Reinier’s refrigerator, a Soviet manufactured “Minsk,” was not only empty but also hopelessly warm. While food was difficult to come by in the first place, there was little point in storing anything in it because of the power cuts. On Monday June 7, 1993, the blackout started at seven in the evening. According to the timetable that had been published in the provincial newspaper *Guerrillero* the week before, the state utility had shut off the electricity supply to Pinar del Río’s third district already once that day. The current blackout was scheduled for five hours in three of the provincial distribution networks.¹ The city came to a halt, energyless, but for Reinier and his family it was nothing out of the ordinary. Just as food was in short supply, blackouts occurred almost every day of the week, every week, throughout the 1990s. The problem was greater than a blown fuse: it was the collapse of the Soviet Union.

Four decades earlier, Fidel Castro had outlined his visions for a new independent Cuba, promising that once a progressive government was in power, electricity would reach “to the last corner of the Island.”² The revolutionary program of land reform, alphabetization, and improved public health was undergirded by a vision of energy use. Head­ing the Ministry of Industries, Ernesto Che Guevara argued that electrification was necessary

Introduction
for Cuba’s transition to communism. Electricity infrastructure constituted a techno-material base that enabled industrialization and automation. Nationally integrated energy infrastructure overbridged the development gap between the city and the countryside, the wealthy entertainment districts and the poor barrios. By the mid-1980s, a national electricity system—the SEN—interconnected Cuba from Pinar del Río to Guantánamo via Havana, Santa Clara, and Camagüey. In the revolutionary narrative, the infrastructure did historical work: it enabled the modernization of Cuba, reduced social difference, and, on these grounds, induced communism. The Revolution, one might say, had infrastructural form.

A series of thermoelectric power plants powered up the SEN, and they were named after heroes of the Cuban anti-colonial struggle. In a thermoelectric plant, an energy-potent material—often a fossil fuel—is put on fire. Some of the resulting heat is used to turn water into steam. The steam is led into a turbine, which is connected to a generator that converts mechanical energy into electricity. The state utility Unión Eléctrica made use of fuel oil to set this chain of events in motion. Following a first trade deal in 1960, the revolutionary government imported fuel oil from the Soviet Union in exchange for sugar. As Figure 1 shows, Cuba imported 13.3 million tons (Mt) of oil in 1989, almost all of which originated from oilfields in West Siberia. In the 1980s, the socialist state also launched a nuclear program aiming to replace the oil-fired energy system with one based on nuclear energy. Both Cuban and Soviet leaders spoke of their exchanges as expressions of socialist fraternity and fair trade: “The USSR has given our people terms of commercial exchange and long-term credits that constitute a true model for relations between a large industrial country and a small nation,” Fidel Castro declared to a mass crowd during the first visit of a Soviet head of state to Cuba. “One million Cuban patriots express . . . their indestructible friendship, deep affection and eternal gratitude to the USSR,” he said before the sea of people broke into chants of “Brezhnev, Brezhnev!” and “United Cuba and the USSR will win!” Cuba’s power plants, the oil they combusted, and the oil’s terms of exchange were part of an imaginary of national liberation and socialist development, and the infrastructural system operated not only technically but also in the political economic and the semiotic domains.

As Figure 1 also shows, the situation changed dramatically in 1990. Between 1989 and 1995, Cuba’s imports of crude oil decreased by 86 percent.
and the availability of oil derivatives—fuel oil, diesel, kerosene, gasoline, and liquefied petroleum gas (LPG)—declined by 47 percent (1989–93). There were four geopolitical reasons behind the energy crisis. First, Cuba lost its beneficial oil trading agreement as a result of the Soviet collapse. This loss coincided, second, with spiking international oil prices following Iraq’s invasion of Kuwait; third, with a slump in the sugar market; and fourth, with the US government reinforcing its economic blockade of the island. In workplaces and households, the effects were direct and far reaching. After more than a century of sugar monoculture and decades of mechanized farming, the island’s cane fields were lifeless without synthetic inputs. Tractors and trucks were immobile without diesel and gasoline. The state’s reserves of kerosene and LPG, rationed for cooking purposes, ran out in 1993. In the SEN, the electricity supply was at best intermittent. While Cubans were forced to adapt to a new low-carbon reality, Fidel Castro announced that the country had entered a “special period in times of peace.”

The situation slowly improved before disaster struck again. This time the shock was climate related rather than geopolitical. In August 2004, hurricane Charley wreaked havoc in western Cuba; “never before had the province been in such conditions,” Guerrillero summarized the events once the worst was over. Hurricane Charley disconnected the entire province of Pinar del Río from the SEN, leaving more than six hundred thousand people without electricity for eleven days. At this time, new oil supplies were arriving in Cuban ports from Venezuela, in large part in exchange for Cuban medical services, which reflected Hugo Chávez’s bid to create a Caribbean anti-imperialist trade alliance. Nevertheless, the collapse of the electricity system prompted a drastic overhaul of Cuba’s energy infrastructures. In 2005, Fidel Castro announced that the country would go through a nationwide Energy Revolution, territorially decentralizing the electricity infrastructure while decarbonizing the economy by over a third. In reaching this goal, the Energy Revolution also did something more: it fundamentally changed the political nature of the socialist state.

THE LOW-CARBON CONTRADICTION

Cuba’s post-Soviet experience figures vividly but often anecdotally in discussions on energy transitions. In Societies beyond Oil, John Urry refers to the “Cuban miracle,” asserting that Cuba has a life expectancy on a par with the United States but “uses only about one-tenth of the USA’s energy per person.” In 2006, the Worldwide Fund for Nature reported that Cuba was the only country in the world to combine a high Human Development Index with an ecological footprint kept within the limits of the biosphere, thus making it the only country to have achieved “sustainable development.” When a new Sustainable Development Index (SDI) was developed in 2015, Cuba was again ranked first in global comparison. Many authors frame Cuba’s special period in a narrative of simulated “peak oil”—the point in time when the availability of oil enters a terminal decline. Running with this metaphor, Cubans are said to have encountered an “abrupt and imposed” oil peak in the 1990s, after which they developed a low-carbon economy on the basis of economic and social reform rather than high-tech innovation. While peak oil represents a point in time when oil
production reaches its maximum level—an apex rather than a historical low—the special period can provide an approximate understanding of the effects of declining oil supplies at the local and national levels. Based on these accounts, then, Cuba’s post-Soviet history appears to offer a model for a radical low-carbon transition.

The agricultural sector has been the predominant focus for studies of Cuban low-carbon development. The revolutionary government imported food from the socialist bloc during the Cold War, freeing up space for sugar production, but the geopolitical upheavals in the early 1990s forced it to cut back on its rationing of food. It was difficult to increase the national levels of food production since the long-standing use of synthetic pesticides and fertilizers made it hard to farm the island’s impoverished soils without them. While Cubans lost weight, a neuropathy epidemic—a neurological disorder affecting the eyes—spread in the country, likely resulting from vitamin-B deficiency. In response, many farmers began employing agroecological methods in rural areas, to farm without agrichemical inputs, while a popular movement of organic urban agriculture emerged in cities. In 2021, the government’s plan target was for 10 m² per inhabitant to be cultivated in urban and suburban farms. This process of agrarian change, which according to one sympathetic observer was “the largest conversion from conventional agriculture to organic and semi-organic farming that the world has ever known,” went hand in hand with conversations on food sovereignty and the development of horizontal knowledge sharing networks among small farmers.

Cuba’s post-Soviet experience is also mooted by advocates of degrowth. The call for degrowth starts with the observation that exponential economic growth ultimately is impossible to sustain on a planet with a limited biosphere. As Vaclav Smil shows, the historical data are unequivocal: up to the present, the levels of economic growth, energy consumption, and carbon emissions have followed the same incremental curves almost exactly. In order to transition to a low-carbon economy at a time when the global mean temperature is already increasing fast, Smil argues that this close coupling “makes it highly misleading to advocate any growth-oriented policies [even] assuming that . . . decoupling, and continued GDP growth, is possible.” For Giorgos Kallis and colleagues, it is fossil fuels that have made a history of growth possible. If energy is a “source
of useful work,” fossil fuels have enabled growth by doing “things human labor alone could not do.” A low-carbon economy is therefore likely to be one of reduced productivity and output, seeing that renewables are more diffuse in space than fossil fuels are. The argument for degrowth is usually pitted against capitalism, the very foundation of which is capital accumulation, but it is necessarily also an argument against the socialism that developed in Cuba, the Soviet bloc, and China in the twentieth century. The state-socialist aim was to spur rapid industrialization and to outcompete the capitalist West in the pursuit of “development.”

The special period adds further impetus to the degrowth critique: without a continuous supply of oil, Cubans were unable to sustain the socialist economy founded on growth. While most mainstream approaches to sustainable development treat the biosphere and the economy as complementary and substitutable dimensions of human activity, the economy may therefore better be conceptualized as a subsystem of the biosphere. Discussing the SDI, Jason Hickel details that within this model a country’s level of income is so strongly coupled with a large ecological footprint that high income precludes the country from being ecologically sustainable. The SDI therefore incorporates a threshold so that countries with relatively low levels of income, such as Cuba, score more highly, all other things being equal. If Hickel’s observation is correct, the countries with the highest levels of income could only become sustainable if they significantly de-grew their economies, reducing the throughput of energy and raw materials in production and consumption.

The degrowth goal “is to build a society in which we can live better whilst working less and consuming less.” Such a project requires radical material changes to occur in economic processes at all scales, and particularly in the parts of the globalized economy with the highest rates of consumption. However, a smaller metabolism is only one aspect of successful degrowth. Seeing that growth is the backbone of the Western development paradigm, in both its capitalist and socialist iterations, a community pursuing degrowth would have to redefine the primary drivers of the economic process to instead base it on a cultural ideal of a “good life” other than growth-based modernity. As Federico Demaria and Ashish Kothari write, “In a degrowth society everything will be different from the current mainstream: activities, forms and uses of energy, relations, gender roles,
allocations of time between paid and non-paid work, and relations with the non-human world.²¹

The degrowth critique sustains a narrative in which absolute planetary boundaries, the stability of the global climate system, and the laws of thermodynamics variously are emphasized as the limiting factors to exponential growth. On the one hand, the reading of Cuba’s post-Soviet history in terms of a simulated peak oil scenario ties into this narrative, reflecting the argument that Cubans have adapted to a set of externally imposed biophysical limitations. On the other, the narrative echoes Malthusian arguments of old, such as those set out in the Club of Rome’s report *Limits to Growth*, which suggest that humans either must adapt to absolute biophysical limits or else succumb to them.²² However, more than insist on the existence of absolute limits, the degrowth proposal calls on communities to impose limits on themselves. Instead of reacting to an externally imposed limit, a community empowers itself to develop new forms of socio-ecological organization through a process of voluntary self-limitation.²³ The Cuban case is particularly interesting in this regard, because the biophysical limits to growth were not absolute but socially produced—they were geopolitically imposed—and possibly Cuba’s special period can offer important insights on a degrowth future.²⁴

It is important in this context to recognize that degrowth is not tantamount to economic recession; rather, it is an endeavor to organize economic life beyond the growth imperative, allowing production and consumption to take place under qualitatively different conditions.²⁵ In this sense, Cuba’s post-Soviet history is an imperfect example of degrowth. While many Cubans built toward low-impact livelihoods, the special period was far from a voluntary political project, and the growth imperative has remained at the core of the Cuban Communist Party’s (PCC) economic program. Thus, while many aspects of Cuba’s special period can be interpreted in a degrowth framework, it is often closer to hand from the perspective of Cuban government and Party policy to argue that Cuba offers a window on efforts to develop an eco-socialist economy. As opposed to degrowth, this is a political vision in which growth and large-scale infrastructure are seen as the requisite conditions for economic development and social equality. Growth creates an abundance that can be shared equitably among its producers. The history of revolutionary Cuba is replete with examples of