2050 LOW CARBON ECONOMY ROADMAP

IEA Global Industrial Dialogue and Expert Review Workshop

7 October 2013

By Claude Loréa – CEMBUREAU Deputy Chief Executive – Industrial Policy Director

CEMBUREAU

SETTING THE SCENE – EU POLICY

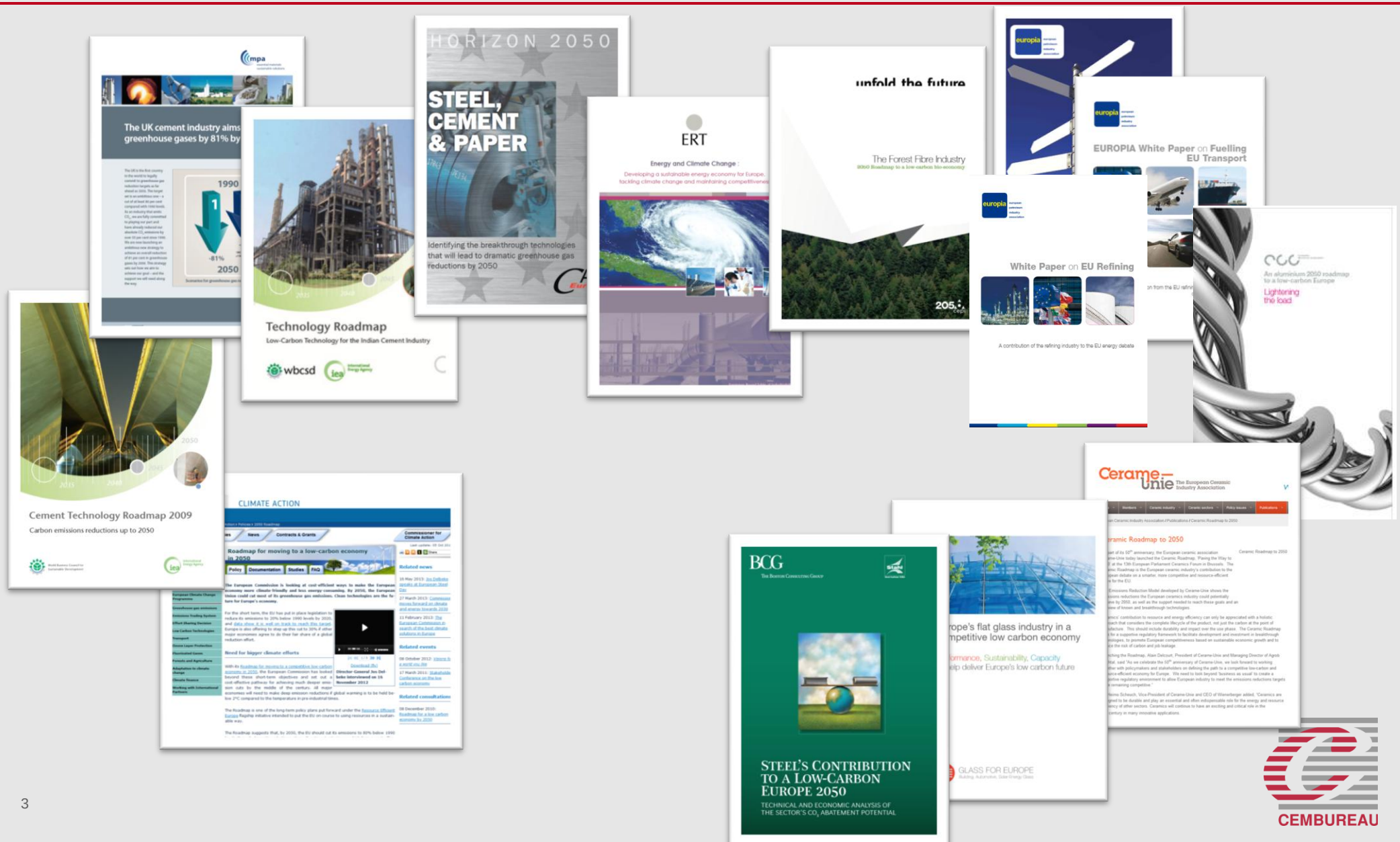
- Ambitious EU Targets
  - Low Carbon Economy Roadmap – by 2050: -80%

- Resource Efficiency Roadmap – by 2050:
  - ☞ All resources = sustainably managed
  - ☞ Climate change milestones = reached
  - ☞ Biodiversity & ecosystem services = substantially restored

- Energy Roadmap – by 2050:
  - ☞ Decarbonisation is feasible

CEMBUREAU

SETTING THE SCENE – THE OTHERS…



CEMBUREAU

WHAT LIES BEHIND OUR ROADMAP

- An aspirational vision
- Positive contribution
- Highlight our potential
- Underline our needs
- And, above all, to be constructive

CEMBUREAU

FINAL TOOL

- Interactive web-based tool

  http://lowcarboneconomy.cembureau.eu/

- Divided up into digestible, bite-size sections
- Development: CEMBUREAU-Morris & Chapman-CAG

+

- Summary leaflet with key elements

CEMBUREAU

FIVE PARALLEL ROUTES

Resource efficiency	Energy efficiency	Carbon sequestration & reuse	Product efficiency	Downstream
• Alternative Fuels • Raw Material Substitution • Clinker Substitution • Novel Cements • Transport Efficiency	• Electrical Energy Efficiency • Thermal Energy Efficiency	• Carbon sequestration & reuse • Biological Capture	• Low carbon concrete	• Smart buildings & infrastructure • Recycling concrete • Recarbonation • Sustainable construction

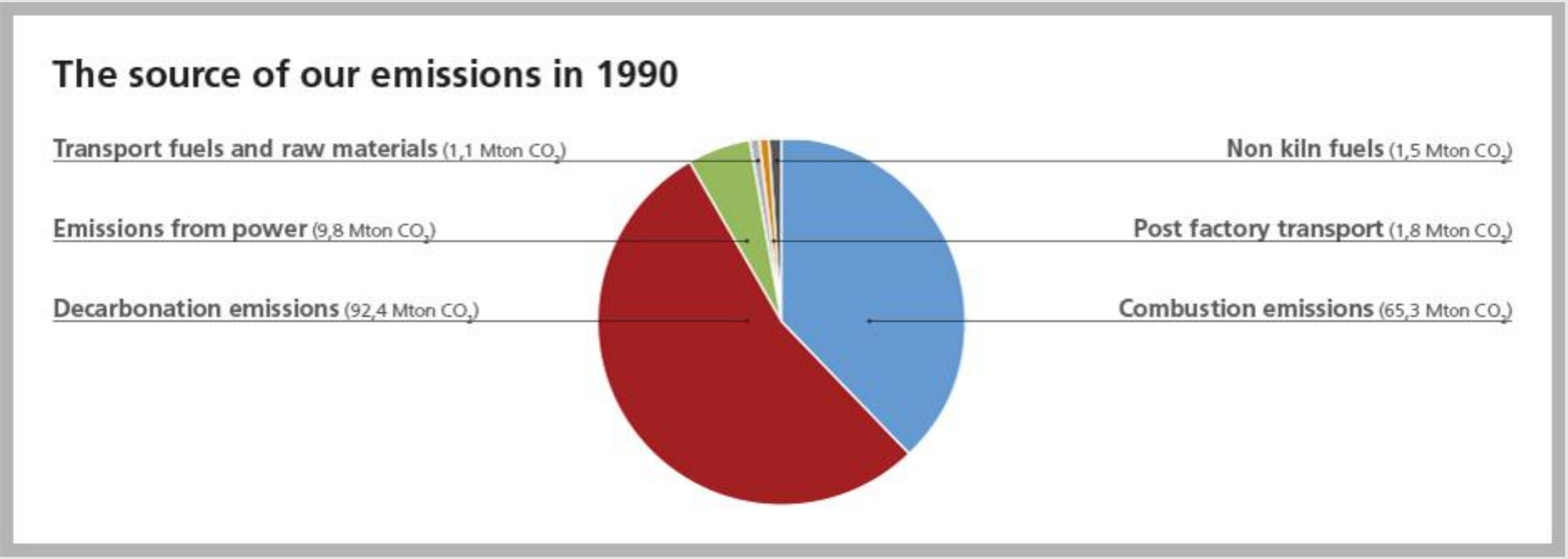
CEMBUREAU

OUR MODEL

- Production has been normalised (2050 equals 1990)
- Power sector assumed to be fully decarbonised
- 60% of kiln energy will be AFR. 40% of which will be biomass
- Average clinker capacity of 5000 tonnes/ day - i.e. a doubling of today's capacity
- 3.3 MJ/tonne with by-pass rate of 5 to 10%. Actually means 2.5 MJ/tonne fossil fuels consumption
- 5% derived from novel cements at assumed CO_2 rate of 50% of EU ETS Benchmark
- Factory made cement non-clinker content of 70%

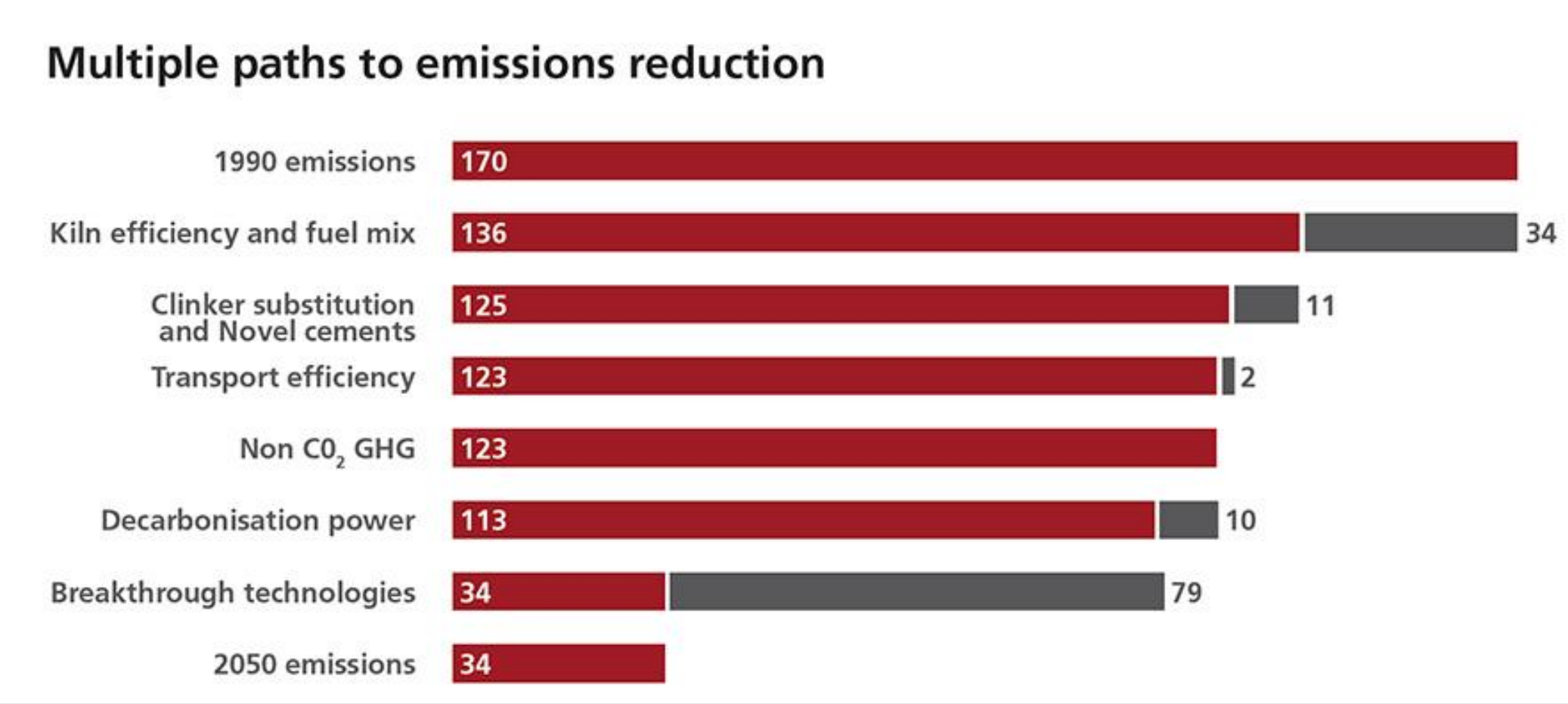
CEMBUREAU

1990 EMISSIONS



CEMBUREAU

EMISSION REDUCTIONS



CEMBUREAU

www.cembureau.eu

RESOURCE EFFICIENCY

- Alternative fuels
  - Replacing a large part of traditional fuel sources with biomass or waste
- Raw material substitution
  - Replacing raw natural resources with waste and by-products from other processes
- Clinker substitution
  - Replacing clinker with alternative materials in cement grinding (reducing clinker to cement ratio)
- Novel cements
  - Potential of new or novel cement types currently under development

BACK

CEMBUREAU

ENERGY EFFICIENCY

- Electrical energy efficiency
  - Continuous improvement of the production process to lower the amount of electricity used
  - ! Deploying CCS would increase electricity consumption by 50 to 120%
- Thermal energy efficiency
  - Continuous improvements to production facilities have halved energy consumption since the 1960s
  - Waste heat recovery systems being investigated

BACK

CEMBUREAU

CARBON SEQUESTRATION & REUSE

- Initial results show currently available technologies (oxyfuel/ post combustion) could capture 90% of CO_2 emissions
- Captured carbon to be transported to a storage site, valorised, or used to grow algae,...
- Carbon capture would increase production costs by 25 to 50%, require substantial investments and require the use of additional electricity
- Carbon Capture and Storage (CCS) is only worthwhile if the CO_2 transport infrastructure and storage sites are suitable and approved for that purpose

BACK

CEMBUREAU

PRODUCT EFFICIENCY

- Low carbon concrete
  - Using high performance cements to optimise cement use per tonne of concrete
  - Locally sourcing of aggregates
  - Optimising admixtures and concrete composition at the concrete mixing stage

BACK

CEMBUREAU

DOWNSTREAM

- Smart building and infrastructure development
  - New buildings can be built with deconstruction rather than demolition in mind
- Recycling concrete
  - Using crushed concrete in construction
- Recarbonation
  - At the end of its working life, concrete can be crushed (increasing the exposed surface area) thereby increasing the recarbonation rate
- Sustainable construction
  - Thermal mass of concrete
  - Concrete roads reduce fuels consumption of vehicles

BACK

CEMBUREAU