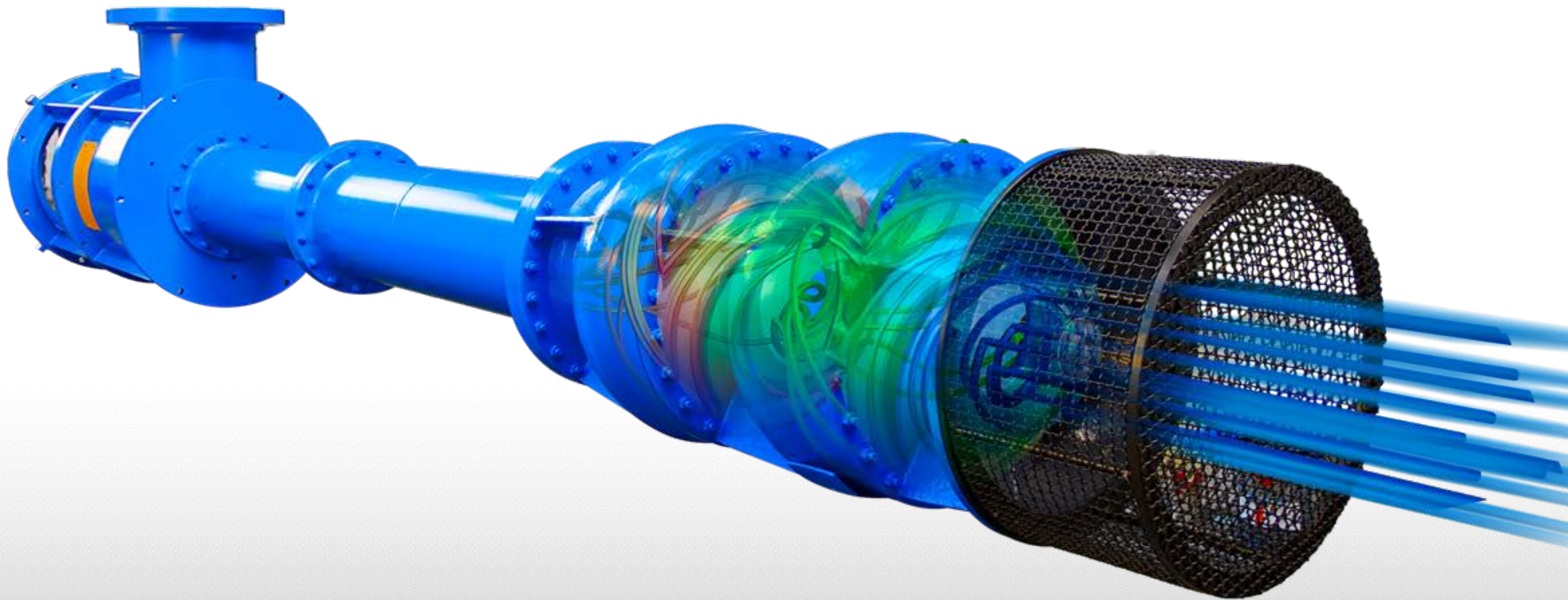




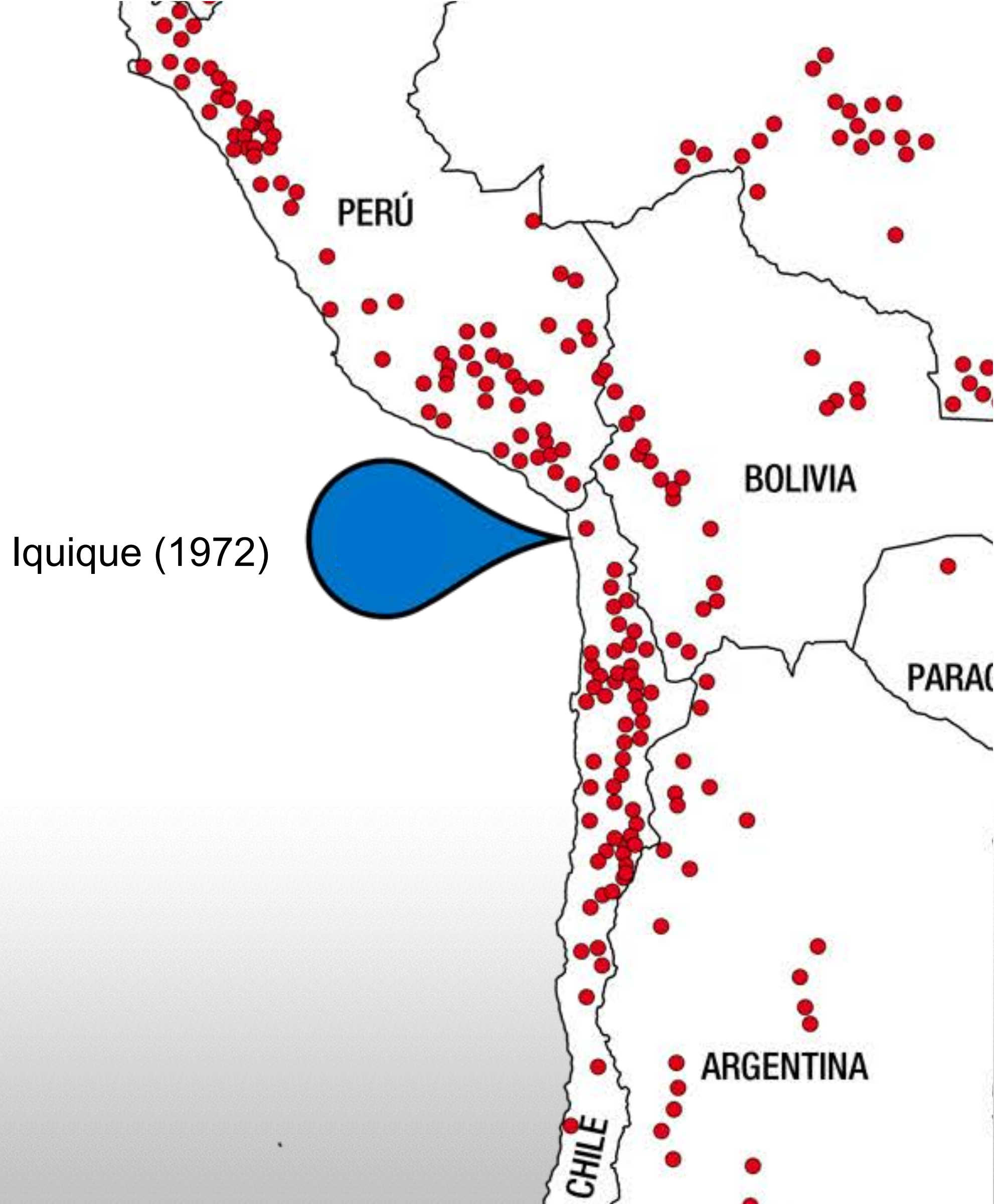
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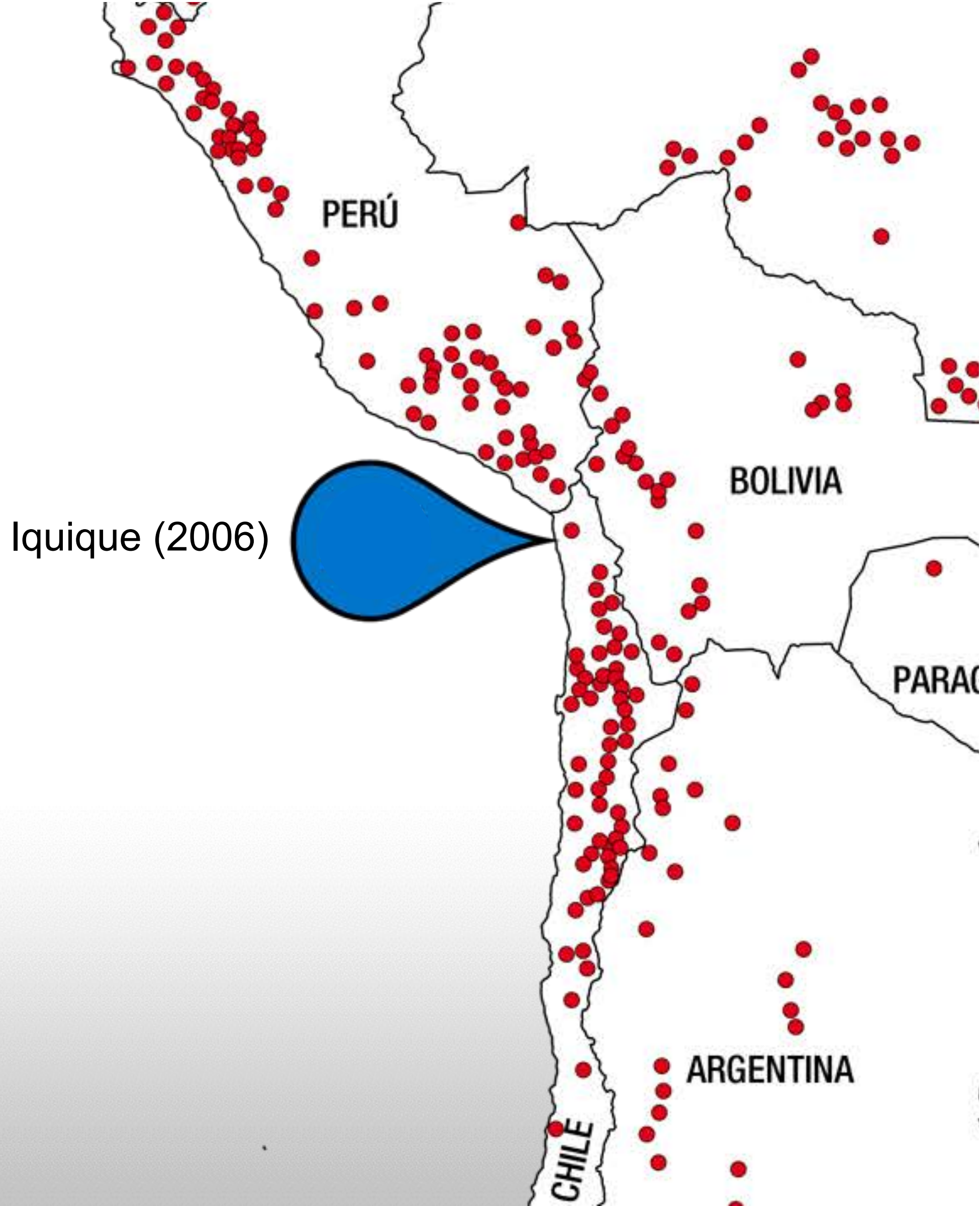
@PetarOstojic
CEO

Diseño y Manufactura Chilena de Clase-Mundial



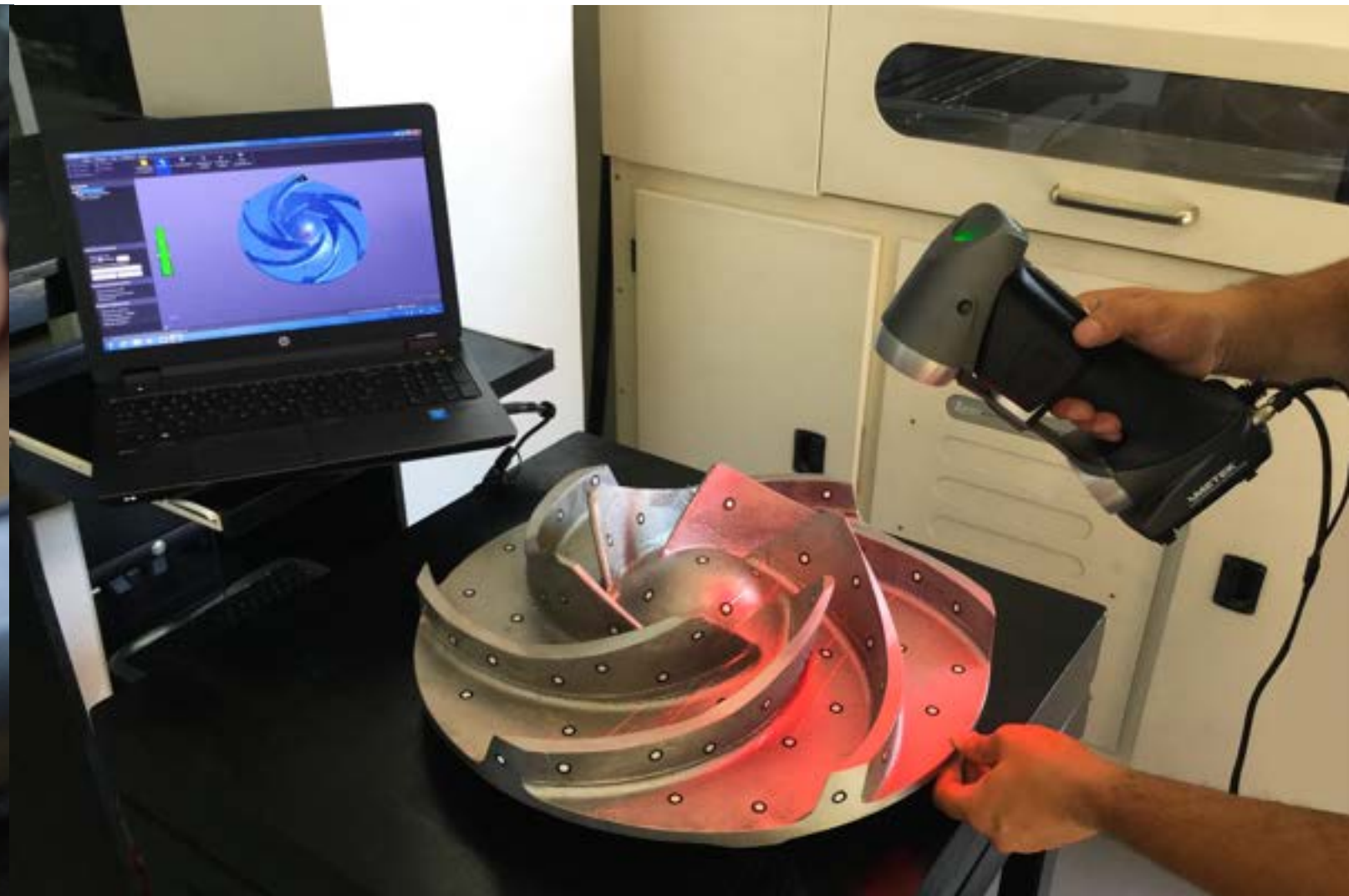
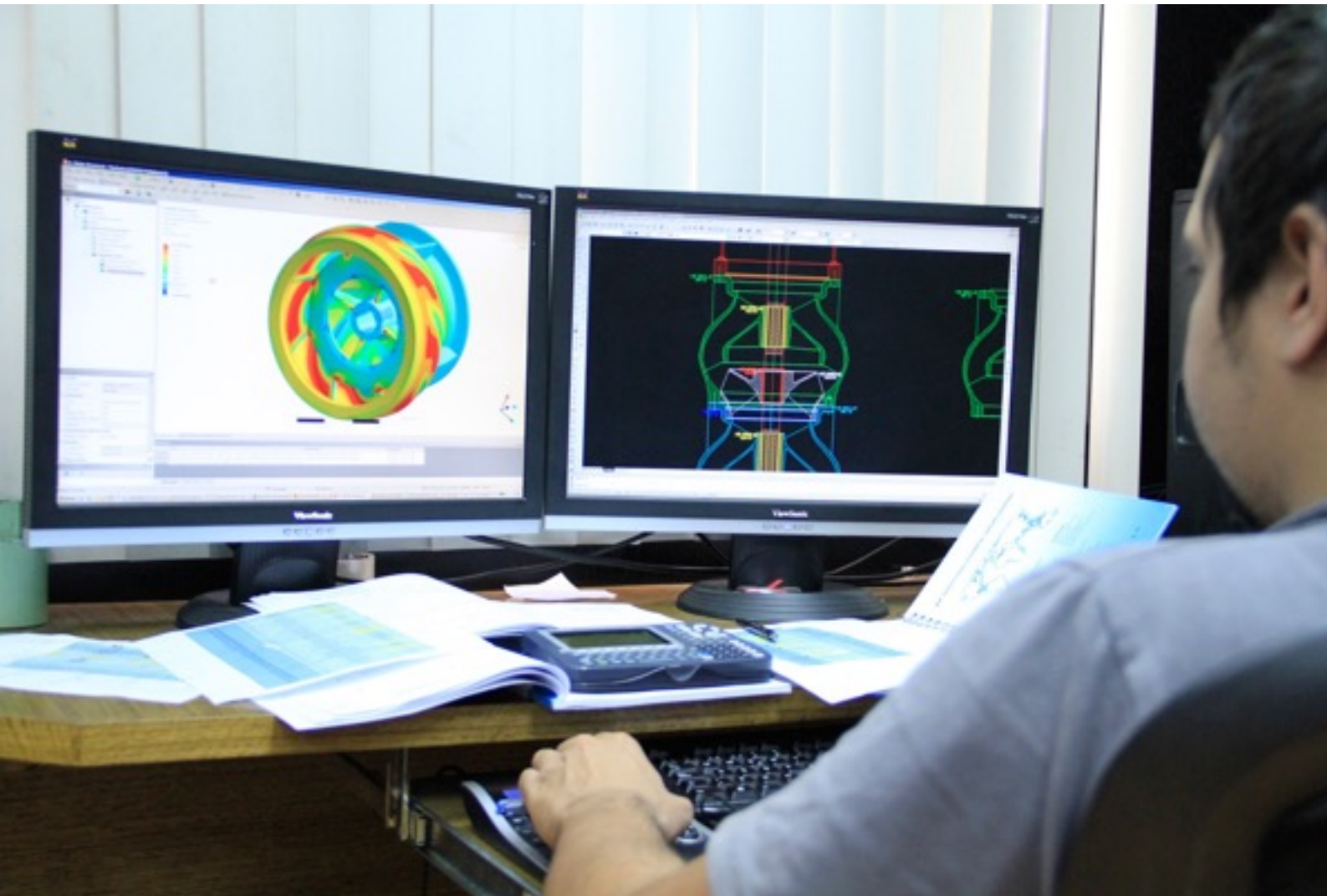


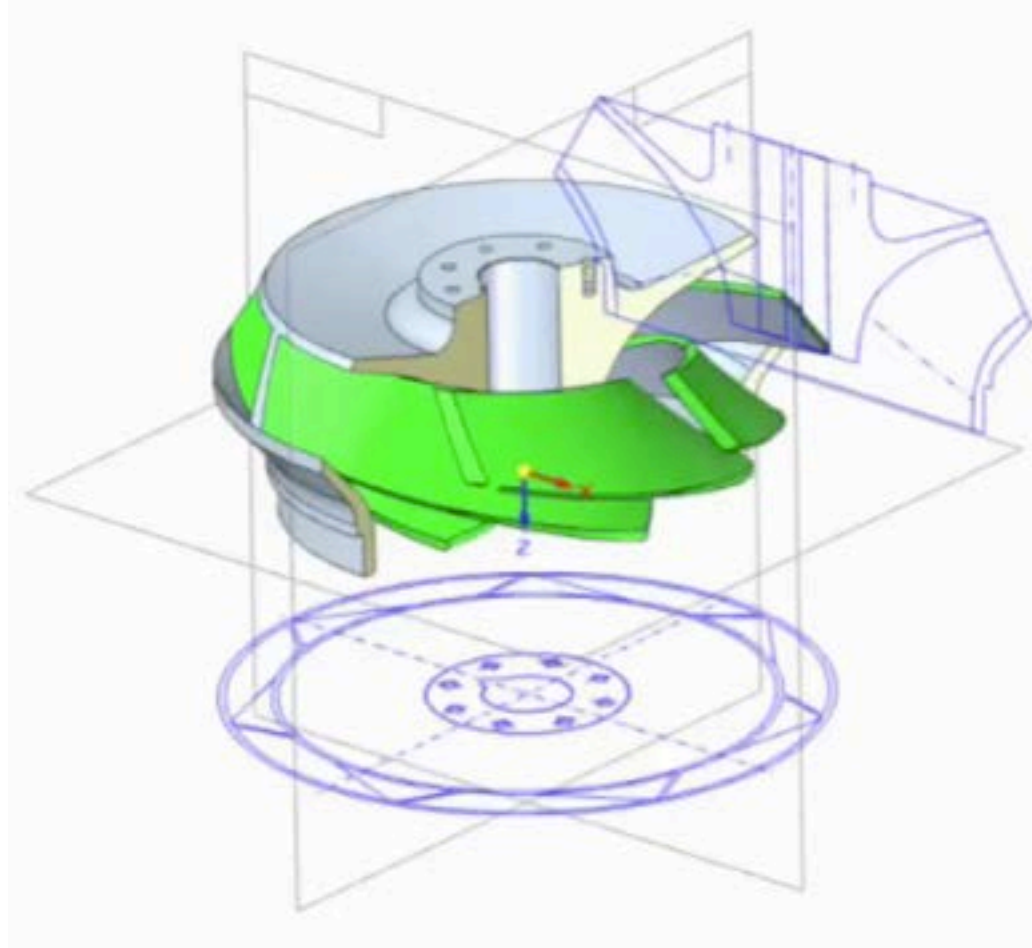




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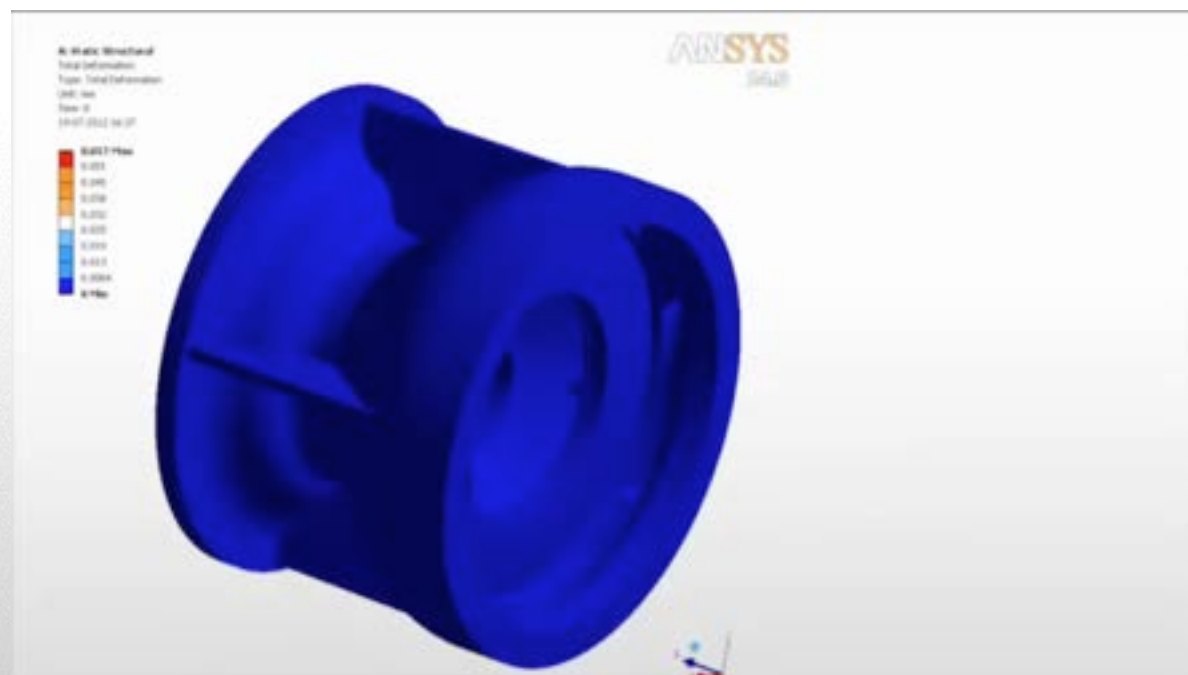




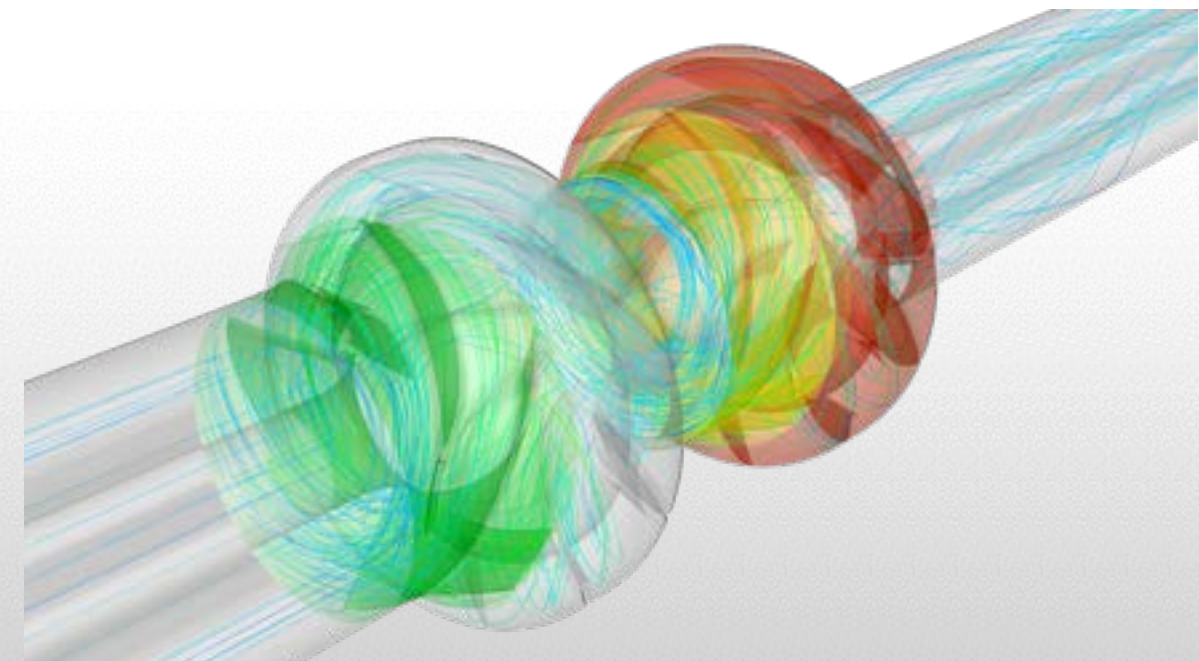
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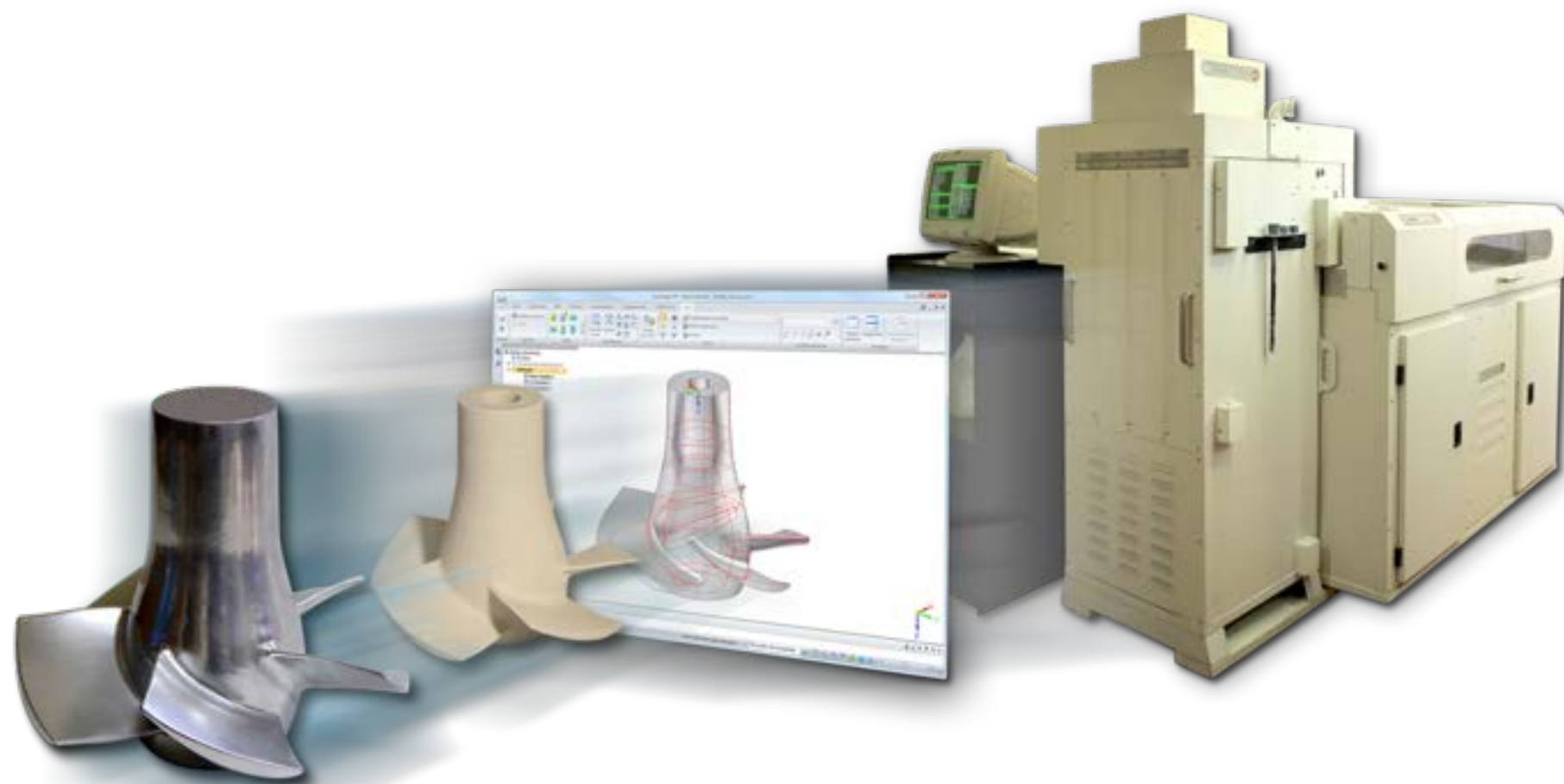


• Simulación de Fundición, Enfriamiento y Solidificación



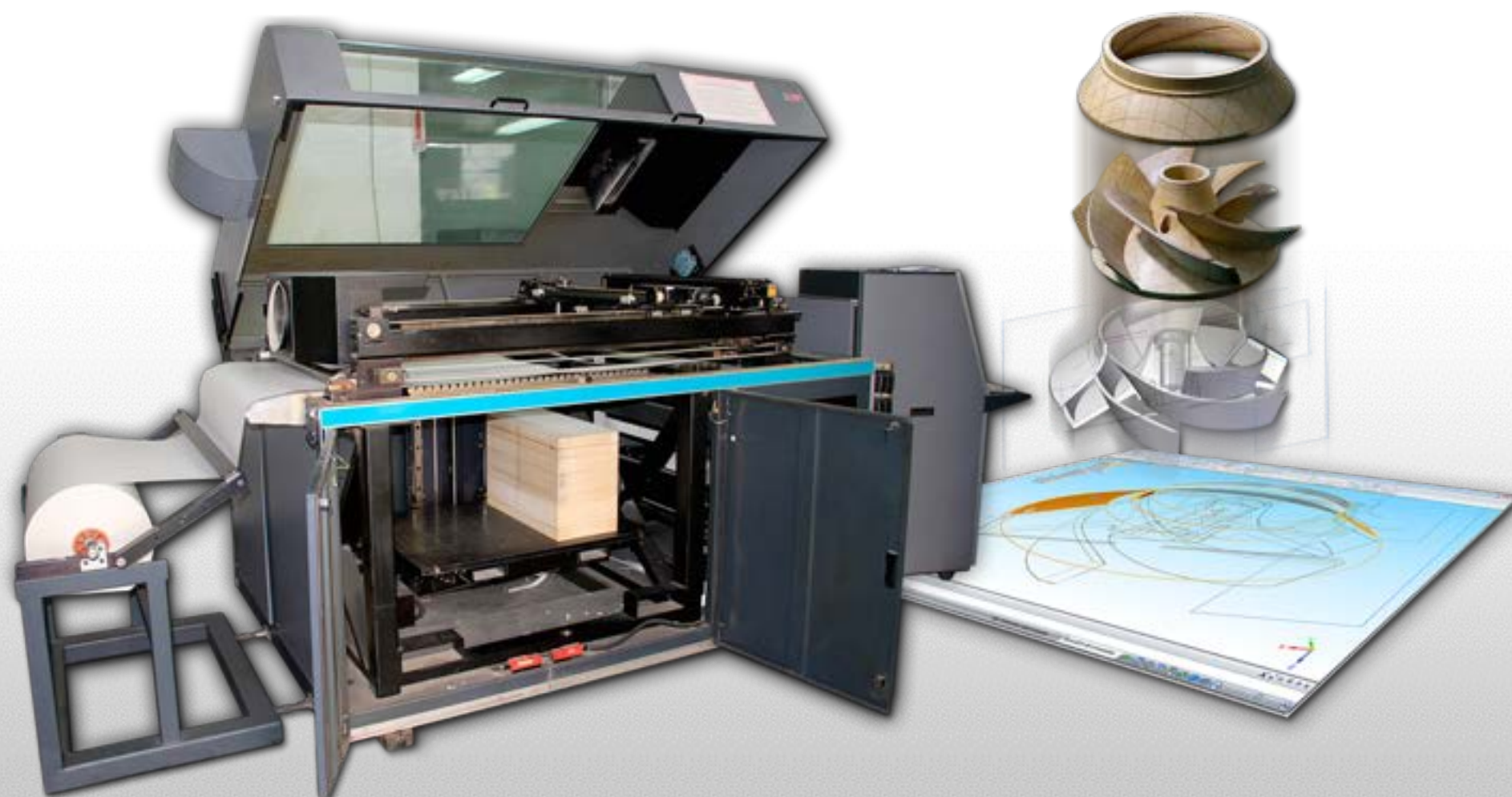
• Simulación de Dinámica de Fluidos Computacional y Análisis Elementos Finitos





3D PRINTING (3DP)

LAMINATED OBJECT MANUFACTURING (LOM)











Pumps and circular economy
January 2016



Axial thrust in vertical turbines
December 2015



Energy efficient pumps help fight climate change
August 2015



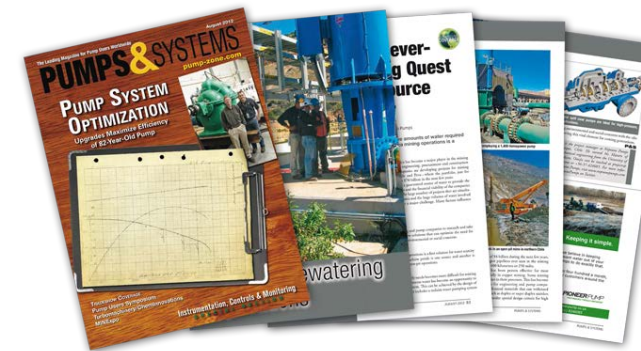
Mining industry gets pump improvements
October 2014



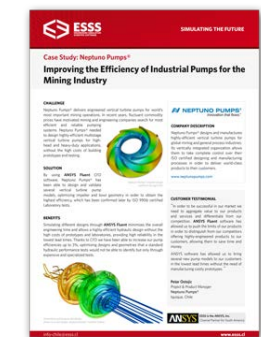
Energy Efficient Vertical Turbine Pumps Promote Sustainable Mining Efforts
January 2014



Optimización Energética y Disminución de emisiones de CO2
January 2014



The Never-Ending Quest for Source Water
March 2012



Improving the Efficiency of Industrial Pumps for the Mining Industry
October 2012



Water Management for Cooper Mining
August 2012



Re-powering Water Reclaim Systems
May 2012



Reclaim Water Pumping by Neptuno Pumps®
March 2012



South America for Growth and Diversity
November 2011







Sistema de Agua Recuperada Los Pelambres

+ 31% Caudal



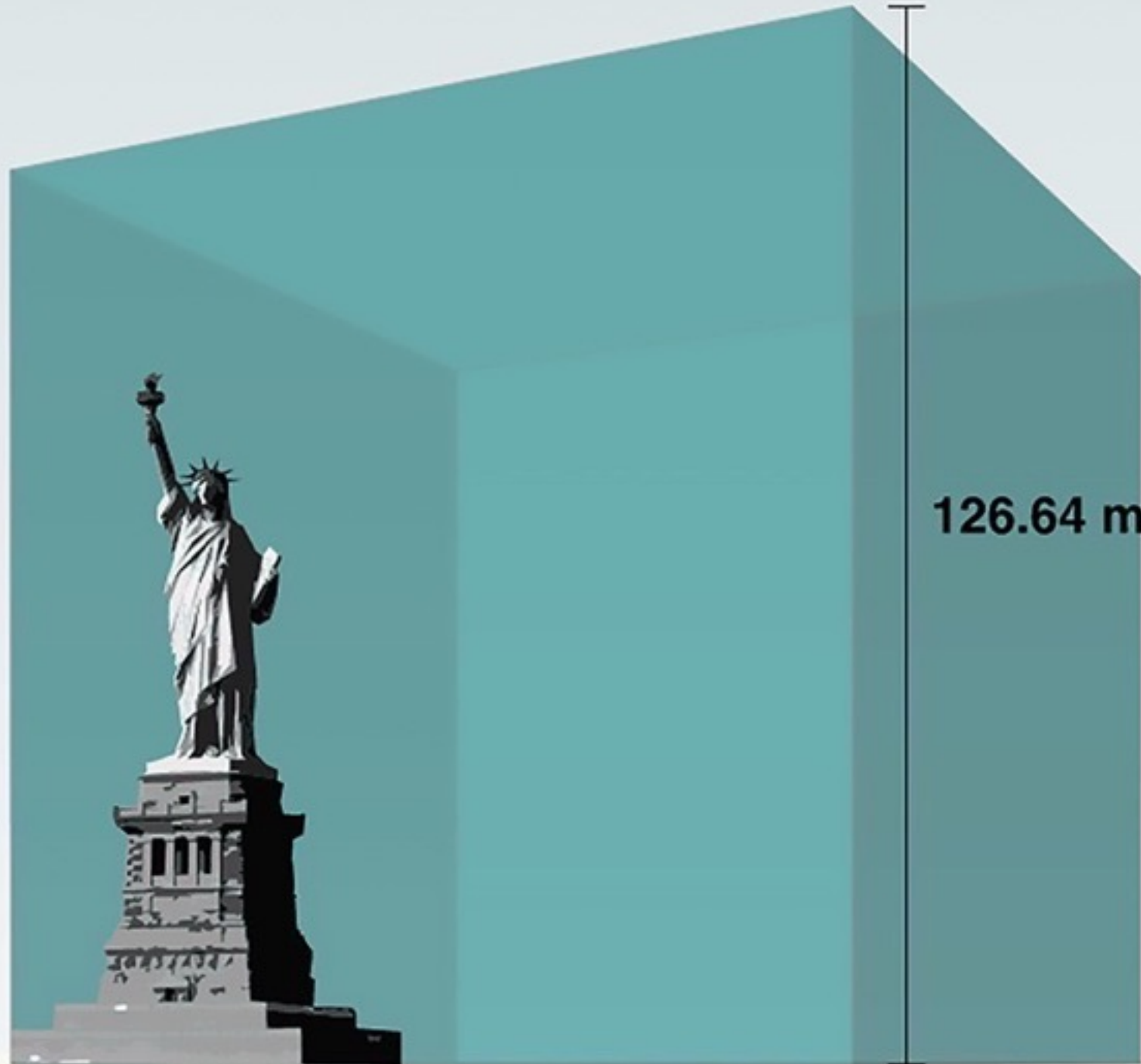
-34% Energía



US\$ 1.500.000



7000 tonnes of CO₂ *i*





Applications | WORLD PUMPS May 2013

Mining

Re-powering water reclaim systems

In the mining industry, production is directly related to the plant's total pumping capacity, and reclaim systems are the main source of water. With the pressure on to improve processes, Petar Ostojic discusses how pump manufacturers can help mining companies re-power their reclaim water systems with custom engineering solutions, improving pump capacity and reducing energy consumption.

In recent years, good copper prices have motivated the world's biggest mining companies to improve processes, increasing production with the shortest payback period and minimum operational intervention. Re-powering reclaim water pumping systems represents a huge opportunity for pump companies to increase engineering consulting to their service portfolio, providing fast and custom-engineered solutions to their clients, to optimise efficiency and reliability.

The pumping system

Lixi Petroleum Mining Company, based in China, has one of the ten largest copper deposits in the world. In 2011 the company advised several studies, searching for areas of improvement in their processes. One study showed that its reclaim water system represented a good opportunity to improve pumping capacity and reduce electricity consumption.

The reclaim water pumping system consisted of two feed pumping stations, as shown in Figure 1, originally designed to pump a total capacity of 300 l/s. These pump stations, named D1 and D2, were located with a difference in altitude of 240 m and approximately 60 km of 32 inch piping. Each station was equipped with six vertical turbine pumps (VTPs) with a total dynamic head (TDH) of 390 m and 382 m respectively. Each station had a 1100 HP motor.

The options

The first option studied was to modify the piping and get the pumps at 303 flow, however, this was not economically feasible because of the length of the piping system and it would require considerable civil works.

A second alternative was to re-engineer the existing pumps, taking advantage of the existing main components to minimise purchase costs. However, this option would require lengthy downtime of the equipment on both pump stations in order to obtain the desired duty point, such as adding an extra stage per pump, changing all impellers to their maximum diameter and replacing all shafts because of its new pump length.

The study showed that pumps on both stations were operating at off-design flow to the left of the best efficiency point - BEP, intersecting their system curves at 910 l/s and 820 l/s respectively, both with the same low efficiency performance of 69%, thus operating in a highly loaded condition. This situation was damaging the equipment and generating high operational costs because of the high energy consumption.

However, the piping system could still withstand an increase in capacity of approximately 10%, being able to reach up to 1100 l/s. Three different options were studied in order to accomplish this goal, but only one was economically and technically suitable for the client.

In both pump stations, the pumps were operating 9% below the BEP, ending 9% above it. This high efficiency allowed the reuse of the feed pump motors, replacing the 200 HP motors facing the client.

Figure 1. The reclaim water system was originally designed to pump a total capacity of 300 l/s.

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PIA 10th Anniversary
PUMP INDUSTRY AWARDS 2013

WINNER

This certificate is presented to
Neptuno Pumps
for
Repowering of Reclaim Water System

in the category
Technical Innovation of the Year - Projects

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on Thursday 14th March

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BPMA

Technical Innovation of the Year - Projects
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Awarded to Neptuno Pumps Repowering of Reclaim Water System

SIHI | WEG | John Crane | SOP | PROCESS | KSB | EPMA





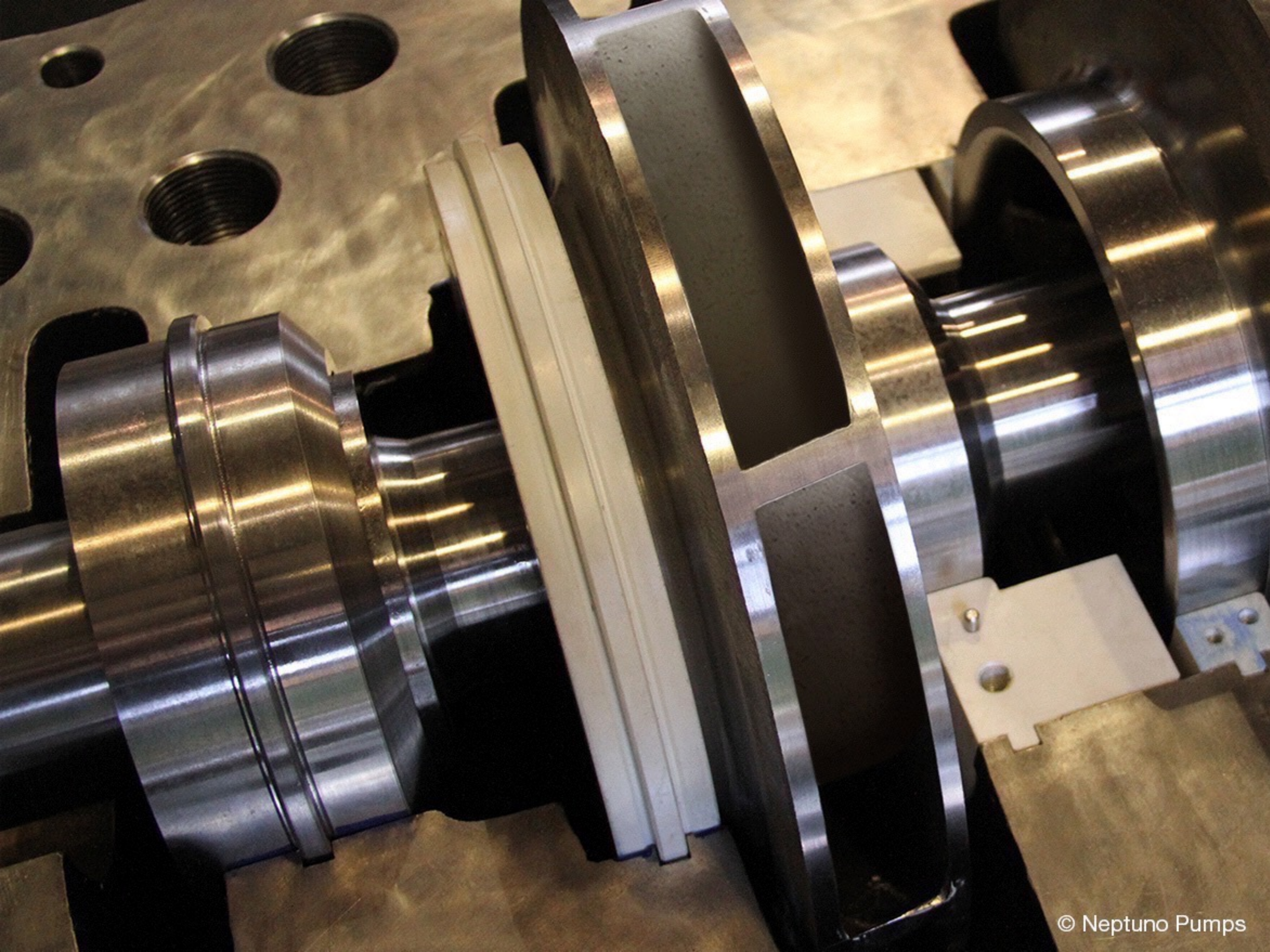
Sistema de Agua Fresca Collahuasi

4,500 m.s.n.m.

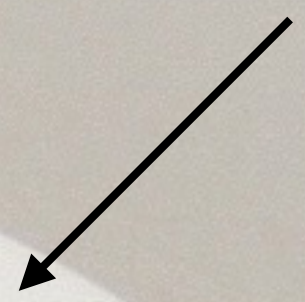


70,000 (mg/l) Cl

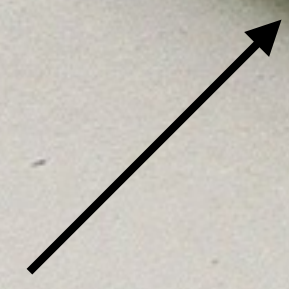




18,000 horas



3,000 horas





+600% Disponibilidad



-US\$650.000/año



Feature WORLD PUMPS October 2014

Construction & mining

Mining industry gets pump improvements

Plant in one of the biggest open-pit mine operations on the planet have to handle the exceptionally poor and aggressive quality of water. This article discusses how a combination of a pump shaft upgrade and the use of non-galling advanced thermoplastic represented a huge improvement in the pump performance.

For any new project, engineering and mining companies select their pumping equipment for some very specific duty conditions and fluid characteristics. However, when months and years go by some of these variables start changing, such as the pipeline internal diameter or the percentage of solid concentration in the fluid, which can impact pumps heavily and even experience catastrophic failures if no corrective measures are taken. This is certainly not desirable for the end-user, as it operation does not perform as planned, nor the pump manufacturer that usually receives negative reviews of its product.

It is estimated that annual maintenance and operations on pumps is 50% greater than any other type of rotating machinery and, furthermore, that they represent 25 to 32% of total plant motor energy, making them a key equipment for any mining process. However, as shown in our award-winning article "Re-powering water systems" (World Pumps, Number 547, May 2012), there is a new way of doing things in the mining industry, with its main focus in efficiency, sustainability and cooperation between end-user and pump provider that allow to innovate and improve their process, and this project is another example of that.

Composive water in the Andes
Compañía Minera Cona Inca de Collahuasi is thought to be the world's fourth largest copper mine and it counts as one of the biggest open-pit mine operations on the planet. It is located at 4,800 m above sea level in the Andean plateau of northern Chile's Tarapacá region. A few years ago, the company incorporated a new source of fresh water to its process. However, this water was characterized by its high levels of sulphides and chlorides, with values of 8300 mg/l and 50000 mg/l respectively making it one of the few places in the world with this poor and aggressive quality of water at such high altitude above sea level.

The pumping system
Before the incorporation of this highly corrosive water to their process, the company pumped water to a mineral tank connected through a manifold to a 17,940 l/h booster pumping station, as shown in Figure 1, with a total of ten Neptune Pumps (NPT) axial split case multistage pumps. Each pump had a capacity of 480 m³/h and a total dynamic head of 700 m. These pumps were selected for pumping clean water with low sulphide and chloride concentrations, as specified in the original project, therefore they were fabricated in accordance to the original quality of water which, at that time, only required metallurgy of standard cast steel, operating with optimal performance and reliability.



Figure 1. Booster station equipped with ten Neptune Pumps (NPT) axial split case multistage pumps with a total power of 17,940 l/h.

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PUMP INDUSTRY AWARDS 2015 **WINNER**

This certificate is presented to

Neptuno Pumps for Improving Performance of Minera Collahuasi's Water Pumping System

in the category

Technical Innovation of the Year - Projects

Sponsored by



at the Pump Industry Awards 2015, Kenilworth, UK on Thursday 19th March

Steve Schofield
Steve Schofield
Director
BPMA



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TATA STEEL


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 **GE** Oil & Gas

KSB 

wilo


GRUNDFOS

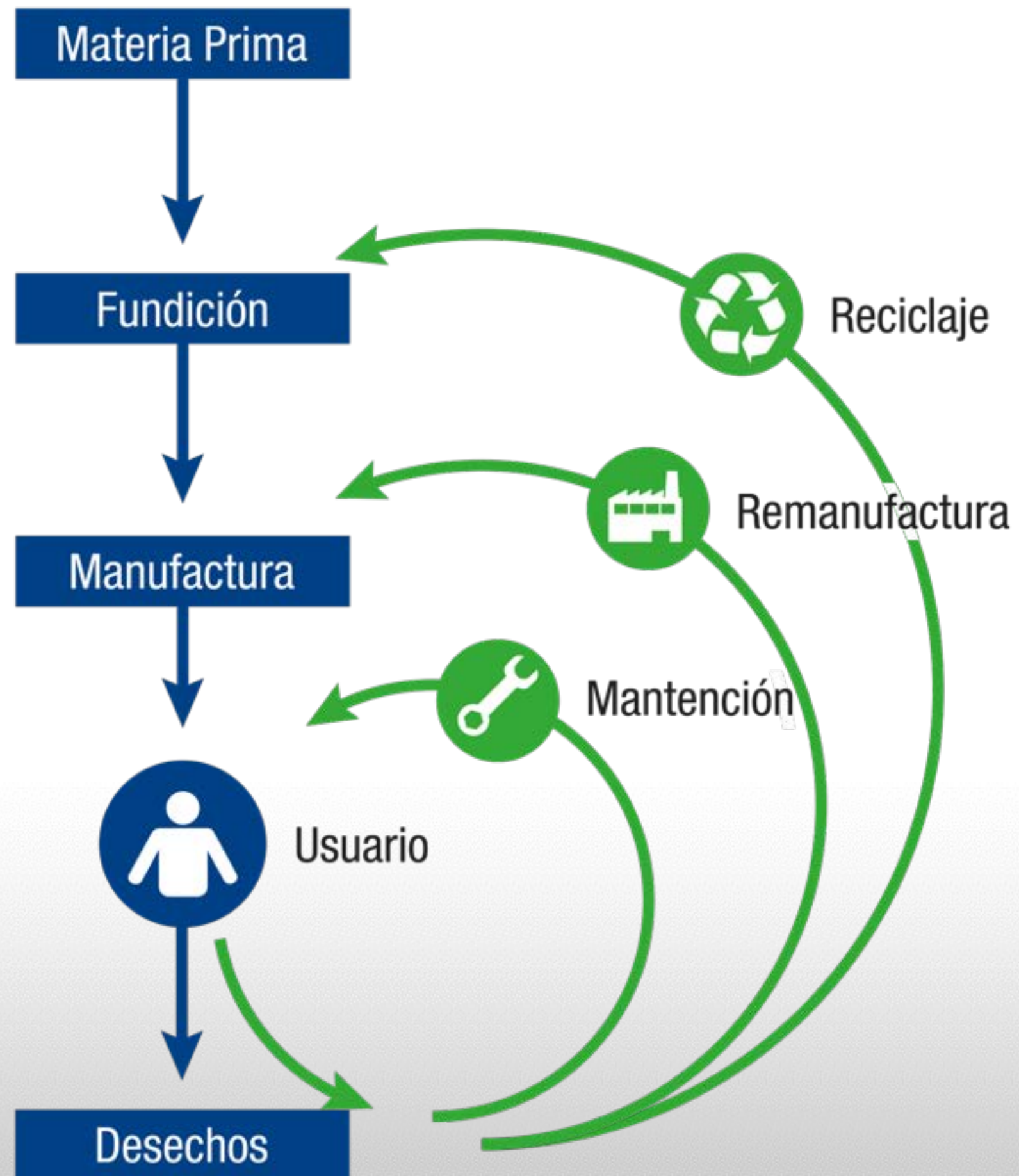
SULZER

 **ITT**

 **Ensival Moret**
A Moret Industries Company

400(t)/Mes











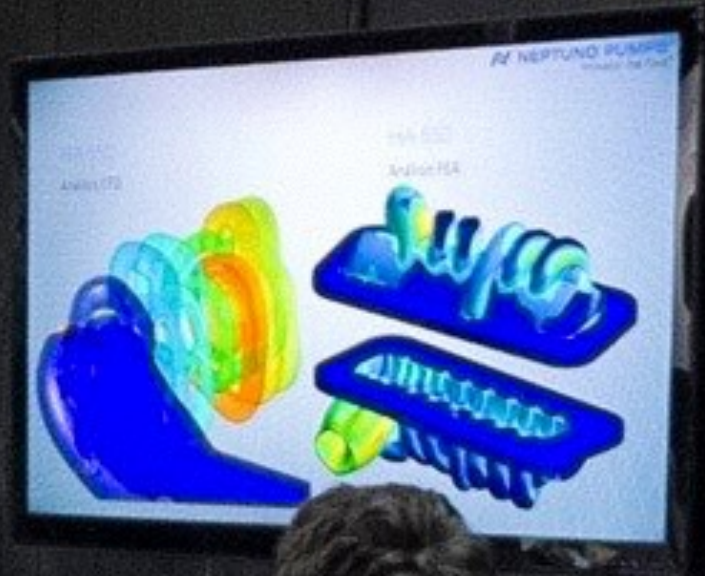
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Ley de
Fomento al
Reciclaje!



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100%
Diseños Modulares

60%

Materiales Recicladados



-70%

Desechos y Emisiones CO₂



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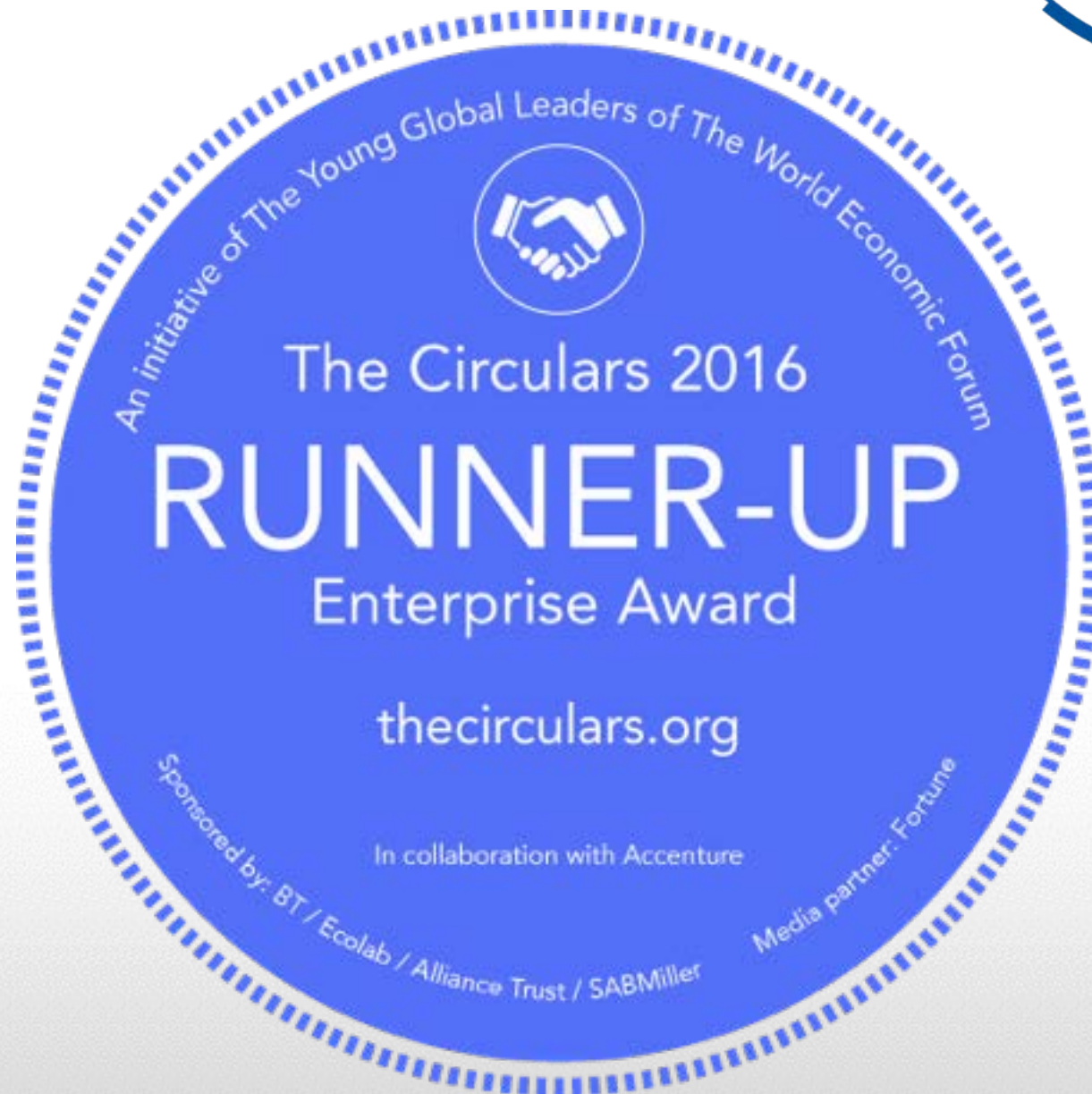
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WORLD ECONOMIC FORUM



WORLD ECONOMIC FORUM





Sistema de Agua Fresca Los Pelambres

- 15% Energía



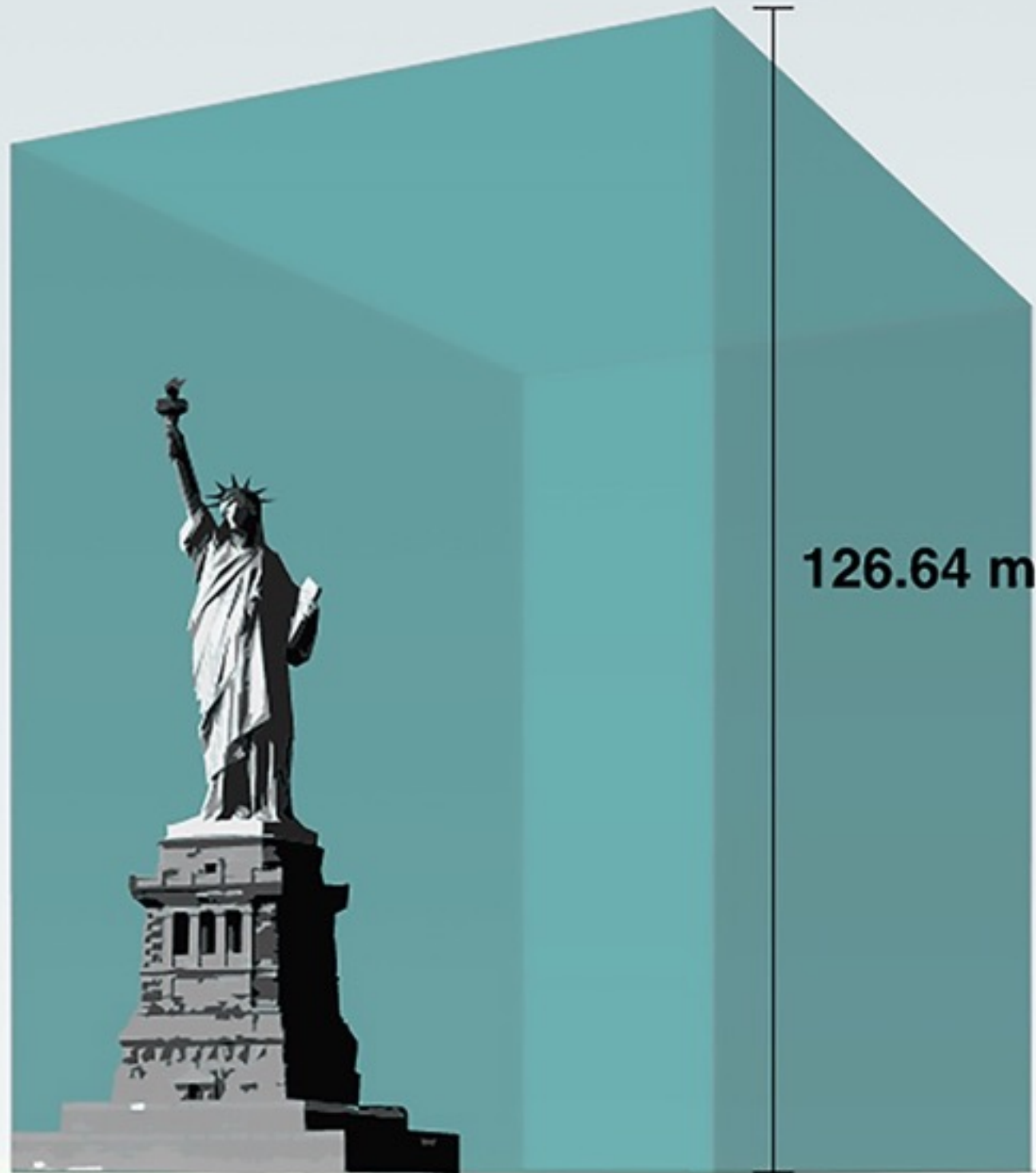
US\$ 580.000



-70% Desechos



3.8 kilotonnes of CO₂ *i*





Feature **WORLD PUMPS July/August 2016** Feature **September 2016**

Mining

Energy efficient pumps help fight climate change

Global warming is currently one of the greatest threats to humanity; Latin America being one of the most vulnerable regions in the world. Neptuno Pumps' project & product manager, Petar Ostojic, shows how energy efficient pumping systems and a circular economy approach can help mitigate the effects of climate change.

Pumps are essential to human life and are considered the heart of industry, accounting for 30% of total energy consumption on an average industrial site. However, 30% of pumps are operating at low efficiencies worldwide, wasting millions of dollars in energy and emitting millions of tons of carbon dioxide every year. Several studies have shown that an old worn pump operating 20% below its best efficiency point will consume up to 40% more energy and will produce twenty percent more carbon dioxide in order to deliver the same volume of water.

The mining industry is heavily dependent on water and energy, two resources which are particularly scarce and valuable in Latin America; nonetheless, pumping systems are still the 'vanguard' in the sector for this sector, and no serious or definitive measures have been taken in order to improve neither their energy efficiency nor their carbon footprint.

To put in perspective, the global average carbon emission per person is 7 tons, which is approximately the weight of a large male elephant. At the same time, a single 15,000 hp robust water pumping system produces 136,900 tons of carbon annually; fortunately some mining companies have started noticing the 13,270 elephants in their pumping stations.

The pumping system
Antofagasta Minerals Minera Los Pelambres in Chile, has led the transition towards a new more cooperative business model with its providers, creating synergies that have allowed them improve their pumping systems with outstanding economic and environmental results, saving millions of dollars in energy and reducing thousands of tons of carbon emissions each year. For more information read the article Mining industry gets pump improvements, World Pumps, 171, October 2014.



Figure 1. CHN's pumping station powered by its original 1250 hp motor, located in Antofagasta Minera Los Pelambres in Chile.

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3^{er} Ranking de
Proveedores
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5^o Ranking de
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