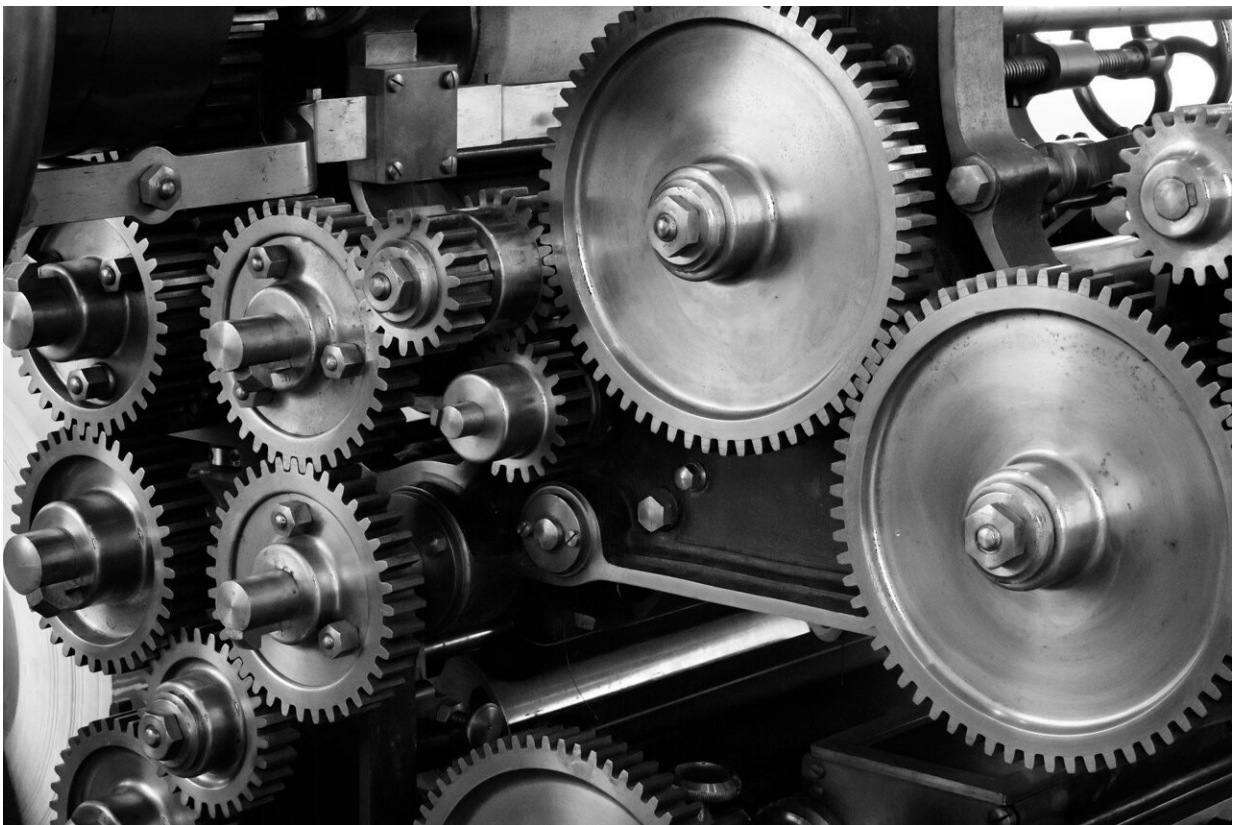


Climate researcher claims 'There are sustainable paths forward for the basic material sector'

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The new UN climate report shows that the zero emissions goal for 2050 is achievable. However, it will require major changes in all sectors—not

least in industry, which currently accounts for a large proportion of global emissions. The researchers identified several sustainable paths forward, but some sectors—above all in plastics and chemicals—are still searching for potential transition routes.

Mitigating climate change is the theme of the third sub-report from the UN climate panel's sixth assessment. Since the fifth assessment eight years ago, the Paris agreement has been added, many countries have made climate commitments and several of them show a sustained reduction in their emissions.

Lars J Nilsson, Professor of Environmental and Energy Systems at Lund University's Faculty of Engineering (LTH) and the coordinating lead author of the chapter on industry in the climate report, says that this, together with [renewable energy](#) becoming cheaper, is a positive trend but, due to overexploitation of energy and natural resources, global emissions continue to rise.

"We need even more sustainable development paths that break out of the rut of rising emissions, resource exploitation and environmental damage—the trend must be reversed immediately so that we can achieve our goal of zero emissions by 2050."

Conversion more difficult for the plastics and chemicals industries

Several alternatives to limit [climate change](#) have been identified for industry: contributing to a reduction in demand for materials, optimizing efficiency for materials and energy, electrification, increased use of hydrogen, development of recycling, increased carbon dioxide capture and sequestration, and new sources for carbon atoms in plastics.

The chemicals industry is facing an additional challenge to conversion, as [fossil fuels](#) are still key to production—both as a source of energy in [chemical processes](#) and as a raw material in chemical products such as plastics.

Fredric Bauer, Associate Senior Lecturer in Environmental and Energy Systems at LTH, and contributing author to the climate report's chapter on industry, says that there are few signs of conversion in the chemicals industry:

"Increasing plastics recycling is a key measure. But as a single initiative, it is insufficient for the industry as a whole to achieve zero emissions. New technology for chemical recycling is also often highlighted as another path forward, but the way processes are currently designed still results in major emissions of greenhouse gases."

Electrification is an important element

However, not all industries encounter the same sustainability challenges as the chemicals industry. A conversion process is now underway in the steel industry to use hydrogen instead of coal and coke in the production of iron.

"Sweden has gained an internationally leading role through plans to build two different production plants for fossil-free steel, based on the use of hydrogen. At the same time, we need to get better at recycling existing steel, as continuous production of new steel is not a sustainable strategy," says Lars J Nilsson.

Steel is an important component in many sectors, not least in the automobile industry, which is striving hard for zero emissions—both in production and recycling and through cars that run on renewable energy.

"Cars that run on fossil fuels are on the way out and increasingly being replaced by electrified alternatives. The cost of producing renewable electrical energy continues to fall, and electrification is an important strategy in our efforts to reduce emissions," says Lars J Nilsson.

Smarter use of materials and more recycling

In addition to electrification, the climate report clarifies that more efficient use of materials and recycling are necessary elements of industrial transition.

"If we can subdue the demand for new production of materials through smarter use of the material and more recycling, we can avoid the energy and emissions-intensive initial process stages where iron ore becomes iron, limestone becomes calcium oxide and crude oil becomes plastic," says Fredric Bauer.

Despite the resources and technical conditions available for a future industry with [zero emissions](#), the researchers at LTH are unanimous in their view that transition won't happen unless companies redirect their strategies and investments.

"We need a new policy on innovation and industry, transparent and standardized accounting of emissions from materials and products, and market-generating measures for green materials—initiatives that are important on the national level as well as the regional and local levels," says Lars J Nilsson.

Summary of chapter 11 on the transition of industry

- Materials use continues to rise in many parts of the world, resulting in increased emissions from the steel, cement and

chemicals industries.

- Subdued demand, more efficient use of materials and better recycling could reduce the need for energy-intensive primary production.
- Electrification, hydrogen, carbon dioxide sequestration and fossil-free sources of [carbon atoms](#) for the chemicals industry are important strategies for the production of new base materials.
- Energy-intensive industries could usefully be located in areas with good access to renewable energy.
- Industry has been relatively protected from climate policy instruments; long-term policy strategies are now needed to bring about transition in industry as well.

Provided by Lund University

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