

# 低溫熱能渦輪ORC發電技術開發與應用

執行單位

財團法人工業技術研究院

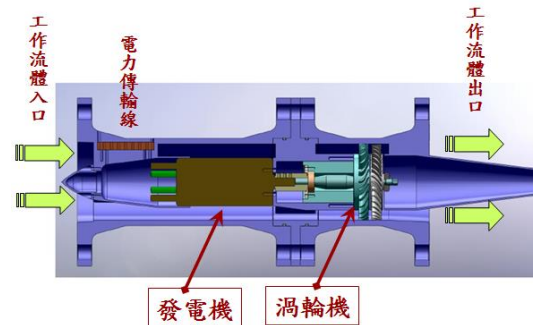
計畫主持人

廖榮皇

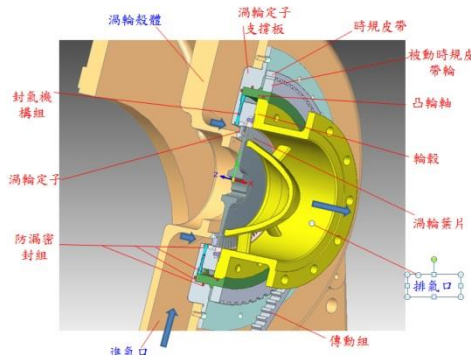
- 計畫未來應用標的：ORC發電技術除了工業餘熱/廢熱應用外，尚可應用至地熱/溫泉、生質能/廢棄物熱能、太陽熱能等低溫熱能發電場域。

申請專利：

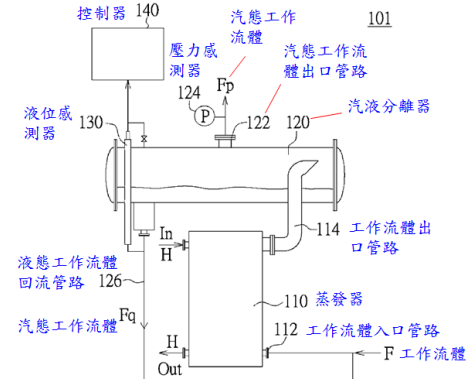
1. 內嵌式渦輪發電機(獲證，發明專利號 I366623)
2. 熱交換器、熱機循環系統及其控制方法(獲證，發明專利號 I579520)
3. 渦輪進氣控制裝置及進氣控制方法(獲證，發明專利號 I592567)



內嵌式渦輪發電機專利



渦輪進氣控制裝置及進氣控制方法專利



熱交換器、熱機循環系統及其控制方法專利

1. 技術介紹：本計畫針對國內工業部門低溫廢熱特性，設計開發螺桿機ORC、渦輪機ORC系統及其關鍵元件，建立系統整合和應用技術；同時，藉由示範應用，以現地機組運轉展現ORC技術成效，驗證技術可行性同時帶動國內節能產業發展。
2. 目前發展情形：
  - (1)建立國內石化業首座台化200kW螺桿式ORC低溫(82°C)廢熱回收發電系統：截至106年10月底累計發電量約471萬度(kWh)，減碳量約2,492公噸。
  - (2)建立國內鋼鐵業首座中鋼200kW 螺桿式ORC煙氣熱能回收發電系統：截至106年10月底累計發電量約110萬度(kWh)，減碳量約582公噸。
  - (3)建立國內造紙業首座正隆125kW渦輪式ORC發電系統：截至106年10月底累計發電量約104萬度(kWh)，減碳量約551公噸。
  - (4)本計畫104年與漢力能源公司簽署了技術授權合約-螺桿ORC溫差發電技術，目前已完成3,000千元技術授權金。



台化200kW螺桿式ORC廢熱回收發電系統 中鋼200kW 螺桿式ORC煙氣熱能回收發電系統

正隆125kW渦輪式ORC發電系統

# Development and Application of Low Grade Heat to Power Turbine ORC Technology

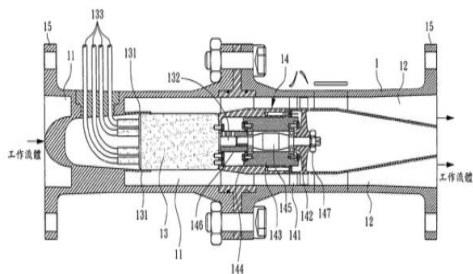
Execution Unit    Industry technology research institute

Project Director    Jung-Huang Liao

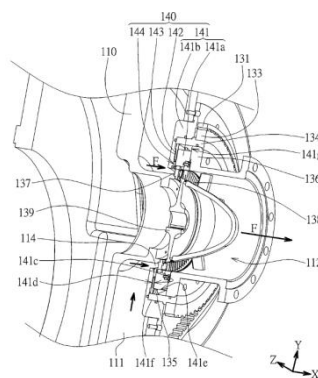
- Application : ORC power generation system can be applied to the low-temperature thermal energy generation field as industrial waste heat, geothermal, biomass, solar thermal energy, etc.

Apply for patents :

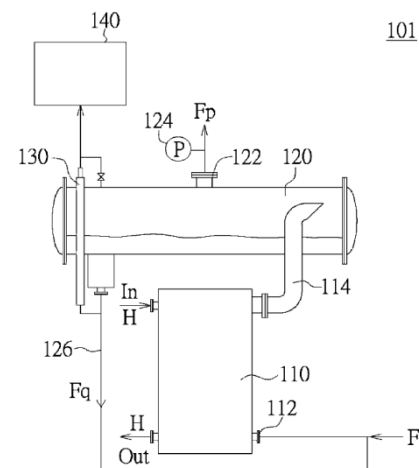
1. Embedded turbine generator set (patent NO: I366623)
2. Heat exchanger, heat engine system and control method using the same (patent NO: I579520)
3. Turbine intake control device and intake control method (patent NO: I592567)



Patent of embedded turbine generator set



Patent of turbine intake control device and intake control method



Patent of heat exchanger, heat engine system and control method using the same patent

The plan for low-temperature waste heat characteristics of the domestic industrial sector and the demand for generating capacity of the unit, design and development the screw machine ORC and key components of the turbine, the establishment of systems integration and application of technology; in addition, by the demonstration and application to real ORC unit operation to show the effectiveness of ORC technology.

Current development as following,

(1) Established petrochemical 200kW screw-expander low-temperature ORC power generation system ,which generate 4,710 ,000 power and reduce carbon 2,492mt.

(2) Established iron&steel 200kW screw-expander flue gas ORC power generation system ,which generate 1,100 ,000 power and reduce carbon 582mt.

(3) Established paper made 125kW turbine ORC power generation system ,which generate 1,040 ,000 power and reduce carbon 551mt.

(4)The Technical authorization 3,000 thousand NT dollars of screw-expander ORC power generation technology.



petrochemical 200kW screw-expander low-temperature ORC power generation system



iron&steel 200kW screw-expander flue gas ORC power generation system



Establish paper made 125kW turbine ORC power generation system