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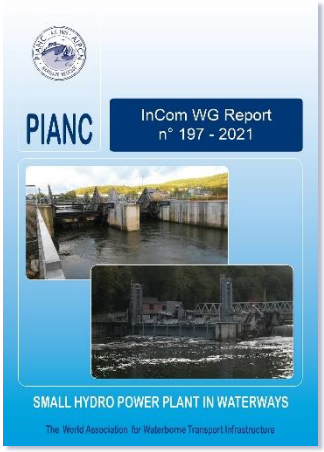

Title: **'SMALL HYDRO POWER PLANT IN WATERWAYS'**

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Introduction:

Hydropower generates the bulk of the world's renewable energy. In 2014, 74 % of the world's renewable electricity came from hydropower, 13 % from wind, 8 % from biomass, with solar contributing 4 %. The remaining 1 % is made up from geothermal and wave/tidal power. While the construction of new wind and solar generation has accelerated, hydropower will continue to be the dominant contributor to renewable energy generation for the foreseeable future.
Hydropower is a very long-lasting source of electrical power generation. The civil engineering structures associated with hydro usually have a design life of more than 100 years and there are many dam structures considerably older than this. The typical design life for the mechanical and electrical equipment might be quoted today as forty years. This can be extended with careful maintenance and mid-life refurbishment, and indeed, there are hydro power plants operating many years beyond the nominal design life. Even when refurbishment is required, it is usually limited to replacing mechanical and electrical components within the existing civil structures.
Hydropower structures are rarely built for a single purpose. Hydropower is usually incorporated in a multipurpose system used for water storage (irrigation and drinking water), flood attenuation and water management, navigation, and amenity. In most fully developed economies, all the large commercially viable hydropower potentials have been developed. Even in developing economies, hydropower is often well developed with most of the larger schemes having been developed or under development. However, there is considerable potential in all countries to increase hydro capacity using small, mini- or micro-sized turbines on smaller water courses, rivers and even man-made canals. Any organisation that controls or manages a water course can utilise the potential of moving water to generate renewable energy and inland navigations are an obvious possibility with existing infrastructure creating differences in level and water movement.
In the past, the developers of navigations paid little attention to the effect on the environment of the creation of the navigation. Rivers and water courses were blocked with weirs and dams to facilitate the passage of vessels, preventing the long-distance migration of diadromous fish to/from the sea and even the localised potamodromous movement of fish within the freshwater river system. The transportation of silt downstream during floods, often a source of land fertilisation for deltas in the lower reaches, can be blocked by the dams, weirs and other control structures causing land degradation a long way downstream.
The same can be said of the damming of rivers for the purposes of hydropower where the environmental impacts of the structures put in place across the water course were, in the past, not considered.
In recent years, governments have imposed stricter and stricter environmental conditions on new developments and are retrospectively imposing new regulations on existing impounding structures whether these are for navigation or hydropower. An example of this is the European Water Framework Directive which imposes a series of conditions and targets for the improvement of environmental conditions on water courses both natural and manmade, throughout the European Union.
Many governments offer a wide variety of green energy subsidies and incentives to assist with renewable energy development that go hand in hand with tightening control of the environment. The environmental improvements now required of waterway infrastructure owners and the ever-increasing cost of fossil fuels both in financial and environmental terms, has brought many smaller hydro schemes back into focus for development and waterway managers can no longer ignore the potential on their doorstep.