

# The evolution of the residual mix as key tool for avoiding double counting

RE-DISS II Final Conference, Belgium

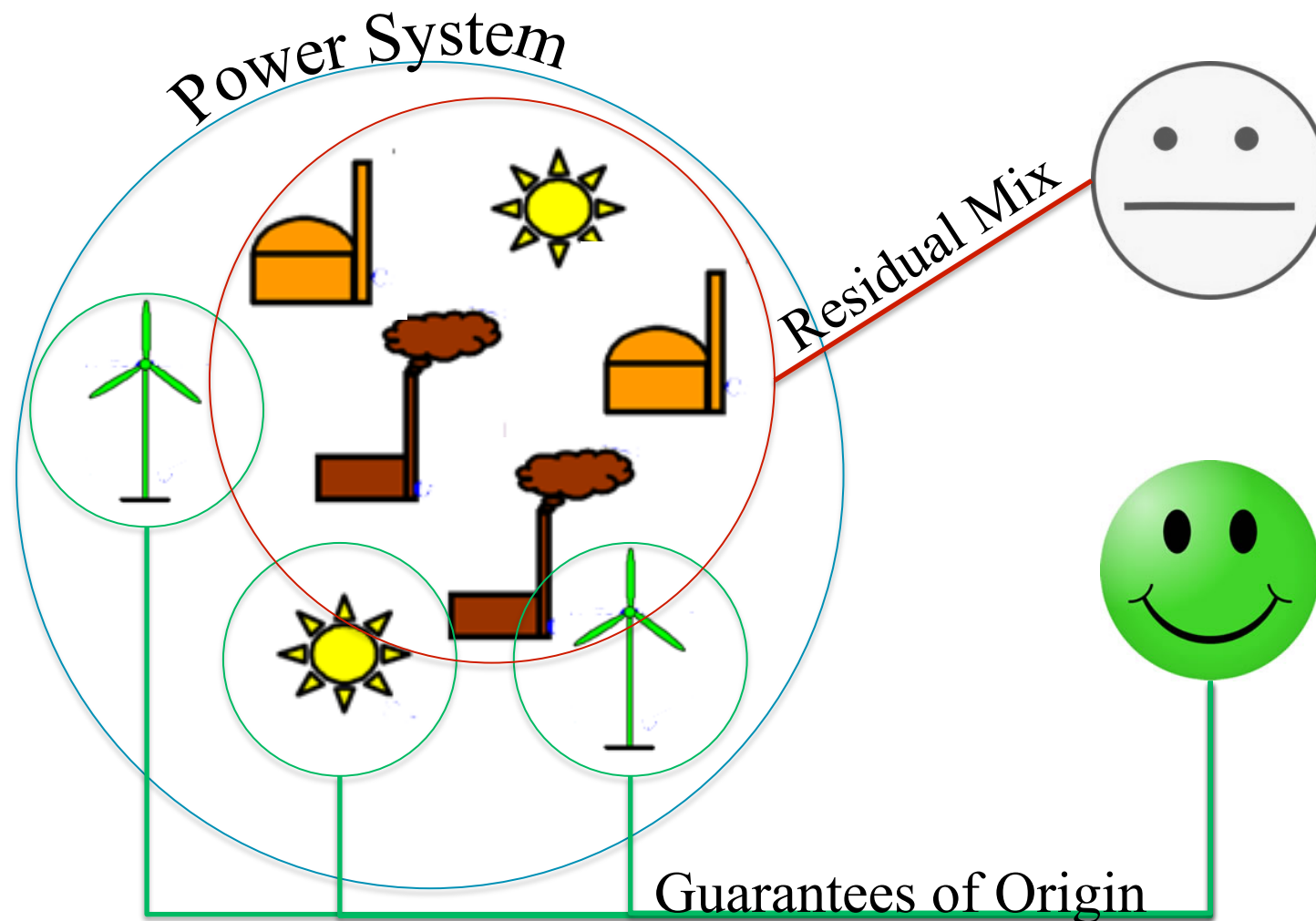
Bruges, 23.9.2015

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Programme of the European Union

## Residual Mix is leftover



## Residual Mix

- Mix of Generation Attributes, which are available after *Explicit Tracking* through Guarantees of Origin and other Reliable Tracking Mechanisms has been accounted for
  - Is first calculated at a domain level, but final residual mix must be internationally coordinated due to international exchange of Guarantees of Origin and electricity
    - Coordination through European Attribute Mix calculated by RE-DISS
  - Attributes of the Residual Mix
    - RES unspecified, Solar, Wind, Hydro&Marine, Geothermal, Biomass, Nuclear, Fossil unspecified, Lignite, Hard Coal, Gas, Oil
    - Direct CO<sub>2</sub>, Direct CO<sub>2</sub>eq, LCA CO<sub>2</sub>, LCA CO<sub>2</sub>eq
    - High-level radioactive waste
- Fulfills requirements of 2009/72/EC, Art. 3(9)

## RE-DISS Calculated European Residual Mixes & European Attribute Mix

- [http://www.reliable-disclosure.org/upload/161-RE-DISS\\_2014\\_Residual\\_Mix\\_Results\\_2015-05-15\\_corrected2.pdf](http://www.reliable-disclosure.org/upload/161-RE-DISS_2014_Residual_Mix_Results_2015-05-15_corrected2.pdf)

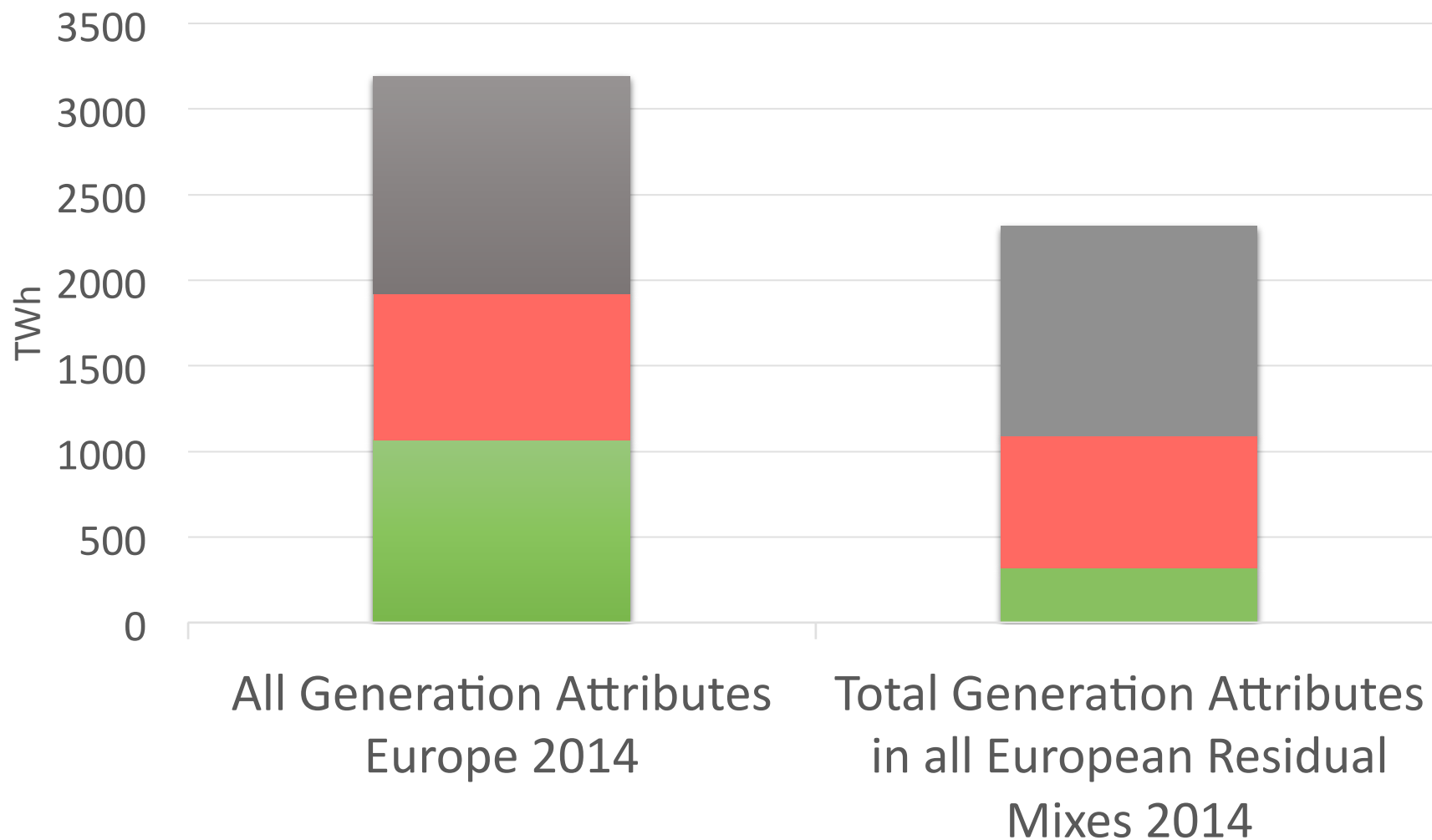
European Residual Mixes 2014

RE-DISS II

Table 2: Final Residual Mixes for 2014

	Residual Mix														Untracked consumption	Direct CO <sub>2</sub> (gCO <sub>2</sub> /kWh)	High-level RW (mgRW/kWh)
	Renewables Total	Renewables Unspecified	Solar	Wind	Hydro & Marine	Geothermal	Biomass	Nuclear Total	Fossil Total	Fossil Unspecified	Lignite	Hard Coal	Gas	Oil			
AT	0.15%	0.00%	0.01%	0.03%	0.08%	0.00%	0.02%	9.08%	90.78%	14.63%	5.56%	34.61%	29.61%	6.37%	13.39%	529.96	0.26
BE	11.88%	0.00%	2.15%	2.68%	3.41%	0.95%	2.70%	38.76%	49.36%	1.41%	4.60%	10.36%	32.84%	0.15%	34.60%	334.03	1.06
BG	16.33%	0.00%	2.93%	3.13%	9.95%	0.00%	0.31%	35.88%	47.80%	0.15%	37.67%	6.11%	3.86%	0.01%	100.00%	503.33	1.25
HR	58.30%	0.00%	0.23%	4.50%	52.62%	0.00%	0.94%	8.76%	32.94%	3.77%	8.32%	16.53%	4.23%	0.09%	99.43%	302.72	0.25
CY	7.00%	0.00%	1.87%	4.26%	0.00%	0.00%	0.88%	0.00%	93.00%	0.00%	0.00%	0.00%	0.00%	93.00%	99.99%	771.99	0.00
CZ	10.95%	2.99%	2.63%	0.57%	2.56%	0.00%	2.19%	36.28%	52.77%	0.14%	41.27%	5.78%	5.52%	0.06%	99.61%	561.59	1.27

## Residual Mix Prevents 700 TWh of Double Counting!



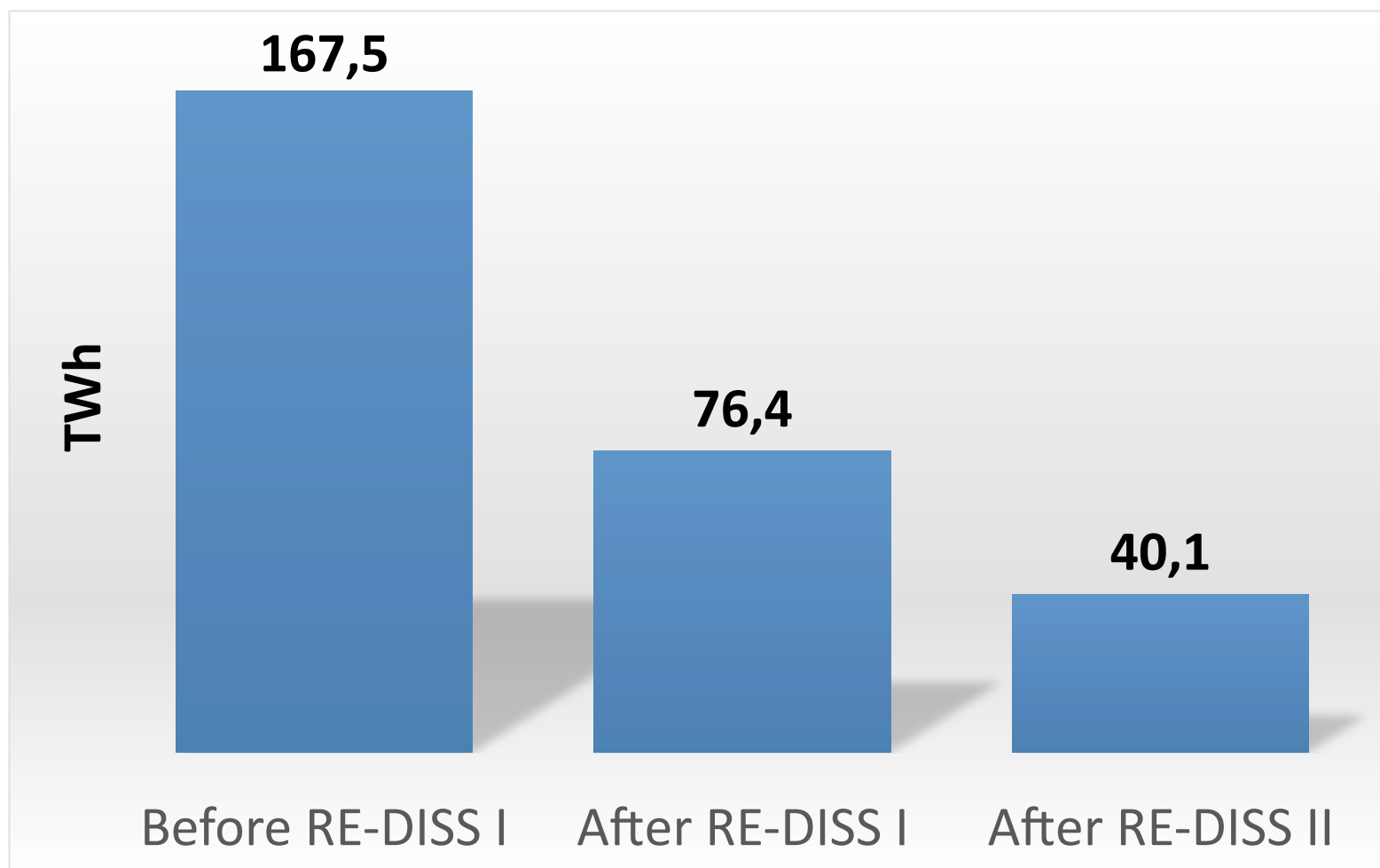
## How was the analysis made?

- The implicit disclosure (RM) policies of 31 countries were replicated in three scenarios using 2014 RMC data:
  - Before RE-DISS I, After RE-DISS I and After RE-DISS II
  - Evaluated against calculation according to RE-DISS BPR
- The effect of major errors on total disclosure was studied:
  - Application of uncorrected generation statistics
  - Use of non-transparent (contract-based) tracking mechanisms
  - No harmonization → EAM not used for attribute deficits
  - As well as overlapping regions and calculation methodology problems
- Analysis does not reflect:
  - Errors at supplier level, Errors in explicit tracking

## Basedata for the analysis

Country	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5	Description
France (1)	X	X		X		No residual mix. Mix of own production, contracts and ENTSO-e mix used for
France (2)	X	X		X		No improvements
France (3)	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.
Germany (1)	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.
Germany (2)	(X)	(X)				National production mix, excluding all renewables, used for implicit disclosure. CBT only applicable for NUC/FOS
Germany (3)	(X)	(X)				Expired GOs added to implicit disclosure

## Total double counting of renewables with RM practices Before and After RE-DISS (2014 data)

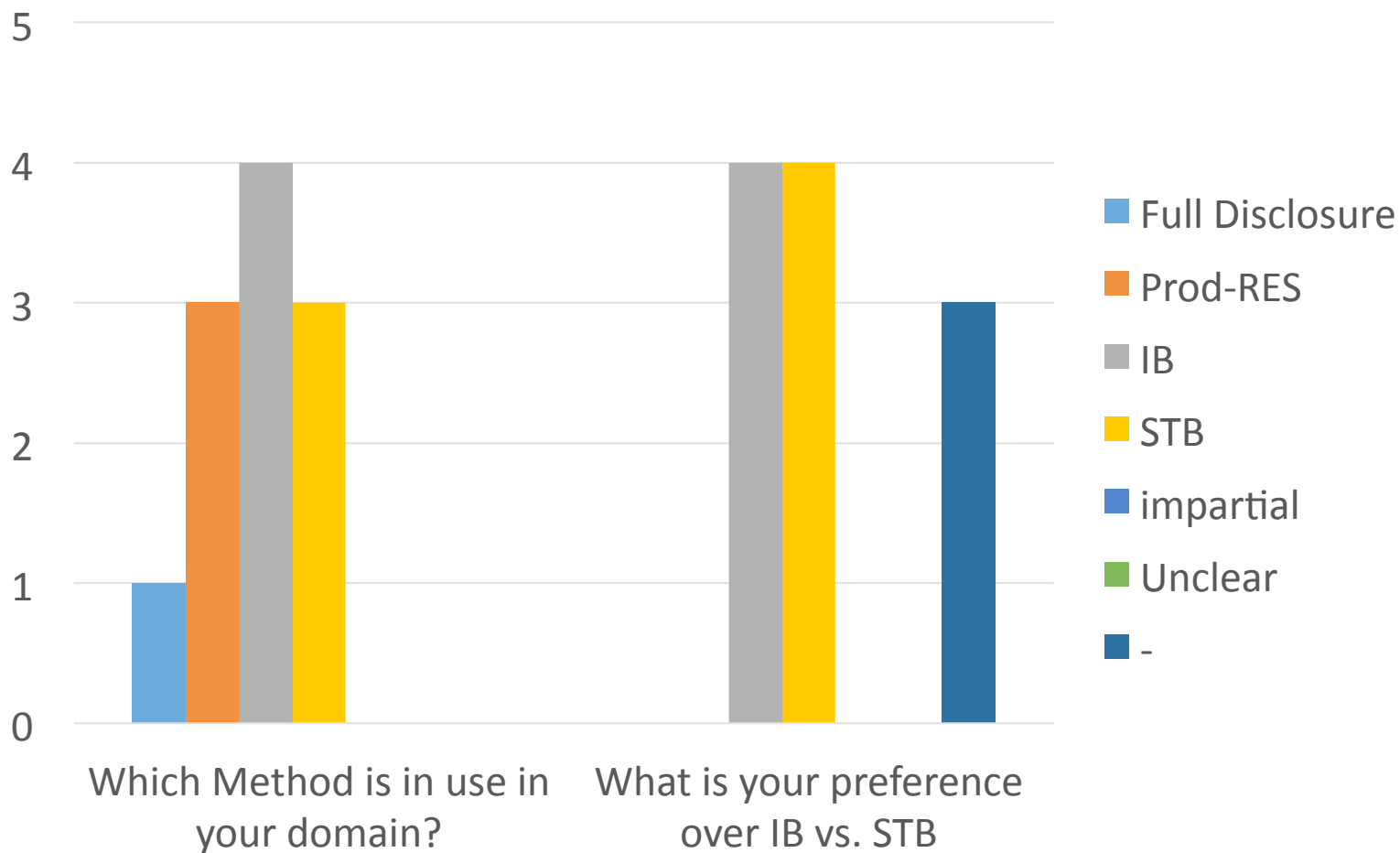




## Methodology Outlook

- **Issuance-Based Method**
  - **Deduct issuing**
- **Shifted Transaction-Based Method**
  - **Deduct cancellations and net export**
- Accurate, logical
  - Especially if production= disclosure year
- Robust without special measures
- Needs special measures, against:
  - Expanding/shrinking EAM
  - Late issuing
- Downsides
  - Inaccuracy of prod.year, negative RES, international movements

## How is residual mix calculated in your domain?



## In need of Robust and Simple Legacy Methodology

- Before RE-DISS: Central RM calculation for all countries
- During RE-DISS: RE-DISS in provides EAM for all and RM for some
- Current situation: One size doesn't fit all! (discl. DL; prod. and discl. year...)
- Legacy:
  - STB is always solid against double counting without extra measures or data
  - Both IB and STB supported → equal in long-run
  - CBs should assess the options in their regulative setting
- Central RM calculation for all countries after further harmonization?

## Conclusions

- Without an implicit disclosure regime, explicit electricity tracking (GOs) is double counted!
  - Implement residual mix
  - Make cancelled GOs sole way to sell RES (/electricity from a known source)
- Measures taken during RE-DISS have reduced double counting by 130 TWh
- Residual Mixes and European Attribute Mix will continue to be counted using a shifted transaction-based methodology
  - Issuance-based methodology continues to be supported and fits well in countries where production and disclosure year of GOs are to large extent the same.

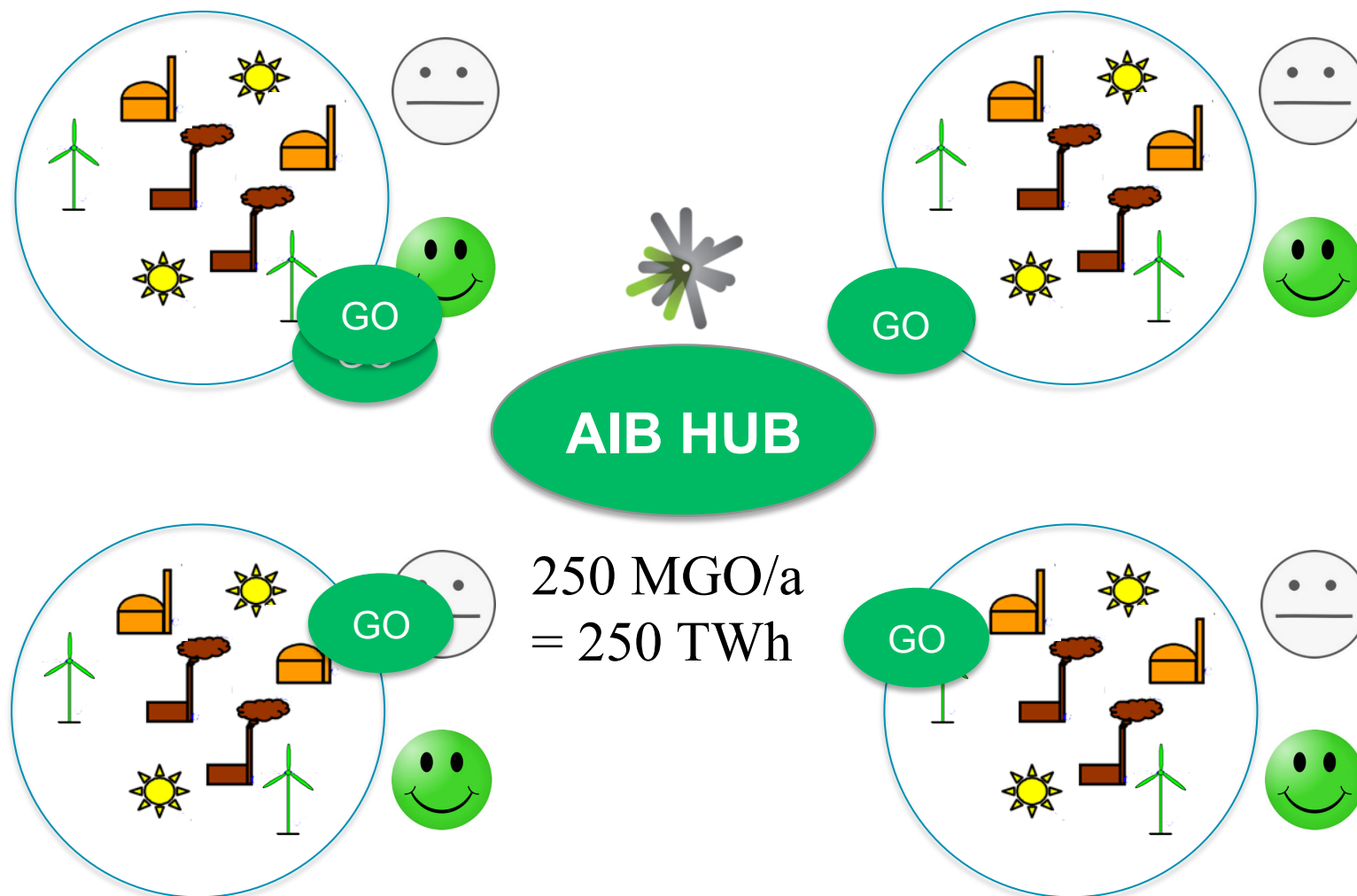
# Thank You for Your Attention!

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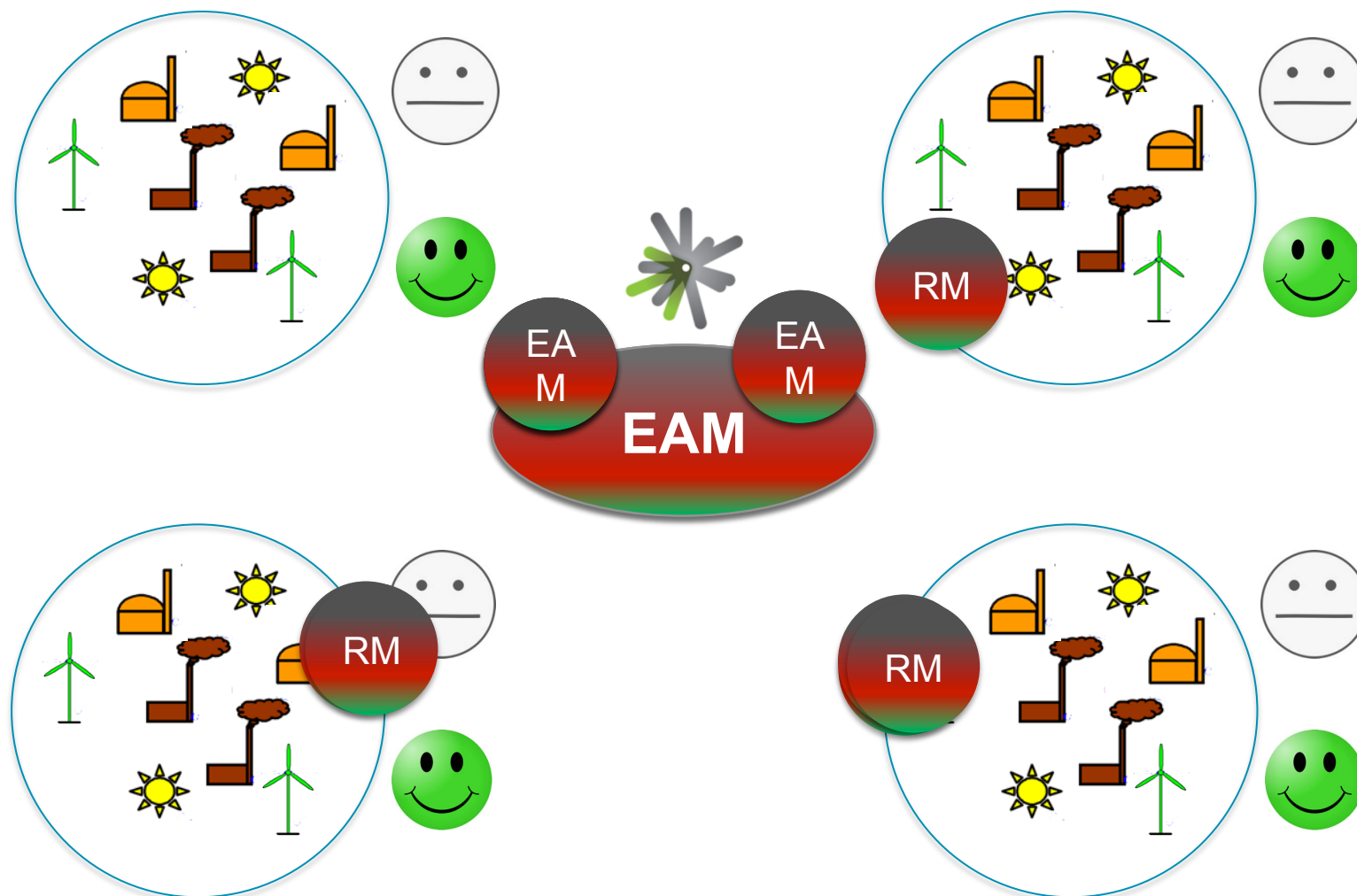


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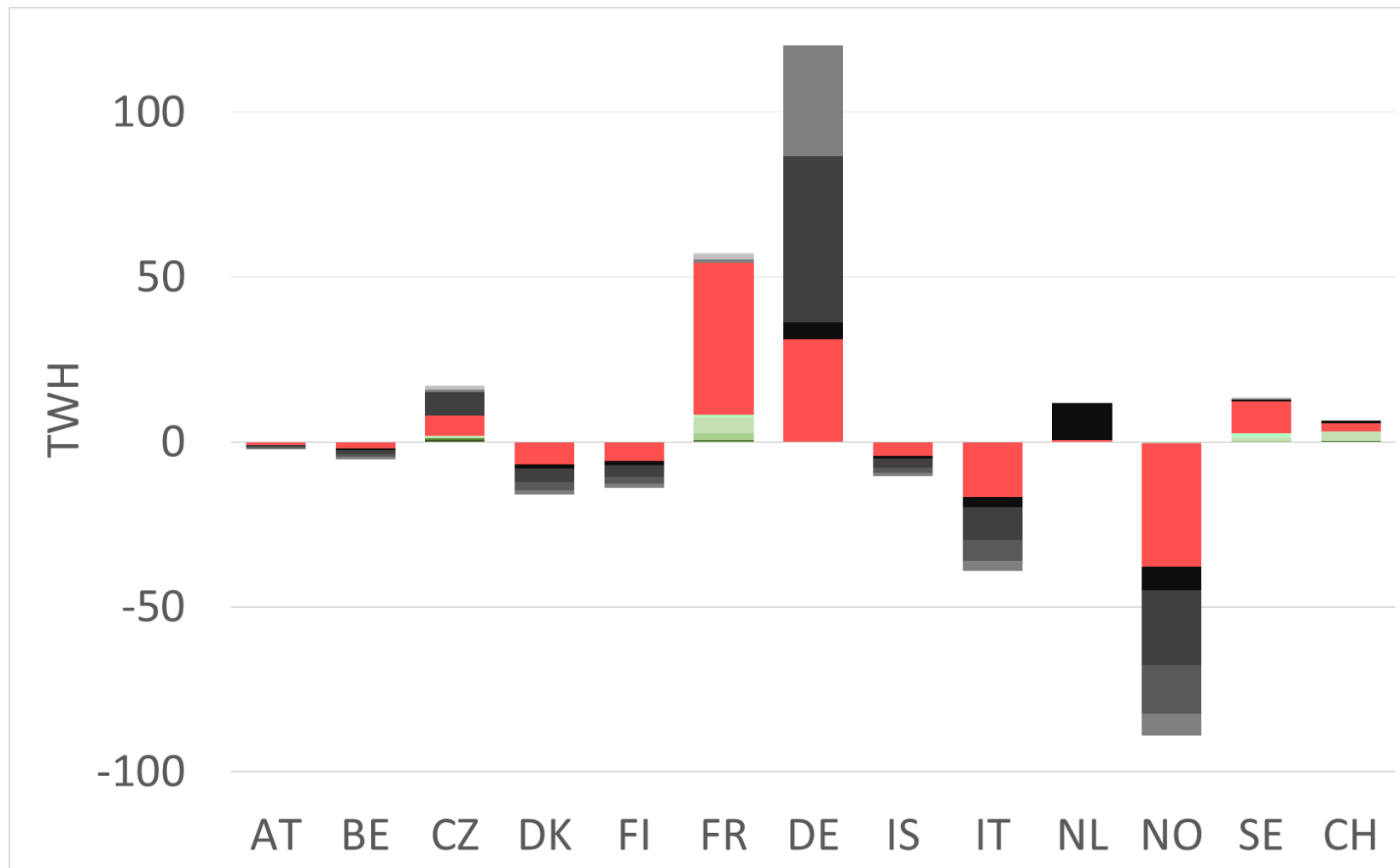
## Renewables are transferred accross Europe



## The European Attribute Mix determines what replaces an exported GO

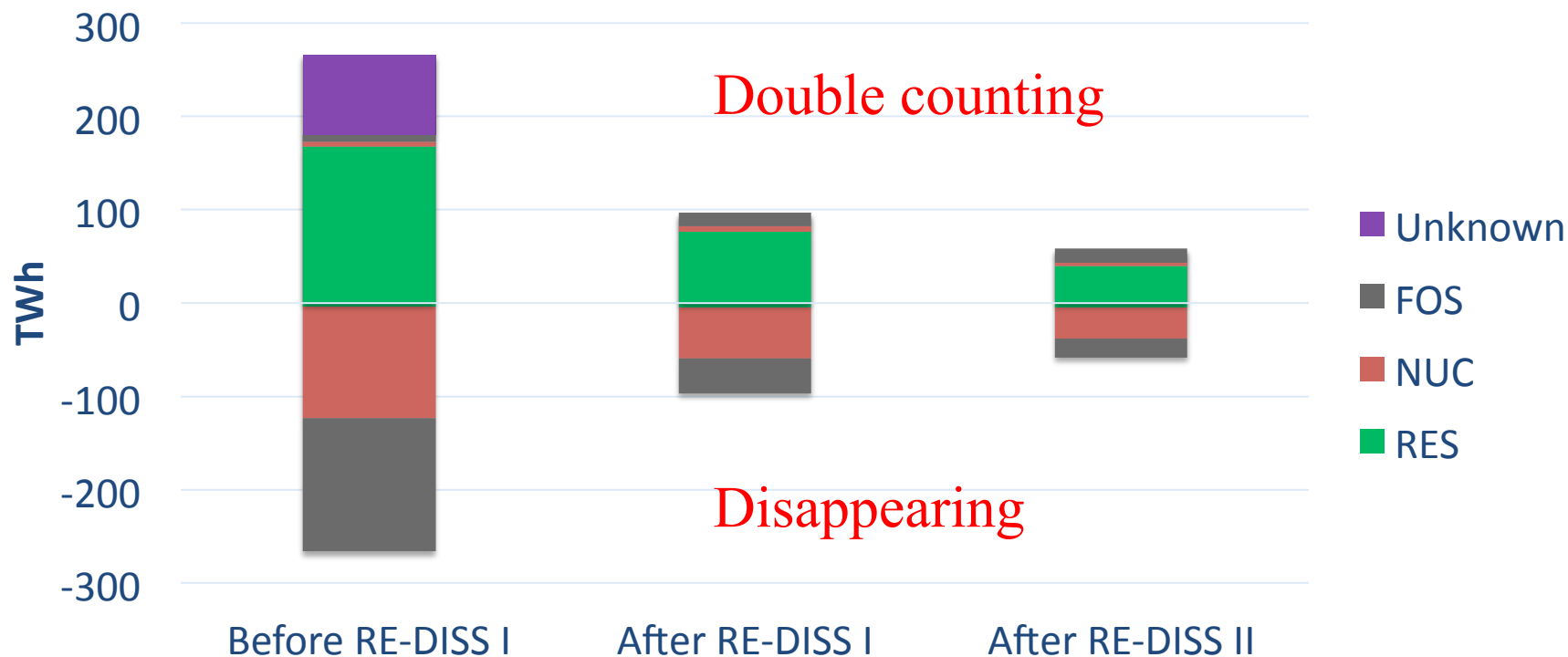


## Interaction with the EAM 2014





## Total Improvements



- **Unknown**: No unknown origin disclosed after RE-DISS I
- **RES**: Double counting down by 130TWh (36 in RE-DISS 2)
- **NUC**: Disappearing down by 90 TWh (22)  $\approx$  260 Tons RW
- **FOS**: Disappearing down by 120 TWh (17)  $\approx$  72 Megatons CO<sub>2</sub>
- **Total**: Disclosure error down by 210 TWh (38)