Tata Steel plans hydrogen from steel-plant off-gases at Kalinganagar

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News

Tata Steel and Houston (USA)-based Utility Global announced on 18 November 2026 a plan to produce hydrogen from steel-plant off-gases at Tata Steel's integrated steelworks at Kalinganagar, Odisha. The two firms will first carry out joint Front-End Engineering and Design (FEED) studies; installation will follow only after a Final Investment Decision (FID) by Tata Steel's board. Utility's 'H2Gen', an electrochemical process, uses the residual energy in a mix of blast-furnace gas and converter gas to make hydrogen from water without electricity, while giving a separate concentrated carbon dioxide stream that is easier to capture. The planned capacity is 10 tonnes of clean hydrogen a day, which could be injected back into a blast furnace. Tata Steel called it the first such initiative in India (PTI); the companies' joint release calls it Utility's largest industrial H2Gen deployment announced so far. The technology was earlier demonstrated with real blast-furnace gas at a steel plant in Canada. The project is part of Tata Steel's goal of net-zero emissions by 2045.

Key facts for the exam

Point	Details
Site	Kalinganagar integrated steelworks, Odisha
Partner	Utility Global (Houston, USA)

Point	Details
Announced	18 November 2026
Technology	H2Gen – H_2 from water using off-gas residual energy; no electricity
Capacity	10 tonnes of hydrogen a day
Stage	FEED study; then Final Investment Decision (FID)
Use	Re-injection into blast furnace; separate CO_2 stream
Kalinganagar capacity	8 million tonnes a year (2025 expansion)
Tata Steel goal	Net zero by 2045

Background

- A blast furnace is charged with iron ore (haematite, Fe_2O_3), coke and limestone. Carbon monoxide (CO) formed from burning coke reduces the ore to molten pig iron, while limestone removes impurities as slag. The outgoing 'blast-furnace gas' contains CO, CO_2 and nitrogen.
- To turn pig iron into steel, the LD (Linz–Donawitz) or basic oxygen process blows pure oxygen to remove excess carbon; the gas released is 'converter gas'. Because steelmaking is a major carbon emitter, using hydrogen to cut carbon is a key strategy.
- Hydrogen gets a 'colour' by how it is made: from natural gas by steam-methane reforming without capturing CO_2 – grey; with CO_2 capture and storage – blue; by splitting water with renewable electricity – green. India's National Green Hydrogen Mission was approved in January 2023.
- Kalinganagar is in Jajpur district of Odisha. After the Phase II expansion in May 2025 its capacity rose to 8 million tonnes a year; India's largest blast furnace was commissioned there in September 2024. Odisha is India's leading iron-ore producing state. SAIL's Rourkela plant (Sundargarh district) was set up with West German collaboration, Bhilai with Soviet help and Durgapur with British help.

Tamil Nadu link: In Tamil Nadu, SAIL's Salem Steel Plant is known for stainless steel. In green hydrogen, V.O. Chidambaranar Port, Thoothukudi, is one of the three ports recognised by the Centre as green hydrogen hubs.

Frequently asked questions

What is this news about?

Tata Steel and Houston (USA)-based Utility Global announced on 18 November 2026 a plan to produce hydrogen from steel-plant off-gases at Tata Steel's integrated steelworks at Kalinganagar, Odisha.

What are the key facts to remember for the exam?

Site: Kalinganagar integrated steelworks, Odisha; Partner: Utility Global (Houston, USA); Announced: 18 November 2026; Technology: H2Gen – H_2 from water using off-gas residual energy; no electricity.

What is the background to this news?

A blast furnace is charged with iron ore (haematite, Fe_2O_3), coke and limestone. Carbon monoxide (CO) formed from burning coke reduces the ore to molten pig iron, while limestone removes impurities as slag.

Practice questions (with answers)

1. Which gas is the main reducing agent that converts iron ore (Fe_2O_3) to iron in a blast furnace?

A) Hydrogen

B) Carbon dioxide

C) Methane

D) Carbon monoxide

Answer: D – Explanation: Carbon monoxide – formed from coke: $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$. Hence blast-furnace gas is rich in CO.

2. Tata Steel's Kalinganagar industrial hub lies in which district of Odisha?

A) Sundargarh

B) Jajpur

C) Angul

D) Ganjam

Answer: B – Explanation: Jajpur – 8 million tonnes a year after the 2025 expansion. SAIL's Rourkela plant is in Sundargarh district.

3. Fe_2O_3, the iron ore charged into a blast furnace, is the chemical formula of which ore?

A) Haematite

B) Magnetite

C) Siderite

D) Limonite

Answer: A – Explanation: Haematite (Fe_2O_3). Magnetite is Fe_3O_4, siderite is $FeCO_3$ and limonite is a hydrated iron oxide.

4. SAIL's Rourkela Steel Plant in Odisha was set up with the collaboration of which country?

A) West Germany

B) USSR

C) UK

D) Japan

Answer: A – Explanation: West Germany. Bhilai (Chhattisgarh) – USSR; Durgapur (West Bengal) – UK; all three came up in the Second Five-Year Plan period.

5. In the 'LD' (Linz–Donawitz) steelmaking process, which gas is blown into molten pig iron?

A) Nitrogen

B) Hydrogen

C) Oxygen

D) Chlorine

Answer: C – Explanation: Pure oxygen – it burns off excess carbon as CO; hence also called the basic oxygen process. It was developed in Austria in the 1950s.

Sources: ThePrint (PTI), 18 Nov 2026; Utility Global–Tata Steel joint release (company release, secondary to PTI); Tata Steel release (2025); Business Standard; OdishaTV; Deccan Herald (Salem Steel Plant); News On AIR (green hydrogen ports, Oct 2025); MNRE –

National Green Hydrogen Mission (mnre.gov.in); SAIL (sail.co.in – plants); NCERT Chemistry (Class XII, metallurgy). © Shanmugam IAS Academy.