

Referring to the map on page 1, it is relevant that the countries of USA and Australia have no long term plans to build major dams and hydro electric schemes.

Both countries are subject to devastating weather conditions, and have been for centuries. Climate change has only accelerated the frequency and magnitude of events, yet there appears to be no long term infrastructure upgrades in the 'pipeline'.

Plans for industry include massive data centers, transport infrastructure and manufacturing industry growth, but to date, there have been no apparent plans for the basic commodities of Water and Power.

Notably, Eastern Europe, Asia and Africa have major projects underway, with many more projects awaiting permissions and financing.

Infrastructure needs to maintain parallel growth with Industry. Currently, Infrastructure is holding growth back, costing the economy trillions of dollars and forcing manufacturers to more balanced economic climates.

Perhaps the billionaires need to consider investing in larger scale projects that will foster growth in their own, and associated industries.



**INFRASTRUCTURE  
WATER**

# **DAM WATERS**

**RESEARCH  
OPINION**



Massive dams and large water storage systems deliver reliable, renewable electricity through hydropower while providing flood control, irrigation support, and water supply for cities and industry. These multipurpose reservoirs also enhance navigation, recreation, and economic resilience by regulating seasonal water variability.

### Electricity generation

Hydropower from large dams supplies baseload power with high capacity factors, often exceeding 40–50%, and features quick ramping for grid stability. In the US alone, dams produce over 100 GW, equivalent to more than 300 TWh annually, with minimal fuel costs and emissions once built. Reservoirs enable pumped storage, which stores excess renewable energy (e.g., from solar/wind) and dispatches it during peaks, improving overall system efficiency.

### Flood control

Dams temporarily store floodwaters, releasing them gradually to protect downstream communities and infrastructure, potentially reducing global GDP losses from flooding by 12–22% (about \$53–96 billion annually). Multi-purpose reservoirs like those in the US safeguard thousands of bridges, farms, and highways while trapping sediment that would otherwise clog rivers.

### Water management

Reservoirs capture surplus wet-season flows for dry-season irrigation, supporting agriculture across vast regions and boosting food security. They also secure drinking water supplies, industrial needs, and even fish farming, while enabling inland navigation by maintaining steady river levels.

### Economic and social gains

Large dams drive development by creating jobs in construction and operations, fostering tourism via reservoirs for boating, fishing, and parks. Studies of US multipurpose dams show non-power benefits (flood control, irrigation, navigation) often rival or exceed hydropower revenue, with long lifespans amplifying returns. These systems build climate resilience by buffering droughts and extreme weather variability.



*Global estimates suggest that roughly 1,500–2,000 TWh per year of additional hydropower generation could realistically come online worldwide over the next ten years, with very large uncertainty around mega-projects like Grand Inga and Medog. This would be on the order of a 30–40% increase over today’s hydropower output if all major planned projects were completed and operated as expected.*

*The 2025 World Hydropower Outlook reports a global hydropower development pipeline of about 1,075 GW (475 GW conventional, 600 GW pumped storage), most expected to be commissioned by 2030 if permitting and finance are accelerated.*

*Using a conservative average capacity factor of 35–45% for new conventional hydro, 475 GW would yield roughly 1,500–1,900 TWh per year once fully online, within an approximate 10 year time frame..*

*The Medog Hydropower Station in Tibet alone is planned for about 300 TWh of annual generation when fully operational around the early–mid 2030s, roughly triple Three Gorges’ current output.*

*Grand Inga’s full scheme has been described as potentially “nearly doubling” the output of Three Gorges, implying on the order of 200 TWh per year if completely built, but only Inga 3 is moving slowly and may not be finished for more than a decade.*

*Large hydropower projects frequently face multi-year delays from financing, permitting, resettlement conflicts, and construction challenges, so only a fraction of the technical “pipeline” is likely to be generating power by 2036.*

*Climate-driven hydrological changes (droughts, glacial melt timing) and grid constraints can also keep realized annual generation below nameplate-based estimates, making TWh projections inherently approximate.*



Several dozen very large dams (mostly for hydropower) are planned or under construction worldwide, concentrated in China/Tibet, South and Central Asia, Africa, and parts of South America. Many of these projects are controversial because of ecological damage, displacement, and downstream geopolitical risks.

#### Major new “mega-dam” plans

Medog Hydropower Project, Tibet (China)

Planned on the lower Yarlung Tsangpo in Tibet, designed to be the world’s largest hydropower project, with estimated annual generation around 300 TWh (roughly triple Three Gorges’ output). Construction has begun and the project is framed as central to China’s long-term energy and emissions targets.

Siang Hydroelectric Project, India

Proposed on the Siang River (Indian stretch of the Yarlung Tsangpo/Brahmaputra), with around 11,000 MW capacity and reservoir storage of about 9 billion m<sup>3</sup>. India presents it both as a power project and as a strategic buffer against sudden upstream releases from Chinese dams in Tibet, aimed at reducing flood risks in Arunachal Pradesh, Assam, and Bangladesh.

Grand Inga scheme, DR Congo

Planned as a multi-stage complex (including Inga 3 and further phases) on the Congo River, with an ultimate target on the order of 40,000 MW, more than twice Three Gorges’ capacity. The scheme has been discussed for decades and is now re-emerging with support from institutions such as the World Bank, but financing and governance remain major uncertainties.

Very large dams under construction

Rogun Dam, Tajikistan

Tall clay-core rockfill dam on the Vakhsh River; when complete, crest height is expected to reach about 335 m, making it the tallest dam in the world. Construction restarted after long delays, and the project has recently received multibillion-dollar backing, including a large World Bank-supported financing package.

Grand Ethiopian Renaissance Dam (GERD), Ethiopia

On the Blue Nile, designed capacity about 6,500 MW and already over 90% complete, with initial units operating. Although near completion, it is still part of the current wave of mega-projects and remains central to regional water-sharing and security debates with downstream Sudan and Egypt.



Pakistan's large hydropower dams, [Diemer-Bhasha Dam](#) (Indus) and [Dasu Hydropower Project](#) are both under construction and classed among the world's largest current hydro projects. They are intended to add several gigawatts of capacity and improve storage and flood management but raise concerns about seismic risk, sediment trapping, and displacement.

#### [Mambilla Hydropower Project, Nigeria](#)

Planned complex on the Dongo River with four dams and two underground powerhouses, for a total installed capacity around 3,050 MW. Involves multiple dam types (RCC and rockfill) and has faced repeated delays over financing, land, and environmental questions.

Large new dams are planned or advancing on major rivers including the Mekong, [Brahmaputra/Yarlung Tsangpo system](#), [Indus](#), and [Vakhsh](#). Drivers include rapid demand growth, energy security, and water control, but there is intense debate about seismic safety, glacial melt impacts, and downstream riverine livelihoods.

#### [Africa \(Congo, Nile and others\)](#)

Beyond [Inga and GERD](#), multiple large hydropower schemes are proposed or under development on major African rivers to address chronic power shortages. These projects are increasingly linked to global climate finance narratives, even as critics highlight social displacement and ecosystem disruption.

#### [South America \(Amazon basin\)](#)

The Amazon basin alone has been projected to see well over a hundred additional dams, many in the large to mega-scale category. Modeling suggests these could drastically increase upstream carbon sedimentation and alter nutrient flows, with significant implications for rainforest and coastal ecosystems.



## Environmental and social concerns.

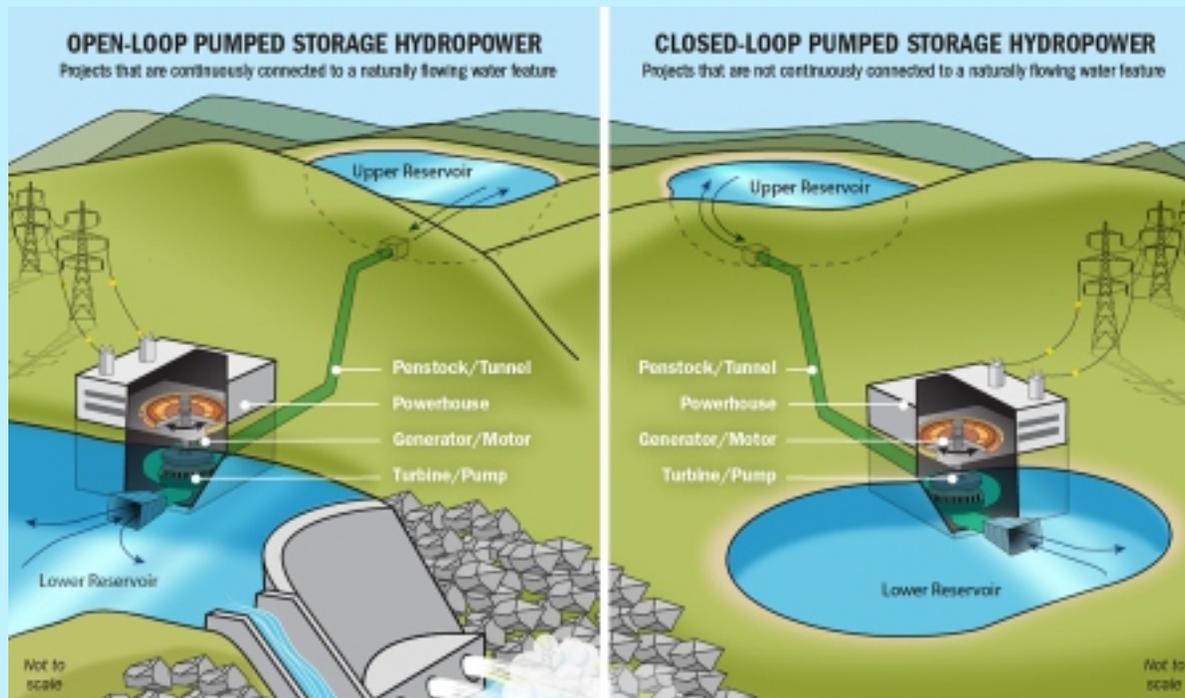
Large dams can cause:

Significant habitat loss, species declines, and major changes in sediment and nutrient transport downstream. Soil degradation downstream, increased greenhouse gas emissions from reservoirs, and in some cases heightened risks of diseases in reservoir regions.

Critiques of the current boom in big hydropower argue that:

Framing large dams as “clean” climate solutions can understate their lifecycle emissions and long-term ecological costs.

Better alternatives in many regions include smaller run-of-river schemes, grid upgrades, and non-hydro renewables such as solar and wind.



The United Arab Emirates is building the world's largest strategic reserve of desalinated water, storing over 20 billion liters underground and trading oil for water security in the desert.      Written by: Valdemar Medeiros - Published - 07/01/2026

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The United Arab Emirates are trading oil for water: how underground reservoirs and artificial aquifers have become the new strategic security of the desert.

For decades, the United Arab Emirates has been known for turning rock into oil vaults. Underground strategic reserves, reinforced tunnels, and deep infrastructure have always been part of the country's energy strategy. In recent years, this same mentality has been applied to a resource even more critical to national survival: potable water. Contrary to what many simplistic narratives suggest, the Emirates are not "filling natural caves with water." What is underway is something more sophisticated—and proven: Controlled underground storage of desalinated water in deep aquifers and excavated reservoirs, integrated into urban distribution networks.

It's water security engineering on a national scale.

What really exists: underground storage and aquifer recharge.

The country adopted systems known internationally as Aquifer Storage and Recovery (ASR). In this model, desalinated water produced in coastal plants is injected intentionally in deep geological formations, which function as natural reservoirs sealed by impermeable layers of rock.

These aquifers are neither underground rivers nor hollow caves. They are porous structures. These tanks are capable of safely storing enormous volumes of water with thermal stability and complete physical protection. When needed, the water is pumped back into the urban system with controlled quality.

Furthermore, the Emirates also build excavated and lined underground reservoirs, functioning as storage tanks below the surface, connected directly to the water supply network.



Surface reservoirs in desert environments are highly inefficient. With temperatures frequently above 45°C, evaporation can eliminate significant volumes in a short time. Sandstorms, salinization, and the risk of contamination make artificial lakes a weak point in the infrastructure.

The subsoil solves these problems simultaneously. Water stored in aquifers or underground reservoirs maintains stable temperature—it has virtually no evaporation, is protected from light, extreme heat, and weather events. Furthermore, it is shielded against sabotage, industrial accidents, and even conflict scenarios.

In practice, water begins to be treated as a strategic asset, not just as a public service.

Desalinated water as a national reserve, not just continuous production. The Emirates rely on desalination for more than 90% of the drinking water consumed. This creates an obvious vulnerability: if coastal power plants shut down—due to power failure, cyberattack, or regional crisis—the supply immediately collapses.

Underground storage changes this equation. Water produced outside of peak consumption periods is stored underground, creating Strategic reserves sufficient to supply major cities for weeks. It's the same concept used for strategic oil reserves, now applied to water. Out goes the "produce and consume in real time" model, and in comes the "produce, store, and protect" model.

Real scale: billions of liters stored beneath the desert.

Officially released projects indicate individual capabilities of hundreds of millions of liters per ASR system, with modular networks that add up to tens of billions of liters of stored drinking water at the national level. These systems feature continuous monitoring of quality, pressure, salinity, and geological integrity. The water does not remain "stagnant": there is controlled circulation, periodic testing, and safety protocols equivalent to those used in critical energy infrastructure. This is not improvisation — it is state planning.

Water security as a national policy

For the United Arab Emirates, water has come to be treated as question of sovereignty. The country has no permanent rivers, scarce rainfall, and rapid urban growth. The only truly controllable variable is engineering.



By investing in underground storage, the country gains response time in crises, reduces immediate dependence on coastal power plants, and transforms water into a strategic, protected, and predictable resource.

Few countries in the world operate water systems with this level of planning.

The cost is high, but the cost of scarcity is higher.

Desalinating water, pumping it over long distances, and injecting it into deep aquifers requires energy, capital, and technology. The cost per cubic meter is high compared to countries with natural rivers and lakes.

Still, in the desert, Not storing water costs infinitely more. For the Emirates, energy—increasingly solar and nuclear—is a manageable resource. Fresh water, however, is not.

Similar experiences are already being studied by countries in the Middle East, North Africa, Australia, and arid regions of the United States. The difference in the Emirates lies in the scale, national integration, and accumulated experience in heavy underground engineering.

If before the country was the ultimate symbol of the oil age, today it is consolidating itself as an extreme laboratory of water adaptation in a hostile environment, where the subsoil replaces non-existent rivers.

