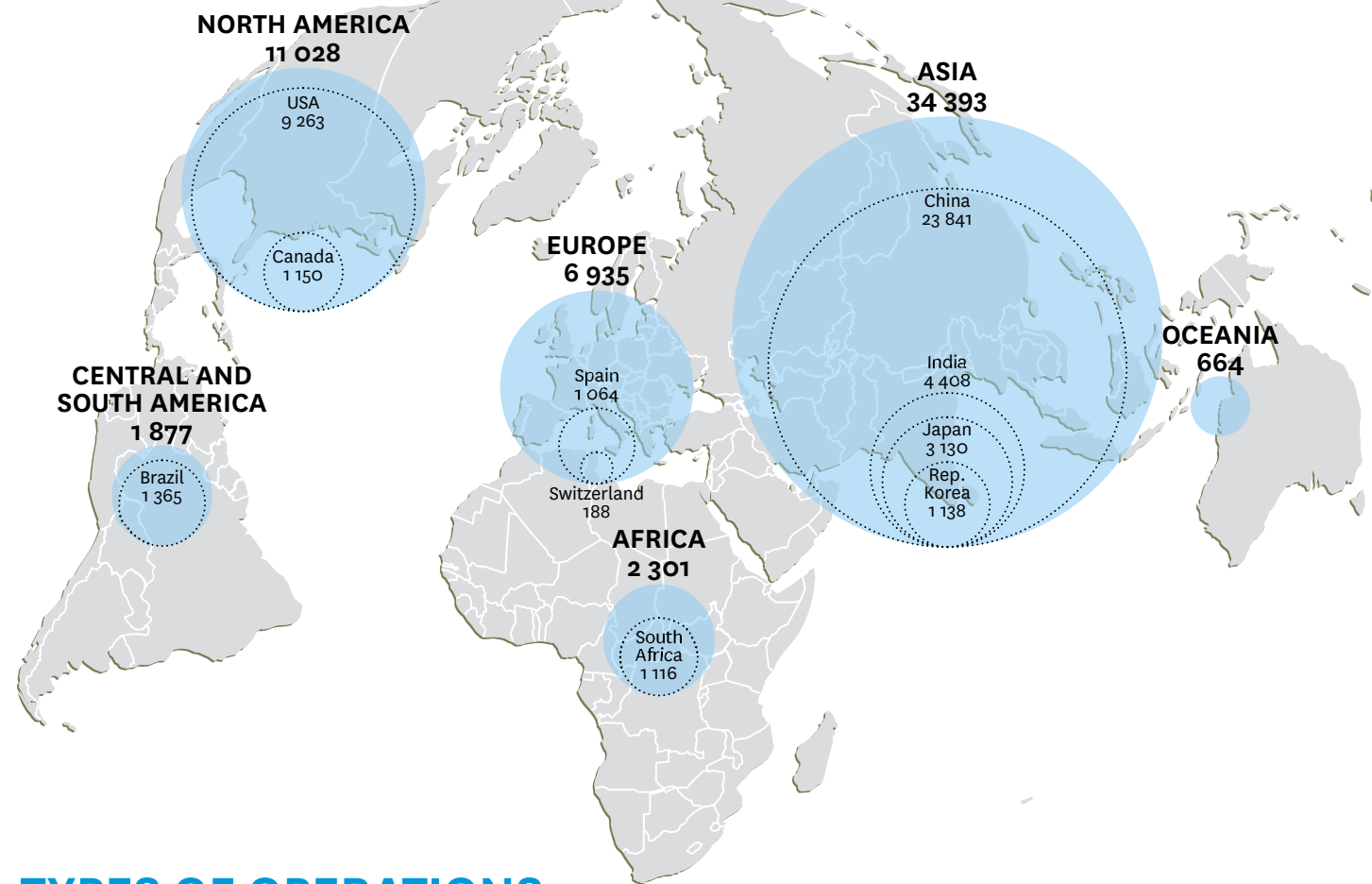


LARGE DAMS OF THE WORLD

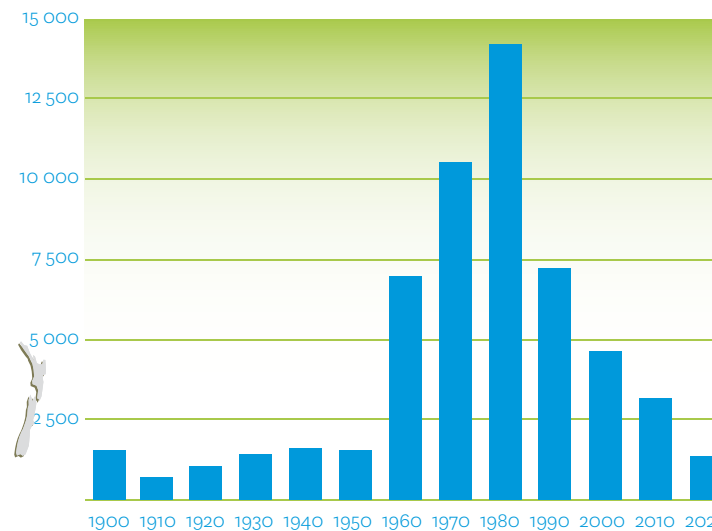
Hydropower is a low-carbon source of energy that, in combination with other intermittent renewable energy technologies, plays an important role in mitigating climate change. In addition to electricity production, large dams (minimum height of 15 m.) are increasingly multipurpose infrastructures that provide public goods (flood mitigation or increased water storage) and contribute to development objectives (such as improving food production or supplying water in rural areas).

Yet, such large infrastructure schemes may also have significant negative biophysical, socioeconomic and geopolitical impacts – debates between the advocates and opponents of large dams have been more or less ongoing for the last 40 years. Reaching a consensus on new projects can be elusive, but certainly requires the involvement of numerous stakeholders and an integrated assessment of all negative aspects alongside the positive ones.

NUMBER OF LARGE DAMS GLOBALLY

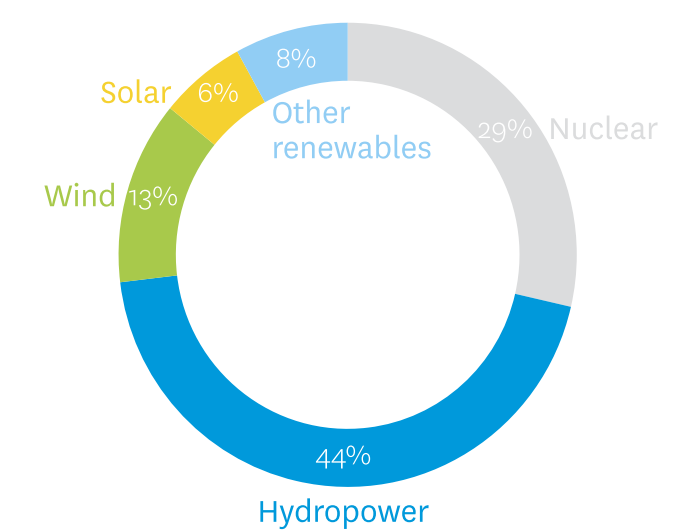


LARGE DAM CONSTRUCTION



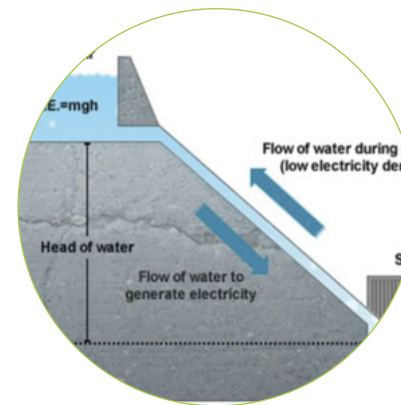
For the majority of large dams, hydropower is a primary operating purpose. Hydropower development has been widespread in developed countries in the second half of the 20th century, which partly explains the decrease in new project development in the last 40 years. Large dams currently under construction around the world are mainly located in Asia. In Africa, hydropower potential underexploited, and trends suggest an expansion in this continent for upcoming decades.

GLOBAL LOW-CARBON ELECTRICITY GENERATION



The development of nuclear and renewable energies (solar, wind, geothermal, bioenergy, and hydropower) is key for the mitigation of electricity-related emissions. Hydropower represents 62% of renewable electricity generation which, in comparison with conventional power plants, avoids about 9% of global annual CO₂ emissions. Furthermore, being the only technology able to store significant amounts of energy, it presents important synergies with other intermittent renewable energy sources.

TYPES OF OPERATIONS

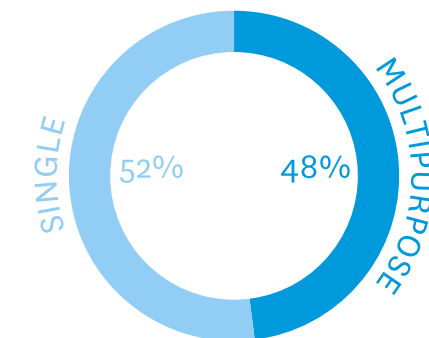
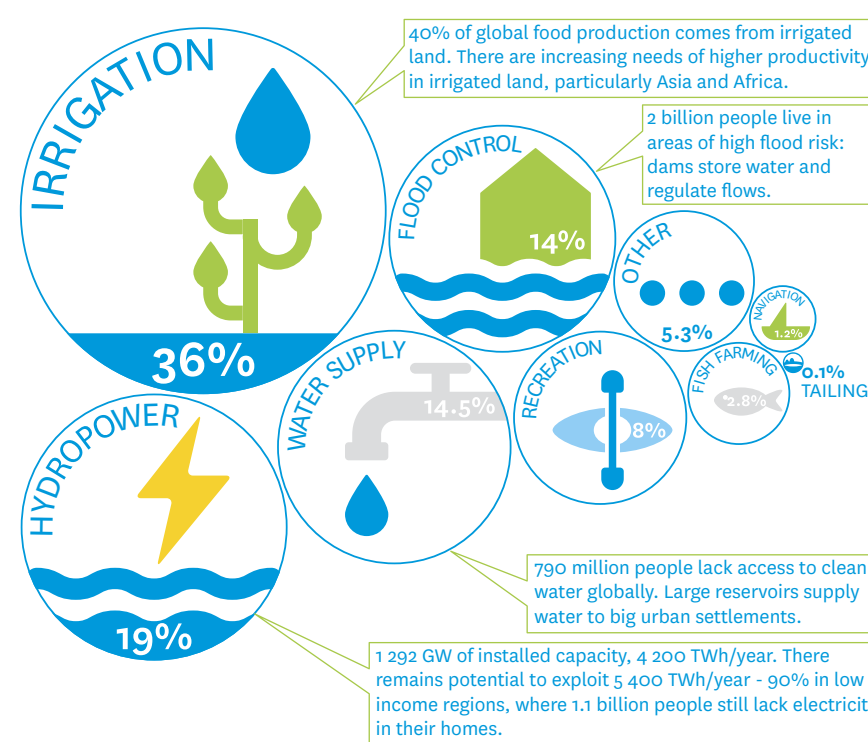


Storage reservoirs are formed by the construction of dams across rivers, or off-channel reservoirs may be created by diversion structures and canals or pipelines that convey water from a river to natural or artificial depressions.
(cf. <https://bit.ly/3nsDYWr>).

Run-of-river schemes divert water from a flowing river and guide it down a channel, or penstock, which leads to a generating house. The water is fed back into the main river further downstream.
(cf. <https://bit.ly/2GC2ohl>).

Pumping storage stores energy in the form of gravitational potential energy of water, pumped from a lower elevation reservoir to a higher elevation. Low-cost surplus off-peak electric power is typically used to run the pumps
(cf. <https://bit.ly/36JHcPw>).

PURPOSES AT THE GLOBAL LEVEL



Most dams are single-purpose dams by design, but they often become multi-purpose by practice. Single-purpose infrastructures are typically more attractive to private investors (especially for hydropower) while multipurpose projects are promoted by public authorities and international donors, as they may align with development goals. Private sector participation in the financing of multipurpose dams can be achieved through public-private partnership projects when risk is appropriately allocated and profitable and unprofitable components separated.