



Global Energy Collaborations

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Steam versus Gasification (IC Engine based) Power production.

Our IC Engine based Gasification process and the special converted Engines (we offer a very unique 1.66MW converted engines), will be without ANY DOUBT better priced than ANY steam turbine solution, by any calculation our systems will be atleast 23% lower costed against Steam based process, if we look at the core aspects and we can be accomplished in 5 – 7 month!!!. We can provide service steam same time made by the residual heat of our system, at a Steam turbine you will need more feed-ins' biomass fuel to have such, we are using the wasted heat as in any case we cool down the Syngas.

Customer will have faster 2 years advanced income/profit real cash money!!!. Steam turbine takes at least 2.5 years to erect and if customers will insist to save and to buy second hand stuff, he thinks he save, but this turbine & boiler will be 25 years old !!! - what about fatigue of steel... , boiler inside corrosion of 25 years???... Customer will never know where, when and how the next problem is coming & pop-ups. Who will give the real guaranty? Who will give service?, (if any, it must be by skilled ones, will cost a lot...). If the customer buys new stuff - Steam is more expensive than what we offer without any doubt.

Customer must bear in mind costs of the chemicals and process (expansive) of treating the feed-in (Make Up) water, steam station will also need high costs of pipes and thermal isolation in site pipelines, erection site costs (civil work) of steam turbine is at least 33% of the budget, (even without stack erection fee), our Syngas Gasification system is only 15%!.

Steam turbines has comparatively big problems to start-up, it can take even a day to stabilize the station, and if customer want to shut it down, it will take also days to cool down, new start could take few days to balance between ambient temp. for the turbine stability needs. We saw BAD experience in many places with steam turbines of few MW, people stop this projects because of the reasons mentioned above.

Our standard Internal Combustion Engines (ICE) can be serviced by a simple basic technicians, standard spare parts, low cost ones, if customer want to upgrade, as our system is modular units, it will be very simple, can customer upgrade a turbine?... , a boilers? Steam station, usually need at least 12% self power, means lower net power output, we use only 6 – 9% this is also saving in daily use costs, producing of 1.0 MW steam process need near 1.4 – 1.6 Tons of husk/biomass, we need quite same with Gasification 1.4 – 1.7 Tons.

The steam boilers ash can't be use as Charcoal selling to Barbeque/other markets, Steel mills, etc. (good market), - while the charcoal coming from our systems can be sold, so that you get an extra income throughout the life of usage. Our power station takes much smaller "foot-print" of land site. Steam station needs continually cooling fresh (and treated) water, river, lake, sea, - we don't, we just recycle the water again & again as needed.

We supply few Engines, modular systems, if customer have lower power demand (at night...) he simply shut down one or two generator, this increase a lot the efficiency of each,



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as the best generation in every power station is between 75 – 87% load, with steam it will be very much un-efficient and un stabilize at big power out-put variations/demands!.

With high-pressure boiler customer need to take special care of the **stack gases treatment!**, (we don't have any stack!...NO out gases, NO Emission!), this cost money!.

The reasons that Sugar mills and few others still works with steam turbine is mainly because: most works 12.0–18.0MW, a lot of traditional behaviour, Gasification in large scale is not in the market for many years in small plants (we and GE are very unique in the high sizes) our systems become more and more popular as people realize the benefits and the simplicity mentioned above, we have in Philippines 3.0MW, Cambodia 3.0MW, China, one coming up in Europe and few other stations running for years in China, we will erect more 2.0MW in Vietnam/Cambodia very soon, and we offer Technology help presence on live and on site basis for more than 6 months to let your person take up smooth transition.

For the in-factory process-steam for boiling/cooking (low pressure) we can keep the old boilers and add an extra CHP systems, or we can change/add burners using the bagasse waste, customer will **not** work 'High pressure' boilers, this also serious 'story' must skilled engineers, special licenses, yearly professional expansive checks, etc., lot of head-ache and..... much money!.

We can make feasibility for projects [at a lower costs] and help customer to get loan for their projects (with good solid confirmed securities), we also can help to bring the CDM refund from the International Banks or other funds for the saving of CO₂ to the globe, this rate is near US\$ 15/ton of gas saving versus fossil fuels that needs stack, there are special companies doing this job for having small % from the saving, no prepaid fee needed.

Have a look at the comparison done by N R E L itself and judge for yourself, what is better Steam based system or Gasification based systems, when you are looking at system upto 10 or 12 MW



Present and Future Costs

	Steam Turbine	Advanced Gasification
Capital	3-5 cents/kWh	2.63 cents/kWh
Operating (excluding fuel)	2.2-2.8 cents/kWh	.4 cents/kWh
Biomass Feedstock	1.2-3.5 cents/kWh	1.62 cents/kWh
TOTAL	6.4-11.3 cents/kWh	4.65 cents/kWh