

The Future of Renewable Energy

# What Is the Future of Hydrogen Power?

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# What Is the Future of Hydropower?

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# Hydropower Can Help Replace Fossil Fuels

“Hydropower is the only renewable source of energy that can replace fossil fuels’ electricity production while satisfying growing energy needs.”

— Agriculture and Rural Development of Alberta, Canada, which oversees Alberta’s agriculture and food industries.

Government of Alberta [Canada], Agriculture and Rural Development, “Hydroelectric Power,” May 27, 2010. [www1.agric.gov.ab.ca](http://www1.agric.gov.ab.ca).

Although hydropower is an inexpensive and environmentally friendly form of energy, it is often overlooked as an energy source. In particular, hydroelectricity can be overshadowed by the widespread use of fossil fuels such as oil, coal, and natural gas. In today’s society, these materials account for over 85 percent of the world’s total energy production. Because of fossil fuels’ importance, coal, natural gas, and oil are a main focus of energy planners, power companies, and the general public. The news is full of information about rising gasoline prices and concerns about natural gas supplies. News stories about hydropower, in contrast, are more difficult to find.

At the same time, however, hydropower is also discounted by many people whose interest lies in nontraditional fuel sources. In particular, hydropower is typically ignored in favor of wind and solar energy. In the popular mind, these two forms of energy are nearly synonymous with terms like *renewable energy* and *green power*. Certainly each has attracted a great deal of attention in the modern world. Indeed, both solar and wind power are routinely described as fashionable, up-and-coming sources of energy. One energy corporation refers to wind power as “the trendy energy alternative,”<sup>5</sup> for example, and another describes solar energy as “hip [and] cool.”<sup>6</sup> Few observers describe hydropower in similar terms.

Despite the lack of attention it receives, hydroelectricity is nonetheless an important source of energy in today's world. Already, an estimated 20 percent of the globe's electricity is generated from hydroelectric plants. In some countries, notably Norway and Paraguay, virtually all electricity comes from hydropower. In other nations, including Brazil and Canada, hydropower accounts for over half the electricity produced. And even in the United States, where just 6 percent of the electricity is obtained from hydroelectric plants, hydropower makes up an important share of electricity production in states such as Oregon, New York, and Idaho. Without hydropower, the world would have less energy and would pay more for it.

In the future, moreover, hydropower's importance is almost certain to rise. One reason is simply that fossil fuels will not last forever. Most current estimates suggest that about half the world's oil supplies have already been used up, with significant amounts of the remainder locked away in places where it is difficult to reach—and may not be cost-effective to recover. Moreover, global demand for oil and other fossil fuels has skyrocketed in recent years, in large part because of the growing economies of high-population countries such as India and China. The result is that the world's supplies of oil, coal, and natural gas are being depleted at an ever increasing rate—and someday will run out altogether.

**“Most renewable technologies other than hydroelectricity are not able to compete economically with fossil fuels.”<sup>9</sup>**

—US Energy Information Administration.

### **The Need for Alternatives**

Some energy experts argue that the world is already feeling the effects of a dwindling supply of fossil fuels. One natural result of a declining supply is a rise in cost. As fossil fuels become scarcer and more in demand, it makes sense that their cost would increase—as indeed it has been doing in recent years. “As the 20th century turned into the 21st century,” notes energy analyst Samuel R. Avro, “gas prices began to spike at an incredible rate . . . an astronomical 243 percent rise in under 15 years.”<sup>7</sup> This increase in

The link is clear: Places that rely on hydropower production often have lower electrical rates than places that do not. There are exceptions, of course. Some countries that produce a great deal of oil, for instance, also have low electricity costs despite generating little or no hydroelectricity. But for the most part the connection between low electrical rates and hydropower generation is real—and far from a coincidence. Hydropower is a cheap form of energy, one of the cheapest available today. Places like Idaho and Paraguay enjoy low electricity prices in large part because so much of their energy comes from hydropower.

### **Reliable and Renewable**

Hydropower is cheap for a number of reasons. One of these involves the renewability of water. When oil, coal, or natural gas are burned to create heat and light, those fossil fuels are destroyed forever. To continue to produce power from these materials requires getting more of them, and getting more requires plenty of money. Oil must be pumped up from hidden reservoirs; coal must be dug out from under the ground. The labor costs involved in obtaining these resources are enormous. Then the raw materials must be transported to refineries and power plants—an expensive proposition as well. The cost of transportation makes up close to 20 percent of the price of coal, for example.

In comparison, the water that flows past hydroelectric turbines is continually replenished. No one needs to locate a new water supply once one day's flow has been converted to electricity. Nor is it necessary to transport the water from one place to another. By eliminating the need to dig up fuels and transport them long distances, hydropower avoids significant costs invariably associated with electrical production from fossil fuel sources. And because electricity from hydropower costs less to produce, it can usually be sold for less.

The reliability of hydropower also helps make it an inexpensive source of electricity. Though the water level in rivers does fluctuate according to the amount of rainfall and the time of year, the volume and speed of river water is usually enough to produce a steady supply of energy. Except in times of extreme drought or in cases when emergency maintenance is



## The Projected Cost of Hydropower Compared with Other Energy Sources

Hydropower is currently one of the cheapest available energy sources. The US Energy Information Administration uses a metric called *levelized cost* to compare the costs of different fuel sources. Levelized cost includes the actual cost of power generation, along with other factors such as the capital cost of building the power plant. This chart gives the levelized costs of six different energy sources used in the United States. The information is given for power plants that would open in 2016, and the costs are national averages. The lower the levelized cost of a given energy source, the less expensive the energy will be.



Source: US Energy Information Administration, *Levelized Cost of New Generation Resources in the Annual Energy Outlook 2011*, November 2010.

# Related Organizations and Websites

## **American Rivers**

1101 Fourteenth St. NW, Suite 1400

Washington, DC 20005

phone: (202) 347-7550 • fax: (202) 347-9240

website: [www.americanrivers.org](http://www.americanrivers.org)

An advocacy organization lobbying on behalf of rivers and river systems in the United States and elsewhere, American Rivers often opposes new dam projects; it also works to mitigate the environmental problems caused by existing hydroelectric complexes.

## **Canadian Hydropower Association**

340 Albert St., Suite 1300

Ottawa, ON, Canada K1R 7Y6

phone: (613) 751-6655 • fax: (613) 751-4465

website: [www.canhydro.org](http://www.canhydro.org)

This is a trade organization that represents members of the hydropower industry in Canada, which produces more hydroelectricity than any nation but China. Much of its time and effort is spent lobbying on behalf of hydroelectric development.

## **Hydropower Reform Coalition**

1101 Fourteenth St. NW, Suite 1400

Washington, DC 20005

website: [www.hydroreform.org](http://www.hydroreform.org)

The Hydropower Reform Coalition is dedicated to changing the way hydropower plants are designed and inspected. Its particular focus is on improving the health of rivers.



# For Further Research

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