

Methane mitigation – do we need policies or will it happen anyway?

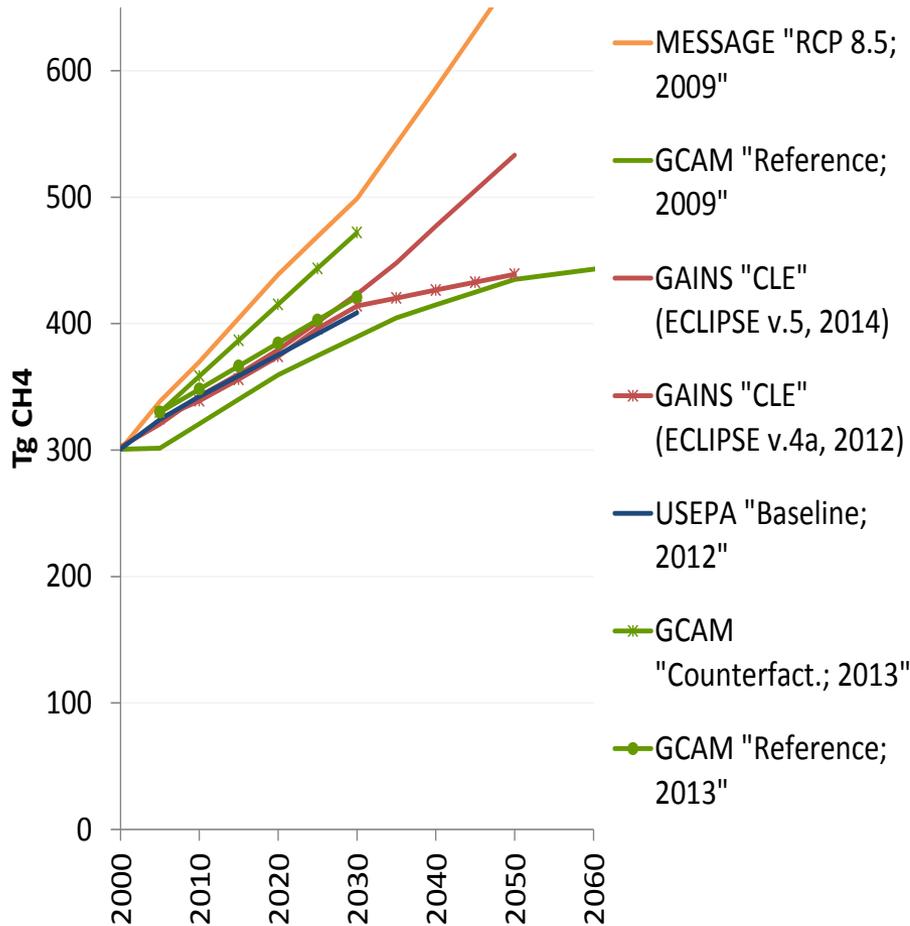
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Mitigation of Air Pollution and Greenhouse Gases program

HTAP meeting IIASA, 12 Feb 2015

Global methane scenarios RCPs, USEPA, GAINS

Baseline scenarios



Abatement-driven vs Output-driven technical mitigation opportunities

- **Abatement-driven mitigation:**

Adoption of mitigation technology is independent of the development in external activities and will **only** be adopted if policies specifically directed at CH₄ comes in place.

- **Output-driven mitigation:**

Adoption of mitigation technology is driven by the development in external activities e.g., energy supply and demand (and costs)

- CO₂ mitigation typically Output-driven (close link to energy efficiency improvements to reduce energy costs –not primarily to mitigate CO₂!)
- CH₄ mitigation typically a mix of Abatement and Output-driven

Abatement-driven vs Output-driven technical mitigation opportunities

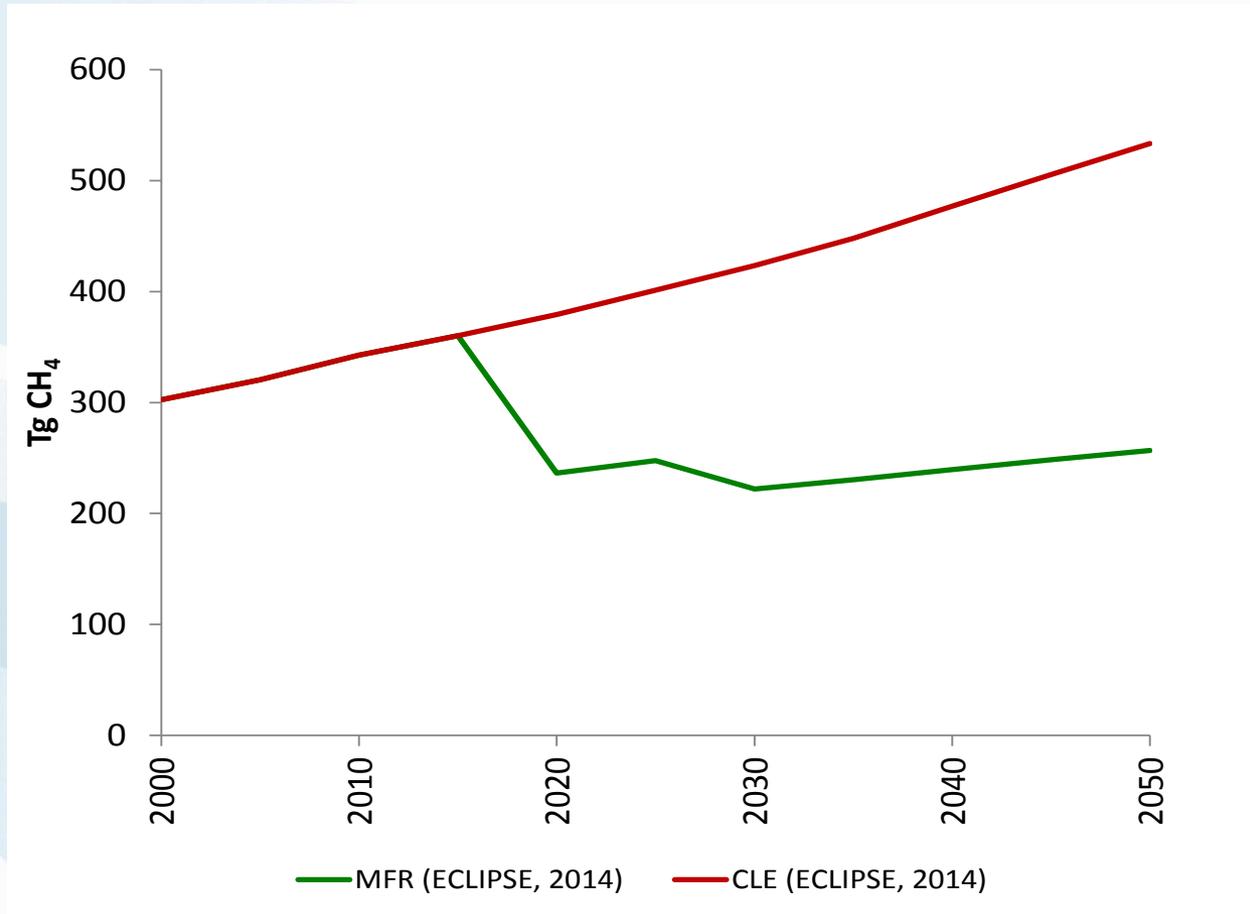
Policy implications:

- ✓ Abatement-driven mitigation: will not move unless driven by policies.
- ✓ Output-driven mitigation: can take place without additional policies **if the development in external activities is favorable**, e.g., fossil energy becomes more expensive. Else must also be driven by directed policies.
- ✓ Technology adoption is the driver for **technological development**.
- ✓ Influences the **choice of policy instrument type**

CH₄ mitigation: Abatement-driven or Output-driven?

Emission source	Abatement-driven mitigation technologies	Output-driven mitigation technologies
Agriculture	<ul style="list-style-type: none"> Changes in animal diets Animal feed additives Breeding for more productive and healthy animals Ban on open burning field residuals Intermittent aeration of rice fields Rice hybrids geared at methane control Sulphate amendments on rice fields 	<ul style="list-style-type: none"> Anaerobic digestion of manure with biogas recovery
Energy	<ul style="list-style-type: none"> Ventilation air methane oxidation on coal mines 	<ul style="list-style-type: none"> Controlling leakage from gas distribution networks Controlling leakage from gas transmission pipelines Extended recovery of waste gas associated with oil production Control of unintended leakage from oil and gas extraction Pre-mining degasification of coal mines
Waste & wastewater	<ul style="list-style-type: none"> Composting of organic waste Extended paper recycling Aerobic treatment of wastewater 	<ul style="list-style-type: none"> Anaerobic digestion of organic waste with biogas recovery Anaerobic treatment of wastewater with biogas recovery

Scope for global technical CH₄ mitigation in GAINS

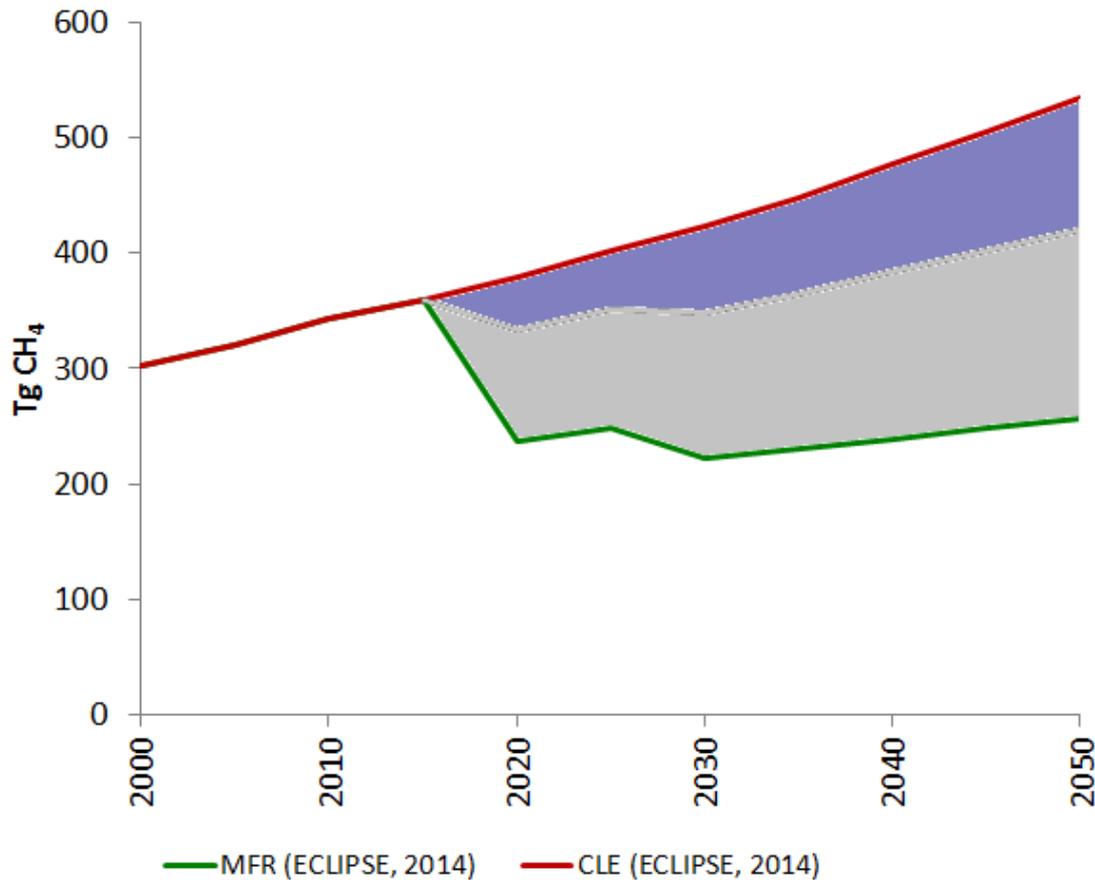


In 2050:
-276 Mt CH₄
or
-52% below CLE

CLE: Emissions when no further policies implemented than currently adopted in legislation

MFR: Emissions when existing technology implemented to maximum technically feasible extent

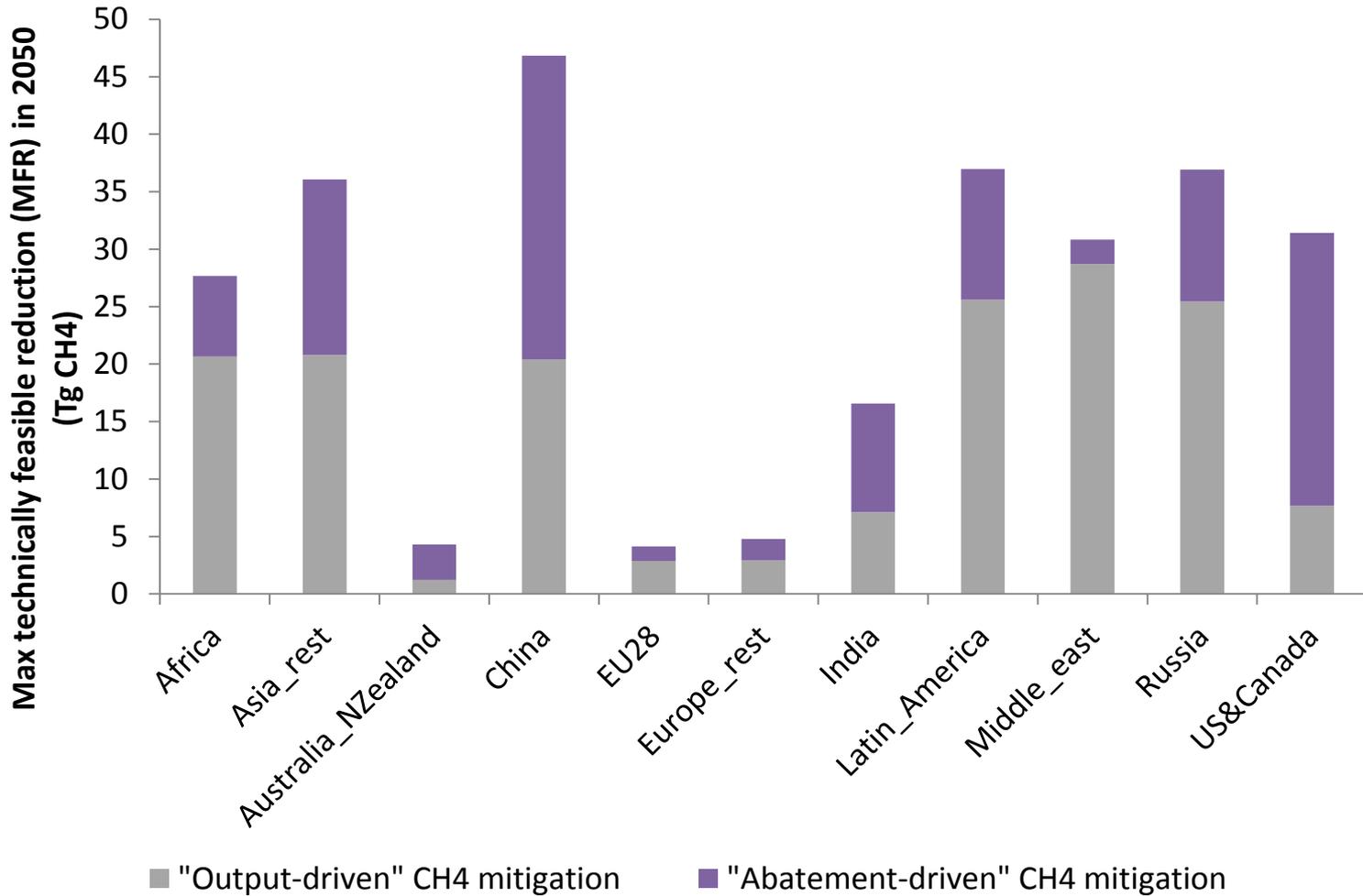
CH₄ mitigation: Abatement-driven or Output-driven?



Abatement-driven mitigation:
41% of MFR in 2050

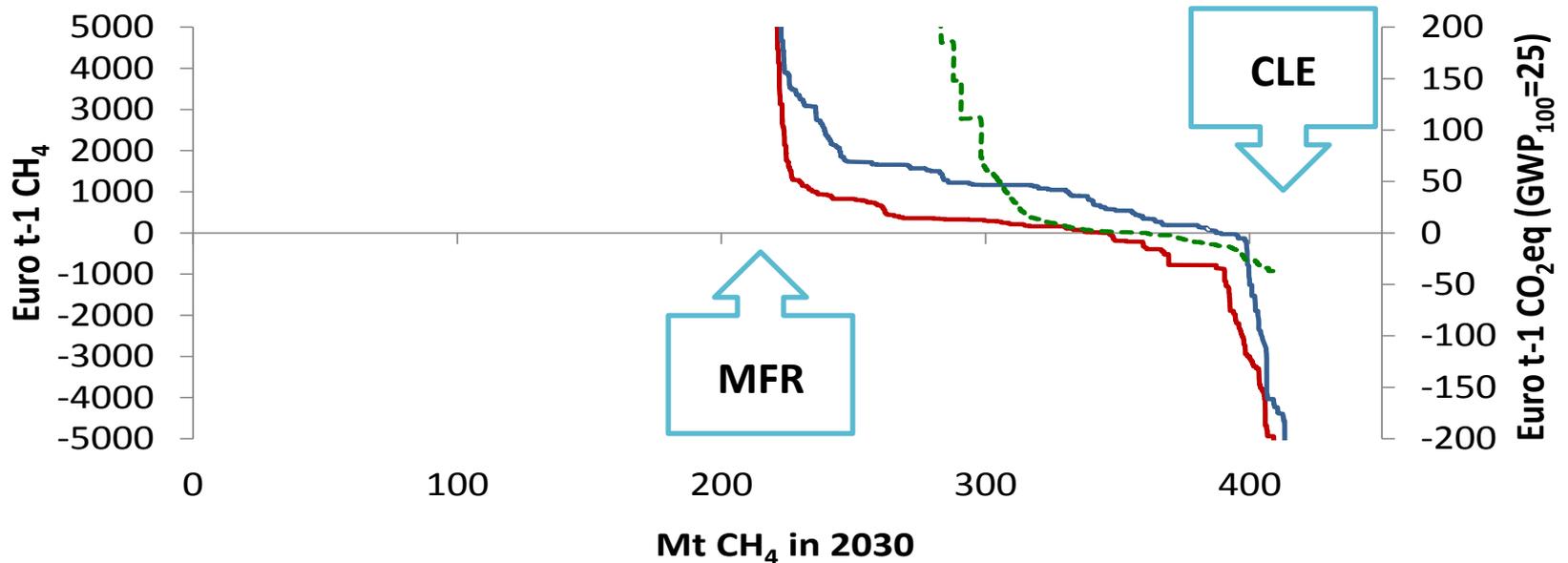
Output-driven mitigation:
59% of MFR in 2050

CH₄ mitigation: Abatement-driven or Output-driven?



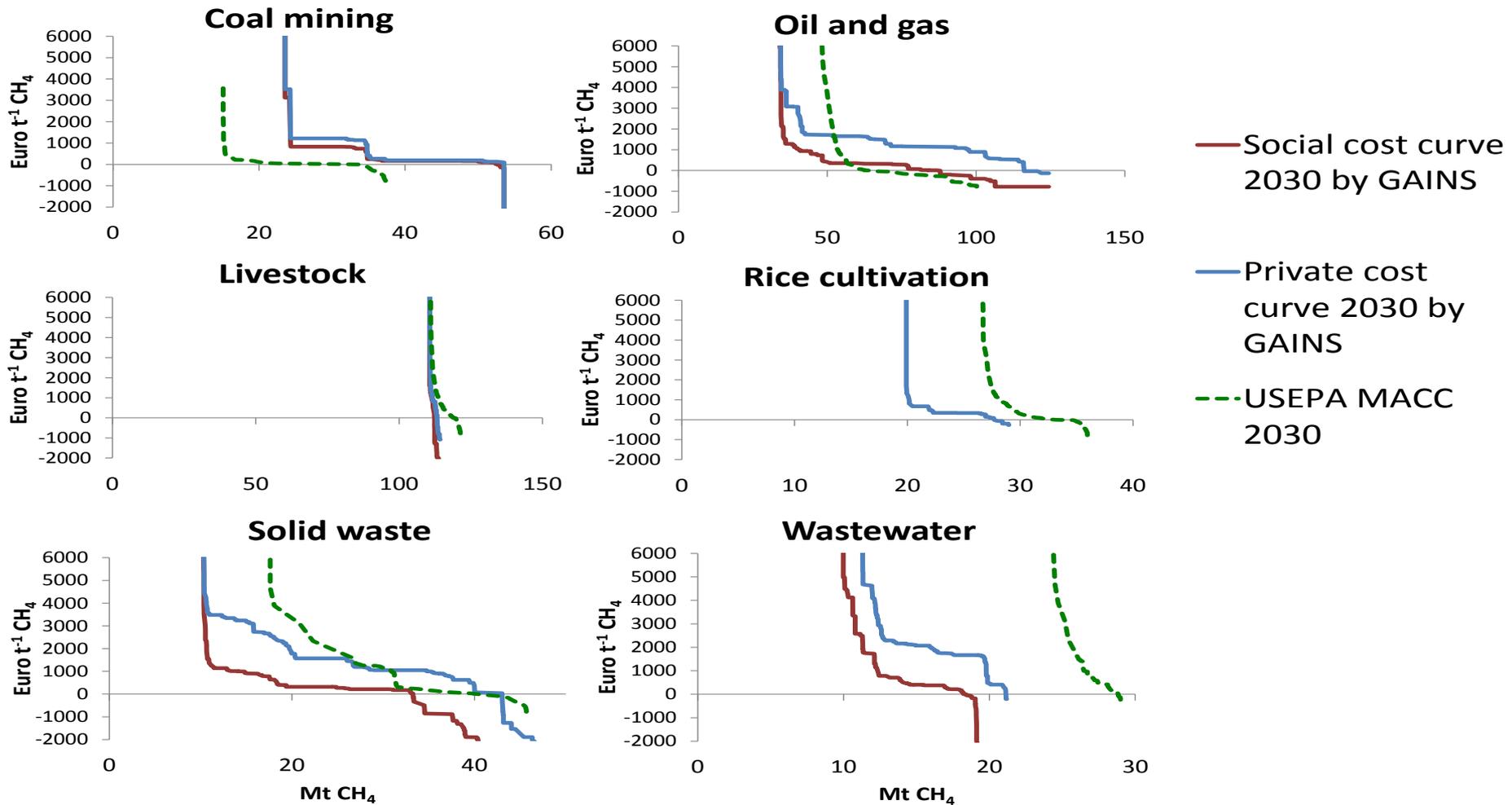
How much of output-based mitigation should be expected to be taken up without further policies?

- Depends on assumptions about developments in external activities (energy prices), investor time perspectives, interest rates etc.



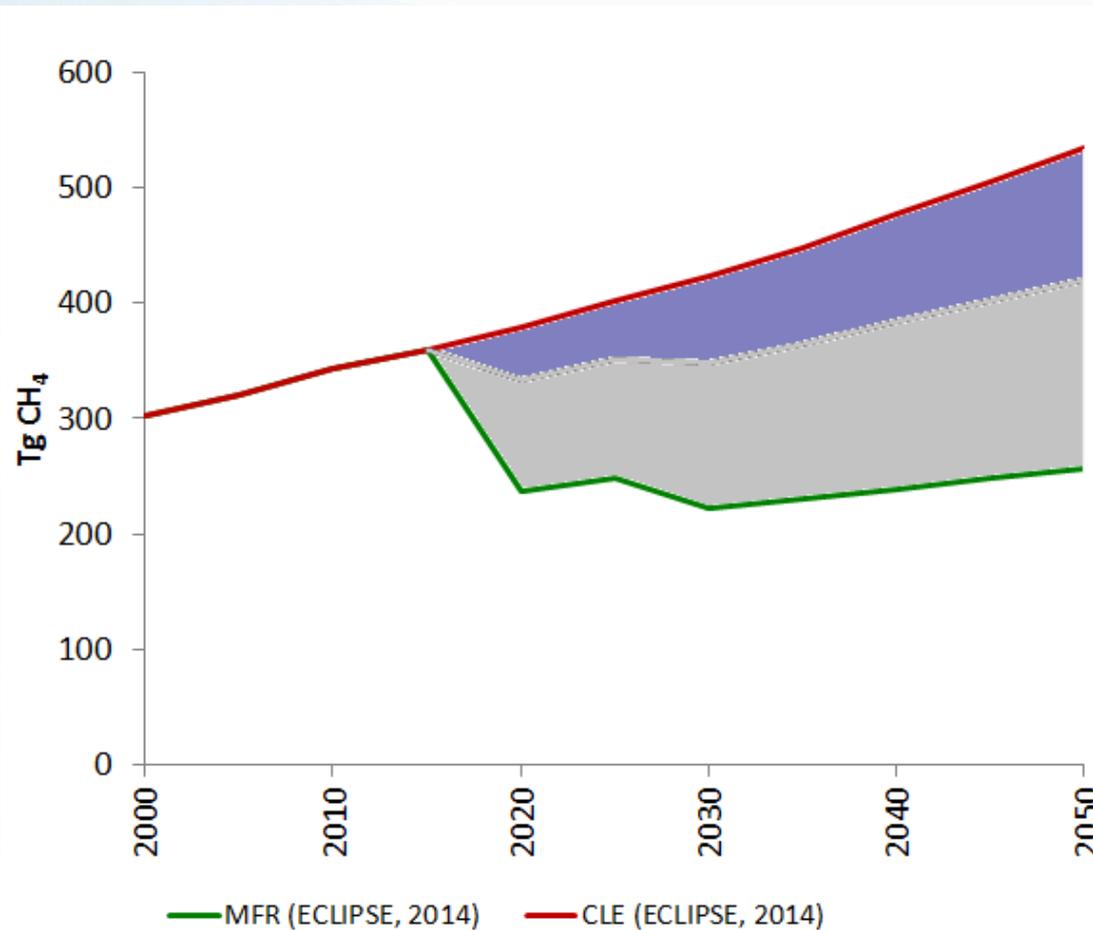
- GAINS: "Social planner" perspective (energy prices about tripple, equipment lifetime, 4%)
- GAINS: "Private investor" perspective (constant energy prices, max 10 years, 10%)
- - - USEPA MACC 2030 (2014)

How much of output-based mitigation should be expected to be taken up without further policies?



Conclusion:

Do we need CH₄ policies or will CH₄ mitigation happen anyway?



Abatement-driven mitigation:
Further CH₄ policies
absolutely essential

Output-driven mitigation:
Further CH₄ policies
or
Gamble on favorable
developments in external
drivers, particularly in a 2
to 3 times increase in the
cost of fossil fuels