



WATER IN ACTION

Partnerships

Knowledge

Solutions

The Benefits of Pipeline Innovation by Professor Alessandro Marangoni



Alessandro Marangoni is a Professor in Bocconi University in Milan, which is recognised as one of Europe's leading institutions in business and economic education. The university was recently ranked among the top 20 best business schools in the world by The Wall Street Journal.

In many of our large cities, the water and sewage networks were built in the late 19th Century, after a clear linkage had been established between disease and the contamination of drinking water with sewage. This single act led to the largest sustained rise in life expectancy in human history but today, in many cities, we are in danger of turning the clock back 150 years by not taking care of these important assets.



The Benefits of Pipeline Innovation

Partnerships

Knowledge

Solutions

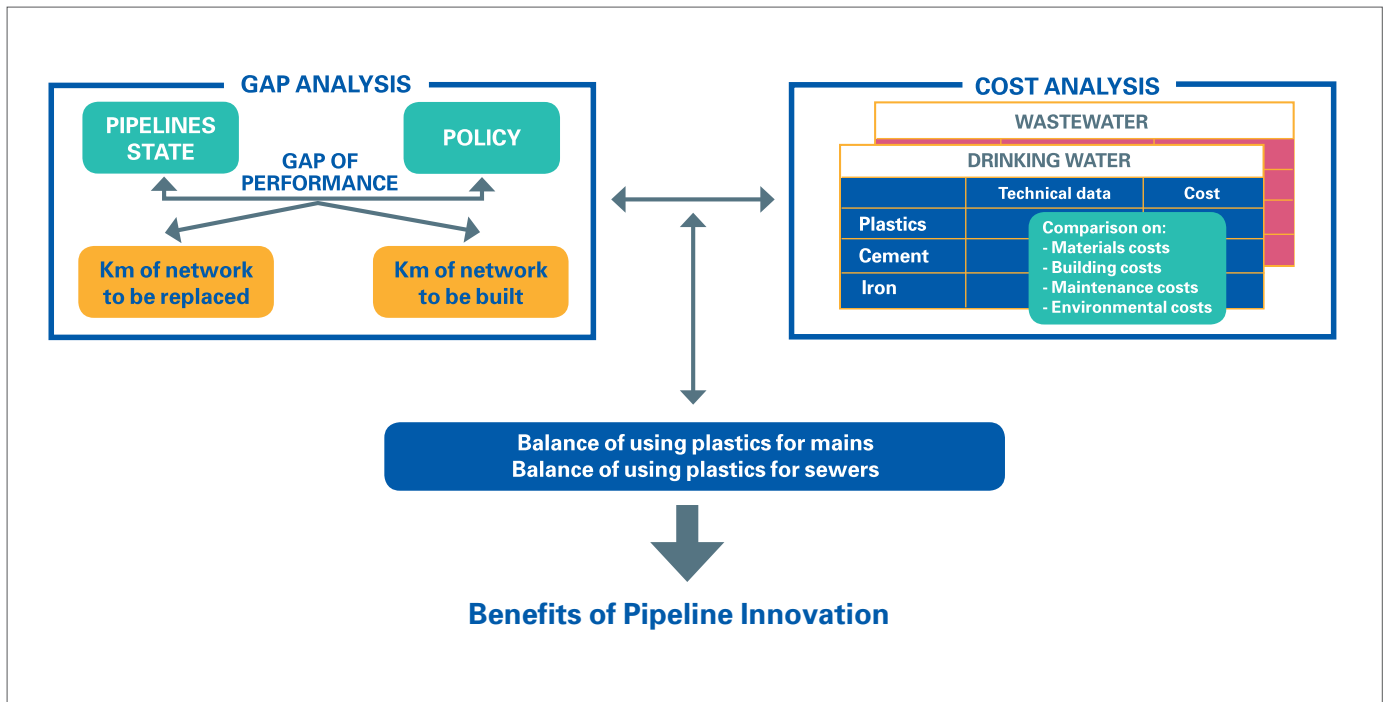


Fig.1. Steps in the cost of no action model

Nor are these problems restricted to the developing world, as can be seen from the list below of countries where water is a critical issue:

- > In USA, there are over 700 failures per day in the ageing US water system. A Senate committee found that corrosion in the predominantly iron water and sewage system is the prime cause, and was costing the US taxpayer US\$36 billion per year.
- > In Europe, Italy has a water leakage rate of 42% which is equivalent to 4 billion cubic metres of water, costing the water industry over US\$6 billion each year to process and transport.
- > In the Middle East, Jordan, Yemen, Syria and Egypt face serious water shortages, which will restrict future agricultural production and already affect the lives of many farmers.

Clearly, the “Cost of No Action” is high and with increasing population and reducing rainfall due to climate change, this cost will rise in the future

and will have a damaging effect on the countries’ industrial and commercial wealth, the environment and general welfare of its citizens. Therefore, it is crucial that action is taken now to renovate and maintain existing systems and develop new networks where none exist. In these circumstances, the quality and durability of the replacement systems is critical, and recent innovations in materials and installation technology should be employed to optimise the cost efficiency of the operation. In order to analyse the needs of the infrastructure and to calculate the costs of replacement, a model has been developed, based upon a Cost-Benefit Analysis approach that has previously been applied to industrial and economic systems as well as to plant construction projects.

The steps in the analysis are shown in fig. 1 and are as follows:

- i) Analysis of the state of present networks: materials, diameters and performances, compared to best practice in Italy and other countries.



The Benefits of Pipeline Innovation

Partnerships

Knowledge

Solutions

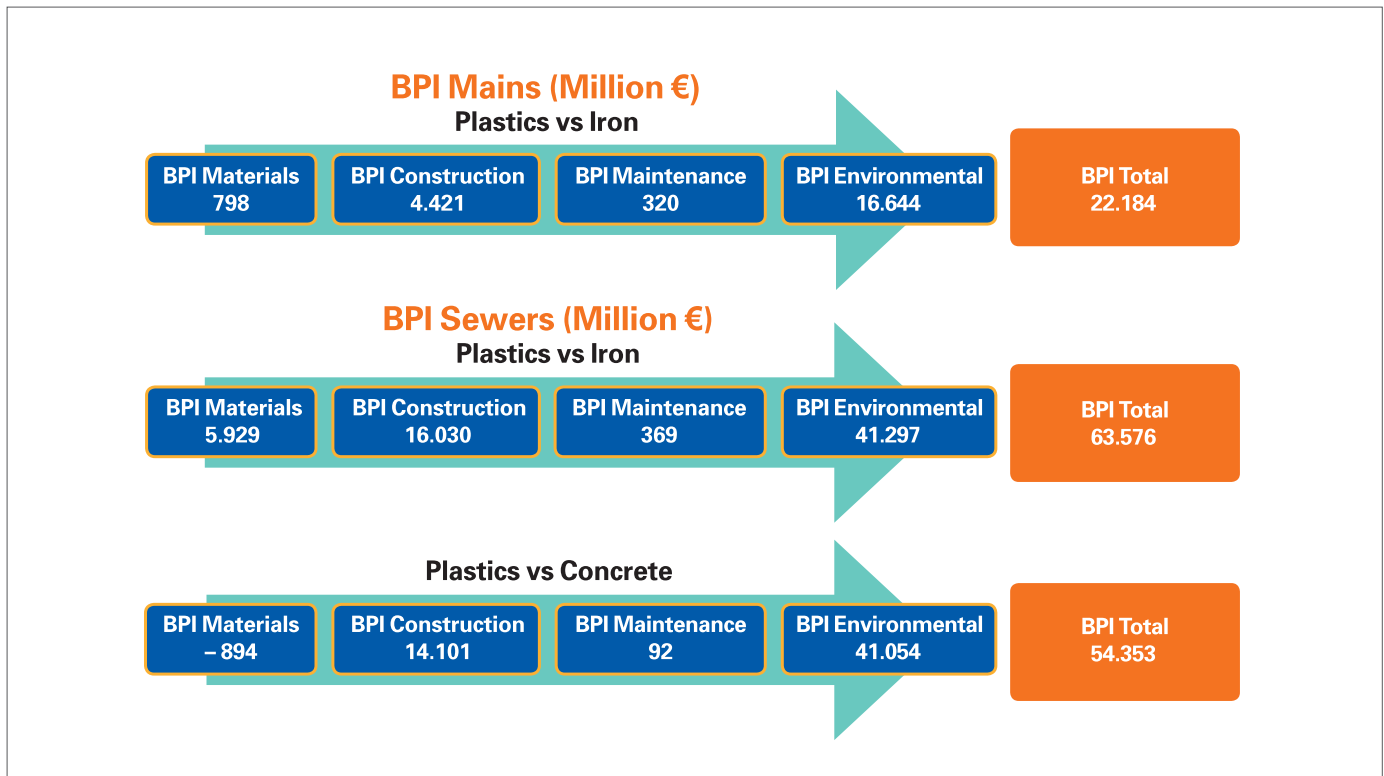


Fig.2. The Benefits of Pipeline Innovation

- ii) Determine the infrastructure gap, in terms of kilometres of network to be built and to be replaced, through the comparison between the state of present networks and the chosen reference. For Italy, this gap was 155,300km of water mains and 66,600km of sewers
- iii) Cost analysis for each materials family over the complete lifecycle. This needs to consider all the costs (materials, construction, installation and environmental) of different pipeline materials and of different diameters over a period of 50 years. For plastics, it was assumed that 30% of the pipes could be installed by “no dig” methods.
- iv) Calculate the Balance of Pipelines Innovation (BIP) by evaluating the difference between the costs and benefits of using the different materials to build the water mains and sewers.

For Italy, the analysis revealed large cost savings compared to using the traditional iron and concrete pipes (refer to fig. 2):

- **The cost savings of using plastic water mains v. iron is US\$30 billion.**
- **The cost savings of using plastic sewers v. iron is US\$89 billion.**
- **The cost savings of using plastic sewers v. concrete is US\$76 billion.**

For a copy of Professor Marangoni's full paper, contact us at infopipe@borouge.com.



To learn more about the Water for the World visit: www.waterfortheworld.net

For more information contact: info@borealisgroup.com

