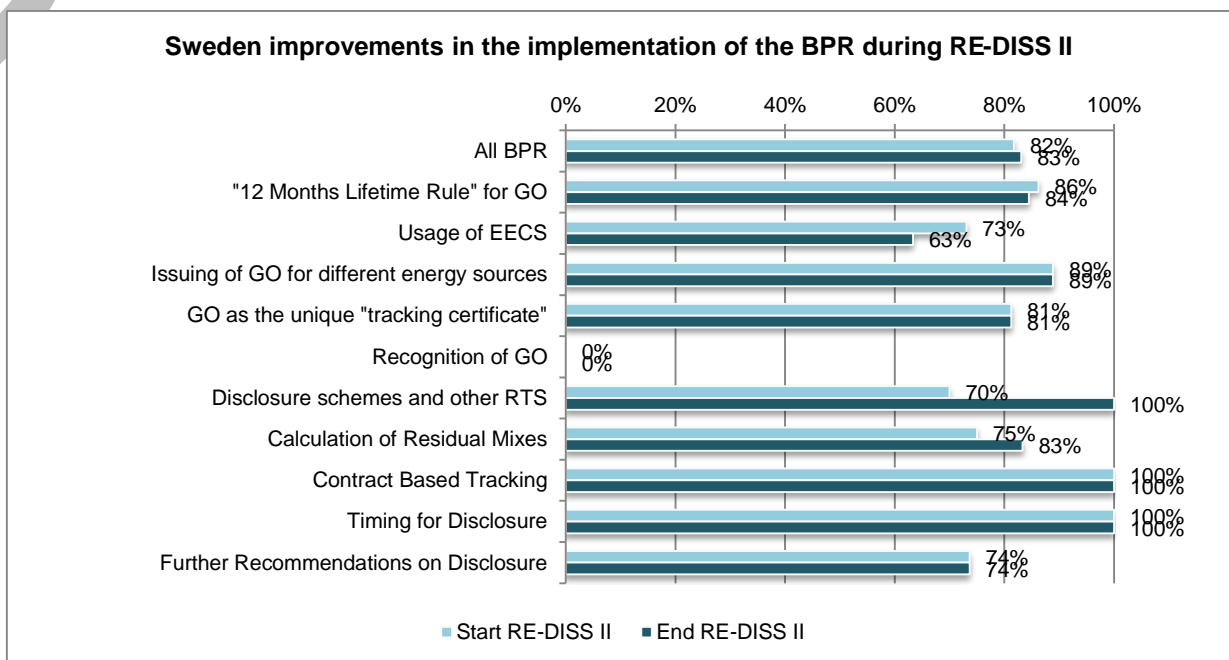




Figure 48: Improvements in addressing the main disclosure problems in Sweden during RE-DISS II

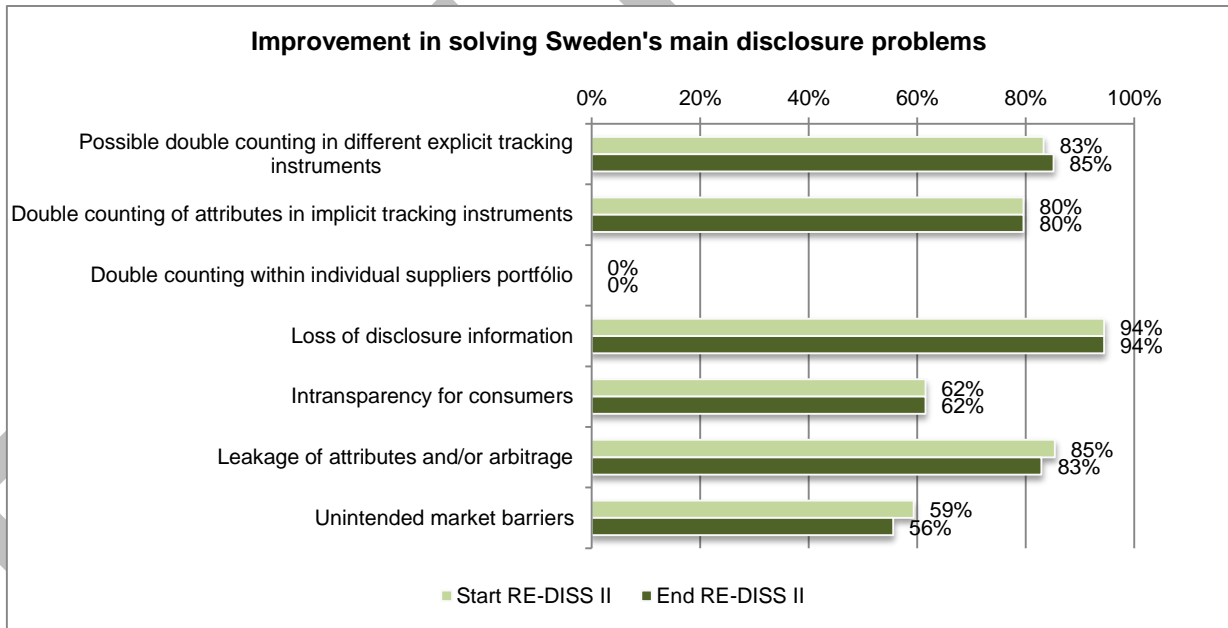


Figure 49: Improvements in the implementation of BPR in The Netherlands during RE-DISS II

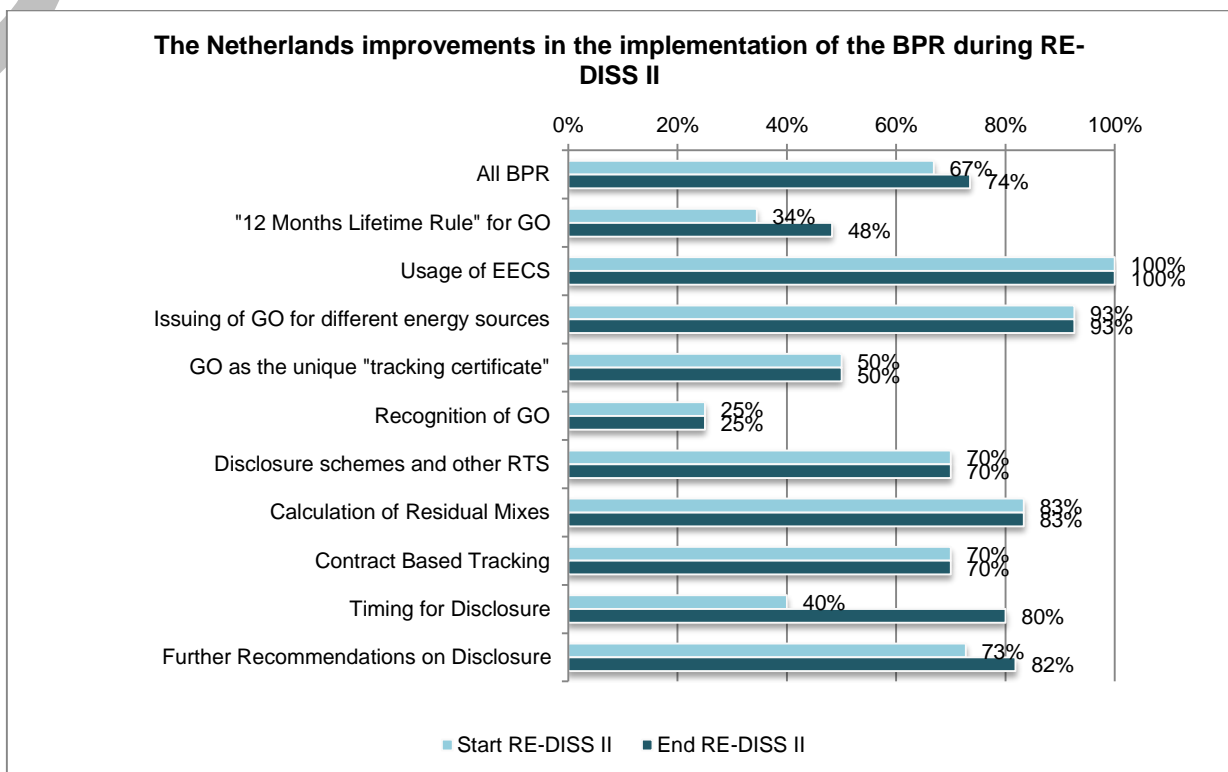


Figure 50: Improvements in addressing the main disclosure problems in The Netherlands during RE-DISS II

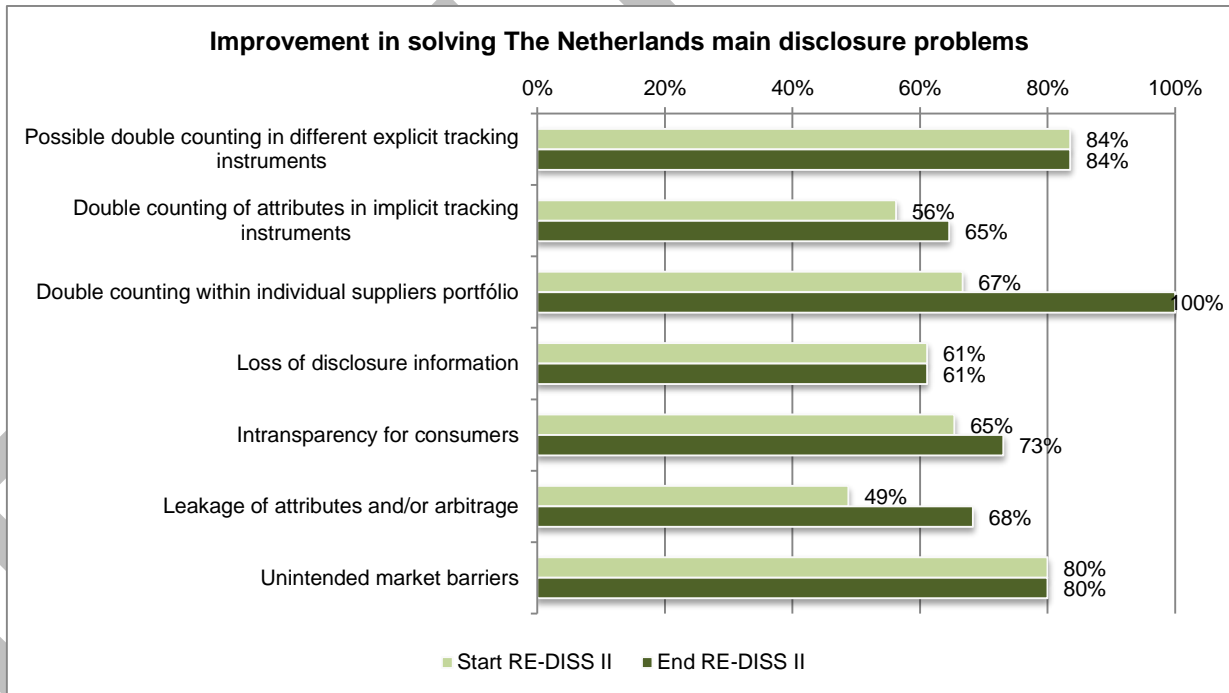


Figure 51: Improvements in the implementation of BPR in Belgium-Wallonia during RE-DISS II

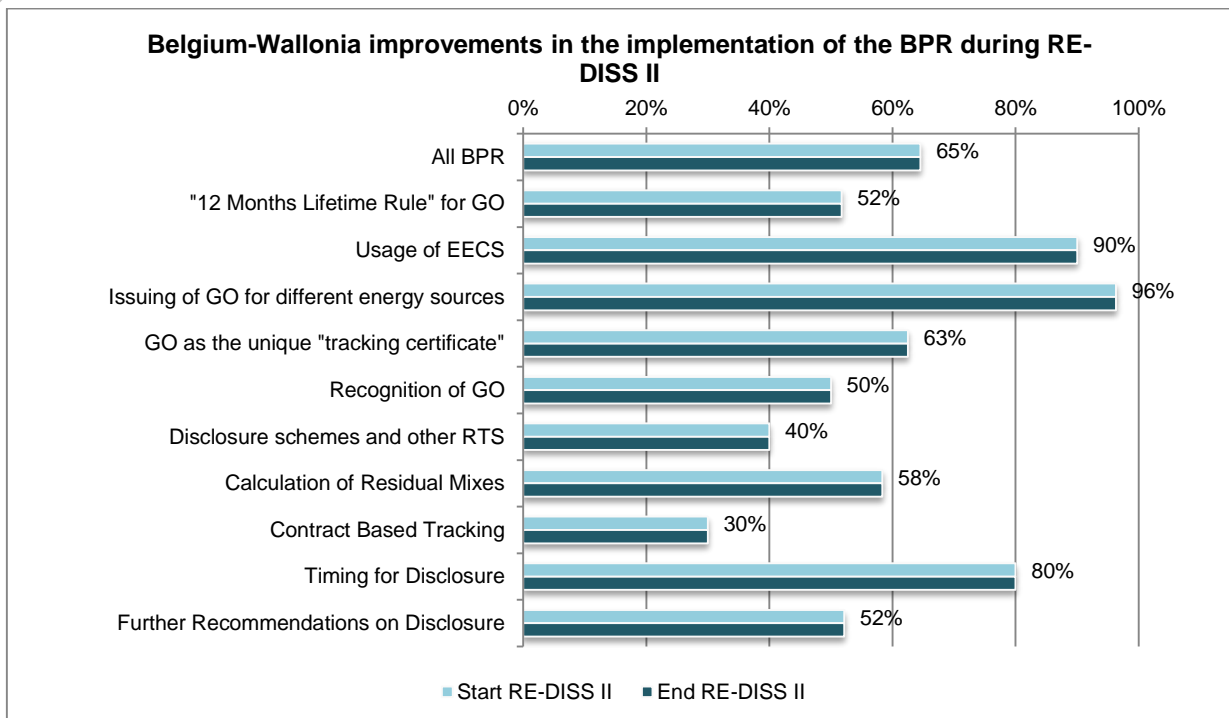


Figure 52: Improvements in addressing the main disclosure problems in Belgium-Wallonia during RE-DISS II

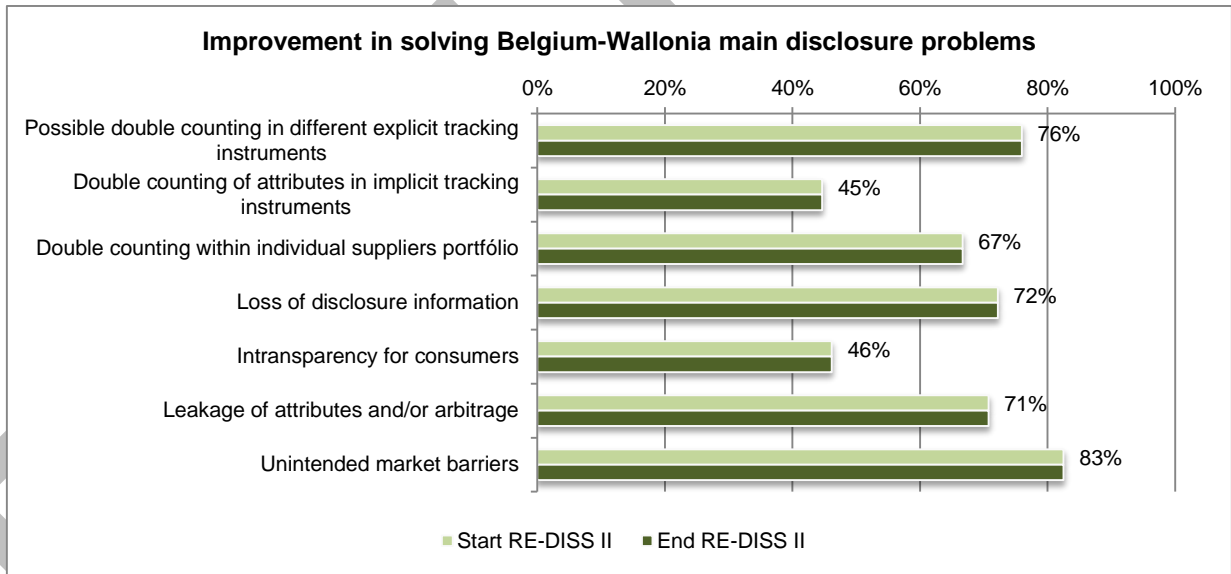


Figure 53: Improvements in the implementation of BPR in Bulgaria during RE-DISS II

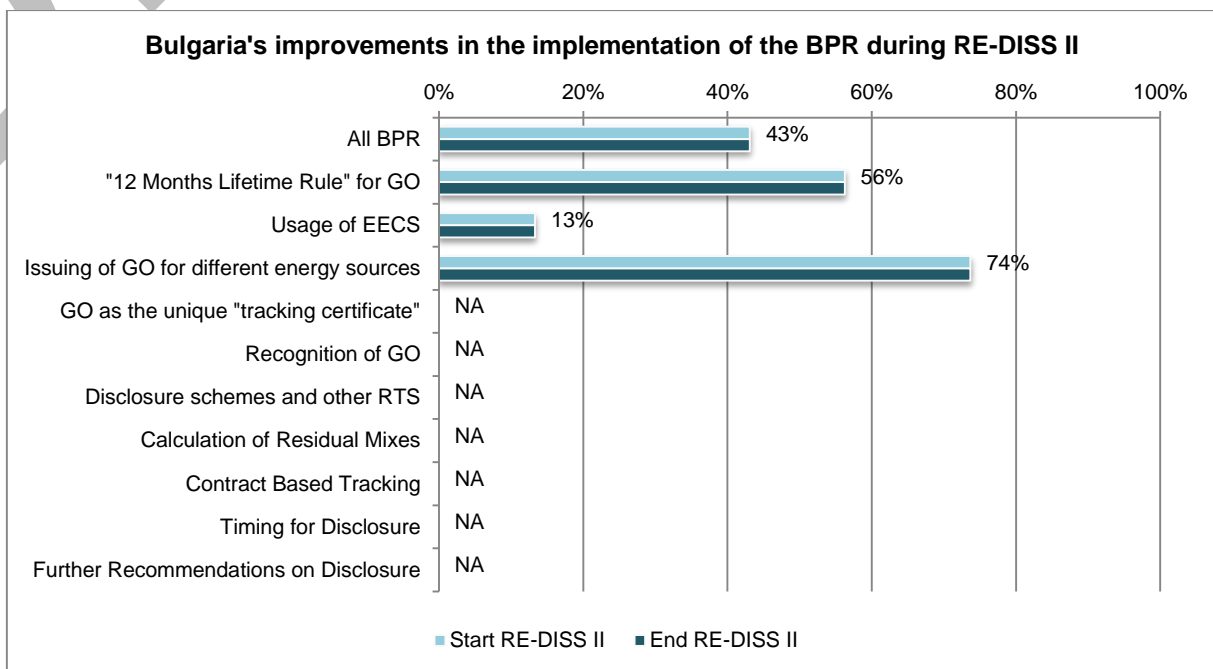


Figure 54: Improvements in addressing the main disclosure problems in Bulgaria during RE-DISS II

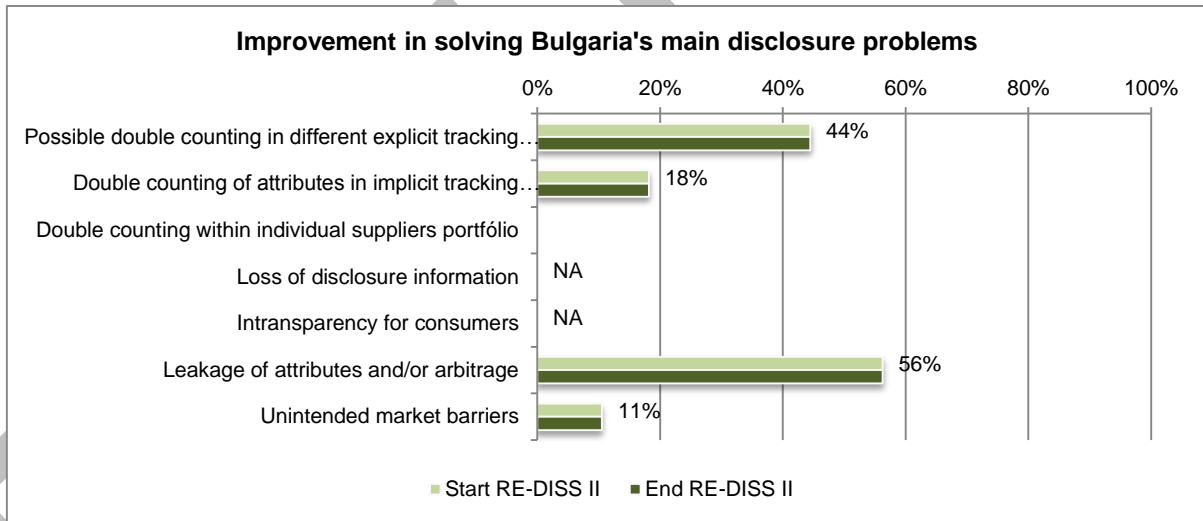


Figure 55: Improvements in the implementation of BPR in Denmark during RE-DISS II

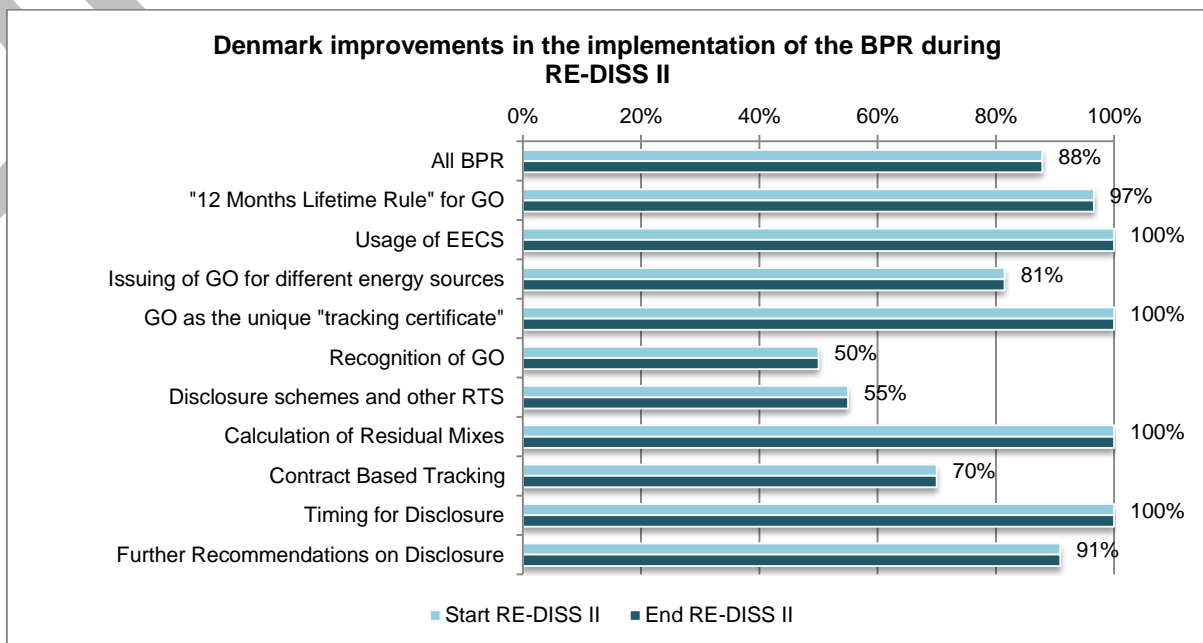


Figure 56: Improvements in addressing the main disclosure problems in Denmark during RE-DISS II

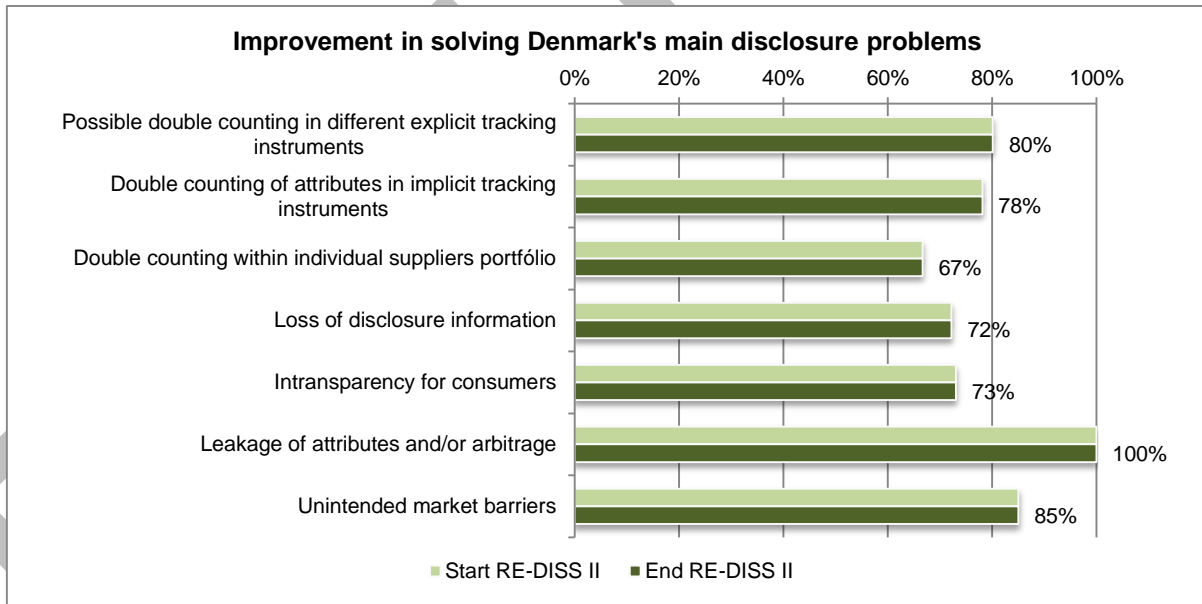


Figure 57: Improvements in the implementation of BPR in Finland during RE-DISS II

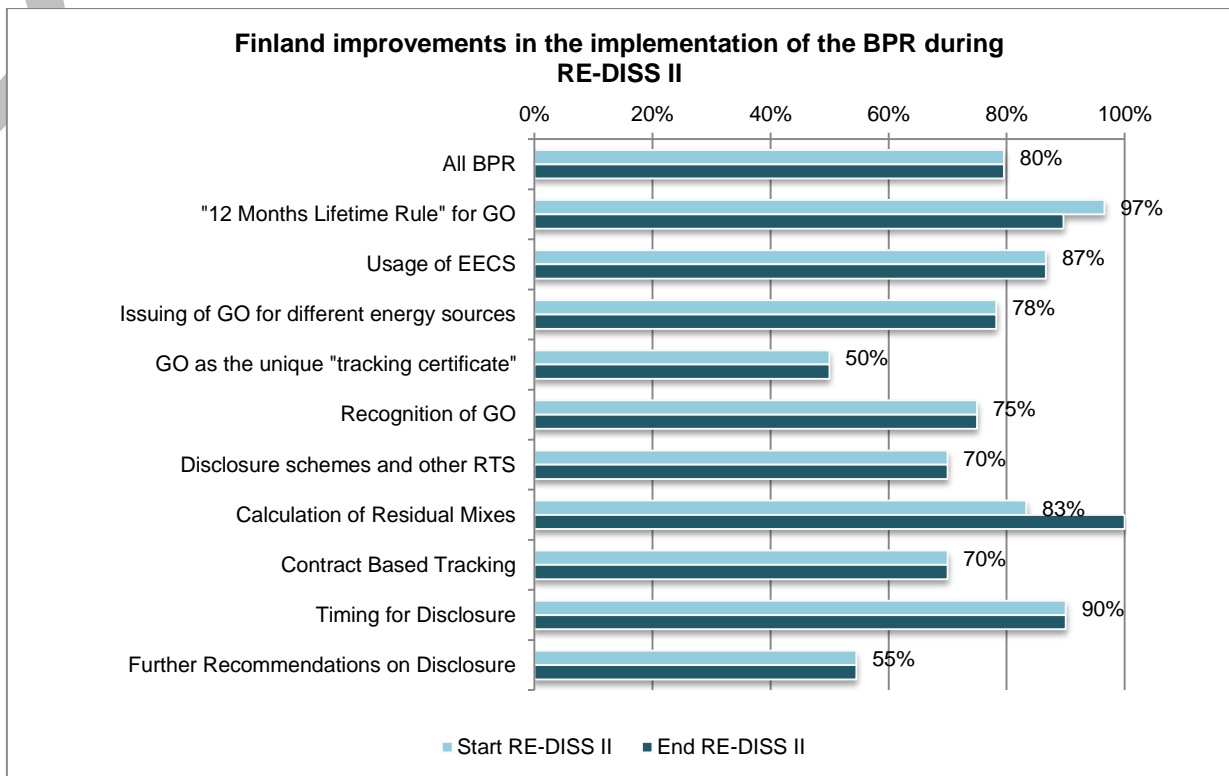


Figure 58: Improvements in addressing the main disclosure problems in Finland during RE-DISS II

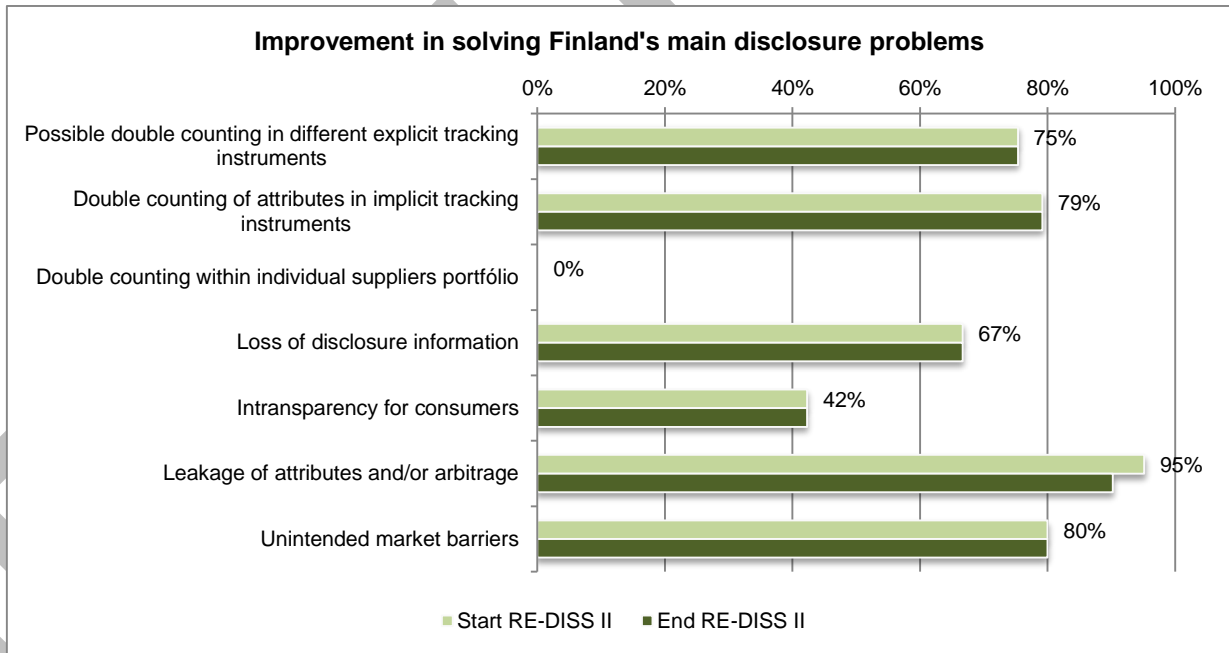


Figure 59: Improvements in the implementation of BPR in Hungary during RE-DISS II

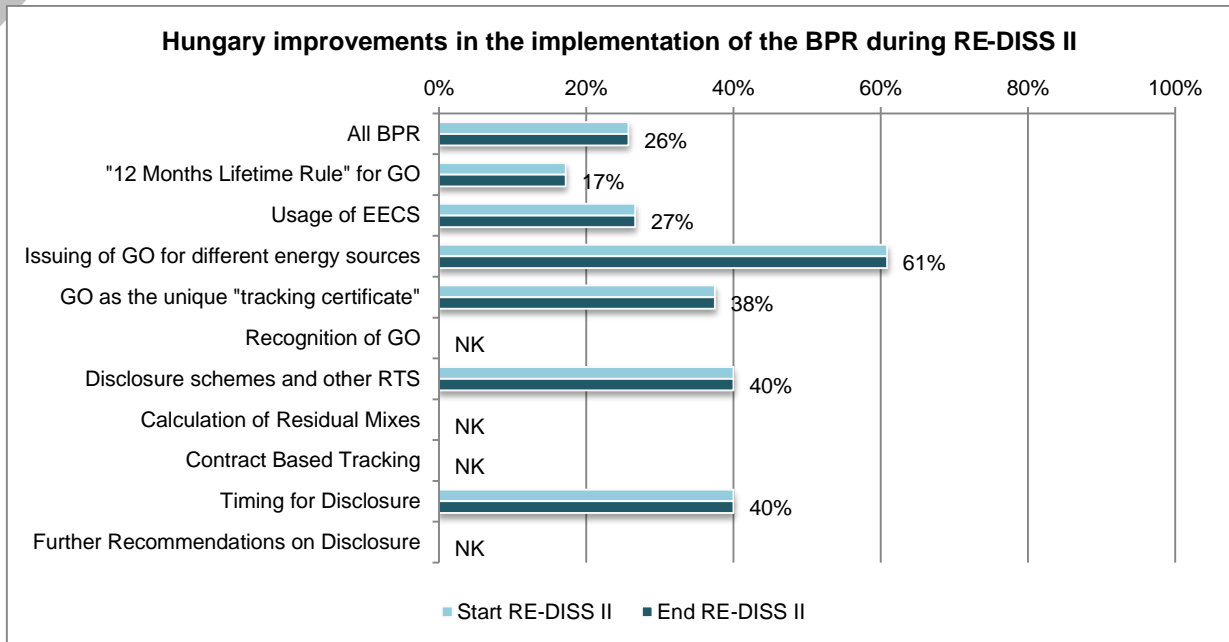


Figure 60: Improvements in addressing the main disclosure problems in Hungary during RE-DISS II

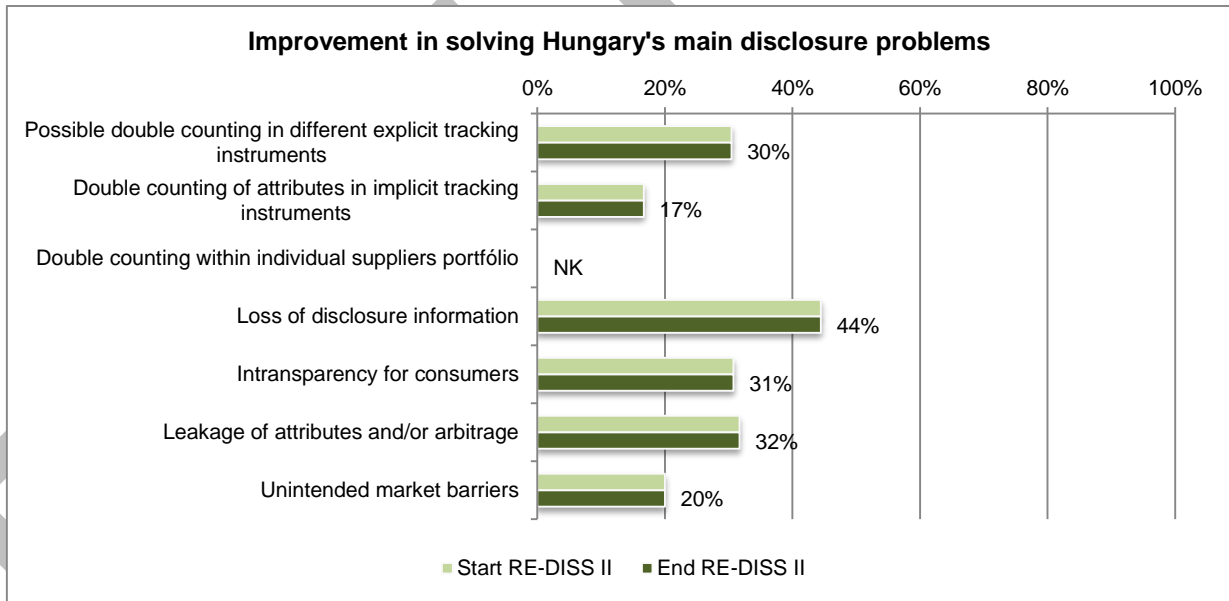


Figure 61: Improvements in the implementation of BPR in Latvia during RE-DISS II

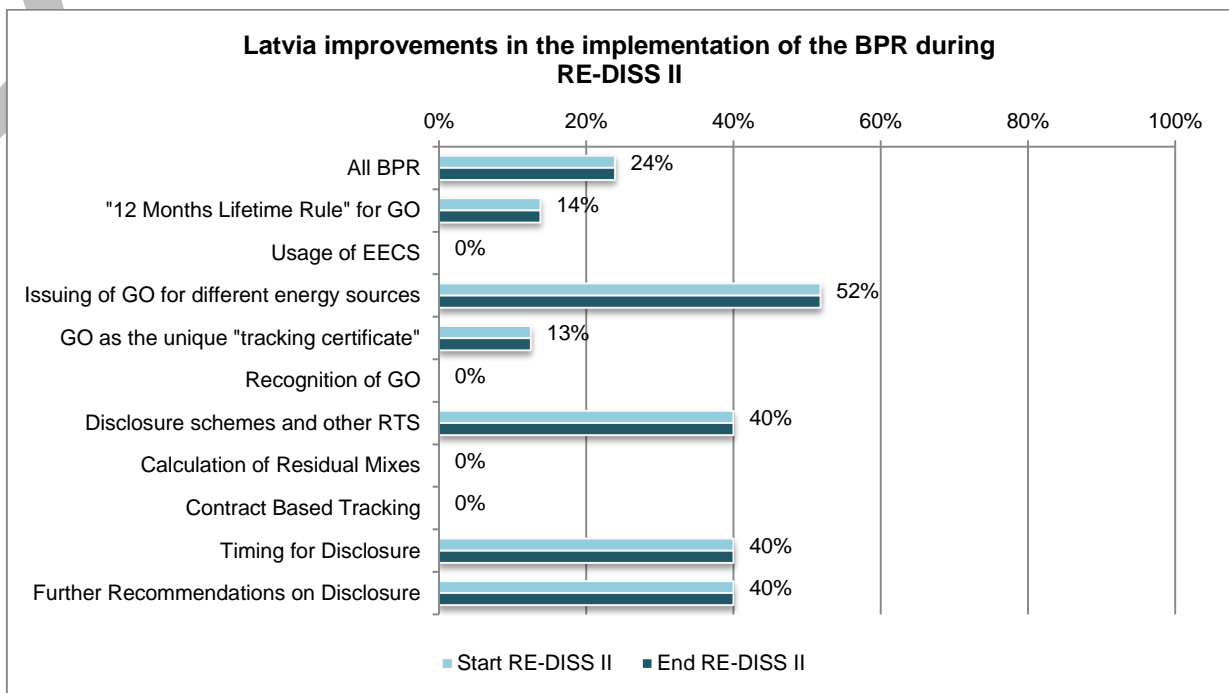


Figure 62: Improvements in addressing the main disclosure problems in Latvia during RE-DISS II

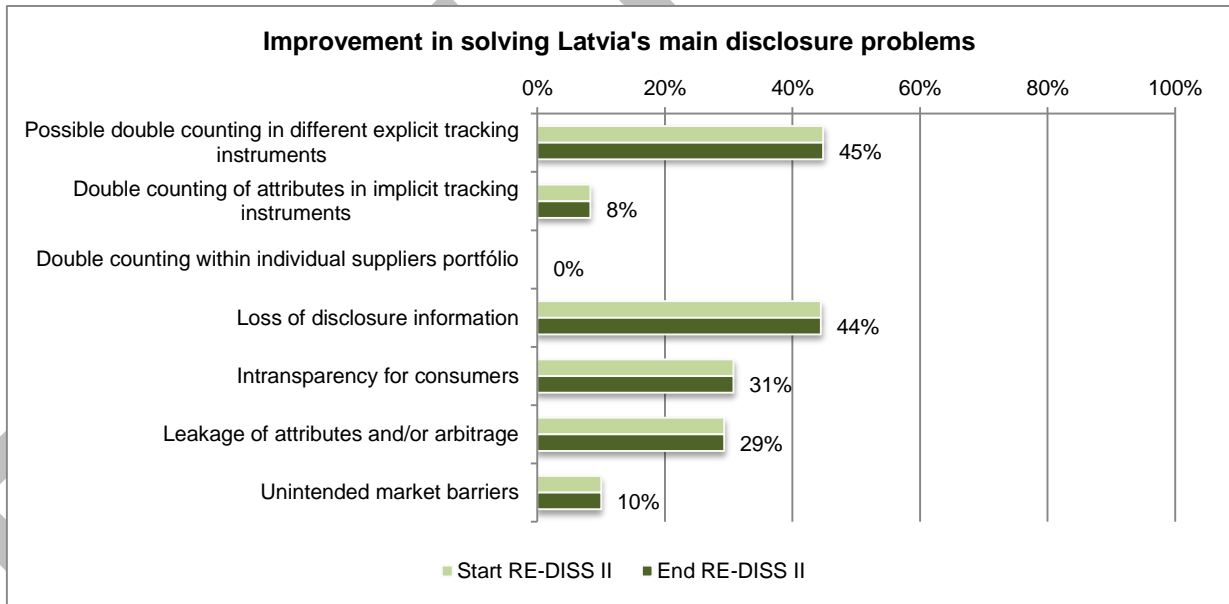


Figure 63: Improvements in the implementation of BPR in Lithuania during RE-DISS II

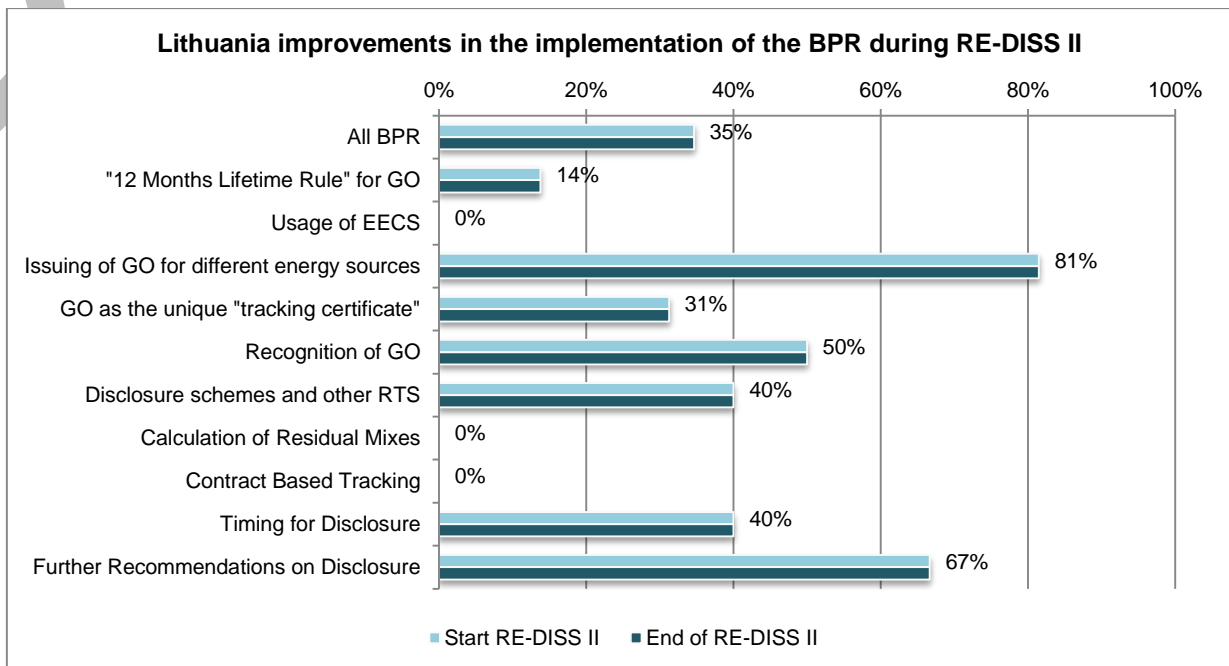




Figure 64: Improvements in addressing the main disclosure problems in Lithuania during RE-DISS II

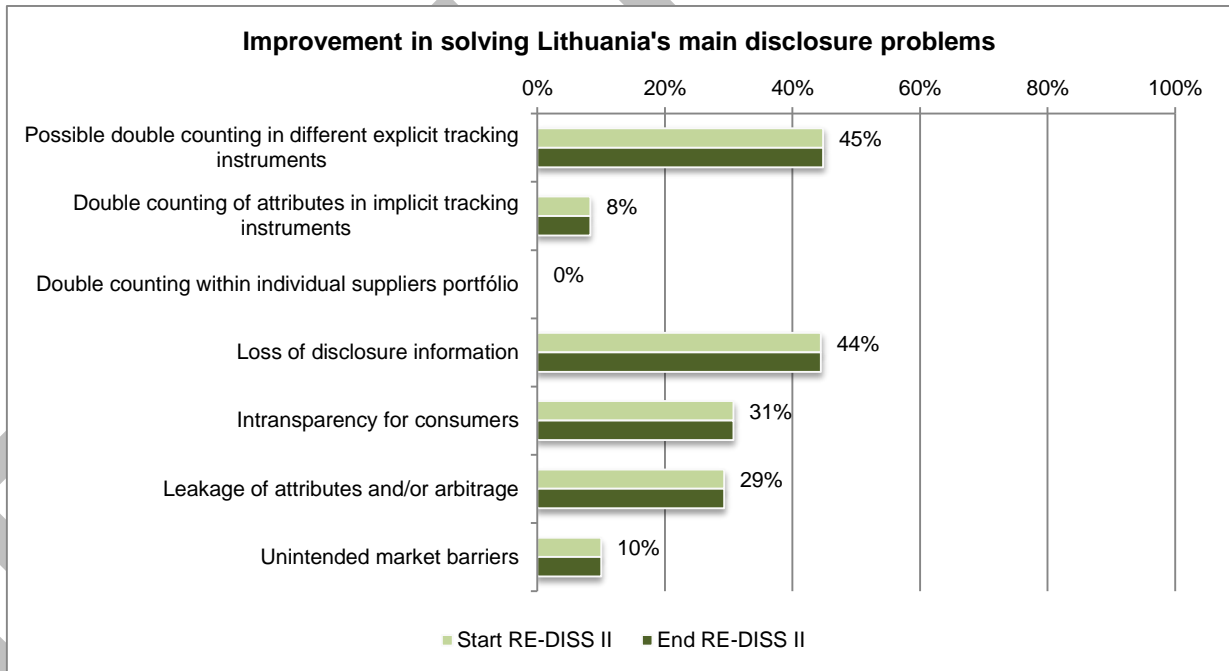


Figure 65: Improvements in the implementation of BPR in Romania during RE-DISS II

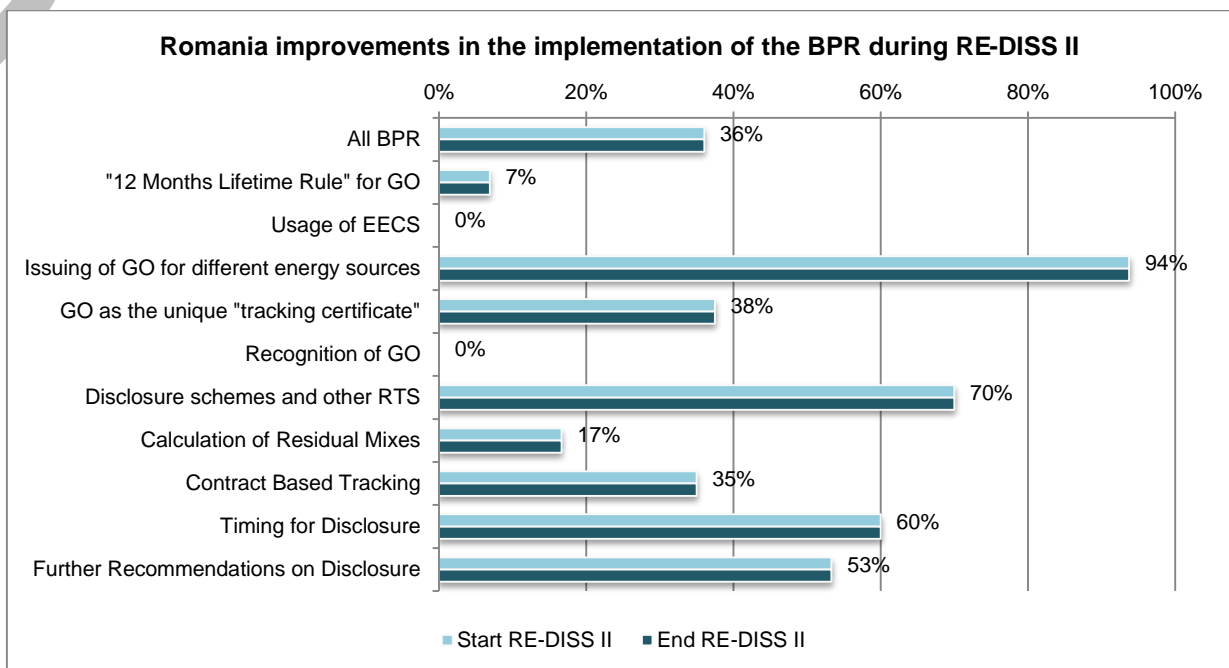


Figure 66: Improvements in addressing the main disclosure problems in Romania during RE-DISS II

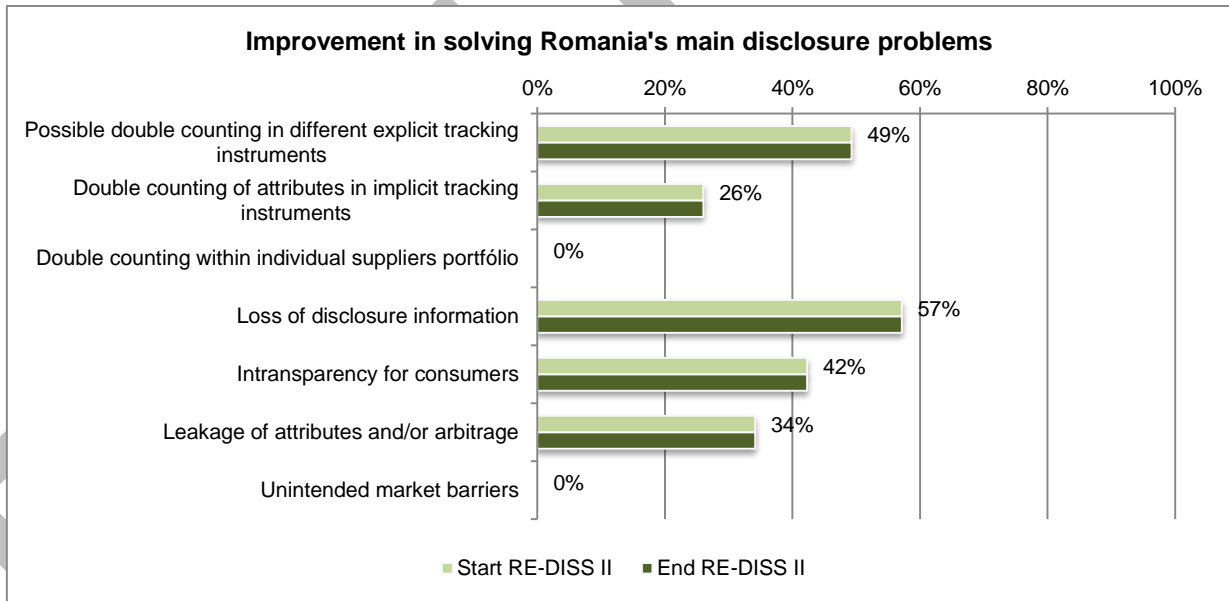


Figure 67: Improvements in the implementation of BPR in Switzerland during RE-DISS II

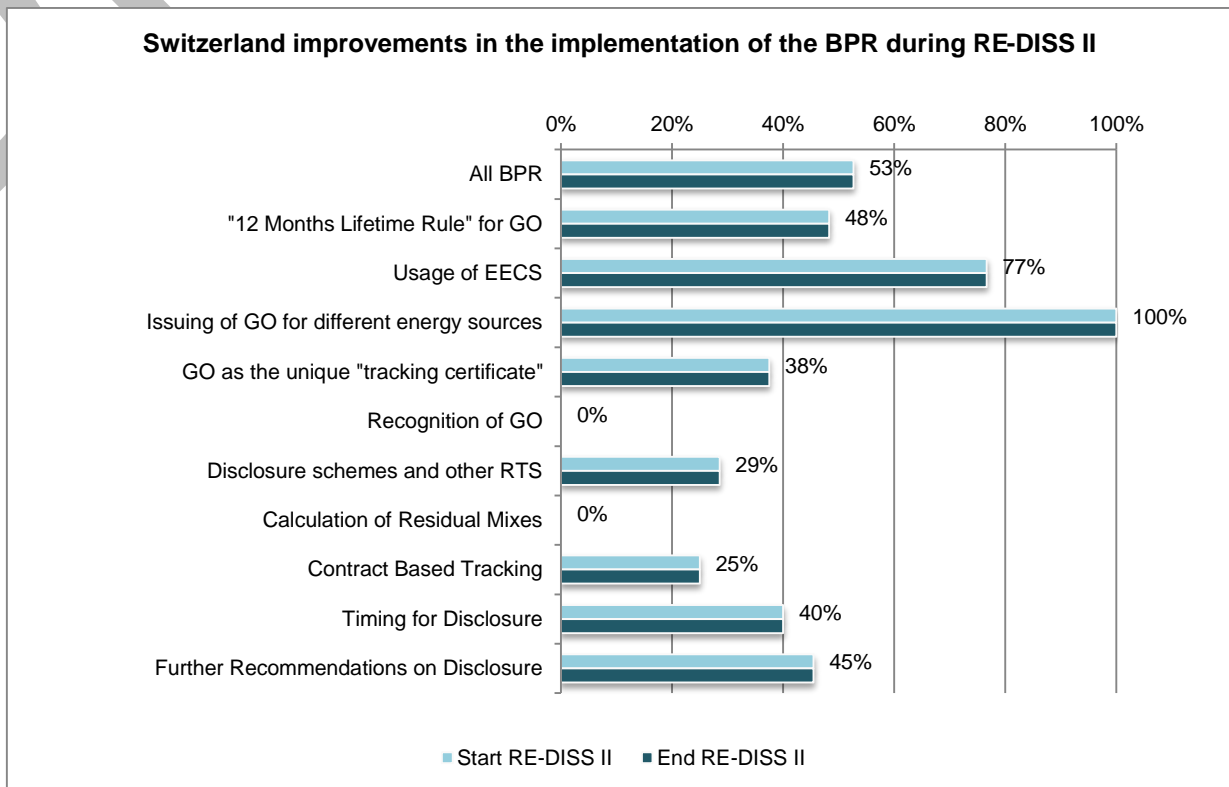


Figure 68: Improvements in addressing the main disclosure problems in Switzerland during RE-DISS II

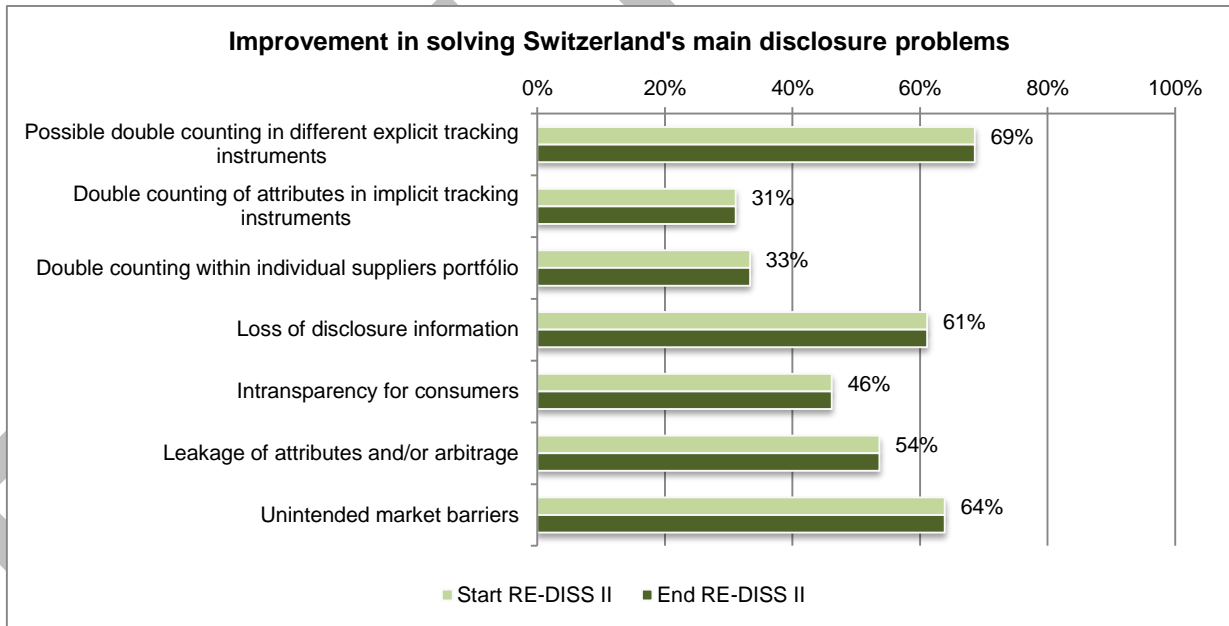


Figure 69: Improvements in the implementation of BPR in Great Britain during RE-DISS II

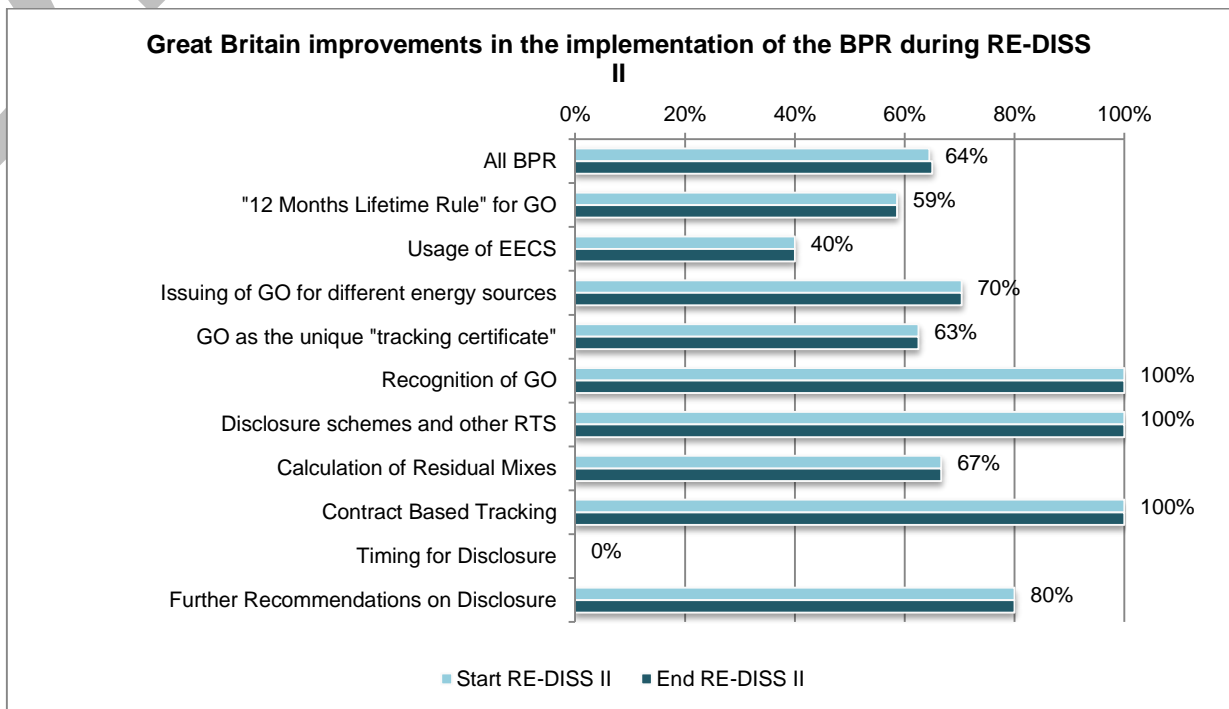
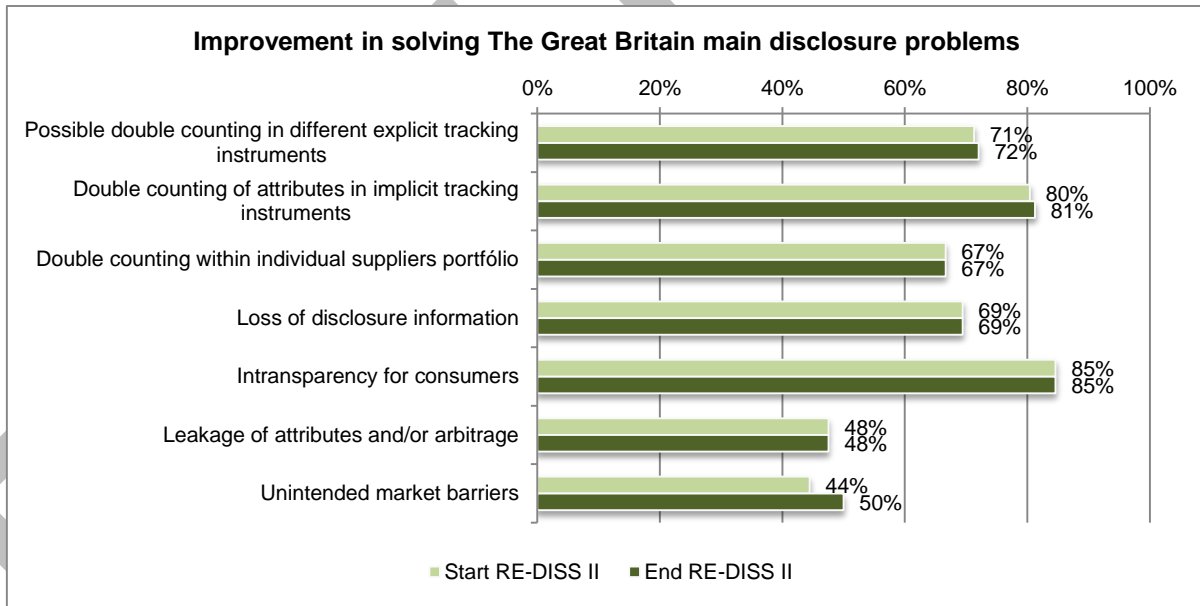


Figure 70: Improvements in addressing the main disclosure problems in Great Britain during RE-DISS II

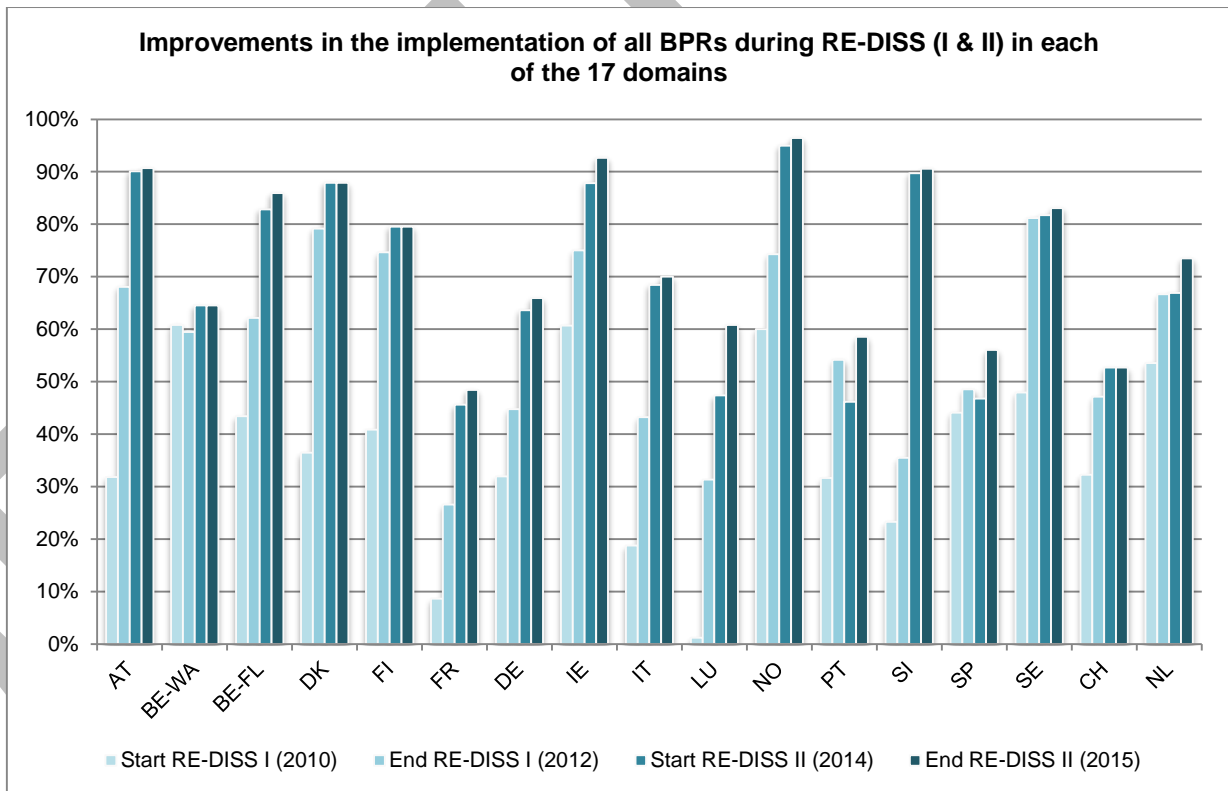


#### 6.4 Improvements registered in the implementation of the BPR since the beginning of the RE-DISS project in 2010

Figure 71 shows the historical evolution of the status of implementation of all BPR during the entire RE-DISS project in the period from 2010 to 2015 for each of the 17 domains, which had been already assessed, in the first phase of the RE-DISS project. As it can be seen from this figure large improvements were made in the implementation of all BPR:

- More than 50% of improvements were registered for Austria, Denmark, Italy, Luxemburg and Slovenia;
- Improvements between 30-50% were registered for Belgium-Flanders, Finland, France, Germany, Ireland, Norway and Sweden; and
- Improvements up to 30% were registered for Belgium-Wallonia, Portugal, Spain, Switzerland and The Netherlands.

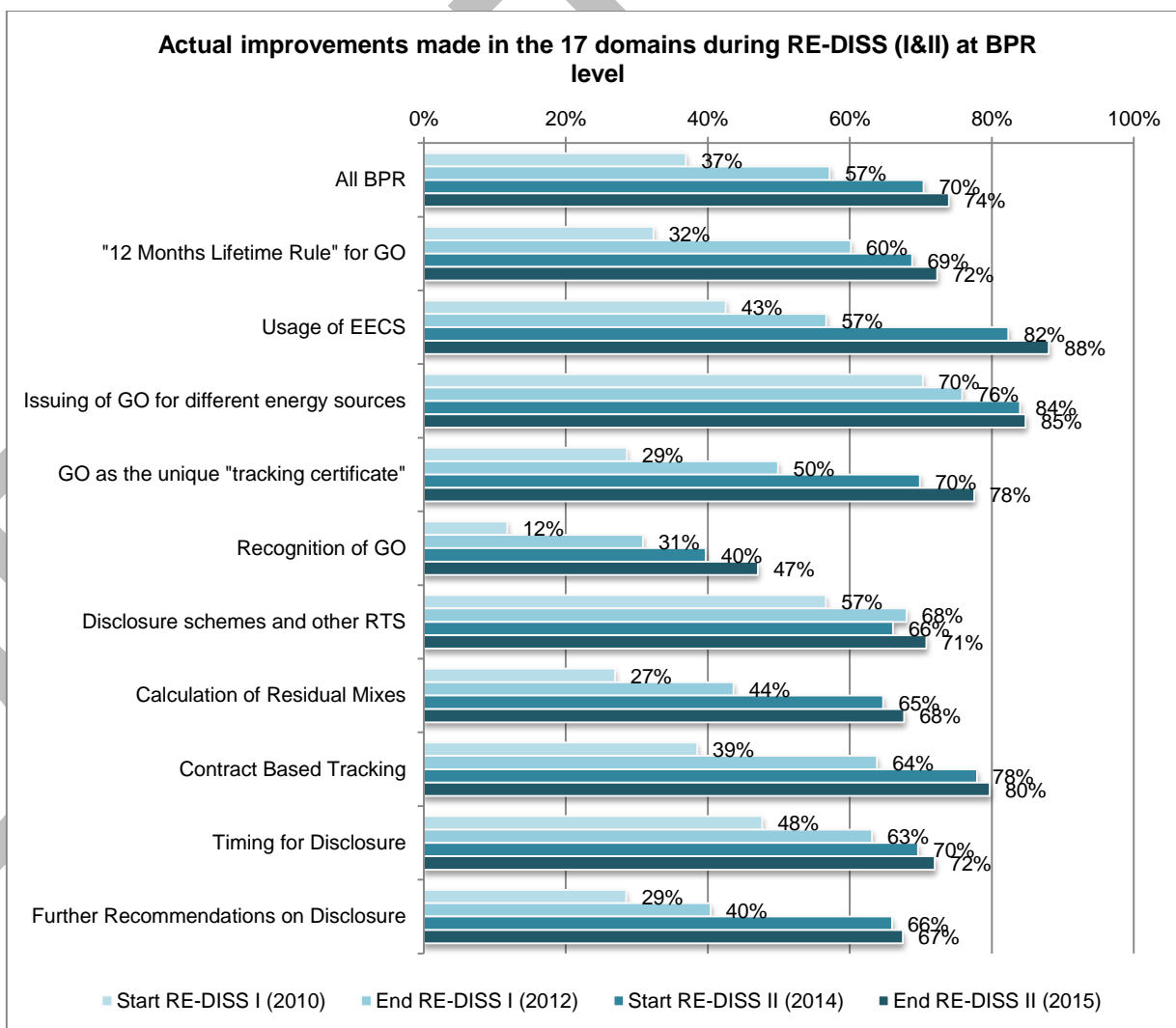
Figure 71: Status of implementation of all BPR in the 17 domains during the entire RE-DISS project



As it can be seen in Figure 72 during the entire RE-DISS project important improvements were registered throughout all BPR categories (between 14 and 49 percentage points) in the 17 domains. The BPR category with highest registered improvement was the “GO as the unique tracking certificate” (49% improvement), followed by “Usage of EECS” (45% improvement) and by “Calculation of Residual Mix” and “Contract Based Tracking” (both with 41% improvement). 14% improvement was registered for the BPR categories “Issuing of GO for different energy sources” and “Disclosure schemes and other RTS”.

It is important to refer that the biggest rate of improvements across the different BPR categories for the 17 domains was registered during RE-DISS I (as the improvements on the different categories varied between 5% and 28%). During RE-DISS II the rate of improvement across the different BPR categories for the 17 domains was more moderate and varied between 1% and 8%.

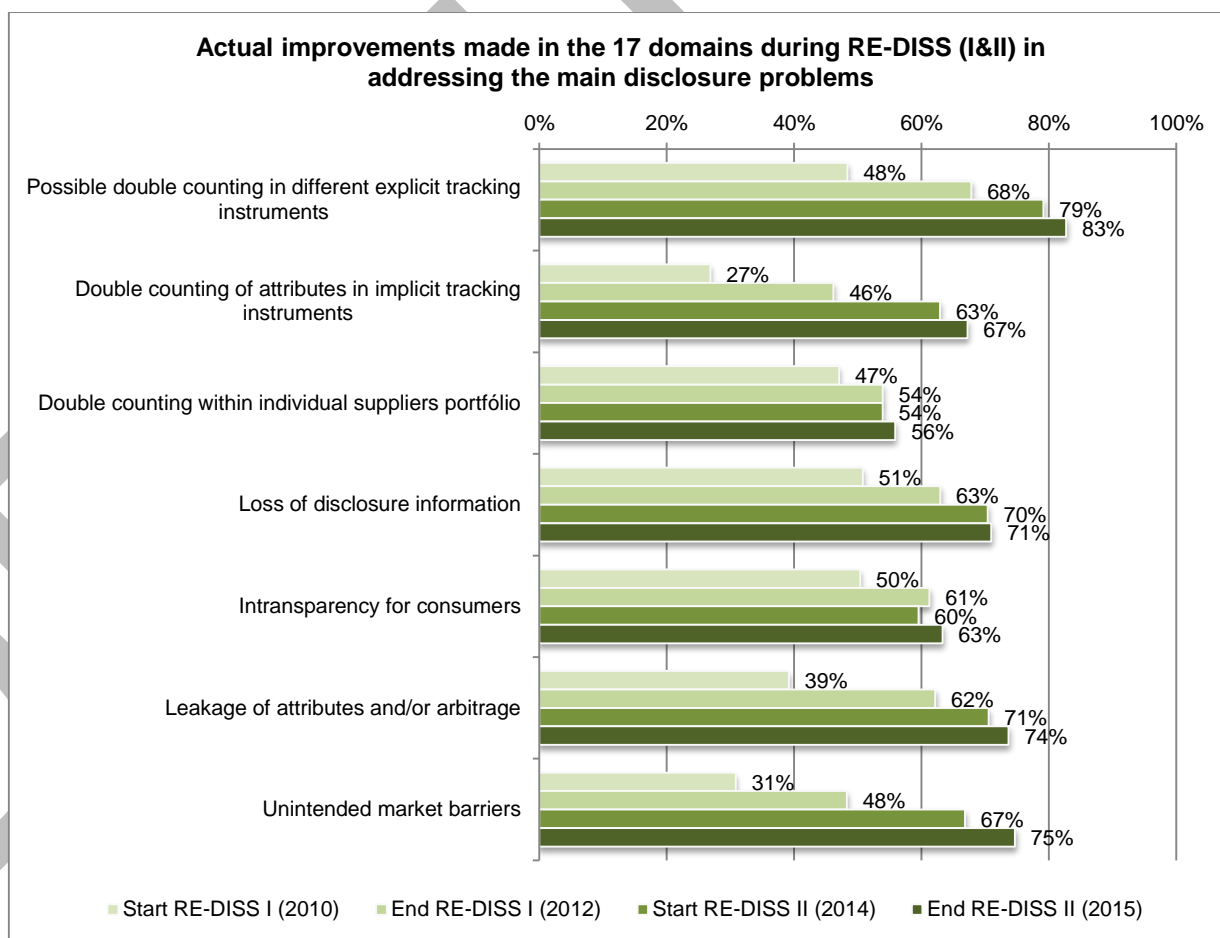
Figure 72: Improvements in the implementation of BPR in the 17 domains during RE-DISS



Similarly to the improvements in the implementation of the BPR categories across the 17 domains, the improvements registered in addressing the main disclosure problems during the entire RE-DISS project were also high: between 9% and 44% (see Figure 73). The biggest improvement was registered in addressing the problem of “Unintended market barriers” (44% improvement registered between the start of RE-DISS I and end of RE-DISS II). The smallest improvement was registered in addressing the problem “Double counting within individual suppliers portfolio” (9% improvement registered).

Once again, the biggest improvements in addressing the main disclosure problems were registered during RE-DISS I (improvements varying between 7% and 23%). During RE-DISS II the registered improvements were moderate: between 1%-8%.

Figure 73: Improvements in addressing the main disclosure problems in the 17 domains during RE-DISS



## 7 Quantitative Improvements: Residual Mix

Based on the qualitative data collection sheets, Table 9 was compiled. It describes for each considered country which of the issues described in Chapter 3.2 existed. This was used as input for the simulation of residual mix calculation practices of each country (see methodology in Chapter 3.2). The first line (1) of each country describes the situation before RE-DISS I (2010), the second line (2) that after RE-DISS I (2012) and the third line (3) that after RE-DISS II (2015). If no rules for implicit disclosure exist in the domain, Issues 3, 4 and 5 are not applicable.

The following holds true for the markings of Table 9 in relation to each issue:

- Issue 1: Uncorrected generation statistics used for implicit disclosure
  - X = Uncorrected mix used for implicit disclosure (e.g. production, ENTSOe, Eurostat)
  - (X) = Uncorrected mix used for implicit disclosure, but RES is taken out
  - None = Residual mix or full disclosure<sup>15</sup>
- Issue 2: Contract-based tracking is used
  - X = Unsupervised CBT allowed
  - (X) = CBT allowed but supervised or allowed only for NUC/FOS
  - None = CBT not allowed
- Issue 3: Residual mix calculation is not harmonized with the rest of Europe
  - X = European Attribute mix not used
  - None = European Attribute mix used or full disclosure
- Issue 4: Geographical domains for implicit disclosure overlap
  - X = Calculation domain is overlapping with another domain (e.g. Nordics / use of ENTSOe mix without a coordinated approach)
  - None = Calculation domain is not overlapping or full disclosure.
- Issue 5: Residual mix only considers explicit tracking of the reference production year attributes
  - X = Calculation considers only explicit tracking of the reference production year attributes
  - None = Calculation considers all transactions that occurred in the reference time period or uses a methodology that otherwise correctly considers the production time. Or full disclosure.

Table 9: Existence of implicit disclosure issues per country before RE-DISS I, Before RE-DISS II and After RE-DISS II

Country	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5	Description
<b>Austria (1)</b>	X			X		No residual mix. ENTSO-e mix used for implicit disclosure.
<b>Austria (2)</b>	(X)			X		All renewables filtered out of the ENTSO-mix before used for implicit disclosure

<sup>15</sup> Full-disclosure in this context means that all electricity is explicitly tracked with GOs (possibly supported by monitored CBT) and hence no residual mix is required.



Country	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5	Description
<b>Austria (3)</b>						Full Disclosure. No outstanding issues.
<b>Belgium (1)</b>	(X)					No residual mix. Production mix from which all RES filtered out used for implicit disclosure.
<b>Belgium (2)</b>	(X)					No improvements. When the share of unknown electricity is over 5%, suppliers have to use the RE-DISS RM
<b>Belgium (3)</b>	(X)					No improvements. When the share of unknown electricity is over 5%, suppliers have to use the RE-DISS RM
<b>Bulgaria (1)</b>	X	X				No Rules for implicit disclosure
<b>Bulgaria (2)</b>	X	X				No Rules for implicit disclosure
<b>Bulgaria (3)</b>	X	X				No Rules for implicit disclosure
<b>Croatia (1)</b>	X	X				No Rules for implicit disclosure
<b>Croatia (2)</b>	X	X				No Rules for implicit disclosure
<b>Croatia (3)</b>						No outstanding issues
<b>Cyprus (1)</b>	X	X				No Rules for implicit disclosure
<b>Cyprus (2)</b>	X	X				No Rules for implicit disclosure
<b>Cyprus (3)</b>						No outstanding issues
<b>Czech Republic (1)</b>	X	X				No Rules for implicit disclosure
<b>Czech Republic (2)</b>	X	X				No Rules for implicit disclosure
<b>Czech Republic (3)</b>	X	X				No Rules for implicit disclosure
<b>Denmark (1)</b>	X	(X)				No residual mix. CBT for nuclear and fossil.
<b>Denmark (2)</b>		(X)				Reliable and coordinated residual mix calculation. CBT of nuclear and fossil supervised. No outstanding issues.
<b>Denmark (3)</b>		(X)				No Improvements
<b>Estonia (1)</b>	X	X				No Rules for implicit disclosure
<b>Estonia (2)</b>	X	X				No Rules for implicit disclosure
<b>Estonia (3)</b>		(X)				CBT for NUC and FOS allowed
<b>Finland (1)</b>	(X)	X		X		Residual mix of Finland based on the Nordic region. No legal status for residual mix: given as a recommendation by the Association of Energy Industries. Contract based tracking allowed.
<b>Finland (2)</b>		(X)				Reliable and coordinated residual mix calculation set by legislation. CBT only

Country	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5	Description
						for nuclear and fossil.
<b>Finland (3)</b>		(X)				No Improvements
<b>France (1)</b>	X	X		X		No residual mix. Mix of own production, contracts and ENTSO-e mix used for disclosure.
<b>France (2)</b>	X	X		X		No improvements
<b>France (3)</b>	X	X				Estimated 70 % of untracked consumption now disclosed with RM. Contract based tracking still resides. Green offers can only be disclosed through Gos, but not all green in the supplier mix.
<b>Germany (1)</b>	X	X				Residual mix only corrected by German support RES-E volumes, but not for other explicit tracking. ENTSO-e mix for Germany minus German supported RES-E volumes as default value for disclosure. No clear regulation on eligible tracking instruments, therefore CBT, GOs, RECS and labels were used for explicit disclosure.
<b>Germany (2)</b>	(X)	(X)				National production mix, excluding all renewables, used for implicit disclosure. CBT only applicable for NUC/FOS
<b>Germany (3)</b>	(X)	(X)				Expired GOs added to implicit disclosure
<b>Great Britain (1)</b>		(X)	X			National RM where CBT is accounted
<b>Great Britain (2)</b>		(X)	X			No improvements
<b>Great Britain (3)</b>		(X)	X			No improvements
<b>Greece (1)</b>	X	X				No Rules for implicit disclosure
<b>Greece (2)</b>	X	X				No Rules for implicit disclosure
<b>Greece (3)*</b>	X	X				National RM where CBT is accounted (regulation not adopted yet*)
<b>Hungary (1)</b>	X	X				No Rules for implicit disclosure
<b>Hungary (2)</b>	X	X				No Rules for implicit disclosure
<b>Hungary (3)</b>	X	X				No Rules for implicit disclosure
<b>Iceland (1)</b>	X	X				No Rules for implicit disclosure
<b>Iceland (2)</b>						No outstanding issues
<b>Iceland (3)</b>						No outstanding issues
<b>Ireland (1)</b>			X			Disclosure based on contracts and residual mix (residual mix accounts for contracts).

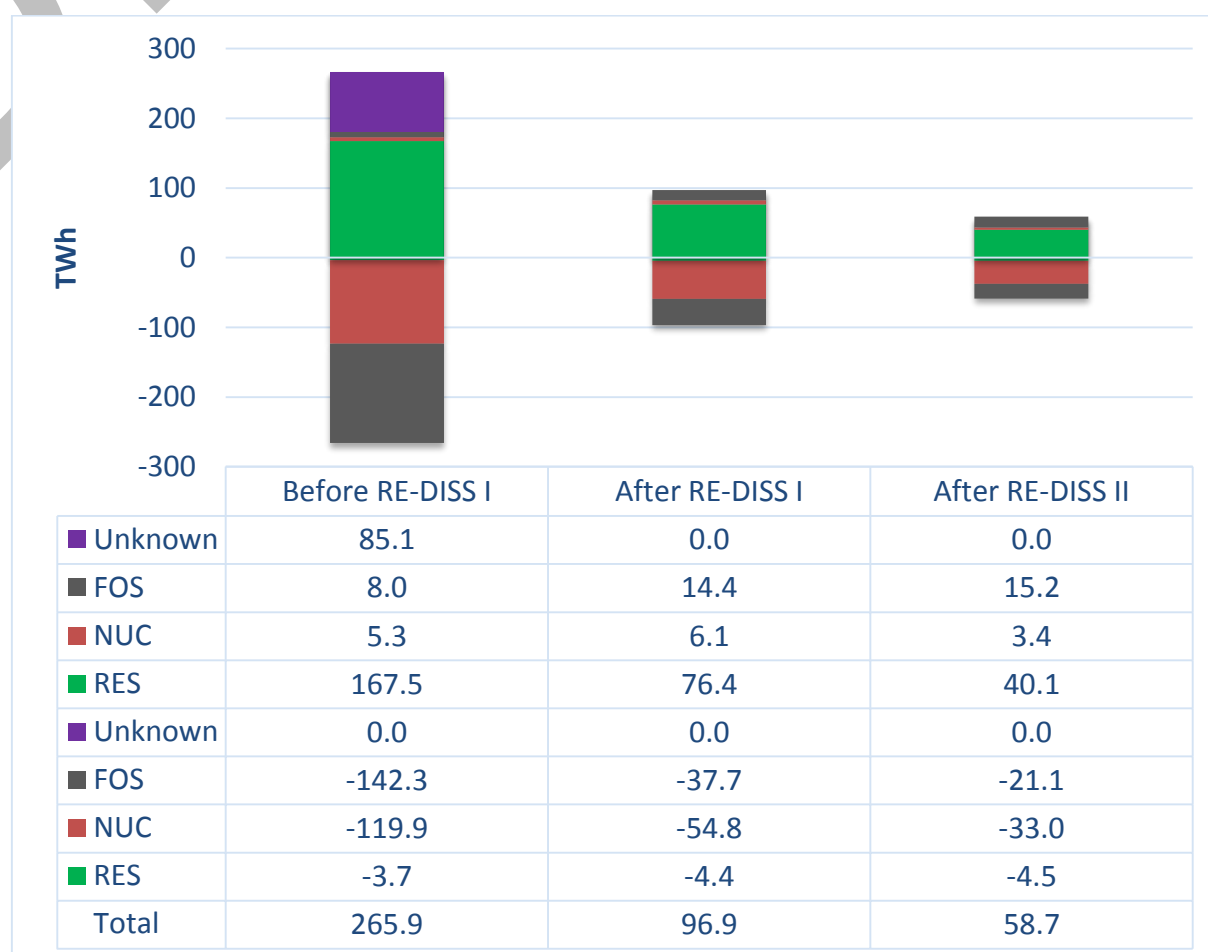
Country	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5	Description
						Residual mix is not coordinated with other countries.
Ireland (2)		(X)				Coordinated residual mix calculated. No outstanding issues.
Ireland (3)		(X)				No improvements
Italy (1)	X	X				No residual mix. Disclosure based on fuel mixes.
Italy (2)			X	X		Residual mix calculated but not coordinated (deficit disclosed with Eurostat mix). CBT not allowed
Italy (3)			X	X		No improvements
Latvia (1)	X	X				No Rules for implicit disclosure
Latvia (2)	X	X				No Rules for implicit disclosure
Latvia (3)	X	X				No Rules for implicit disclosure
Lithuania (1)	X	X				No Rules for implicit disclosure
Lithuania (2)	X	X				No Rules for implicit disclosure
Lithuania (3)	X	X				No Rules for implicit disclosure
Luxemburg (1)						No Rules for implicit disclosure
Luxemburg (2)	(X)	X		X		Disclosure system implemented. ENTSO-e mix from which all renewables filtered out used for implicit disclosure.
Luxemburg (3)	(X)			X		Contract based tracking not allowed, but ENTSOe (-RES) still used
Malta (1)	X	X				No Rules for implicit disclosure
Malta (2)	X	X				No Rules for implicit disclosure
Malta (3)	X	X				No Rules for implicit disclosure
Netherlands (1)	(X)	(X)	X			Residual mix refers to national production statistics, excluding all RES-E. Does not consider contracts and is not coordinated. Volumes of CBT (for FOS/NUC) have to be reported to the CB, but no mechanism to take this into account at the RM calculation
Netherlands (2)	(X)	(X)				No improvements
Netherlands (3)	(X)	(X)				No improvements
Norway (1)			X		X	Residual mix calculated, but not coordinated. Deficit attributes disclosed as unknown.
Norway (2)					X	Deficit attributes replaced with the European Attribute Mix. Residual mix only accounts for year X certificates.

Country	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5	Description
Norway (3)						No outstanding issues
Poland (1)	X	X				No Rules for implicit disclosure
Poland (2)	X	X				No Rules for implicit disclosure
Poland (3)	X	X				No Rules for implicit disclosure
Portugal (1)	X	X				No residual mix. Disclosure through contracts.
Portugal (2)			X			Residual mix calculated but not coordinated. Considers contracts.
Portugal (3)			X			Residual mix calculated but not coordinated. Considers contracts.
Romania (1)	X	X				No Rules for implicit disclosure
Romania (2)		(X)	X	X		National RM where CBT is accounted. UCTE for phys imports
Romania (3)		(X)	X	X		National RM where CBT is accounted. UCTE for phys imports
Slovakia (1)	X	X				No Rules for implicit disclosure
Slovakia (2)	X	X				No Rules for implicit disclosure
Slovakia (3)	X	X				No Rules for implicit disclosure
Slovenia (1)	X	X		X		No residual mix. Disclosure is based on contracts, GOs and ENTSO-e mix.
Slovenia (2)	X	X		X		No improvements.
Slovenia (3)						No outstanding issues
Spain (1)			X			Residual mix is calculated, but not coordinated with other countries (domestic attributes expanded if needed).
Spain (2)			X			No improvements.
Spain (3)			X			No improvements
Sweden (1)	(X)	(X)		X		Residual mix based on the Nordic region. Contract based tracking allowed but accounted for. No legal status for residual mix: given as a recommendation by the Association of Energy Industries.
Sweden (2)				X		Contract-based tracking not allowed (disclosure based on GOs or residual mix). Use of the residual mix obligated by law.
Sweden (3)				X		No improvements
Switzerland (1)	X	X				No residual mix. Contract-based tracking allowed.
Switzerland (2)		(X)				A major share of electricity explicitly tracked with GOs (as long as GOs are

Country	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5	Description
						available to suppliers); measures implemented for reducing the need for default mix). No outstanding issues
Switzerland (3)		(X)				No Improvements

On an overall level, Figure 74 presents the reduction of implicit disclosure errors brought about by the improvements described in Table 9. The positive values of Figure 74 demonstrate the total over-representation of the relevant attribute in countries where the attribute was over-represented in implicit disclosure. As previously explained, the total positive and negative errors are equal because if an attribute is over-represented in a domain, another attribute must be under-represented. It needs to be noted that values calculated in this report should be considered as indicative, due to the nature of implicit tracking, which is always subject to some national variance that cannot be accounted for in a centralized error analysis. Furthermore, the data used is of only 1 year (2014) and results would be to some extent different (although co-directional) had e.g. 2013 data been used.

Figure 74: Total implicit disclosure error Before RE-DISS I (left), After RE-DISS I (center) and After RE-DISS II (right)



From Figure 74 we see that the total implicit disclosure error decreased from 266 TWh from before RE-DISS I (what the error would have been with 2010 practices and 2014 data) to some 60 TWh after RE-DISS II. Double counting of renewables in the meantime dropped from nearly 170 TWh to 40 TWh between the first and last scenario. These improvements actualized through enhanced implicit disclosure practices implemented during the entire RE-DISS project (including both phases I and II). It is important to refer that: this only relates to implicit disclosure problems on a national level and not those resulting from disclosure errors inside a supplier's portfolio; and that not all improvements are necessarily a direct influence of RE-DISS, although in most cases RE-DISS has doubtlessly assisted.

Furthermore, no "unknown origin" was disclosed in the after RE-DISS II case, compared to 85 TWh before RE-DISS I. This is also a significant improvement, because the "unknown origin" was disclosed in Norway in the before RE-DISS I case, where, given the production mix of the country, it is probable that consumers assume a green origin for electricity without better knowledge.

The decreased amounts of RES and "unknown origin" were correctly replaced by NUC and FOS attributes, for which the negative disclosure error contracted from -120 TWh to -33 TWh and -142 TWh to -21 TWh, respectively.

These improvements have major impacts also in the disclosure of environmental indicators data. Contraction of the negative disclosure error of FOS by some 120 TWh would yield to roughly 72 Megatons of CO<sub>2</sub> being correctly disclosed with an assumed 600 g/kWh factor. Same goes for radioactive waste: contraction of the negative disclosure error for NUC of some 87 TWh would avoid incorrect disappearing of 260 tons of radioactive waste from disclosure with an assumed 3mg/kWh factor.

Progress solely during the RE-DISS II project phase can be observed as the difference between the second and third column of Figure 74. Total disclosure error decreased some 40 TWh (from 97 TWh to 59 TWh) and double counting of renewables by 36 TWh (From 76 TWh to 40 TWh) It is clear that improvements done in the first phase of the project had much greater impact as these related mostly to the active GO trading countries, whereas during the second phase mainly the newcomers achieved improvements. However, once these newcomers start actively transferring GOs internationally, the improvements achieved today will show a much clearer result. Figure 75 and Figure 76 break down Figure 74 in disclosure errors per individual country first in TWh and then in percentage units of Total Supplier Mix. In Figure 75 and Figure 76 there are 3 columns per country indicating the implicit disclosure error in the three scenarios (left: before RE-DISS I, center: after RE-DISS I and right: after RE-DISS II). If there are only 1 or 2 columns, this means that no error is remaining in the after RE-DISS II or already in the after RE-DISS I scenario.

Note, that if a country doesn't portray an error in Figure 74, this indicates that implicit disclosure was rather correct in the country. Most commonly it means that all issues have been resolved, but not always: for example if a domain had surplus of attributes in 2014 calculation, existence of issue 3 will not cause an error, but might do so in following years where a deficit is encountered.

From Figure 75 it is visible that the countries with largest errors in the before RE-DISS I case (Denmark, France, Italy, Norway) have all improved significantly and in many cases rectified the error altogether by end of RE-DISS II.

For the smaller countries Figure 76 is more descriptive as it portrays the percentage-unit error in Total Supplier Mix (e.g. 5%-unit positive error of RES means that 5% of consumption

was disclosed with RES that was double counted). Here we see the criticalness of correct implicit disclosure for countries such as Croatia, Finland, Iceland and Slovenia which have all rectified the error.

Countries where no rules exist for implicit disclosure (Bulgaria, Czech Republic, Hungary, Latvia, Lithuania, Malta, Poland and Slovakia) display a constant disclosure error ranging between 3 – 30 % of the TSM (Figure 76). Although the simulation for these countries was carried out in similar manner the wide range was largely due to correct handling of physically imported electricity, but also to some extent due to differences in RES shares of production mixes (the larger the share of RES, the more contract based tracking occurs in proportion to consumption).

Luxemburg and Sweden are peculiarities in Figure 76, because although according to Table 9 their implicit tracking regime has improved, these countries display a risen error. This is because the corrected error compensated for another error (Luxembourg: CBT compensated for removal of all RES from implicit mix; Sweden: CBT compensated for using the Nordic mix). Thus it needs to be separately stated that disallowing CBT in both of these countries has significantly improved implicit disclosure, although in Figure 76 this can't be observed due to the effect of other errors.

Looking at progress solely during RE-DISS II, countries relatively new to international GO trading, such as Croatia, Cyprus Estonia and Greece improved their performance significantly. However, on a quantitative-level this portrays still as quite small due to the relatively minor amount of explicit tracking, but will be more visible once the volumes grow. Advancements were also achieved in "more traditional" GO-trading countries such as France, Norway, Slovenia and Luxemburg.

Figure 75: Implicit Disclosure Error with Disclosure Practices Before (left) and After (right) RE-DISS (TWh)

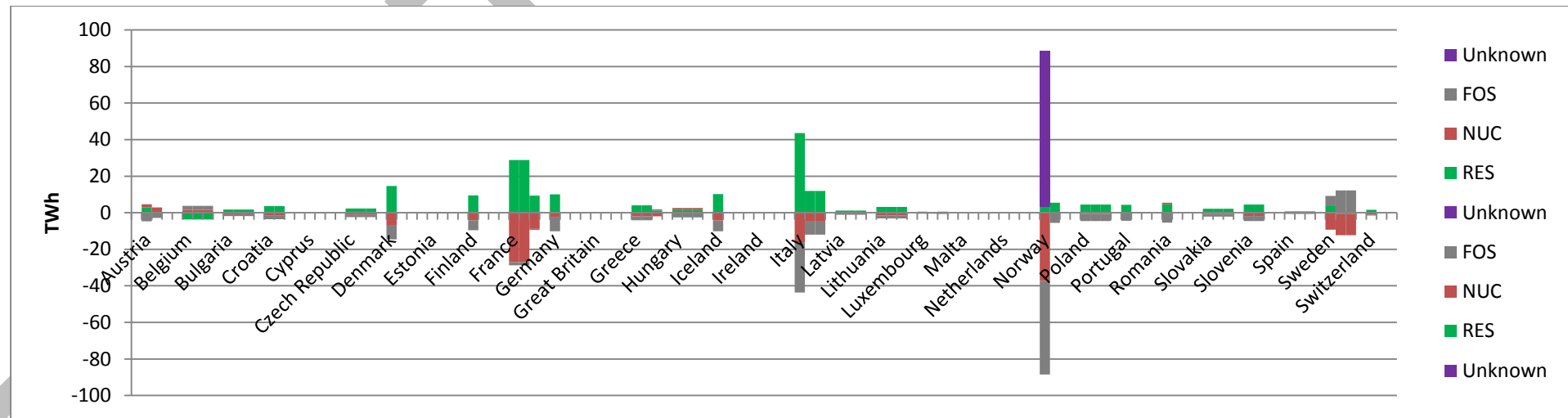
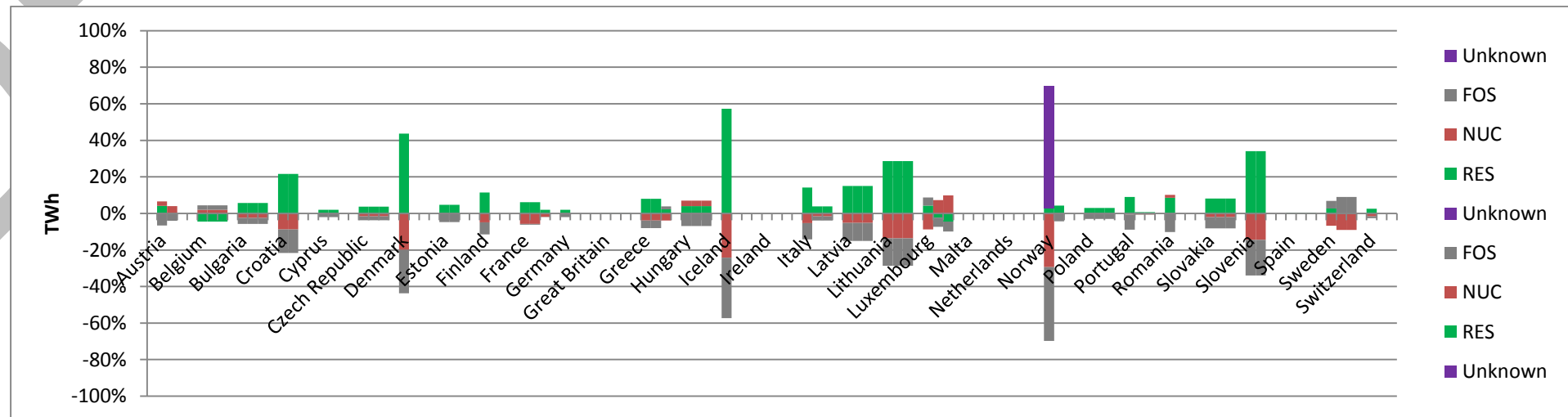


Figure 76: Implicit Disclosure Error with Disclosure Practices Before (left) and After (right) RE-DISS (%)





## 8 Works Cited

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