BANCO MUNDIAL

Enerdata intelligence + consulting

# EVALUATE

*Enabling Simple Economic Assessments of NDCs*

*Developed by ENERDATA with the World Bank, Brasilia Office*

*(TTL: Christophe de Gouvello, CC coordinator for Brazil)*

# Why EVALUATE?

- **Enable the assessment of the NDCs in terms of economic efforts**
  - What are the estimated national cost associated to the (I)NDC?
  - Economy-wide but also for Sectors (13 different sectors)
  - Can be made available for 67 countries or regions, with possibility of adjustment for every country
  - All GHG gases (emissions from agriculture included but not from land use change and forest)

- **Easy to use and reliable**
  - Based on transparent historical data and robust peer-reviewed modeling (WEO 2013, up to 2030, POLES model):
    - ❖ World simulation model, 67 countries/regions through 2050
    - ❖ Complete accounting of energy demand and supply, associated technologies and GHG
    - ❖ Developed for over 20 years, used by the European Commission, UK and others
  - User-friendly interface for update in real time

***→ Many visual features to facilitate assessment and comparison***

# Generates a series of indicators for each country

→ **Most innovative feature**: **Economic Indicators**

+ Carbon intensity of GDP (baseline and with pledge)

+ Corresponding Marginal Abatement Cost of pledge ($/tCO2)
*(MAC: cost of last tCO2 abated to achieve target,)*

+ Estimate of effort : total Abatement Cost

- in million of USD or Euros

- in % of GDP

- in $/capita

+ Estimate of total Abatement Cost
(in million of USD or Euros and in % of GDP)

→ **Impact of introducing Carbon Trading**: **National, Regional, Global**

→ **But also** : **Physical Indicators**

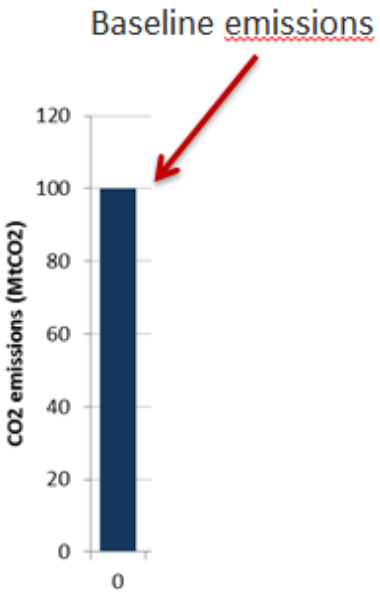
+ Emissions per capita (baseline and with pledge) (tCO2/cap)
+ Consolidate total global efforts & gaps
*gap with RCP 2.6, 4.5, 6.0 and 8.5Carbon intensity of GDP*

Enerdata

BANCO MUNDIAL

# Marginal Abatement Cost Curves produced with the POLES model

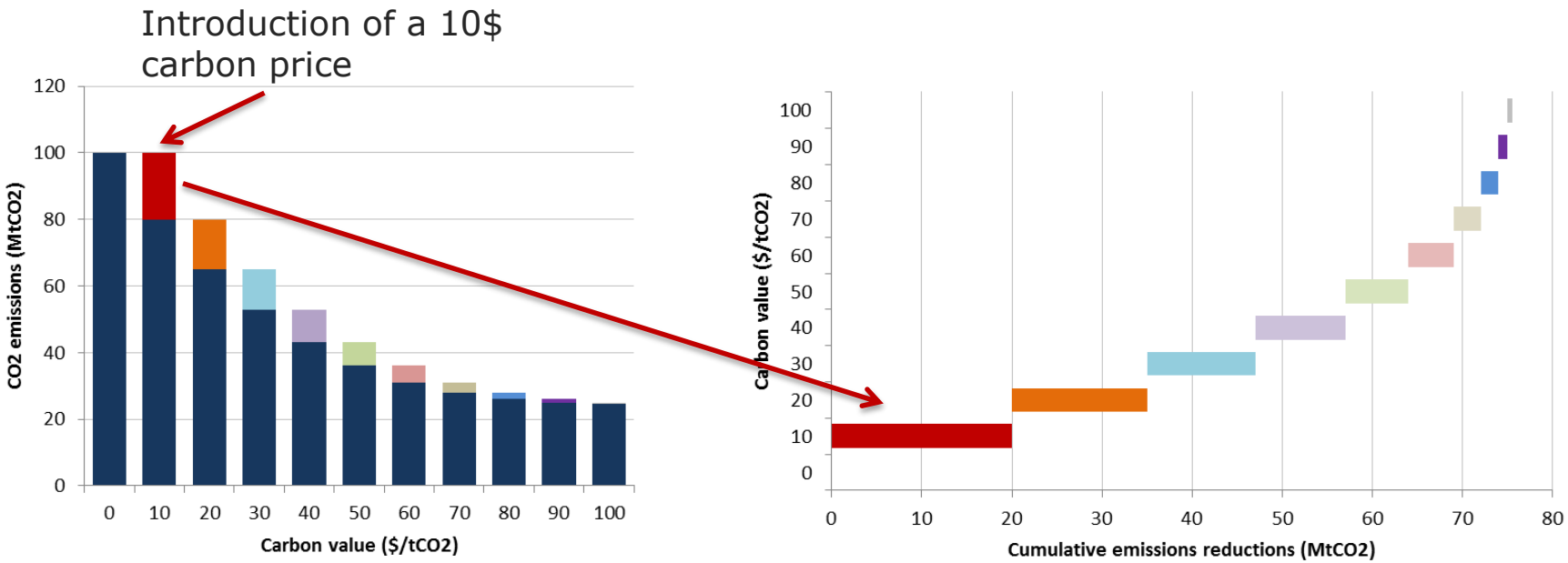
- At a given year, POLES simulates the impact of a given carbon taxation on the level of CO2 (or GHG) emissions




- The MACCs from POLES are based on:
  - Power sector: full technological description and load curve simulation
  - Final demand sectors: econometric demand functions (including short-term price and long-term price elasticities), incorporating explicit description of technologies in road transport and buildings

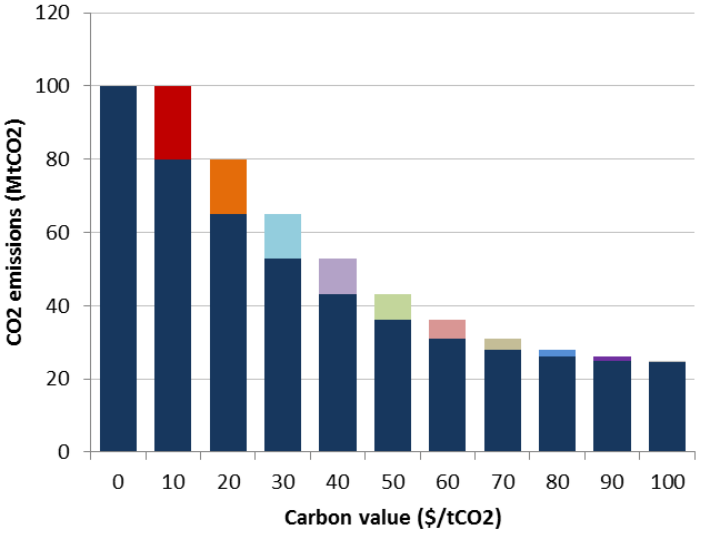
# How to build MACCs

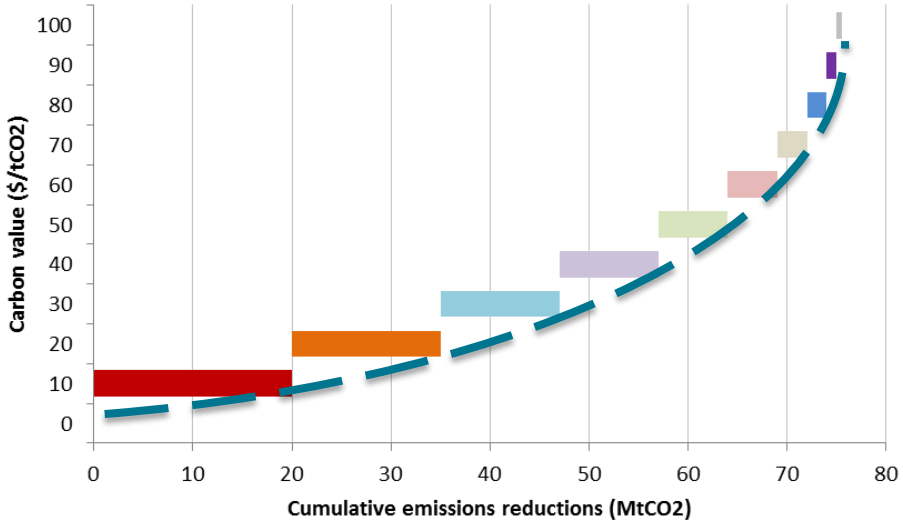
- At a given year, POLES simulates the impact of a given carbon taxation on the level of CO2 (or GHG) emissions



# How to build MACCs

- At a given year, POLES simulates the impact of a given carbon taxation on the level of CO2 (or GHG) emissions



# National sectoral outputs

- To quickly visualize:
  - Contribution to national reduction effort (**binding or not**)
  - Sectoral efforts (GHG **reductions** and **costs**)
  - Potential for inter-sectoral trade (quantities exchanged and **revenue/expense**)
  - Historical emissions + 2030 projection

EU28 example:

| All costs are cumulative 2015-2030 | Country | Effort level resulting from pledge | Reduction of GHGs MtCO2 | Marginal Abatement Cost $/tCO2 | Total Abatement Cost $B | Net Imports MtCO2 | Total Trade cost $B | Total cost $B | Pledge and Reference Year Emissions MtCO2 | | | | | | Reduction of GHGs % Below Reference year | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | at Pledge in 2030 | BaU 2030 | 1990 | 2000 | 2005 | 2010 | BaU 2030 | 1990 | 2000 | 2005 | 2010 |
| EU28 | | | | | | | | | | | | | | | | | | | |
| | Power | Pledge | 370,3 | 206 | 21,7 | -60,9 | -8,8 | 12,9 | 741,8 | 1112,1 | 1464,5 | 1289,4 | 1373,2 | 1236,6 | 33% | 49% | 42% | 46% | 40% |
| | Chemicals | Pledge | 63,4 | 206 | 3,9 | -3,6 | -0,5 | 3,4 | 151,3 | 214,7 | 316,8 | 265,9 | 251,4 | 210,6 | 30% | 52% | 43% | 40% | 28% |
| | Manufacturing | Pledge | 130,3 | 206 | 8,5 | -46,1 | -6,7 | 1,9 | 172,5 | 302,8 | 428,6 | 318,0 | 297,9 | 274,7 | 43% | 60% | 46% | 42% | 37% |
| | Mineral Products | Pledge | 34,9 | 206 | 2,3 | 14,0 | 2,0 | 4,3 | 140,9 | 175,8 | 265,4 | 248,8 | 250,5 | 198,0 | 20% | 47% | 43% | 44% | 29% |
| | Steel | Pledge | 16,1 | 206 | 0,8 | 7,8 | 1,1 | 1,9 | 70,1 | 86,2 | 244,2 | 184,7 | 169,8 | 139,4 | 19% | 71% | 62% | 59% | 50% |
| | Upstream & Refining | Pledge | 70,6 | 206 | 3,2 | -11,7 | -1,7 | 1,5 | 141,0 | 211,6 | 377,3 | 366,2 | 342,9 | 327,1 | 33% | 63% | 61% | 59% | 57% |
| | Residential | Pledge | 107,4 | 206 | 4,8 | 9,4 | 1,4 | 6,2 | 312,7 | 420,1 | 498,0 | 473,6 | 495,4 | 460,3 | 26% | 37% | 34% | 37% | 32% |
| | Services | Pledge | 57,5 | 206 | 2,5 | -0,8 | -0,1 | 2,4 | 146,1 | 203,6 | 213,1 | 177,9 | 194,6 | 186,0 | 28% | 31% | 18% | 25% | 21% |
| | Agriculture | Pledge | 27,5 | 206 | 1,3 | -7,4 | -1,1 | 0,3 | 44,8 | 72,3 | 82,2 | 72,0 | 69,6 | 59,2 | 38% | 45% | 38% | 36% | 24% |
| | Road | Pledge | 42,5 | 206 | 2,1 | 166,1 | 24,0 | 26,1 | 707,3 | 749,8 | 719,3 | 848,9 | 903,7 | 877,6 | 6% | 2% | 17% | 22% | 19% |
| | Domestic Air | Pledge | 4,9 | 206 | 0,5 | 3,3 | 0,5 | 0,9 | 24,7 | 29,5 | 24,7 | 23,1 | 23,3 | 21,7 | 16% | 0% | -7% | -6% | -14% |
| | Other transport | Pledge | 3,9 | 206 | 0,3 | 3,5 | 0,5 | 0,8 | 22,8 | 26,7 | 30,2 | 30,2 | 30,8 | 27,9 | 15% | 24% | 24% | 26% | 18% |
| | Waste | Pledge | 149,4 | 206 | 6,6 | -73,7 | -10,7 | -4,0 | 122,5 | 271,9 | 0,0 | 0,0 | 0,0 | 0,0 | 55% | 0% | 0% | 0% | 0% |

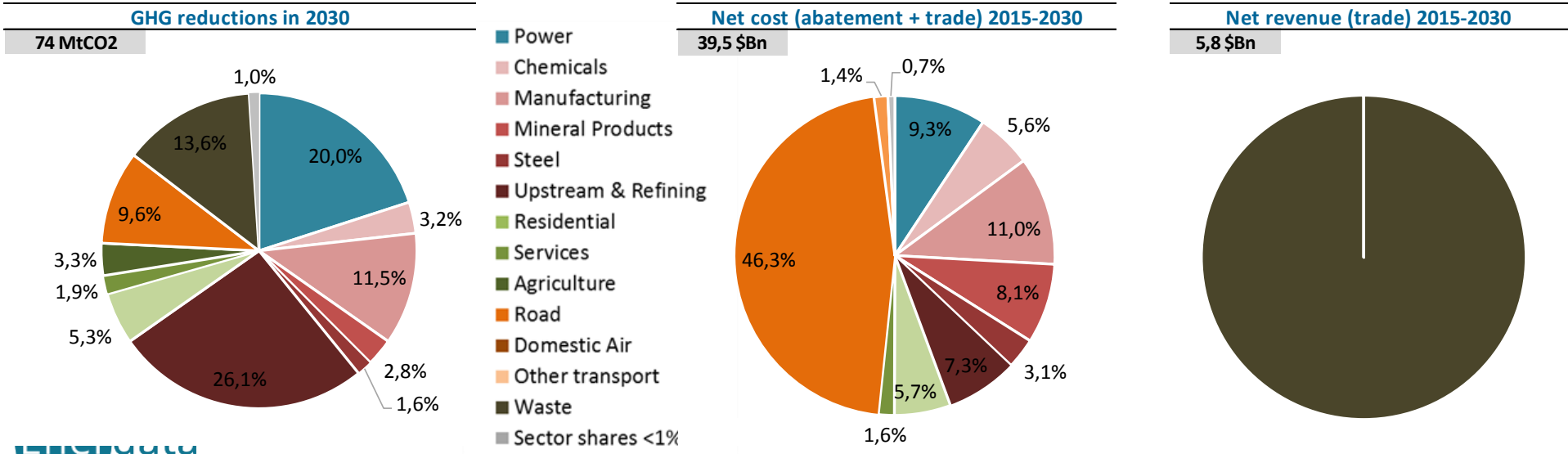
# Example of country results:

## *1) Unconditional Pledge*

| Country | Type of target | Total mitigation effort | Reference Year | Emissions by 2030 | Share of forestry and agriculture | Energy related emissions by 2030 |
|---|---|---|---|---|---|---|
| Argentina | % | 15% | BaU | 670 MtCO2 | 26% | 421,4MtCO2 |

- Policy scenario to achieve Unconditional INDC:

  Policy Selected in EVALUATE: **Economic Wide ETS**
  (covered all sectors)

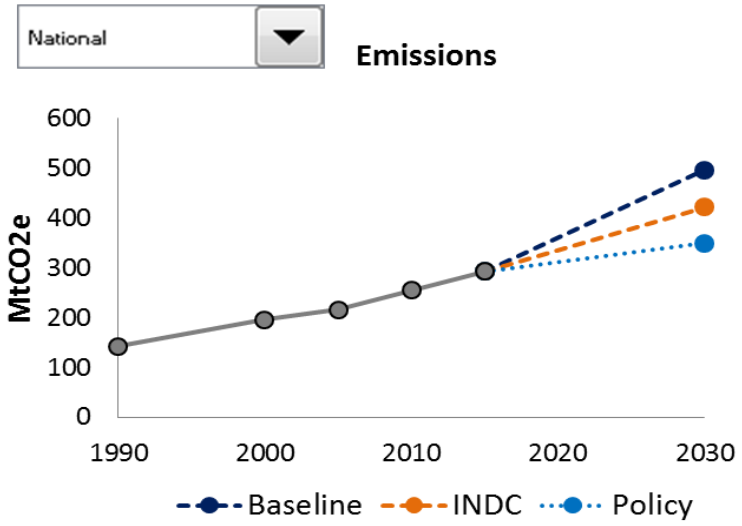



**Carbon value : 169 $/tCO2**

# Example of country results:
## *2) Conditional Pledge*

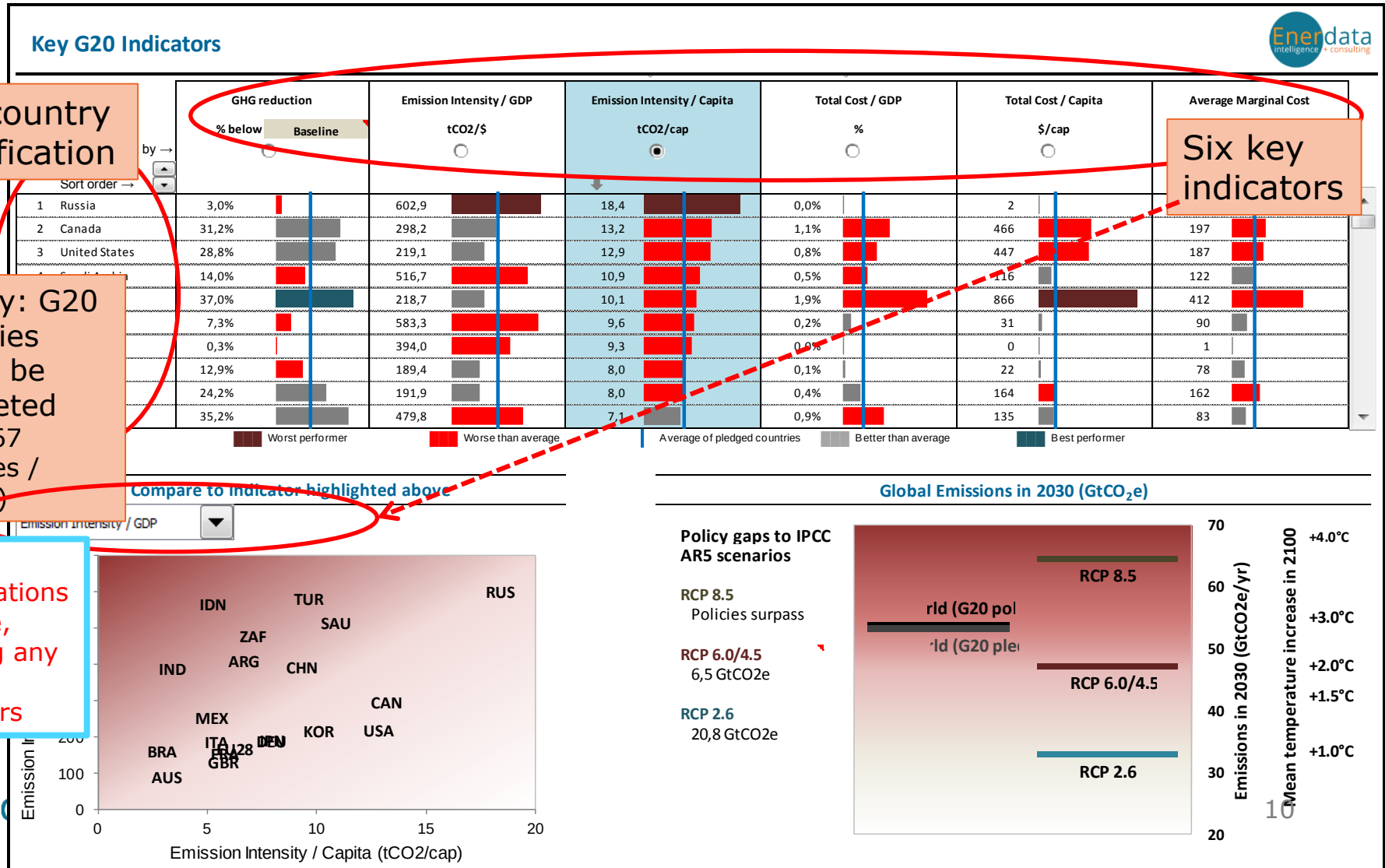
| Country | Type of target | Total mitigation effort | Reference Year | Emissions by 2030 | Share of forestry and agriculture | Energy related emissions by 2030 |
|---|---|---|---|---|---|---|
| Argentina | % | 15%<br>**30%** | BaU | 670 MtCO2 | 26% | 421,4 MtCO2 |

- Policy scenario to achieve Unconditional INDC:
  - Economic Wide ETS (covered all sectors)



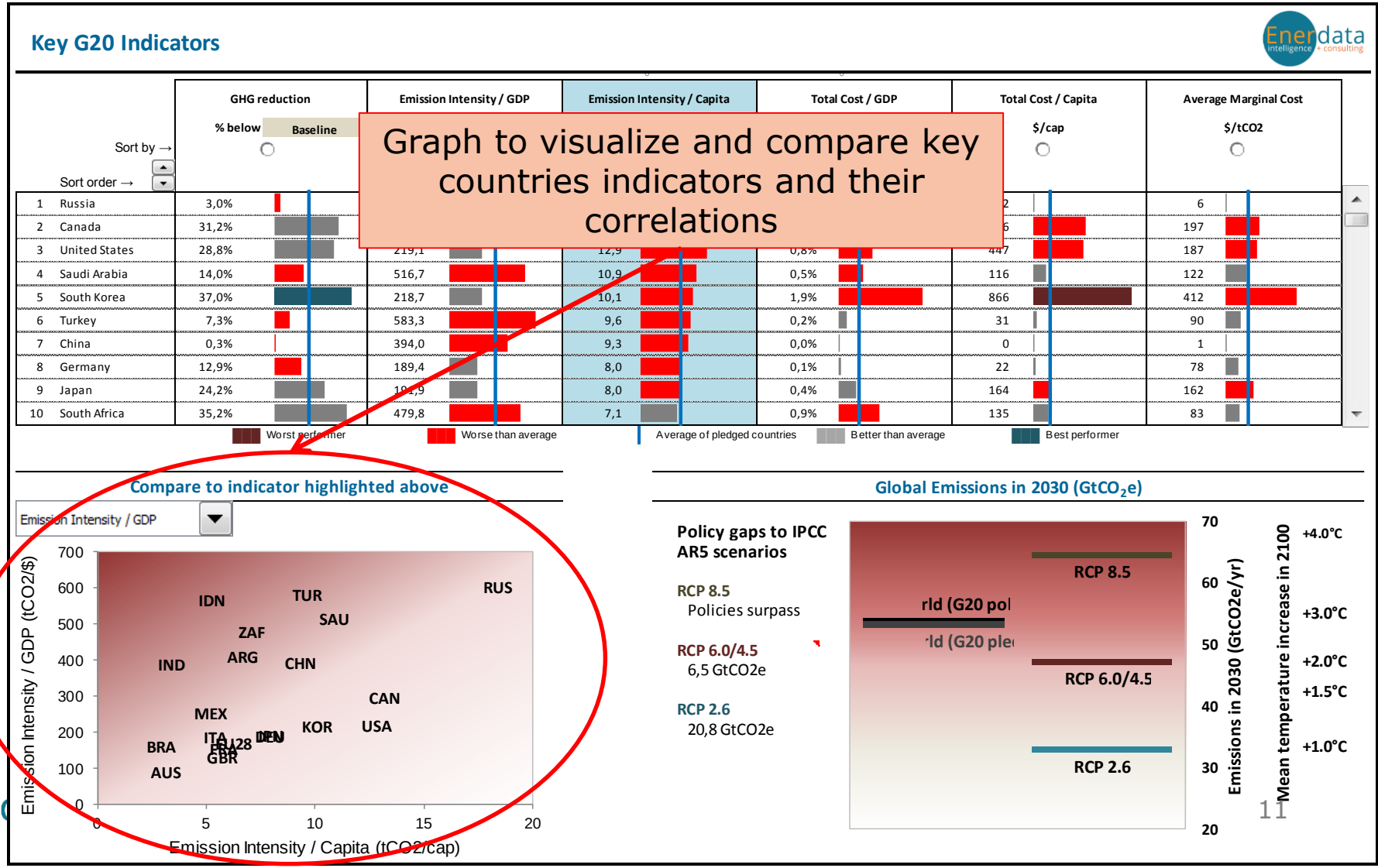
# EVALUATE Interface –**Indicators sheet**

- 3 windows: 1 table (key indicators) - 2 graphs



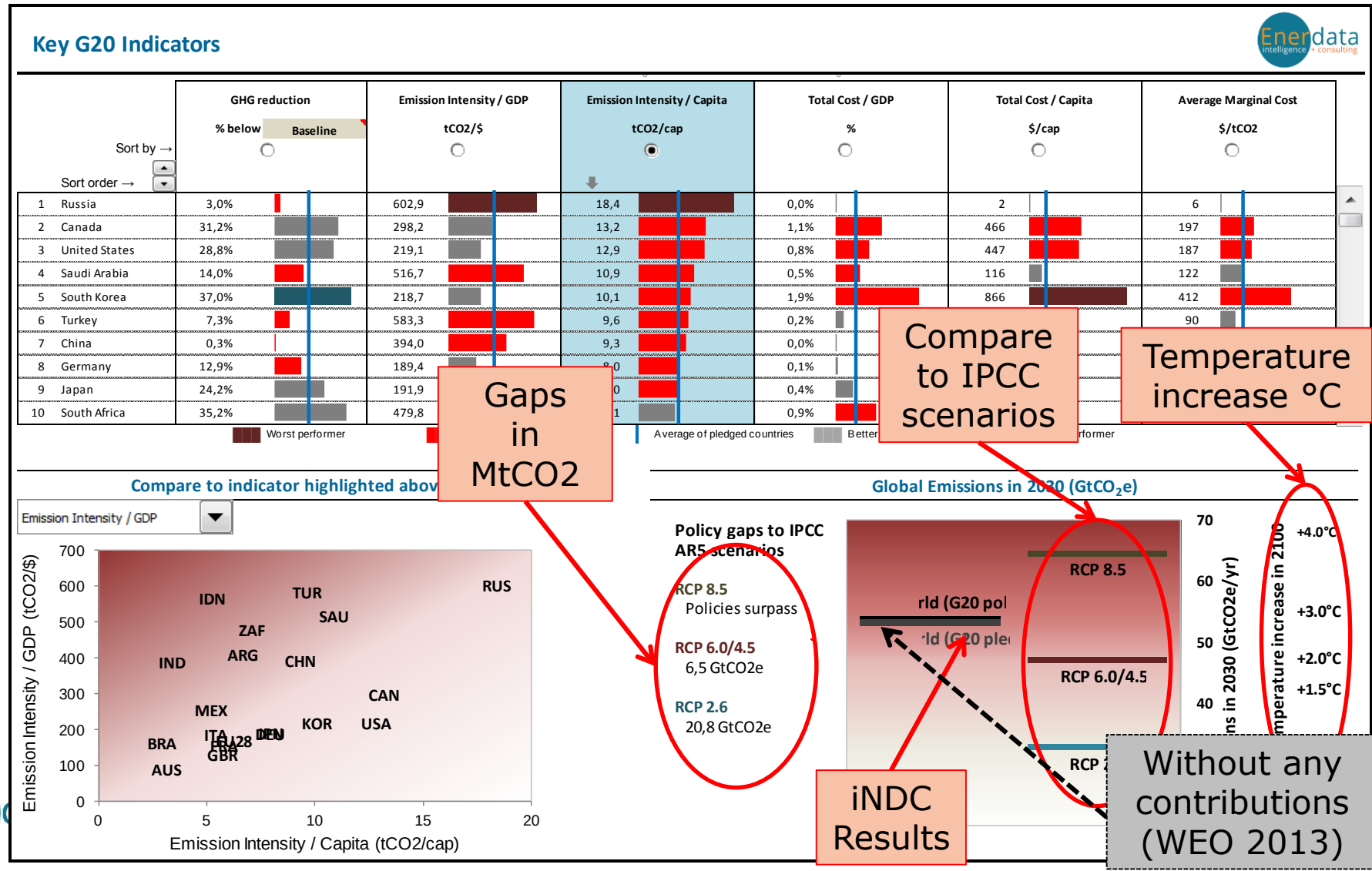
# EVALUATE Interface –**Indicators sheet**

- 3 windows: 1 table (key indicators) - 2 graphs



# EVALUATE Interface –**Indicators sheet**

- 3 windows: 1 table (key indicators) - 2 graphs



# Summary

- Dedicated tool for supporting decision makers in developing and assessing NDCs, including detailing these by sector
- Robust and quantified pledges economic assessment
- Effort evaluation compared to 2°C gap
- iNDC implications:
  - At country and sectoral levels
  - Optimal cost estimations
    - Total cost for coutries and sectors, per capita, per GDP unit, etc
    - Level of investment needed
    - Impact of Trading on costs
- And much more…

Enerdata