

# Climate Resilience: Moving beyond Climate Change Mitigation

The Potential Role of the Chemical Sector as  
a Solution Provider for Climate Resilience Needs



International  
Council of  
Chemical  
Associations



## A Changing World

Climate change is one of the most pressing challenges of our time, already dramatically impacting natural environments and human communities around the world. The United Nations Intergovernmental Panel on Climate Change (IPCC) states that without additional efforts to constrain greenhouse gas emissions, global warming is likely to exceed 2°C by the end of the 21<sup>st</sup> century<sup>1</sup>. Global warming has been linked to climate related extremes, such as heat waves, droughts, floods, cyclones and wildfires.

Human influence on the global climate system is clear. Continued emission of greenhouse gases (GHG) without prevention or mitigation efforts will cause further warming and long-lasting changes in all components of the climate system, and may well increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems<sup>2</sup>.

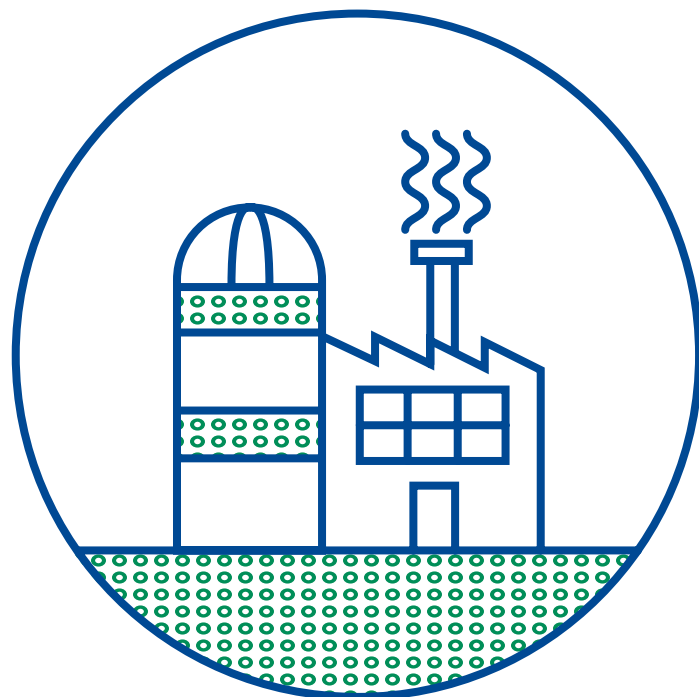
## The chemical industry as solution provider

The chemical industry is a major consumer of energy as both a feedstock and source of power. Importantly, however, innovation in chemistry can enhance energy efficiency and reduce GHG emissions.

Climate change is a global challenge that requires long-term commitment and action by every segment of society. A combination of technology, market-based and policy solutions is necessary to reduce GHG emissions, to face the climate risks and to achieve climate goals, such as those of the Paris Agreement.

As a significant manufacturing sector, we are continuously improving the energy efficiency and intensity of our own operations. And we are putting our brightest minds to work developing transformational technologies that cut GHG emissions, improve energy efficiency and enable a socially, environmentally and economically sustainable future<sup>3</sup>.

However, addressing climate change mitigation is not enough. Society needs to develop ways to adapt to the situation, in a reality where rise in mean sea level and temperatures is already at hand. As stated in the IPCC Special Report 2018,<sup>4</sup> “future climate-related risks would be reduced by the upscaling and acceleration of far-reaching, multilevel and cross-sectoral climate mitigation and by both incremental and transformational adaptation”.



## Key impact opportunities for the chemical sector to contribute to climate resilience

Adapting to a changing climate – also known as climate resilience – requires an entire generation of new products, some already available and some yet to be developed, and services that will help to improve life standards and offer higher quality than their precedents, reshaping the economy and the value chains.

The IPCC defines climate resilience as the “ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions.”

The chemical industry has already been working on solutions in this regard. The examples below depict the areas where advanced products delivered by the chemical industry create climate resilience benefits.

1 The Intergovernmental Panel on Climate Change, IPCC, states in the 2014 Synthesis Report that without additional efforts to reduce GHG emissions beyond those in place today, global emissions growth is expected to persist, driven by growth in global population and economic activities. Global mean surface temperature increases in 2100 in baseline scenarios range from 3.7°C to 4.8°C above the average for 1850–1900 for a median climate response

2 IPCC - Climate Change 2014: Synthesis Report

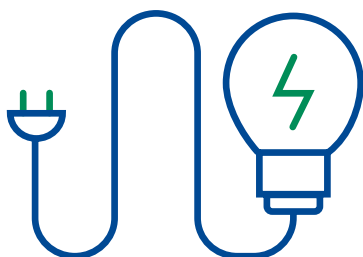
3 ICCA - Enabling the Future: Chemistry Innovations for a low carbon society

4 IPCC – Special Report 2018 - Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C



## Energy efficiency, production and storage

Changing temperatures, weather intensity and patterns will influence energy production and use. The chemical industry can provide solutions to the housing, transportation and energy sectors for efficient use of energy by:

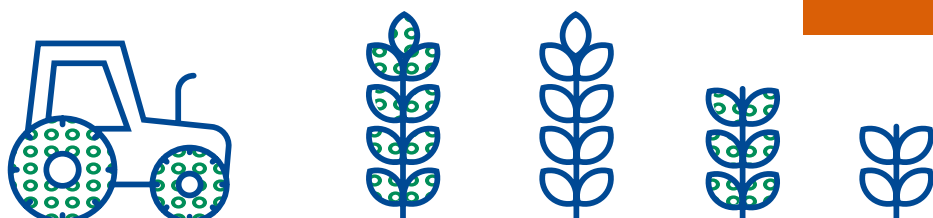


- Creating housing materials that increase resilience to variable temperatures and reduce the dependency on air conditioning systems (e.g. insulation, cool roofs, tinted windows).
- Producing chemicals and materials that contribute to decentralized production of energy and its storage (e.g. micro-solar panels, compact batteries).
- Producing more resilient products recognizing changing weather patterns (e.g. adding coatings to roads, refrigerated trucks).

## Agricultural production

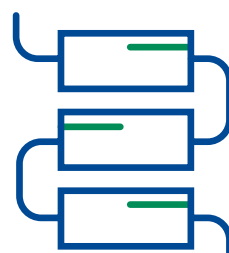
With an ever-growing population, securing food production is essential. Food and agricultural production are threatened by changing weather patterns. The agriculture and food sectors can benefit from innovations that provide greater resilience and reliability to these changing conditions. The chemical industry is currently working on:

- Materials that enhance protection for crops and reduce demands for irrigation and fertilizers.
- Fertilizers/pesticides that could increase resilience of agricultural products and/or allow resilience to changing climates.

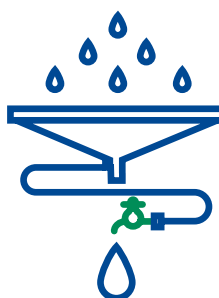


## Water protection and efficiency

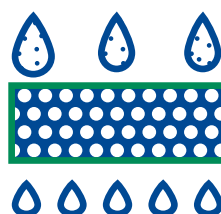
Water scarcity and stress are emerging as key climate change challenges. Solutions that improve access to, efficiency of use and protect water resources will be very valuable. The chemical industry can facilitate in the areas of:



**Water treatment:**  
enhanced purification and benefit to human health (e.g. membrane filter)

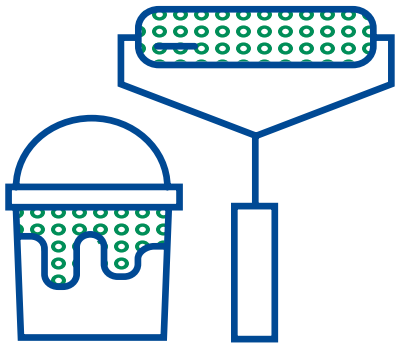


**Capturing rainwater**



**Desalination Membranes**  
that remove salt from water and enable water reuse.

*“ Future climate-related risks would be reduced by the upscaling and acceleration of far-reaching, multilevel and cross-sectoral climate mitigation and by both incremental and transformational adaptation.*

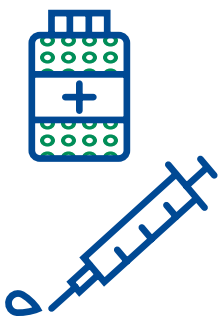


### Material resilience and durability

Changing and more extreme weather patterns will expose surfaces – such as those of roads, bridges, buildings and vehicles – to more weather-related impacts. The chemical industry can:

- Provide coatings, resins and paints for buildings and infrastructure like bridges and roads, which increase resistance to extreme events.
- Protect the natural features and characteristics of these surfaces against erosion and weather impacts.

### Health protection



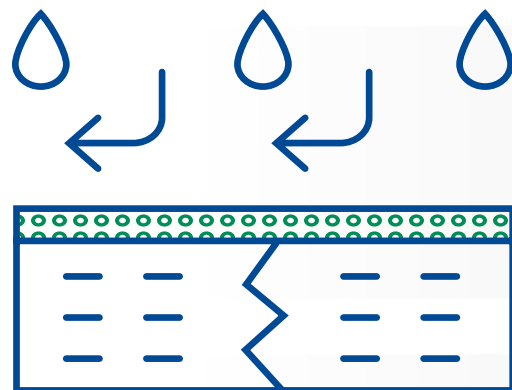
The chemical industry provides inputs to the pharmaceutical and consumer products that help protect people from the consequences of changed weather patterns and changing disease profiles, including products which prevent disease, and control vectors.

### Emergency preparedness and response

The chemical industry provides knowledge, expertise, and products that help other sectors, organizations and cities reduce losses of output of products and services, resulting from extreme weather patterns.

#### How?

- Working together with relevant stakeholders on emergency plans made by cities, companies and the supply chain, through policy discussions, and by providing engineered solutions such as protective walls and other products.
- Products and materials to aid post-weather event recovery, including temporary housing and water treatment.



The above examples are just some of the possible chemical products that contribute to climate resilience. Increased resilience and reduced vulnerability (not limited to climate change) should be important aspects of any product development in any sector and the chemical innovation driver could help with that. As such, the chemical sector, through its products and technology, will play an even more important role in providing solutions for climate change.



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