Pathways to a Low Carbon Economy

Version 2 of the Global GHG Abatement Cost Curve

CEPS
Brussels, July 8, 2009

Full report available at
http://climatedesk.bymckinsey.com

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Setup of the research

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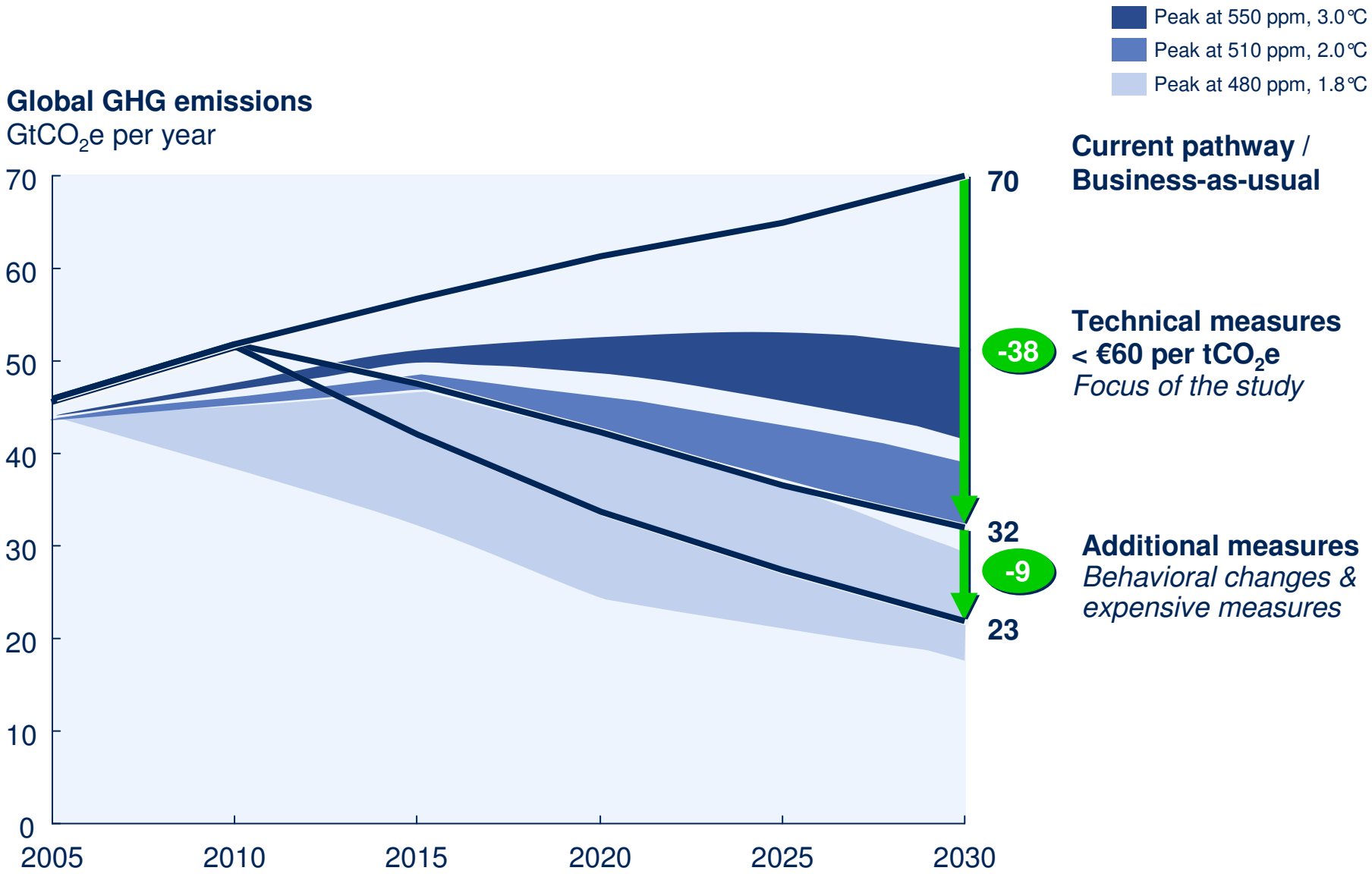
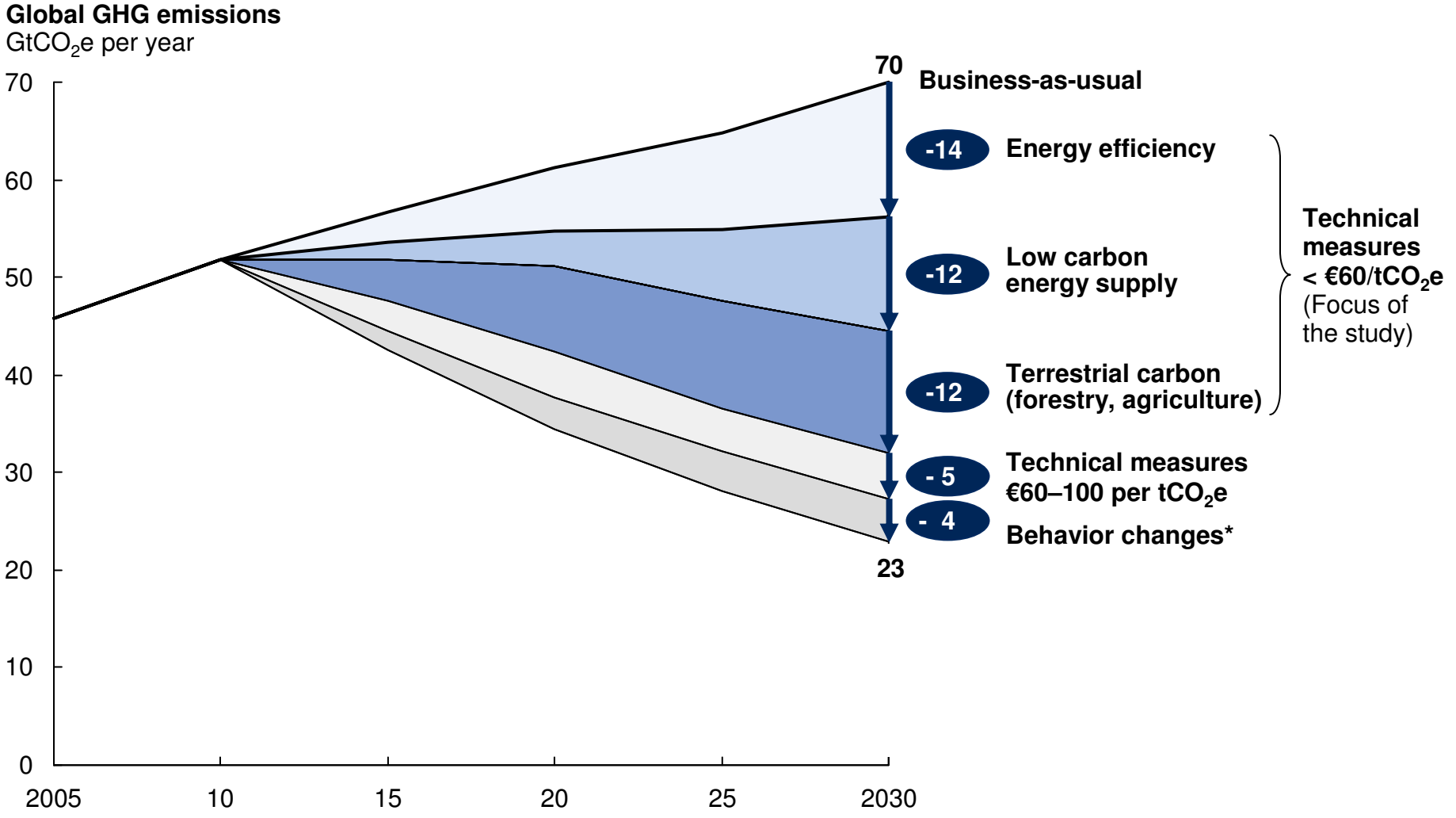
Key findings global GHG abatement cost curve v2.0

- There is sufficient abatement *potential* to contain global warming below 2°C with high probability
- Global and cross-sector action is essential to capture the opportunity
- Costs and financing look manageable, but is likely challenging in some sectors and regions
- Time is of the essence, and the value of early investment is high

Possible to contain global warming below 2°C



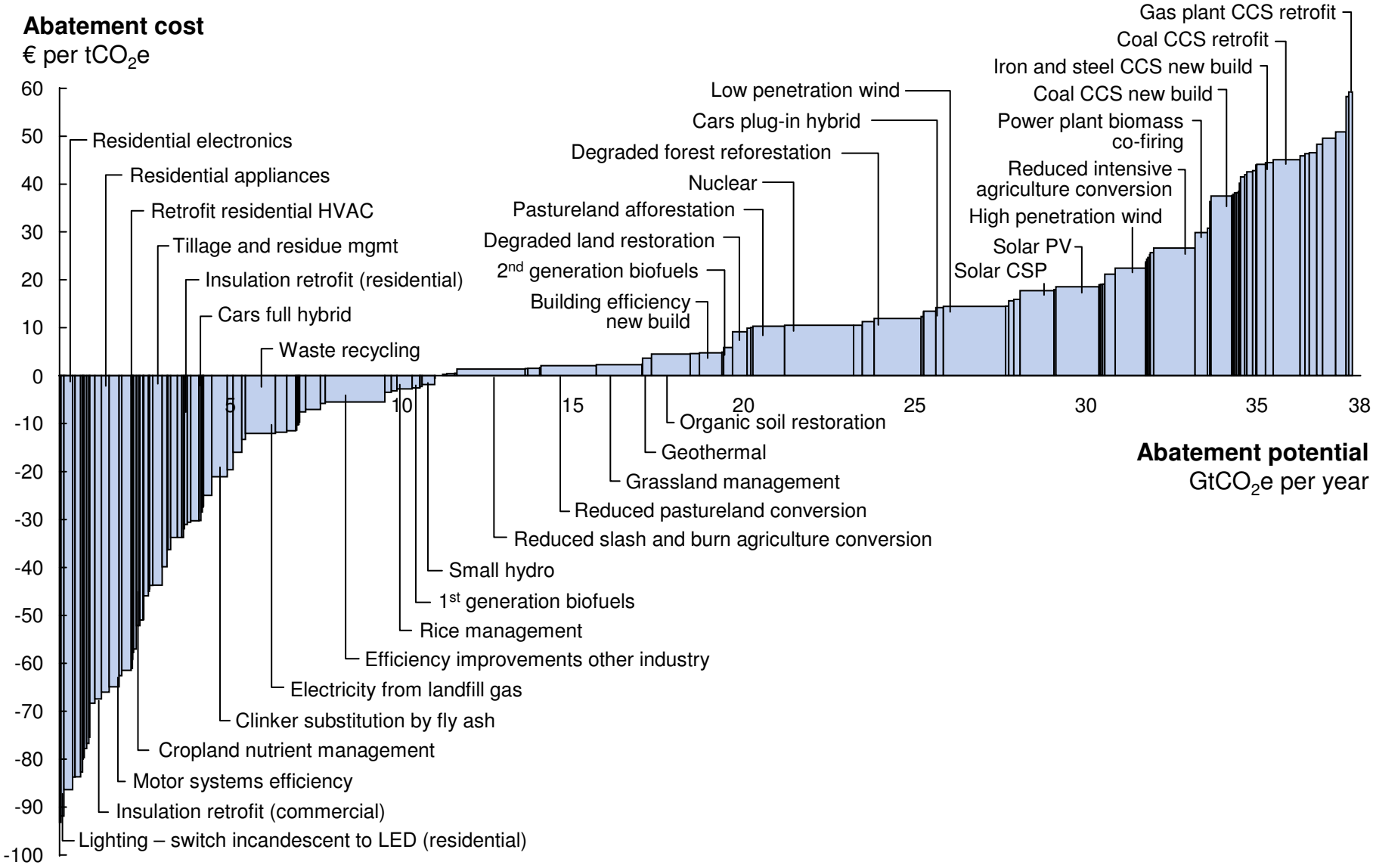
Three major categories of technical abatement opportunities complemented by behavioral change



* The estimate of behavioral change abatement potential was made after implementation of all technical levers; the potential would be higher if modeled before implementation of the technical levers.

Source: Global GHG Abatement Cost Curve v2.0; Houghton; IEA; US EPA

Global GHG abatement cost curve beyond business-as-usual – 2030

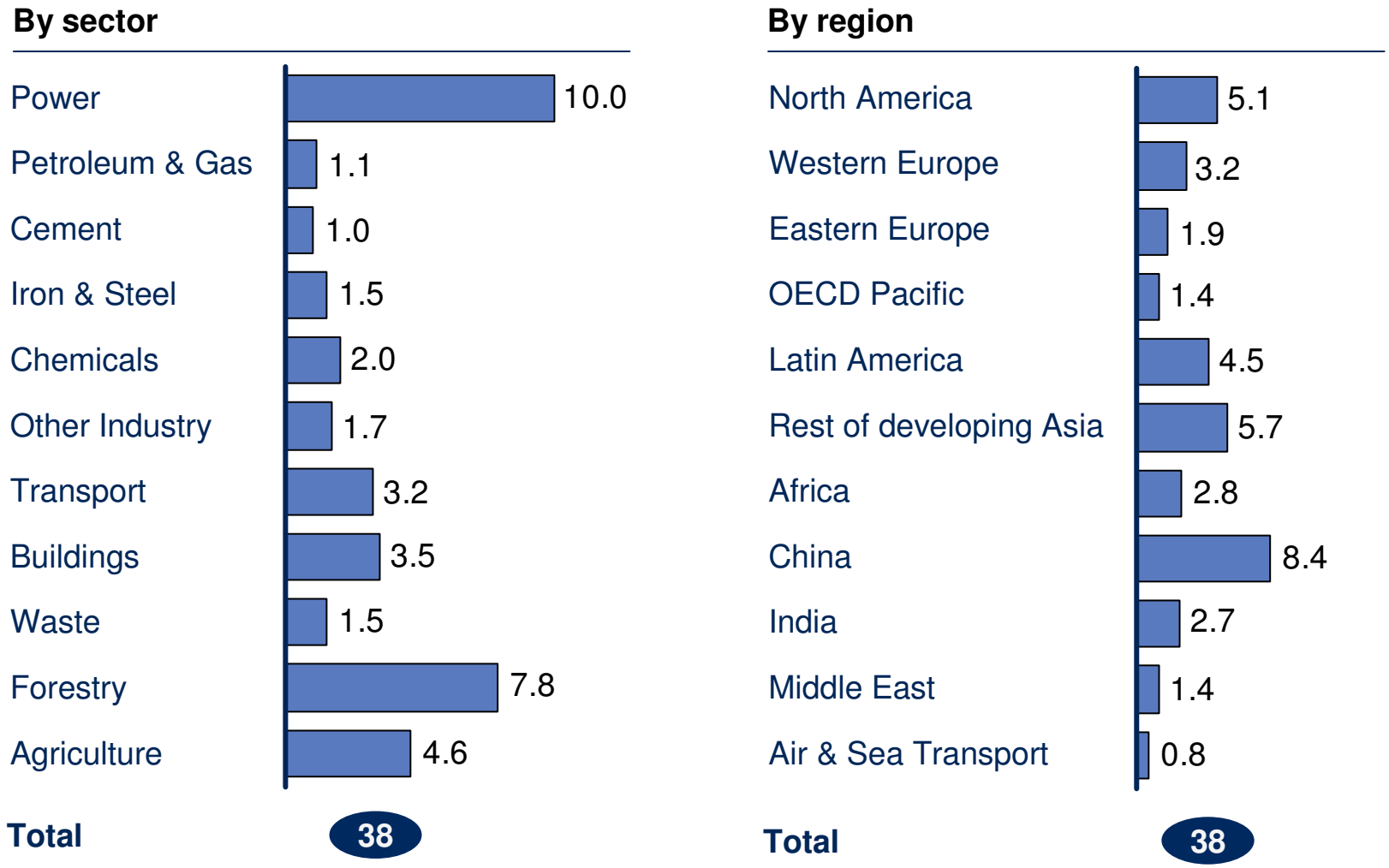


Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €60 per tCO_2e if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.

Source: Global GHG Abatement Cost Curve v2.0

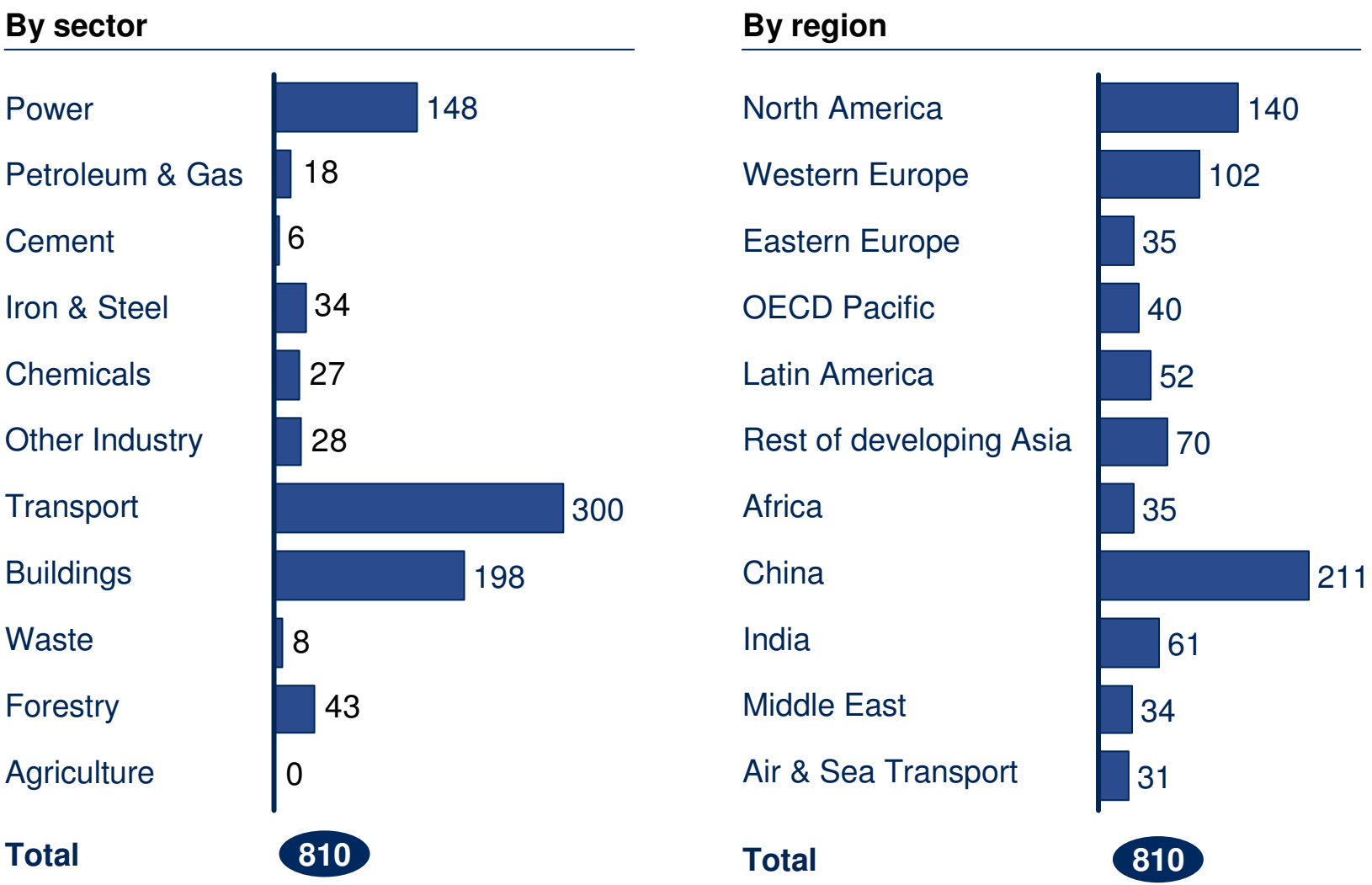
Global and cross-sectoral action required to capture full potential

Abatement potential; $GtCO_2e$ per year; 2030

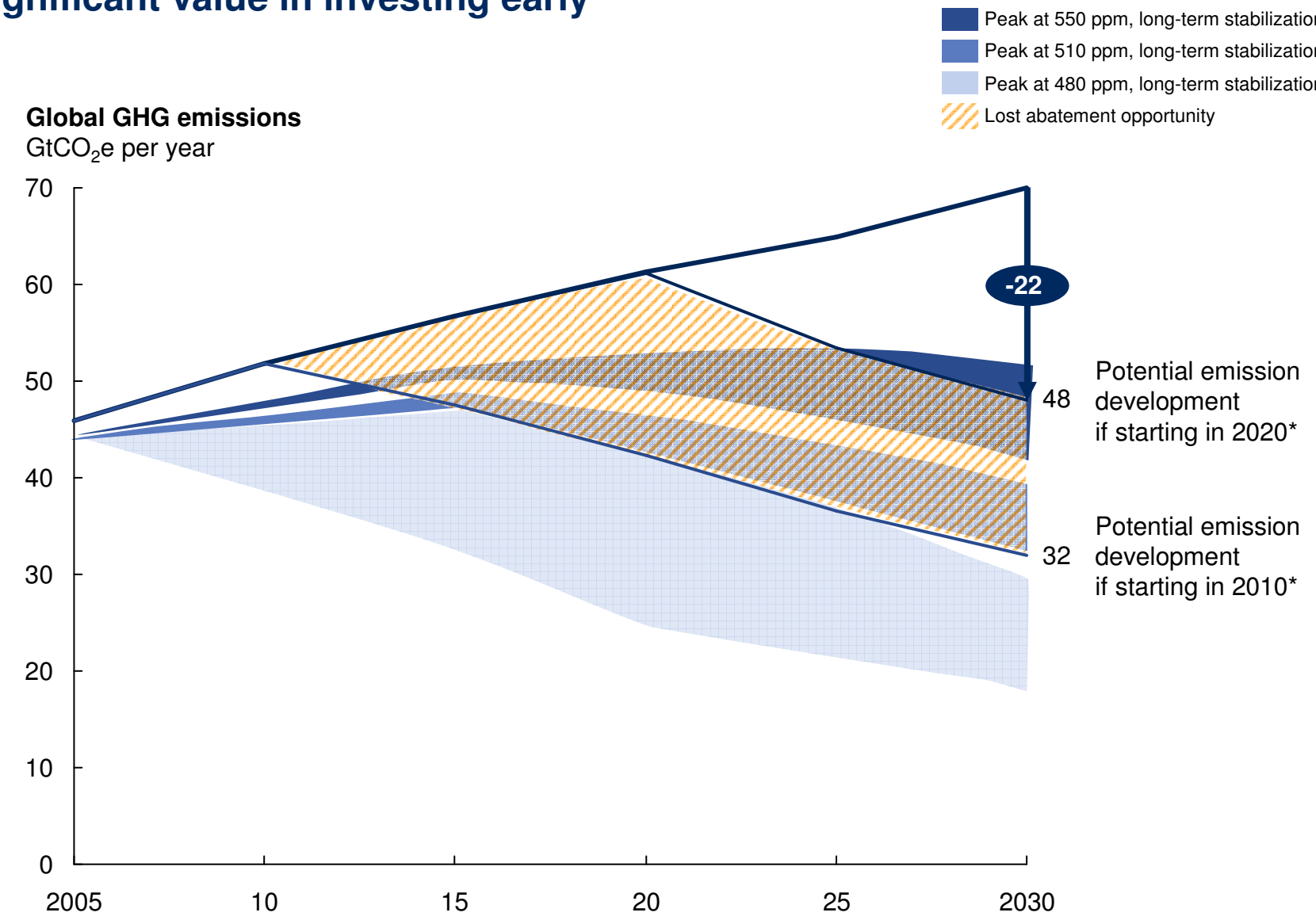


Investments manageable at the global level, but could be challenging in some sectors

$ billions per year; 2030; in addition to current projected / business as usual investments



Significant value in investing early

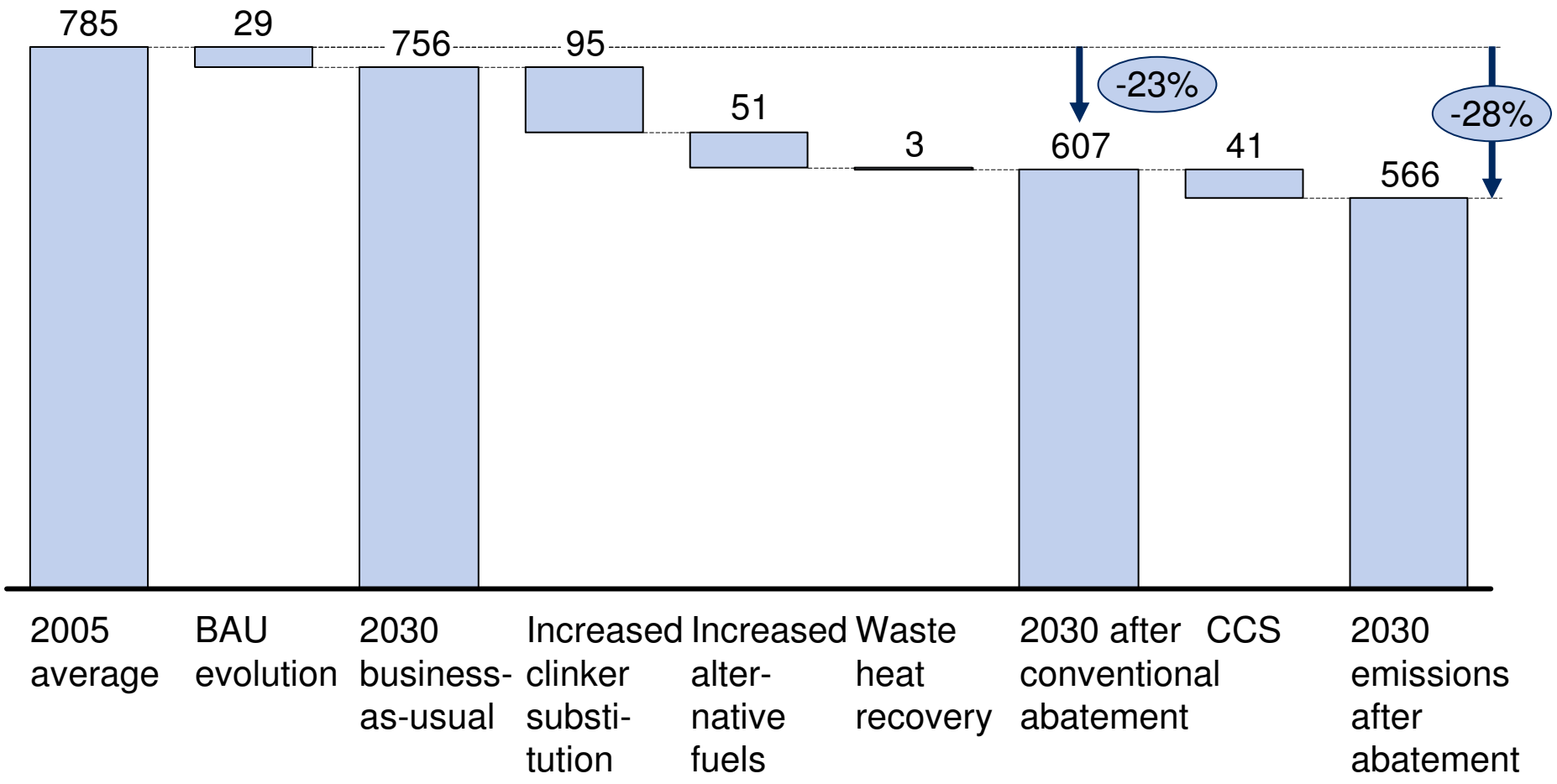


* Technical levers <€60/tCO2e

Source: Global GHG Abatement Cost Curve v2.0; Houghton; IEA; OECD; EPA; den Elzen; van Vuuren, Meinshausen

Illustration of CO_2e intensity development by abatement lever group – Cement industry

Kg CO_2e per tonne cement; Global average



Source: Global GHG Abatement Cost Curve v2.0

Carbon intensity of oil and gas production is influenced by a variety factors

Upstream

1. **Type of field**
   - Conventional vs non-conventional oil fields, e.g.
     - Oil with API lower than 10
     - Tar sands
   - Gas fields vs oil fields
2. **Maturity**
   - Water content
   - Reservoir pressure
3. **Associated gas or oil**
   - Ratio of oil produced vs gas produced in the same timeframe
4. **Operator excellence**
   - Technology application
   - Regional practices
     - Costs of energy
     - Environmental awareness

Downstream

1. **Regional characteristics**
   - Crude slate
   - Fuel specifications
   - Emissions specifications
2. **Regional practices**
   - Costs of energy
   - Fuel used to power refinery
3. **Refinery complexity**
   - Types of units present in refinery, i.e. FCC, Coker, Visbreaker
4. **Size**
   - Ability to leverage economies of scale
5. **Operator excellence**
   - Operators of refineries have different policies with regards to energy efficiency and GHG emissions

Source: GHG abatement cost curve 2.0 team

Thank you for your attention!

More information at climatedesk.bymckinsey.com

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