Thorcon 500 Specifications August 31, 2024

Thorcon 500 is a 500 MW molten salt nuclear reactor power plant built into a seagoing hull at a shipyard to mass-produce low-cost, reliable electricity generation plants. Power plant includes fixed steam module and exchangeable nuclear module with reactors in 4 Cans.

Power generation capacity 500 MW(e) from two 557 MW(th) reactors.

Power output 245 kV 50 or 60 Hz AC; optional HVDC for long transmission lines.

Load following power output flexible within 50-100% range at 5% per minute.

Fuel. uranium dissolved in molten beryllium and sodium fluoride salts;
40 t 2.2% enriched U235 at start up, plus 80 t of 4.95% U235 over 8-year fuel cycle.

Refueling makeup fuel casks loaded annually. Every 8 years the entire nuclear module exchanged. Used nuclear module refloated and towed to maintenance center where Cans are refurbished and nuclear module readied for reuse.

Availability 95% planned; fuel salt goes to standby Can after 4 years during 14-day outage with turbine-generator maintenance; 30-day nuclear module exchange every 8 years.

Unexpected load disconnect steam bypass allows reactor fission to continue, temporarily raising cooling water temperature, until load restoration or fission power-down.

External power not needed; ThorCon 500 has passive safety and black start capability.

Siting Protected navigable waterside location up to 10 m depth.

Cooling 16 cubic meters per second seawater flow, 8.2°C temperature rise.

Lifetime Plant: 80 years; nuclear module and fuel salt: 8 years then exchange and recycle.

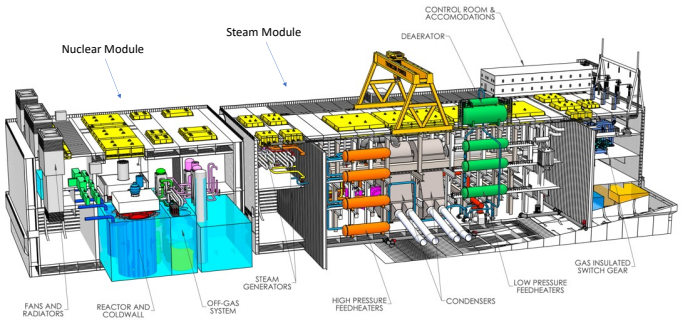
Decommissioning Nuclear module refloated and towed to maintenance center. Steam module refloated and repurposed.

Staffing plan 72 security; 42 operations; 30 maintenance; 65 other, for 1,000 MW plant.

Capital plan $1,400 million per 1-GW for two, fully fueled,Thorcon 500 power plants, plus costs for site, licenses, environmental permits.

Construction plan two years from firm order to power generation; transmission lines, permitting, siting, cooling are local limiting issues.

Generated electricity cost $0.04 per kWh.



Contact: info@thorconpower.com

THORCON
LOW-COST NUCLEAR

Thorcon 500 Safety August 31, 2024

Passive safety dependent on materials properties and physics, not electrically operated pumps or valves.

Decay heat cooling two active and two passive systems, continuous recirculation of cooling water to air cooled radiator; natural convection continues decay heat cooling after shutdown.

Stability increasing fission raises temperature, thus increasing neutron absorption by U238 and expanding structural materials, both lowering fission rate.

Containment radioactive fuel contained within primary loop, contained within Can, contained within cooling silo, contained in silo hall along with tanks of makeup and overflow fuel.

Radioactivity barriers minimum 3 barriers between radioactive materials and environment.

Refill pumps fuel salt always draining by gravity to drain tanks, with refill pumps returning fuel salt to reactor. In power failure or overheat detection refill pumps stop, allowing fuel salt to flow to drain tanks where fission is impossible.

Walkaway safe abandoned plant will self-cool for 195 days before water addition required.

Aircraft strike withstands perpendicular impact of 777 aircraft nine-ton engines.

Ship collision protected by 3 m double hull and 25 mm interior silo cold wall and 25 mm Can containing radioactive fuel salt.

Earthquake withstands 0.8 peak ground acceleration.

Tsunami massive hull firmly ballasted to seabed will withstand 18 m surge before floating.

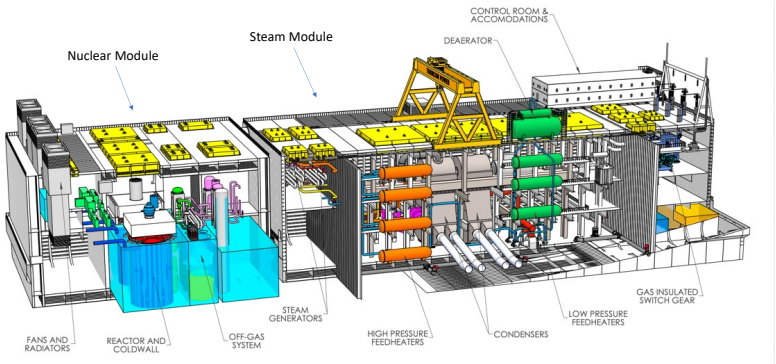
Fission products the most environmentally troublesome radioactive fission products, I-131, Sr-90, and Cs-137, are chemically bound within the fuel salt, which will not disperse.

Tritium captured by getters in inert gas in nuclear module and secondary heat exchanger cell; tritium penetrating hot heat exchangers captured by oxidation in solar salt loop.

Sabotage operators can not defeat safety functions; reactivity increases limited by flow orifices and slow motors; no alterable safety-critical control systems.

Weapons proliferation all fissile material in inaccessible high-radiation areas; uranium always low-enriched; fissile and fertile materials accounting; IAEA seals and video monitoring.

Contact: info@thorconpower.com



THORCON
LOW-COST NUCLEAR