

RED SUN Energy Systems



EGG RED SUN MSR PHILS CORP.

Three Island Solution to Mitigate Brownouts.

- The RED SUN Thermal battery is designed to transform electricity into heat, like the earth with 98 % efficiency. It can store heat for up to a year as a back-up battery to run both diesels and turbines with 30 % more efficiency than fuel because of its higher heat band, storing heat 1400-2200 C. This enables energy arbitrage which is charging the battery at night from all renewable sources including hydro, wind and geothermal and delivering due to its mobile transportability in the day. RED SUN Thermal batteries are 7x energy dense than Tesla batteries, whereas a 11 MW battery only weights 6 tons and provides 120 MWh per charge. Therefore, we will charge the battery at night at various hydroelectric facilities and deliver to distributed locations in the various cities, suburbs and industrial parks in the day. This one-of-a-kind battery therefore can give 30 % more income to wind, solar, geothermal, and hydroelectric, allowing them to sell electricity at night and supplying much needed extra electricity throughout the Philippines for industrial parks, cities and suburbs, thus preventing brown-outs.

To successfully transport batteries between the islands using seaports and land-based road networks, charged batteries will deliver to selected transmission stations and grid connections and/or industrial parks directly. The 11 MW is 6 m³ and fits on a normal truck or midsize ship for easy transport, transforming roads and sea-lanes into energy corridors.

The RED SUN Molten Nickel thermal batteries have a 10 year warranty and lasts 50 years or more.

This fleet of 20 batteries gives **2.4 GWh per day and/or per day of charge** and will enable for a secure and versatile energy system paying the hydroelectric and other renewable companies to charge at night. RED SUN Infrared solar troughs are 2 500 m² and go up to 1100 C and therefore give triple the energy of normal solar troughs. This makes them RED SUN's number one stand-alone modular desalination system. These are positioned on and/or around a turnkey 20-foot container, featuring our highly efficient forced evaporation and Reverse Osmosis – Carbon fiber/Single-Wall Nanotubes- filtered desalination units that put out 3 million liter per day supplemented by lithium sulfur batteries; that way you get 16 hours operation per day in a modular 20-foot container that can be moved in one day. The batteries also allow for RED SUN's second type of local desalination plants to be constructed, instead of laying costly pipelines between the islands, which will corrode and therefore allow saltwater to fowl the previously treated water supply.

This strategy will also be advantageous for the farming communities on the islands, as well as other industry which are very water intensive, such as mining, steel metal refining, cement production, distilleries, food processing, ice production and refrigeration. For example, cement production is very sensitive to salt water and will otherwise speed-up spauling and cracking of the rebar and cement if coated with salt. This can be avoided with local desalination plants run on the waste heat from the 1350 C cement energy production captured by the RED SUN battery system we are proposing.

Using the existing ports and road systems with the existing truck fleets and ships is a way of speeding-up the RED SUN Battery transport systems and is the main reason batteries will be 6 tons at 11 MW and only 6 m³, rather than larger and heavier batteries up to 32 MW weighing 26 tons and 18m³ in size. Also, 11 MW is the perfect size for plugging into existing grid and industrial connection sites.

WIRELESS ENERGY INFRASTRUCTURE: GRID, TRAIN & PORT INTEGRATION

1. RED SUN LOW-TEMPERATURE DESAL

Tesla Turbine high efficiency Turbines 86% eff!

30 MW RED SUN thermal storage

RED SUN MOBILE batteries deliver to grid/port

RED SUN BATTERIES retrofit trains/generators

SANITARY HOT WATER & STEAM-Heat for industrial plants & manufacturing

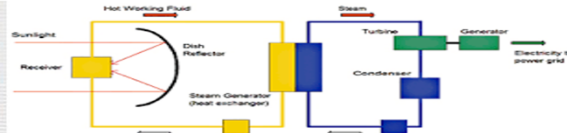
Runs Ice plants at low-cost 180kt/yr

DESALINATION 3 million liter/day for each 20 foot container

3 Infrared Troughs on Each

PURI-STAT water filtering – 10 Mmgal/day

POWERSOURCE 1.6 – 3.2 MWp battery provides **24 hour continuous heat & operation running on 3 to 12 Infrared troughs. that roof-mount**



Utilizing the existing night excess energy produced by either hydroelectric, geothermal, or other energy production, from 10 PM to 7 AM on the islands, and/or during off peak hours (9-16 hours a day) thermal charging at existing renewable sites and hydro will be an inexpensive way to mitigate brownouts, and help expand electricity capacity by 30-40%, and prevent brownouts plaguing the region. This system is totally immune to typhoons and earthquakes.

Solar On Demand Power, Water, Desalination + Refrigeration & Pack Ice for Shipping

CONCENTRATED SOLAR POWER (CSP)

Infrared Trough Systems

Base load power up to 1 GW!



> ***Infrared Solar Power & Desal***
 > ***Ice & Refrigeration Plants***
 > ***Automated Permaculture***
 > ***Nanographene Desal Wireless***
 > ***40 MW Power Storage***



RED SUN MOBILE batteries can be charged off-site!



Above left - RED SUN Infrared solar troughs go to 1100 C, which is double the heat energy and triple the power of any solar troughs on the market and run 3 million liter per day of desalinated water. Above middle – RED SUN – Power Source batteries are 1 MW- 32 MW which the latter is equivalent to 1000 tons of coal steam at 1000 C, or 265 000 million btu of power. Above right - The 11 MW battery will have a warranty of 10 years and can be insured by Lloyds Syndicate which also can cover the power purchase agreements, production of electricity and all equipment. RED SUN Battery charging will also be through various MSRs:

Fourth Generation Advanced Thorium & Uranium Nuclear Power Plants

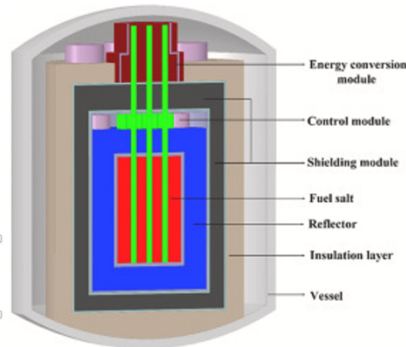
An advanced nuclear reactor that uses a liquid fuel instead of solid fuel like most conventional reactors operates at atmospheric pressure and cant blow up!

MSR Power Plants for trains, ships and land 99% of existing nuclear waste can be eliminated through MSRs

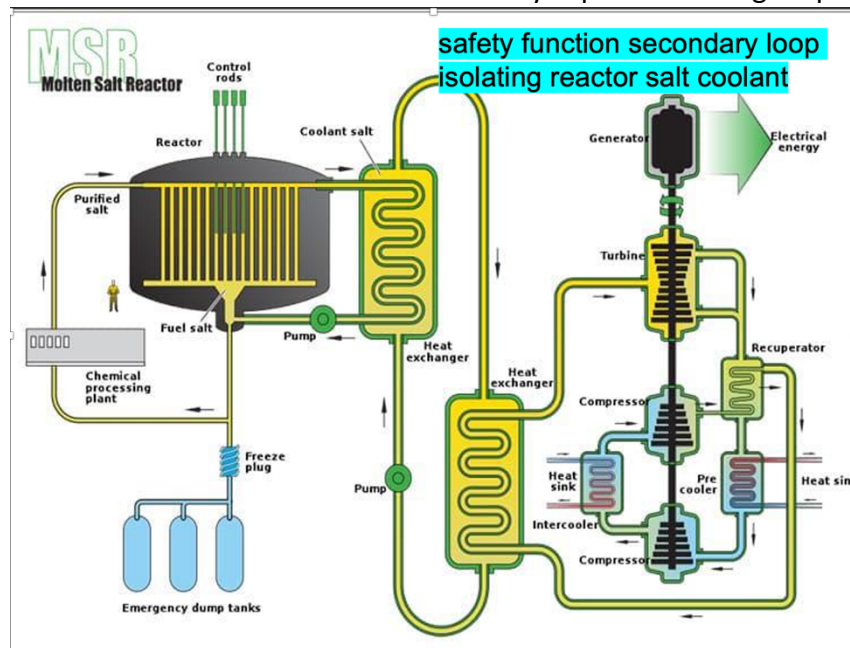
Molten salt reactor (MSR) (chlorine salt 550 -600 C) vs (fluorine salts 800 C)
The fourth generation of the MSR works at atmospheric pressures vs the light water reactors such as the one built at the bataan plant, operates at 3,000 psi, requiring 3,000 times larger containment domes to prevent the escaping steam from spreading radioactive contamination.

MSR uses liquid salt fuel and operates on Thorium. Burn 99 % of the fuel vs the light water reactor which burns half of 1%, discarding the remaining fuel after only a few years. 1 GW results in 100 kg of waste/year

The light water reactor makes plutonium and other highly radioactive materials, that are radioactive for 300,000 years. This compared to MSR material which is only radioactive for 300 years.



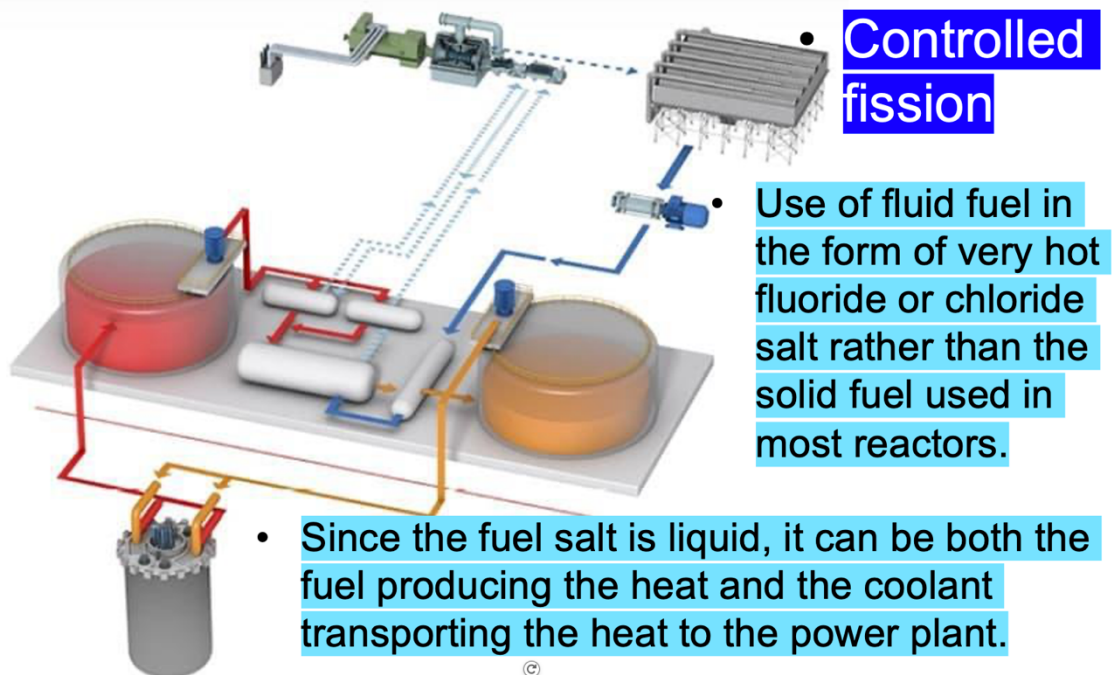
- Molten salt reactors operated in the 1960s and have run 400 years experimentally.
- They are a proven technology today principally as a thorium fuel cycle system that burns 99% of the thorium fuel or for using spent Light Water Reactor (LWR) fuel.
- A variety of designs is being developed as thermal spectrum or fast neutron types.
- Global research is currently led by China but was fully developed in the USA.
- Some are solid fuel similar to high-temperature reactor HTR fuel, others have fuel dissolved in the molten salt coolant with secondary separate cooling loop below.



Above – MSRs feature Passive fuel dump in case of emergency and are walk-away safe!

Molten salt reactors (MSRs) use molten fluoride salts as primary coolant at low pressure. This itself is not a radical departure when the fuel is solid and fixed. But extending the concept to dissolving the fissile and fertile fuel in the salt certainly represents a leap in lateral thinking relative to nearly every reactor operated so far. However, the concept is not new, as outlined below, & removes expensive preprocessing & cracking of solid fuel coating.

MSR = Radioactive waste removal + non-proliferation + safety



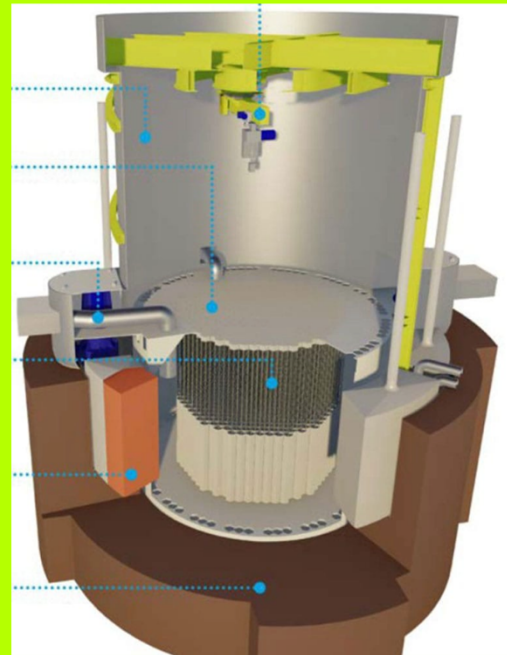
- Since the MSR operates at atm. pressure it can't explode!

MSRs may operate with epithermal or fast neutron spectrums, and with a variety of fuels. Much of the interest today in reviving the MSR concept relates to using thorium (to breed fissile uranium -233), where an initial source of fissile material such as plutonium-239 does not need to be provided. There are several thorium reactors including integrated thorium MSRs, lithium, beryllium, fluoride (LFTR) and sodium or heavy water moderator MSR pg. 6.

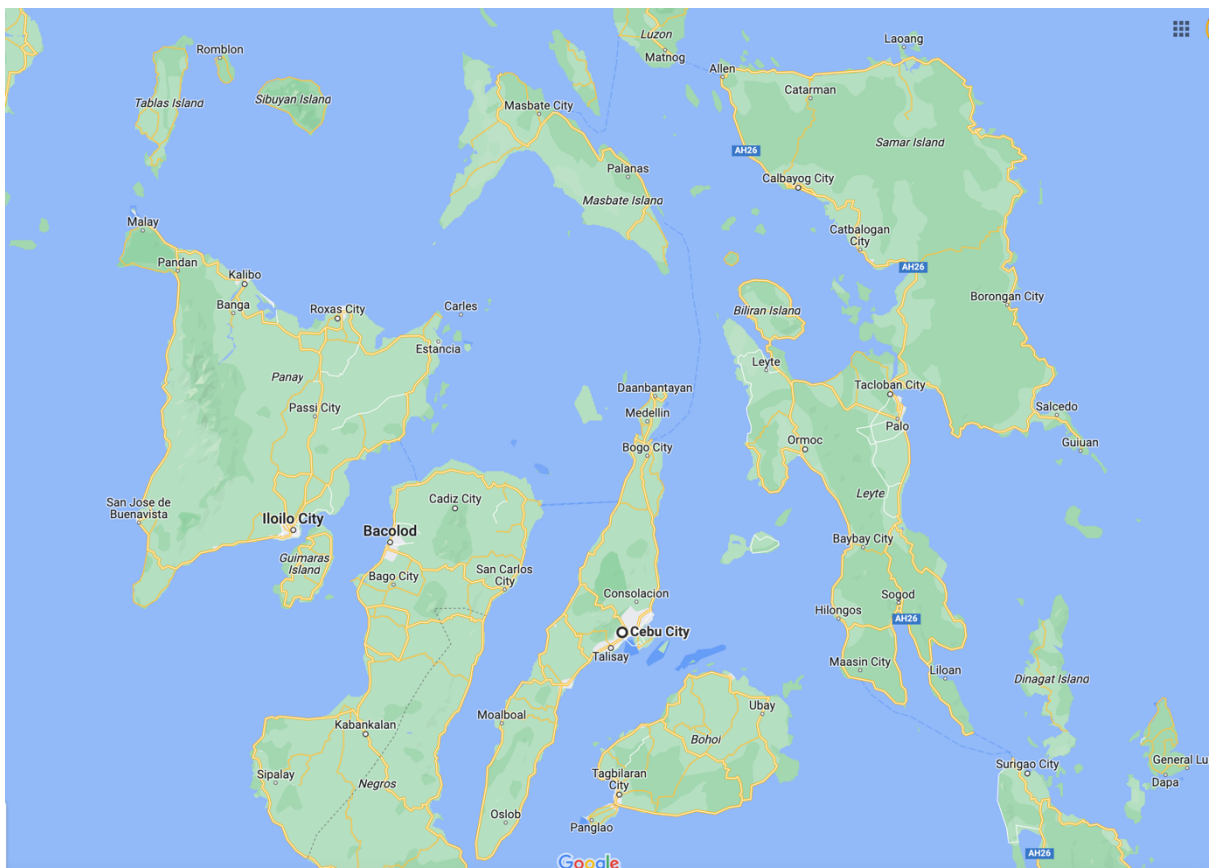
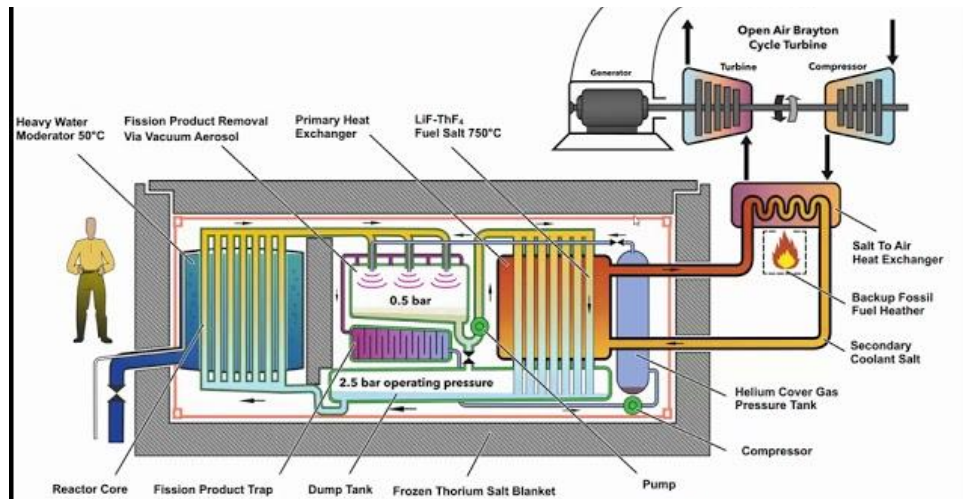
The MSR salts concerned as primary coolant, mostly lithium-beryllium fluoride, and lithium fluoride, remain liquid without pressurization from about 500 C up to about 1400 C, in marked contrast to a Pressure Water Reactor (PWR) which operates at about 315 C under 150 atmospheres pressure, which we are NOT using. All graphics are various MSRs below.

The main MSR concept is to have the fuel dissolved in the coolant as fuel salt, and ultimately to reprocess that online. Thorium, uranium, and plutonium all form suitable fluoride salts that readily dissolve in the LiF-BeF₂ (FLiBe) mixture, and thorium and uranium can be easily separated from one another in fluoride form. Batch reprocessing while running is likely in the short term, and fuel life is quoted at 4-7 years, with high burn-up. Intermediate designs and the Advanced High Temperature Reactor (AHTR) have fuel particles in solid graphite and have less potential for thorium use. MSRs operate at 650 to 760C for high efficiency turbines

- The cost of the electricity with the MSR is only 3 cents/kWh.
- Almost every mine in the Philippines has Thorium as byproduct and therefore no fuel needs to be imported and no waste exported.
- The MSR is extremely safe because the fuel is imbedded in the Thorium salt and will not dissociate. The experimental Thorium breather reactors have a combined running time of 400 years including 10 years at Oak Ridge National Laboratory in Tennessee. <https://www.ornl.gov/>
- The cost of building a MSR is only US \$ 1000 per installed kW
- MSRs are clean solution for all industrial processes including refining, metallurgy, desal, nitrogen production and electricity.



- Thorium is four times more abundant in nature than uranium & ten times cheaper!
- It is fertile rather than fissile and can only be used as a fuel in conjunction with a fissile material such as recycled spent solid fuel rods containing plutonium.
- Thorium fuels can breed fissile uranium-233, which is fissile, to be used in various kinds of nuclear reactors and 2 cm³ is found in almost every 1m³ of the crust.
- Molten salt reactors are well suited to thorium fuel, as normal expensive fuel fabrication is avoided along with the many problems of solid fuels incl. cracking.
- Thorium is abundant in the Philippines at every mine and is a by-product of every rare earth mining facility and is in abundance in Ombo and Erawan coastal areas of north-western Palawan; with cost about \$35 per kg, it is 10x's cheaper than U-235!



Cebu

Province of Cebu with its capital and largest city Cebu City nicknamed "the Queen City of the South", the oldest city and first capital of the Philippines, which is politically independent from the provincial government.

The Cebu Metropolitan Area or Metro Cebu is the second largest metropolitan area in the Philippines (after Metro Manila) with Cebu City as the main center of commerce, trade, education, and industry in the Visayas. Being one of the most developed provinces in the

Philippines, in a decade it has transformed into a global hub for business processing services, tourism, shipping, furniture-making, and Heavy Industries. Mactan- Cebu International Airport, located on Mactan Island, is the second busiest airport in the Philippines.

Seaport- Port of Cebu is the largest shipping hub in the Visayas region.

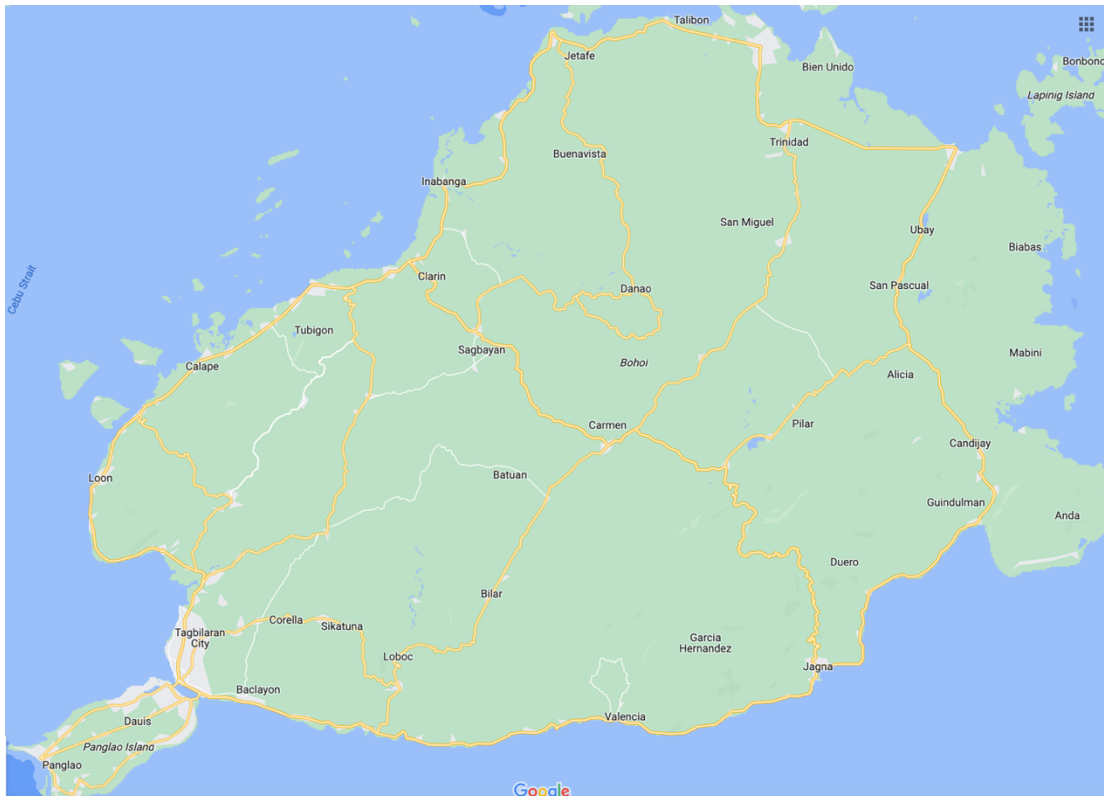
EGG CYLINDERS RUN 4000 m2 Refrigeration & Ice:

**ICE
REFER
RED SUN
Renewable
Energy**

**350,000t/yr
Pack Ice**

**4,000 m2 Refrigeration plant plus Ice Plant
Franchise can payback power plants quickly**

Bohol



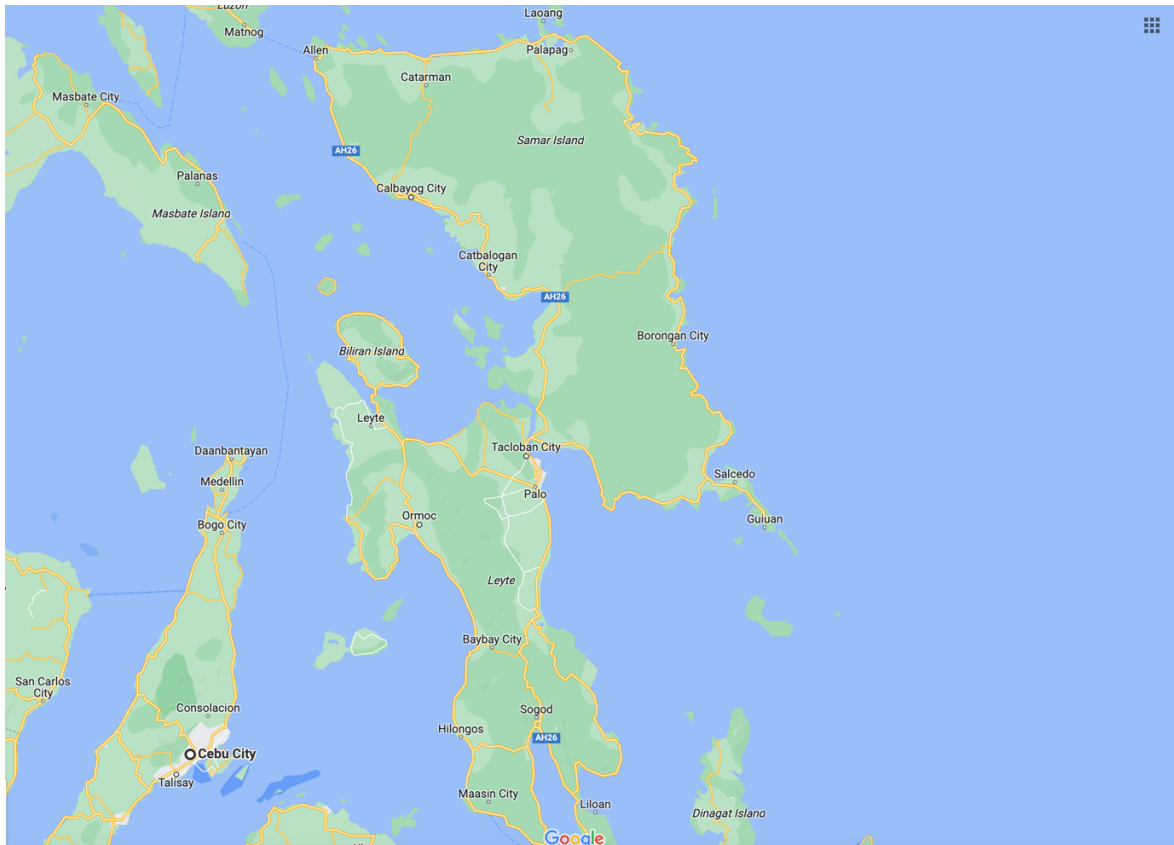
The North Bohol Fault has produced high magnitude earthquakes.

Seaports

Port of Tubigon, the busiest among the smaller ports, offers more than ten daily round trips plying the Cebu-Bohol route, including fast-craft and roll on roll off craft. Catagbacan Port in Loon serves the roll-on roll-off services between to Argao and Sibonga in Cebu. Port of Jagna offers service between Bohol to Opol, Cagayan de Oro, Camiguin (Balbagon and Benoni), and Nasipit with (with roll-on/roll-off) routes.

The port of Ubay is the province's gateway to Eastern Visayas which offers service round trips to Bato, Hilongos, and Maasin City.

Leyte



Leyte is an island in the Visayas group of islands in the Philippines. It is eighth largest and sixth-most populous island in the Philippines, with a total population of 2,626,970 as of 2020 census.

Since the accessibility of land has been depleted, Leyte has provided countless number of migrants to Mindanao. Most inhabitants are farmers

The major cities of Leyte are Tacloban, on the eastern shore at the northwest corner of Leyte Gulf, and Ormoc, on the west coast. Leyte today is notable for the geothermal electric power plants near Ormoc.