

# CASE STUDY

Turboexpander Modification & Redesign

## Turboexpander-Generator

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**METS  
Presentation**

**18/02/2015**

by *Dr. Houman  
Shokrane*h of  
*L.A. Turbine*

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### Specifications

Wheel Diameter	60.3cm (23.75")
Speed	12,500 RPM
Operating Temperature	177 to 204°C (350 to 400°F)
Wheel Power	12 MW

In 2010, L.A. Turbine was asked to solve a problem with another manufacturer's turboexpander-generator in a geothermal power plant. Commissioned in 2000, the unit had failed repeatedly over its 10-year life, with MTBF of only six months. The longest run cycle was 18 months, but with less than 10 MW power output. A metallurgical study of previous failures showed the Hirth coupling attachment was the first to fail in all cases. L.A. Turbine designed a four-lobe polygon shaft-wheel attachment to support the high-speed, high-power and high-temperature application. The redesign reduced centrifugal stress and vibration and increased power transfer capacity. For more than two years, the redesigned turboexpander-generator has run continuously without failure, producing up to 12 MW, at least 20% above any previous operating point.



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+1 (661) 294 8290

L.A. Turbine designs and manufactures application-specific, highly engineered turboexpanders used in hydrocarbon processing, geothermal power generation and other industrial power recovery or refrigeration applications.

The company is also a recognized leader in aftermarket repair, redesign, maintenance and production of spare parts for all brands and configurations of turboexpanders worldwide.

A global field service team provides diagnostics, maintenance and emergency support 24/7/365.

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# L.A. Turbine: Your On-Call Turboexpander Experts

## Turboexpanders

Turboexpander configurations include expander-compressor, expander-generator, expander-dyno (oil brake) and expander-compressors with active magnetic bearing units. Turboexpanders range from 3kW to 14MW, are capable of handling up to 3,000 PSIG pressure, can operate at speeds up to 105,000 RPM, and accommodate temperatures between -195°C to 260°C.

## Ability to Deliver

From concept to commissioning, L.A. Turbine controls and manages the entire design, engineering manufacturing, assembly and testing process for all new and aftermarket equipment. As a result, we are able to deliver faster-to-market customized solutions than competitive firms, and our equipment not only meets but often exceeds clients' output performance requirements. All engineering design and development processes comply with ISO 9001:2008.

## Global Presence

L.A. Turbine has established a global presence on five continents, in 16 world offices and partner locations. U.S. headquarters and manufacturing is located in Valencia, California, with sales and service facilities in California, Texas and Belgium. U.S. operations also support the needs of Canada, South America, Asia and Australia. European headquarters in Belgium serve Europe, the Middle East and Africa.

### L.A. Turbine Headquarters

28557 Industry Drive  
Valencia, California 91355  
Tel: +1-661-294-8290  
sales@LATurbine.com

### Gulf Coast Sales & Service Center

20302 Park Row #900  
Katy, Texas 77449  
Tel: +1-832-772-7800  
sales@LATurbine.com

### Europe Sales & Service Center

Rue de la Digue 35  
4400 Flémalle BELGIUM  
Tel: +32-4-247-30-11  
sales@LATurbine.com



[www.LATurbine.com](http://www.LATurbine.com)