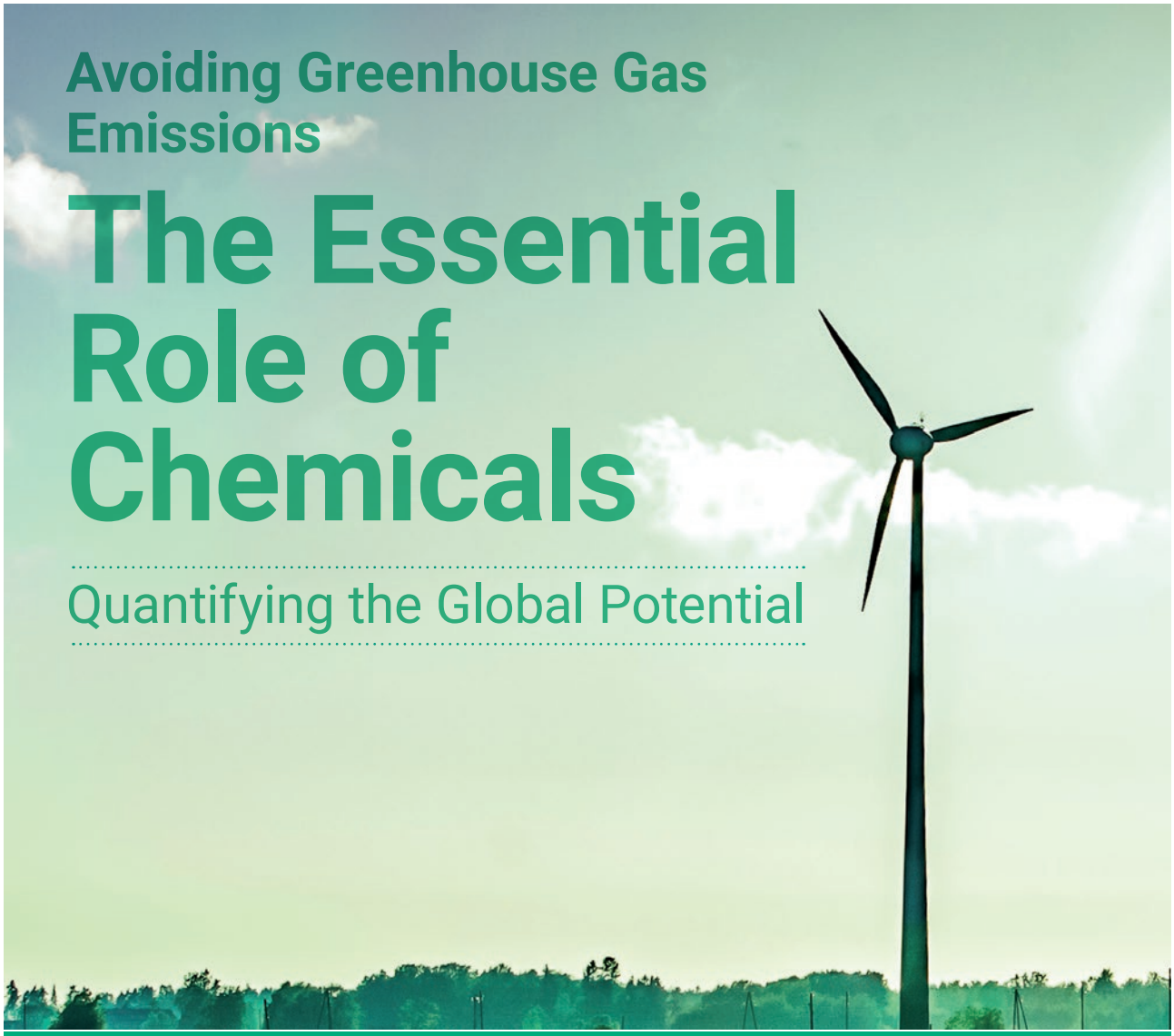
Avoiding Greenhouse Gas Emissions

The Essential Role of Chemicals

Quantifying the Global Potential



Key findings from a technical report by Ecofys, a Navigant company

The study carried out by Ecofys finds that the chemical industry has the possibility to make an important contribution to a low carbon future. Solutions from the chemical industry could enable significant emission reductions and support the goal of the UNFCCC Paris Agreement of restricting global warming to "well below 2 degrees Celsius" by the end of the century.

Realising the potential of the chemical industry in avoiding emissions now and post 2030 will require recognition that the future is cross-sectoral. Joint action will be needed from all partners in the value chain with reductions measured along the value chain including both use and end-of-life phases.

Delivering this potential will necessitate a policy and business environment that fosters cost-effective solutions based on a life cycle approach while harnessing all viable energy sources integrated into normal market conditions.

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ICCA
INTERNATIONAL COUNCIL OF CHEMICAL ASSOCIATIONS

In order to unlock its potential for emissions avoidance the ICCA, the voice of the global chemical industry, calls for:

- Recognition by governments, regulators, value chains and their aligned industries that the future is cross sectoral.
- An enabling regulatory environment endorsed and mandated at inter-governmental level.
- Action demanded of all partners in the value chain in realising the potential avoided emissions.
- Incentives for investment in pilot projects and R&D to deliver novel business models.
- Financial support focused on development of pre-commercial innovative technologies.
- All technologies should have equal access to market, gradually removing subsidies as soon as the technology is commercial.

Key findings

Methodology

Six product groups were identified: efficient building envelopes, efficient lighting, lightweight materials, electric cars, fuel efficient tires, and wind and solar power. In addition, food packaging is also discussed using a different methodology due to concerns about data quality. Together these represent four key sectors of the chemical industry's value chains: buildings, transport, renewable power and food packaging.

The study uses two distinct approaches. The first approach estimates the annual emission reductions if the solutions were used to their full potential right now. The second approach estimates the reductions enabled by the solutions in 2030 in a 2 degrees Celsius mitigation scenario as compared to a reference scenario. The scenarios in the second approach are based on the IEA Energy Technology Perspectives (ETP) scenarios.

Both approaches adapted a stock-based approach in order to assess the annual avoided emissions. With this novel "stock approach" the current, maximum and future levels of im-plementation of solutions to mitigate climate change are taken into account, as opposed to the more frequently used "flow approach", based on expected sales of enabling products in a given year.

While results from the two approaches are not directly comparable, they provide insights into potential GHG emissions reductions enabled by chemical industry solutions.

The study findings complement the 2009 study "Innovations for Greenhouse Gas Reductions: A life cycle quantification of carbon abatement solutions enabled by the chemical industry" (**www.icca-chem.org/wp-content/uploads/2017/10/Innovations-for-Greenhouse-Gas-Reductions-McKinsey-Study.pdf**) and make progress in calculating avoided emissions.

Messages and proof points:

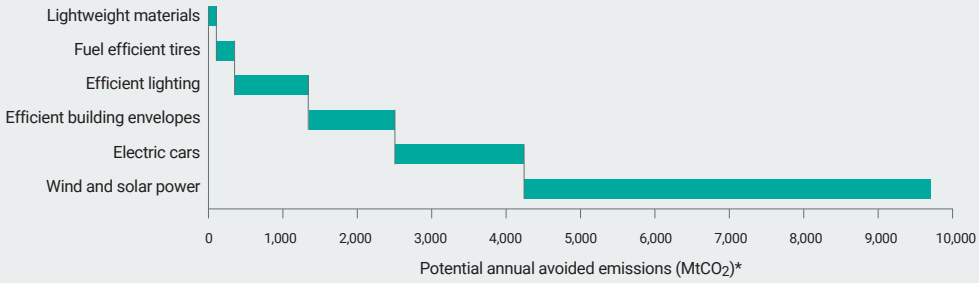
- Chemical industry contributions in products across key value chains could reduce emissions by over 9 $GtCO_2e$ each year if implemented immediately – a reduction greater than the total annual emissions of the United States.
- Avoided emissions were calculated across six areas:
  - Wind and solar power;
  - Efficient building envelopes;
  - Efficient lighting;
  - Electric cars;
  - Fuel efficient tires;
  - Lightweight materials.

  Options in food packaging (beef) were also examined to assess mitigated food loss.
- The largest reduction contribution is in renewable energy – solar and wind power – and the chemical sector makes a contribution to an increased renewable energy supply. The chemical industry contributes to the deployment of renewables through the supply of key materials for wind turbines and solar PV panels. It provides key materials to renewable power generation systems, including gear oils for wind turbine gearboxes, resins for blades and coating materials for wind turbines, and silicon ingots, semiconductor gas and sealant for PV panels.
- Road transport (including cars, buses, and trucks) accounts for more than two thirds of the final energy consumption for transport. Fuel efficient tires have lower rolling resistance compared to normal tires, while providing enhanced road-gripping performance, resulting in an energy efficiency improvement of about 2.5% (ICCA/JCIA, 2015). Chemical products such as synthetic rubbers and silica are key components in reducing energy loss and enabling improved fuel efficiency of tires.
- Chemically-based building products (insulation, piping, air barriers and sealing materials) have a significant role to play in achieving substantial reductions in energy use and associated GHG emissions by improving the energy performance of new and existing buildings
- In 2030 the solutions provided by the chemical industry could reduce emissions by 2.5 $GtCO_2e$ per year – a reduction equivalent to total emissions from France, Germany, Italy and the UK combined.
- The chemical industry plays an essential role in enabling other industries to reduce their energy efficiency and reduce their GHG emissions. It has the potential to further develop its role in the energy transition beyond 2030 and to accelerate its contribution to avoided emissions far beyond these six areas and across many value chains.

Approach 1 Results

Annual avoided emissions with stock-based approach

- Estimated annual emission reduction if the solutions were used to their full potential right now



Approach 2 Results

- Contribution of the solutions to the GHG emissions reductions in 2030 in a 2 degrees Celsius mitigation scenario as compared to a reference scenario

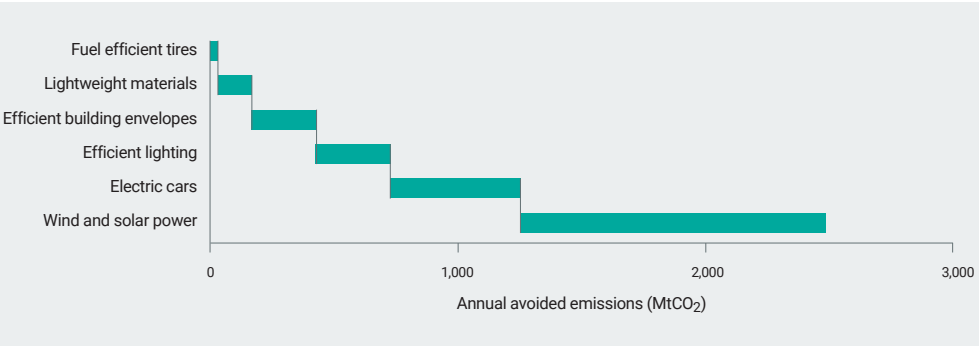
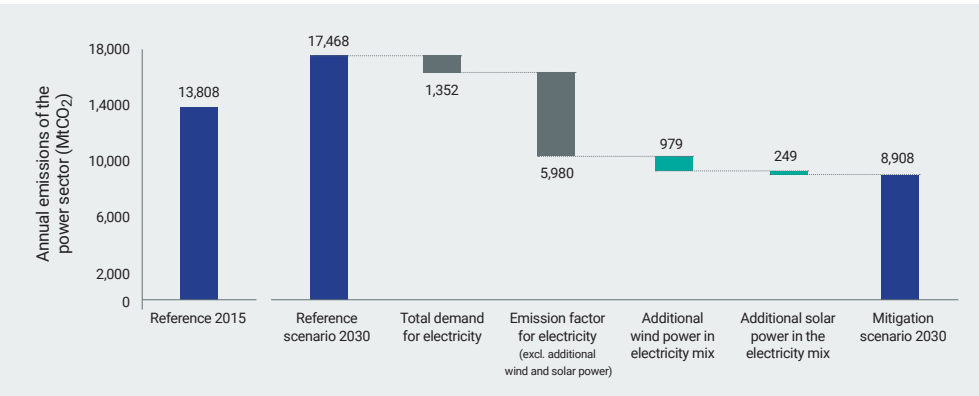
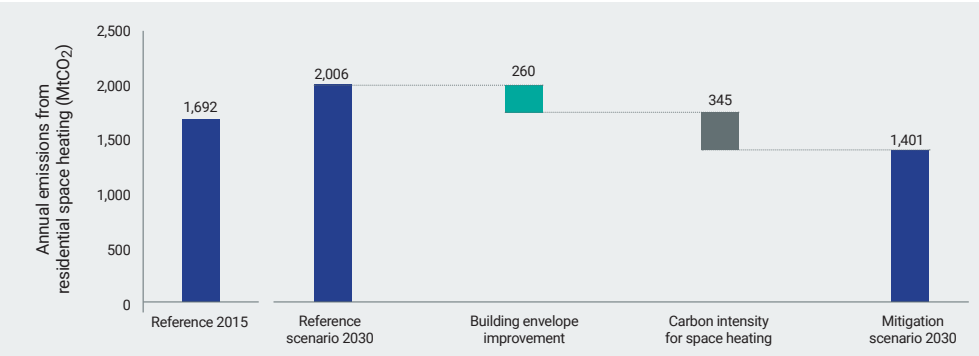


Illustration across the different scenarios:

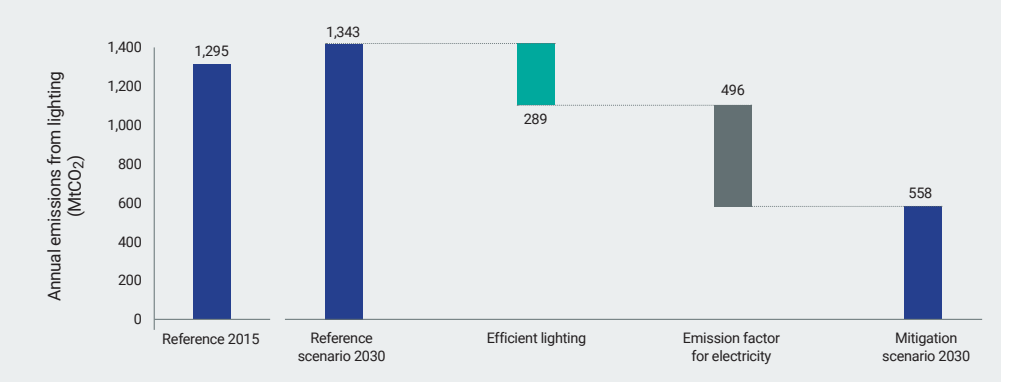
Wind and solar power



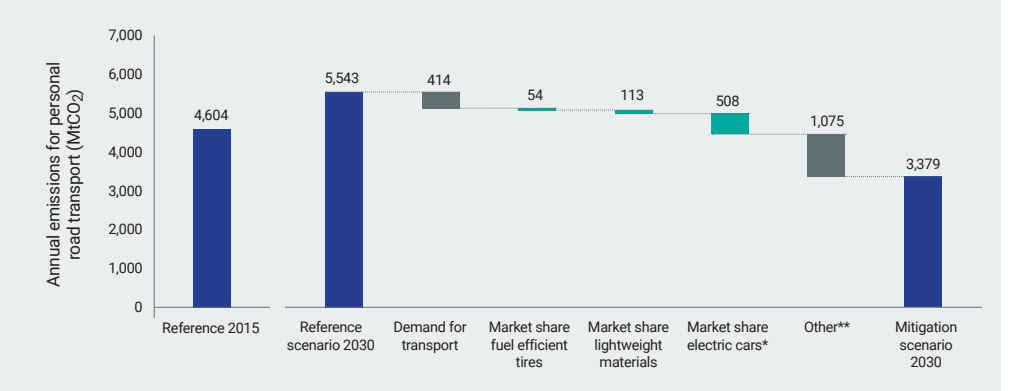
Efficient building envelopes



Efficient lighting



Transport



Business and policies required to realise potential savings along the value chains

Actions to deliver the potential emissions savings the chemical industry can enable will need to focus on:

- **Joint cooperation** and action from all partners in the value chain.
  - As the contribution of the chemical industry occurs alongside that of others.
- An **enabling policy environment that:**
  - Stimulates emission reductions along the value chain including use and end-of-life phases;
  - Promotes technology-neutral policies which enable cost-effective renewable energy;
  - Encourages renewables while also ensuring a reliable, affordable and consistent supply of electricity;
  - Provides financial support for innovation development but once commercialised integrates them into normal market conditions;
  - Sets energy efficient standards, encouraging manufacturers to provide clear information and taking action to raise public awareness.
- **Novel business models**
  - Pilot projects, LCA studies, R&D investment, value chain cooperation from architects to craftsmen.

* Including emission factor reduction for electricity;
** Other efficiency improvement, other fuel shifting, etc.

INTERNATIONAL COUNCIL OF CHEMICAL ASSOCIATIONS

About the International Council of Chemical Associations (ICCA)

The International Council of Chemical Associations (ICCA) is the worldwide voice of the chemical industry, representing chemical manufacturers and producers all over the world. Responding to the need for a global presence, ICCA was created in 1989 to coordinate the work of chemical companies and associations on issues and programs of international interest. It comprises trade associations representing companies involved in all aspects of the chemical industry.

ICCA is a chemical industry sector with a turnover of more than 3,600 billion euros. ICCA members (incl. observers & Responsible Care members) account for more than 90 percent of global chemical sales.

ICCA promotes and co-ordinates Responsible Care® and other voluntary chemical industry initiatives. ICCA has a central role in the exchange of information within the international industry, and in the development of position statements on matters of policy. It is also the main channel of communication between the industry and various international organizations that are concerned with health, environment and trade-related issues, including the United Nations Environment Programme (UNEP), the World Trade Organization (WTO) and the Organisation for Economic Co-operation & Development (OECD).

ICCA operates by coordinating the work of member associations and their member companies, through the exchange of information and the development of common positions on policy issues of international significance. Three main issues focused on by ICCA are: Chemicals Policy & Health, Climate Change & Energy, Responsible Care®.

ICCA also serves as the main channel of communication between the industry and various international entities, such as inter-governmental organizations (IGOs) and NGOs that are concerned with these global issues.

www.icca-chem.org

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