

Baseline setting approaches for Article 6.4

The power sector example

Luca Lo Re

Based on: *Lo Re, Ellis, Vaidyula and Prag (2019)*

“Designing the Article 6.4 mechanism: assessing selected baseline approaches and their implications”

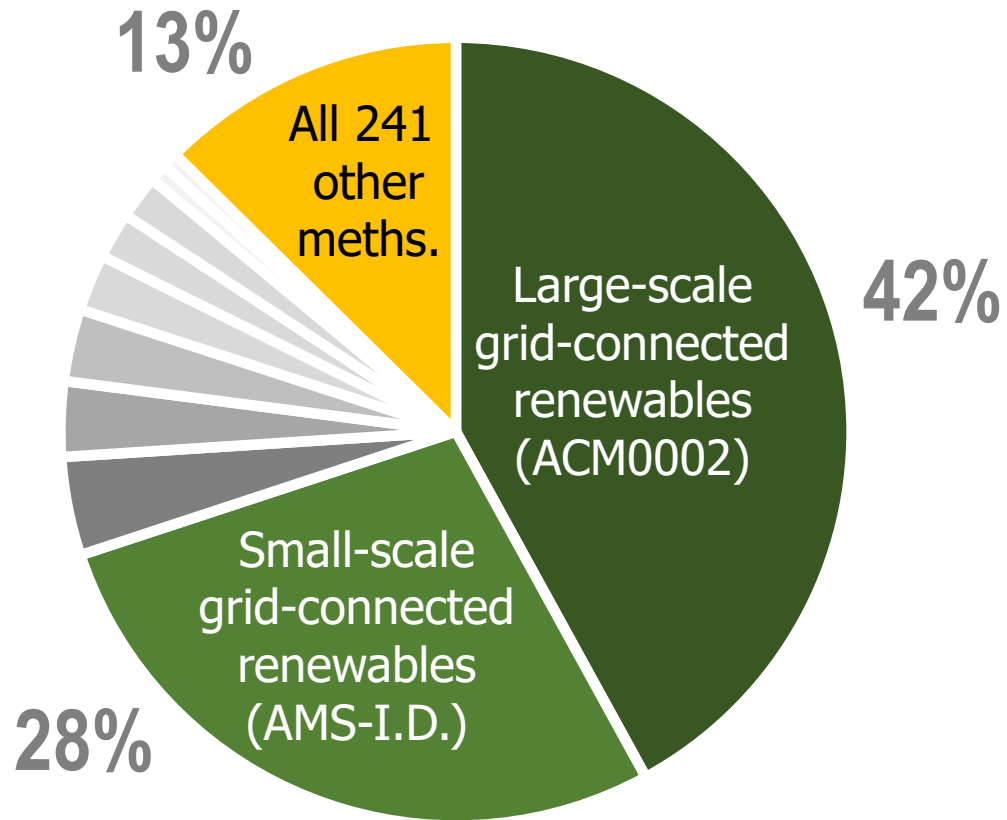
Webinar: Reflecting the Dynamics - Baseline setting under a future Art. 6.4 mechanism
19 May 2020

Presentation outline

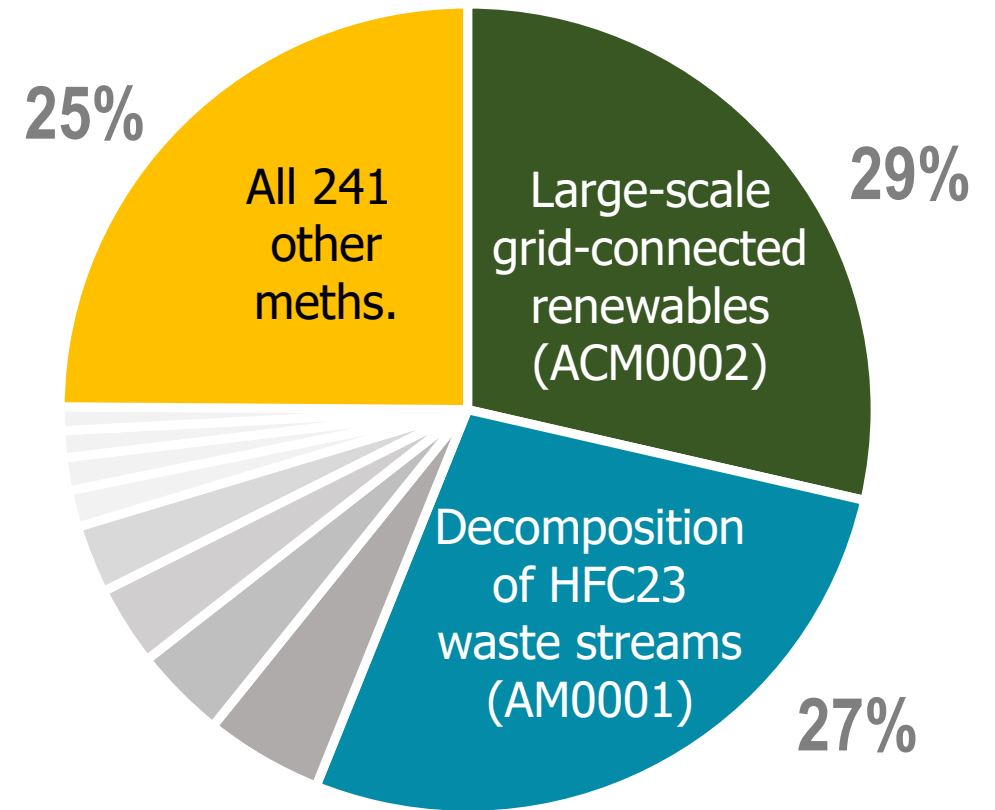
- Lessons learnt from CDM baseline methodologies
- Revision of the Combined Margin methodology in the power sector
- Conclusions and possible lessons for Article 6.4

Baseline methodologies in the CDM

Uneven methodology use
(% CDM activities)



Uneven sectoral spread
(% CERs generated)



Can the power generation mitigation activities still be relevant for Article 6.4?

- Large emitting sector with proven, low-GHG technologies that are commercially available;
- Substantial experience in implementing mitigation activities with the support of crediting mechanisms (e.g. CDM);
- Good availability of data in many countries.

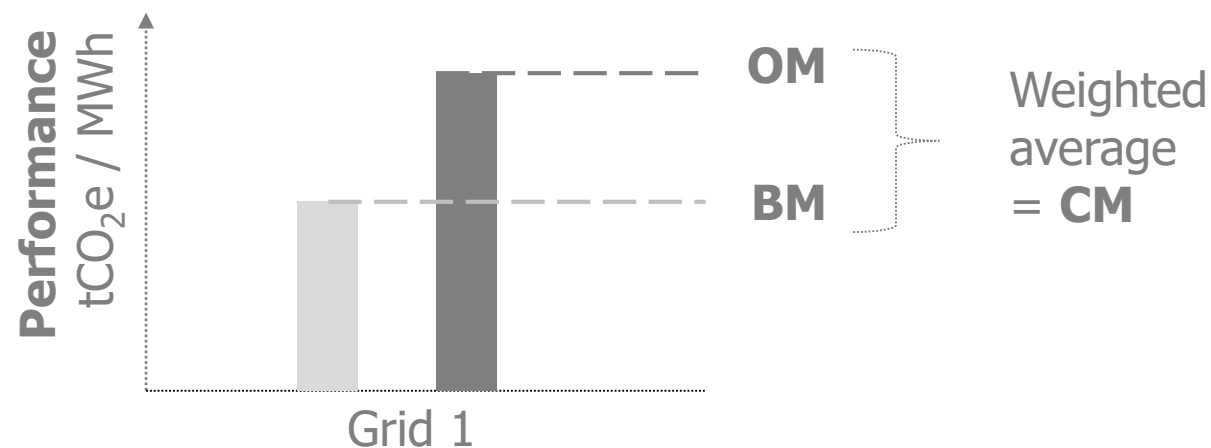
The Combined Margin (CM) baseline methodology

- **CM:**
 - Baseline methodology used in the most number of CDM activities, applicable to grid-connected power plants;
 - Aims to estimate the carbon intensity of electricity being displaced by a new project coming onto the grid.
- **Problem:** single, simple performance benchmark could lead to perverse results for crediting - wide range of emissions profiles among power generation technologies.

The Combined Margin (CM) baseline methodology

- **Solution:**

- **Operating Margin (OM):** emission factor that refers to the group of existing power plants whose current electricity generation would be affected by the proposed CDM project activity
- **Build Margin (BM):** emission factor that refers to the group of prospective power plants whose construction and future operation would be affected by the proposed CDM project activity
- **Combined Margin (CM):** weighted average of the OM and BM = counterfactual emission factor of the grid-connected power sector.



The Combined Margin (CM) baseline methodology

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$$

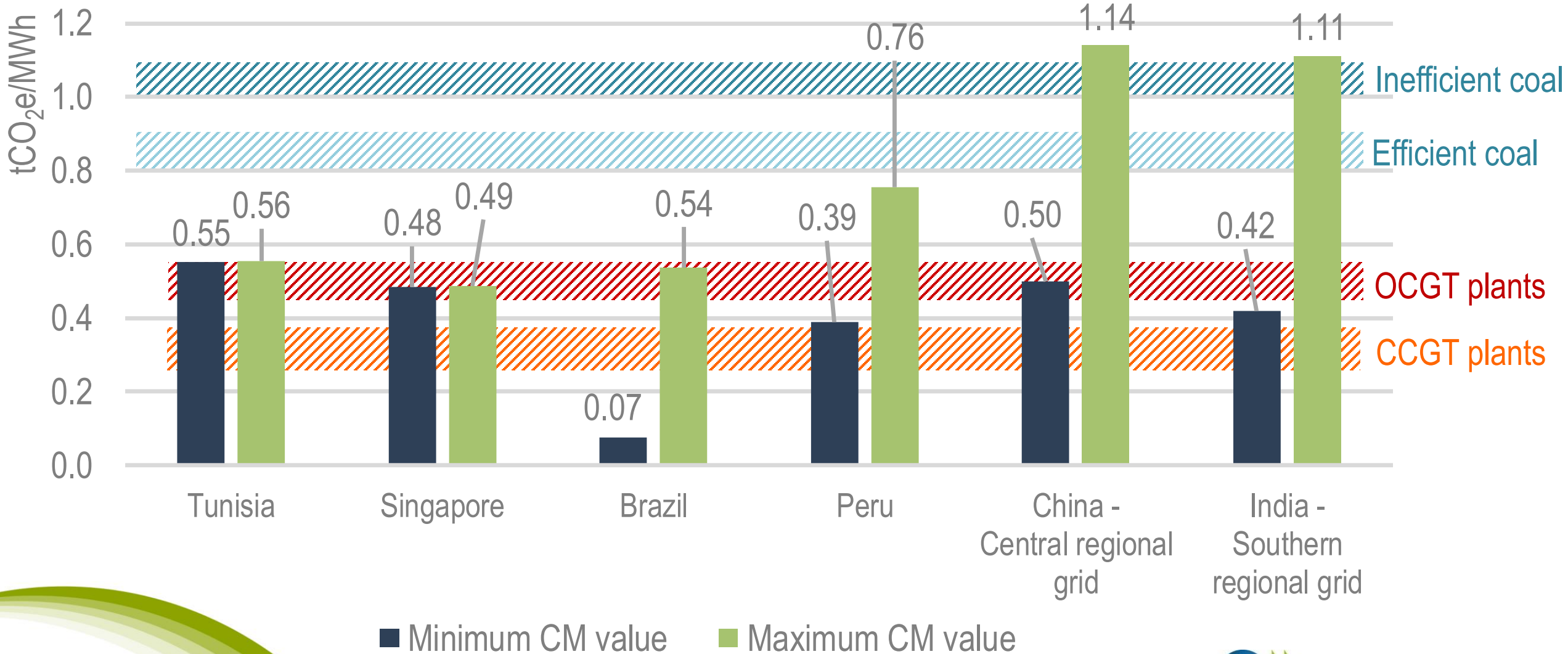
Where:

- $EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (t CO₂/MWh)
- $EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (t CO₂/MWh)
- W_{OM} = Weighting of operating margin emissions factor (per cent)
- W_{BM} = Weighting of build margin emissions factor (per cent)

Built-in flexibility to account for different country contexts and data quality

- **Different ways of calculating OM and BM allowed:**
 - BM: ex-ante / ex-post
 - OM: Dispatch data; Simple adjusted; Simple; Average
- **Different weighting for OM and BM:**
 - Wind and solar: $w_{OM} = 0.75$ and $w_{BM} = 0.25$
 - All others: $w_{OM} = 0.50$ and $w_{BM} = 0.50$
 - Possibility to choose alternative weightings

Analysis of CM factors used in CDM activities



■ Minimum CM value ■ Maximum CM value

Analysis of CM factors used in CDM activities

- CM can lead to **significant variation in baseline levels** within an individual country (and grid), depending on the details applied in its calculation
- **Conservativeness principle:** CM can lead to high emissions baseline levels in some cases and allows for crediting where the emissions intensity of the electricity grid is increasing (i.e. where $BM > OM$)
- How to reflect the **conditional part of NDCs** in the CM baseline?

Conclusions - Possible lessons for Article 6.4

- A single baseline methodology can lead to a **significant variation of baseline levels**, depending on detailed assumptions and calculation methods.
- **Transition of Kyoto Protocol methodologies to Article 6.4:** will not necessarily lead to conservative baselines – need to assess case by case
- How can CDM methodologies be adjusted to best reflect the **new context of Article 6.4?**

THANK YOU!

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