How to reduce the hidden environmental costs of supply chains

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Global supply chains account for 70% of world trade. They are the arteries of global capitalism, moving goods and services across borders multiple times before reaching consumers.

Since the early 1990s—as part of economic globalization—these networks have enabled mass consumption by delivering cheap goods made using cheap labor and shipped globally at minimal cost. But this convenience comes at a catastrophic environmental price.

The infrastructure that supports global supply chains—ports, highways, railways, data servers—has expanded dramatically, increasing the distance goods travel from production to consumption to disposal. These "supply chain miles" are a major contributor to ecological degradation.

Worse still, managing these sprawling networks depends on energy-intensive digital technologies, produced and distributed through global supply chains. Electronic waste is soaring, reaching 62 million tonnes in 2022 and projected to increase to 82 million tonnes by 2030.

Global supply chains have also driven the expansion of global markets. Argentina's soy industry is a case in point: production surged from under 30,000 tonnes in 1970 to over 60 million tonnes in 2015, largely to feed the world's growing livestock population.

Consequently, much of the Argentinian pampas region—previously renowned for its rich biodiversity—has been decimated by soy monocultures.

As an expert on global supply chains, I study what can be done to remedy this environmentally damaging situation. My research shows that this problem runs deeper than logistics.

Global supply chains are a key part of the capitalist system that thrives on endless economic growth. Competitive capital accumulation (where profits are reinvested to generate more profits) drives this cycle.

The global economy is forecast to more than double by 2050. This

entails an accelerated use of resources and waste generation, in a world that has already transcended an increasing number of planetary boundaries or safe limits of consumption.

While green technologies can hypothetically make supply chains more efficient, enhanced efficiency under capitalism often leads to more production, not less. Efficiency gains can reduce costs, make goods more profitable and stimulate greater investment. Energy-saving lightbulbs and digital tools, for example, have led to broader adoption and higher overall energy use, rather than a decrease in energy demand.

Better tech alone won't reduce environmental harm. We need a shift toward a low-energy economy that prioritizes human and ecological well-being over profit.

Public transport, health care, open-source software and urban food systems are examples of social provision that are often cheaper, more inclusive and more environmentally sustainable than their profit-orientated alternatives.

Greening supply chains

I've identified five practical steps that can reduce the environmental footprint of supply chains.

First, accelerating the transition from fossil fuels to renewables is essential. The Danish Island of Samsø went from fossil fuel dependence to 100% renewable energy by the early 2000s in the space of a decade by constructing and deploying on- and off-shore wind-power and biomass boilers. Scaling up such transitions could power cleaner supply chain infrastructure.

Second, the electrification of shipping means that battery-powered

shipping is no longer science fiction. The Yara Birkeland, the world's first fully electric cargo ship, recently launched with a 100-container capacity. One study suggests that 40% of container traffic could be electrified this decade using existing technology.

Third, by designing for durability and repair, digital and electronic products can be built to last and easy to repair. The "right to repair" movement advocates for consumer rights to fix and repair products rather than having to buy new ones and is gaining traction.

It is challenging corporate control over who can fix what. Six US states have passed laws giving consumers the right to repair their own devices. In the UK, a community initiative called the Restart Project is pushing for stronger regulations and promoting community-based repair initiatives and digital technology sharing.

Fourth, urban transport needs a rethink. Road transport accounts for about 12% of global greenhouse gas emissions. That sector could be streamlined by shifting supply chains from manufacturing millions of cars to investing in efficient and affordable bus, train and bike networks. Car-free cities and expanded electric public transport networks could slash emissions from road transport. This is already happening in places like Ghent in Belgium, Amsterdam in the Netherlands, Lamu Island in Kenya and Fes el Bali in Morocco.

Fifth, supply chains can be shortened by shifting diets. Reducing meat consumption could shrink the global feed-livestock chain the vast complex of animal feed production (such as soy) underpinning the burgeoning world cattle population and its associated transport emissions.

Countries such as Germany, the Netherlands and Denmark have already seen declines in meat consumption over the past decade as plant-based

diets have gained popularity. The UK is also experiencing a fall in per capita meat consumption

These strategies are all tiny steps in the right direction. But, as the US author and environmentalist Bill McKibben says, "winning slowly is the same as losing." We need much greater and more rapid transformations.

So, while parts of supply chains can become more sustainable, any efforts will be counterproductive as long as governments and firms continue chasing endless economic growth. What's needed now is the political and cultural will to prioritize people and the planet over profit.

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