

## GREEN ECONOMY

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Ecological economics views the economy as a subsystem of the planetary ecological system, fundamentally limited by the physical realities of that planetary system. This has always been true, but it was possible to neglect the implications of this basic truth so long as human economic activity was at a relatively low level relative to planetary capacity—allowing economic theorists to take what Herman Daly has referred to as an “empty world” rather than a “full world” perspective (Daly, 1974, 1993). This perspective, typical of neoclassical economics, essentially ignores or minimizes resource and environmental constraints. In the twenty-first century, this approach is no longer possible.

Since about 1950, there have been substantial increases in global population, energy use, and carbon emissions—more than threefold for global population and more than sixfold for energy use and carbon emissions. This has led to an intensifying climate crisis, and parallel crises have emerged in other resource and environmental areas, including issues of overdraft of water resources, decline of forests and wetlands, degeneration of agricultural soils, ocean pollution, fisheries decline, and biodiversity loss (United Nations, 2019; IPCC, 2021). Even with optimistic forecasts of population stabilization, these consumption-generated pressures on the global ecosystem can be reliably forecast to increase further during the twenty-first century.

An ecological economics perspective thus implies a drastic change in the nature of economic production as the period of steady economic growth, characteristic of the past 200 years and especially of the last 75 years, necessarily comes up against firm ecological limits. Changes in production systems that are essential for a “green” economy include:

- Shifting agricultural practices away from current patterns of heavy reliance on chemical inputs; development of regenerative agricultural systems to build up soil productivity and carbon content, conserve water, and integrate crop production with agroforestry and sustainable livestock systems.
- Eliminating fossil fuel dependence through a rapid transition to renewable energy sources and energy efficiency, with a goal of net zero carbon emissions.
- Development of “circular economy” practices for reuse and recycling of resources, with elimination of chemical and plastic waste entering the environment.
- Sustainable management of forests and wetlands, preserving or expanding current area in forests and wetlands while eliminating destructive harvest practices, and significantly expanding forest carbon storage.
- Sustainable management of fisheries, including consideration of impacts on non-harvested species.

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- Conservation of species diversity, with major areas being set aside for conservation and modified management of “buffer” areas to protect ecosystems and species diversity.

An important issue is whether these changes are possible in the context of continuing economic growth. In theory, “absolute decoupling” – reducing overall resource inputs, specifically carbon-based fuels— may be possible while still “growing” the economy. Advocates of “degrowth” argue that absolute decoupling is unlikely, meaning that consumption in developed nations must be reduced if carbon reduction targets are to be achieved. “Relative decoupling” – reducing the carbon intensity of the economy – has been adopted as a goal by some major developing economies such as China and India, where consumption is still growing. Both in developed and developing economies, major changes will be required to redirect economic activity away from a carbon-intensive path. A similar logic applies to other major ecological constraints including water supply, soil fertility, species diversity, and ocean ecosystems (Harris, 2019a).

The United Nations Environmental Programme green economy initiative, “promoting the transition to economies that are low-carbon, resource-efficient, and socially inclusive” (UNEP, 2011, 2018) includes policy recommendations such as:

- Using taxes and other market-based instruments to internalize negative externalities.
- Decreasing government spending and subsidies that deplete natural capital.
- Implementing rigorous efficiency and technology standards.
- Phasing out polluting industries while developing and phasing in green technologies.
- Supporting an employment transition for affected workers, providing training for displaced workers to gain new jobs in the green economy.
- Strong international agreements to deal with global environmental issues such as climate change and ozone depletion.

Green Economy initiatives have been taken up in the United States and the European Union, under the rubric of the Green New Deal (GND) and the European Green Deal. The GND takes its inspiration from the original New Deal under Franklin Roosevelt that countered mass unemployment in the 1930s. It envisions an ambitious national mobilization to achieve net-zero greenhouse gas emissions through investments in energy efficiency, renewable energy, zero-emission vehicles, high-speed rail, and other infrastructure, with a goal of achieving net-zero emissions no later than 2050.

Economists who have analyzed the Green New Deal note that cost and benefit estimates depend on which specific proposals are included. Initial costs for many aspects of the program may be quite low, since energy efficiency and renewable energy are already very economically viable (Harris, 2019b). Getting to the goal of net zero emissions is more difficult.

Robert Pollin proposes that reaching 80% renewables by 2035 and 100% renewables by 2050 is “realistic if very, very challenging”, and would be compatible with the Paris Climate Agreement targets (Pollin, 2015). Edward Barbier calls for the U.S. to invest about \$200 billion annually to address climate change, funded by a carbon tax and elimination of fossil fuel subsidies, and possibly a tax on the highest-income earners (Barbier, 2019).

Renewable energy is not a panacea, since “renewable” refers only to the energy source and not to the materials that are required to build the structures (e.g., solar arrays and wind turbines) These materials are not renewable and only partially recoverable, reusable and recyclable. Thus a transition to renewables needs to be accompanied by expansion of methods for net carbon removal, whether nature-based or artificial. The greatest known potential lies in carbon storage in agricultural soils, forests, and wetlands; artificial carbon removal is more speculative.

A key element of GND plans is job creation. A transition away from fossil fuels means that jobs will be lost in the coal, oil, and gas sectors, but new job creation in other sectors, such as solar energy, is expected to be much larger. This still leaves a significant problem of transitional aid, since those who lose jobs in one sector will not necessarily be able to regain them in another. In some cases retraining is required; in other cases different kinds of job creation, for example in environmental restoration of areas damaged by strip mining, or expansion of rural health care, may be appropriate (Brown & Ahmadi,2019).

The European Green Deal has a goal of net zero greenhouse gas emissions by 2050. Strategies include decarbonizing the energy sector, expanding public transit, promoting energy efficient buildings, and investing in environmentally friendly technologies. The EU also promises to “provide financial support and technical assistance to help those that are most affected by the move towards the green economy” (European Commission, undated).

The concept of a “green economy” implies that improved human well-being and reduced inequality can be achieved through investments that reduce environmental impacts and promote a transition to sustainable forms of production. The common perception that protecting the environment is detrimental to the economy is not borne out by numerous studies. Strong environmental regulations often involve some economic costs, but evidence indicates that the benefits of environmental regulations far exceed their costs. Rather than leading to job losses, protecting the environment through well-designed policies can actually be a source of net job creation (Harris & Roach, 2022).

While creating a green economy will entail short-term costs, the long-term economic and environmental benefits are projected to be much greater. The transition to a green economy will require strong policy action, including increasing investment in renewable energy and regenerative agriculture, eliminating harmful subsidies, retraining workers for green industries, using economic policy instruments such as taxes and tradable permits, and strengthening international agreements that protect the environment (Richardson ed., 2013).

Whether a green economy is compatible with “green growth” is controversial. Some analysts believe that the green growth concept makes sense provided that natural capital – the resources and environmental services that support the economy – can be fully accounted for and maintained: “Moving to inclusive green growth necessitates a rigorous understanding of the significance and values of natural capital for human well-being. Whether in the public or private sectors, decision makers will need to be persuaded of the benefits from major investments in nature and nature-based solutions compared to their costs” (Mandle et al. eds., 2019). Others argue that “green growth” is an oxymoron: “There’s no question that economic growth depends crucially on what nature provides for human economies to function and grow. . . there is compelling evidence that economic growth is stressing nature’s capacity beyond its limits” (Victor, 2019).

One review of the literature on the relationship between economic growth and sustainability concludes that “green growth paths are unlikely to be sustainable,” mainly because carbon

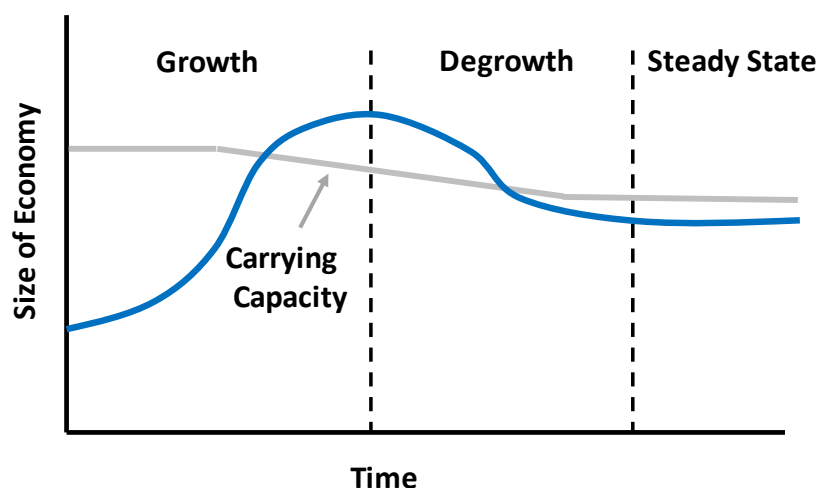
emissions will fail to fall quickly enough to meet global climate objectives (Kallis et al., 2018). A review of decoupling studies reached a similar conclusion, detecting no “economy-wide resource decoupling, neither on national nor international scales.” The authors recommend that “more attention should be given to conceptualisations of economy that do not rely on economic growth as the key route towards ecological sustainability and human wellbeing” (Vadén et al., 2020).

Given the limitations of green growth, an alternative path to sustainability is a fundamental reorientation of developed economies away from continual economic and material growth. This path was first advocated by Herman Daly, one of the founders of ecological economics, in the 1970s (Daly, 1974, 1993) with his proposal for a steady state economy (SSE). Daly defined the three main characteristics of an SSE as:

- a stable human population
- a stable stock of physical resources
- a minimum throughput (combined input and output) of materials and energy

Other ecological economists have called for a transition to a “post-growth” economy that would emphasize sustainability rather than further economic growth (Jackson, 2017). An economy experiencing degrowth is presented in Figure 1. As this hypothetical economy experiences exponential economic growth it eventually outstrips its ecological carrying capacity, causing a reduction in ecological resilience. The size of the economy reaches a peak, and then a period of degrowth occurs, either because of conscious policy, or due to an “overshoot and collapse” syndrome. Eventually the ecosystem stabilizes at a new, though lower, carrying capacity. Once the size of the economy once again falls within carrying capacity, an economic steady state can be maintained. A particular steady-state level need not be indefinite – as ecological conditions change, the level of economic activity can be adjusted upward or downward as needed.

**FIGURE 1**



Source: Harris, Jonathan M., and Brian Roach. 2022. *Environmental and Natural Resource Economics: A Contemporary Approach*, 5th ed. Chapter 22: Policies for Sustainable Development. New York and London: Routledge.

A possible resolution of the “green growth” versus “degrowth” argument could be to apply the degrowth principle only to certain resource and energy-intensive sectors of the economy. Reducing or eliminating consumption of fossil fuel energy, resource-intensive agriculture, single-use plastics, etc., could allow for expanding regenerative agriculture, renewable energy, social services, health, education, etc.

In this way the effect on overall economic growth would be indeterminate, depending on the relative rates of decrease and increase in output of different economic sectors. In general, a focus on sustainable systems and human services would be associated with more labor-intensive methods, leading to higher employment. This could reduce GDP growth as traditionally measured, but numerous alternative measures of economic welfare indicate that GDP is not the optimal measure of economic success (Harris and Roach, 2022). A green economy would therefore be consistent with expanded employment and improved human well-being.

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