



**IEA Bioenergy, Task 33 Meeting
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**Country Update
Turkey**

**Serhat Gül
TUBITAK MRC, Energy Institute, Kocaeli, Turkey**

Introduction of MRC - Combustion/Gasification Group

TUBITAK MARMARA RESEARCH CENTER (MRC)



Panoramic view of Europe

In parallel to this project, nationally funded project has been started and laboratory scale and pilot scale test facilities has been constructed.

Combustion/Gasification Group	
Researcher (PhD)	6
Researcher (MSc)	13
Technician	3

Researchers are mainly consists of, Mechanical Engineers, Chemical Engineers and Chemists.

MRC is government institution and has 7 Institute located at Kocaeli where the nearby of Istanbul.

One of these Institute is Energy Institute and has 7 different research group.

One of these group is “Gasification/Combustion of Biomass/Coal Group” and has 19 researchers.

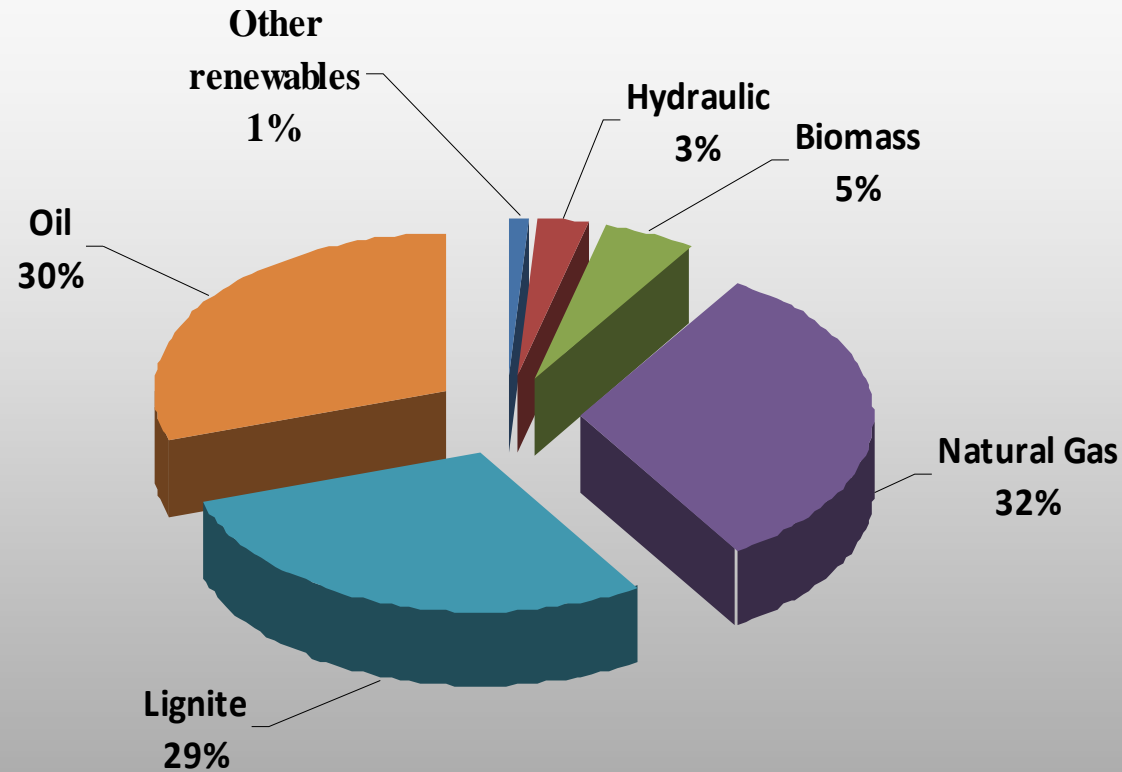
Group has been started its activities at 2005 with EU project “BIGPOWER” with the aim of being the excellence center of gasification/combustion process in Turkey.



Panoramic view of MRC

Turkey Energy Consumption Profile

Turkey Primary Energy Consumption*



Lignite, biomass, hydraulic and renewables are the national energy sources of Turkey.

However, oil and natural gas are import energy sources which are totally 62 % of the energy demand.

Biomass Potential of Turkey

- The annual biomass energy potential of Turkey is estimated as 32 Mtoe.
- The total recoverable biomass energy potential is estimated as 17 Mtoe.
- The total biomass consumption in Turkey was 4,8 Mtoe/year (2008)
- The recoverable biomass energy potential come from:
 - Agricultural residues,
 - Forestry and wood processing residues,
 - Animal wastes,
 - Municipal wastes.
- The largest portion of this product is used in rural areas for heating and cooking in a primitive way.

Biomass Gasification Activities in MRC

Gasification/Combustion of Biomass/Coal Group Activities

Current Laboratory Scale Test Facilities;

- Bubbling fluidized bed gasifier (20 kW_{fuel})
- Fixed bed gasifier (40 kW_{fuel})
- Circulating fluidized bed combustor (20 kW_{th})
- Circulating Fluidized bed combustor (35 kW_{th})
- Circulating Fluidized bed gasifier (150 kW_{fuel})

Current Pilot Scale Test Facilities;

- Bubbling fluidized bed gasifier (450 kW_{fuel})
- Fixed bed gasifier (300 kW_{fuel})
- Circulating Fluidized bed combustor (750 kW_{th})

Under construction test facilities;

- Pressurised bubbling bed gasifier (1250 kW_{fuel})

Laboratory Scale Test Facilities



BFBG - 20



CFBC - 20



CFBC - 35



FBG - 40

Selected Gasification/Combustion Projects in MRC

Completed Projects:

- **Integrated Biomass Gasification with Power Technologies BIGPOWER, EU FP 6 Project, 2005-2008.**
- **The Integrated European Network for Biomass Co firing, NETBIOCOF, EU FP 6 Project, 2005-2008.**
- **Designing and Manufacturing of 400 kWth Fixed bed Biomass Gasifier, Industrial Project, 2009-2010.**
- **Coal and Biomass Gasification, Gas Cleaning and Integrated Energy Production, Nationally Funded Project, 2005-2009**

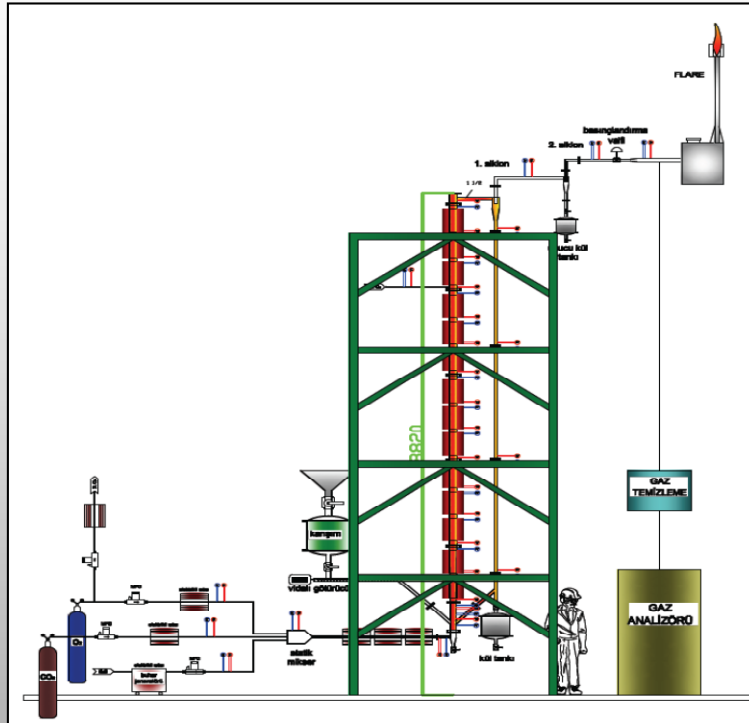
Ongoing Projects:

- **Combustion of Biomass and Lignite in Circulating Fluidized Bed, National Funded Project, 2007-2010.**
- **Liquid Fuel Production From Coal and Biomass, National Funded Project, 2009-2013.**
- **High Added Value Materials From Waste Tyre Gasification Residues, EU FP 7 Project , 2009-2012.**
- **Designing and Manufacturing of 2 MWe Fluidized Bed Gasifier, Industrial Project, 2009-2011.**

Updates

Biomass Gasification Activities in MRC - Updates

About Test facilities



150 kW_{fuel} Circulating Bed Gasifier

Capacity (kW _{fuel})	150
Fuel feeding (kg/h)	30
Diameter (cm)	10
Height (cm)	750
Pressure	1 barg



Biomass Gasification Activities in MRC - Updates

About Policy

In 2010, Turkey has constituted two new regulations to encourage the biomass usage for electricity generation.

First one is about the usage of renewable energy sources for electricity generation up to 500 kWe for individual producers/users.

There is no obligation for being authorized by government and no obligation for being a company for generating electricity no more.

This regulation allows the small scale electricity generation/cogeneration for local applications. Individuals can generate electricity for both their self electricity consumption or can connect to the grid and sell the excess electricity production.

Biomass Gasification Activities in MRC - Updates

About Policy

Second one is about the electricity selling price regulations that are generated with the usage of the renewable energy sources (hydraulic, wind, geothermal, biomass, solar).

Renewable electricity production is supported by feed-in rates. The feed-in rates for the different types of renewable electricity generation are;

Electricity generation with different renewable energy sources	Selling prices (\$ cent/kWh)
a. Hydraulic Power	7.3
b. Wind Power	7.3
c. Geothermal Power	10.5
d. Biomass/Biogas Power	13.3
e. Solar Power	13.3

This selling price is for both gasification and combustion applications. Legislation has been recently approved by Turkish Assembly at the end of 2010.

With this attempt, Turkey is newly on the way of subsidizing renewable energy entrepreneurs and of increasing the usage of biomass as well.

Thank You...

View of Pilot Scale Gasification and Combustion systems



Serhat.Gul@mam.gov.tr