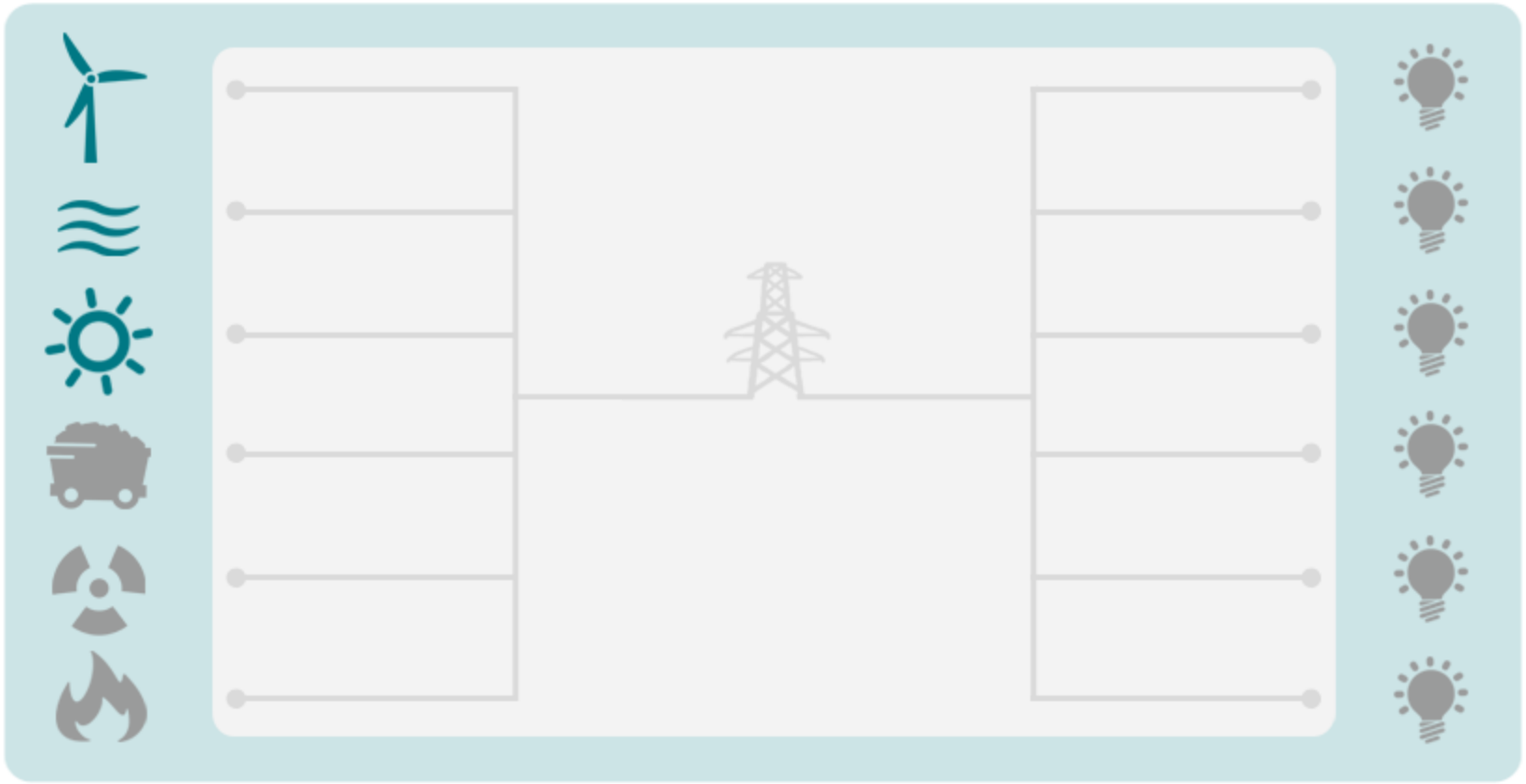
RECS INTERNATIONAL

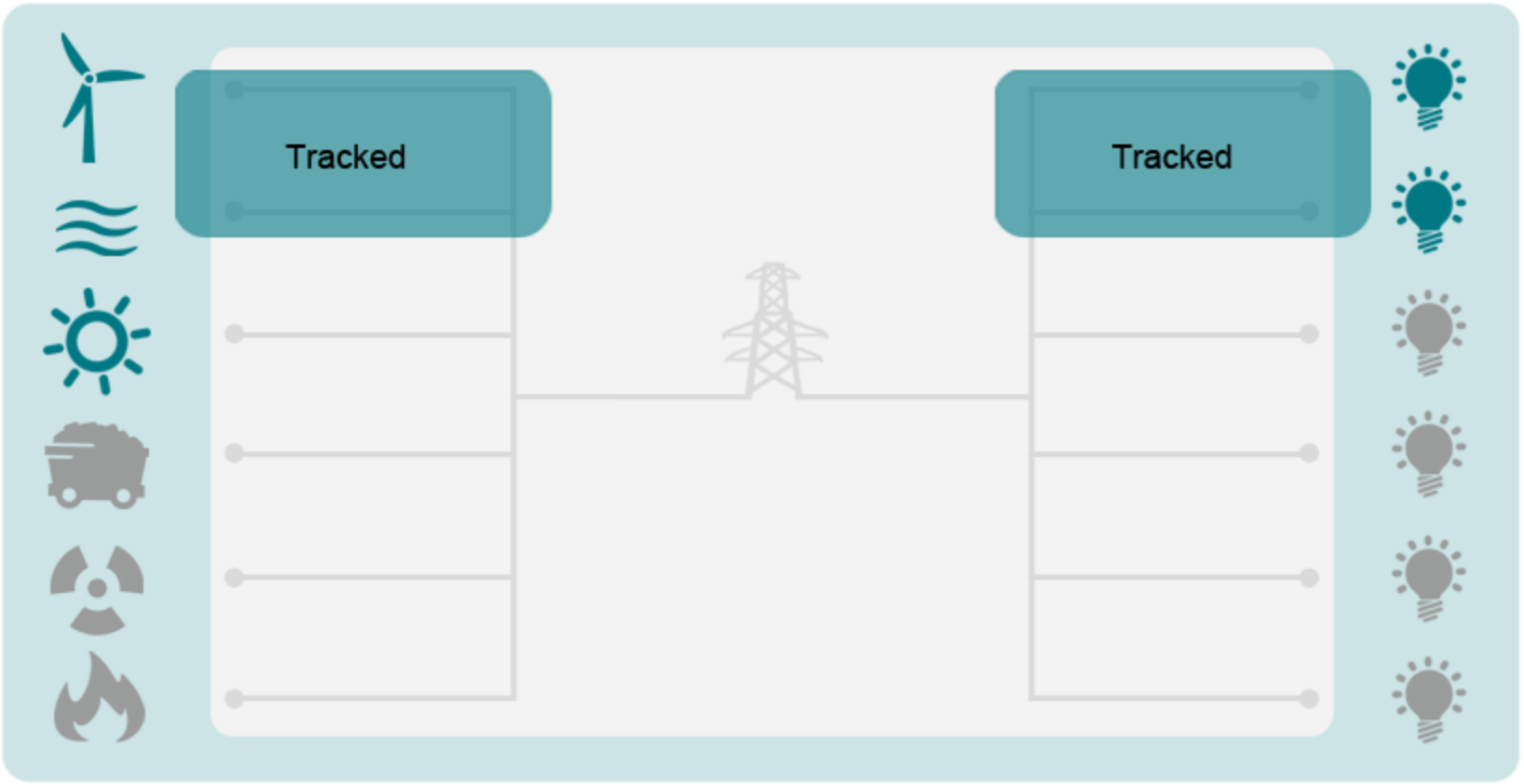
SHAPING
AN EFFECTIVE
RENEWABLE
ELECTRICITY
MARKET

The choice for renewables and the power of a consumer

A *very* short presentation on the developments of the renewable electricity market in Europe and abroad

Date: June 18th, 2014

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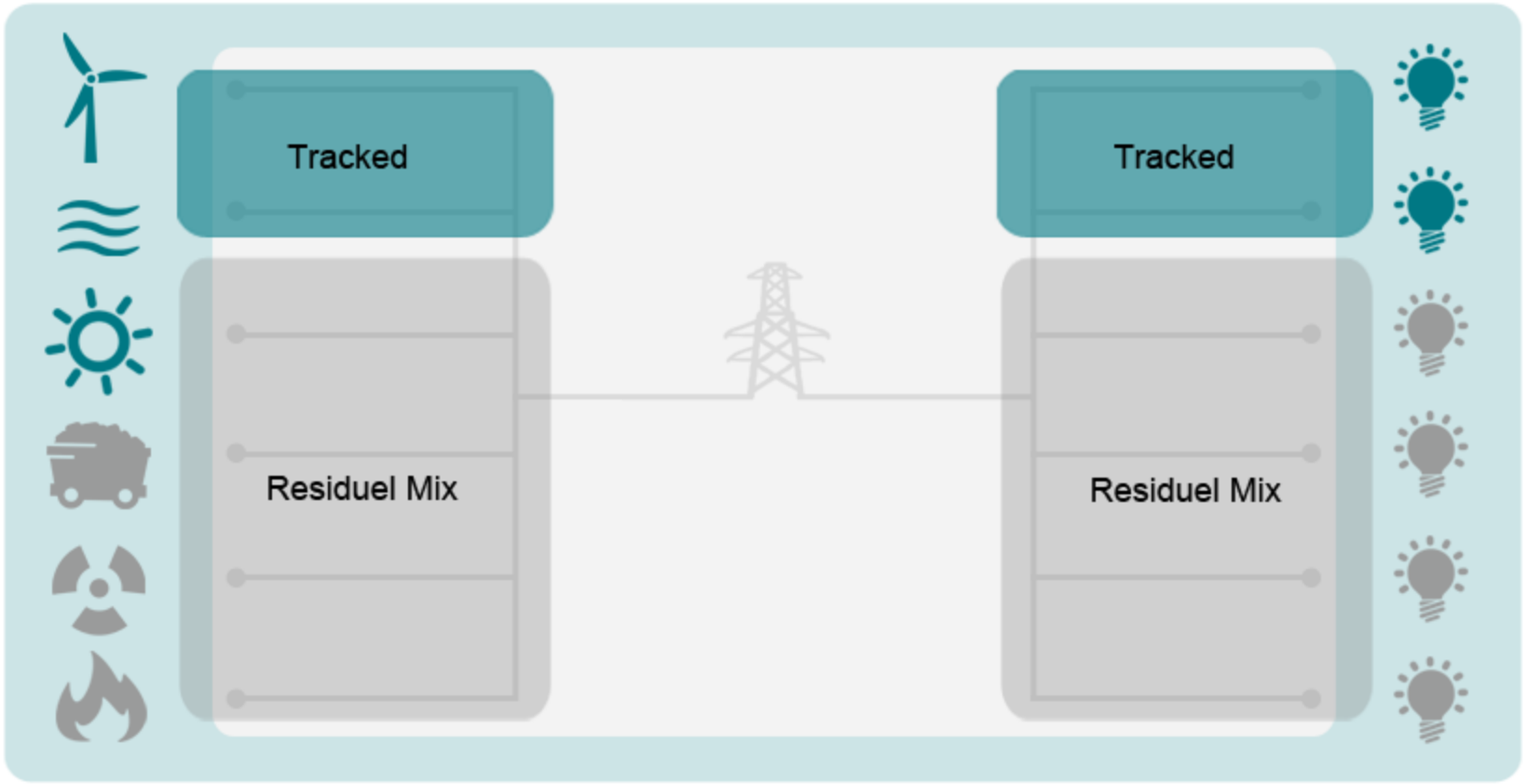
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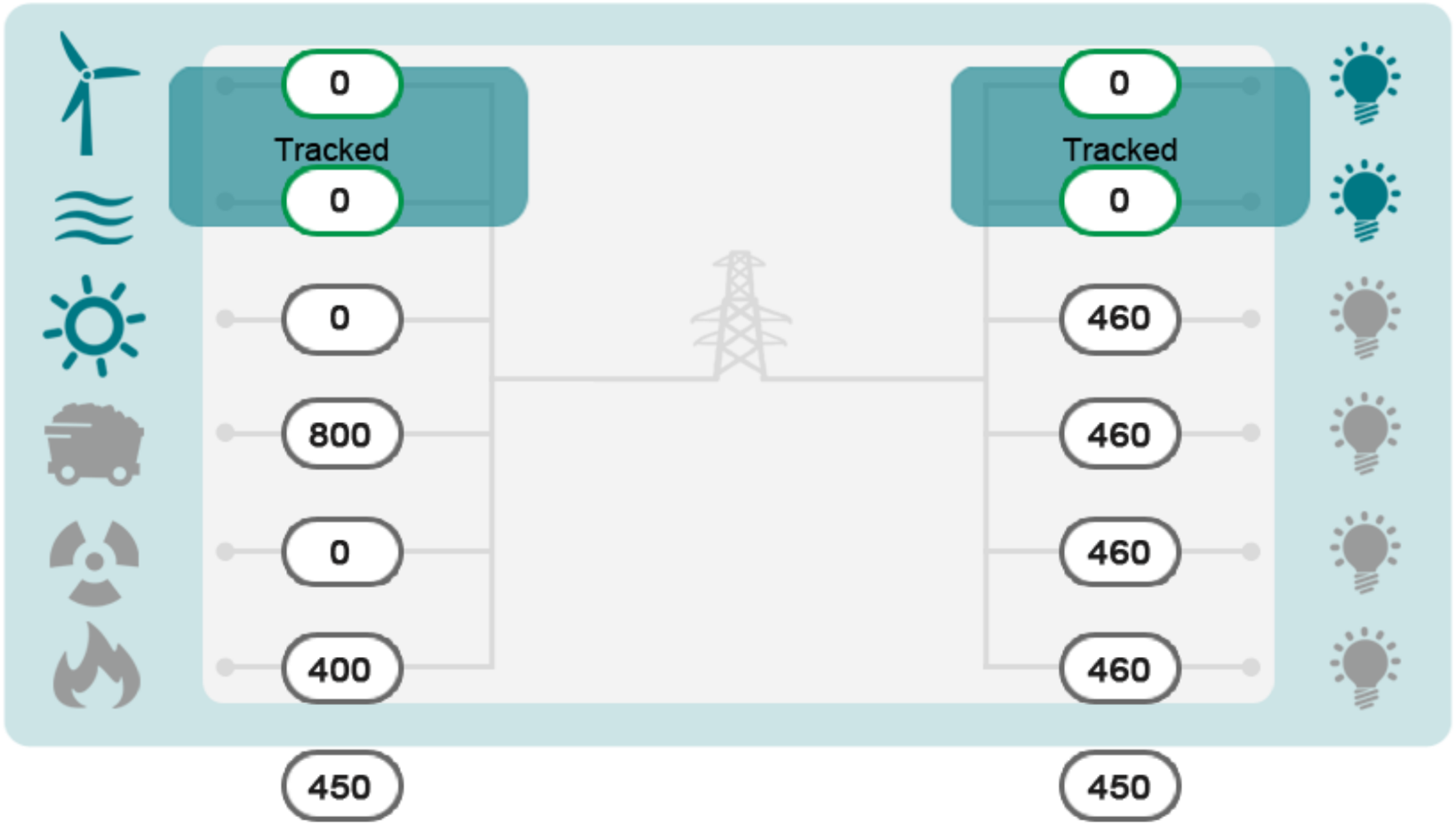
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Create new renewable power from Guarantees of Origin

Preben Munch, Director Corporate Customers, ECOHZ AS

ECOHZ Origin Matters

ECOHZ Origin Matters

WHAT IS A GUARANTEE OF ORIGIN ?

In short the GO is a certificate

- EU based system (Renewables directive 2009/28)
- Documents the origin of the power production
- Traceability tool
- Means to prove that renewable power has been bought and consumed

- Complements efficiency measures

- Empower the consumers – choice

PROVEN

- Supported by CDP and vast majority of GHG community
- ISO standard

- Efficient measure;
  - Any company in Europe and US can implement now
  - Immediate impact, cost efficient
  - Clear documentation

- Reliable tracing and disclosure
- Robust and proven system available in Europe & US

- Solution in Asia, Middle East will follow in the short term

USE OF GO IN TRANSPORTATION SECTOR

Rail

- Rail networks
- Train operators

eMobility

- EV OEMs
- Charging networks
- Equipment manufacturers
- EV associations

ECOHZ Origin Matters


Realise the potential

PRODUCE AS MUCH AS YOU USE

- actually produce much more then you use -

energy POSITIVE

ECOHZ GO²

How does it work?

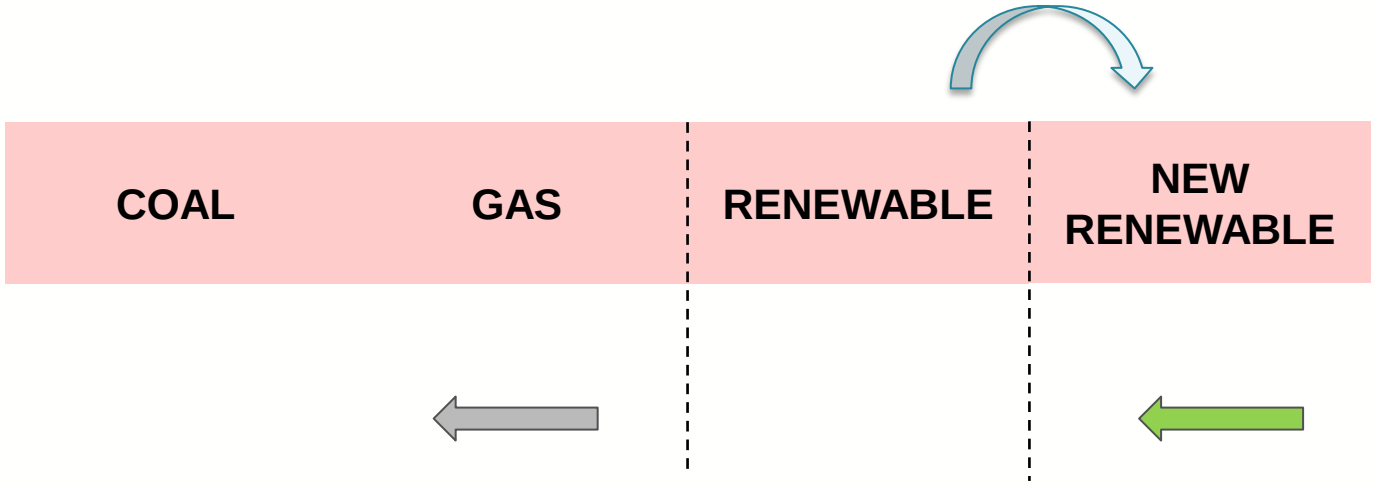
- New product - “GO inside”
- Fixed price of € 4.00 per GO² (1 MWh)
- Minimum 80 % (€ 3.20) directly to projects
- Incremental renewable projects
- Financing up to 15 % of project costs (top-up)
- 3rd party verification and audit
- Independent FOUNDATION as bridge to projects

POSITIVE -
PRODUCE AS MUCH AS YOU USE!

1 ➡ 3

€ 320’000	←	top-up financing triggers construction
€ 3.20 / MWh	←	money flow from upgrade to GO^2
100 GWh	←	RES consumption need (GO)
8.5 GWh	←	yearly renewable production
300⁺ GWh	←	life-time renewable production

TRANSFORMATIONAL



"WHAT'S IN IT FOR ME"

- *Gives credibility to sustainable rail transport*
- *Shows climate leadership - Produce as much as you use*
- *"Best solution in the market to manage Scope 2 emissions" - CDP*
- *Position the operator and the industry*
- *Same profile - same story - as the trend setters (Google, Ikea…)*
- *Same effect*
  - *a fraction of the cost*
  - *effect now*
- *Good story – clear message*

One-to-one connection to "your" power plant project(s)

ECOHZ Origin Matters

changing energy behaviour

Preben Munch, Director Corporate Customers, ECOHZ AS

ECOHZ Origin Matters

Transforming the electricity sector

Catalysing the role of consumers

UIC

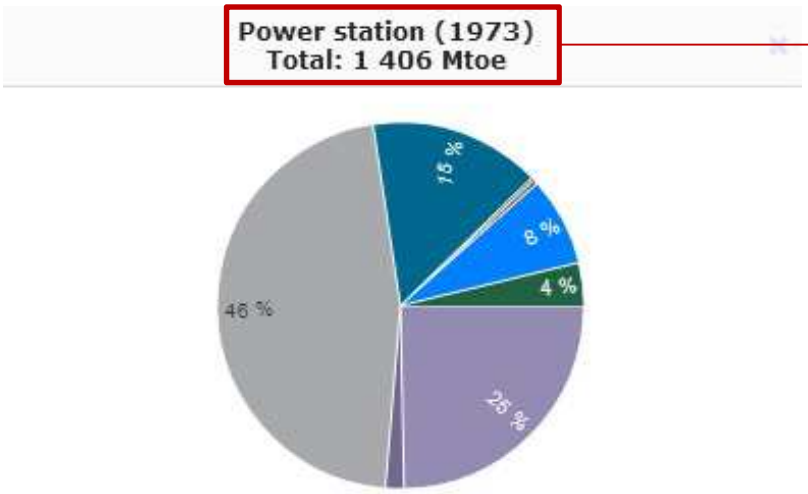
Antwerp, 18 June 2014

Pedro Faria, Technical Director

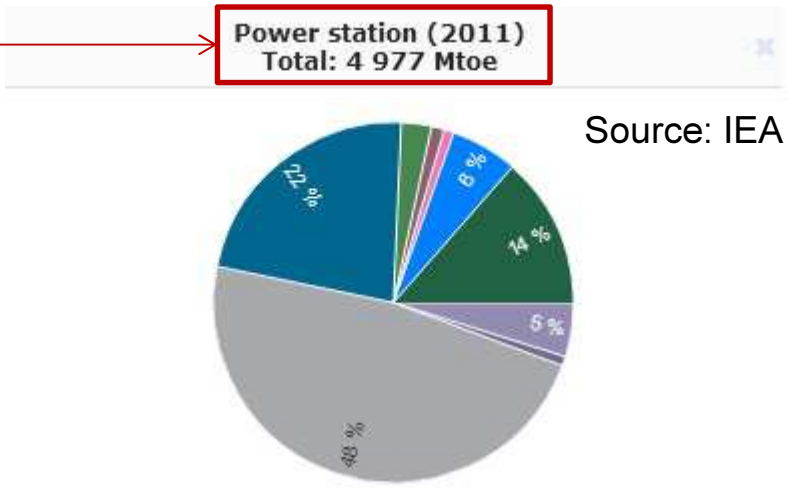
pedro.faria@cdp.net

CDP
DRIVING SUSTAINABLE ECONOMIES

World electricity production



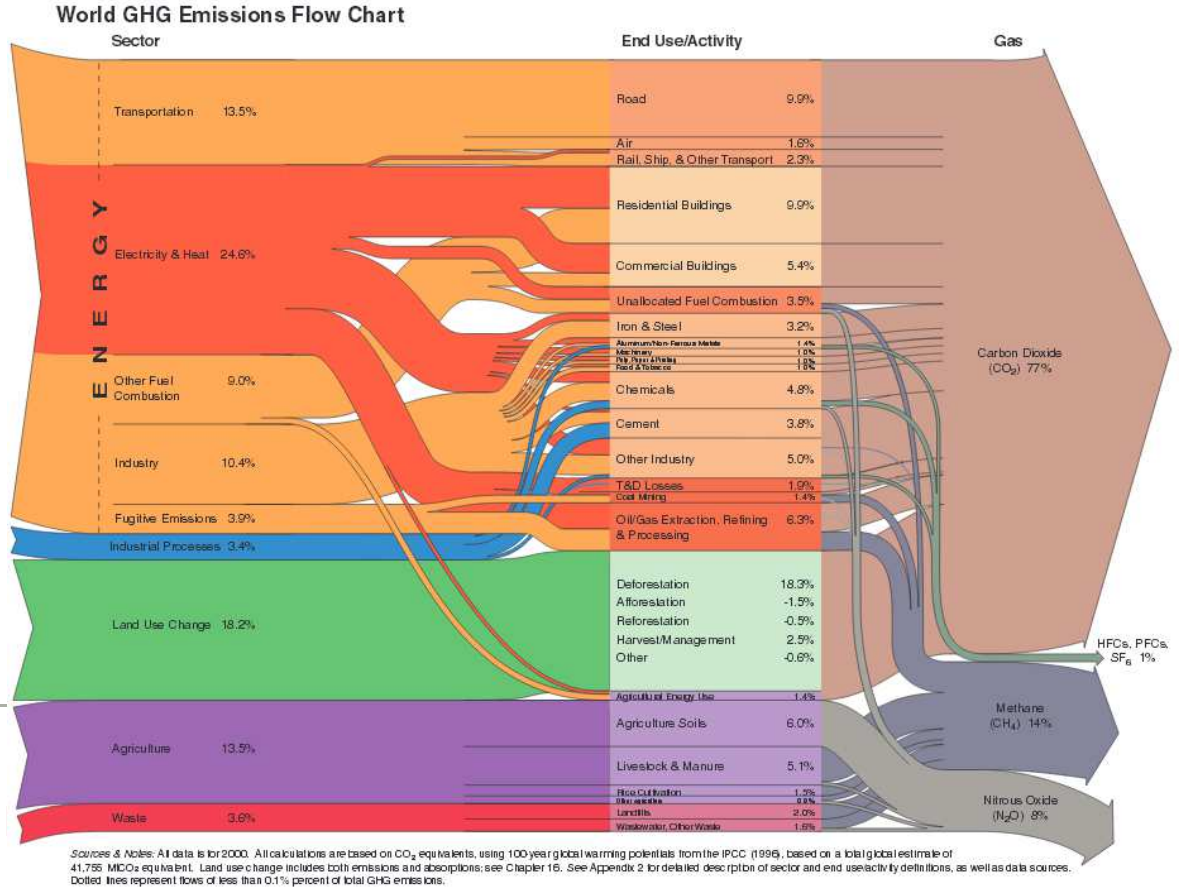
Oil products	347 Mtoe
Oil	23 Mtoe
Coal	651 Mtoe
Natural gas	212 Mtoe
Biofuels and waste	4 Mtoe
Geothermal	6 Mtoe
Solar/tide/wind	0 Mtoe
Hydro	110 Mtoe
Nuclear	53 Mtoe



Source: IEA

Oil products	241 Mtoe
Oil	42 Mtoe
Coal	2 366 Mtoe
Natural gas	1 118 Mtoe
Biofuels and waste	135 Mtoe
Geothermal	58 Mtoe
Solar/tide/wind	43 Mtoe
Hydro	300 Mtoe
Nuclear	674 Mtoe

What does it means in terms of emissions?

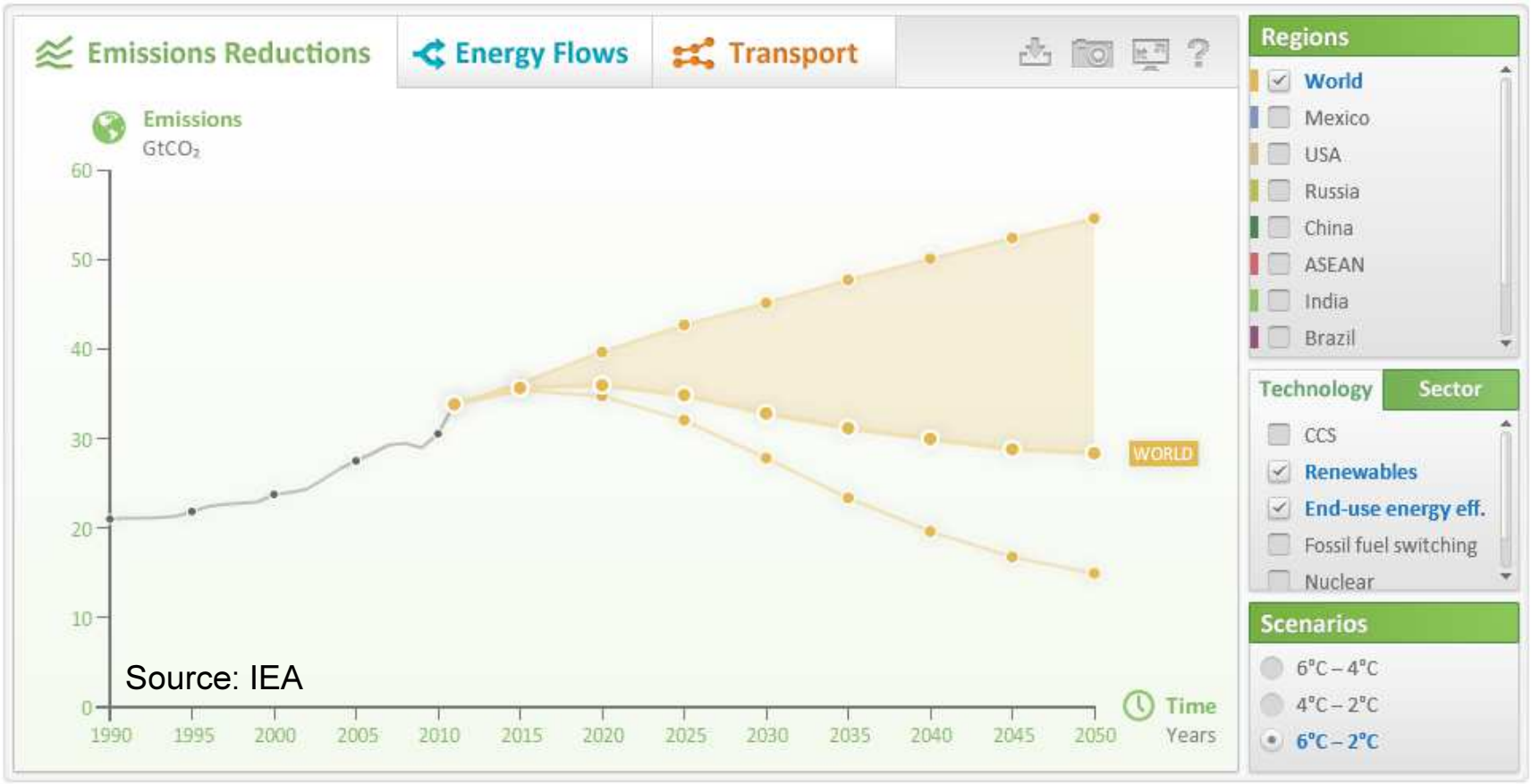


Sources & Notes: All data is for 2000. All calculations are based on CO_2 equivalents, using 100-year global warming potentials from the IPCC (1996), based on a total global estimate of 41,755 $MtCO_2$ equivalent. Land use change includes both emissions and absorptions; see Chapter 16. See Appendix 2 for detailed description of sector and end use/activity definitions, as well as data sources. Dotted lines represent flows of less than 0.1% percent of total GHG emissions.

Source: WRI

CDP
DRIVING SUSTAINABLE ECONOMIES

The challenge – contribution of EE and RE



Why CDP exists? Challenging times

Our climate is changing.

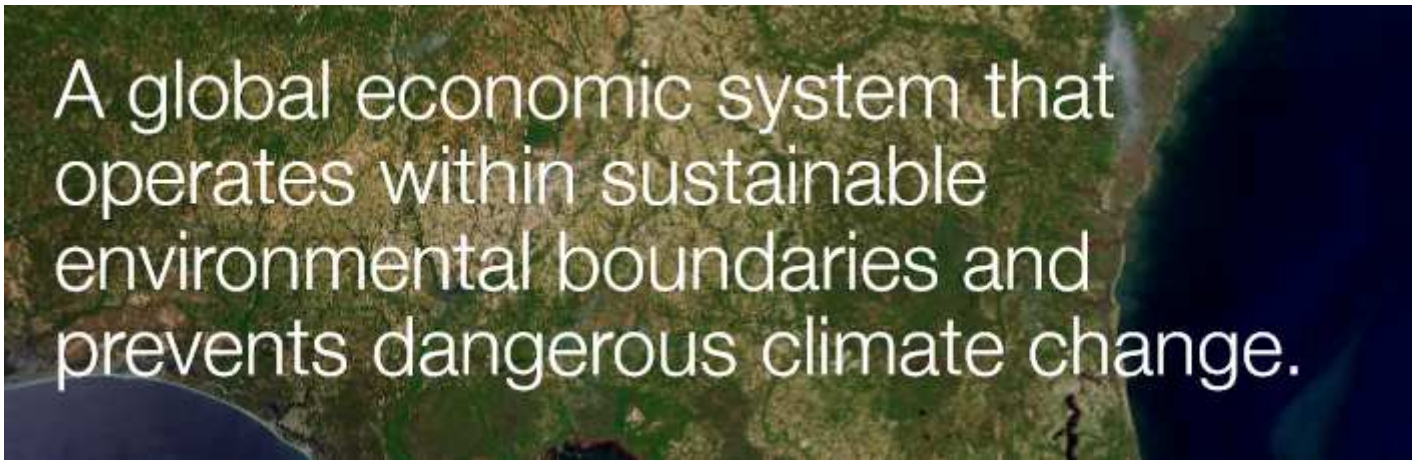
We are facing unprecedented global economic challenges.

By 2030 the global population is expected to increase 18.5% to 8.3 billion.

This demands:

- **50%** more food;
- **50%** more energy;
- **30%** more fresh water;
- Every ton of carbon to become at least **five** times more efficient in its economic output

Our vision


A global economic system that
operates within sustainable
environmental boundaries and
prevents dangerous climate change.

Strategic goal

Our strategic goal is to drive action by companies and cities globally to reduce greenhouse gas emissions, safeguard water resources and prevent the destruction of forests.

Strategic pillars

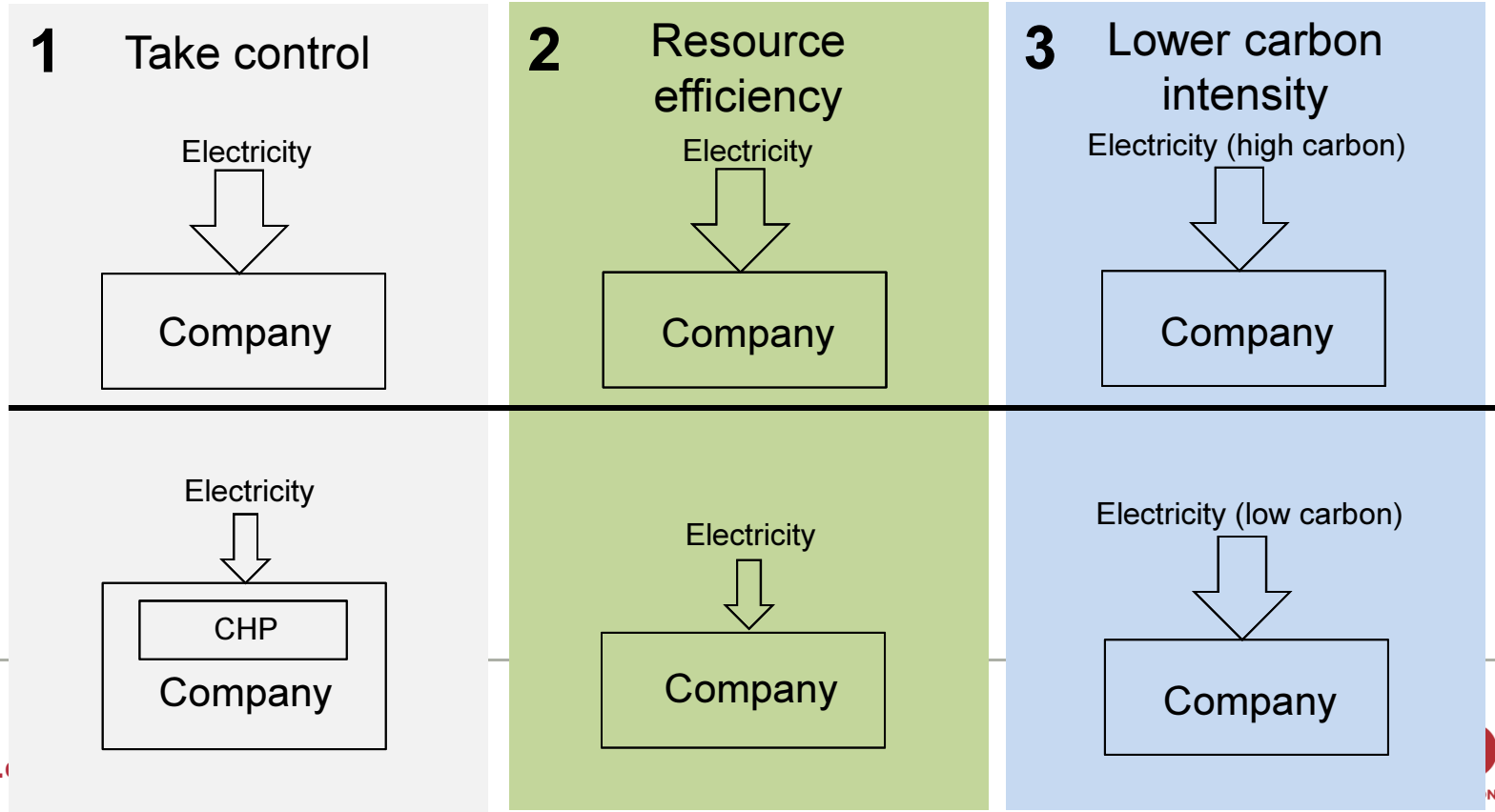
To increase corporate transparency on environmental impact and performance

To assist cities to reduce their climate impacts and build resilience

To make environmental performance central to investment and business decisions

To support effective policy and regulation to protect the environment

Choices to reduce indirect footprint



Fundamentals – Accounting of electricity emissions

Basics

X tCO2 = Activity data [MWh] * Emission Factor [tCO2/MWh]

Implications

Energy Efficiency

Electricity procurement

Consume RE Power

Consume & transform power

CDP response

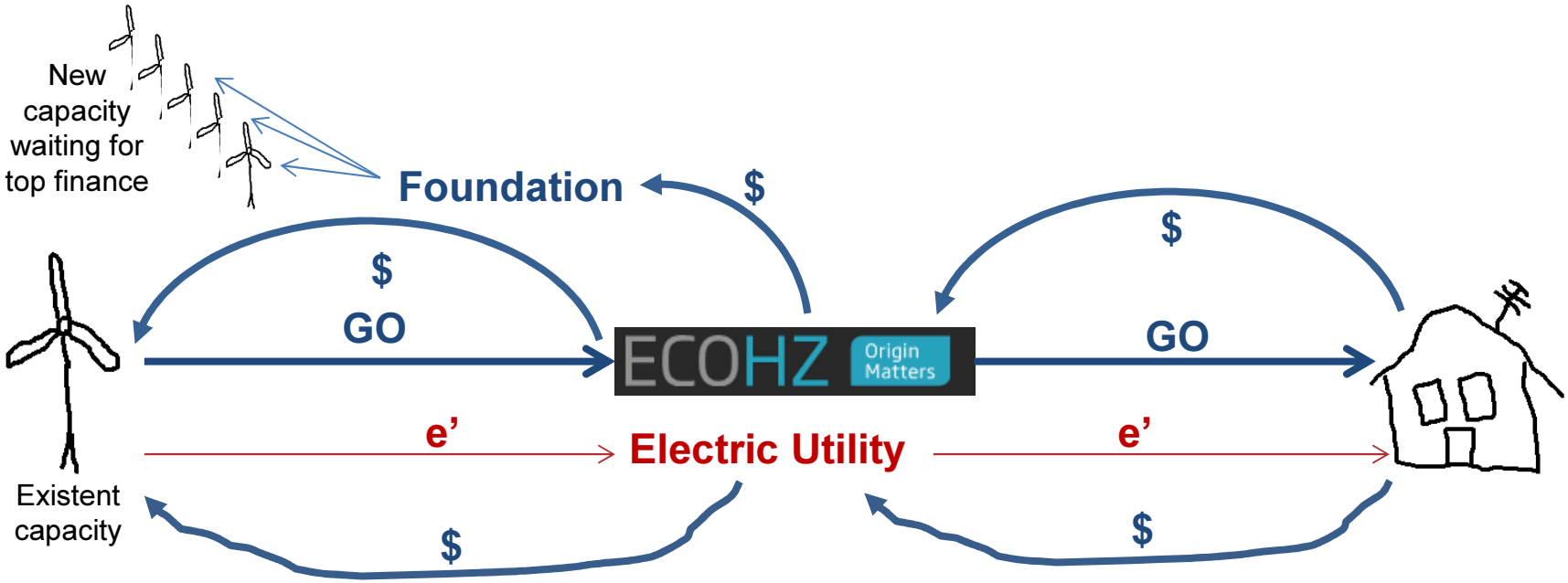
Action Exchange

RE100

Ren Power Procurement

CDP
DRIVING SUSTAINABLE ECONOMIES

Renewable Power Procurement – tracking electricity & $



CDP
DRIVING SUSTAINABLE ECONOMIES

Ren Power Procurement – eliminating barriers (I)

Table 8.1 Risk profile of different technologies

	Regulatory	Construction	Market	Operations
CCGT	Low	Low	Medium	Low
Onshore wind	Low	Low	High	Low
Solar PV	Low	Low	High	Low
Offshore wind	Medium	High	High	Medium
Nuclear	Medium	High	High	Low
Large hydro	Medium	Medium	Medium	Low

Low Medium High

Source: IEA

Ren. Power Procurement – eliminating barriers (II)

Growth of non-hydro renewables has been especially rapid in markets where households and smaller companies have underpinned deployment. However, such investors do not usually have substantial assets that can generate income to finance new capital expenditures. The expansion of renewables assets by household and small company investors, therefore, relies more on external sources of finance than is typical for conventional power plants.

Source: IEA

Trying to work and understand needs of European RE cooperatives

Coopérnico

Som energia

RESCOOP

Use your choices to build a brighter future

May your choices

reflect your hopes,

not your fears! ~

Nelson Mandela

Thank you!

pedro.faria@cdp.net

INFRABEL

UIC

UIC Energy Efficiency Days 2014

Antwerpen, 16 - 19 June

Measuring GHG Emissions In Rail: The EU Legislation & The Sector's Needs

Wednesday, 18 June 2014

Green Electricity and Carbon Disclosure Workshop

Energy Efficiency, the best fuel to move our trains!

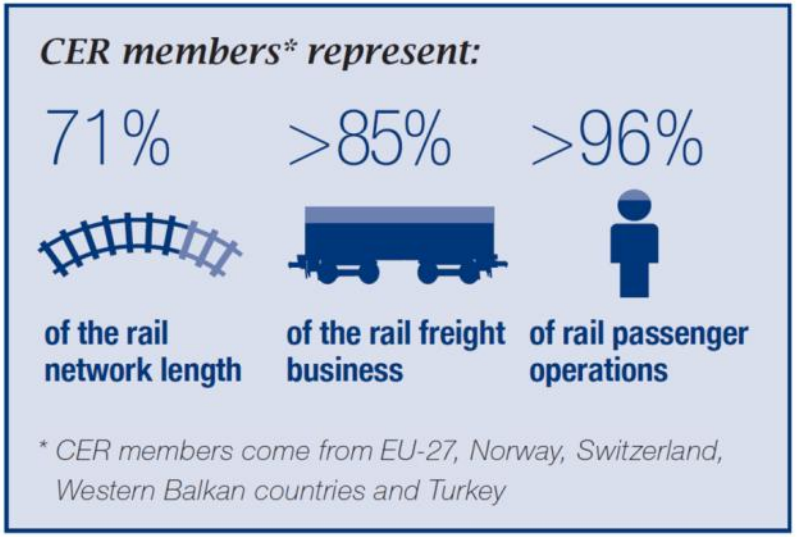
CER

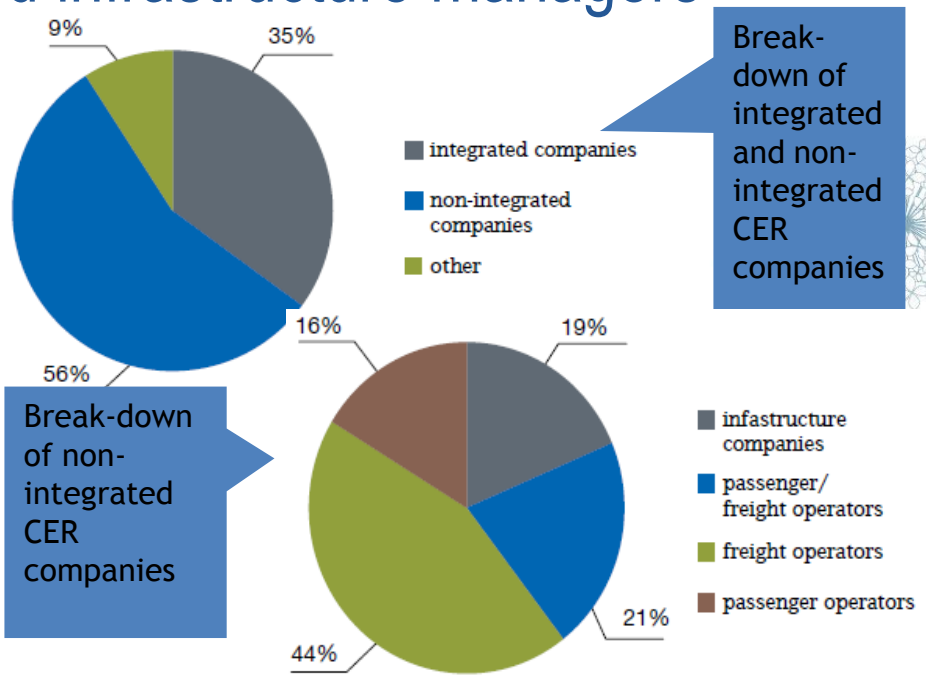
CER represents over 70 members (23% privately owned):

– incumbents and new entrants,

– passenger and freight operators,

– integrated and separated infrastructure managers



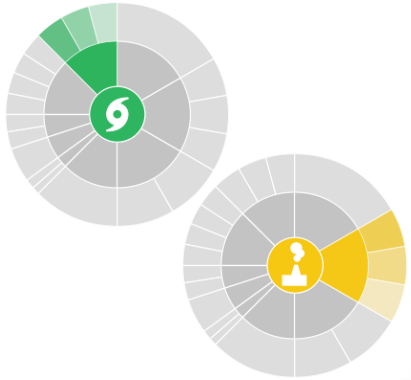


ARTICLE 15 OF THE RENEWABLE ENERGY DIRECTIVE 2009/28/EC

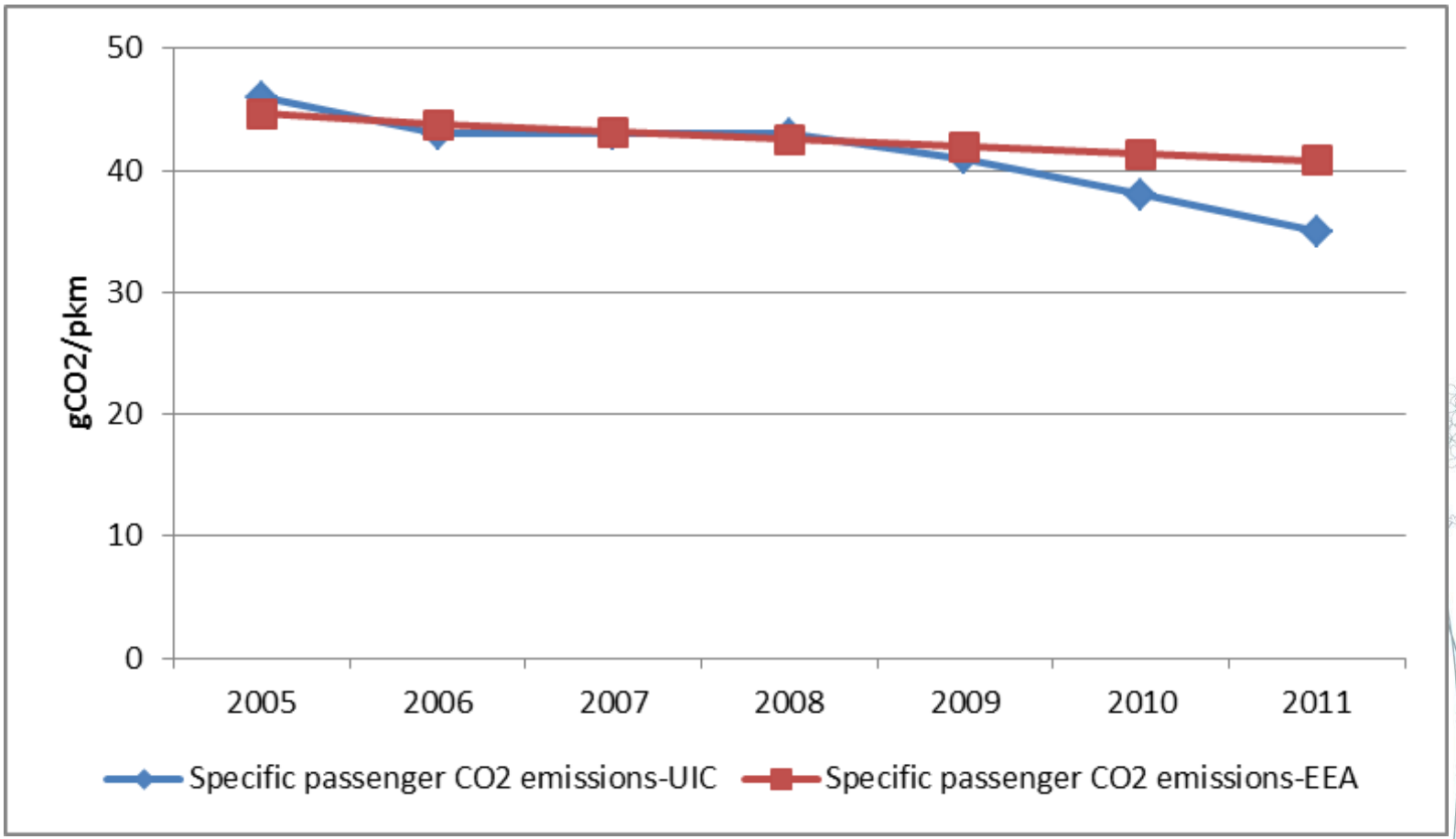
- The guarantee of origin shall have **no function** in terms of a Member State's compliance with Article 3 [**mandatory national overall targets** etc]. Transfers of guarantees of origin, separately or together with the physical transfer of energy, shall have no effect on the decision of Member States to use statistical transfers, joint projects or joint support schemes for target compliance or on the calculation of the gross final consumption of energy from renewable sources in accordance with Article 5 [calculation of share of energy from renewable sources].
- **GOs have no role for targets, Eurostat & EEA data**

DATA NEEDS FOR POLITICAL COMMUNICATION

- Inter-modal comparisons
  - Key environmental performance data
  - Different modes
  - Trusted source
- Evolution of rail sector emissions over time
  - UIC's work is appreciated
  - Progress towards sector commitments
  - Danger of big discrepancies between data sources



SPECIFIC CO_2 EMISSIONS PER PKM FOR RAIL TRANSPORT IN EUROPE 2005-2011



TERMINOLOGY

- Three different terms:
  - Green Certificates
  - Guarantees of Origin (GOs)
  - Renewable Energy Certificates (RECs)
- GOs = RECs; a transition period
- Green Certificates encompass everything BUT it also includes mechanism of support of renewable electricity generation

DOUBLE COUNTING

- Residual mix = Grid mix - Tracked & claimed RES
- ⇧ GOs bought ⇨ Green residual mix ⇩
- Residual mix ~~GOs~~
- There is double counting (estimated 20-25%)
- Renewable electricity into a railway network:
  - Physically
  - Contractually

ADDITIONALITY

- GOs $ ⇨ New renewable energy installations
- New renewable energy generation

SECTOR'S NEEDS

- Corporate strategic priorities:
  - 'Green Strategies' ☺
  - More renewable energy ☺
  - Measurement & reporting standards ⚐
- Sectoral reporting/targets
  - Minimise the discrepancies between data
  - Guarantees of Origin – Directive 2009/28/EC Art.15
  - Do not report with GOs: Physical approach

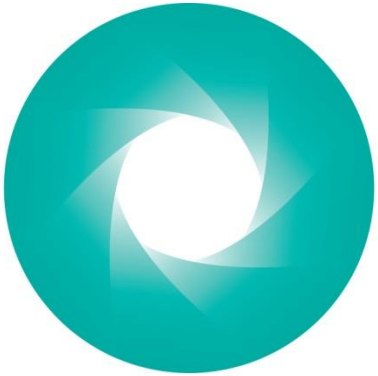
THANK YOU FOR YOUR ATTENTION!

Ethem Pekin

Environmental Economist

Email: etp@cer.be

GREENHOUSE
GAS PROTOCOL



GREENHOUSE
GAS PROTOCOL

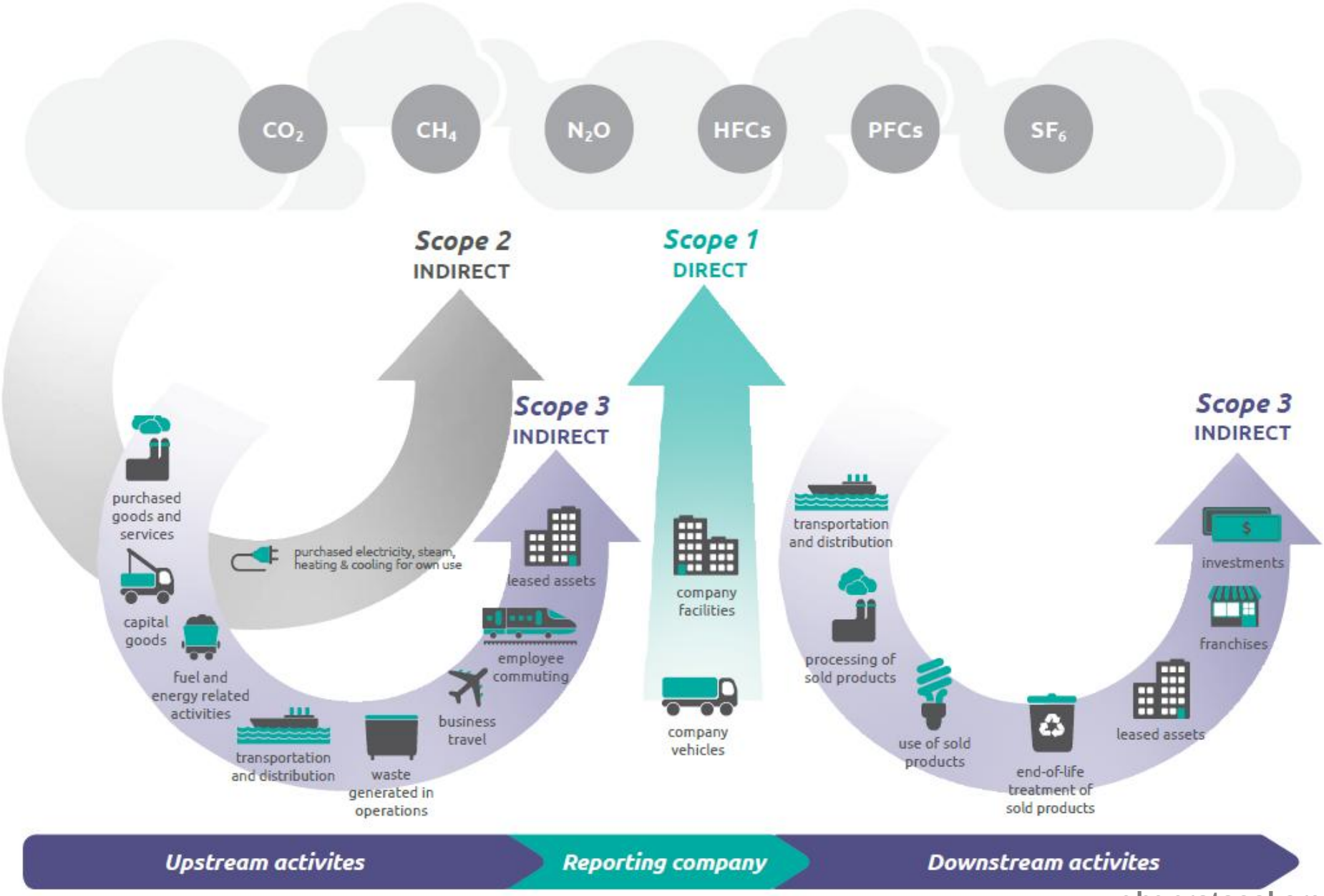
Scope 2 Guidance: *new developments in corporate GHG accounting for energy purchases and consumption*

Mary Sotos

5th UIC Energy Efficiency Days conference (UIC EED 2014)

June 17-18, 2014

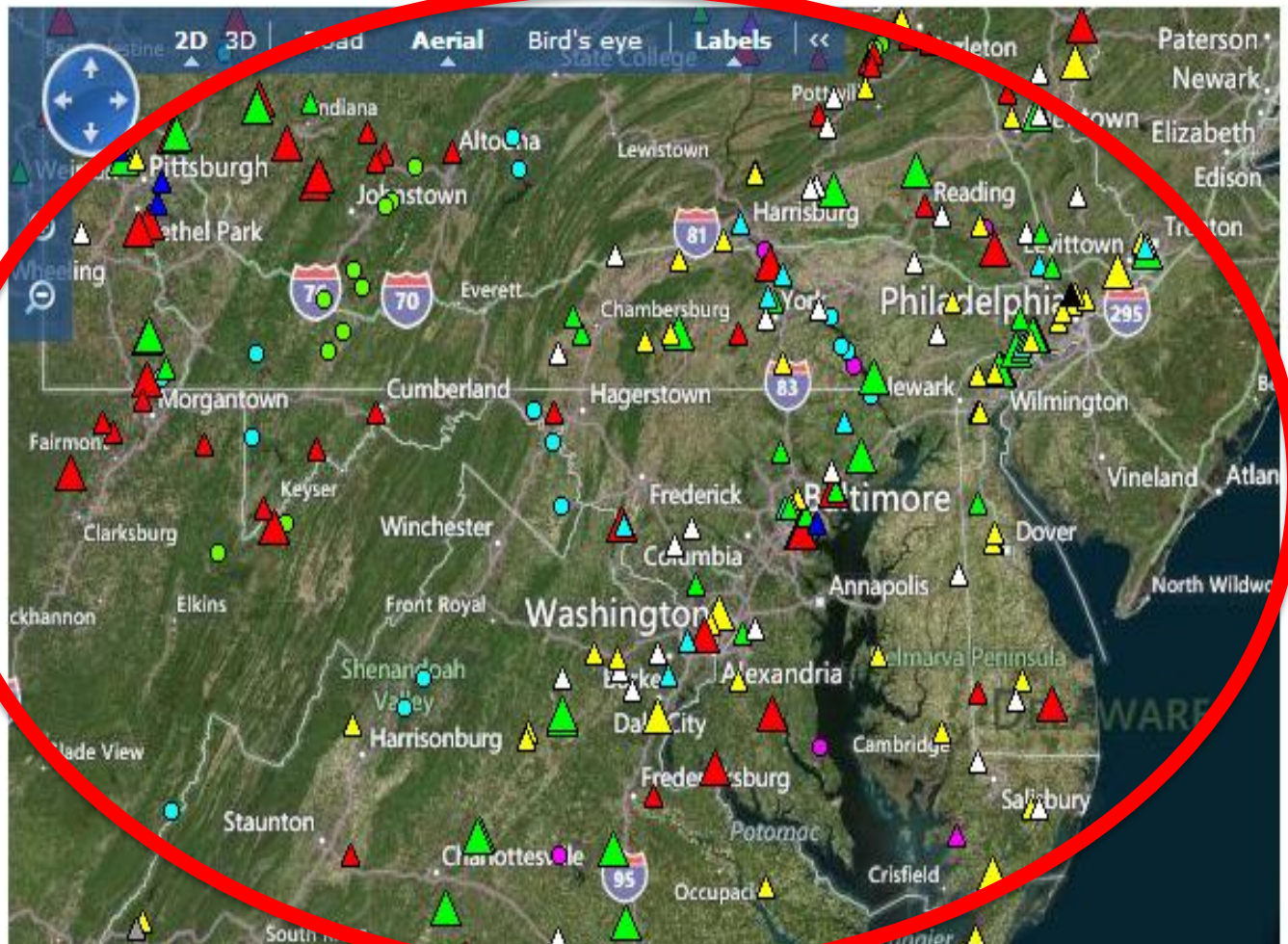
GREENHOUSE GAS PROTOCOL



Map of Power Plants in the Mid-Atlantic Region

Note: the map below has been updated to reflect 2009 eGRID data.

Show power plants utilizing:
Clean Fuel Carbon-based Fuel All



Legend

Carbon-based Fuel (triangle):

- Large Coal, >300 MW (43 plants)
- Small Coal, <300 MW (48)
- Large Oil (5)
- Small Oil (78)
- Large Gas (30)
- Small Gas (37)
- Other Fossil Fuel (6)
- Black liquor (5)
- Municipal solid waste biomass compound (12)
- Landfill Gas (45)
- Digester Gas (1)
- Wood, wood waste (0, 4)

Clean Fuel (dot):

- Water (54 plants)

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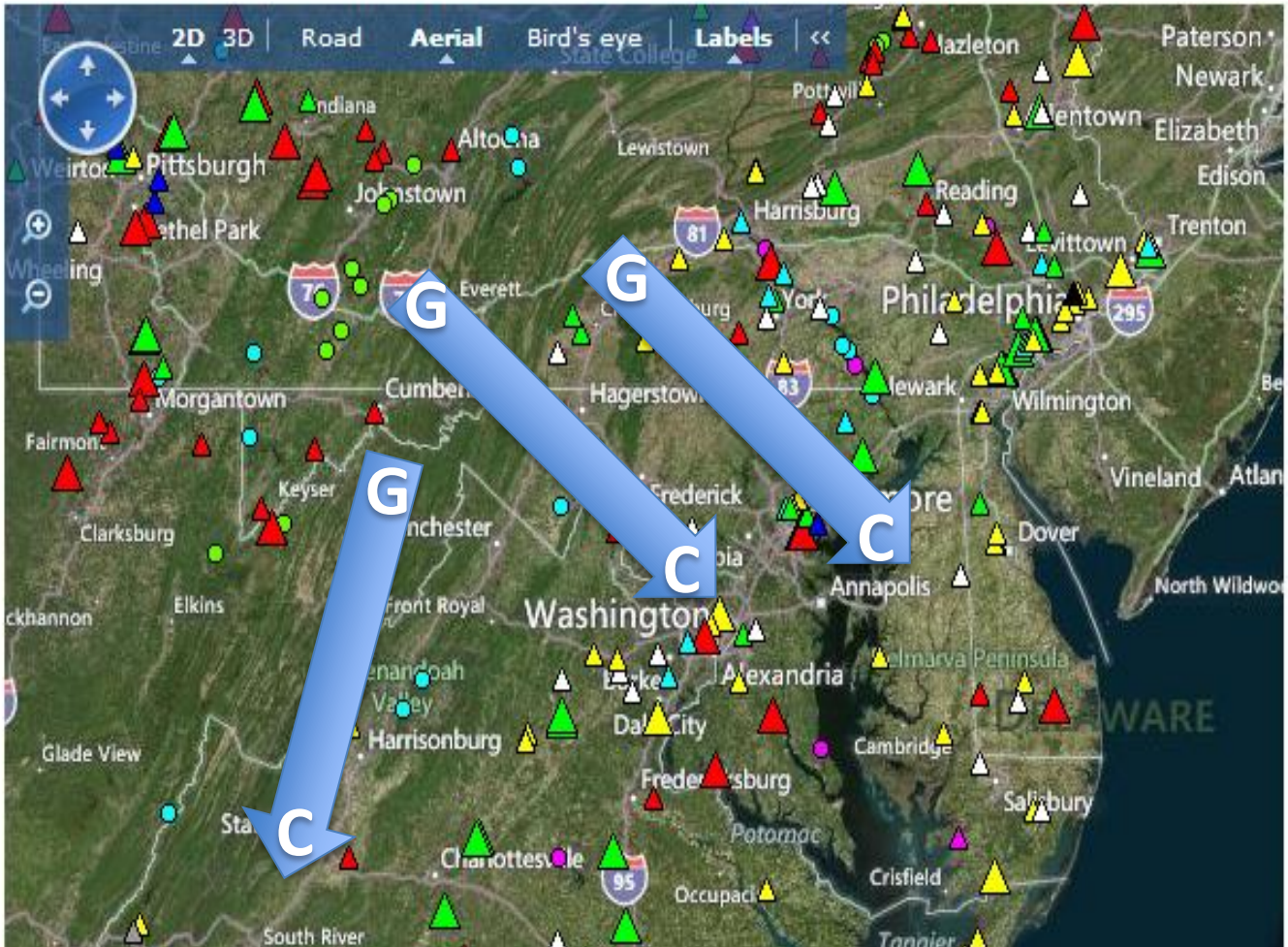

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GREENHOUSE GAS PROTOCOL

Concerns with market-based method instruments

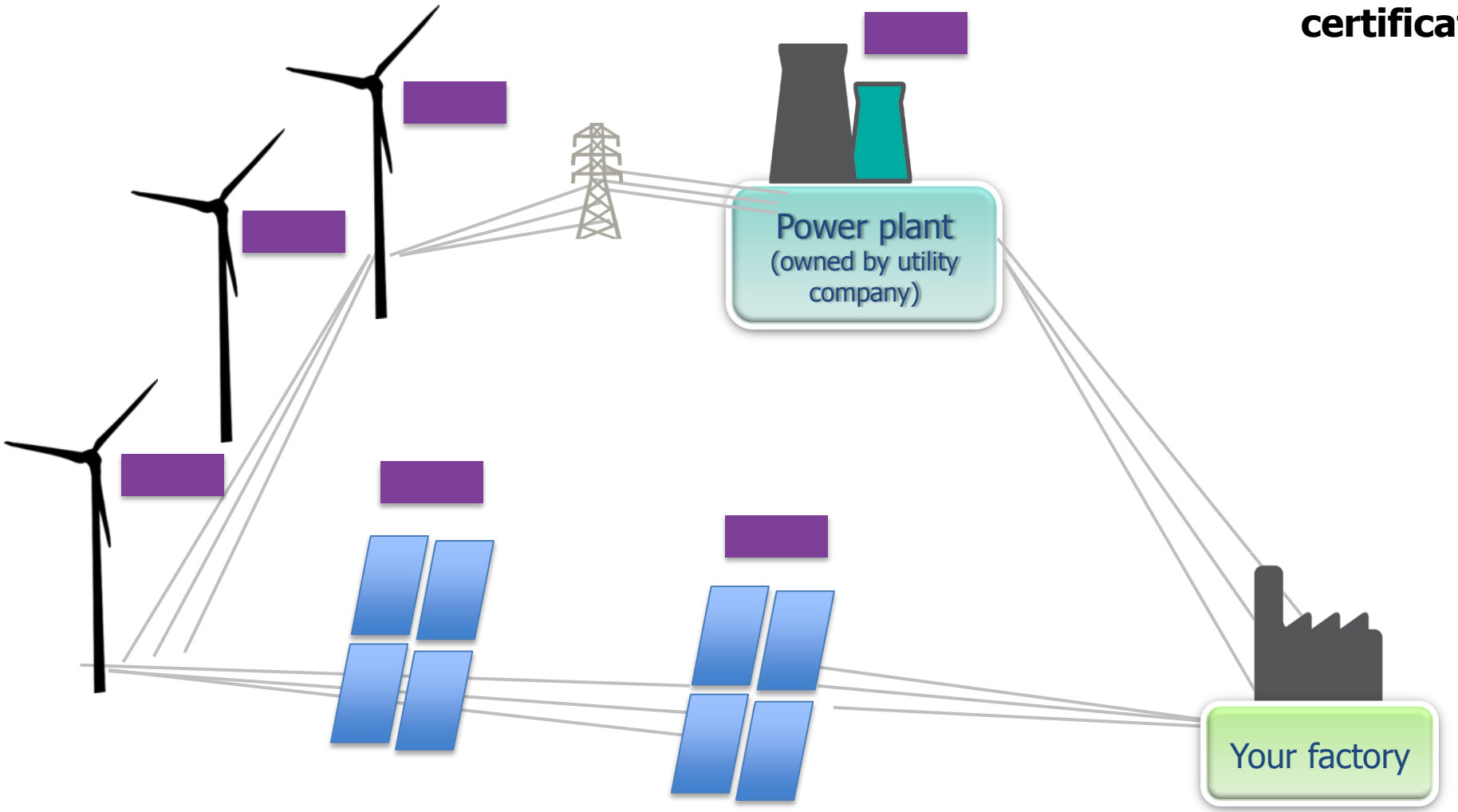
Concept

Execution

Instrument and market impact

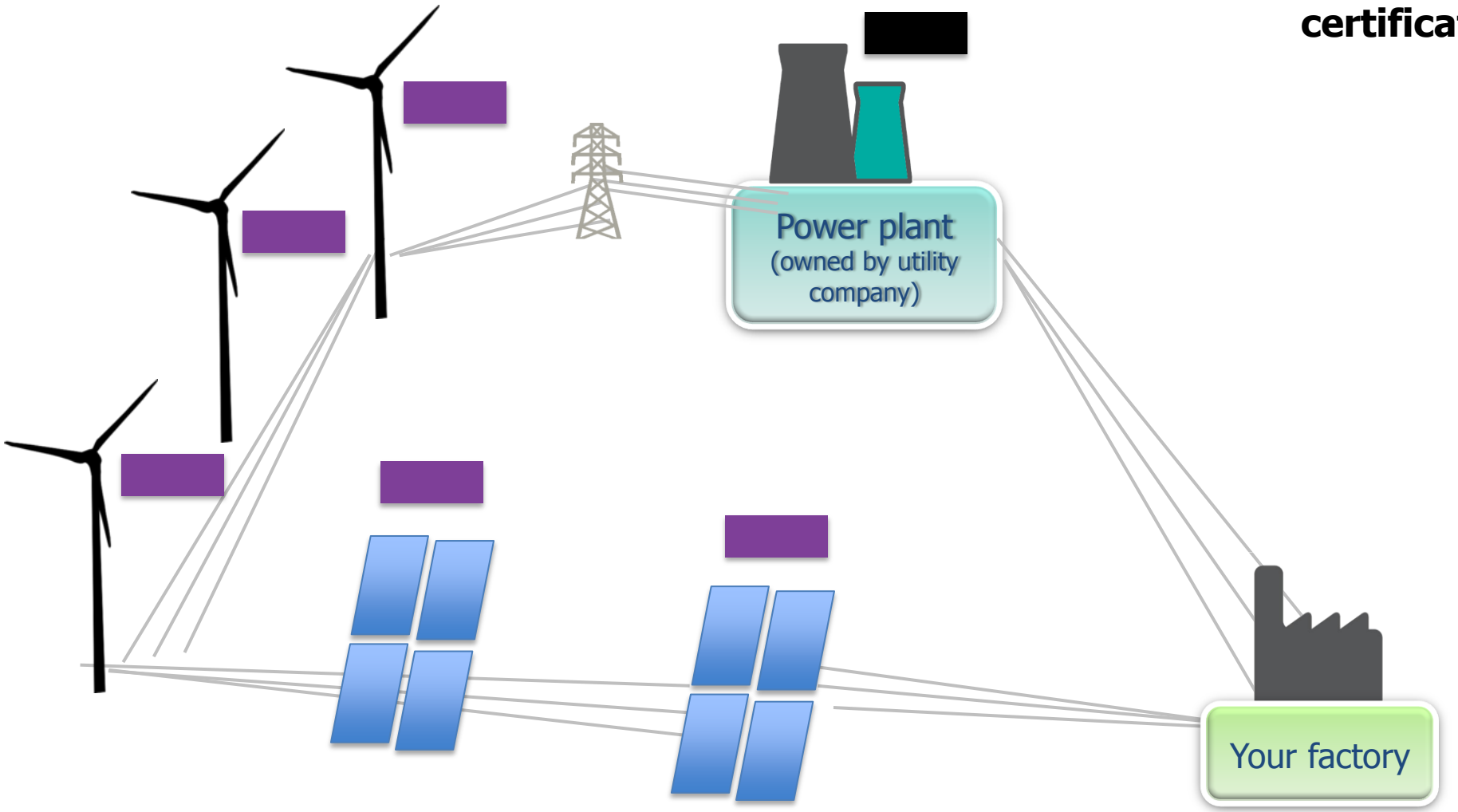
GREENHOUSE GAS PROTOCOL

= energy attribute tracking certificate



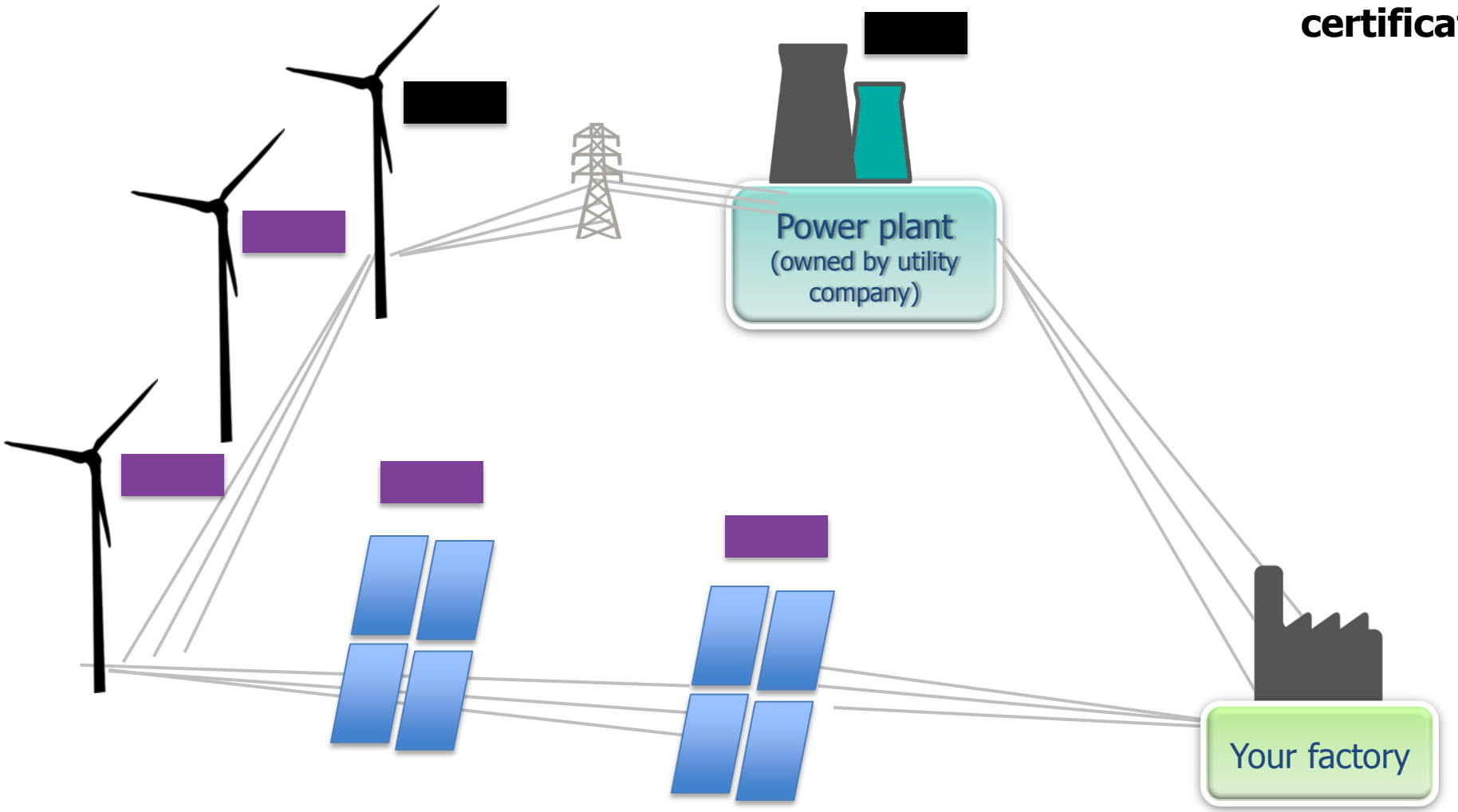
Eligibility rules for green power

= energy attribute tracking certificate



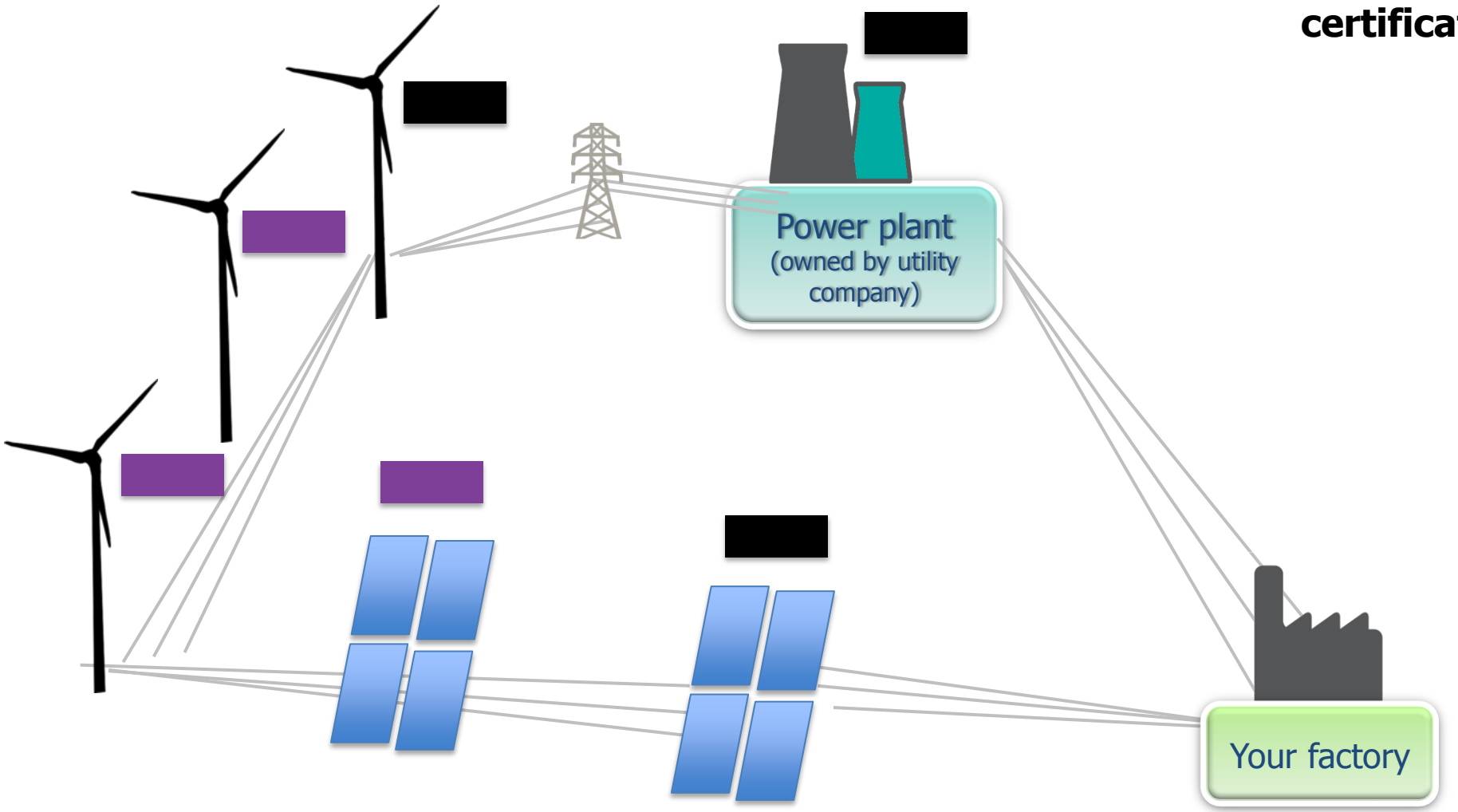
Eligibility rules for age of facility

= energy attribute tracking certificate



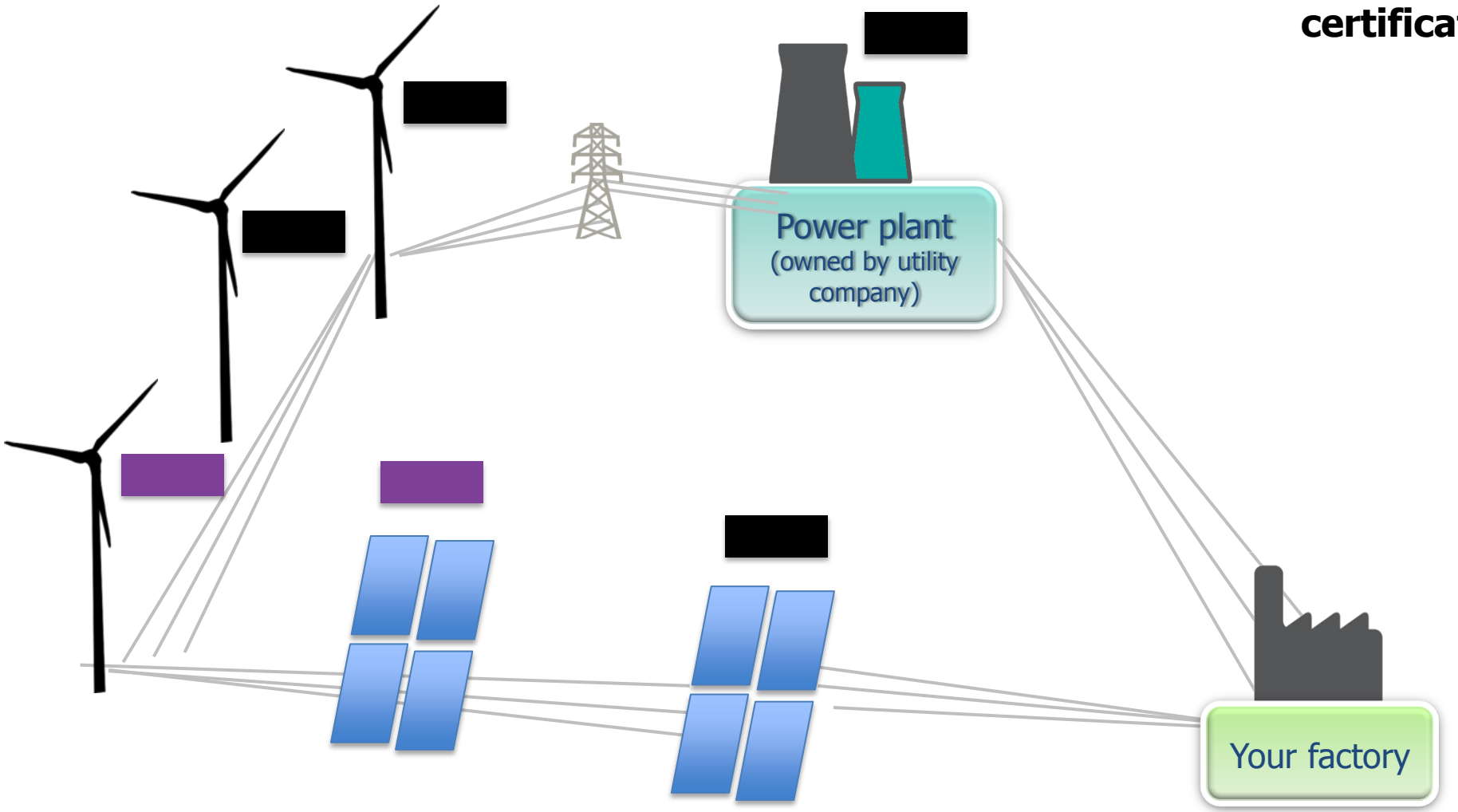
Eligibility rules for public support

= energy attribute tracking certificate



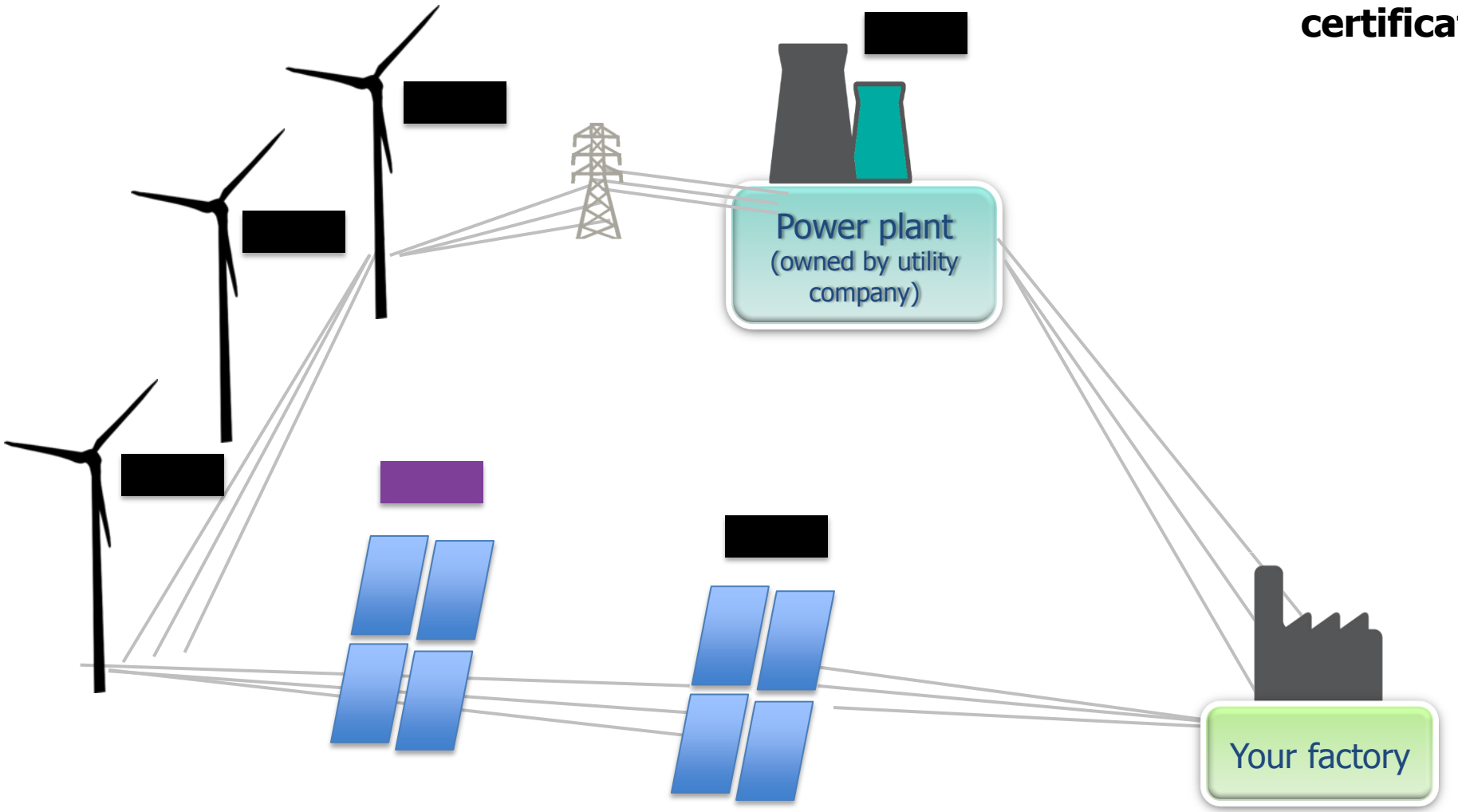
Eligibility rules for supplier quotas

= energy attribute tracking certificate



Eligibility rules location

= energy attribute tracking certificate



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How to "make a difference" with energy procurement?

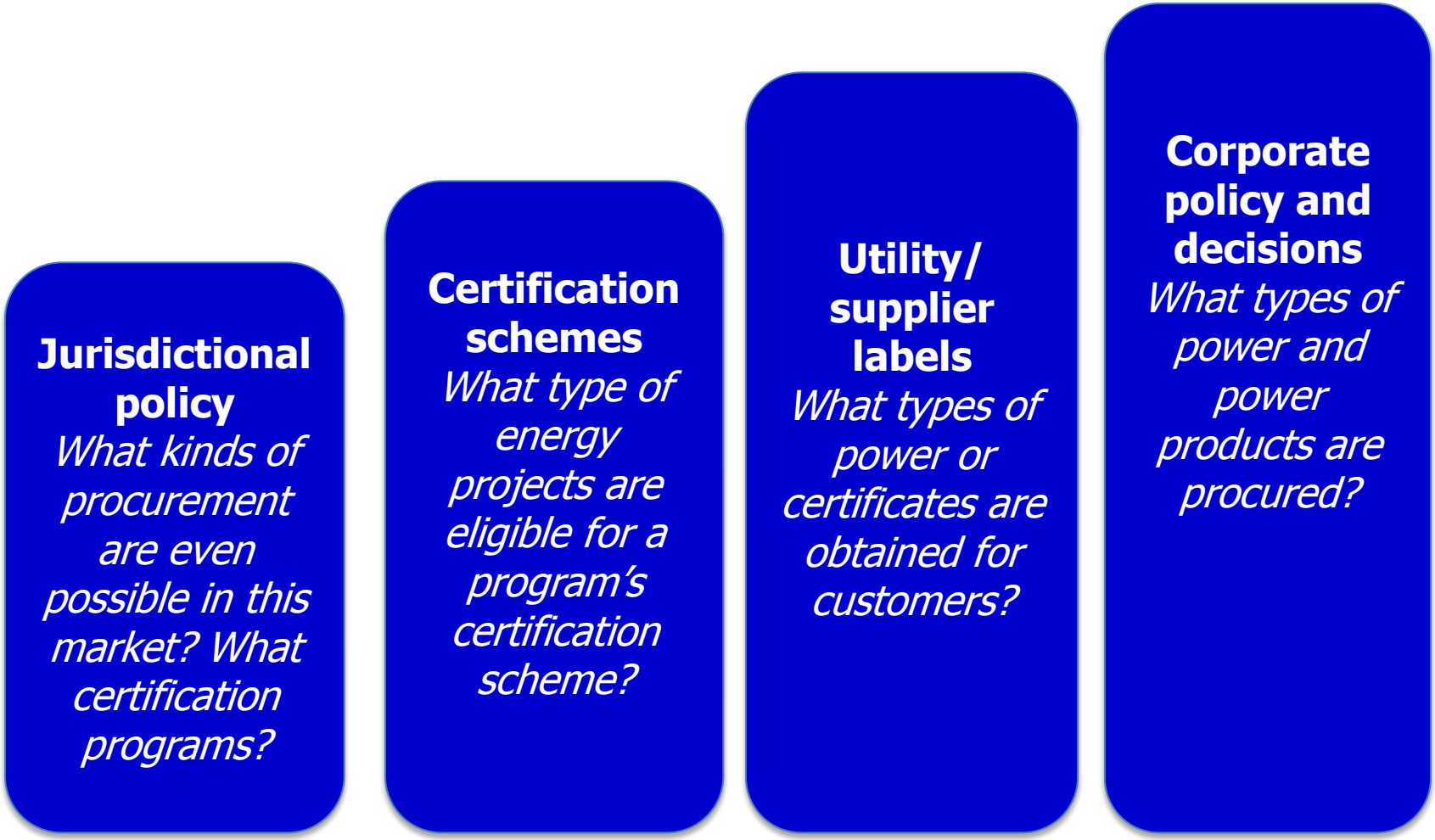
1. This Guidance's reporting requirements

2. Enacting eligibility changes throughout the supply chain

3. Emphasizing new corporate-driven energy projects

GREENHOUSE GAS PROTOCOL

Eligibility Decisions Made By All Stakeholders in the Electricity Sector



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For companies with operations in markets without choice in electricity product or supplier

- **No change**. Only one scope 2 total will be reported based on the location-based method.

GREENHOUSE GAS PROTOCOL

For companies with operations in markets *with* choice in electricity product or supplier :

Paradigm shift! Changes in:

1. Dual reporting
2. Quality Criteria
3. Disclosure

GREENHOUSE GAS PROTOCOL

2. QUALITY CRITERIA

- **Instruments must meet Quality Criteria.** Companies shall ensure that contractual instruments used in the market-based method meet the Quality Criteria outlined in this Guidance.

- A statement shall be made by a 3rd party ensuring that these Criteria have been met, or a reference given to the certification program which has verified conformance with the Quality Criteria

3. DISCLOSURE

- **Must disclose key regulatory feature to give insight into market.** Companies shall disclose the relationship between energy attribute certificates used in the market-based method and compliance instruments present in the same market.

- *Companies **should** disclose key features about their contractual instruments for added transparency about the context of the procurement choices*

- *Companies **may** report avoided emissions from projects or actions separately from the scopes using project-level methodology.*

GREENHOUSE GAS PROTOCOL

Quality Criteria (draft)

Instruments used as emission factors in the market-based method must:

1. Convey GHG emission rate claim
2. Be the only instrument that conveys the GHG emission rate claim
3. Be retired, redeemed or canceled by or on behalf of reporting entity
4. Be of vintage reasonably close to inventory year to which it is applied
5. Be used in appropriate market boundary
6. Be accompanied by a residual mix, or a statement made
7. *For utility-specific EFs: must be disclosed according to best available information and preferably best practice, must disclose how certificates are used, must not double claim attributes across different product offerings.*
8. *For direct contracts or on-site: no other entity can make claims on these attributes (see Criteria 2)*

GREENHOUSE GAS PROTOCOL

Location-based: *These are the emissions from the energy mix on the grids where we operate. The electricity grid is physically bound, and our consumption is linked to those local grids.*

Market-based: *Where we have options in terms of energy product or supplier, these are the emissions associated with our procurement choices in the market.*

Country	Location-Based Total (mtCO2e)	Market-Based Total (mtCO2e)	Instrument Types	Consumption
USA	650	0	RECs to cover 100% of consumption	1,590 kWh
France	150	150	*No market-based information available*	
Norway	100	500	No purchase but residual mix	
China	800	800 *** N/A**	N/A	
India	850	400	Collaborative solar PPA to cover 50% consumption	
Mexico	400	0	PPA to cover 100% of consumption	
TOTAL	**2,950 mtCO2e**	**1,850 mtCO2e**		

GREENHOUSE GAS PROTOCOL

Materials to date and summaries of scoping workshops available on project website:

http://www.ghgprotocol.org/feature/ghg-protocol-power-accounting-guidelines

http://www.ghgprotocol.org/feature/scope-2-guidance-public-comment-period

Contact: Mary Sotos
mary.sotos@wri.org
202-729 7627

SUSTAINABLE DEVELOPMENT FOUNDATION
Fondazione per lo Sviluppo Sostenibile

The Zero Carbon Railway Project

Raimondo Orsini
Sustainable Development Foundation

The Project steps:

- Analysis of Renewable energy certificates market
- Questionnaires to UIC members
- Informal meetings with selected stakeholders
- SWOT analysis of possible methodological options
- Discussion/Workshops
- Final UIC Guidelines.

INTERNATIONAL UNION
OF RAILWAYS

unity, solidarity, universality

Analysis of Renewable energy certificates market

The legal background

The REC/GO system is more than legal: it is supported by the latest EU Directives on renewable energy as a means of incentive to renewables and as a way to prove to final customers the quality of electricity.

The inclusion of RECs and Gos into the Corporate Reporting (single **company level**) is accepted by 2 main international standards for GHG reporting: Carbon Discloslure Project and GHG Protocol + by the specific standard for emission in transport services: CEN 16258

CDP
DRIVING SUSTAINABLE ECONOMIES

GREENHOUSE
GAS PROTOCOL

cen

COMPANIES USING RENEWABLE ELECTRICITY CERTIFICATES

"The long term direction is for all IKEA Group buildings to be supplied with renewable energy."

"We have a clear interest in changing to renewable energy and reducing our energy usage"

"Purchases renewable energy certificates to offset 5% of the energy consumed by its North America manufacturing locations."

"Purchasing electricity generated from renewable sources is an important component of Cisco's GHG reduction strategy."

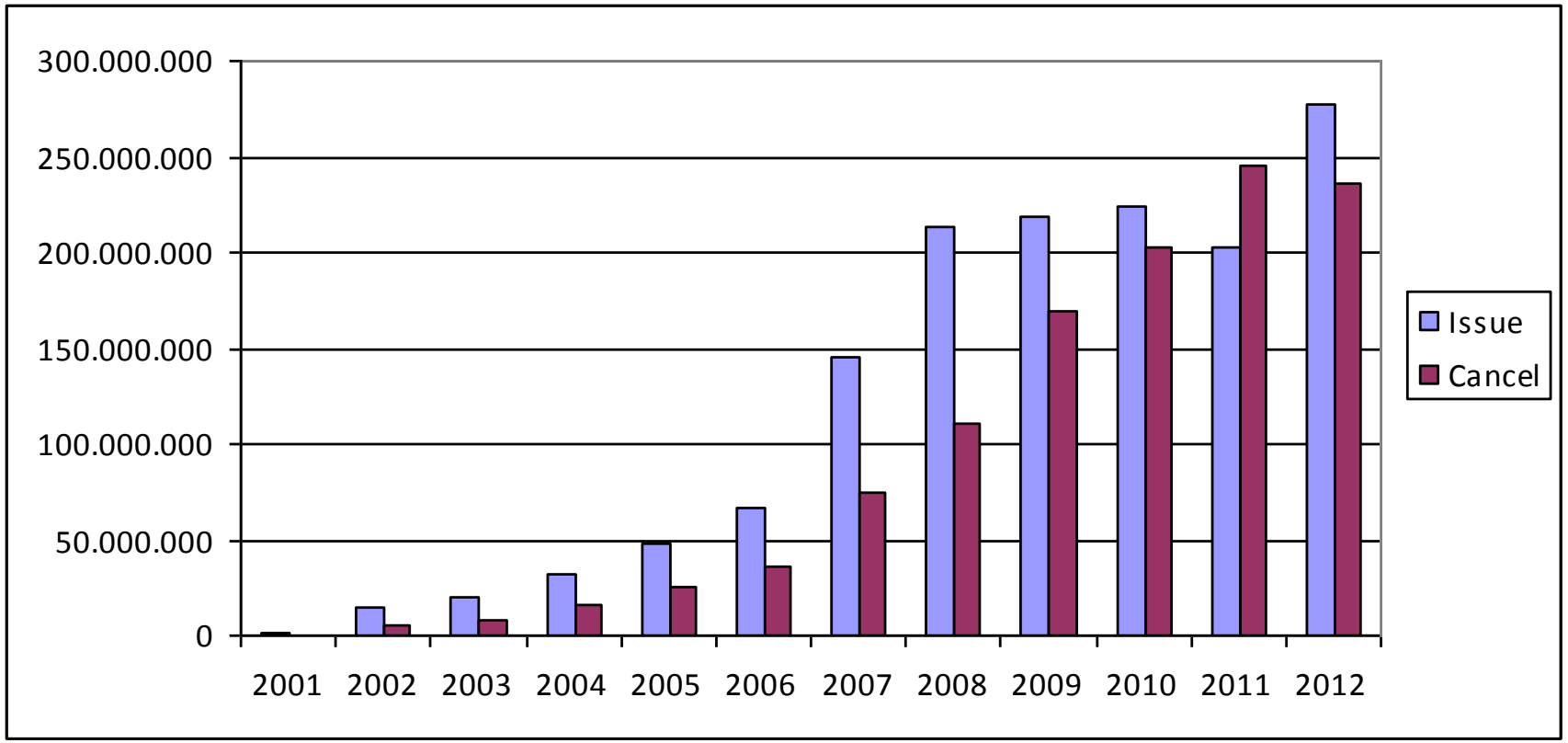
"We use renewable energy ourselves and work with our industry partners to increase the use of responsibly managed renewables."

" We purchased renewable energy credits equal to 20 percent of the electricity for company-operated stores in the U.S. and Canada."

SGS signed a contract in December 2011 with …. ECOHZ, to purchase renewable energy certificates each year that correspond to 100% of our trend electricity consumption in European countries.

Transactions of EECS certificates during 2001 – 2012 (MWh)

Almost 30% of the electricity produced by renewable sources in Europe



Source: AIB

EUR 10 billion
100 TWh new RES

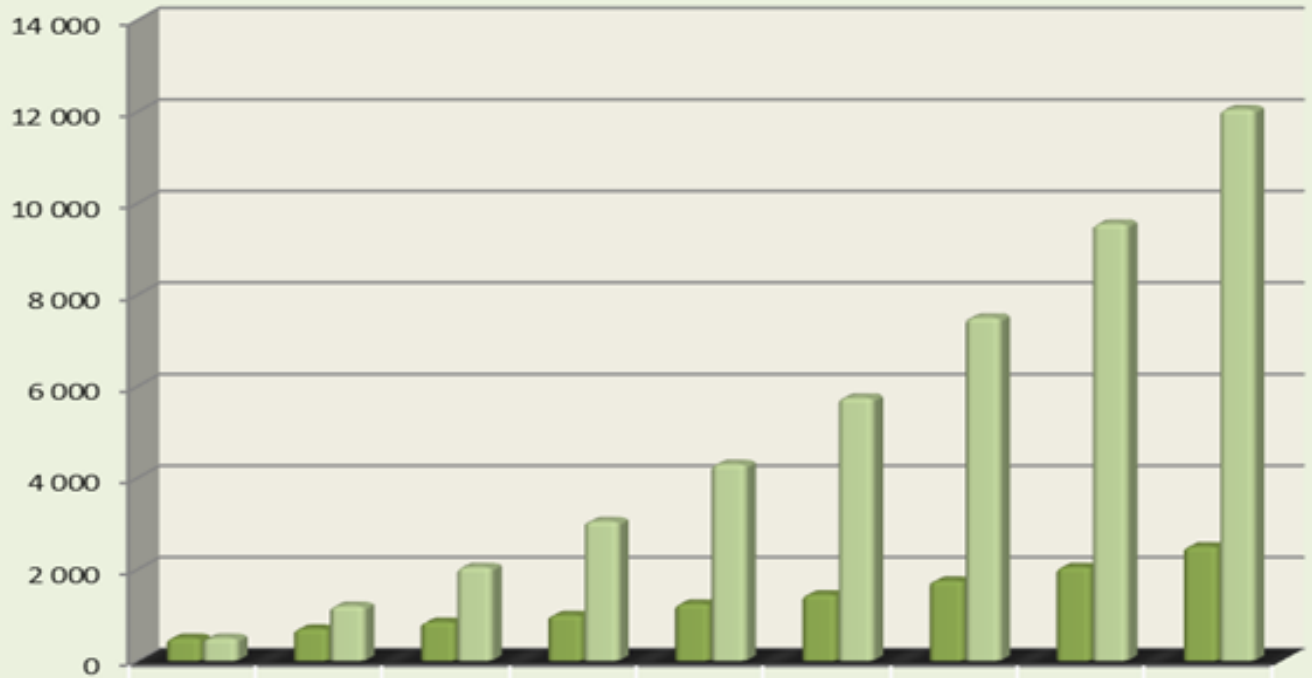
Key assumptions:

Price: eur 2,5

GO growth: 19% ➔ 1000 TWh

Revenue allocation: 80%

Top financing: < 15%



	2012	2013	2014	2015	2016	2017	2018	2019	2020
Yearly revenue (MEUR)	500	700	850	1 000	1 250	1 450	1 750	2 050	2 500
Aggregate revenue (MEUR)	500	1 200	2 050	3 050	4 300	5 750	7 500	9 550	12 050

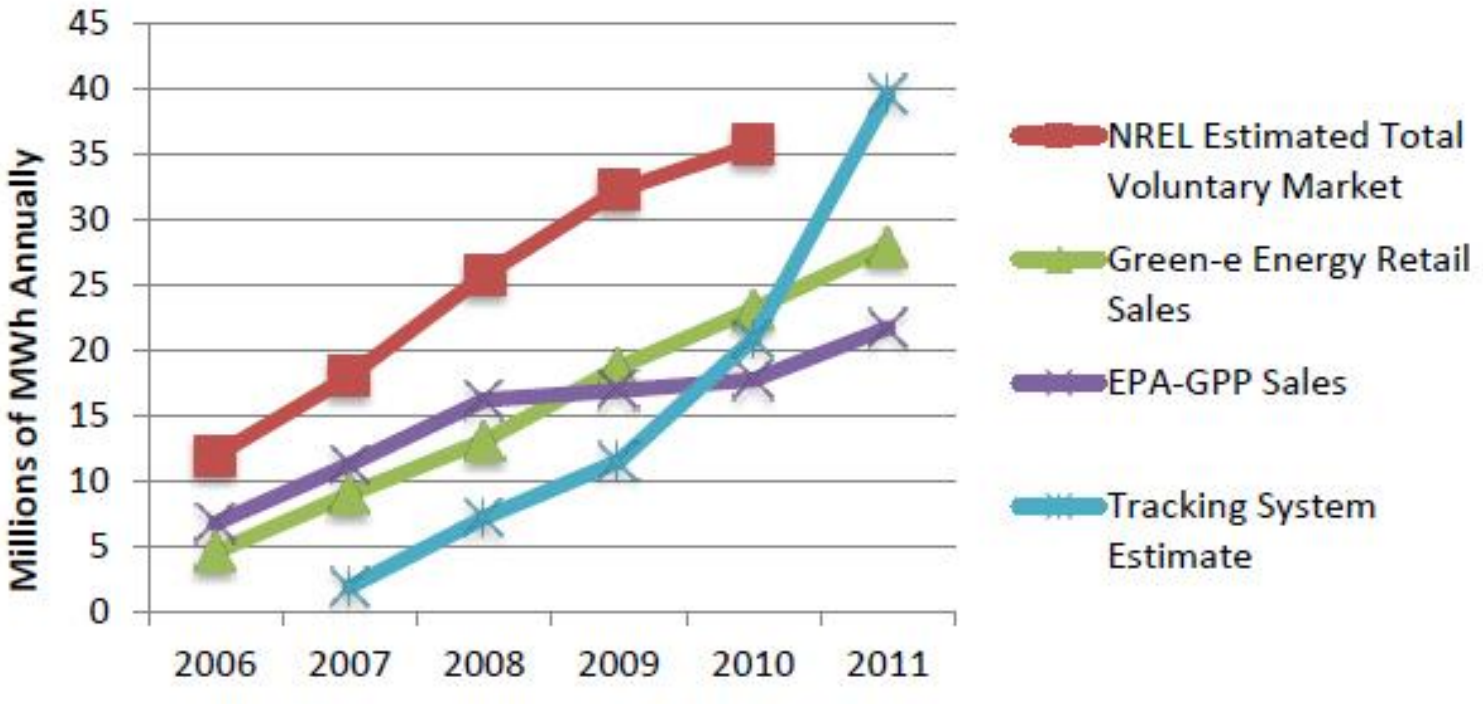
To give some examples (prices for 2013 in the wholesale market) in Euro per certificate (1 MWh):

- GO based on hydro installation older than 12 years without any further specification (commodity product): **0.16-0.20 €**
- GO based on hydro installation less than 6 years old: **1.8 €**
- GO from Norwegian wind power: **0.6-0.7 €**

Prices in the end customer market are significantly higher, **up to 4-6 Euro** for specific products/ecolabels with thorough documentation. There is in fact a tendency in the market to pay more attention to the “quality” of electric power, guaranteed by disclosure certificates.

As a comparison, the current average gross prices of electric power in Europe for non-household use (source: Eurostat, year 2012) are considerably higher: they go from a maximum of **227.9 Euro/MWh** (consumption up to 20 MWh) to a minimum of **103.7 Euro/MWh** (consumption between 70-150 GWh).

ESTIMATED ANNUAL VOLUNTARY SALES IN U.S. BY MARKET SECTOR, 2006–2011



Source: U.S. Department of Energy

Figure 6.1 Energy attribute tracking certificate flows

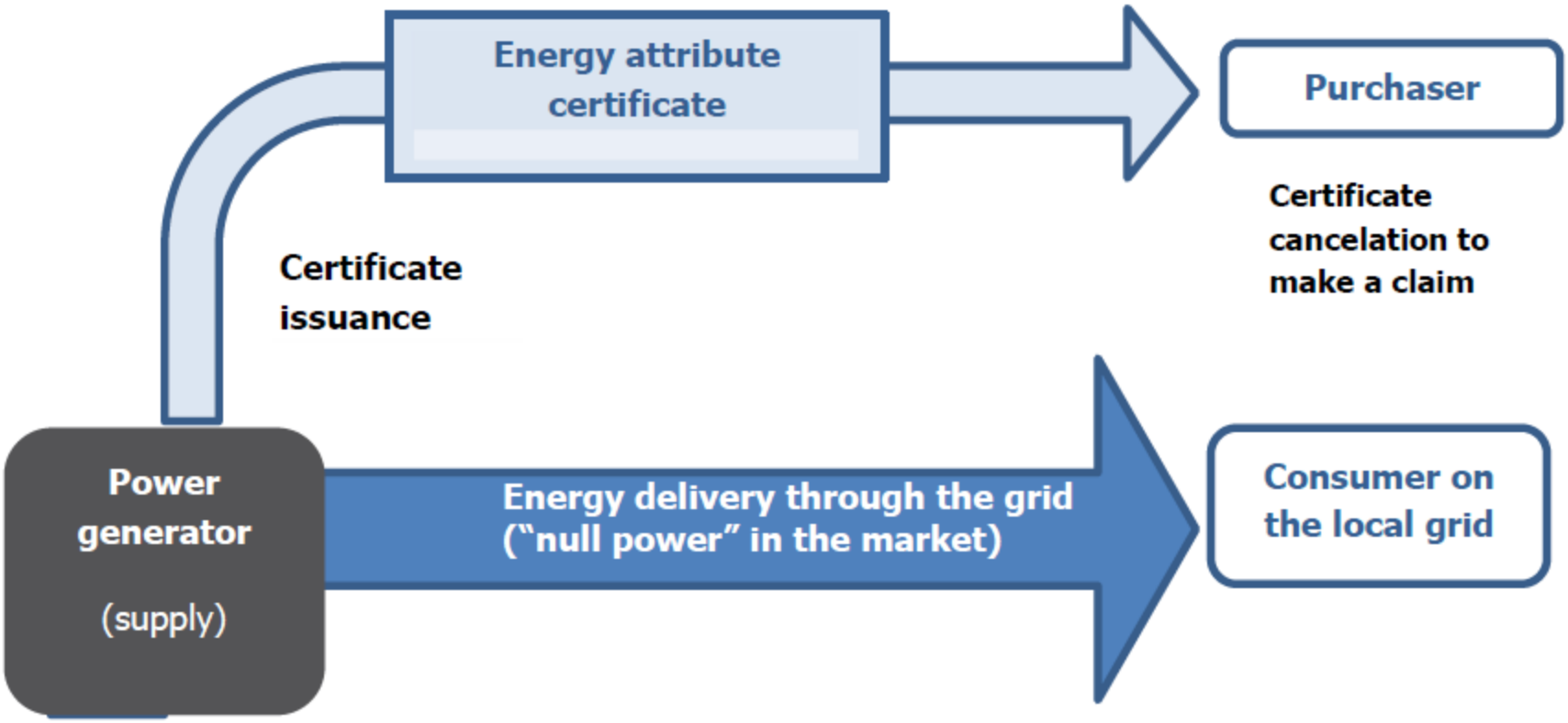


Fig. 3: Renewable producers gain extra revenue from selling energy certificates in the certificate markets

Source: Grexell

Figure 9.2 Electricity supplier purchasing and disclosure

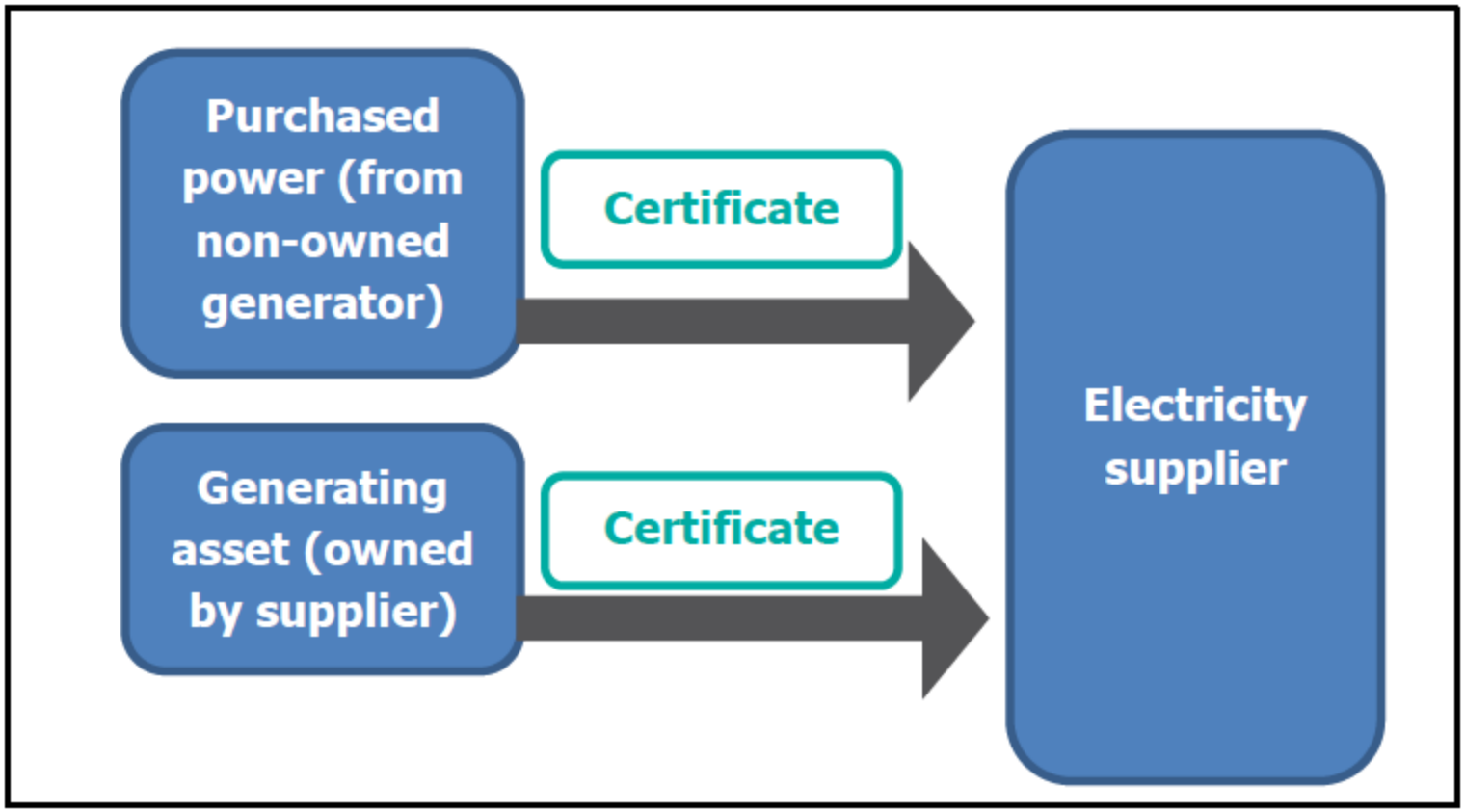
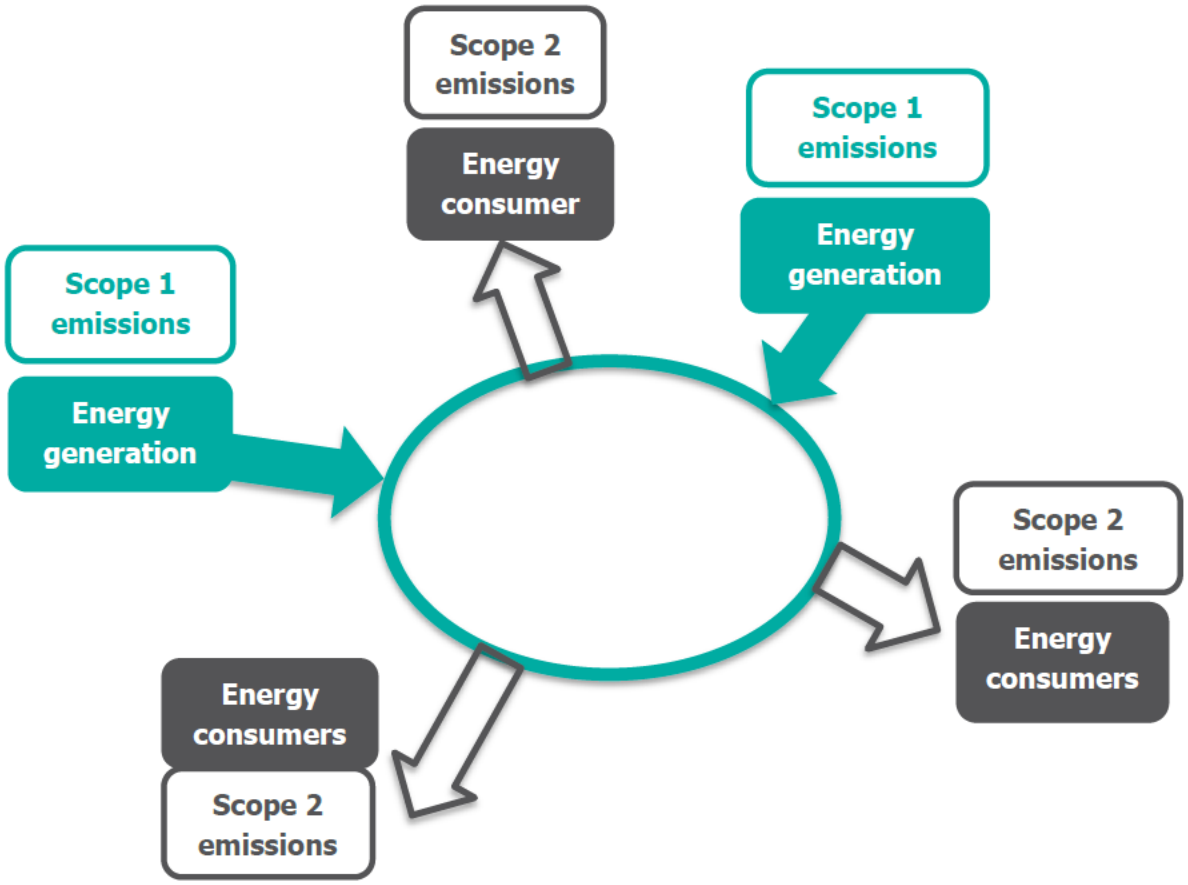


Figure 5.3 Grid-distributed energy, with multiple separate producers and consumers



The main models for corporate use of renewable energy

- **Direct investment:** a company directly invests in on-site renewable energy assets and consumes the energy generated. In order for the company to claim that the energy consumed is renewable, GO/RECs must be withdrawn by the company rather than sold..

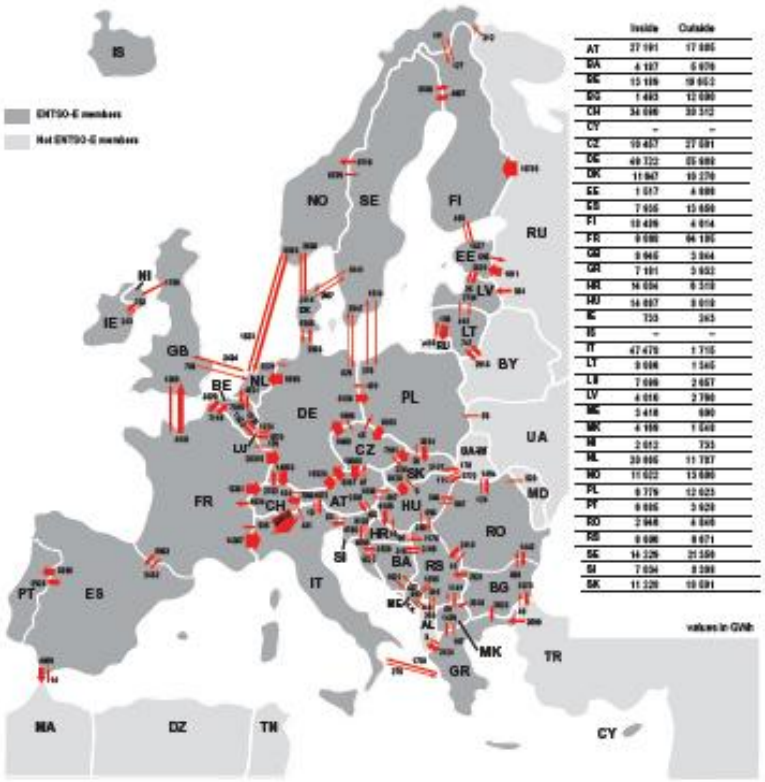
  - **Power purchase agreement (PPA):** The company purchases electricity from a specific renew-able energy project and the associated GO/RECs are produced.

  - **Green power procurement:** An energy supplier offers the purchasing company a guarantee with GO/RECs that its power has been produced using a certain percentage of renewable energy..

  - **Renewable energy certificate (GO/REC) procurement**

    Companies procuring credits from the voluntary market can claim, after certificates have been used (cancelled), that they have purchased a quantity of renewable energy corresponding to the number of GO/RECs. Traders may manage and withdraw the GO/RECs on the company's behalf, or the company may do this in-house.

Physical energy flows 2011 - graphical overview in GWh



Consolidated physical inside and outside flows in GWh[1]:

	Inside	Outside
AT	37 191	17 685
BA	6 187	5 870
BE	15 189	19 663
BG	1 493	12 690
CH	34 696	39 312
CY	-	-
CZ	19 437	27 691
DE	49 722	65 989
DK	11 967	10 270
EE	1 017	4 699
ES	7 916	15 699
FI	10 439	4 014
FR	9 598	64 195
GB	8 945	5 864
GR	7 191	3 652
HR	14 694	6 319
HU	14 667	8 019
IE	733	363
IS	-	-
IT	47 479	1 715
LT	3 698	1 345
LU	7 699	2 657
LV	4 016	2 799
ME	3 418	690
MK	4 199	1 649
NI	2 012	733
NL	39 995	11 787
NO	11 622	13 699
PL	9 779	12 623
PT	9 695	3 629
RO	2 948	4 649
RS	9 696	8 671
SE	14 229	21 359
SI	7 694	8 399
SK	11 329	10 691

values in GWh

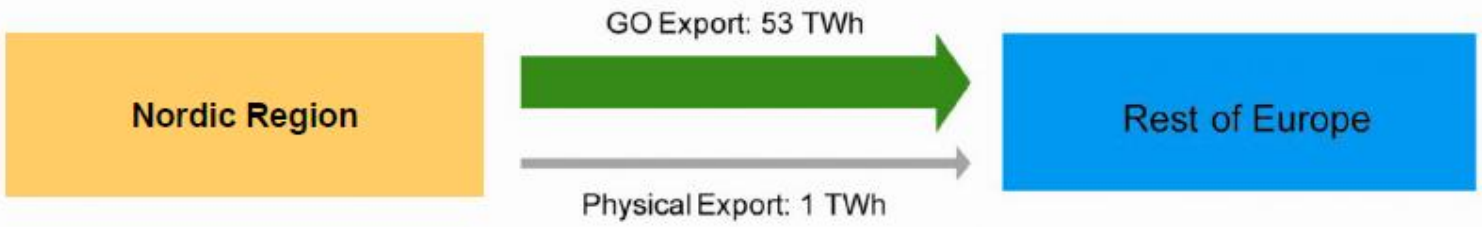
Sum of physical energy flows between ENTSO-E countries = 370786 GWh [2]

Total physical energy flows = 411934 GWh [2]

[1] Consolidated yearly values might differ from detailed flow data from the ENTSO-E database due to ex-post consolidation taking into account national statistical resources.
[2] Calculation based on the detailed physical energy flows in the table on page 16 without exchanges ME-AL

Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

Why do we need a European Attribute Mix?



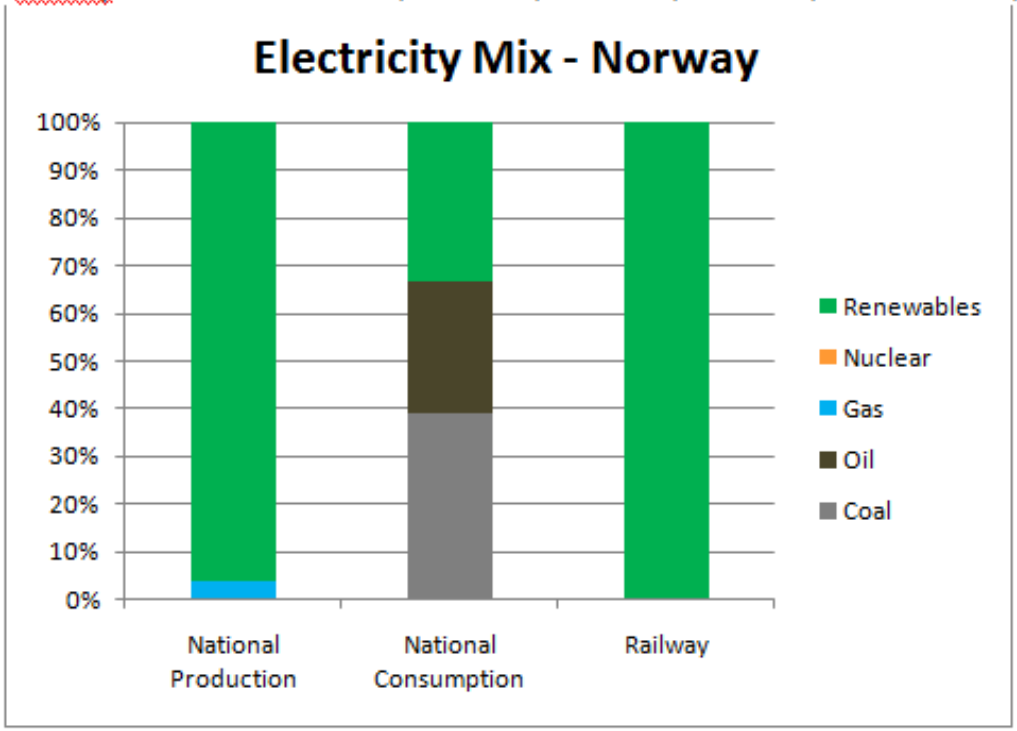
Production	397 TWh
Phys Export	1 TWh
Consumption	396 TWh
GO Export	53 TWh
Available Attributes	344 TWh
Attribute Deficit	**52 TWh**

Production	2.640 TWh
Phys Import	1 TWh
Consumption	2.641 TWh
GO Import	53 TWh
Available Attributes	2693 TWh
Attribute Surplus	**52 TWh**

All export & import figures refer to net balances.

Norway

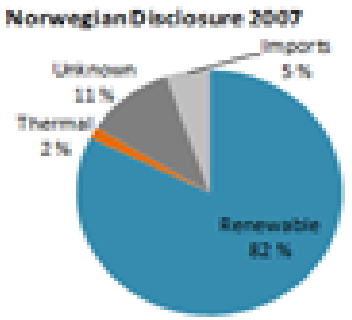
Norway	Coal	Oil	Gas	Nuclear	Renewables	REC/GF/GoO
National Production	0,1%	0,0%	3,9%	0,0%	95,9%	RECS
National Consumption	39,0%	28,0%	0,0%	0,0%	33,0%	98 Twh
Railway	0,0%	0,0%	0,0%	0,0%	100,0%	sold

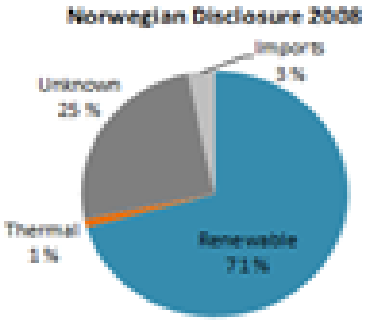


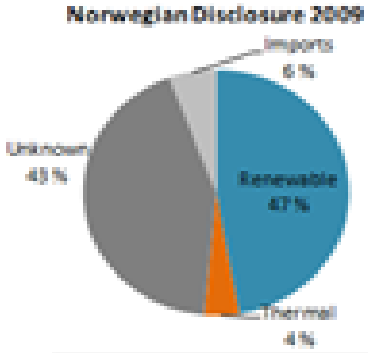
Source : IEA (2012b), UIC (2012b) and UIC (2013b)

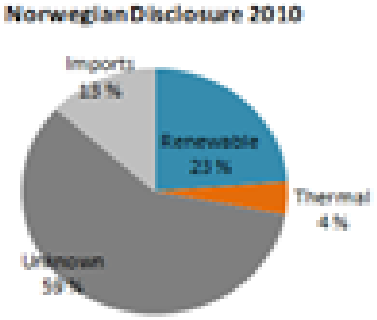
The Norwegian Disclosure

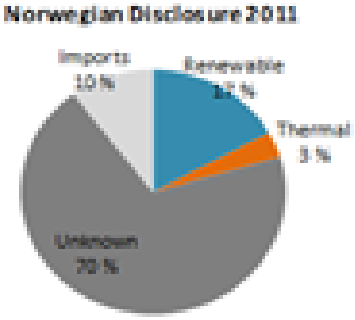
- The Norwegian Water Resources and Energy Directorate (NVE) is responsible for publishing the Electricity Disclosure











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Questionnaires to UIC members

SUSDEF Sent questionnaires in 2013 to **37** UIC/CER members: **21** railways replied.

The following railways already used RECs or GO certificates in 2013:

VR, SJ, Greencargo, NSB, DSB, PKP, OBB, NS, DB and RENFE.

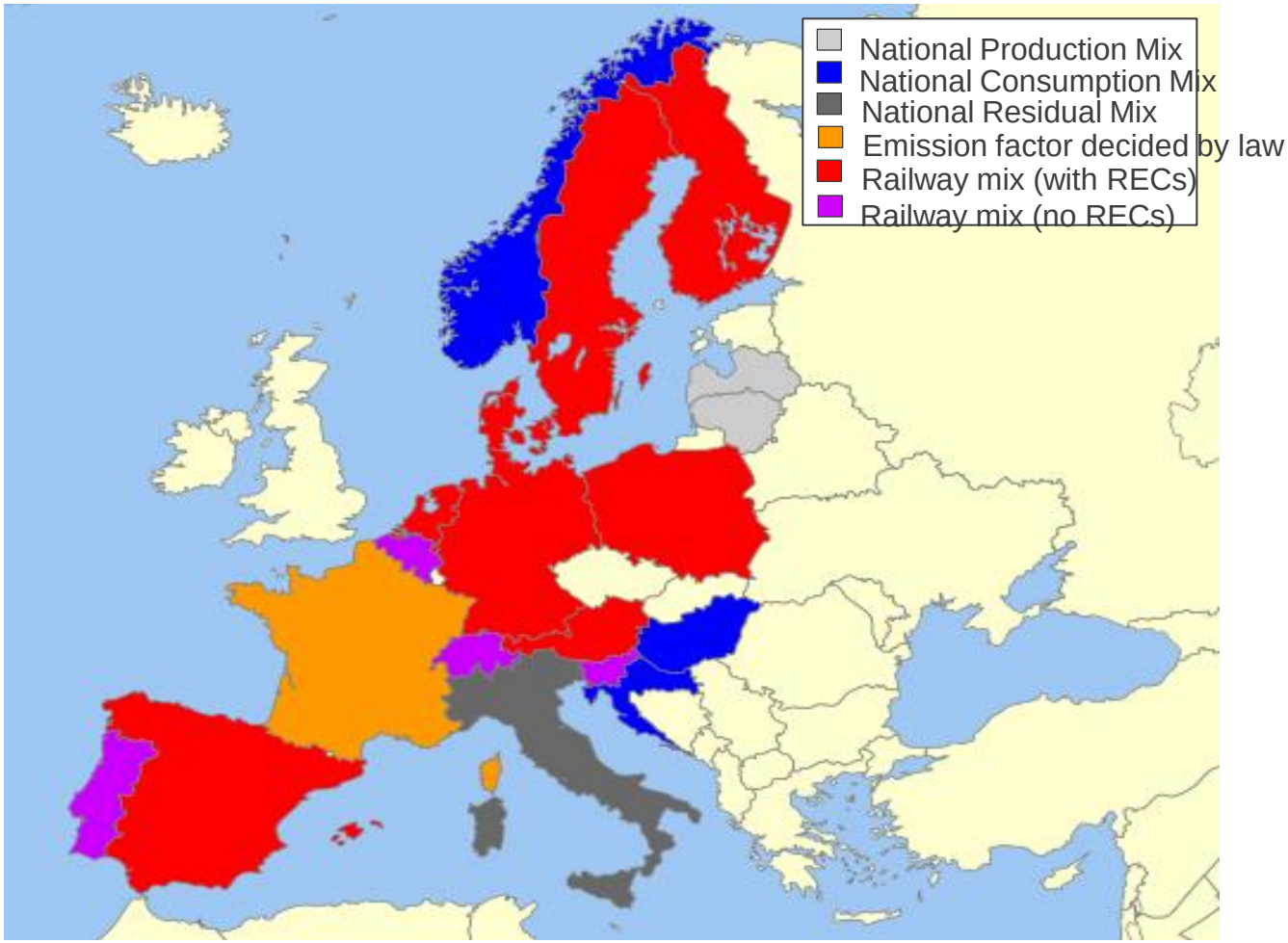
The Questionnaires gave also very useful information about the type of electricity mix considered in the national methodologies by UIC members

Table 1: Questionnaire report

Railway	National Production Mix	National Consumption Mix	Railway Mix	Use of RECs or Gos
ATOC				
CP			x	no
DB			x	yes
DSB				yes
FS		x		no
Greencargo			x	yes
HZ		x		no
LDZ	x			no
LG	x			no
MAV		x		no
NS			x	yes
NSB			x	yes
OBB			x	yes
PKP			x	yes
RENFE			x	yes
SBB			x	no
SJ			x	yes
SNCB			x	no
SNCF		x		no
SZ			x	no
Trafikverket			x	yes
VR			x	yes

source: SUSDEF

Electricity mix used by railways



The EES Strategy 2030 Targets and beyond

	Target	Baseline	Horizon
Climate Protection	• -30% pkm and tkm	**1990**	**2020**
	• -50% pkm and tkm • Not exceed total CO_2 Emissions (1990)	**1990**	**2030**
	• Carbon-free train operation	**-**	**2050**
Energy Efficiency	• -30% pkm and tkm	**1990**	**2030**
	• -50% pkm and tkm	**1990**	**2050**
Exhaust Emissions	• -40% Total PM and NOx	**2005**	**2030**
	• Zero emissions of NOx and PM	**-**	**2050**
Noise and Vibrations	• No longer a problem for railways	**-**	**2050**

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Informal meetings with selected stakeholders

Informal meetings held (June 2013- January 2014):

- ✓ DB
- ✓ **IFEU**
- ✓ **ADEME** (French environment authority)
- ✓ National Authority Energy (Italy)
- ✓ NTM (Scandinavian transport calculator)
- ✓ **EEA** (European environment agency)
- ✓ **IEA** (International Energy Agency)
- ✓ EcoHz (provider of GO certificates)
- ✓ **EU commission (DG energy)**
- ✓ **Transport and environment** (NGO-Bruxelles)
- ✓ **Greenpeace Italy**

The meeting with EU Commission (DG Energy) and European Environmental Agency (EEA) has clarified that:

Gos should be used purerely as an **instrument for the final customer** and:

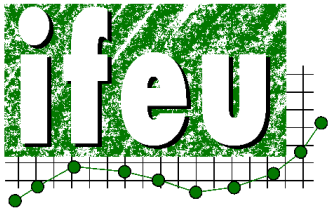
- Shall have no role for the calculation of the Mandatory National Targets (EU 2020), where only the physical production is used,
- Shall not be used for the calculation of the EU **2020 Transport Sector taget** (10% use of renewables in transport at 2020).
- Shall not be used in the EEA official data for transport sector and Post-Kyoto evaluation
- Only the **physical approach** will be used.

Some skeptic NGOs' view is that the green certificates system is purely a "mind game" potentially generating contradictory messages, **without creating "additionality**" (i.e. new renewable energy installations).

Doubts are also raised on the possibility of having a certificate exchange system which is strongly accurate, reliable and fraud-resistant (risk of **double-counting**)

Other bodies (like EEA): see the claim of zero emissions from inclusion of GO as a **"too little effort"** from railways side.

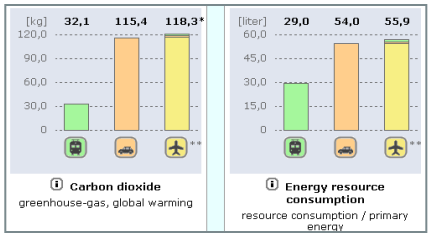
Some NGOs see as "wishful thinking" the possibility of extra revenue coming from certificate sales being invested in the installation of plants for renewable energy production.



Ecopassenger

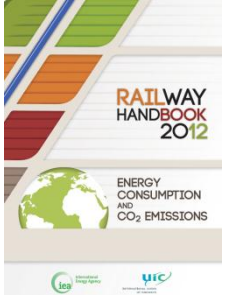
IFEU requests EcoPassenger calculations to use the official national electricity mix and consider that this would better highlight the rail sectors environmental advantage and prevent accusations of ‘green washing’.

Ecotransit:

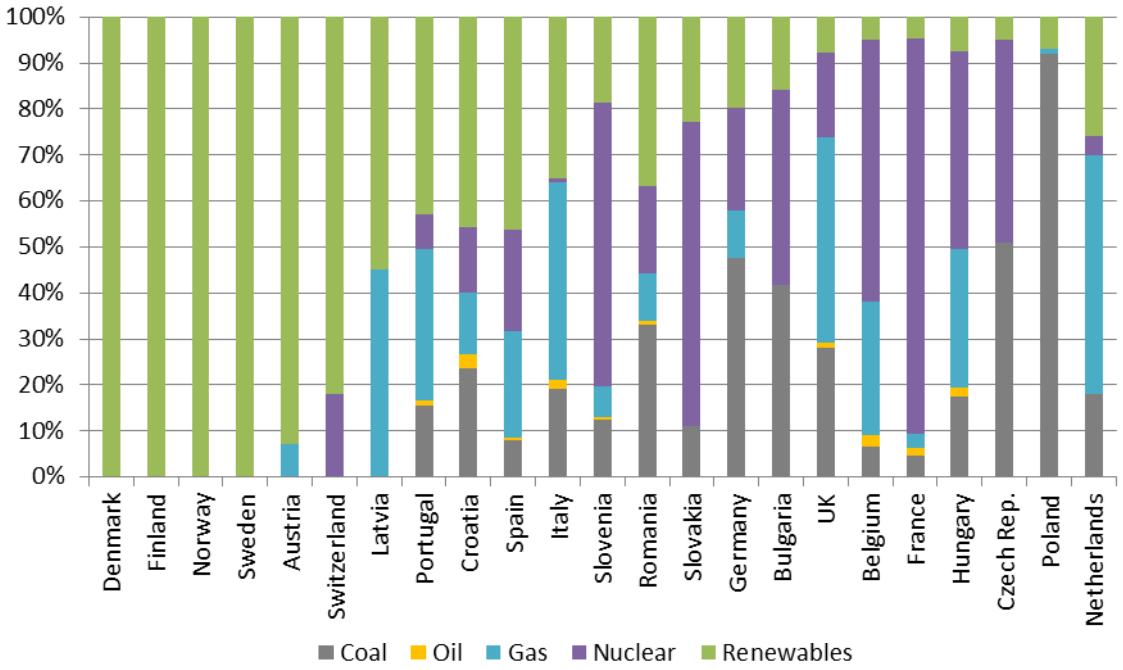


The Methodology Working Group of EcoTransIt World, the CO2 emissions tool of which UIC, DB Shenker and other railway companies are members, decided in April 2014 that only the physical electricity mix will be used for calculations

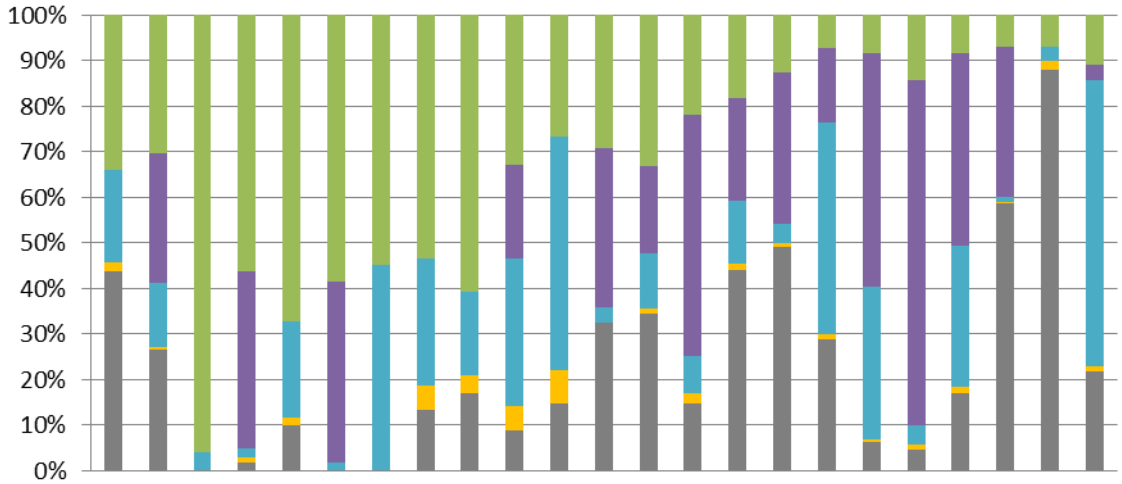
Warning from International Energy Agency



Railway operator mix

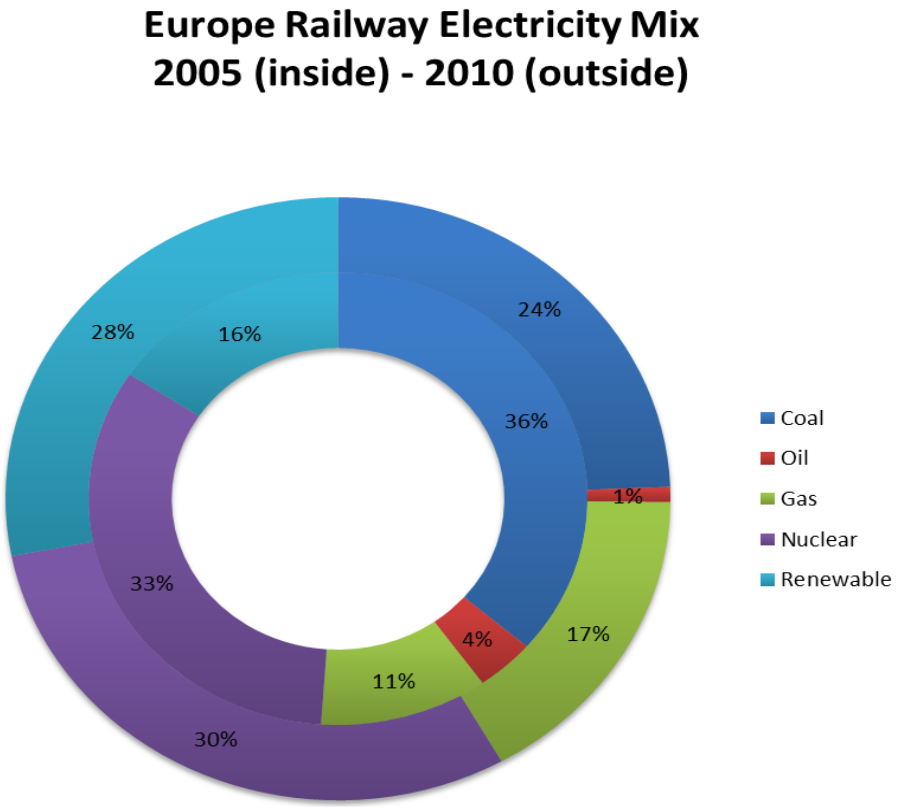


National production mix



(2010 data)

European Railways electricity mix



European railways use **almost 30% of renewable electricity**, with a tremendous increase in the last 5 years

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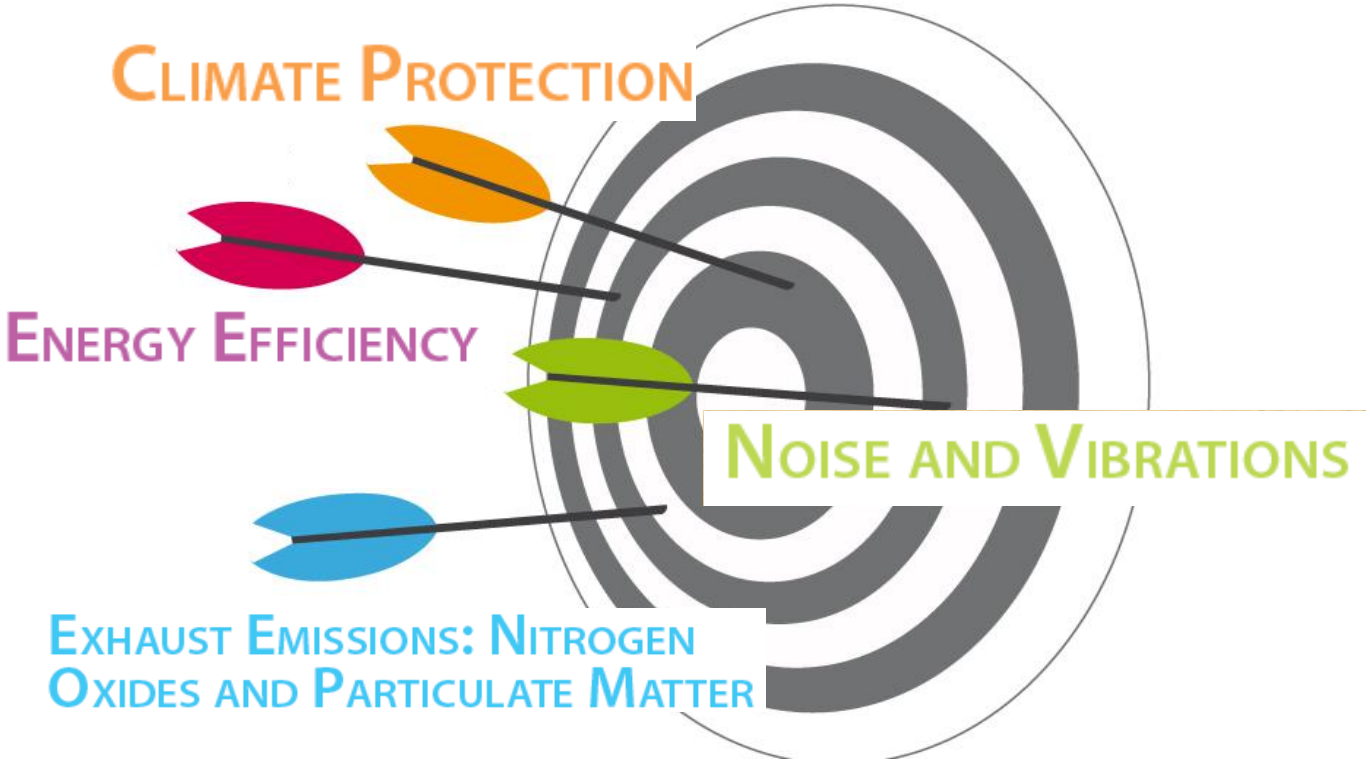
SWOT analysis of possible methodological options

STRATEGY

Moving towards sustainable mobility: The EES Strategy for 2030 and beyond

(voted by UIC and CER at UIC General Assembly in December 2010)



The EES Strategy 2030 Targets and beyond

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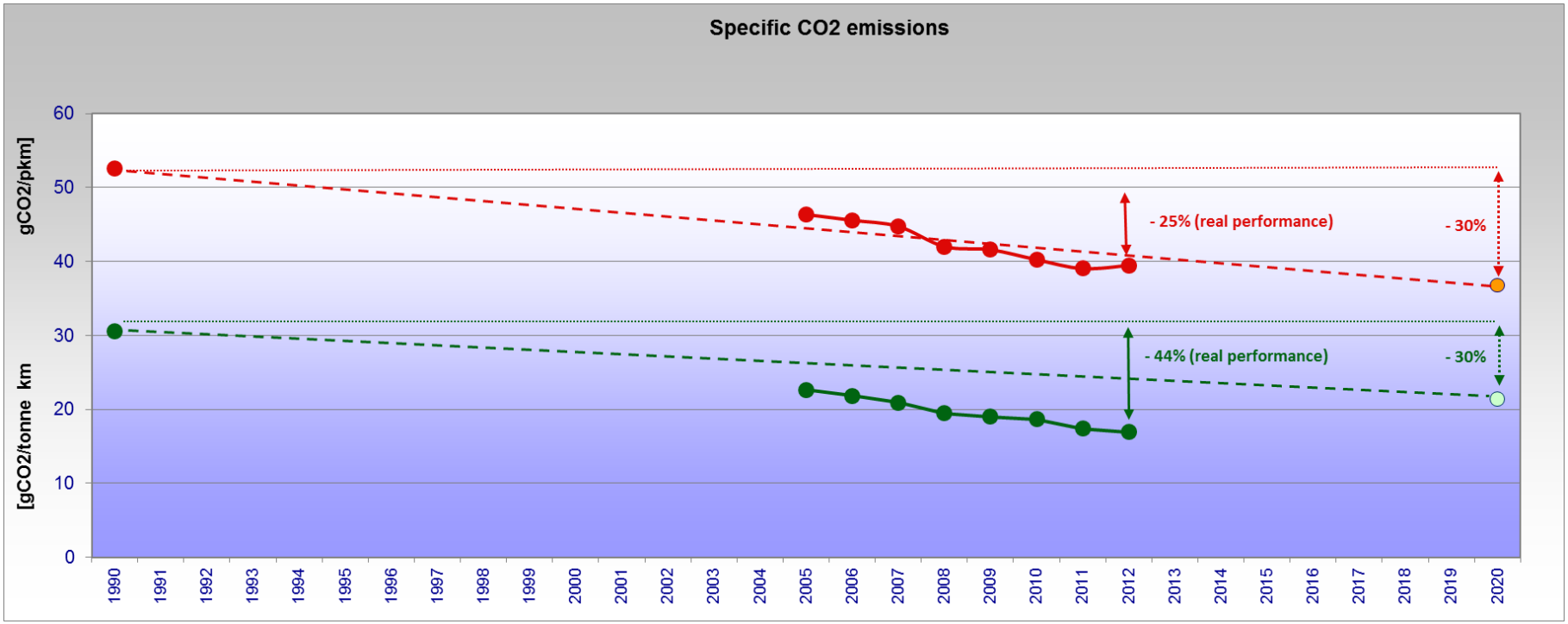
Noise and Vibrations	• No longer a problem for railways	**-**	**2050**

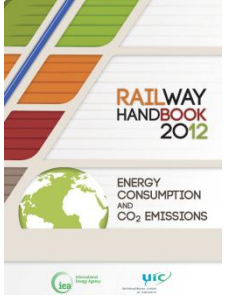
PROGRESS TOWARDS TARGETS: SPECIFIC EMISSIONS RECALCULATED

Specific CO_2 emissions 1990-2012 trend:

Passengers: 39.5 g/pkm (-25%) Freight:17 g/tkm (- 44%)

(vs. -22% expected linear tendency to 2020)





Input for UIC/CER Methodology
on 2020-2030 European Railway Sector
C02 reduction target calculation :

Possible Options :

1) **Physical approach (grid-based)**
2) **Virtual Approach (market-based)**

- **Physical Approach, option 1:** Calculation using the European production mix

- **Physical Approach 2, option 2 :** Calculation using the "National consumption mix" (including physical import/export)

- **Virtual Approach, option 1:** Calculation using the electricity providers' mix (allowing green electricity procurement and Renewable energy certificate procurement/GOs), and establishing some "minimum requirements" for quality of certificates

- **Virtual Approach, option 2:** Calculation using all forms of certificates, provided they are compliant to the EU directive

Calculation using the European production mix

Fig. 10: Physical Approach SWOT analysis– Option 1

STRENGTHS

- Low impact on database management
- No input needed from railway operators on electricity mix
- Official and authoritative
- Data available since 1990

WEAKNESSES

- Allows an easy comparison between different modes of transport only at European average and not at national level

OPPORTUNITIES

- No double accounting
- Avoids potential criticism for ambiguous and counterproductive messages
- European mix will naturally be greener in 2020 and 2030: railways would benefit directly

THREATS

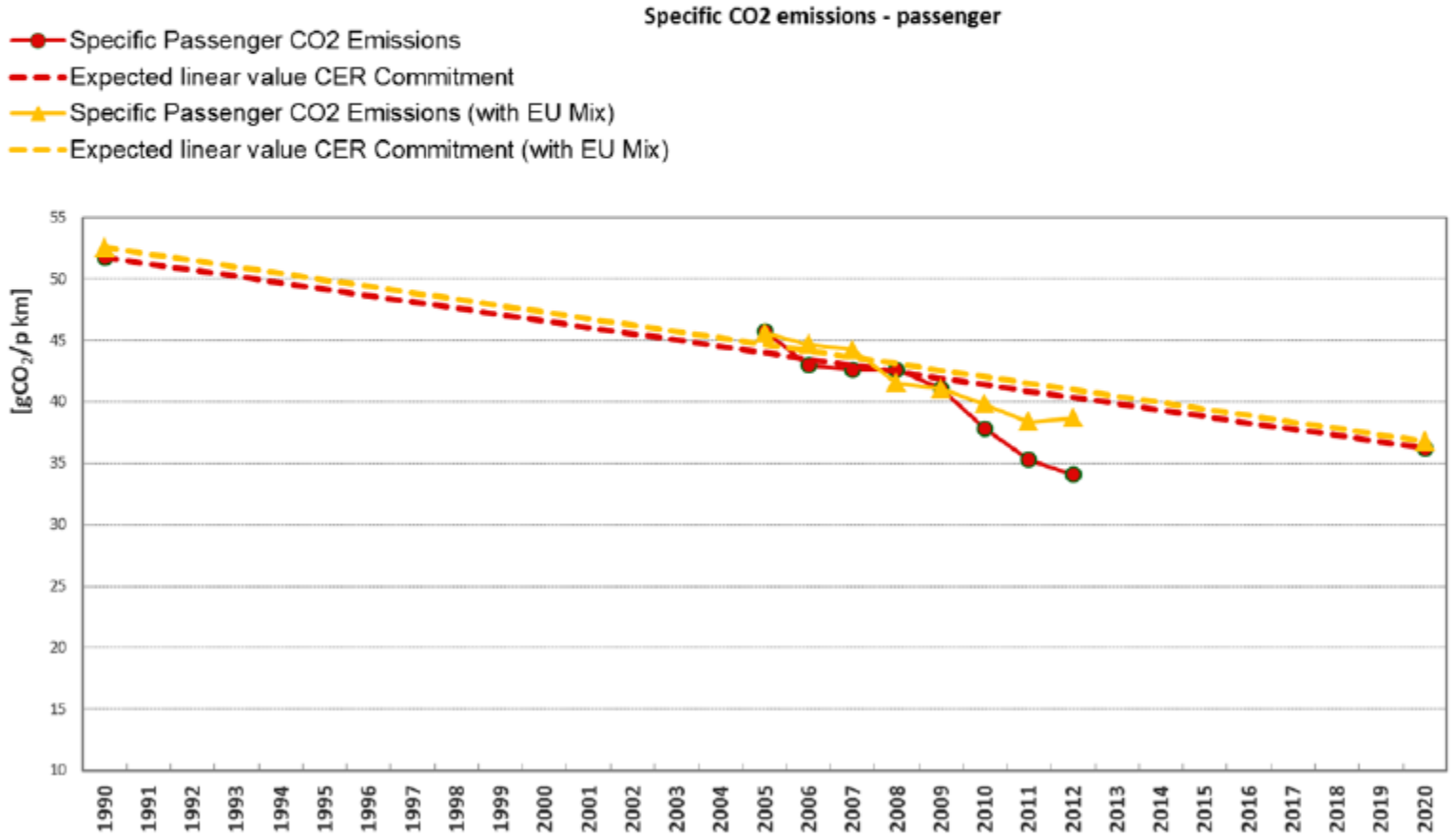
- Doesn't support the market for renewables
- Doesn't allow railway companies to use an emission reduction strategy commonly accepted in other sectors
- Doesn't follow the EC formulation on RES incentives and establishment of a single market

SPECIFIC EMISSIONS RECALCULATED WITH EU PRODUCTION MIX: DIFFERENCE WITH TRADITIONAL METHOD (PASSENGER)

Traditional method: 34.1 g/pkm (-34%)

Recalculated: 38.7 g/pkm (-26%)

(vs. -22% expected linear tendency to 2020)

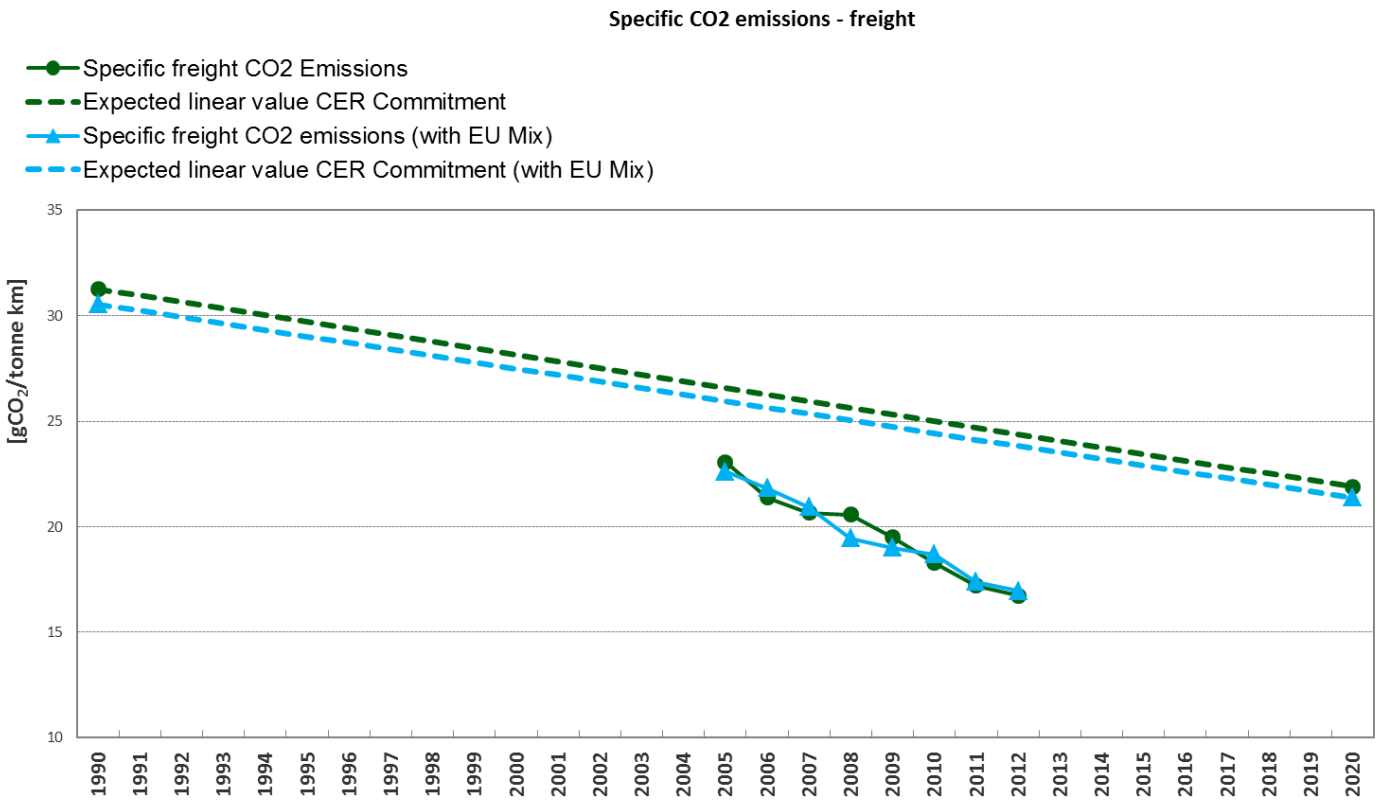


SPECIFIC EMISSIONS RECALCULATED: DIFFERENCE WITH TRADITIONAL METHOD (FREIGHT)

Traditional method: 16.7 g/tkm (-47%)

Recalculated: 17 g/tkm (-44%)

(vs. -22% expected linear tendency to 2020)



Calculation using the “National consumption mix”

Fig. 12: Phyisical Approach SWOT Analysis – Option 2

STRENGTHS

- Low impact on database management
- No input needed from railway operators on electricity mix
- Data available since 1990
- Takes import and export into account

WEAKNESSES

- Not official
- A specific methodology has to be created to calculate the electricity mix

OPPORTUNITIES

- Allows an easy comparison between different modes of transport
- Avoids potentially ambiguous and counterproductive messages
- No double accounting

THREATS

- Doesn’t support the market for renewables
- Doesn’t allow railway companies to use an emission reduction strategy commonly accepted in other sectors
- Doesn’t follow the EC formulation on RES incentives and establishment of a single market
- Not compliant with practices already adopted by several railway undertakings

Virtual approach, option 1 : estabishing minimum requirements

- Define a threshold limit to the **age** of the electricity plant ?
- Define a required quantity of investment actually going to **additional** green electricity?
- Define a maximum **limit of use** by a single railway (ex. 30% of the total energy consumption) ?
- Any other ????

Calculation using recs with minimum requirements

Fig. 13: Virtual Approach SWOT ANALYSIS- Option 1

STRENGTHS

- Low impact on database management
- Takes import and export into account
- When the EECS system is up and running, there are no risks of double accounting
- In line with art. 15 of EU 2009/28 directive

WEAKNESSES

- The database needs special input from RUs
- Inhomogeneity of input data between RU that use GO/RECs and those who do not use them
- Inhomogeneity of input data from 2012 onward
- Residual mixes will always get "dirtier"

OPPORTUNITIES

- Goes hand in hand with the current process of using green electricity contracts already in place in several railway companies

THREATS

- Virtually eliminates the possibility of a comparison with other transport modes
- Is exposed to the fluctuations of the GO/REC market – «one-way strategy»
- Potentially ambiguous and counterproductive message towards customers and NGOs
- Double accounting, currently estimated at 20%
- Discrepancy between railway statistics and official sources

Calculation using all kinds of existing recs

Fig. 14: Virtual approach SWOT ANALYSIS -Option 2

STRENGTHS

- Low impact on database management
- Takes import and export into account
- When the EECS system is up and running, there are no risks of double accounting
- In line with art. 15 of EU 2009/28 directive

WEAKNESSES

- The common principles should be drafted and accepted by UIC/CER
- The database needs special input from RUs
- Inhomogeneity of input data between RU that use GO/RECs and those who do not use them
- Inhomogeneity of input data from 2012 onward
- Residual mixes will always get "dirtier"

OPPORTUNITIES

- Stimulates RES and single market
- Shows that the railway sector is proactive
- Can be easily harmonized with current process of using green electricity contracts already in place in several railway companies

THREATS

- Virtually eliminates the possibility of a comparison with other transport modes
- Is exposed to the fluctuations of the GO/REC market – «one-way strategy»
- Potentially ambiguous and counterproductive message towards customers and NGOs
- Double accounting, currently estimated at 20%
- Discrepancy between railway statistics and official sources

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Discussion

Virtual approach could be less applicable for European Sector Target calculation

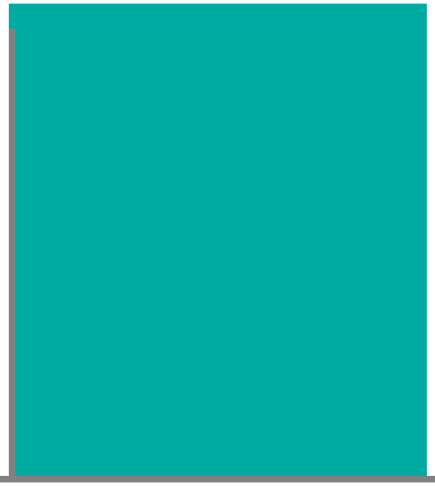
Calculation and Reporting would lack consistency and reliability:

1. Some national data would be calculated with GO/RECS
2. Other data (SNCF) would be calculated with national law approach (ADEME)
3. Other data (FS) would be calculated with National «Residual mix»
4. Other data with National Production mix

GREENHOUSE GAS PROTOCOL

WORLD RESOURCES INSTITUTE

GHG Protocol Scope 2 Guidance



A supplement to the GHG Protocol Corporate Standard

March 2014

For companies with operations in markets *with* choice in electricity product or supplier: (see chapter 6, 9)

- Companies **shall** report scope 2 in two ways: one total based on the location-based method, and one total based on the market-based method where applicable and Quality Criteria are met.

- Companies **shall** ensure that contractual instruments used in the market-based method meet the Quality Criteria outlined in this Guidance. A statement shall be made by a 3rd party ensuring that these Criteria have been met, or a reference given to the certification program which has verified conformance with the Quality Criteria

- Companies **shall** disclose the relationship between energy attribute certificates used in the market-based method and compliance instruments present in the same market.

- Companies **shall** identify which scope 2 total – location-based method or market-based method – serves as the basis for goal setting and for scope 3 data uses.

- Companies **should** disclose key features about their contractual instruments for added transparency about the context of the procurement choices

- Companies **may** report avoided emissions from projects or actions separately from the scopes using project-level methodology.

POST EUROP

YOUR LINK TO POSTAL EXPERTISE

Environment Report 2010

2009 CO_2 Data Result and Analysis

Issued in March 2011

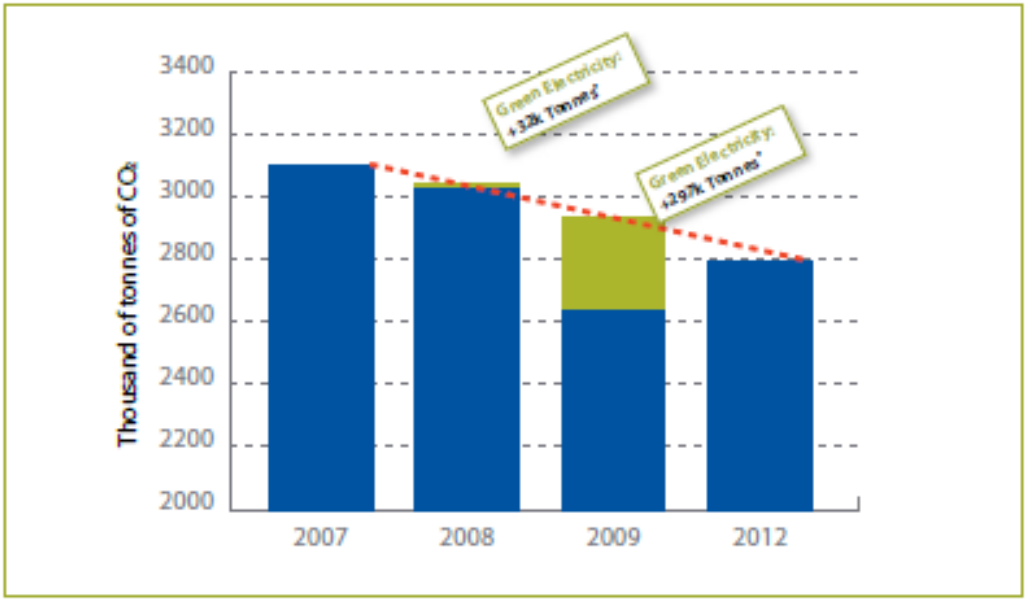
UIC

Evolution of Target

Following the PostEurop recalculation on historical data, it shows that members are on the right track to reach the reduction target in 2012.

From 2007 to 2009, a **reduction by 465 thousand of tonnes of CO_2** was accounted for, meaning a collective reduction of 15%. However, green electricity with a low emission factor was major contribution in achieving this result. Consequently, without considering the reduction obtained thanks to green electricity*, the result will be a lower reduction, that will require further alternative efforts in order to reach the target in 2012.

Evolution of Target (SCOPE 1 and 2 only)



INFRABEL UIC

UIC ENERGY EFFICIENCY DAYS 2014

ANTWERPEN, 16 - 19 JUNE

COMPANY RELATED BALANCES VS PUBLIC INFORMATION TOOLS

CARBON FOOTPRINT OF ELECTRICITY GENERATION IN ECOPASSENGER AND ECOTRANSIT

Energy Efficiency, the best fuel to move our trains!

OVERVIEW

1. Basic principles of EcoTransIT (ETW) and EcoPassenger (EP)
2. Problems regarding green electricity
3. Problems regarding provider mixes
4. Decision of the ETW methodology group
5. Conclusions and recommendations

BASIC PRINCIPLES OF ETW AND EP

Credibility

- Sound, transparent and well documented methodology
- Based on official and reliable data
- Methodology and data are well balanced: no preference for a specific transport mode

PROBLEMS REGARDING GREEN ELECTRICITY

Different company strategies – which one is sustainable?

- RECs, GOs and contracts concerning delivery of green electricity from existing power plants only improve the carbon footprint (CF) balance of the company:
  - transfer of CF to other sectors and consumers
  - no or – so far - only small reduction of overall CF
  - future effects of this strategy cannot be quantified now

REDUCTION OF CO_2?

DB says: with green electricity we reduced our CO_2 balance by 750.000 tonnes within one year

DB WELT | Nr. 04 | April 2014

750.000 TONNEN CO_2 EINGESPART

Mit 75 Prozent Ökostrom ist DB Fernverkehr Umwelt-Vorreiter. Zwischenbilanz nach einem Jahr

An den Türen der ICE weist eine grüne Plakette darauf hin: „Unterwegs mit Ökostrom". Seit dem 1. April 2013 fahren alle 4,9 Millionen Bahn-Card-Inhaber, Mitarbeiter von 26.000 Firmenkunden, 37.000 Zeitkartenbesitzer und weitere Kunden im Fernverkehr mit Ökostrom. Unter dem Strich setzt die DB für drei Viertel ihrer Fahrten im ICE, IC und EC erneuerbare Energie ein. Die erforderliche Menge Ökostrom kauft DB Energie und speist ihn in das Stromnetz ein.

Das Fazit nach einem Jahr:

» Bereits jetzt erreicht die DB im Bahnstrom-Mix einen Ökostromanteil von 35 Prozent. Dieses Ziel war erst für 2020 angepeilt (siehe Seite 1).

» Durch den Zukauf von Ökostrom hat allein DB Fernverkehr seine Klimabilanz 2013 um 750.000 Tonnen CO_2 verbessert. „Mit nur noch 14 Gramm CO_2 pro Personenkilometer bieten wir jetzt das klimafreundlichste Verkehrsmittel – sogar vor dem Fernbus", sagt Henning Colsman-Freyberger, Projektleiter grüne

ICE T Baureihe 411 im bayerischen Fürth-Vach

- **Company View:**

  Yes:

  Amount is reported in the company balance according to official accounting rules

- **Global View:**

  No:

  Overall amount of reduction cannot be quantified so far (transfer of CO_2 from DB to other consumers)

PROBLEMS REGARDING GREEN ELECTRICITY

Alternative strategies – more sustainable?

UIC says: Yes

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- Improvement of efficiency of transports has a direct impact on energy consumption (EC) and carbon footprint (CF):
  - no transfer of CF to other sectors and consumers
  - overall reduction of EC and CF

PROBLEMS REGARDING PROVIDER MIXES

- The general usage of provider mixes demands a fully transparent inventory system over all providers and consumers
- If used, provider mixes have to be obligatory for all, e.g. all transport modes, single transports, transfer processes etc.

-> the usage of provider mixes excludes usage of general public consumer mixes at the same time

-> difference to the „rest of the world“ has to be reported

-> framework to fulfill these conditions is not available so far

PROBLEMS REGARDING PROVIDER MIXES

Would a provider mix improve the results of EP and ETW as public information tools?

- Provider mix can differ for each company or user and consequently for each single train, car and lorry

-> in the case of electric vehicles EP and ETW would compare impacts of electricity production and not of transports

-> no useful information about the impacts of transport

DECISION OF THE ETW METHODOLOGY GROUP

ETW Public tool (www.ecotransit.org):
General view, information and comparison

- no usage of company specific provider mixes; usage of official public consumer mixes based on publicly available data

ETW business solutions:
Company view, company related balancing, benchmarking and communication

- companies are free to balance and report CF based on provider mixes, following the rules of EN 16258 (including Renewable Energy Directive 2009/28/EC)

CONCLUSIONS AND RECOMMENDATIONS

- The good reputation of the public versions of ETW and EP is based on the credibility of methodology and data from independent and transparent sources

-> no railway tools!

-> no company tools!

-> fair and transparent balances and comparison
of transport modes,
not of companies - and not of electricity generation

CONCLUSIONS AND RECOMMENDATIONS

- Electricity provider mixes should not be used for general and independent comparisons of transport modes
- Electricity provider mixes can be used by companies for company balances, benchmarking and communication (e.g. business solutions of ETW)
- Companies should be aware of their responsibility, when using strategies with « green electricity »
- Railway companies and UIC should focus on strategies which influence the environmental performance of railway operation directly

CONCLUSIONS AND RECOMMENDATIONS

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Thank you very much for your attention!

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