KARANATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

BIOMASS & COGENERATION POWER PROJECTS IN KARNATAKA

PROCEDURE FOR ISSUING

"NO OBJECTION CERTIFICATE"

FROM GOVERNMENT OF KARNATAKA

Biomass

- Biomass is organic material available from the plants and animals. Biomass contains stored energy from the sun. Plants absorb the sun's energy in a process called photosynthesis. The chemical energy in plants gets passed on to animals and people that eat them.
- Biomass is a renewable energy source because we can always grow more trees and crops, and waste will always exist. Some examples of biomass fuels are wood, crops, manure, and some garbage.
- When burned, the chemical energy in biomass is released as heat. If you have a fireplace, the wood you burn in it is a biomass fuel. Wood waste or garbage can be burn to produce steam for making electricity, or to provide heat to industries and homes.
- Burning biomass is not the only way to release its energy. Biomass can be converted to other useable forms of energy, such as methane gas or transportation fuels, such as ethanol and biodiesel.
- Methane gas is the main ingredient of natural gas. Smelly stuff, like rottened garbage, and agricultural and human waste, release methane gas — also called "landfill gas" or "biogas."
- Crops like corn and sugar cane can be fermented to produce ethanol. Biodiesel, another transportation fuel, can be produced from left-over food products like vegetable oils and animal fats.
- The most common form of biomass is wood. For thousands of years people have burnt wood for heating and cooking. Wood was the main source of energy until the mid-1800s. Wood continues to be a major source of energy in much of the developing world.
- wood and wood waste (bark, sawdust, wood chips, and wood scrap) provide about 2% of the energy we use today. About 84% of the wood and wood waste fuel is consumed by industry, electric power producers, and commercial businesses. The rest, mainly wood, is used in homes for heating and cooking.
- Many manufacturing plants in the wood and paper products industry use wood waste to produce their own steam and electricity. This saves these companies money because they don't have to dispose of their waste products and they don't have to buy as much electricity

Biogas

- Collecting Gas from Landfills
- Landfills can be a source of energy. Organic waste produces a gas called methane as it decomposes, or rots.
- Methane is the same energy-rich gas that is in natural gas, the fuel sold by natural gas utility companies. It is colorless and odorless. Natural gas utilities add an odorant (bad smell) so people can detect seeping gas, but it can be dangerous to people or the environment. New rules require landfills to collect methane gas as a pollution and safety measure.
- Some landfills simply burn the methane gas in a controlled way to get rid of it. But the methane can also be used as an energy source. Landfills can collect the methane gas, treat it, and then sell it as a commercial fuel. It can then be burned to generate steam and electricity.
- Some farmers collect biogas from tanks called "digesters" where they put all of the manure, dirt, and waste from their barns. A biogas digester can convert animal waste into useable energy. On some dairy farms, the muck from inside the barn is collected and put into a large digester, or tank. Inside the digester, methane gas is separated from the liquid and solid waste. The methane gas can then be used to generate electricity to light a shelter, or to sell to the electric power grid.

Biomass & the Environment

Each form of Biomass has a different impact:

- Biomass pollutes the air when it is burnt, but not as much as fossil fuels do. Burning biomass fuels does not produce pollutants such as sulfur that can cause acid rain. When burnt, biomass releases carbon dioxide, a greenhouse gas.
- But when biomass crops are grown, a nearly equivalent amount of carbon dioxide is captured through photosynthesis. Each of the different forms and uses of biomass impact the environment in a different way.
- Because the smoke from burning wood contains pollutants like carbon monoxide and particulate matter, some areas of the country won't allow the use of wood-burning fireplaces or stoves on high pollution days. A special clean-burning technology can be added to wood-burning fireplaces and stoves so that they can be used even on days with the worst pollution.
- Plants that burn waste to make electricity must use technology to prevent harmful gases and particles from coming out of their smoke stacks. The particles that are filtered out are added to the ash that is removed from the bottom of the furnace. Because the ash may contain harmful chemicals and metals, it must be disposed of carefully.
- Biogas is a gas composed mainly of methane and carbon dioxide that forms as a result of biological processes in sewage treatment plants, waste landfills, and livestock manure management systems. Methane is one of the greenhouse gases associated with global climate change. Many of these facilities capture and burn the biogas for heat or electricity generation. Burning methane is actually beneficial because methane is a

stronger greenhouse gas than carbon dioxide. The electricity generated from biogas is considered "green power" in many states and may be used to meet state renewable portfolio standards (RPS).

- Ethanol was one of the first fuels used in automobiles, and now nearly all gasoline sold contains some ethanol. Ethanol and gasoline fuel mixtures burn cleaner and have higher octane than pure gasoline, but have higher "evaporative emissions" from fuel tanks and dispensing equipment. These evaporative emissions contribute to the formation of harmful, ground-level ozone and pollution. Gasoline requires extra processing to reduce evaporative emissions before it is blended with ethanol. Carbon dioxide, a greenhouse gas, forms when ethanol burns, but growing plants like corn or sugarcane to make ethanol may offset these carbon dioxide emissions because plants absorb carbon dioxide as they grow.

- Biodiesel was the fuel used in the first diesel engines. Compared to petroleum diesel, biodiesel combustion produces less sulfur oxides, particulate matter, carbon monoxide, and unburned and other hydrocarbons, but more nitrogen oxide. Similar to ethanol, biodiesel use may result in lower net-carbon dioxide emissions if the source of biodiesel are oils made from plants, which absorb carbon dioxide.

Since 1996, in the State of Karnataka the total capacity of Biomass and Cogeneration Power Generation plants established and feeding electricity to the grid is about 1317 MW and expecting more in the future.

The tariff fixed by the Hon'ble KERC is as below.

Biomass Power Projects using Air Cooled Condensors	:	Rs. 5.19
Biomass Power Projects using Water Cooled Condensors	:	Rs. 5.15
Cogen Power Projects	:	Rs. 4.83

BIOMASS & COGENERATION POWER PROJECTS

PROCDURE FOR ISSUING "NO OBJECTION CERTIFICATE" FROM GoK

The developer who is interested to setting up Biomass/Cogen Power Projects in the State,

- will approach KREDL along with DPR, land details marked on topo sheet.
- Study the availability of biomass with in 40km radius for Biomass Power Projects.
- There should not be any other applicant overlapping this area.
- Applicant has to pay Rs: 1 Lakh/MW as processing fee & Rs: 10,000 + Service tax as application fee (**processing fee of RS: 1 lakh/MW is exempted for co-generation**).
- Net worth of the Company should be 30% of the project cost.
- Documents will be forwarded to energy dept.
- NOC will be issued if feasible.
- The generation can be consumed locally or can be connected to grid/third party.
- The time frame for commissioning project is 18 – 24 months from date of issue of NOC.
- After synchronisation approach MNRE for CFA duly forwarded by KREDL.
- Depending on the boiler capacity, MNRE will sanction upto 30% of project cost after successful commissioning of the project.
- Exemption on Central Excise Duty exemption and other benefits will be provided.
- Reimbursement of 50% of the VAT amount paid is allowed.