



SUPPLYING THE  
ENERGY NEEDS OF  
THE PRESENT



SERVING THE  
INTERESTS OF  
THE FUTURE

# SAVING THE EARTH - IT JUST MAKE GOOD BUSINESS SENSE

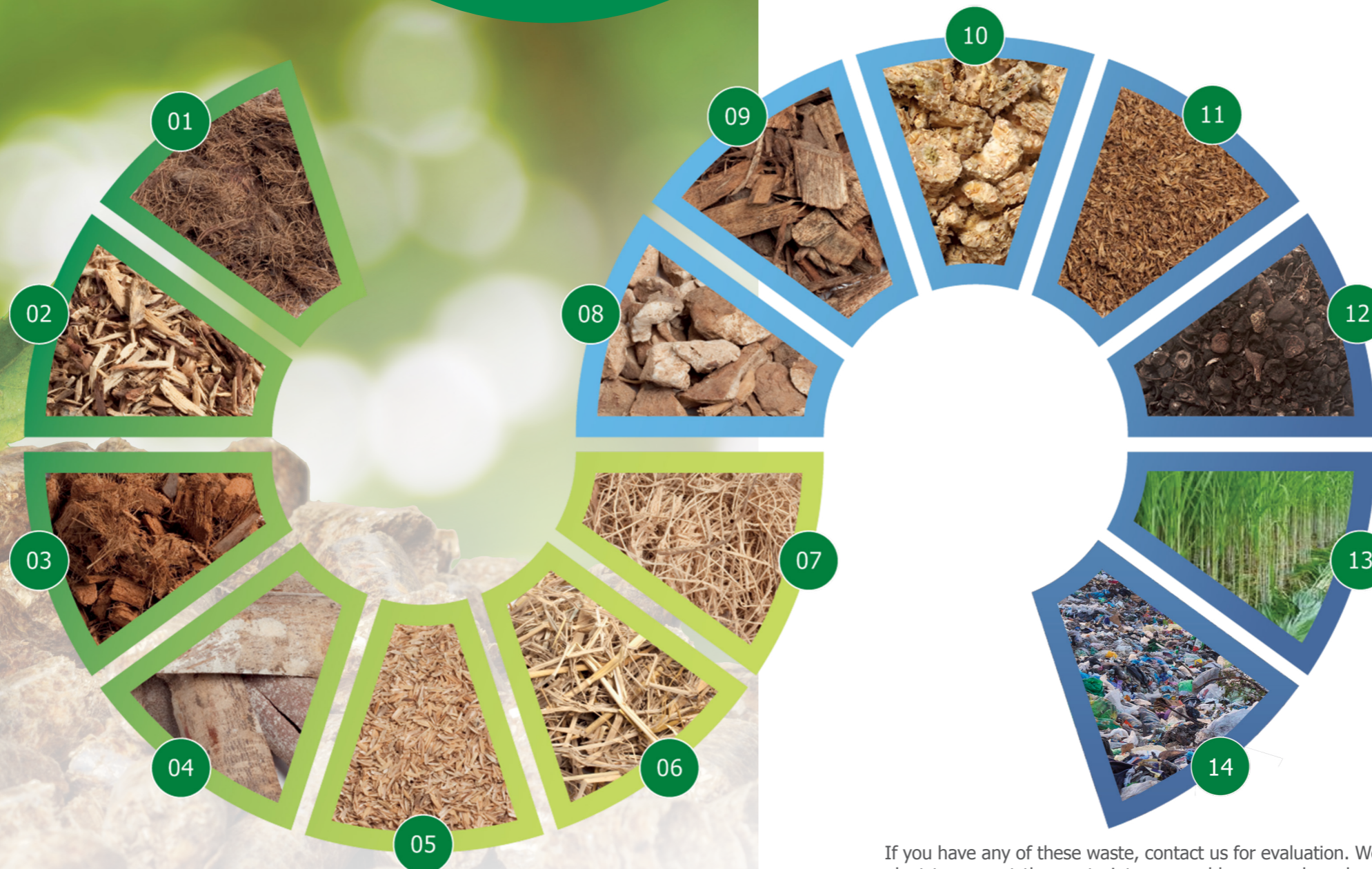
Renewable energy empowers you to operate your business at reduced energy costs and generate additional revenue streams, all while reducing your carbon footprint and impact on our environment.

With TS Energy's biomass renewable energy solutions, we can help you convert waste materials into clean energy.

We will help you assess your potential to produce clean energy and, if viable, will help you plan, build and operate a biomass power plant that produces clean energy.

## BENEFITS FOR YOU AS AN ENERGY SUPPLIER:

- Generate power through eco-friendly resources and systems
- Clean, safe reliable energy source
- Reduce carbon footprint
- Additional revenue stream
- Additional source of power supply
- Enhanced corporate reputation



## BIOMASS WASTE

We use the following biomass waste materials to generate renewable energy.

### Legends:

- 01 - Empty Fruit Bunch
- 02 - Cassava Rhizome
- 03 - Coconut Husk
- 04 - Tree Bark
- 05 - Rice Husk
- 06 - Rice Straw
- 07 - Oil Palm Trunk Fibre
- 08 - Tapioca Waste
- 09 - Wood Chips
- 10 - Corn Cob
- 11 - Brewery Waste
- 12 - Palm Shell
- 13 - Napier Grass
- 14 - RDF
- 15 - Others

If you have any of these waste, contact us for evaluation. We will assess the feasibility of establishing a power plant to convert the waste into renewable energy based on land and waste availability, projected costs and potential returns.

Tel: +65 6228 4770 Email: [enquiry@tsenergy.com.sg](mailto:enquiry@tsenergy.com.sg)



## PHASE ONE INITIAL DEVELOPMENT

### PROJECT EVALUATION & INITIAL CUSTOMER CONSULTATION

- Identification of Client's Needs
- Conceptual Design & Proposal of Power Plants
- Preliminary Agreement Negotiation

### TAP ON OUR EXPERTISE

Our experienced team of consultants will assess the feasibility of establishing a power plant, and calculate your projected investment, power generation potential and rate of returns.

### A CUSTOMISED PLANT THAT WORKS FOR YOU

If establishing a plant is feasible, our consultants will sit down with you to discuss the limitations and possibilities, and to understand your goals before presenting you with a preliminary design based on your budget.



## PHASE TWO DETAILED DEVELOPMENT

### FULFILMENT OF BUSINESS REQUIREMENTS

- Finalisation of Agreement
- Planning of Ownership & Financing Structure
- Application for Permits & Approvals

### TOTAL PROJECT PLANNING & MANAGEMENT

- Engineering & Design Consultation
- Detailed Planning & Design of Plant

### PLANNING FOR A SMOOTH DELIVERY

Our goal is to get your plant up and running by or before the agreed timeline. Our project management team will work with you to oversee the finalisation of legal agreements and support in the approval of necessary permits, while our design and engineering teams get to work on finalising the detailed design and specifications of your plant.

### NO COMPROMISE ON SAFETY

Our designers and engineers will focus on achieving the fast assembly of the plant on site to the required specifications. Throughout this planning process, the safe operation of your plant is our top priority.



## PHASE THREE PROCUREMENT & DELIVERY

### PROCUREMENT & DELIVERY

- Procurement & Fabrication of Power Plant Equipment
- Shop Testing & Inspection
- Shipment / Delivery to Project Site

### PROCUREMENT FROM TRUSTED SUPPLIERS

Our stringent procurement processes involve sourcing the ideal equipment for your needs and budget to ensure you get the most value for your investment.

### FACTORY ACCEPTANCE TEST (FAT)

Factory Acceptance Test (FAT) for major equipment shall be conducted before shipment.



## PHASE FOUR PROJECT EXECUTION

### POWER PLANT INTEGRATION, TESTING & COMMISSIONING

- Turnkey Erection & Installation of Power Plant
- Full System Integration
- Testing & Commissioning
- Performance & Reliability Test

### ATTENTION TO EVERY DETAIL

Upon delivery of each piece of equipment to your site, we will inspect before installation to ensure the required safety and quality standards are met.

### BRINGING IT ALL TOGETHER

We assemble the plant and perform a full system integration before testing and commissioning takes place.

Once installations are completed, we perform all the necessary checks, which includes no-load test and full load test before the actual plant performance test and finally handing over the plant to the end-user.





## PHASE FIVE PLANT OPERATION

### OPERATION ORIENTATION & MAINTENANCE

- Training for Operators
- Commencement of Operations
- O&M Management
- Spare Parts Supply & Maintenance Management

### POST-INTEGRATION SERVICE

- Technical Advisory Support
- Power Plant Management

### FULL TRAINING PROVIDED

Orientation and maintenance training for your engineering and operational staff. This includes control room operations, maintenance and management to help you operate your plant at full efficiency and ultimately prolong its lifespan.

### SUPPORT PACKAGES CUSTOMISED TO YOUR REQUIREMENTS

Post-integration, we will design a comprehensive customised support package aimed to keep your plant in operation and minimise downtime. We can either support you in a technical advisory role or provide full power plant management services.

## PROJECTS



## RECOGNITION

### Thailand Energy Awards 2008

On-Grid Category –  
Mungcharoen Green Power Co. Ltd

### 7th Asean Renewable Energy Project Competition 2008

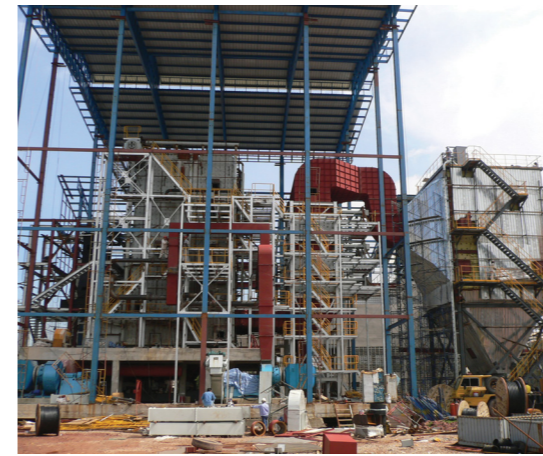
On-Grid Category -  
Mungcharoen Green Power Co. Ltd

### 8th Asean Renewable Energy Project Competition 2009

Cogeneration Category –  
Felda Palm Industries Sdn Bhd



## PROJECTS



### 01 Jong Stit Energy Co. Ltd

**Plant Location**  
Samutsakorn, Thailand

**Biomass Fuel**  
Woodchips / Palm shell

**Plant Capacity**  
7.0 MW, 55 tons/hr boiler @ 37 bar(g), 435°C with step grate



### 02 Mungcharoen Green Power Co. Ltd

**Plant Location**  
Surin, Thailand

**Biomass Fuel**  
Rice Husk

**Plant Capacity**  
9.9 MW, 55 tons/hr boiler @ 37 bar(g), 435°C with step grate



### 03 Bua Sommai Co. Ltd (Phase 1)

**Plant Location**  
Roi-et, Thailand

**Biomass Fuel**  
Rice Husk

**Plant Capacity**  
6.0 MW, 35 tons/hr boiler @ 37 bar(g), 435°C with travelling grate



# PROJECTS



## 04 Bua Sommai Biomass Ltd (Phase 2)

**Plant Location**  
Udon Thani, Thailand

**Biomass Fuel**  
Rice Husk and Woodchips

**Plant Capacity**  
9.9 MW, 50 tons/hr boiler @ 97 bar(g), 520°C with step grate



## 05 Songkhla Biomass Co. Ltd

**Plant Location**  
Songkhla, Thailand

**Biomass Fuel**  
Rubber Wood Chips

**Plant Capacity**  
9.9 MW, 50 tons/hr boiler @ 54 bar(g), 460°C with step grate



## 06 Ajinomoto Co. (Thailand) Ltd

**Plant Location**  
Ayutthaya, Thailand

**Biomass Fuel**  
Rice Husk

**Plant Capacity**  
40 tons/hr boiler @ 45 bar(g), 450°C with step grate



## 07 Felda Palm Industries Sdn Bhd

**Plant Location**  
Lahad Datu, Sabah, East Malaysia

**Biomass Fuel**  
Empty Fruit Bunch

**Plant Capacity**  
7.5 MW, 50 tons/hr boiler @ 37 bar(g), 435°C with water-cooled step grate



## 08 Parakaya Plywood Sdn Bhd

**Plant Location**  
Keningau, Sabah, East Malaysia

**Biomass Fuel**  
Woodwaste

**Plant Capacity**  
6.0 MW, 50 tons/hr boiler @ 37 bar(g), 435°C with step grate

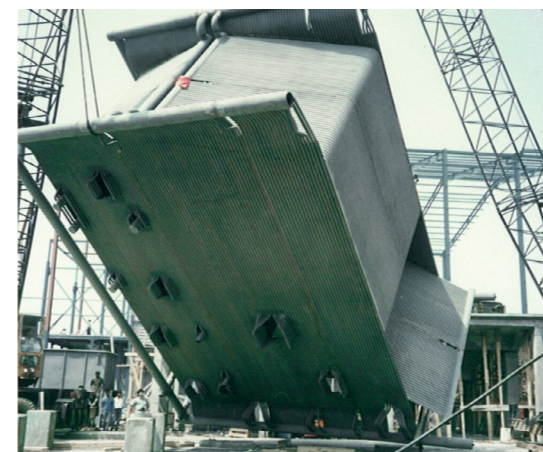


## 09 FTJ Bio Power Sdn Bhd

**Plant Location**  
Pahang, West Malaysia

**Biomass Fuel**  
Empty Fruit Bunch

**Plant Capacity**  
10 MW, 60 tons/hr boiler @ 45 bar(g), 450°C with step grate



## 10 PT Masari Dwisepakat Fiber

**Plant Location**  
Karawang, West Java, Indonesia

**Biomass Fuel**  
Woodwaste

**Plant Capacity**  
6.0 MW, 50 tons/hr boiler @37 bar(g), 435°C with step grate

**WE TURN YOUR GARBAGE INTO BIG BENEFITS.  
LET US HANDLE IT FROM HERE!**



## REFUSE-DERIVED FUEL (RDF)

Refuse-Derived Fuel (RDF) is fuel produced from municipal solid waste (MSW) and other combustible refuse. These are combustible materials such as non-recycle plastics and paper, which can be turned to fuel to create energy. RDF is a renewable energy source that ensures waste is not simply discarded into a landfill but is instead put to good use.

RDF is an emerging green fuel that contributes to a greener environment by generating alternative energy and resolving environmental issues related to waste disposal; it also allows for cost savings while reducing CO2 and other greenhouse gas emissions!

### ADVANTAGES OF UTILIZING REFUSE-DERIVED FUEL (RDF)

- Waste is utilized to generate electricity.
- Alternative and renewable resources of fuel which is derived from municipal waste.
- Generate profits from waste management.
- Saving the land by using less landfills area.
- It contains Higher Calorific Value or Higher Heating Value.

### THE PRODUCTION OF RDF IS SEPARATED BY DIFFERENT PROCESSING STEPS, SUCH AS:

- Bag splitting/Shredding
- Size screening
- Air classification (density separation)
- Ballistic separation
- Separation of ferrous and non-ferrous materials
- Separation refinement through re-shredding



**Legends:**

- A - RDF
- B - Fuel Thermal Conversion Technologies
- C - Energy Production
- D - Society: Energy Use, Waste Production
- E - Waste Segregation
- F - Waste Sorting and Processing

## SOLAR PHOTOVOLTAIC (PV) POWER SYSTEMS

TS Energy supply solar photovoltaic (PV) power systems to provide our customers with additional sources of clean energy. These can be used in tandem with our biomass energy solutions or as a standalone energy supply.

Our PV power systems allow you to generate clean, affordable energy tailored to the needs of your project and environment, both in on- and off-grid solar installations. In addition to being low maintenance, our PV systems are highly durable and can withstand extreme climatic conditions.

We provide the full turnkey solution from design and development of your system to customised post-installation support.

Find out how clean renewable energy can work to enhance your business.



Call us at **+65 6228 4770** or email **enquiry@tsenergy.com.sg**

## WHO WE ARE

T.S. Renewable Energy Solutions (TS Energy) is a leading provider of renewable biomass and solar energy solutions in Southeast Asia, delivering sustainable energy today for the interests and needs of the future.

The company was established with the absolute conviction of its founder, Danny Hoon, that we do not have to deplete the world's resources, but can harness solar and biomass energy to generate power in cost-effective, efficient and sustainable ways from resources that would otherwise be wasted.

Headquartered in Singapore, TS Energy has successfully developed and integrated biomass co-generation power plants in Thailand, Indonesia and Malaysia for diverse industrial applications. Its commitment to the highest quality and safety standards has resulted in close partnerships being formed with our principle – ERK Boiler, as well as customers placing their trust in TS Energy once again to commission their next cycle of power plant.

By adding solar energy and waste-to-energy solutions to its portfolio, TS Energy has set a path to providing a greater choice for its customers to generate clean renewable energy that empowers responsible end users and conserves our environment for generations to come.

### OUR VISION

A world where natural resources are plenty and clean renewable energy powers the advancement of mankind.

### FOR OUR CUSTOMERS

To access value-for-money sustainable energy through state-of-the-art technology and sound management innovation.

### FOR THE ENVIRONMENT

To provide power systems that promote environmental welfare through best practices.



**T.S. RENEWABLE ENERGY SOLUTIONS PTE LTD**

**台新再生能源有限公司**

**AREA OFFICES**

**Singapore**

300 Beach Road  
#31-07 The Concourse  
Singapore 199555

**Thailand**

Gaysorn Tower, Level 26,  
127 Rajprasong Rd,  
Khwaeng Lumpini,  
Khet Pathum Wan,  
Krung Thep Maha  
Nakhon 10330, Thailand

**Philippines**

Uptown Bonifacio  
Tower Three  
36th Street Corner  
& 11th Avenue  
Manila  
Philippines 1634

**FOR ENQUIRY:**

Tel: +65-6228 4770  
Fax: +65-6228 4771  
Email: [enquiry@tsenergy.com.sg](mailto:enquiry@tsenergy.com.sg)  
[www.tsenergy.com.sg](http://www.tsenergy.com.sg)