



PEEKER ENERGY CORPORATION

PROVIDING CLEAN POWER FOR THE FUTURE

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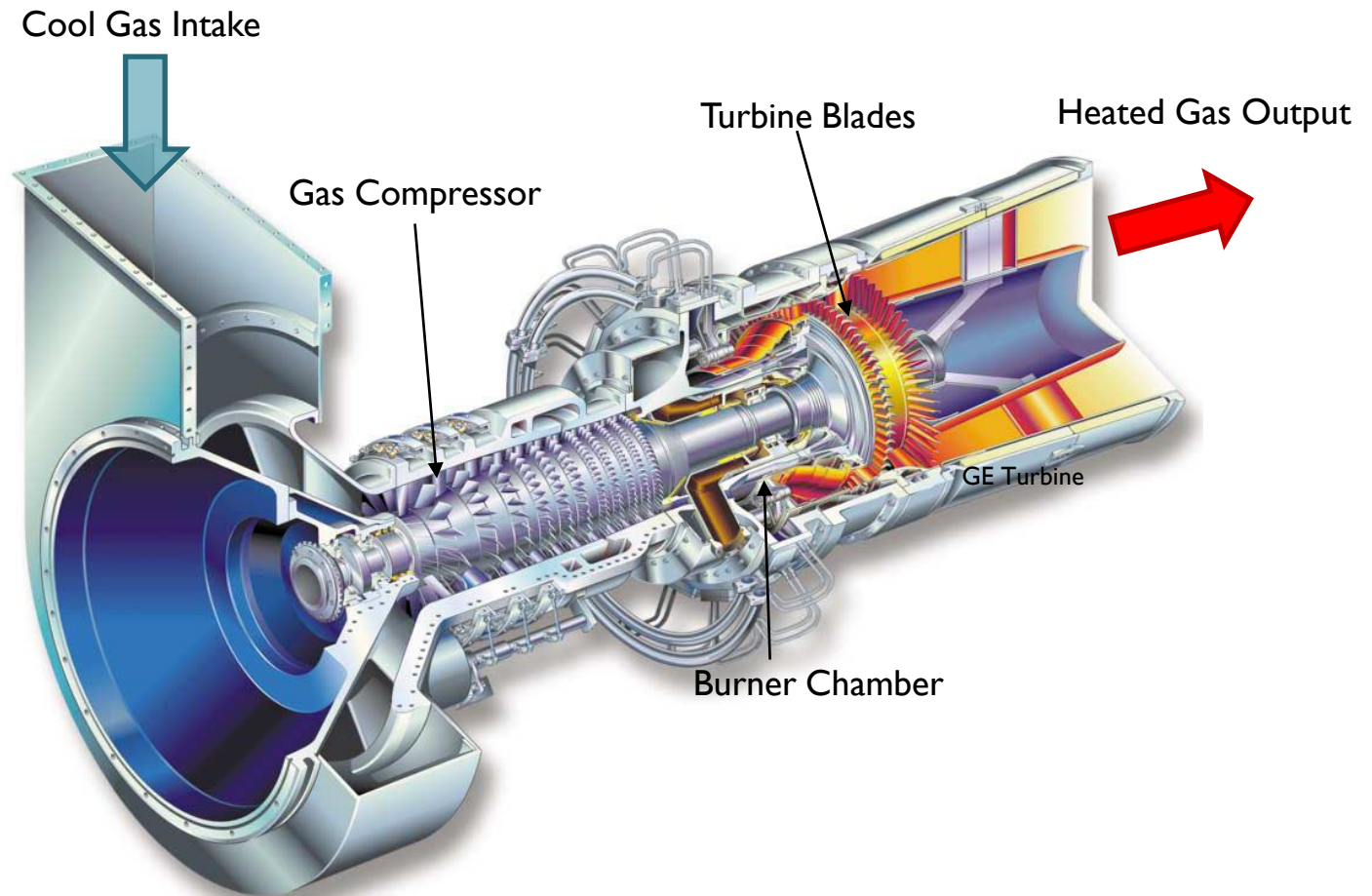
PRODUCTS

- Electrical Power Generation and Distribution Through Power Plants fueled by hydrogen gas generated **on-site** and **on-demand**;
- Electrical Power Generation and Distribution Through Advanced D.C. or A.C., Compact (low-signature), Electrical Power Generators;
- Electrical Power Generation and Distribution Through Plasma Magneto-hydrodynamic Generators

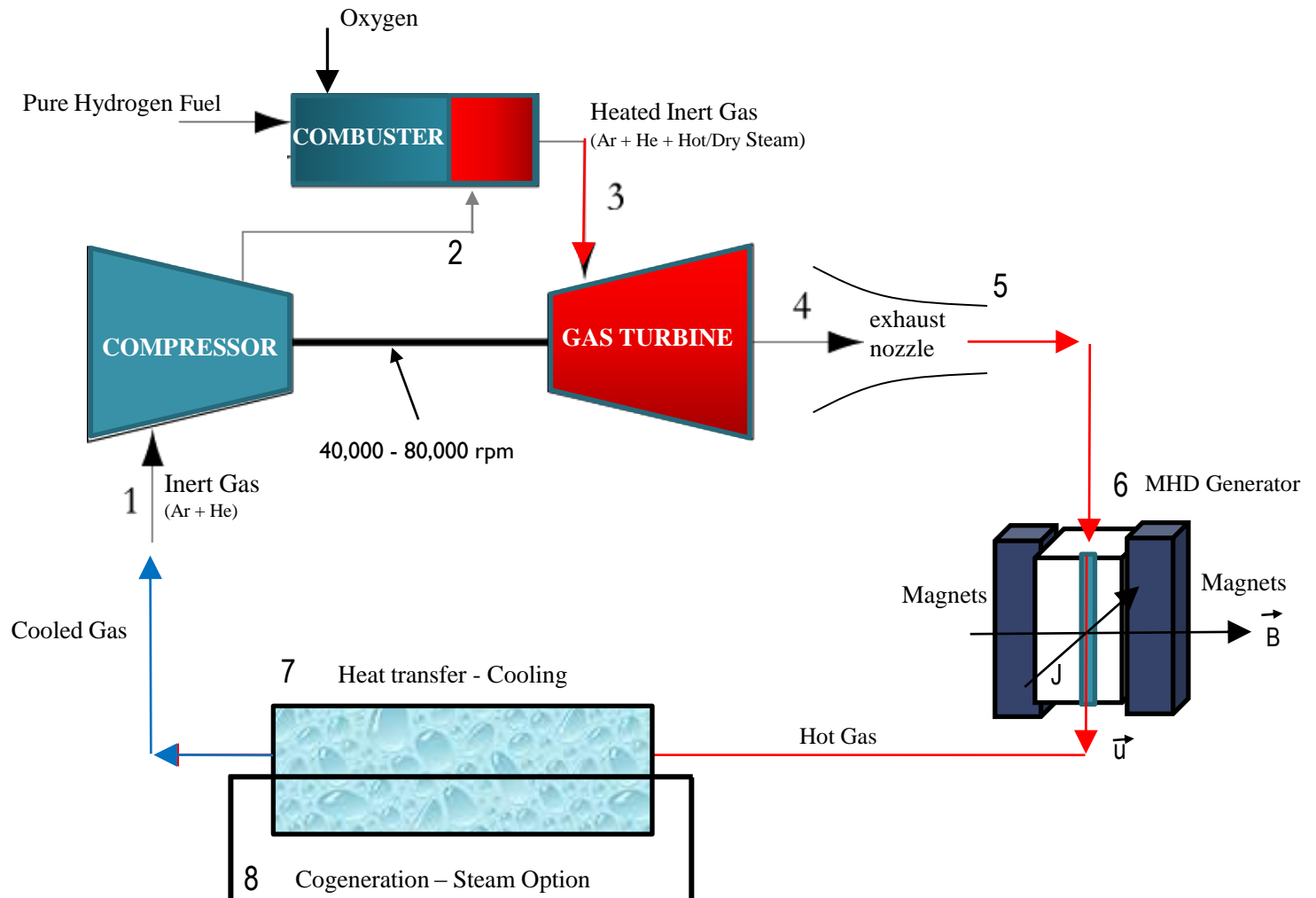
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Electrical Power Generation and Distribution Through Power Plants Fueled By Hydrogen Gas Generated On-Site and On-Demand

Typical Gas Turbine Configuration



Electrical Power Generation and Distribution Through Power Plants Fueled By Hydrogen Gas Generated On-Site and On-Demand





Electrical Power Generation and Distribution Through Power Plants Fueled By Hydrogen Gas CLOSED LOOP SYSTEMS

- **USE OF INERT GASES** (ARGON, HELIUM)
 - Do not burn
 - Transmit an electric current
 - Helium helps in cooling
- **HYDROGEN GAS + A CONTROL VOLUME OF OXYGEN AS HEATING SOURCE**
 - $H_2 + O_2 = H_2O$ (Water – no pollution)
 - H_2 can burn at high temperature thus heating the inert gases adding energy
 - H_2O resultant is actual high temperature dry steam adding to the force to the turbine
- **ARGON PLASMA TO BE USED IN A MHD ELECTRICITY EXTRACTION**
- **HOT GASES ARE COOLED YIELDING MORE ENERGY FOR COGENERATION**
 - Steam obtained in a secondary co-generation loop can be used for industry, or
 - Add a steam turbine for further electricity generation

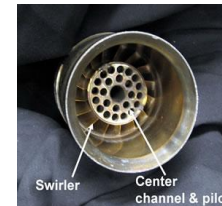
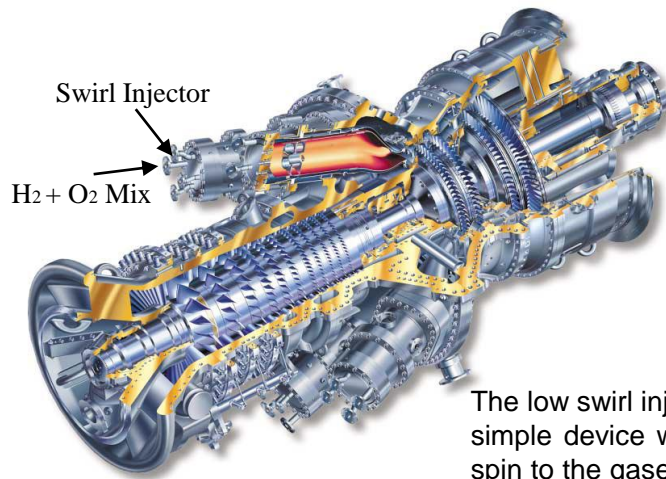
MIXING AND BURNING HYDROGEN AS MAIN FUEL

TURBINE TYPES:

PEEKER ENERGY CORPORATION uses standard gas turbine systems that meets its criteria for pure hydrogen gas use. At this moment, for powers up to 20 MW per system, the Company selected SOLAR TURBINE INTERNATIONAL (a CATERPILLAR Company) as the appropriate host. These turbines require some modifications to allow for a close loop gas flow application, where the input inert gas mix is entirely recovered and reused continuously (thus no harmful exhaust of gases is produced).

ENGINEERING MODIFICATIONS:

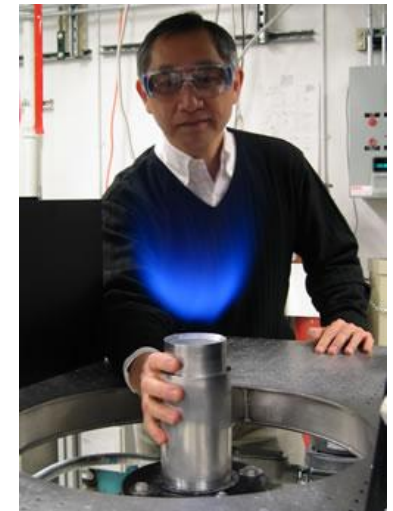
Each turbine system must be custom modified to allow the burning flame of the gas inside the turbine at a safe distance from the burner and any turbine components that may be damaged due to the high temperature of the burning hydrogen gas. These special burners have been designed at the Berkley's Labs (UNIVERSITY OF CALIFORNIA BERKLEY) and need to be custom adjusted to every model turbine we'll use.



The US Department of Energy's Office of Electricity Delivery and Energy Reliability initially funded the development of the LSI for use in industrial gas turbines for on-site (i.e. distributed) electricity production.

The low swirl injector (to the right & up) is a mechanically simple device with no moving parts that imparts a mild spin to the gaseous fuel (hydrogen) and oxygen mixture that causes the mixture to spread out.

The flame is stabilized within the spreading flow just beyond the exit of the burner. Not only is the flame stable, but it also burns at a lower temperature than that of conventional burners. The only compound super-heated steam together with the hot argon and helium rotates the blades and shaft to the generator.



Dr. Bob Cheng of Berkley's Lab views an LSI flame. He is touching the burner, demonstrating that it stays cool because the flame is completely lifted from its body.



HYDROGEN GENERATOR

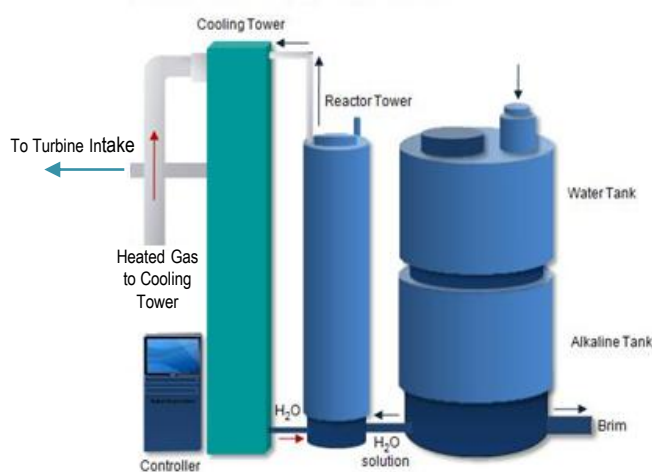
The **Titan 130**, 15 MWe Solar Turbines International turbine consumes **9695 BTU/KWh**. One cubic meters of natural gas consumes in the same turbine 36,303.5 BTU (or 1028 BTU/cu. Ft) to produce **3.74 kWh**.

Likewise, one cubic meter of hydrogen gas yields 1,321,428.6 BTU which means that 1 cubic meter of hydrogen gas would produce **136.3 kWh**. In practice, less electricity is produced due to the lower thermal conductivity (air's thermal conductivity is >1.8 times that of argon) of the argon gas compared to air.

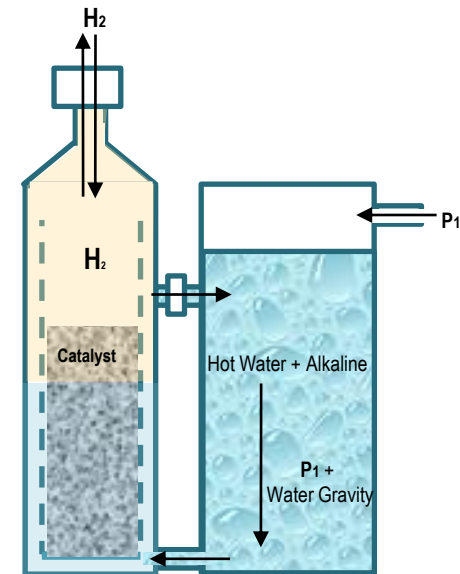
One molecule of hydrogen, or "**1 Kmol H₂ = 22.41 Nm³**", a one (1) **Nm³** equals to **2,588 Kcal/Nm³** of hydrogen (stoichiometric combustion).

If burned in air, other major resultants for hydrogen combustion (**H₂ + air**) are water (**H₂O**), Nitrogen gas (**N₂**) and oxygen (**O₂**). We are using oxygen in a controlled volume to hydrogen, in order to protect the output temperature. The resultant in this case is only water vapor as saturated steam.

HYDROGEN GENERATOR ON-DEMAND



Hydrogen gas can be obtained on-site as a chemical reaction between a alkaline-water mixture and a specific catalyst. Energy is required to create the catalyst therefore the catalyst is used simply as a carrier of energy (same as fossil fuel) to locations where fossil fuel is not available, or the environment must be kept clean. The cost to create the catalyst is lower than the energy derived to create electricity burning hydrogen in oxygen to produce No pollutants. The Company produces the catalyst using other technologies and methods that employs low cost processes (see V-Gen and PMG Technology). The energy required to produce 1 Kg of catalyst (2.2 lbs) is 14.08 kWh of electricity. The catalyst can be recycled, so the energy needed to do so is about 4 kWh for 1 Kg of catalyst. Likewise 1 Kg of catalyst should produce as much as 1.231 cubic meters of hydrogen gas that can be burned in a turbine..



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GENERAL QUESTIONS ABOUT HYDROGEN

1. Is hydrogen more dangerous than gasoline?

Since any fuel we use is flammable, it is inherently dangerous. Hydrogen is often used as a gaseous fuel, which makes it similar to natural gas and town gas, which have been used in America, Europe, and Asia for heating and lighting for almost two centuries. One difference is that hydrogen is nontoxic, so it's not harmful to breathe. It's also so light that it scatters immediately upward when there is a leak, rather than pooling about, polluting groundwater, and soaking into clothes. The end assessment is that when hydrogen is handled with care appropriate to any gaseous fuel, it is safer than fuels in standard use.

2. Is burning hydrogen like the hydrogen bomb?

No. Burning hydrogen, just like burning gasoline, natural gas, or a candle, is a chemical reaction, which means that only the electrons get shifted around and new compounds are made, like water, but the basic atoms are the same. In a nuclear reaction, the actual nucleus of the atom (the protons and neutrons) is changed.

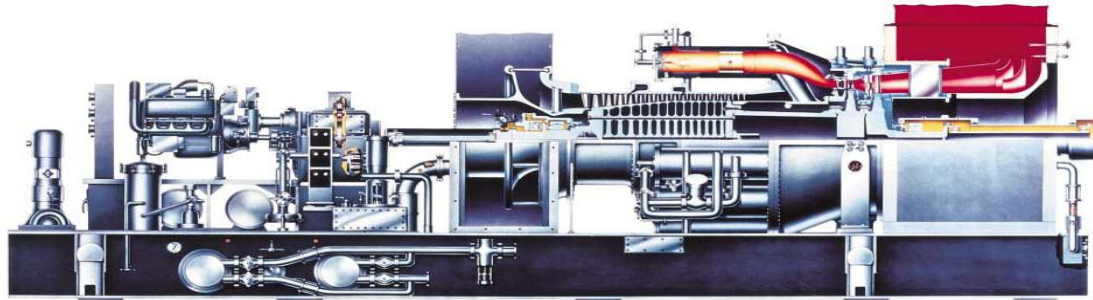
3. Did hydrogen cause the Hindenburg to burn?

No. It turns out that the coating of the Hindenburg airship was treated with two major components of rocket fuel, aluminum and iron oxide. When the airship was docking in 1937, an electrical discharge ignited the skin, and the fire raced over the surface of the airship. In fact, 35 of the 37 people who died, perished from jumping or falling to the ground. Only two of the victims died of burns, and these were from the burning coating and on-board diesel. The hydrogen burned quickly, upward and away from the people.

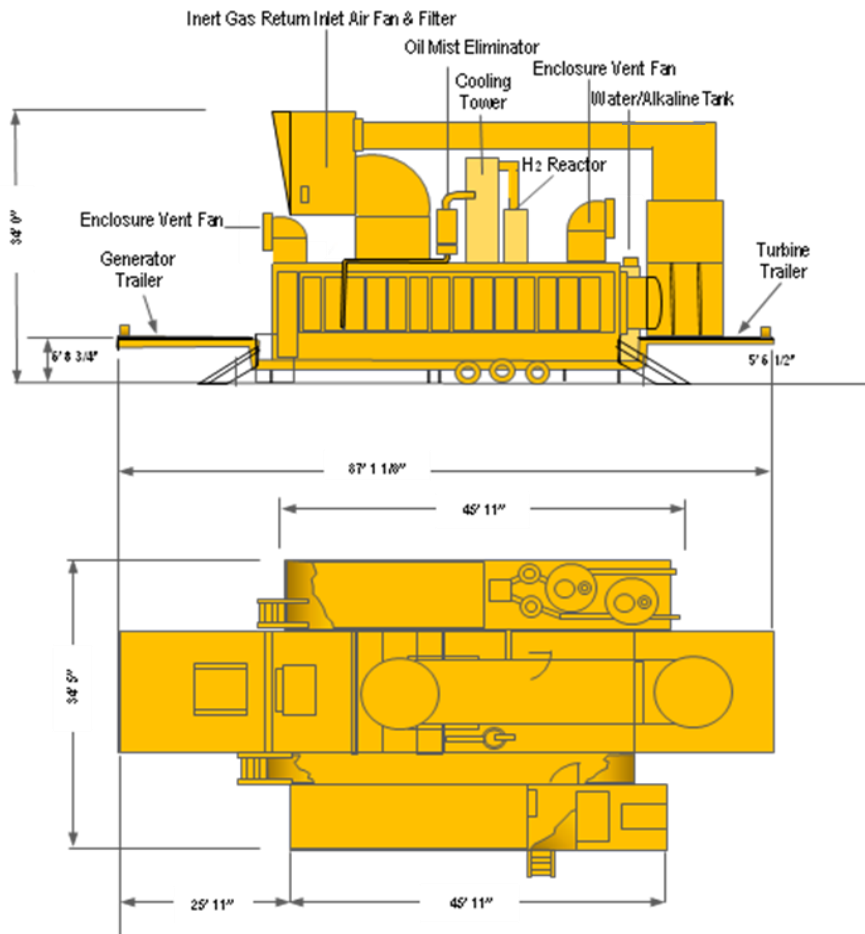
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Typical Dimensions



Output Power (for natural gas – Solar Data):

ISO: 15°C (59°F), sea level	15,000 kWe
Heat Rate	10 230 kJ/kWe-hr (9,695 Btu/kWe-hr)
Exhaust Flow (Air)	179 250 Kg/hr (395,180 lb/hr)
Exhaust Temp (natural gas)	495°C (925°F)
Higher Temp with Hydrogen/Oxygen burning	

GENERAL DIMENSIONS (INSTALLATION):

Length: 100 ft (30.48 m)
Width: 54.5 ft (16.6 m)
Height: 40 ft (12.2 m)

DRY WEIGHT (turbine only), Kg (lb):
73 668 (162,409)



INCREASE EFFICIENCY THROUGH MHD

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- Electrical Power Generation and Distribution Through Advanced D.C. or A.C., Compact (low-signature), Electrical Power Generators;



GENERAL

In addition to the closed loop hydrogen fueled turbines power generation which uses argon gas and helium instead of air flowing through the system, the super heated inert gases mix (Argon, He and water steam) exits through the back nozzle of the turbine at high velocity, pressure and increased temperature (plasma), a highly ionized gas capable of carrying electrical charges.

The ionized gas is introduced into a magneto-hydrodynamic (MHD) system which will yield more electricity at high efficiency. As such, the plasma fluid (hot argon gas + helium + dry saturated steam) is introduced into a cyclotron turbine that increases the velocity of the gases and redirects the electrons in a high magnetic field between two collecting electrodes distributed along the path of the conductive fluid plasma speeding in a swirl. The plasma gases exit and expand into a water cooling sleeve transferring its heat out and turning the cooling water into steam. It is this steam (in excess of 61 tons per hour of steam for a 15 MWe Solar turbine) that can be also used to create more electricity via a steam turbine.

This technology is under development and is extremely proprietary, until the US/Worldwide patents are published.

Considerations of the MHD process:

- Plasma is a conductive fluid flow (very hot);
- Current and magnetic field induction
- Magneto-hydrodynamics (MHD) = hydrodynamics flow + electro-magnetic phenomena
- Applications:
 - Electromagnetic body acceleration,
 - MHD- power generation,
 - Plasma accelerators, thrusters,

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MAGNETO-HYDRODYNAMICS

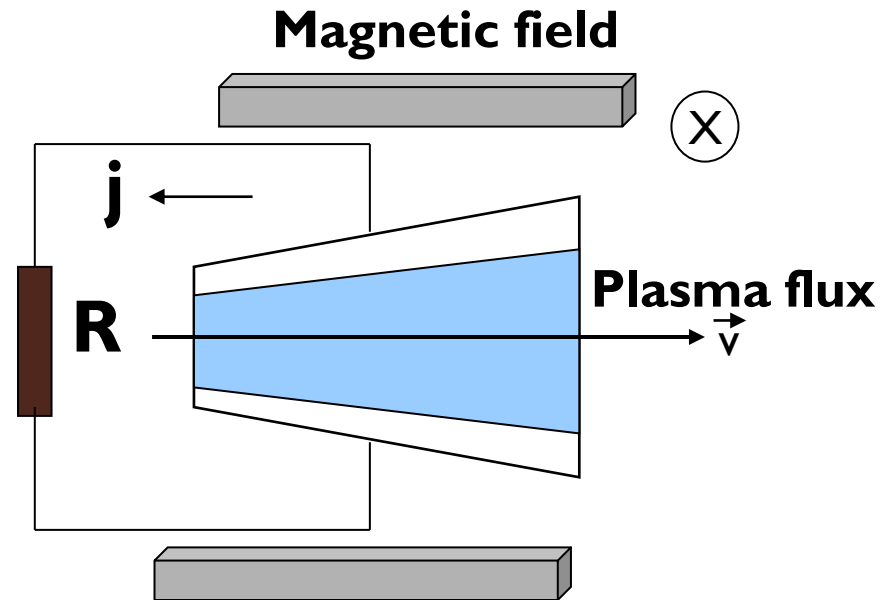
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IN MAGNETIC FIELD:

MHD-Generation of Electrical Power

GIVEN: plasma flow " \vec{v} "

OBTAIN: E-electrical field and the current





Equations in MHD

Magnetic Field Strength (Tesla) X Linear Velocity of Fluid (m/sec) X Distance between electrodes (m) = Output Voltage (V) across electrodes

Therefore, in MHD the length of the plasma path along the electricity extraction electrodes, the distance between electrodes and the strength of the magnetic field are most important. To achieve an efficient system that can extract practical energies one can imagine a variety of machinery. One of the many methods employed by the Company is through the use of Tesla's bladeless turbine.

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