

Justifying Chile's eternal water pipeline

Government support for a long-distance water pipeline to revitalise agriculture in northern Chile appears to be growing. The tender for the pilot phase is still at least two years away.

The plan to build an undersea pipeline to transport fresh water from the south of Chile to the water-starved north has moved one step closer to reality, after public works minister Laurence Golborne praised a preliminary study of the project's viability earlier this month.

The study sets out the economic case for the pipeline project – dubbed 'Aquatacama' – as an alternative to large-scale desalination along the country's coastline, although Félix Bogliolo, founding partner of project proponent Via Marina, acknowledged to GWI that there are still a number of questions which remain unanswered.

Two thirds of the pipeline's proposed flow rate of 30m³/s (2.6 million m³/d) is destined for agricultural use, with a further 23% destined for mining projects, and the remainder for municipal use. "Despite the fact that urban consumption will be minor in terms of volumes, in terms of political

impulse, it is the urban necessity that is driving the project," Bogliolo told GWI.

Privately owned utilities including Esval and Aguas de Antofagasta are expected to be future beneficiaries of the project, which Bogliolo claims will deliver raw water at a price of around \$0.70/m³ (see box below).

Convincing farmers in Chile's parched northern desert to pay full price for the water is likely to prove extremely difficult, however. At present, these farmers often rely on existing water rights, paying only local pumping costs to get the water to where it is needed.

The extent of any government subsidy has not been decided as yet, but Bogliolo argues that the impact on Chile's GDP of agriculturalists having physical access to greater water supplies should ultimately convince the government to support the initiative.

Building a belter of a conveyor

Vinci subsidiary Via Marina believes its long-distance pipeline will be a serious rival to seawater desalination in Chile. How do the two compare?

Via Marina's proposal to build a 2,500km undersea pipeline to pump fresh water from rivers in the south of Chile to farmers in the north is being billed as a viable alternative to seawater desalination.

"It is technically viable, ecologically attractive and economically competitive," according to Félix Bogliolo, founding partner of Via Marina. "Even at the total projected length of 2,500km, we are still reasonably competitive, at something like \$0.70/m³, whereas the cost of desalination would be around \$1.00/m³," he told GWI.

Despite these claims, the pipeline will ultimately deliver raw water to end customers, implying that municipal utilities, at least, will have to put it through a further treatment step before delivering it to consumers – thus reducing the competitive edge.

"We deliver raw water, so the utilities will have to treat it for their own consumption," Bogliolo confirmed. "There will be a filtration step to eliminate solids, and a very light

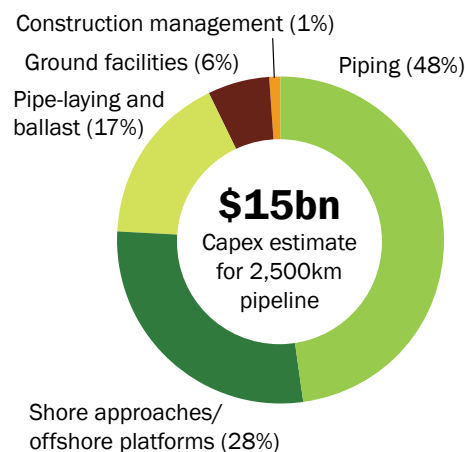
chlorination to eliminate biological components, but that's only for our own transportation purposes."

The energy required to pump the water from the source to the customer is considerably lower than desal, Bogliolo maintains. "Even in the longest case, we are looking at 0.9kWh/m³, whereas desalination is maybe at 4kWh/m³. In the shortest scenarios it would be much less – only 0.4 or 0.5kWh/m³."

He argues furthermore that the high ratio of capex to opex inherent in the pipeline project (around 70:30) is much higher than for a desalination plant. "Our price is much less sensitive to energy cost increases because it is mainly amortisation of capex."

Further disadvantages to the proposed pipeline scheme include the need for frequent shore approaches (in order to take advantage of a new series of reservoirs to be built by the Chilean government), which will account for a disproportionate amount of the capital cost to due earthquake compliance considerations (see chart, top right).

Aquatacama capex breakdown



"The physical and legal availability of water are totally disconnected in Chile," he told GWI. "In some cases in the north you have plenty of legal rights but there is no physical availability of water, and so the farmers have to leave their land to perish because they can't cultivate it. In some cases, they have even sold their water rights to the mines."

Bogliolo argues that studies have shown that access to greater volumes of water would make it possible to plant several rotations per year of high-value crops in northern Chile's sunny climate, enabling farmers to remain profitable while paying up to \$0.50/m³ for their water.

Although the long-term goal is to install 2,500km of undersea pipe to transport water from the Bío-Bío river 500km south of Valparaíso right up to Arica on the Peruvian border, the pilot stage is expected to be roughly 200-300km long, and will be funded by the Chilean government at a projected cost of around \$1 billion.

Further phases are expected to be structured as some form of public-private partnership, although the exact nature of the private sector investment still has to be thrashed out.

"That will form part of the studies to be implemented over the next couple of years," Bogliolo explained. "There is not only an engineering part, but also a legal and financial part to see how the deal is going to be structured and under what scenario the tender will be launched. There won't be commitment for further legs until the pilot is finished and everybody draws their conclusions."