

The Future of Hydropower and its Untapped Potential

Hydropower, compared to solar- and wind-generated power, is the leading source of “green energy,” representing more than 92 percent of all renewable energy generated and accounting for nearly 20 percent of the world’s electricity. According to the International Energy Agency (IEA), the current capacity could be tripled if all available resources were harnessed.

While it remains to be seen whether or not hydropower globally will continue to increase as projected, the World Energy Council predicts capacity will double by 2025. If adapted in a sustainable manner, hydropower provides one of the most effective methods to achieve a renewable energy future. However, there will be challenges – not the least of which is ensuring that hydropower is developed in an economic, responsible and sustainable manner.

Economic Viability

The incredible potential for increased hydropower capacity is especially evident in emerging economies and developing countries where large and small hydropower projects have the ability to improve access to modern energy services, which in turn can alleviate poverty and foster economic development.

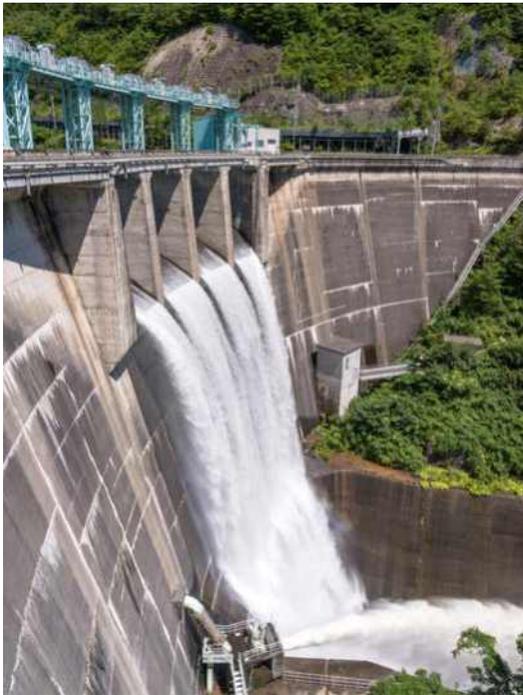
Countries like Turkey, for example, continue a rapid expansion in its hydropower sector to meet significant growth in population and subsequent electricity demand. Fueled by a combination of abundant resources, a supportive government, and favorable policy framework, Turkey is among the top 10 countries for hydropower capacity.

Another example is Norway, known as one of Europe’s poorest countries a century ago. Norway is now a highly industrialized, self-reliant and wealthy nation attributed mostly to its ability to be energy independent. Nearly 99 percent of Norway’s electricity supply comes from the electricity generated by its hydropower plants.



In the U.S., the U.S. Army Corps of Engineers (USACE) own and operate 75 hydropower plants. This is nearly one-third of the nation's total hydropower output: enough energy to serve about ten million households.

And while this certainly sounds positive for the industry, there are about 78,000 existing dams that don't have hydropower, according to the department of Energy's Oak Ridge National Laboratory study. These dams don't produce electricity; they just hold back water for things like flood control, irrigation, and navigation. However, with an infrastructure already in place, they are quickly gaining the attention of energy officials as an untapped resource for renewable energy.



Experts agree retrofitting and using existing infrastructure is definitely the best way to go about finding new hydropower energy without building new dams or creating additional disruptions and diversions to waterways. Electrifying just the primary locks and dams on the Ohio, Mississippi, Alabama and Arkansas Rivers that are operated by the USACE would generate enough electricity for nearly three million more homes and create thousands of jobs.

In addition to propelling growth, economic development and overall expansion, hydropower generation benefits consumers through lower electricity costs. On average, consumers in the U.S. have energy bills that are lower than the rest of the country. Relying only on the power of moving water, hydropower prices don't depend on unpredictable changes in fuel costs or the weather-related variables that solar and wind power contend with.

Environmental Sustainability

Hydroelectricity is classified as a clean, renewable energy source. It is climate-friendly, generating power without producing air pollution or toxic by-products. Using hydropower avoids approximately 200 million metric tons of carbon pollution in the U.S. each year – equal to the output of over 38 million passenger cars according to the National Hydropower Association.

GGB Brasil
Avenida Gupê, 10767
Barueri - SP, 06422-120
T: +55 11 4789 9070
F: +55 11 4789 4433
E: brasil@ggbearings.com
www.ggbearings.com

The production of hydroelectricity reduces the production of greenhouse gases (GHG) compared to power plants driven by gas, coal or oil. While only 33 percent of the available hydroelectric potential has been developed, today hydroelectricity prevents the emission of GHG corresponding to the burning of 4.4 million barrels of petroleum per day worldwide, according to a U.S. geological study conducted by the U.S. Department of the Interior. Reduction of atmospheric pollution also impacts the acidification of rain, soil and aquatic systems.

Along with impacting the air we breathe, hydropower also impacts our drinking water. Hydroelectric reservoirs provide a benefit in collecting rain water, which can then be used for consumption or for irrigation. In storing water, they protect the water tables against depletion and reduce vulnerability to floods and droughts.



GGB's commitment to responsible environmental stewardship extends to its products. GGB's self-lubricating, maintenance-free bearings have less impact on the environment by replacing heavy, bulky, greased or oiled bearings with those that require no additional lubrication that in turn reduce river pollution by hydropower plants. For example, hydropower plants with bearings that require lubrication are injected with

lubricants every 15 minutes. [GGB self-lubricating bearings](#) do not require those injections, thus they alleviate the risk of contaminating waterways.

The hydropower industry is committed to safeguard the environment through sound business practices, and by preventing pollution and minimizing waste through recycling. Additionally, the industry is committed to better understanding and mitigating the impacts dams can have on local ecosystems and fish, with hundreds of millions of dollars invested each year in environmental enhancements at hydropower facilities.

GGB Brasil

Avenida Gupê, 10767

Barueri - SP, 06422-120

T: +55 11 4789 9070

F: +55 11 4789 4433

E: brasil@ggbearings.com

www.ggbearings.com

The Future of Hydropower

Current and future policies and regulations designed to limit energy related emissions of airborne pollutants are likely to affect the structure and growth of global energy use. Future policy actions to limit human-caused carbon dioxide emissions as a means of reducing the potential impacts of climate change could also have significant energy implications.

An example of this is the recently signed Paris Agreement. In December 2015, 192 nations vowed to embrace the important role that ecosystems, biodiversity, and land use can play in reducing GHG and helping communities and countries reduce risks and adapt to climate change impacts.

In order to reach these ambitious goals, appropriate financing, a new technology framework and an enhanced capacity building framework will need to be put in place, thus supporting action by developing countries and the most vulnerable countries, in line with their own national objectives.

It is still early to understand what the full impact of the agreement will be in an increasingly nationalist political environment; although the Paris Agreement has sent a strong signal globally that we are entering a new, low-carbon era.

In Conclusion

GGB remains committed to environmental and social sustainable hydropower projects of all sizes and types. Additionally, GGB is fully aware of hydropower's role in the affects of climate change and efforts to mitigate hydropower's adverse affects on the world's ecosystem.



With over 100 years of experience in bearing applications and as the world's leading manufacturer of high performance, self-lubricating and pre-lubricated bearings, GGB delivers solutions for [hydropower and other renewable energy industries](#). GGB's industry-leading R&D, testing capabilities and expertise is always accessible thanks to a global network of engineers, manufacturing facilities, sales offices and distributors.

For more information, please contact hydro@ggbbearings.com or visit www.ggbearings.com.

GGB Brasil

Avenida Gupê, 10767
Barueri - SP, 06422-120
T: +55 11 4789 9070
F: +55 11 4789 4433
E: brasil@ggbearings.com
www.ggbearings.com