



Benefits of Renewable Energy Use

Source: “[U.S. Renewable Energy Technical Potentials: A GIS -Based Analysis](#)”, National Renewable Energy Laboratory. July 2012.

Renewable energy — [wind](#), [solar](#), [geothermal](#), [hydroelectric](#), and [biomass](#) — provides substantial benefits for our climate, our health, and our economy:

- [Little to No Global Warming Emissions](#)
- [Improved Public Health and Environmental Quality](#)
- [A Vast and Inexhaustible Energy Supply](#)
- [Jobs and Other Economic Benefits](#)
- [Stable Energy Prices](#)
- [A More Reliable and Resilient Energy System](#)



Each source of renewable energy has unique benefits and costs; this page explores the many benefits associated with these energy technologies. For more information on their potential impacts — including effective solutions to mitigate or avoid them entirely — see [The Environmental Impacts of Renewable Energy Technologies](#).

A Vast and Inexhaustible Energy Supply



Throughout the United States, strong winds, sunny skies, plant residues, heat from the earth, and fast-moving water can each provide a vast and constantly replenished energy resource supply. These diverse sources of renewable energy have the technical potential to provide all the electricity the nation needs many times over.

Estimates of the technical potential of each renewable energy source are based on their overall availability given certain technological and environmental constraints [8]. In 2012, NREL found that together, renewable energy sources have the technical potential to supply 482,247 billion kilowatt-hours of electricity annually (see Table 1). This amount is 118 times the amount of electricity the nation currently consumes. However, it is important to note that not all of this technical potential can be tapped due to conflicting land use needs, the higher short-term costs of those resources, constraints on ramping up their use such as limits on transmission capacity, barriers to public acceptance, and other hurdles.

Table 1:			
Renewable Resource	Electricity Generation Capacity Potential (gigawatts)	Electricity Generation Potential (billion kilowatt-hours)	Renewable Electricity Generation as Percent of 2012 Electricity Use
Wind			
Land-Based	10,955	32,784	809%
Offshore	4,223	16,976	419%
Subtotal	15,178	49,760	1,227%
Solar			
Photovoltaics	154,856	283,664	6,997%
Concentrating Solar Power	38,066	116,146	2,865%
Subtotal	192,922	399,810	9,862%
Bioenergy			
Subtotal	62	488	12%
Geothermal			
Hydrothermal	38	308	8%
Enhanced Geothermal Systems	3,976	31,345	773%
Subtotal	4,014	31,653	781%
Hydropower			
Existing Conventional	78	277	7%
New Conventional	60	259	6%
Subtotal	138	536	13%
Total	212,314	482,247	11,896%

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Today, renewable energy provides only a tiny fraction of its potential electricity output in the United States and worldwide. But numerous studies have repeatedly shown that renewable energy can be rapidly deployed to provide a significant share of future electricity needs, even after accounting for potential constraints [9].