

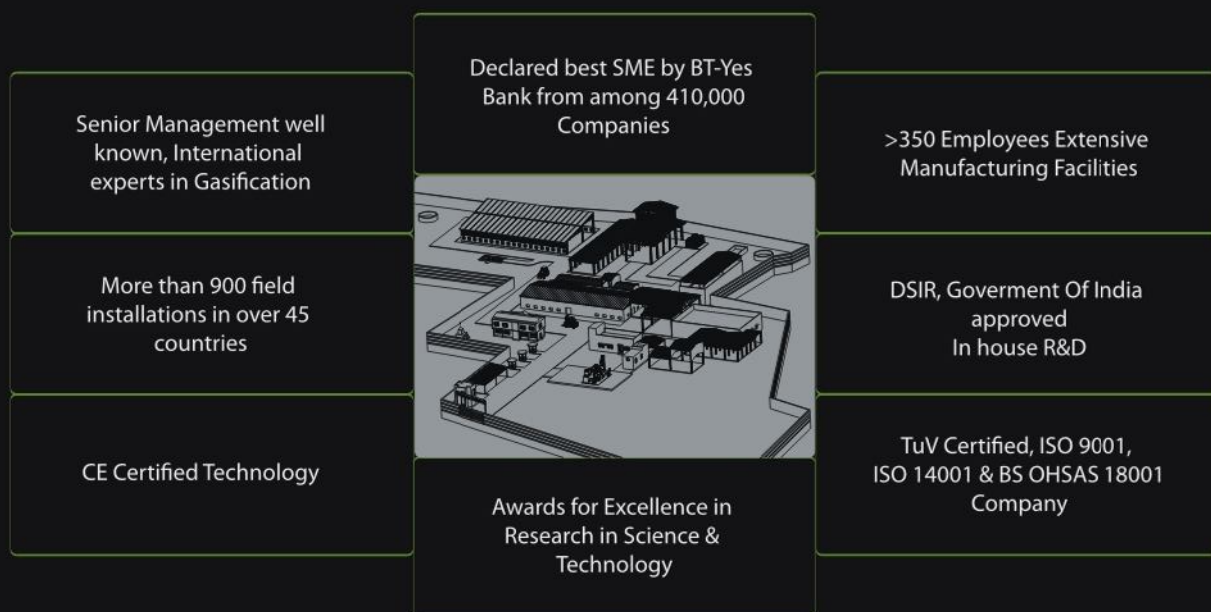
## ANKUR SCIENTIFIC - THE COMPANY

### VISION

Ankur Scientific endeavors to provide energy that is,  
Green,  
Clean,  
Sustainable,  
Convenient,  
At cost that enable all to use it.

### PROFILE

Ankur Scientific Energy Technologies Pvt. Ltd., a company established in 1986, has been in the forefront of research and developmental activities in the area of non-conventional energy sources. Founded by Dr. B.C. Jain ( B.E. - BITS, Pilani; Double M.S., M.B.A. and Ph.D. from MIT, Cambridge, U.S.A.), an internationally acclaimed technocrat, the company has, since its inception, an enviable record of development in the area of Biomass to Energy Solutions.



**Ankur Scientific Energy Technologies (P) Ltd.**

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**ULTRA CLEAN / ZERO DISCHARGE  
COAL GASIFICATION TECHNOLOGY**

## ULTRA CLEAN / ZERO DISCHARGE COAL GASIFICATION TECHNOLOGY

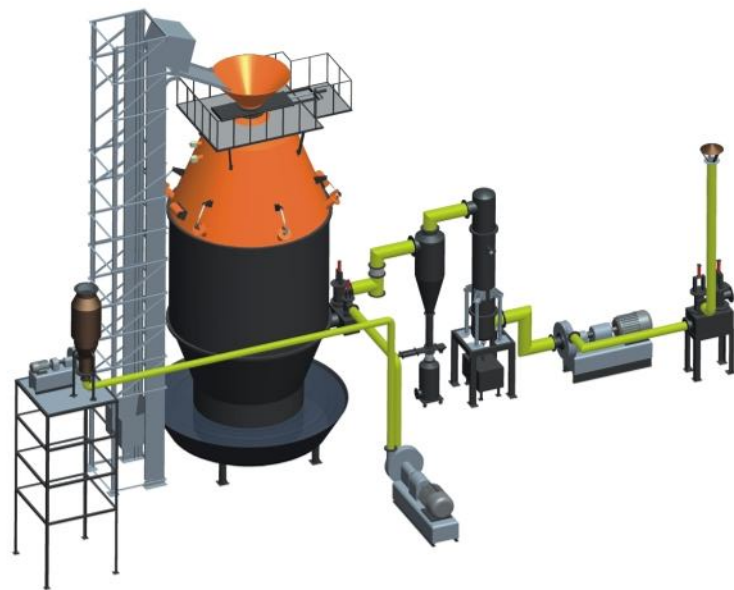
### THE PRINCIPLE

Ankur Scientific offers a completely new process for gasifying Coal. **The systems offered use a Downdraft process instead of the conventional updraft process. In the downdraft process,** the coal is fed into the Gasifier from the top while the gas generated is taken out from the bottom. This leads to the gas being almost tar free.

As the gas is almost tar-free, from an environmental perspective, the system is a boon. There is no need of tar catchers and there is no need to dispose of the same. This is a very large benefit as this facilitates a move away from **Policing (how much tar is generated; how is it disposed off; where) to Prevention.**

### THE BENEFITS

- The systems are environmentally sound as the gas generated is largely tar free and hence clean.
- The water used to cool the gas does not come directly in contact with the gas, thus neither process water nor any Condensates are generated.
- Systems need no steam and are in negative pressure. Thus much **Safer in operation.**
- The systems are completely automated. Thus no manual intervention is required for operation.
- Ease of stopping and start up as and when needed very quickly.
- Systems are generally more compact.
- Safeties are built in to ensure that there are no gas leaks, no pressure related accidents and no back fires from the application end.



The Typical Schematic

### AUTOMATION OFFERED

The systems offered by Ankur Scientific were developed for International and Developed country markets. This mandated a highly automated system. All systems offered by Ankur Scientific are completely PLC controlled with the following features:

- Single Button Shut Down and Start up .
- Various temperature and pressures are monitored to ensure that there are no issues with the process. Any process issue leads to alarms/ system shut down.
- There are coal level sensors in the gasifier which give signals as to when more coal is to be fed in. The bucket then rises and fills the coal into the gasifier automatically. In the event the bucket is going up empty, there is a 2nd sensor which gives an alarm/ shuts down the system.

- Gas generation is VFD controlled. This allows the gasifier to handle variable loads easily.
- The ash and char come out automatically from the system. No poking is needed.
- All important parameters are logged into the PLC. All the data from the PLC can be available on SCADA as well as over the internet. Thus central monitoring of all data is possible.

### SAFETY FEATURES

Safeties have been developed keeping in mind a detailed Hazop study and requirements mandated by the European Union (which are extremely stringent). Some safety features are listed below:

- The system is in negative pressure. This ensures that there are no gas leaks or pressure related explosions.
- There is no need for an ESP/ Tar Cracker which ensure that the issues with tars and a mixture of tars and steam (in the tar cracker) are completely avoided.
- The system is completely PLC controlled allowing for safeties leading to system alarms, shut downs etc. (PLC is optional and can be supplied as per client requirement)
- Rupture Discs at various locations.
- Fast acting, Fully Closing valves which can isolate/ shut down equipment based on various signals.
- State-of-the-art flare that allows the gas to be vented safely.
- CO monitors are part of standard supply to ensure that there is not a high level of CO anywhere. (Additional CO Monitors can be provided as per client's requirement)
- O2 sensors are built in the system to ensure that the gas+air mixture inside the pipelines (before burners) does not get to a combustible level.
- One button and auto stop are part of the system.
- Various pressure, temperature data's etc. are measured and fed into the PLC. The PLC then manages the system by giving an alarm or further if needed by shutting down the system.



### THE RANGE OF SYSTEMS OFFERED

Sr. No.	System	Indicative Fuel (Kg/Hr)	Indicative Gas Flow (Nm3/Hr)	Indicative Heat Output (Kcal/Hr)
1	560	560	1680	18,48,000
2	700	700	2100	23,10,000
3	1000	1000	3000	33,00,000
4	1250	1250	3750	41,25,000
5	1500	1500	4500	49,50,000

### TYPICAL FUEL SPECIFICATION

Technology is based on typical Indonesian Coal with the following characteristics:

- Ash : < 5 % on dry basis @ Ash Deformation Temperature above 1100 °C
- Moisture : 20 to 30 % on wet basis
- Volatile Matter : above 40%
- Calorific Value (ADB) : above 5800 kCal/Kg
- Particle Size: 20 mm to 50 mm