BUSINESS MODEL PROFILES: WATER

SUMMARIZED FROM THE FORTHCOMING PUBLICATION *RESOURCE RECOVERY FROM WASTE*

CGIAR | RESEARCH PROGRAM ON Water, Land and Ecosystems | LED BY: IWMI International Water Management Institute

Enabling Private Sector Investment in Large-scale Wastewater Treatment

Business characteristics

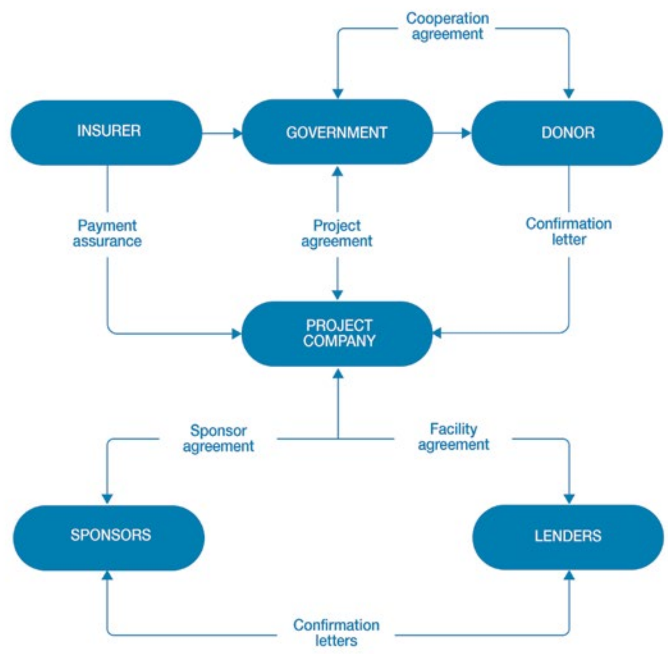
Geography	Water-scarce regions
Scale of production	Medium to very large scale (water volume independent)
Type of organization	Public-private partnership (PPP)
Investment cost range	USD 100-400 million
Key costs	Capital investment (one-time grant), and payment to operators per cubic meter of treated water (ongoing expenses during the PPP term)
Revenue stream	Water user fees for wastewater treatment and reuse, government budget allocation and/or donor funds, high degree of energy recovery as a cost saving measure, and phosphorous recovery as a cost saving measure and possible revenue

Business model

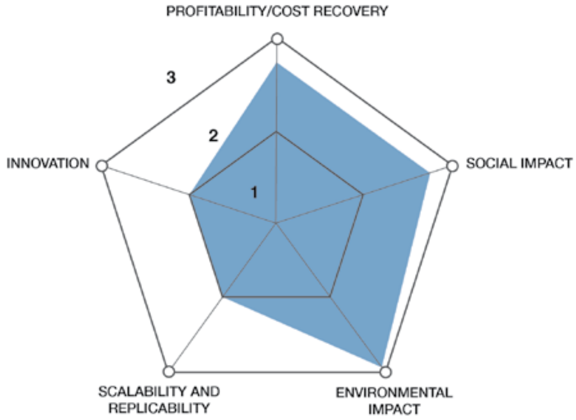
The business model shows one opportunity of mixed capital funding of medium- to large-scale wastewater treatment, which often lacks financial viability despite significant economic benefits. Viability Gap Funding (VGF) reduces the upfront capital costs by providing grant funding at the time of financial close. The VGF is the 'gap' between the revenue needed to make a project commercially viable and the revenue likely to be generated by user fees. VGF helps mobilize private sector investment for development projects, while ensuring that the private sector accepts a share in the risks of infrastructure delivery and operation. Recognized by several international financial organizations, VGF provides a significant leverage to the financial assistance of international donors and will allow new projects to materialize.

Supported projects are run on a time-bound operation agreement, such as the build, operate and transfer (BOT) model, whereby the private sector manages the project. Once operational, the treatment plant can generate revenue from government payments or user fees for wastewater treatment and reuse. A comprehensive risk management and reassurance scheme has to accompany and guide the partnership to ensure adherence to resource commitment by all parties throughout the duration of the PPP term.

CONTRACTUAL SETUP OF THE BUSINESS MODEL



Business performance



The business model ranks highest on socio-environmental impact as it takes care of low returns expected from poor households while supporting very high treatment volumes, and reducing environmental pollution and water contamination, with a high reuse potential. However, the model is not easy to replicate due to the challenging set up of contracts between parties and the high transaction costs before operations can begin.

Main risks

Market risks: Without reliable calculations of cost recovery and attractive profit margins, public overspending is likely. Also, private sector investors will only buy into the venture if it is financially viable.

Technological risks: At the end of the PPP agreement, the public sector is likely to receive state-of-the-art facilities, which, if not prepared, can pose challenges for management takeover. Also, private sector partners must be selected competitively to avoid technology and funding pitfalls.

Political and regulatory risks: The model's dependency on reliable funding commitments and risk-sharing entails heightened relevance of political and regulatory stability. Reinsurance guarantees have to be given by stable, legitimate partners that are very likely to remain unchanged throughout the duration of the PPP agreement.

Safety, environmental and health risks: The construction of a large-scale wastewater treatment plant will impact the site itself and its immediate surroundings, including ecosystems and communities, and must be accompanied by environmental impact assessments.

Case study: Amman, Jordan

The As Samra waste water treatment plant (WWTP) near Amman, Jordan, is the largest in the country, and was purposely designed to support agricultural production in the Jordan Valley, which relies increasingly on treated wastewater for irrigation purposes. Set up as a PPP (25-year BOT contract), the WWTP replaced an older, pond-based treatment system.

The upgrade and expansion of the plant initially received financial support from the United States Agency for International Development (USAID), and a VGF by the Millennium Challenge Corporation for the latest construction phase, in order to reach a capacity of 364,000 cubic meters (m^3) of water per day. Under the coordination of the Ministry of Water and Irrigation, the construction was facilitated by a 20-year commercial loan and a comprehensive risk sharing arrangement. The expanded plant was inaugurated in October 2015 and provides Jordan with up to 133 million cubic meters (Mm^3) of treated water per year. Today, treated wastewater represents 13% of Jordan's entire renewable water resources, freeing up freshwater for more valuable uses. In addition, the As Samra plant is able to generate up to 95% of its energy needs, and thereby reduce its costs and carbon footprint.

Key performance indicators (2015/16)

Capital investment:	Phase 1 (2003-2008) USD 169 million; Phase 2 (2012-2015) about USD 223 million	
Labor:	About 180-210 permanent local employees, of which about 70 are skilled workers, and up to 2,500 workers during the construction phases	
Operation and maintenance cost:	Full cost recovery (currently USD 1.3 million per month)	
Output:	364,000 m^3/day of wastewater treatment capacity, 90-95% energy self-sufficiency, 300,000 tons of CO_2 equivalent/year saved, and 194 tons of dry solids per day	
Social and environmental impact:	Significantly improved water quality, less contamination of soil and groundwater, reduced carbon footprint, treated water for irrigation, livelihood support for irrigating farmers, and job creation	
Financial viability:	Payback period: 13-20 years	Rate of return: About 10-18%

For more information on the business model and related cases, see Chapter 16 of **Otoo, M.; Drechsel, P. (Eds.). 2017. *Resource recovery from waste: Business models for energy, nutrient and water reuse in low- and middle-income countries.* London: Earthscan/ Routledge. In press.** The book has been produced by the Resource Recovery and Reuse subprogram of the International Water Management Institute (IWMI), under the CGIAR Research Program on Water, Land and Ecosystems (WLE) and its Rural-Urban Linkages Research Theme. The support of the Swiss Agency for Development and Cooperation (SDC), the International Fund for Agricultural Development (IFAD), and CGIAR Fund Donors (www.cgiar.org/about-us/our-funders/) is gratefully acknowledged.