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Ground-breaking report warns chemicals industry must dramatically transform operations to avoid 4°C of global warming

- *Ground-breaking study sets out credible pathways for the industry to become an enabler of a sustainable global economy, double in size and create 29 million new jobs*
- *The industry can reinvent itself as a climate solution – becoming carbon negative by early 2040s and acting as a carbon sink by 2050*
- *Without dramatic and urgent change, the industry aligns with 4 degrees of global warming by 2050 with catastrophic consequences for the planet*
- *Building a circular, net zero chemical system will require capital expenditure of over $3 trillion by 2050*

The global chemical industry accounts for around 4% of global greenhouse gas emissions. It must end its fossil dependency and become a planet-positive force by embracing a more circular, low emissions operating model, according to a major new report from Systemiq, the system change company, and the Center for Global Commons at the University of Tokyo. Without urgent action, the industry faces reputational and regulatory risk and may lose its social license to operate, the report warns.

The Planet Positive Chemicals report (Systemiq link, UTokyo link) provides an unprecedented blueprint for the future of the chemical industry, which is worth $4.7 trillion dollars in annual revenues[1] and provides the chemicals that are essential to all sectors of the economy from packaging and consumer goods to construction and fertilisers. It says the industry currently has multiple harmful impacts on our planet, including high carbon emissions and pollution, and its action on climate is currently lagging behind other sectors.

The report identifies the need for radical interventions on both supply and demand sides for the industry to operate within planetary boundaries. Its findings include:

- Chemical products are used across all downstream industries - other sectors of the economy cannot reach net zero without mitigating the climate impacts of the chemicals value chain
- Chemical production would need to double by 2050 to enable a sustainable global economy, with rapid growth in ammonia (around 440%) mainly for use as a sustainable shipping fuel and methanol (330%) to create plastic without using fossil sources
- Expected growth means net zero will be dependent on the maximum scaling of a few key abatement technologies like carbon capture and storage (CCS) – without which the chemicals industry becomes a major climate risk
- Up to 640 million tonnes of CCS capacity will be needed every year by 2050 if the industry does not move away from fossil feedstocks
- Circular approaches can reduce total demand for chemicals by up to 31% by 2050 – with industry reusing and recycling chemicals, or switching certain chemicals for lower-emissions alternatives
- Supply transition requires a shift away from fossil fuels and feedstocks and scaling of CCS to capture residual emission from production processes and end of life chemicals
- Replacing fossil feedstocks will make the industry the largest global consumer of green hydrogen (up to half of all demand by 2050), driving scale-up of this critical enabler of the energy transition

- This creates economic opportunities as the site of primary chemical production for developing countries that have abundant, affordable renewable energy sources to make low-cost green hydrogen
- The industry could become carbon negative by the early 2040s and a carbon sink by 2050, using CO_2 from the air and biomass to make plastic and storing carbon underground at end-of-life
- The transition can create 29 million jobs in upstream production, circular chemicals and waste management - but the chemical industry needs to reposition itself in order to attract highly-skilled workers who often seek environmental and social purpose
- Retrofitting of legacy production and new greenfield chemical production infrastructure will require capex expenditure of over $3 trillion

The Planet-Positive Chemicals report aims to help the industry and policy makers unite around a common view of the path ahead and accelerate the transition to a sustainable model of operation. It suggests ten key actions that could transform the system including establishing a global charter of transition principles and a first-movers coalition to seed markets for net zero chemicals. The report authors have made all their modelling and analysis publicly available. They will host a virtual discussion on 10 October 2022 to explore what's needed from the industry, its customers, policymakers and the investment community to make the transition happen.

Chad Holliday, former CEO of the global chemical company DuPont and former Chairman of Shell, said: "We need realistic and immediate action from industry on the climate goals agreed at an international level. We want to see ambitious companies grabbing the opportunities represented by the global net zero transition, and as the former CEO of a chemicals company, I firmly believe a planet positive chemicals industry IS possible and this is a pivotal moment for the industry to redefine its future."

Naoko Ishii, Executive Vice President, Director for the Center for Global Commons at the University of Tokyo, said: "To avoid the collapse of the complex and interdependent Earth systems on which humanity, including our economic prosperity depends, we need to transform our social and economic systems and our lifestyles. The chemical industry has an outsized role to play, with its products used across many sectors and ubiquitous in modern life. The opportunity is clear: to bring the system back within the planetary boundaries, including net zero GHG and become a contributor to the Global Commons. We hope this report will open the debate about how the chemical industry can transform itself to grasp that opportunity."

Business leader and campaigner Paul Polman, who served as CEO of Unilever and helped design the SDGs, said: "Transformational leadership is critical to the delivery of our global sustainability goals. We urgently need courageous business leaders who profit by fixing the world's problems rather than creating them – and this report is a clarion call to the chemical industry to do just that. It sets out tangible pathways for the sector to become the enabler of a sustainable economy, a climate solution and a planet-positive system – but in order to access the growth and value associated with this future path, the industry must decouple itself from the fossil fuel dependence of the past. This marks the beginning of an urgent and business-critical conversation for the industry and its value chain."

Guido Schmidt-Traub, Managing Partner of Systemiq, says: "The chemical industry underpins every modern economy, but it must change profoundly across its entire value chain to meet the objectives of the Paris Agreement. Importantly, these changes are eminently feasible using proven technologies outlined in this report. The recommendations for policymakers, the industry, and the investment

community are practical and actionable. Systemiq and our partners stand ready to support discussions about how the chemical industry can become a driver of a net-zero and nature-positive economy."

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NOTES TO EDITORS

1. https://www.statista.com/statistics/302081/revenue-of-global-chemical-industry/
2. The full report is available at https://www.systemiq.earth/planet-positive-chemicals/ or at https://cgc.ifi.u-tokyo.ac.jp/en/research-en/chemistry-industry-en/
3. You can sign up for the Planet Positive Chemicals discussion event at https://www.eventbrite.co.uk/e/systemiq-center-for-global-commons-planet-positive-chemicals-discussion-tickets-412873484707

About the Planet Positive Chemicals report

The Planet Positive Chemicals report is the result of over a year of research by the independent systems-change company, Systemiq, working with the Center for Global Commons at the University of Tokyo. It was overseen by an independent expert panel - comprised of experts across industry, independent consultants and academia – to ensure its impartiality. The report and the research behind it were funded by Mitsubishi Chemical Corporation.

The report provides an unprecedented blueprint for the future of the chemicals industry, exploring how it can operate within planetary boundaries and build a low-emissions operating model. It recognises the ubiquity of chemicals in our modern lives and the important role the industry will play in helping other sectors get to net zero. It provides a detailed view of the future pathways for the industry, taking a systems-wide view of the likely demand for chemicals in a net zero world and exploring the industry's carbon emissions along its entire value chain. It integrates careful consideration of how fast and at what scale specific net zero-enabling technologies could be available to help the industry make the transition it needs.

About Systemiq

Systemiq, the system-change company, was founded in 2016 to drive the achievement of the Sustainable Development Goals and the Paris Agreement, by transforming markets and business models in five key systems: nature and food, materials and circularity, energy, urban areas, and sustainable finance. A certified B Corp, Systemiq combines strategic advisory with high-impact, on-the-ground work, and partners with business, finance, policy-makers and civil society to deliver system change. Systemiq has offices in Brazil, France, Germany, Indonesia, the Netherlands and the UK. Find out more at www.systemiq.earth.

About the Center for Global Commons at the University of Tokyo

The Center for Global Commons was established in August 2020 to realize University of Tokyo's then-President Makoto Gonokami's vision that "universities should play a leading role in driving social change through collaborative creation with leaders in a wide range of fields that transcend the boundaries of academia in order to seek fundamental solutions to the challenges facing humanity." The Center seeks to play a key role in catalyzing society transformation by mobilizing decision-makers across a broad spectrum—far beyond academia— in search for fundamental solutions to challenges to humanity. https://cgc.ifi.u-tokyo.ac.jp/en/