UNITED NATIONS OFFICE FOR SUSTAINABLE DEVELOPMENT

UNOSD Workshop on Renewable Energy from Waste/ Biomass Resources and Climate Change

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Renewable Energy Potential and WtE Project in Myanmar

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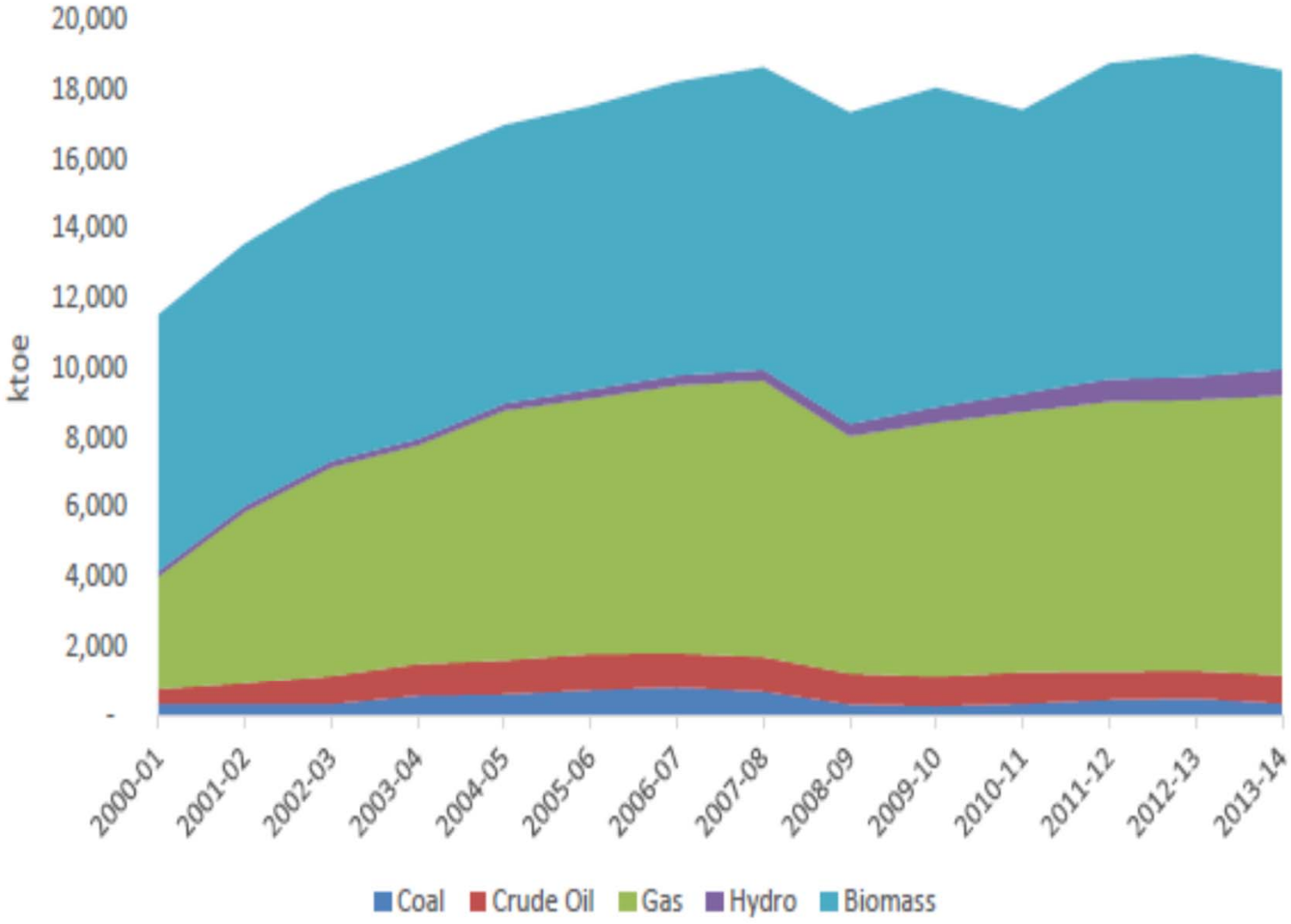
- **National Energy Policy with ten salient points is under reviewing**

The main points on Renewable Energy Sector;

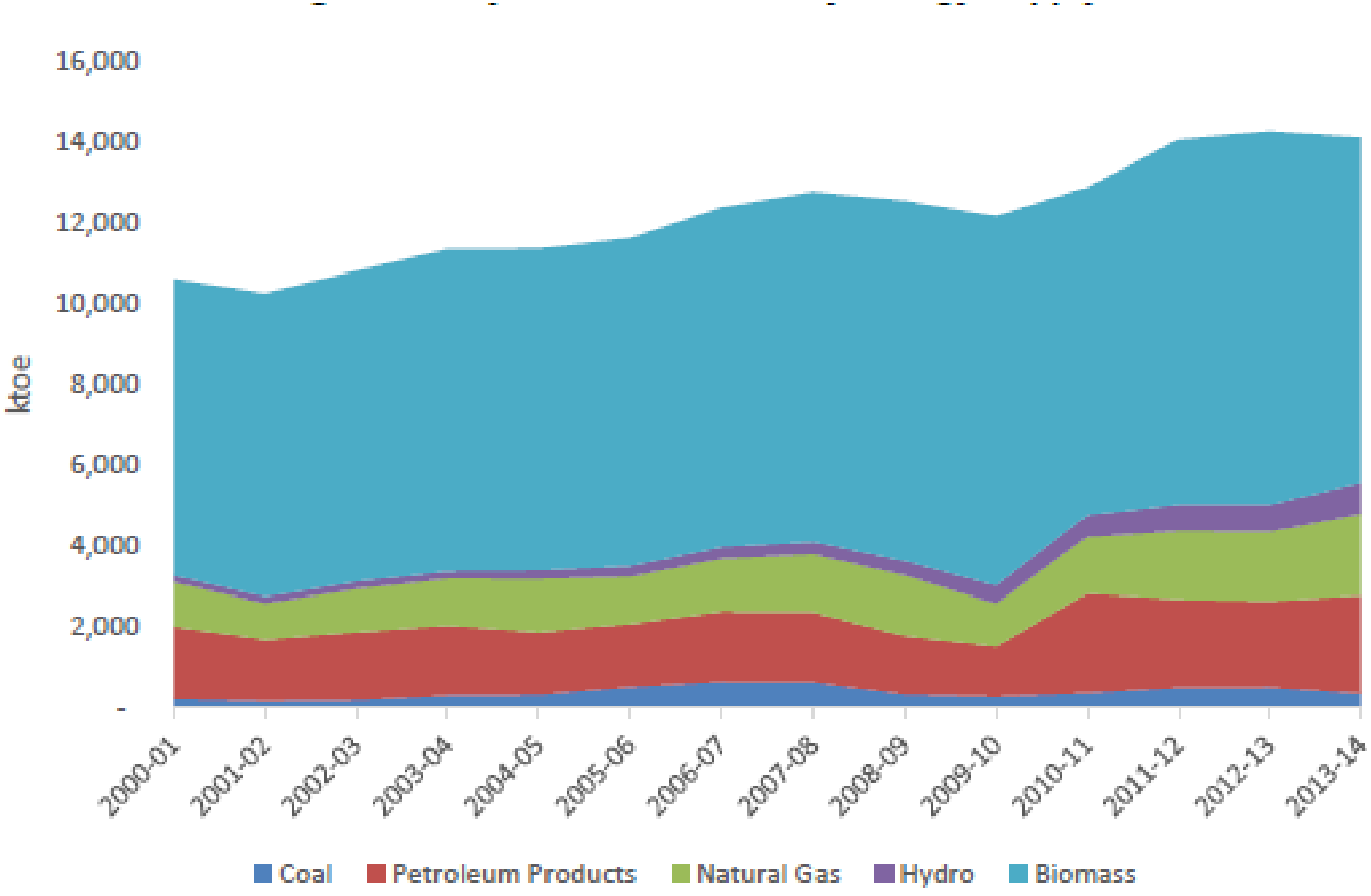
- In extraction and utilization of natural resources,
  - To minimize the environmental impacts
  - To invite the local and foreign investments
  - To carry out CSR
- for defining the energy pricing
  - To observe the ASEAN and international energy pricing policy
  - To ensure stable and fair price for consumer
  - To guarantee the economic benefits for energy producers and energy distributers
- In getting more generation,
  - to generate electricity not only from hydro, renewable and thermal power plants but also from other available energy resources.
- To be planned for increasing of reserved power
- To be fulfilled electricity demand of off-grid areas

Myanmar Total Primary Energy Production



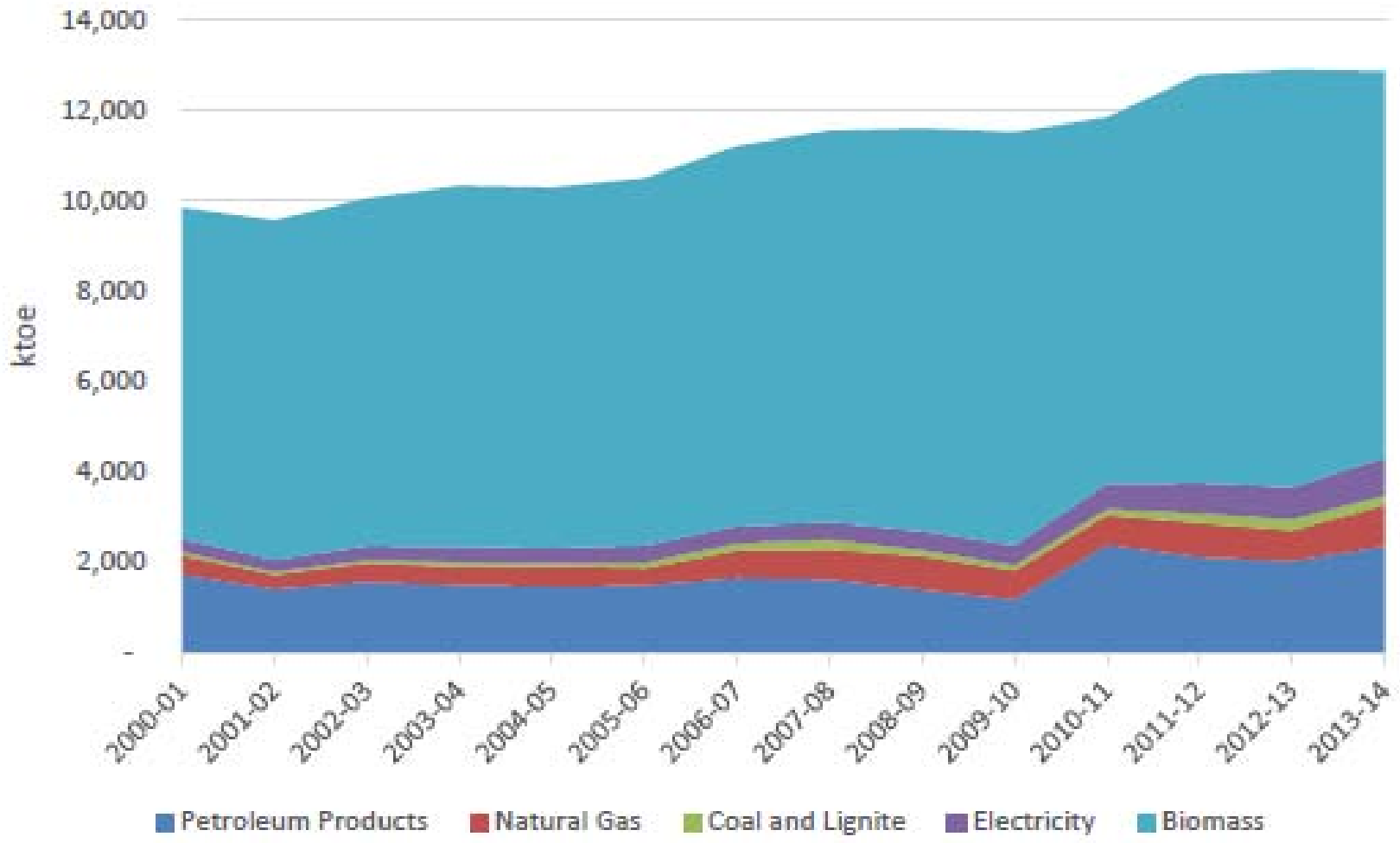
Source: Consultant's estimate based on data of MOE, MOEP, MOGE, MPPE, MOECAF, and CSO

Myanmar total primary energy supply



Source: Consultant's estimate based on data of MOE, MOEP, MOGE, MPPE, MOECAF, and CSO

Myanmar total primary consumption by sector



Biomass

In Myanmar, nearly 52.5 percent of the total land area is covered with forest.

30.5 percent are reserved forests and 69.5 percent are unreserved ones.

Wood-fuel plays vital role for cooking and cottage industries in both urban and rural areas.

The main supply of wood-fuel comes from natural forest, fuel wood plantations, homestead garden, community forest and tops and lops from timber extracted areas.

Natural forests produce about 19.12 million cubic tons of wood fuel annually.

Biomass uses in Myanmar rural area

(per household per annum)

Sr.	Biomass Sources	Dry Ton	Percent
1	Fuel wood	3.76	42.7 %
2	Pigeon pea stalk	2.3	26.2 %
3	Cotton stalk	0.5	5.6 %
4	Sesame stalk	1.2	13.6 %
5	Coconut or palm leaves	0.6	6.8 %
6	Rice husk	0.3	3.0 %
7	Sawdust	0.07	0.8 %
8	Bamboo	0.12	1.3 %

Source: U San Thein, Ministry of Agriculture and Irrigation, Myanmar

Development of bio-diesel Production in Myanmar

Jatropha Plantation

Jatropha Fruits

Jatropha Seeds

Crude Oil Expeller

Demonstration Unit
(Continuous Type)

Demonstration Unit
(Batch Type)

THE GOVERNMENT'S GUIDANCE FOR THE DEVELOPMENT OF THE BIODIESEL PRODUCTION

Planning for Jatropha plantation :

- Year (2006 - 2007), total area - 3 million acres
- Year (2007 - 2008), total area - 4.5 million acres
- Year (2008 - 2009), total area - 6 million acres
- Year (2009 - 2010), total area - 7.5 million acres
- Year (2010 - 1011), total area - 8 million acres

The gasification system for rural area application in Myanmar

Saw Dust

Gas Generator

Gasifier Units (Saw Dust)

Gasifier (Rice Husk)

Gasifier (Rice Husk)

Wind power research projects are under-way in the areas which have the wind - speed of 3m/s and above to be able to produce wind–energy and output power is 300W.

This is the small - scale wind mill constructed by the renewable energy research team of Department of Physics, Taungoo University.

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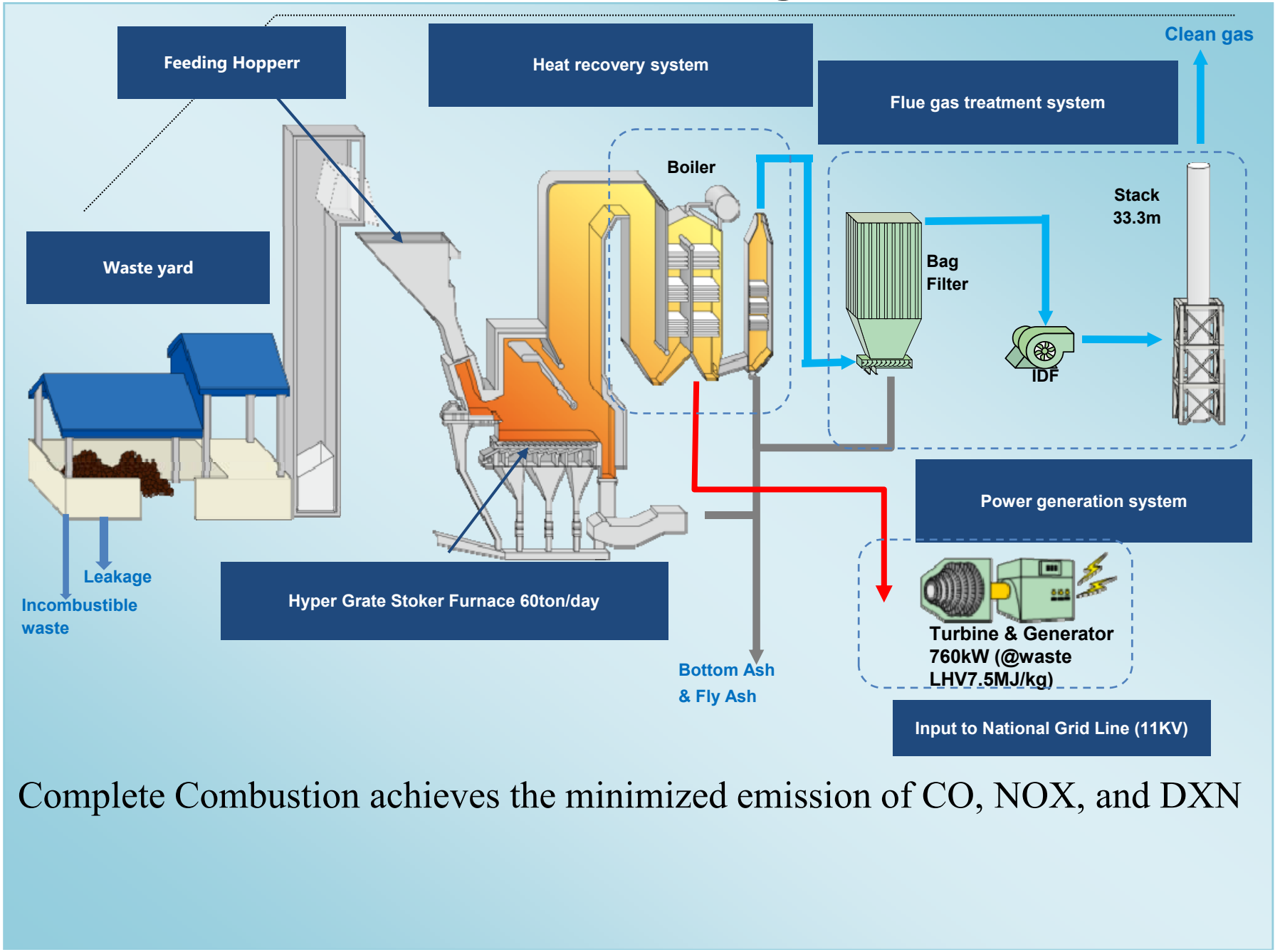
Process Flow Diagram



Complete Combustion achieves the minimized emission of CO, NOX, and DXN

Waste Yard

Type	-	Half Open Space
Storage Area	-	450 m^2
Storage Capacity	-	Appro; 200 tons

Furnace System

Furance

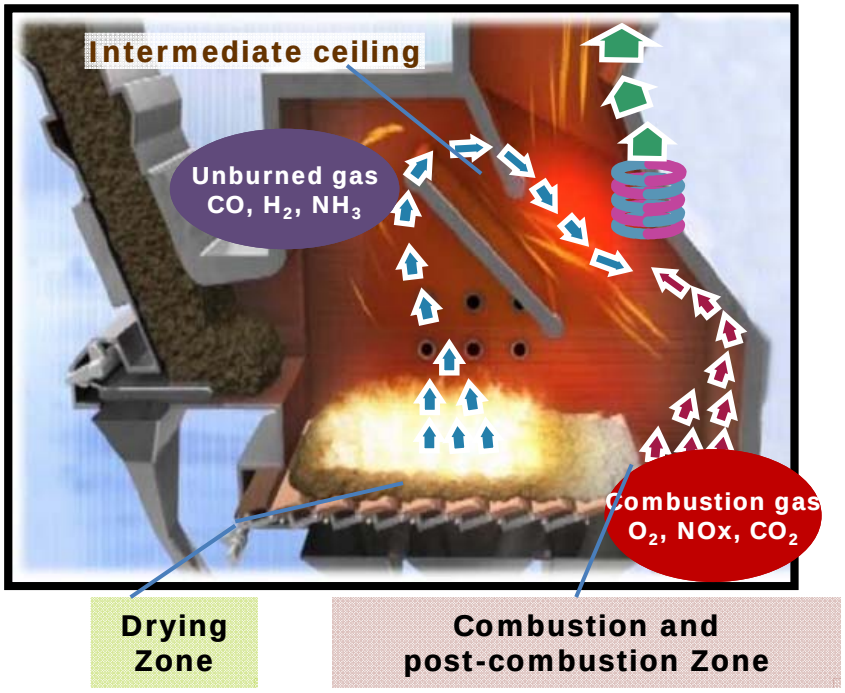
Type ------- JFE Hyper Grate System

Combustion Chamber Volume------- 55.27 m^3

Combustion Rate ------- 165.9 kg/m^2h

Grade Area ------- 31.6 m^2

Waste Feeder ------- 2.5 t/h

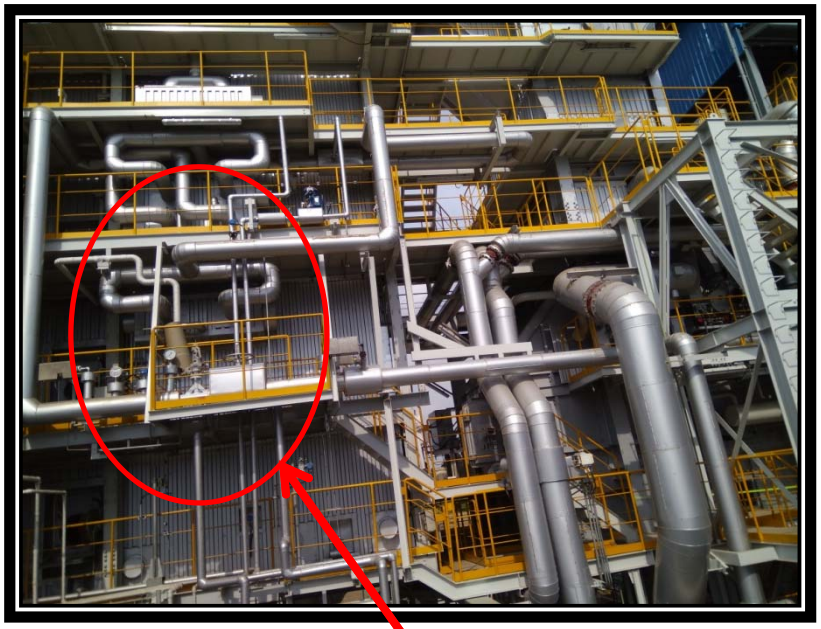


Combustion System ------- Two way flue gas combustion (with Intermediate Ceiling)

Heat Recovery System

Boiler

Type	- Natural Circulation type Waste heat boiler
Boiler Steam Outlet Flow Rate	- 8.6 t/h
Steam Outlet Temperature	- 375°C
Steam Pressure (Maximum)	- 2.26 Mpa



1st & 2nd Superheater

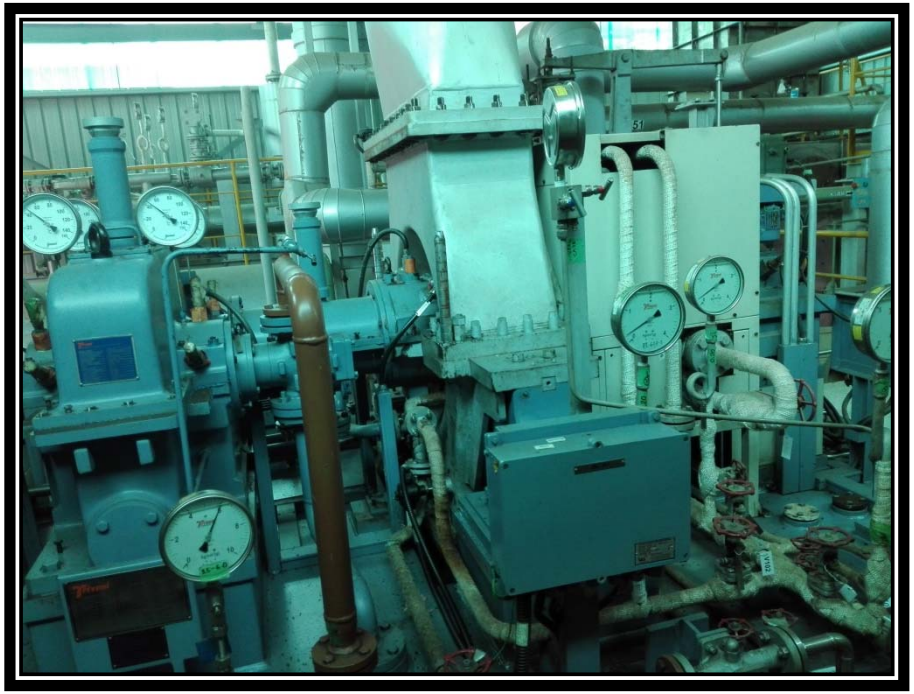
Boiler Drum

Flue Gas Treatment System

Bag Filter

Type	-	Pulse Jet On Line Cleaning
Flow Rate	-	15000 m N/h
Dust Contant	-	2.2/ 0.02g/m N
Material of Filter	-	PTFE with PTFE membrane

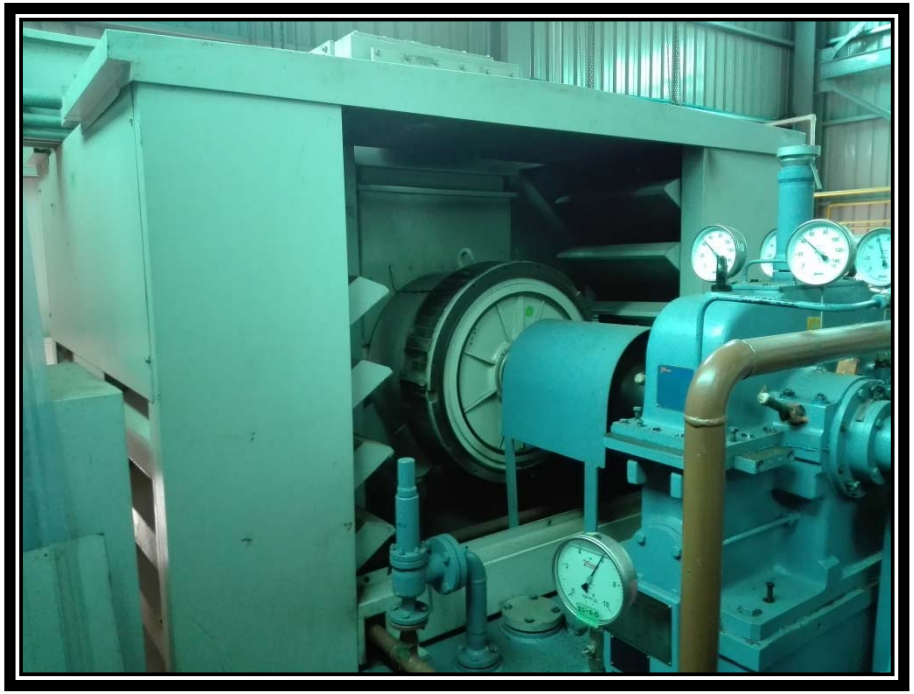
Power Generation System



Steam Turbine

Type	-	Fully Condensate Turbine
Inlet Steam Pressure	-	1.3 Mpa (Min)
Inlet Steam Temperature	-	350°C
Exhaust Steam Pressure	-	9.8 kPa
Steam Flowrate	-	4.71 t/h
Speed	-	9804 RPM

Power Generation System



Generator

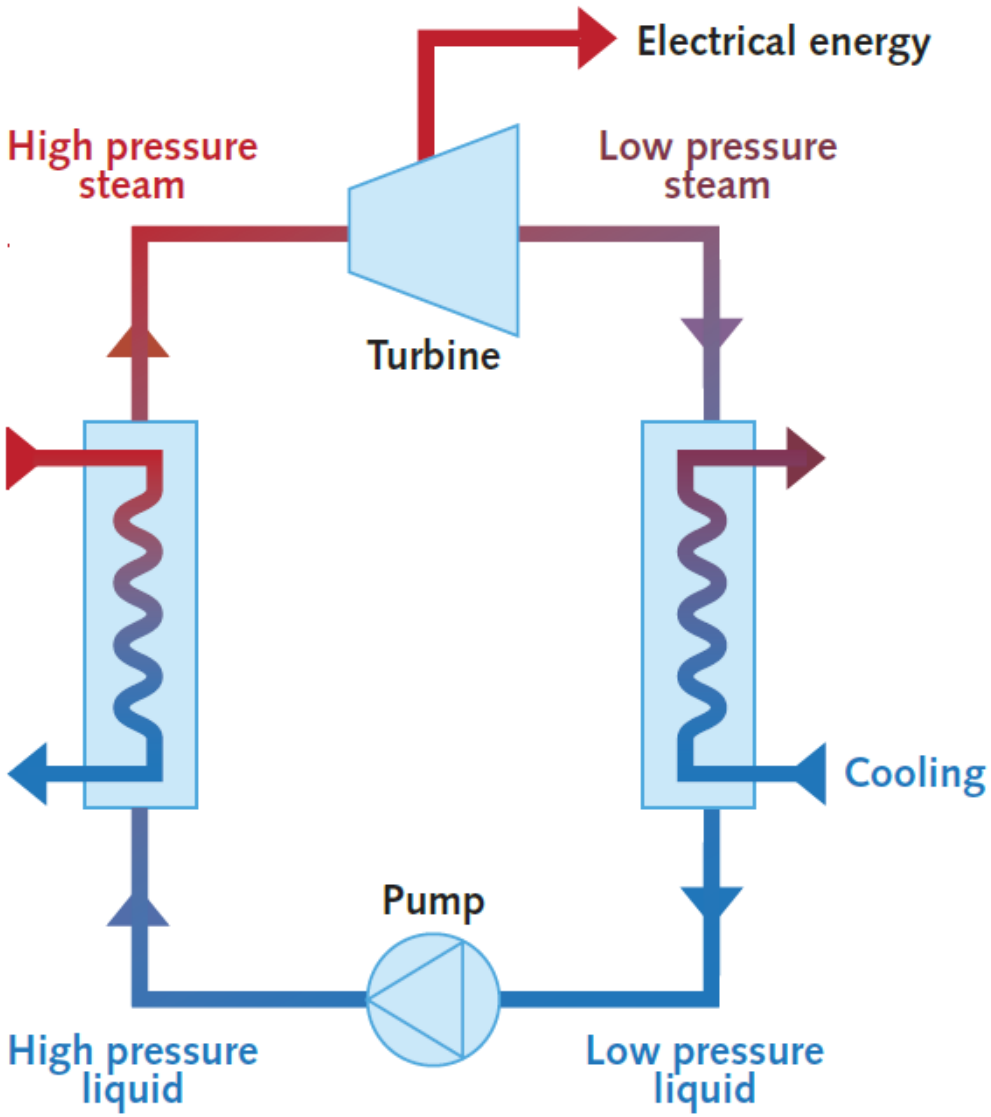
Type	-	Air cooled three phase Synchronizing Generator
Power Output	-	760 kW
Speed	-	1500RPM

Ash Handling System

Bottom Ash Extractor

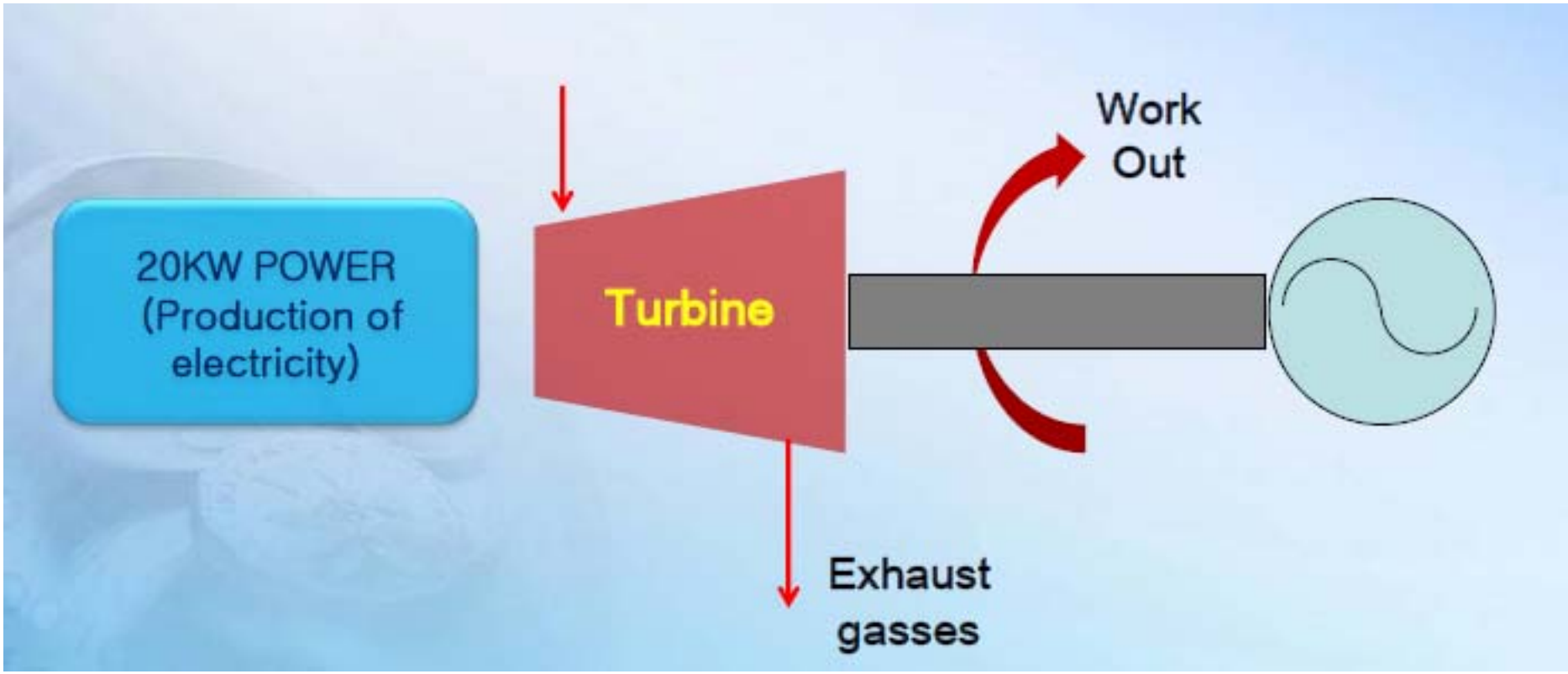
Type	-	Hydraulic Pusher
Capacity	-	0.7t/h

WtE Projet in UY Schematic diagram of operation

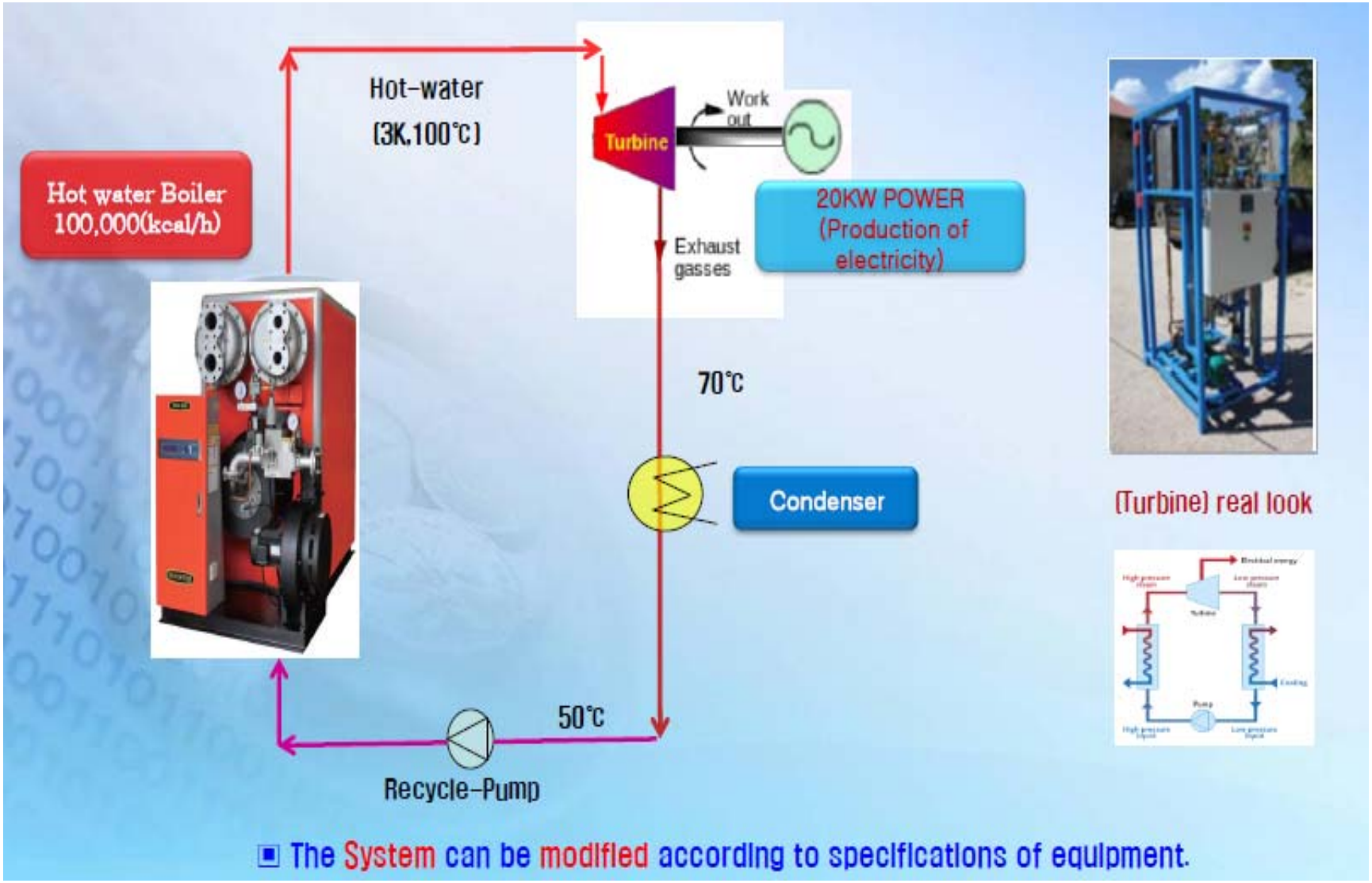


Hot water Boiler 100,000(kcal/h)

Sctional component



Schematic diagram of operation



Investment cost of schematic diagram

(unit : USD)

Name	Standard	Quantity	Unit Price	Price	Remark
Incinerating boiler	100,000 kcal/h	1	30,000	30,000	
Power generating Turbine	20 kw	1	58,000	58,000	
Electric work	1 SET	1	3,000	3,000	
Automatic control work	1 SET	1	2,000	2,000	
Construction work(machinery room)	1 SET	1	5,000	5,000	
Total price				**98,000**	

▣ Our investment cost is the estimated amount by our company and may change depending on the conditions of the installation site.

Benefits of this system

1. Clean the environment around the school – reducing the amount of waste
2. Supporting the school's finance through generating and supplying electricity with incineration power generator – reducing the electricity cost
3. Installation of electric power supply is not needed – reducing the cost of infrastructure
4. Utilization of national waste resources – Improving supply of electricity and environment
5. Fulfilling public(consumer)'s demand and rising government's credibility
6. Diversifying fuel sources - household waste, PKS, macadamia and etc.,

Climate Change

- Consistent with its predominantly hydro-based power production and low industrial development, Myanmar has one of the lowest levels of absolute and per capita greenhouse gas emission rates in the world.
- This is unlikely to change significantly in the medium-term future. However, climate change is expected to have a major impact in Myanmar with forecasts of increased flooding, sea levels rises, and increased temperature variations.
- Climate change adaptation is therefore the priority concern for Myanmar.

Conclusion

- It can clearly be seen, from our presentation, that the production and consumption of various kinds of energy from our country, does not make any harmful consequences on the global warming ,we are giving our best efforts on the environmental preservation and conservation.

- Renewable energy is needed to use for rural area application, so we try to do research for this need.

Acknowledgement

- We are deeply thanks to UNOSD for support to us and Professor Jung-In Dong for invitation to us.

Thank You For your Kind Attention