

## Submarine Technology in India

### Why in news?

French defence major Naval Group has announced that it is unable to participate in the P-75 India (P-75I) project under which six conventional submarines are to be built in India for the Indian Navy.

### What is the issue?

- France's Naval Group was one of the five shortlisted Original Equipment Manufacturers (OEM) for the Navy's P-75I project.
- The group has announced it would not bid for the project.
- The reason was that the Request for Proposal (RFP) requires that the fuel cell AIP be sea proven but the French Navy does not use such a propulsion system.

### What is AIP?

- Diesel electric submarines must come to the surface or close to it to run their generators to recharge the batteries that propel them underwater.
- Air Independent Propulsion (AIP) is a mechanism that allows the batteries to be charged even while the boat is submerged.
- Even with AIP, the submarine needs to surface every three weeks or so.
- There are different types of AIP mechanisms available and India is looking for under the P-75I project is AIP based on fuel cells.
- These cells convert chemical energy into electrical energy, recharging the batteries of the submarine.
- **Advantages**
  - Retain the element of surprise by remaining undetected.
  - Diesel submarines possess the advantage of being able to switch off their engines completely and lie in wait unlike nuclear submarines whose reactors cannot be switched off at will.
  - The ultra-quiet nature of modern diesel subs, has made AIP-equipped diesel subs a very attractive alternative.
- **Disadvantages**
  - Installing AIP increases the length and weight of the boats.
  - It requires pressurised liquid oxygen (LOX) storage on-board and supply for all three technologies.
  - Produce some acoustic noise from moving parts.
  - The submarine's unit cost increases by around 10%.

### What is the Navy's 30-year submarine building programme about?

- In 1999, the Cabinet Committee on Security approved a 30-year plan for the Navy to

indigenously build and induct 24 submarines by 2030.

- The older Project-75 (P-75) was brought under the new plan, with the two production lines to be built under P-75 and P-75I.
- P-75 envisages indigenous construction of Scorpene-class submarines equipped with the state-of-the-art AIP system.
- Six Scorpene submarines are being built under Project-75 by Mazagaon Dock Ltd. (MDL) under technology transfer from Naval Group of France under a \$3.75-bn deal signed in 2005.

<b>Name of the Submarine</b>	<b>Commission Year</b>
INS Kalvari	2017
INS Khanderi	2019
INS Karanj	2021
INS Vela	2021
INS Vagir	Yet to be commissioned
INS Vagsheer	Yet to be commissioned

- Project-75I (approved in 2007) succeeded the Project-75.
- The first Request for Information for P-75I was issued in 2008, then again in 2010, but the RFP was issued only in July 2021.
- This will be India's first project under the Strategic Partnership Model where the government will give the contract to an Indian Strategic Partner (SP), which will partner with a foreign OEM to build AIP-powered submarines in the country.

## What is the status of the project?

- The project is lagging behind the curve as the final bids are yet to be finalised.
- The Naval Group has already announced it is pulling out, and the Russian and Spanish companies might also not proceed with their bids.
- **Concerns-** The requirement to demonstrate a sea-proven fuel cell AIP is the major concern.
- While some manufacturers may have the technology, it may not have been proven at sea yet.
- Another problem for the OEMs is the transfer of technology as they are unwilling to share all their expertise, especially the niche technologies that they have built.

## What submarines does India have now?

- India has 16 conventional diesel-electric submarines, which are classified as SSKs excluding the INS Vagir and INS Vagsheer
- India also has two nuclear ballistic submarines, classified SSBN.

### SSKs

4 Shishumar Class	Bought and then built in India in collaboration with the Germans in 1980s
8 Kilo Class or Sindhughosh Class	Bought from Russia (including erstwhile USSR) between 1984 and 2000
4 Kalvari Class Scorpene submarines	Built at India's Mazagon Dock in partnership with France's Naval Group

### SSBN

INS Arihant	Indigenously-built nuclear-powered ballistic missile submarine
INS Arighat	An upgraded version of Arihant (Yet to be commissioned)

## References

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