

# Solar-powered Vineyard Irrigation System



<b>Subject</b>	Hacienda Araucano Vineyard owned by François Lurton	<b>Location</b>	Colchagua Valley, Central Chile
<b>Application</b>	Solar powered irrigation system	<b>Implementation</b>	Project planned and installed by iEnergia, Santiago, Chile
<b>Size</b>	30 ha of vines	<b>Installation</b>	2012



## THE PROBLEM

With a hot and dry climate and possible variations of the groundwater supply, in order to preserve the high quality of the wine, François Lurton and his team at Hacienda Araucano needed a reliable solution to meet their irrigation needs. Four years ago the company implemented an "eco responsible policy" which requires an environmentally responsible and long-term sustainable solution.

## THE SOLUTION

iEnergia designed, specified and installed a solar powered water pumping system using LORENTZ pumps and solar trackers. The vineyard now has a solution which greatly reduces drought risk, removes reliance on grid power, allows them to irrigate when it is best for the quality of their produce and saves money. All of this is done while reducing their carbon footprint and impact on the environment. The installation supports the "Biodynamic" labels' stringent standards.



## THE CUSTOMER

Hacienda Araucano, located in the Colchagua Valley is one of many international vineyards owned by the famous French wine family Lurton.

On this exquisite terrain François Lurton and his team have developed 30 ha of high quality vineyard with grapes of different varieties. They produce a range of fine wines including "Alka" made from the unique and ancient carmenere grape, long thought of as lost to the phylloxera virus that destroyed virtually all the European vines.

Lurton are focussed on the finding ways to sustainably produce their award winning wines. A long term program has been in place to reduce the impact on the environment.



## THE CHALLENGE

It is not the phylloxera virus that is the challenge for Hacienda Araucano but two new enemies that François and his team have to tackle – drought and energy costs. With the phenomena of global warming and La Niña (the opposite period to El Niño) average rainfall in the region has become less and less over the last ten years.

In the wonderful Chilean climate the irrigation requirements for the vines peak at 30 litres per second in periods where temperatures reach 40 °C. Water sources on the estate cannot meet this demand during the summer season with a maximum of 10 litres per second being available in the dry period.

The situation that the Lurton team found themselves in is summarized below:

- Water demand outstripping availability by three times during the dry period
- The water source being 2.5 km away from the vines.
- Electricity costs for existing electric pumps were rising at 14 % per annum.
- Existing pumps were being overdriven to try to get close to the vineyards irrigation demands, this resulted in higher electricity costs and poor reliability.
- Concern for the well-being and reliable production from the vines because of long periods where no grid electricity was available. Grid electricity is becoming less reliable because of infrastructure issues (earthquake) and general power availability from the supplier.



“This project fits perfectly with our company and brand ethos, we can deliver our wines with passion, quality and consistency, assured that we are doing so in a sustainable and responsible way.”

*François Lurton*



## RISING TO THE CHALLENGE

François Lurton and his team were certain that a radical solution to their problems was needed.

iEnergia have been working on solar water pumping projects in Chile for the past three years. The Lurton team recognised iEnergia's expertise and called on them to develop an innovative solution that would give Hacienda Araucano a good long term sustainable answer to their irrigation and water security problems.

Developing a solution required a full analysis of the water needs at different times of the year and then to compare this to the natural availability of surface and ground water.

Following in depth analysis the key to success was identified as being the

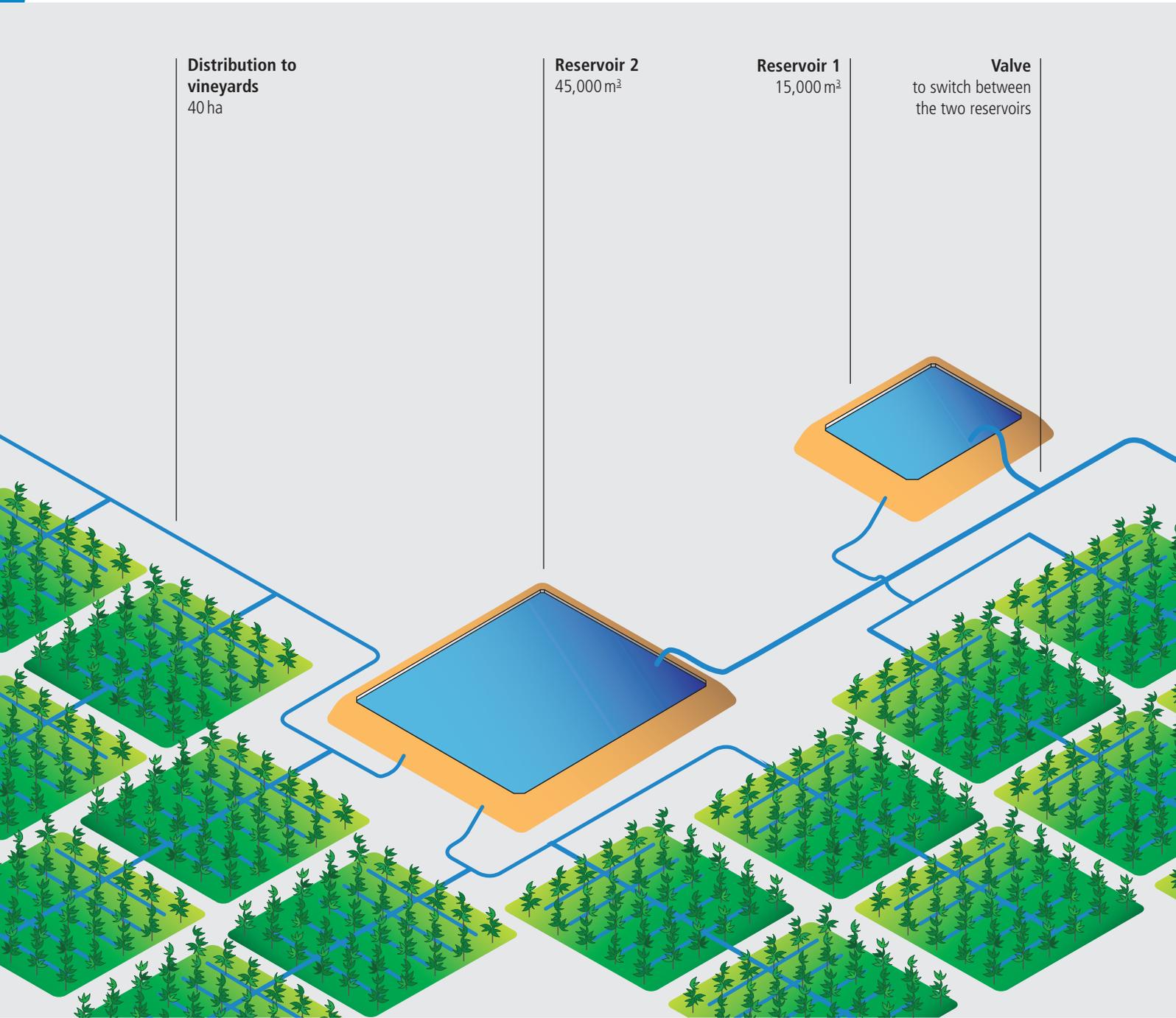
ability to store sufficient water through the year that would allow the vineyard to irrigate for two months from stocked water irrespective of the summer rainfall. The solution would result in Hacienda Araucano being drought proof and able to deliver their excellent products reliably and sustainably.

A reservoir of 45,000 m<sup>3</sup> – 45 million litres – was specified. The reservoir would be filled by a LORENTZ solar powered PS21k pump system, the largest solar pump available on the market. There would be no grid power, the system would be entirely solar powered. The pump system was specified to supply 134,000 m<sup>3</sup> of water per year powered by a 16.5 kWp tracked solar array. The pump would be located 2.5 km away from the reservoir and pumps over a 61 m hill.

Designing such a system is very complex and made possible using the COMPASS design software also from LORENTZ. Following a survey of the site and some careful thinking COMPASS was used to calculate the daily solar energy available and water output under different scenarios. Solar cell temperature losses, pipe friction losses and even cell dirt losses are calculated to ensure that the Lurton team would get exactly the water they expected.

The new solution will remove the existing 80 Hp grid powered pumps resulting in a sustainable, reliable and environmentally friendly solution without any reliance on outside power supply.

The project was planned to provide a three year return on investment against existing operating costs.



“Working with LORENTZ products we are always confident that what will specify will work first time, deliver what is expected and continue to do so reliably and efficiently.”

*David Kennedy*



## TECHNICAL DATA

### Pump System

A LORENTZ PS21k submersible solar pump system was specified. iEnergia are a Premier Distribution Partner for LORENTZ in Chile.

The PS21K CSJ42-10 is capable of delivering flows of up to 62 cubic meters per hour and will operate at a maximum head of 90 metres.

### PV Generator

16.56 kWp of photovoltaic modules we installed on 6 tracked arrays. LORENTZ ETATRACK trackers 3x ETATRACK active H1500, 2x ETATRACK active 1500-A, and 1x ETATRACK active 2000-A were installed. The ETATRACK tracking systems increases the yield from the solar generator and by tracking the arc of the sun through the day ensure maximum power is available for an extended period in the early morning and late afternoon.

### Pipeline

2.5 km pipeline from the water source to the reservoir. Pipeline diameter is 140 mm and rises 61 m along its length.

### System Design Performance

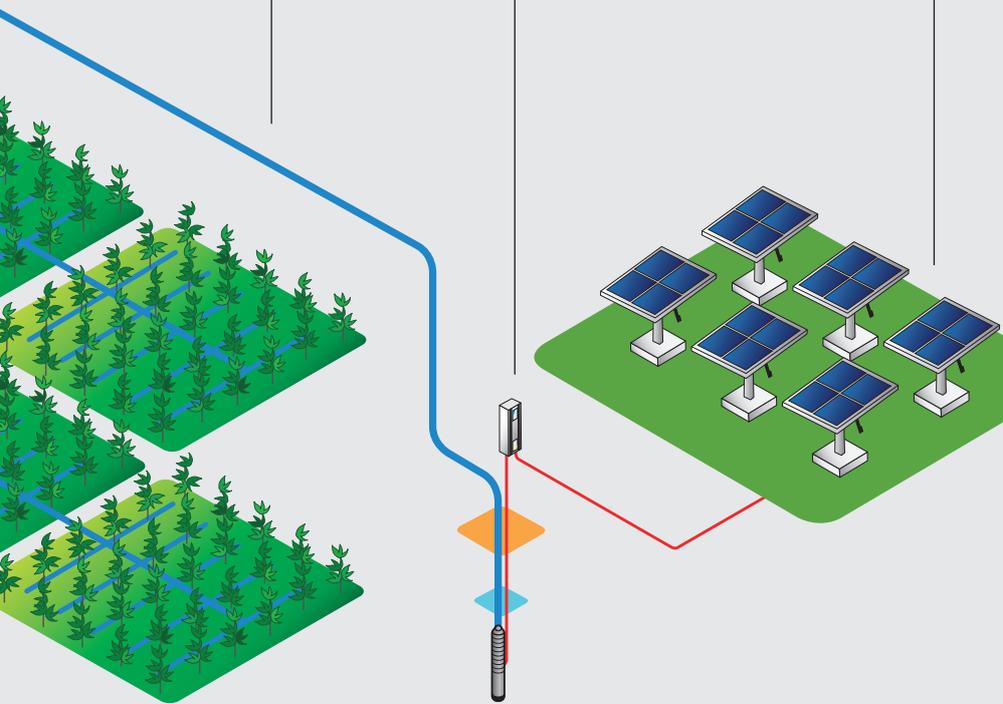
Volume pumped per year 134,000 m<sup>3</sup>

Peak flow per day 500 m<sup>3</sup>. With an annual average of 10l/s

**Uphill to first reservoir**  
TDH 61 m  
pipe length 2,500 m

**Pump**  
PS21k CS-J42-10  
up to 62 m<sup>3</sup>/hour  
peak flow 500 m<sup>3</sup>/day  
134,000 m<sup>3</sup>/year

**Solar generator**  
16.56 kWp  
on 6 trackers  
ETATRACK active



## IMPLEMENTING THE SOLUTION

Working with the vineyards agricultural staff the project was agreed and a staged work plan implemented that would have the system running at the beginning of July. iEnergia sourced the components and used their experienced staff to start the implementation. Ironically freak rainstorms made the site inaccessible to vehicles for three weeks which delayed the project slightly.

On the 24 July the pumps were started for the first time, everything went exactly to plan. The initial water volumes that the pump delivered exceeded all expectations, somewhat aided by the very sunny, warm winter weather which followed the rain storm.

The reservoir is now filling nicely in time for the start of the irrigation season in October.



“If you had asked me if solar was the right solution to our challenge then I may have been a little sceptical, what has been achieved here is ground breaking for us and for our industry.”

*François Lurton*



## THE RESULTS

The results from this project are impressive.

- No grid power is required making savings of US\$ 40,000 per year
- Payback on the project, just considering operating costs, will be less than three years
- The risk of drought damage to the vines and the winery production has been greatly reduced.





## ABOUT IENERGIA

**iEnergia is the Chilean distributor for LORENTZ Solar Pumps.**

iEnergia is a well established company with their head offices and warehousing in Santiago. With a broad range of skilled people and an extensive stock levels we offer fast, cost effective solutions to energy problems. Our range of exclusive high end products includes ultra efficient commercial and public lighting, solar pumping and generation of electricity using solar panels.

Our principle objective is to offer our clients the best solution for their needs, we are always at the front edge of research into new products from across the globe to ensure that we have innovative, reliable and economic solutions for our market.

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## ABOUT LORENTZ

**LORENTZ is a market leader in solar powered water pumping solutions.**

Founded in Germany during 1993 LORENTZ has pioneered, innovated and excelled in the engineering and manufacturing of solar powered water pumping.

Today LORENTZ is active in over 120 countries through a dedicated network of professional partners. LORENTZ technology uses the power of the sun to pump water, sustaining and enhancing the life of millions of people, their livestock and crops.

**Simply – Sun. Water. Life.**

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