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# Projections of global anthropogenic CH<sub>4</sub> emissions up to 2030

# Methodology

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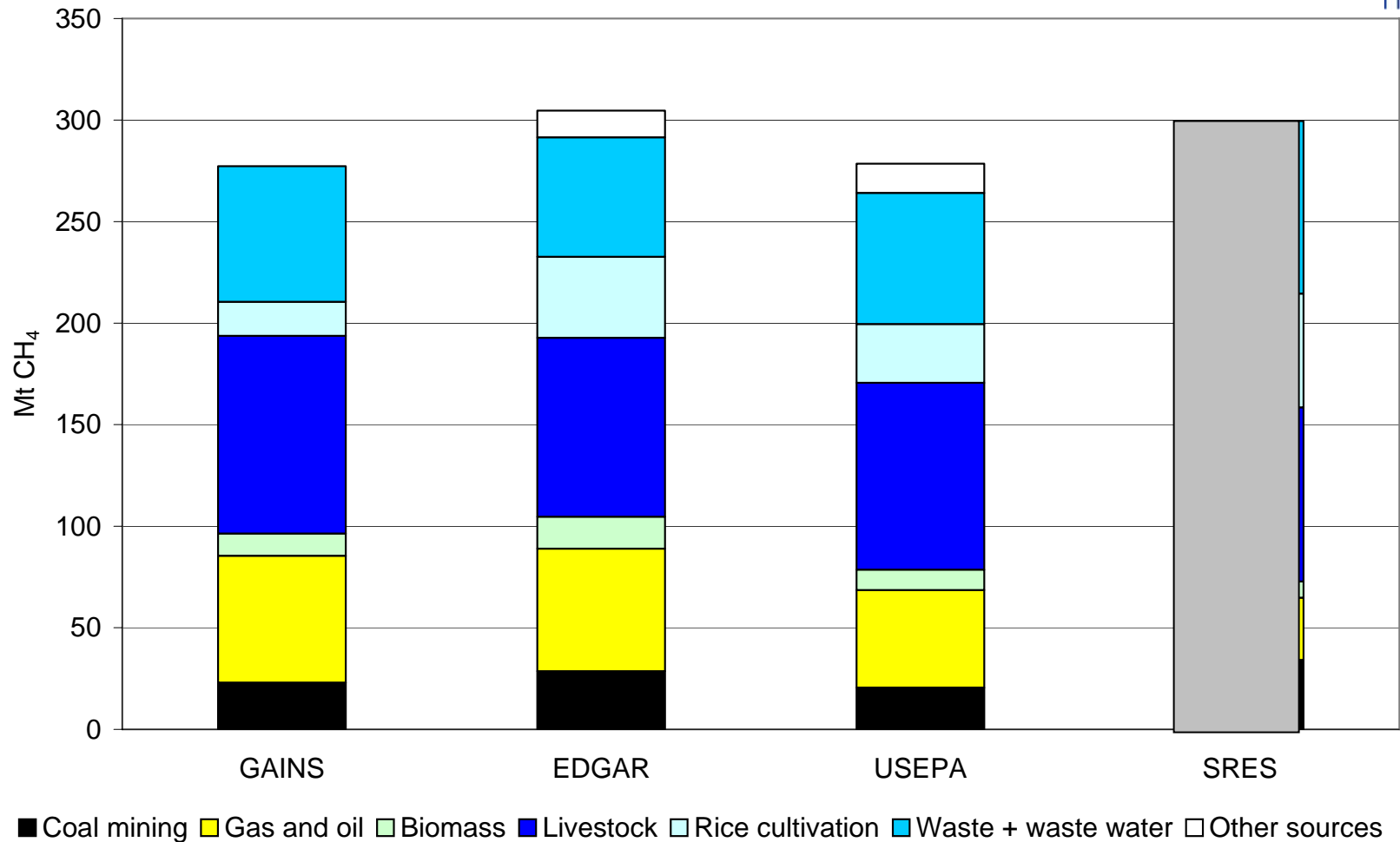
- Estimates of CH<sub>4</sub> emissions with IIASA's GAINS (Greenhouse gas – Air pollution Interactions and Synergies) model
- Global GAINS implementation distinguishing 75 countries and country-groups
- Emissions estimates based on
  - activity data (national projections or SRES B2)
  - “uncontrolled” country-specific emission factors
  - CH<sub>4</sub> removal efficiencies of mitigation options
  - implementation rates of mitigation options
- More info: [www.iiasa.ac.at/gains](http://www.iiasa.ac.at/gains)

# Source category distinguished by GAINS for CH<sub>4</sub>



<i>GAINS sector</i>	<i>GAINS sub sector</i>	<i>UNFCCC category</i>
Livestock	Enteric fermentation	4 A
	Manure management	4 B
Rice cultivation		4 C
Waste	Biodegradable solid waste	6 A
	Wastewater	6 B
Coal mining		1 B1
Gas	Gas production	1 B2
	Gas consumption	1 B2
Oil production		1 B2
Biomass	Biomass combustion for energy purposes	1 A1

# Comparison of emission estimates for 2000



# 28 CH<sub>4</sub> mitigation options considered by GAINS



- **Gas sector**
  - Reduced leakages during gas transmission and distribution
  - Flaring instead of venting
- **Waste management**
  - Recycling/composting of biodegradable waste instead of landfill
  - Methane recovery from landfills
- **Enteric fermentation**
  - Dietary changes for cattle coupled with livestock reductions
- **Manure management**
  - Anaerobic digestion plants and stable adaptation
- **Coal mines**
  - Upgraded gas recovery in coal mines
- **Rice paddies**
  - Modified rice strains

# Assumptions for the 2020 projections



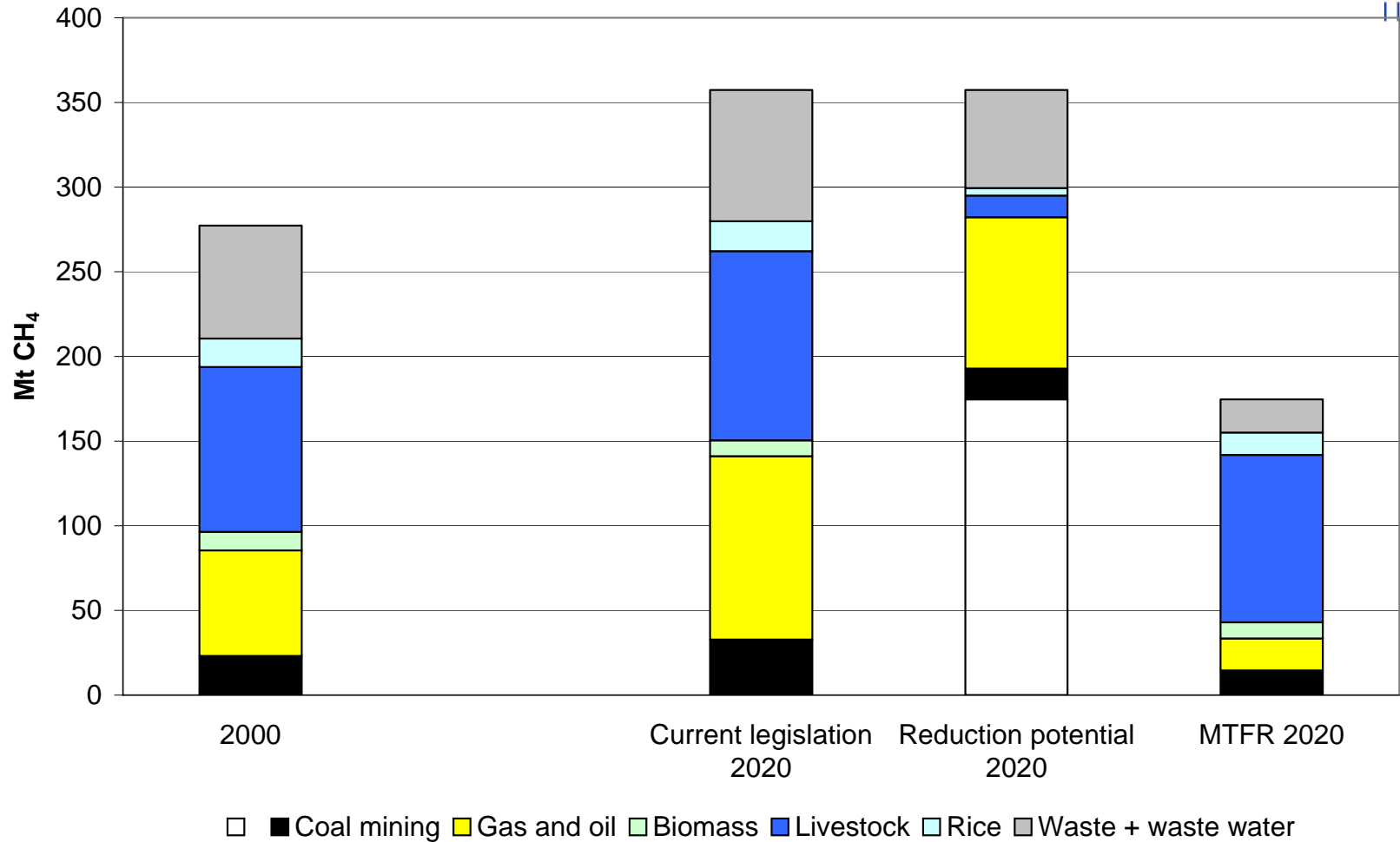
	<b>Current legislation</b>	<b>Potential for further reductions</b>
<b>Europe</b>	<b>National legislation</b>	<b>National application limits</b>
<b>North America and Pacific OECD</b>	<ul style="list-style-type: none"><li>•Coal mining gas recovery: 50% reduction</li><li>•Reduced leakages from gas distribution networks: 50% reduction</li><li>•Integrated sewage treatment implemented in all urban areas</li><li>•Waste incineration instead of disposal</li></ul>	<b>As for EU-12, except for the waste sector, for which reduction potentials corresponds to unregulated North-Western European levels</b>

# Assumptions for the 2020 projections

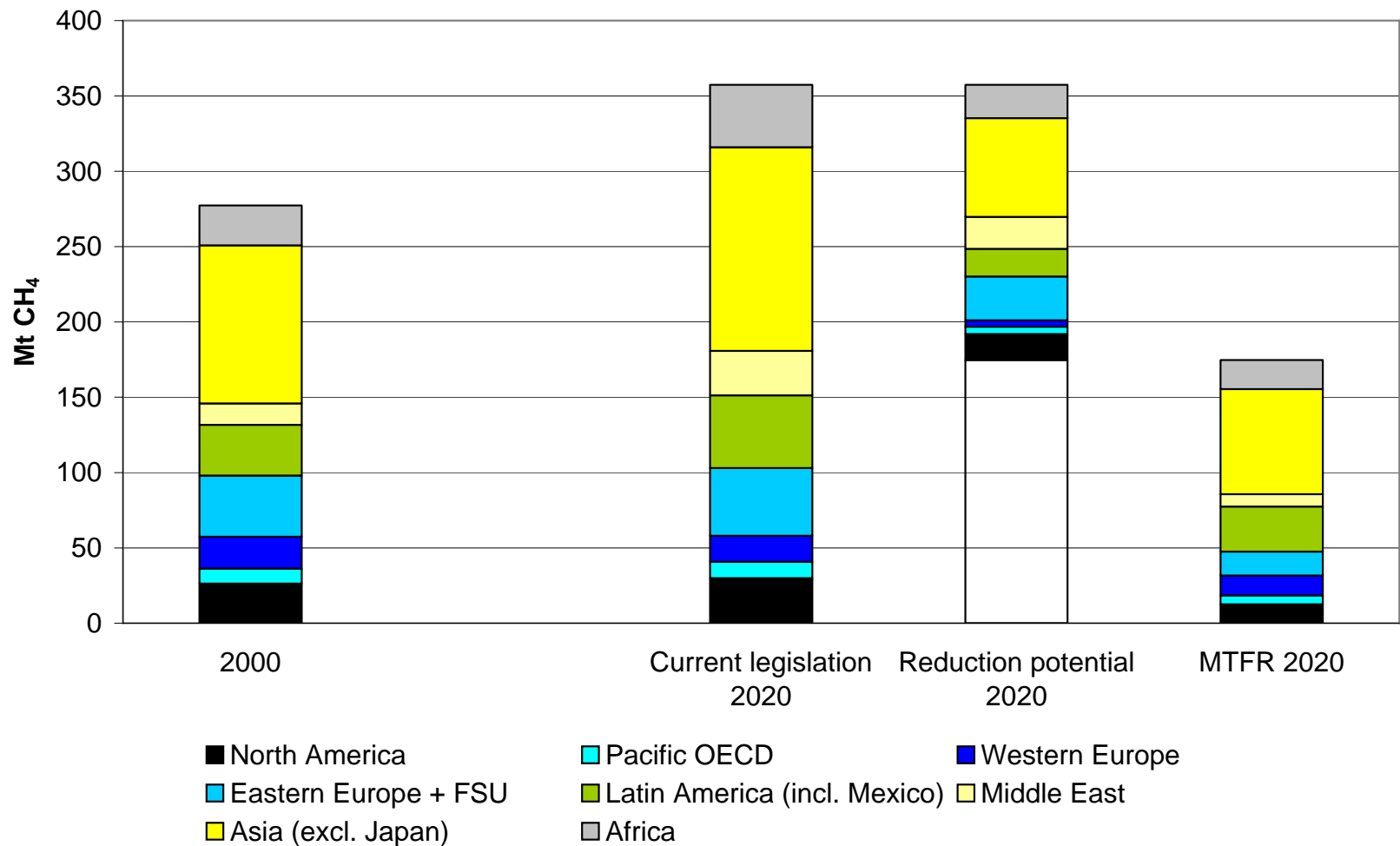


	<b>Current legislation</b>	<b>Potential for further reductions</b>
<b>Former Soviet Union</b>	<b>Coal mining gas recovery: 40% reduction</b>	<b>Same average reduction potentials as calculated for European part of Russia and Ukraine.</b>
<b>Developing countries</b>	<b>Coal mining gas recovery: 30% reduction</b>	<b>As for non-EU Eastern Europe</b>
<b>Latin America, Middle East</b>	<b>Coal mining gas recovery: 40% reduction</b>	<b>Same average reduction potentials as calculated for non-EU Eastern Europe</b>

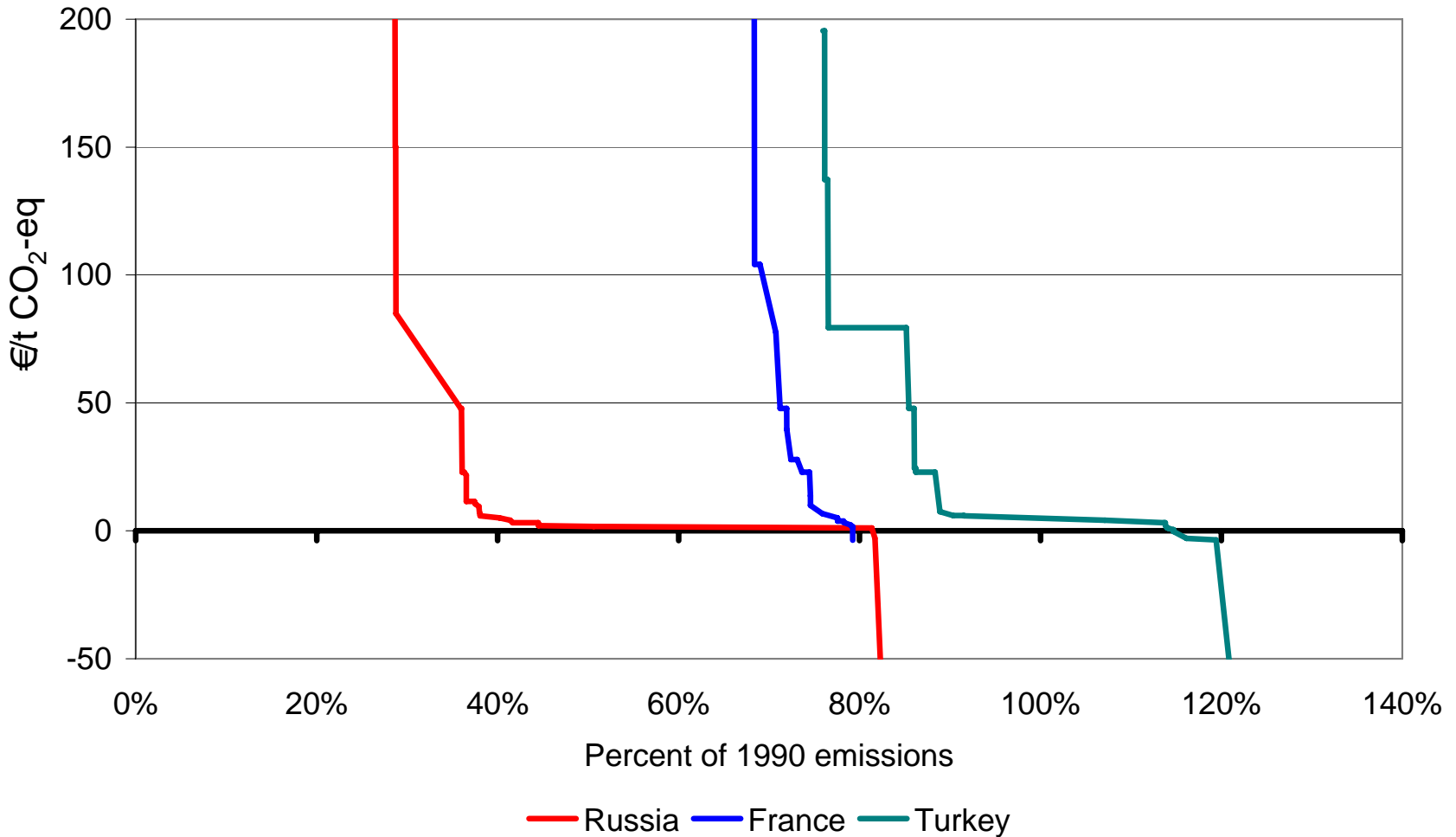
# CH<sub>4</sub> emissions by sector



# CH<sub>4</sub> emissions by region



# Cost curves for 2020



Costs for additional reductions beyond current legislation

# Conclusions

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- Under business as usual assumptions on economic development and mitigation policies, global CH<sub>4</sub> emissions are projected to grow by ~1.3%/year (or by 30% between 2000 and 2020).
- Technical measures are available to mitigate CH<sub>4</sub> emissions.  
If fully implemented, they could reduce in 2020 baseline CH<sub>4</sub> emissions by 50% (or by 33 % relative to 2000).
- ~75% of the reduction potential emerges for gas distribution and waste treatment. 35% of the global reduction potentials occur in Asia, and 15% in FSU.
- Several of the mitigation measures are (very) cheap.