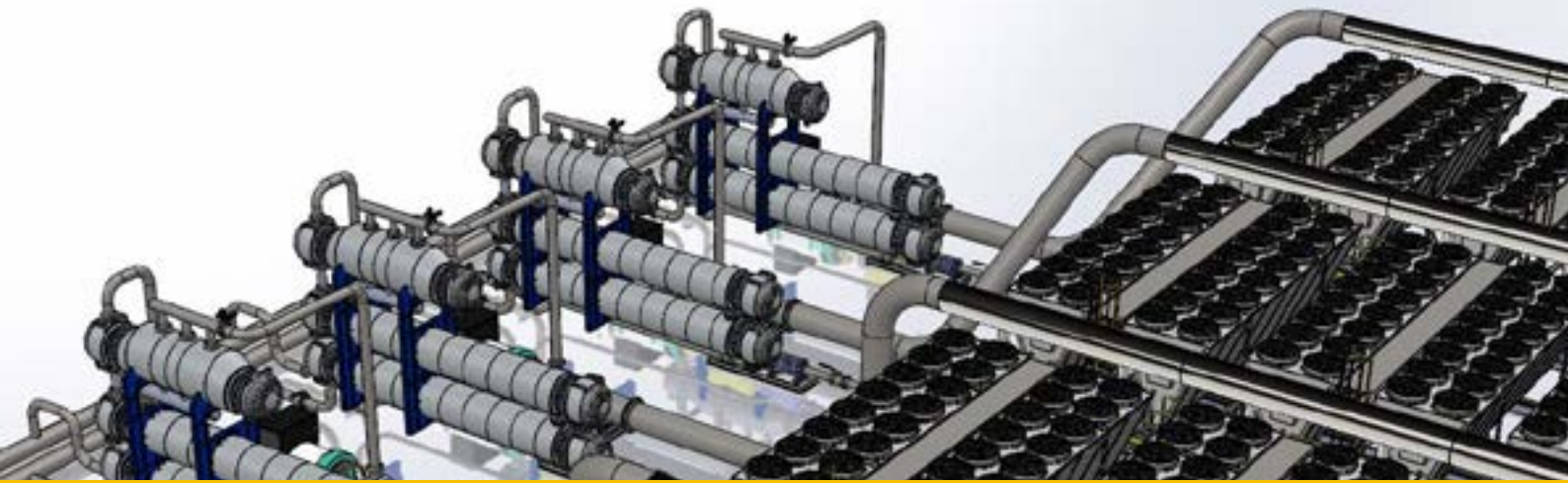


# Geothermal Power Plants



AQYLON ORCs using our proprietary axial multistage **IBA\*** turbine concept

\* Inflow bearing architecture

## Environmentally friendly

For high temperature applications, AQYLON's organic working fluids have a very low Global Warming Potential (GWP 3-20).

## Rugged

AQYLON's ORC modules are designed for durability and fit into standard containers, allowing for modular deployment.

## Efficient

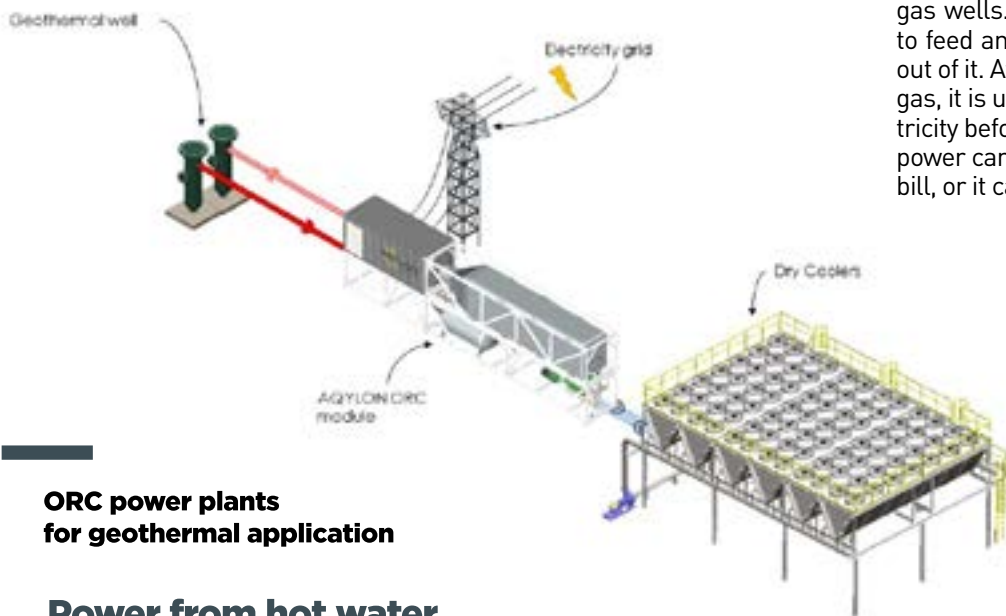
AQYLON's ORC modules apply cutting edge technology to maximize efficiency according to the heat source. AQYLON holds four patents related to turbines and ORC technology, and eight more are pending.

## Geothermal Plants

ORC modules are available for solutions up to 15 MWe. AQYLON is proud to offer either the ORC alone or a complete turnkey geothermal power plant. Our Organic Rankine Cycle (ORC) technology is the best solution geothermal plants of any size.

### Co-produced fluids

Hot water is a nuisance as a byproduct at oil and gas wells. It is possible to use co-produced water to feed an ORC and therefore produce green power out of it. After separating the hot water from oil and gas, it is used in our ORC modules to produce electricity before being reinjected in the soil. This green power can then be used onsite to off-set the power bill, or it can be sold to the grid.

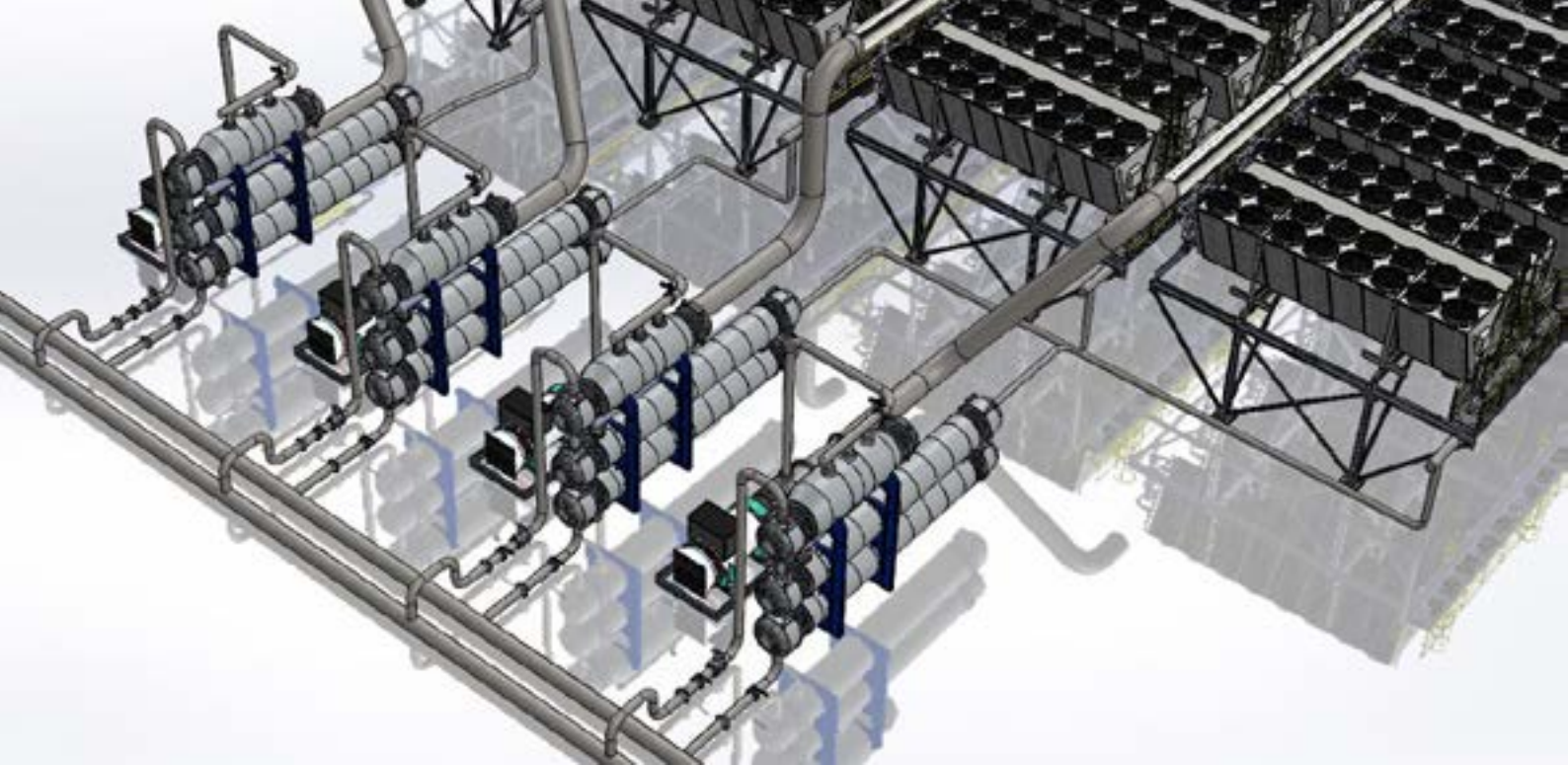


### ORC power plants for geothermal application

#### Power from hot water

Geothermal water can be used to produce electricity alone, or both electricity and heat. In this case, the heat is usually used for district heating networks.

The ORC can also be used in the district heating network itself. Electricity production can then be increased when there is less heating demand, optimizing the overall network profitability.



## Create value from your geothermal source

The geothermal binary power plant designed by AQYLON ensures maximum availability no matter how corrosive and aggressive the geothermal water is. The multi-ORC power plant guarantees continuous valorization of the geothermal energy even during maintenance periods. It also allows power plant production to be adjusted if well production decreases, without losing electrical efficiency.

The evaporators, the power plant's most critical component, are made of high quality steel: duplex, super duplex or hyper duplex, depending on the water quality.

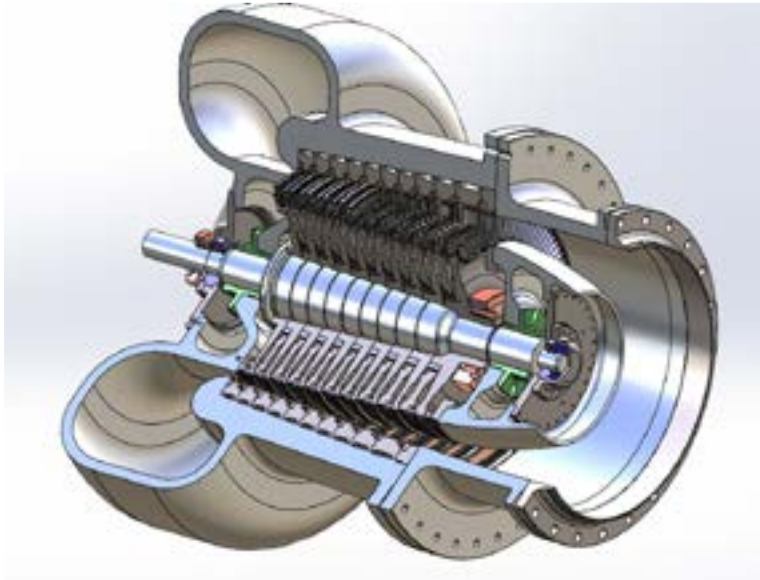


## Engineering Services

AQYLON also provides engineering services of cycle optimization for geothermal power plants. AQYLON's multidisciplinary engineering team has unique expertise and a flexible development approach to create tailored solutions that best fit the client's geothermal power project. We can provide you with design and engineering services using the best design softwares :

- Fluid Property using REFPROP
- Heat Exchanger using ASPEN
- Turbomachine CFD using Star CCM +





## AQYLON's axial multistage IBA turbine concept

AQYLON's axial multistage IBA\* turbine concept is a multi-stage axial turbine with impulse blading. Its architecture ensures:

High mechanical and vibrational stability: two journal bearings supporting the shaft are placed on either side of the turbine stages

Higher lifespan thanks to journal bearings and highly efficient shaft sealing specifically designed for ORC fluids

High conversion efficiency: up to 12 stages, ensuring low expansion ratios at every stage to minimize losses

High adaptability: the high number of stages guarantees satisfying performances for off-design operating regimes

\* Inflow bearing architecture

These are the main specifications for a given site data :

		Parameters	Unit	ORC module ATM-3000M
Temperature range - 90°C to 220°C	<b>Electrical Power</b>	Gross electrical production up to	kWe	3301
		Net electrical production up to	kWe	3000
		Self consumption	-	9,1%
		Electrical gross efficiency	%	16,45%
		Electrical net efficiency	%	15,0%
	<b>Hot Circuit</b>	Geothermal water inlet temperature	°C	185
		Geothermal water outlet temperature	°C	65
		Heat input	kW	20 062
	<b>Cold Circuit</b>	Cooling water Inlet temperature	°C	12
		Cooling water outlet temperature	°C	24
		Residual heat	kW	16912

The low/medium temperature ORC modules can address water temperatures from around 90°C up to around 220°C, for ORC sizes of 1 MWe to 3 MWe. The sizing of the ORC will be a combination between the water temperature, its flow rate, its water composition, and the cooling possibilities (water or coolers). When we have this information we can easily size the ORC.

# Geothermal Power Plants

## A wide range of financing solutions

Depending on the territory and the applications, if there is no will or capacity to invest in an ORC solution, AQYLON offers a fully financed solution where all costs and risks associated with our ORC modules are assumed by external investors. In exchange, the client provides AQYLON with a Power Purchase Agreement (PPA). The client agrees to purchase electricity produced by AQYLON's ORC modules at a price that is 5 to 30% below the plant electricity price or plant generation cost. At the end of the PPA period, the client can renew the PPA or purchase AQYLON's ORC modules at a greatly reduced price.

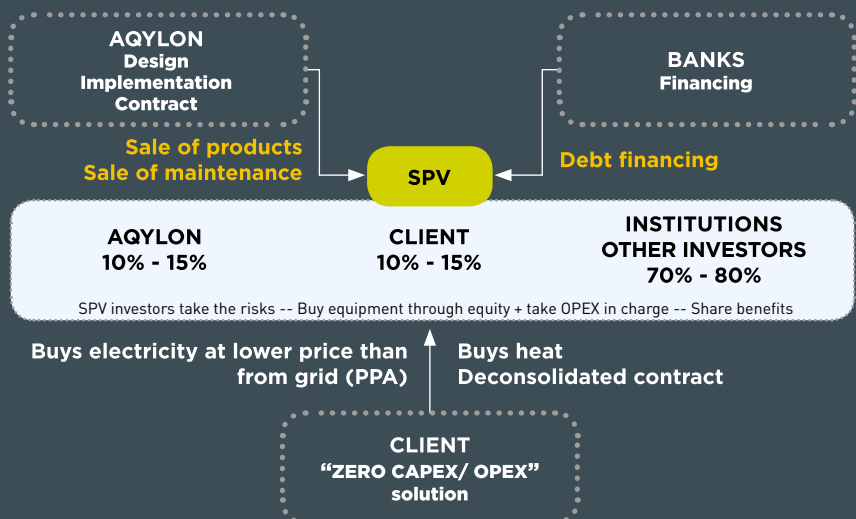
### Our Project Financing Model:

- Creation of a Special Purpose Vehicle (SPV) that owns the solution
- Sale of electricity or heat at an offtake price guaranteed for the long term
- Any performance risks are carried by the SPV
- No impact on the balance sheet of the client ("Zero Capex/Opex")
- Partitioning of the added value between the client and the investors
- This arrangement allows projects with longer payback times to be financed

### There are three possibilities at the end of a 7-10 year PPA contract:

- 1) **There is no contract renewal:** The SPV that owns the project has 6 months to take back its equipment.
- 2) **The PPA is renewed:** Conditions will be determined for the renewal period. The minimum contract renewal period is 5 years.
- 3) **Buyback option:** The customer can purchase the ORC equipment at a greatly reduced price.

If a power plant can provide AQYLON with a hot exhaust stream, we can produce electricity and sell it to the plant at preferential pricing.



# Geothermal Power Plants

**For more information,  
please contact our customer support center**

**Phone: + 33 (0) 1 40 56 07 36**

**E-mail: [contact@aqylon.com](mailto:contact@aqylon.com)**

**<http://www.aqylon.com/>**

AQYLON designs, manufactures and installs complete ORC solutions (Organic Rankine Cycle) for the production of electricity from high temperature heat sources, at a competitive price. AQYLON proposes standard and tailor made solutions up to 15MWe. Targeted applications include recovery of waste heat from engines, recovery of industrial waste heat, biomass power plants, geothermal and solar thermal sources.

AQYLON offers two business models. Customers may invest through the usual product purchasing process. For customers not willing to invest, we have a "ZERO CAPEX/ OPEX" option with turnkey solutions fully financed with the sale of the produced electricity, at a lower price than the grid (PPA).

All product descriptions, technical specifications and representations may change without prior notice. The information contained in this document includes general descriptions of some technical options available, which may not apply in all cases. The required technical options should therefore be specified in the contract.

## Your Local Contact:

