



## 廢棄物處理與資源化技術

Waste Treatment and Resources Recovery

豐 映 科 技 股 份 有 限 公 司

RESI Corporation / Atlas Energy Systems Ltd.

# 廢棄物處理與資源再生

## WASTE TREATMENT/INCINERATION AND RECYCLING SYSTEMS

豐映科技股份有限公司 (RESI) 的專業工程師曾負責主持台灣國家級的廢棄物焚化處理技術研究發展計畫多年，並榮獲多項專利權。RESI 的專業工程師時時秉持著積極的研發與全方位精神，達成提供產業界『完美與創新』的服務目標。

### 一般/有害廢棄物焚化

RESI 焚化工程專家曾以專業化的設計技術，主導台灣的焚化技術發展並實際應用於產業界，以實績證明可將醫院廢棄物及有害廢棄物徹底破壞。

RESI 所完成之醫院廢棄物焚化爐，證實燃燒效率可達 99.99%。RESI 於所完成之產業廢棄物焚化爐可處理固體、污泥及液體廢棄物，已證實有害廢棄物之破壞去除效率高達 99.999 - 99.9999%。

RESI 並引進美國 ENSCO Equipment & Systems Company 的機動式旋轉窯焚化爐，已證實有害廢棄物之破壞去除率高達 99.99999%。



李總統登輝與張榮興博士參觀焚化爐合影



RESI's spirit of waste handling is **Recycling, Reuse and Regeneration whenever possible**. Through RESI's engineering efforts and innovation, industries have proved the high profitability of resources recovery.

### *Incineration*

RESI's senior managers were leading the incineration technology development projects, granted by MOEA of ROC Government, for several years before they joined RESI. Several patents, design software and more than hundred technical articles have been completed and published by them.

RESI has completed several important waste treatment applications in Taiwan. RESI has demonstrated incineration technology for medical waste treatment with combustion efficiency higher than 99.99%, and completed several hazardous waste incineration plants, which were demonstrated to have a DRE higher than 99.999%.

RESI cooperated with EnSCO Equipment & System Company to import transportable rotary kiln incinerator into Taiwan. The system 2000 has demonstrated to have a DRE higher than 99.9999%.

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## 資源回收再利用

RESI秉持著保護環境的執著，以專業化的精神與技術，不斷的開發資源回收技術，技術成果除了具體展現為傲人的工程實績外，更進一步技術輸出海外。資源回收技術之利用不僅為產業界節省大筆廢棄物處理費用，也減少產品原料之消耗。因此，高可行性評估、技術搜尋、投資報酬率分析、到資源回收技術的開發、整廠工程服務，一直是RESI技術開發專家們努力的方向。

## 廢有機溶劑

有機溶劑為製造業的基本原料，如半導體業、電子業、包裝業、汽車塗裝業、製漆業、機械製造業、化工業、合成皮製造業、化學及石化工業等均會產生許多有機廢溶劑。RESI曾協助某一化工公司開發建設台灣地區規模最大、設備最完整的甲級有害廢溶劑處理廠，提供全台灣製造業廢溶劑處理服務，以精餾技術達成廢溶劑全面回收之目標。

## 聚多元醇廢汙泥

生產聚多元醇（PU之上游原料）時產生的廢汙泥，仍含大量之聚多元醇，通常以焚化處理之。RESI以專業化工技術開發完成聚多元醇回收資源化專利技術，可將廢汙泥百分之百資源化，回收達到產品品質之聚多元醇，其餘殘渣尚可完全製成高價值之副成品。本項技術已世界性授權ARCO化學品公司使用。

## 輪胎熱解碳黑

橡膠輪胎一直是環保頭痛的問題，透過熱解法，可將廢輪胎完全資源化，生產製成燃料油、燃料氣及碳黑。RESI自行研發二次加工技術，可以利用最經濟的技術，將熱解產生的重油分離成一定品質之油品，並將碳黑製成經濟價值高數倍之活性炭。

## 焚化灰渣

焚化處理各式廢棄物，為台灣政府既定之政策。然而，伴隨焚化而來之大量灰渣也需有適當處理。RESI的專家們，與美、日、台專業科技單位合作，引進高溫熔融技術，可將焚化灰渣再利用。除使廢棄物焚化處理達十全十美，也創造了更高的附加價值。本項技術也已經應用在低放射性廢棄物處理上。



### *Waste Solvents Recovery*

Solvent is one of major industrial raw material. It is useful in industry but is harmful to the environment in most cases. Every day, large quantity of waste solvent was disposed without proper treatment in Taiwan before RESI completed the solvent recovery plant, invested by a private company, Shenly Chemicals. With the RESI's proven technology, engineering design and innovative R&D efforts, the waste solvent plant with a capacity of handling 50% of waste solvent generated in Taiwan has been completed and permitted in 1995. From then on, eighty to hundred tons of waste solvents are recovered completely everyday. The plant is operating by RESI's brother company, Shenly Chemical Industries Co. Ltd. successfully.

### *Resources Recovery from Polyol Sludge*

A resources recovery process for Polyol sludge has been developed and patented by RESI. The patented technology has been tested in a demonstration plant located in ARCO Chemicals' Lin-Yuen plant, Taiwan. Chemical grade Polyol and other valuable products are produced by this unique process. The process is capable to recover polyol from waste sludge completely. The process know-how and patent has been licensed to ARCO Chemicals for their process modification internationally.

### *Byproducts from Waste Tire Pyrolysis*

Huge amount of waste tires is generated by automobile everyday. Pyrolysis is one of the successful technologies for waste tire treatment. RESI developed an innovative process to further convert Carbon Black, from pyrolysis, to activated carbon, which has much higher market price than its original.

### *Resources Regeneration of Residue from Incineration*

Tons and tons of incineration residues are being produced each year. Utilization of pyrolysis is capable of generating Carbon Black from waste tire. An integrated technology has been developed by RESI to manage the residue problem.

### *Other Wastes*

RESI's philosophy is "Converting waste to gold". Our specialists have devoted themselves to the development of innovative technology for the recovery and reuse of variety of wastes. With RESI's support, you can access a team of experts who solve a wide range of environmental problems-simple or complex, from start to successful finish.



## 硬體設備

RESI除了對焚化及資源回收設施的核心技術具有最深入的心得與經驗，我們更提供全廠的整合技術：

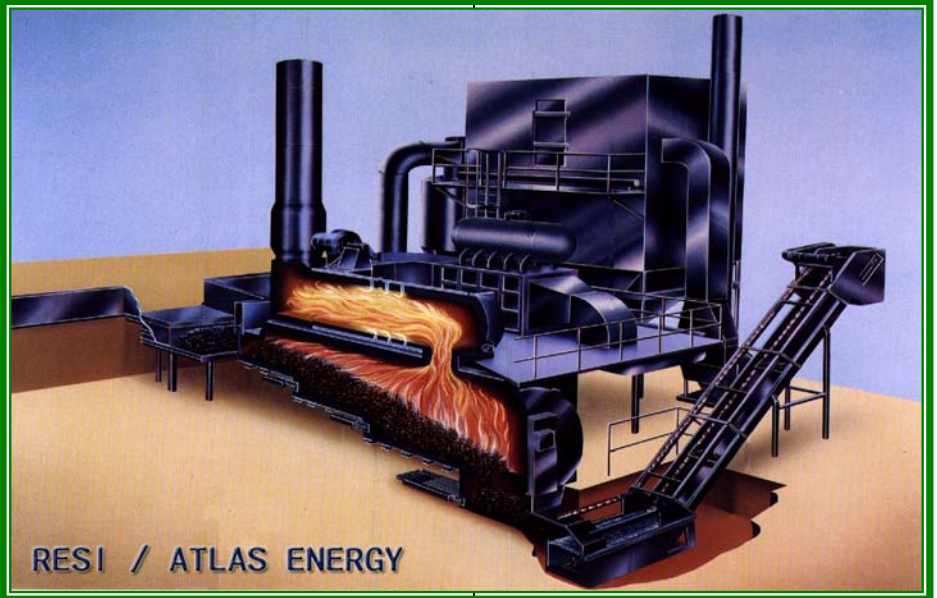
- 廢棄物接收管理與前處理
- 能源與資源回收再利用
- 廢氣及廢水處理
- 灰渣處理

「化腐朽為神奇.....」是RESI的哲學，我們的資深研究人員，對各類產業製程均相當嫻熟。強烈的使命感與專業的技術，使我們更加戮力研究。選擇RESI的支援，您將可得到一群專家的協助，為您解決各種環保疑難雜症。

## 最專業的工程服務

針對一般/有害廢棄物之焚化處理，RESI擁有控氣熱解多燃燒室型焚化爐、流體化床焚化爐及旋轉窯高溫焚化爐之模擬、設計與整廠建造技術。我們可以針對客戶的需求，提供各種專業的服務：

- 廢棄物處理整合規劃設計與建造
- 資源回收與焚化爐整合規劃設計
- 設備設計與供應、統包工程服務
- 代理操作與營運
- 試車/試燒
- 設置許可與操作許可申請



## HARDWARE

The combustion, incineration and resources recovery systems supplied by RESI constitute the core of turnkey plants or components for waste recycling, treatment and disposal. In addition, our product range covers plant units fulfilling the following requirements:

- Waste management and pretreatment
- Energy and resources recovery and reuse
- Flue gas cleaning and pollution control
- waste water treatment
- Ash disposal
- Disposal of residues

## PROFESSIONAL SERVICES

RESI offers professional services for individual components, for partial systems and for turnkey plant. Our services for the thermal treatment of waste include:

- Consulting & Project management
- Disposal scheme
- Engineering, equipment design, supply
- Turnkey Service
- Operation and training
- Trial Burn & Permitting



# 化學廢棄物收集系統

## RESI ChemWaste System

### 全自動安全可靠的化學廢棄物處理系統

RESI 是台灣最有經驗的廢溶劑資源再生工廠設計建造專家。RESI 為了協助電子工業解決廢棄化學品及廢溶劑處理問題，特別精心設計一套全自動化的模組化廢棄化學品暫存、泵送、貯存及處理系統 **ChemWaste System**。

**ChemWaste** 系統提供電子工業 Process Tools 一個安全、有效且經濟的廢棄物清理方案。此系統是由 MPS(模組化泵送系統)、連接管線、貯存槽及全自動圖控電腦控制系統所組成。

MPS 通常安裝於 Process Tools 下方，作為廢溶劑之暫存設施，以便將廢溶劑泵送至集中貯存區，降低廠區廢溶劑處理之風險。

**ChemWaste** 系統適用於各種製程廢化學品之處理，且可因應各廠特性作元件之選用。所有元件均設計成符合 NFPA 及 FM 防爆級要求。安全是工業的基本要求，RESI 與客戶一樣關切。

**ChemWaste** 系統已經使用於台灣積體電路製造股份有限公司、昇利化工股份有限公司、核能研究所電漿熱解熔融廠等廢溶劑應用場所，並證實性能優異。



### Safe, Reliable, and Fully Automatable Waste Handling System

RESI **ChemWaste** System is a modularized chemical waste holding, transportation, storage and handling system. **ChemWaste** System provides safe, efficient, effective and economical waste removal from process tools. The system consists of Mini-Pump Stations (MPS), inter-connecting pipes, storage tanks and computer control system. The MPS are typically located beneath process tools and act as intermediate holding and pumping stations to move chemical waste over long distances to a centralized waste solvent storage tank farm.

**ChemWaste** Systems are designed to meet a variety of process chemical waste removal needs and plant constraints. All components have been designed to compliant with NFPA codes and Factory Mutual (FM) explosion-proof approval. Safety and reliability are of our top priority concern.

### System Components

- Mini-Pump Station (MPS2000, MPS2100)
- Inter-connecting Piping & Fittings
- Storage Tanks
- Computer Control System
- Safety Interlock and VOC Monitors

**ChemWaste** System is a proven technology. It has provided continuous services in Taiwan Semiconductor Manufacturing Co. Ltd. (tsmc), Shenly Chemical Industries Co. Ltd. and INER plasma pyrolysis and melting plant successfully.

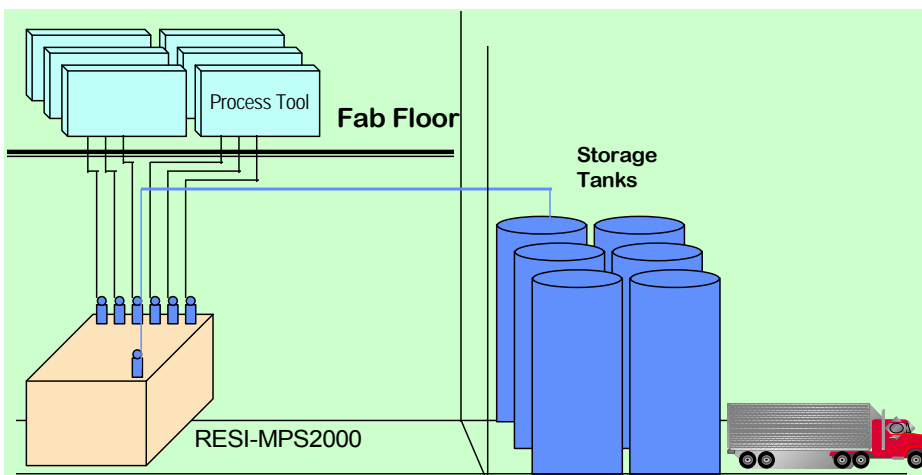
### MPS - Efficient and Effective Mini-Pump station

- Strainer Module - Removing process debris
- Pump Module - Air driven diaphragm pump
- Air Drive Module - Air supply/control system
- VOC Monitor - Spill and leakage detection
- Nitrogen Blanketing System
- Capacity 2, 3, 5, 10, 20, 50 gallons

### System Specifications:

- Constructed of chemically resistant material
- All stainless steel structure and Teflon packing
- Displays chemical storage and removal graphically
- Automatic spill and leakage detection
- Design codes: ASME, ANSI, CNS, FM, NFPA, UFC, JIS, CFR, OSHA
- Overfill alarm and interlock
- Audible and visual alarms
- Central computer control
- On-line event reporting
- Windows compatible man-machine interface

System Performance Reliability  
Minimum time between failure 7,000 hrs



# 電漿熔融與氣化爐系統

## RESI Plasma Melting and Gasification System

### 電漿特殊廢棄物處理及能源回收系統

RESI 是台灣最有經驗的電漿熔融、熱解及氣化爐系統設計建造專家。RESI 接受行政院原子能委員會核能研究所之委託，負責統包興建電漿熔融爐系統設備、生質物電漿氣化及能源回收系統等示範性研發系統。

### 電漿熔融爐系統

電漿熔融爐系統主要設備包括：

- 廢棄物貯存系統、螺旋進料器
- 電漿熔融爐、電漿氣化爐
- 第二燃燒室
- 驟冷蒸發器、熱交換器
- 文氏滌氣塔、填充滌氣塔
- 觸媒反應袋室集塵器
- DeNOx 觸媒反應器
- HEPA 絕對過濾器
- 誘引排風機
- 超純水供應系統
- N<sub>2</sub>、Ar、NH<sub>3</sub> 及廠用空氣供應系統

### 電漿氣化及能源回收爐系統

電漿氣化及能源回收系統主要設備包括：

- 廢棄物貯存系統、粉體輸送系統
- 定量給料器、螺旋進料器
- 電漿氣化爐
- 合成氣淨化系統
- 能源回收及利用系統
- 袋室集塵器
- 吸收式冷凍空調系統
- 超純水供應系統
- N<sub>2</sub>、Ar、NH<sub>3</sub> 及廠用空氣供應系統



### Plasma Melting and Gasification System

RESI Corporation was granted by the Institute of Nuclear Energy Research, Taiwan, to build a plasma melting plant and a plasma gasification plant in turn-key basis. Both plants have been completed, tested, and demonstrated to be successful.

### Plasma Melting Plant

The major components of plasma melting plant are:

- Waste storage silos and screw feeder
- Plasma melting furnace, plasma gasifier
- Secondary combustion chamber
- Quench evaporator and heat exchangers
- Venturi scrubber and packed tower scrubber
- Catalytical filters for dioxin destruction
- Catalytical reactor for NO<sub>x</sub> reduction
- HEPA filter
- Induced draft fan
- Cooling water supply system
- Deionized water supply system
- Gas supply system

### Plasma Gasification Plant

The major components of plasma gasification plant are:

- Waste storage silos and pneumatic transport system
- Controlled rate feeder and screw feeder
- Plasma gasifier
- SynGas purification system
- Integrated energy recovery and utilization system
- Bag filters
- Adsorption chiller system
- Cooling water supply system
- Deionized water supply system
- Gas supply system



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