

## 1. Centre Eases Pollution Norms for Coal Plants

### Major Exemption for Sulphur-Cutting Equipment

The Environment Ministry has exempted most coal-fired power plants in India from installing Flue Gas Desulphurisation (FGD) systems, which are used to reduce sulphur dioxide (SO<sub>2</sub>) emissions.

This reverses a 2015 mandate that required all coal plants to install these systems by 2017.

### Very Low Implementation So Far

- India has about 180 coal plants with 600 units.
- As of now, only 8% have installed FGD systems.
- Most of these are operated by NTPC, a public-sector company.

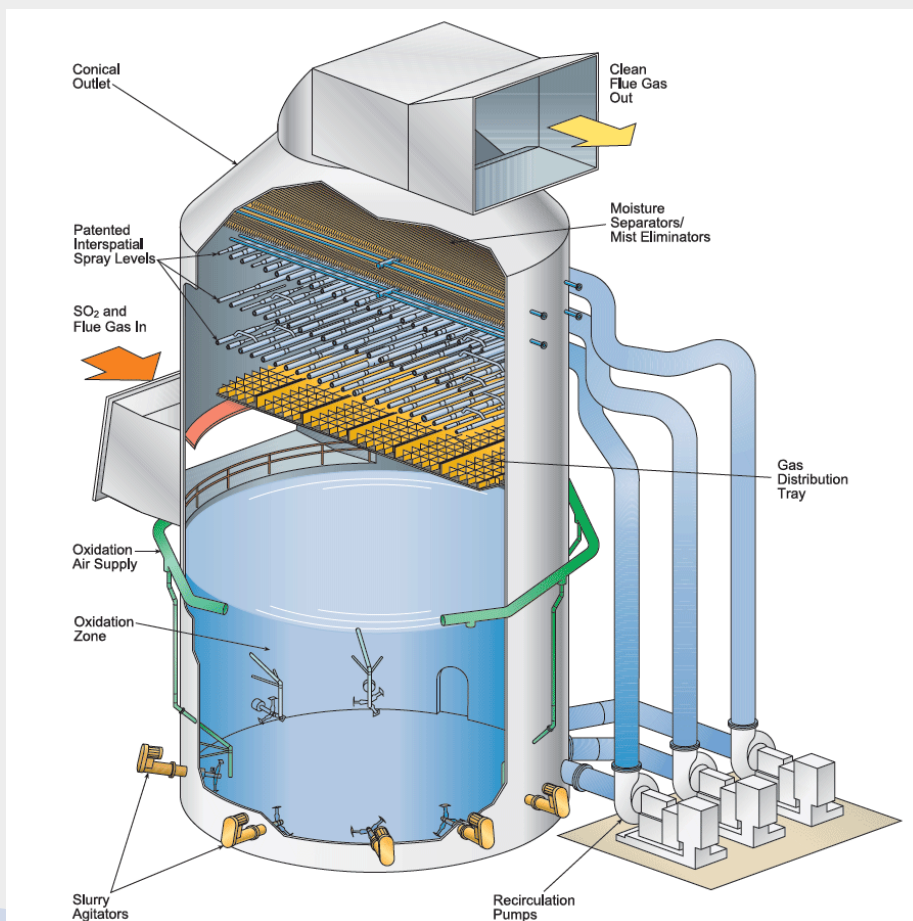
### Why Is SO<sub>2</sub> a Problem?

- SO<sub>2</sub> is harmful when inhaled and contributes to the formation of sulphates, a key component of particulate matter (PM<sub>2.5</sub>) air pollution.
- Although SO<sub>2</sub> levels in India are mostly below legal limits, they still add to air pollution, especially in industrial zones.

### Reasons for Rollback

The government cited the following factors for not enforcing FGD rules:

- Few vendors to supply FGDs
- High cost of installation
- Potential rise in electricity bills
- Delays due to COVID-19
- New studies suggesting Indian coal has low sulphur content



### Questionable Justification Based on New Studies

A government-appointed expert committee claimed:

- SO<sub>2</sub> levels are low even without FGD.
- Sulfates may help by reducing global warming slightly, by blocking sunlight.
- Thus, reducing sulfates (via FGD) could increase warming, affecting climate targets.

However, global scientific bodies like the IPCC acknowledge this cooling effect, but do not recommend keeping sulphates for this reason.

### Double Standards in Environmental Rules

- Only a minority of plants must still install FGDs by 2028:
  - o Those within 10 km of NCR
  - o In cities with over 1 million people
  - o In pollution hotspots

This means location, not pollution risk, determines whether FGDs are required — a rare case of unequal environmental standards within India.

### Why This Matters

- Changing environmental rules without public debate risks damaging India's credibility on public health and climate commitments.
- Scientific revisions are valid, but must be transparent and evidence-based, not made quietly behind closed doors.

Relevance: GS Prelims & Mains Paper III; Environment

Source: Indian Express

## 2. How Space Travel Affects Shubhanshu Shukla's Health

### Return After 18 Days in Space

Indian astronaut Group Captain Shubhanshu Shukla has returned to Earth after 18 days aboard the International Space Station (ISS), where he orbited Earth 288 times. His spacecraft, SpaceX Dragon (Grace), splashed down off the California coast.



### Initial Challenges in Space: Adapting to Microgravity

Shukla experienced space motion sickness in the first few days in space as he adjusted to microgravity.

He shared:

"I didn't feel like myself in the beginning. I hope I don't feel the same when returning — unless I get unlucky both ways."

Commander Peggy Whitson, who has been to space multiple times, said she adapts more easily to space than to Earth's gravity after returning.

### **What Happens After Splashdown?**

After landing:

1. The crew was removed from the spacecraft by a SpaceX recovery team.
2. They got their first medical checks onboard a support ship.
3. They were then flown to land by helicopter.

### **Why Astronauts Need 'Reconditioning'**

Returning astronauts often face:

- Balance issues
- Difficulty standing or walking
- Muscle weakness
- Spinal problems
- Reduced mobility and flexibility

This is because, in space, the brain stops relying on the inner ear (which helps maintain balance on Earth). Once back, the body struggles to readjust.

### **What is Reconditioning?**

Astronauts go through a personalised rehabilitation program to help:

- Improve mobility, balance, strength, and flexibility
- Relearn how to process balance signals
- Restore endurance and motion control
- Manage skilled movements

### **Injuries Are Common After Space Missions**

According to NASA:

- 92% of astronauts experience post-flight injuries
- 50% occur within the first year of return
- Common injuries:

- o Muscle sprains

- o Tendon issues

- o Fractures

- o Spinal disc herniation

Shukla said everyday activities like drinking water, walking, and sleeping were hard at first in space due to the absence of gravity, but he adapted in a few days.

Relevance: GS Prelims & Mains Paper III; Science & Technology

Source: Indian Express

## **3. Jane Street vs SEBI: Alleged Market Manipulation Explained**

### **What Is Jane Street Accused Of?**

Jane Street Capital, a New York-based trading firm, has been banned by SEBI (Securities and Exchange Board of India) for allegedly manipulating India's stock market using advanced trading algorithms to make illegal profits.

- SEBI claims Jane Street made over ₹36,500 crore between Jan 2023 and Mar 2025.
- On Jan 17, 2025, it allegedly made ₹735 crore in one day.

- Jane Street has denied wrongdoing but deposited over ₹4,800 crore in an escrow account as per SEBI's July 3 order.

### **SEBI's Investigation and Crackdown**

- SEBI began investigating Jane Street in April 2024 after a legal dispute in the US revealed details about confidential algorithms.
- On July 3, 2025, SEBI:
  - o Banned Jane Street from trading in Indian markets.
  - o Ordered banks to freeze ₹4,800 crore of its assets.
  - o Issued a 105-page interim order detailing alleged manipulation tactics.



### **How Did Jane Street Allegedly Bypass Rules?**

- SEBI rules (2019) ban intraday trading by foreign firms.
- Jane Street allegedly used Indian subsidiaries to circumvent these rules.
  - o These local subsidiaries engaged in intraday trades.
  - o Meanwhile, foreign units placed options trades to benefit from market movements.

### **Alleged Strategy: How the Manipulation Worked**

#### **Stage 1: Morning Index Manipulation**

- Jane Street's algorithm bought large amounts of banking stocks, causing the Bank NIFTY index to rise.
- Retail investors, noticing the rise, bought call options and sold put options, expecting further growth.

#### **Stage 2: Expiry Day Dump**

- On contract expiry days, Jane Street dumped stocks, causing a sharp fall.
  - Retail investors lost money as their call options became worthless.
  - Jane Street profited from its put options, which increased in value due to the fall.
- This manipulation depended on ultra-fast algorithmic trades, made within milliseconds.

### **What Is F&O Trading and Why Is It Risky?**

#### **Futures**

- Contracts to buy/sell assets at a fixed future price.
- Profitable if price moves in your favor.

#### **Options**

- Give the right (not obligation) to buy/sell in future.
- Require buyers to pay a premium.
- Two types:
  - o Call Option – Right to buy.
  - o Put Option – Right to sell.

### **Risks for Retail Investors**

- F&O trading is highly complex and risky.
- SEBI data (FY25): Over 90% of retail investors lost money in F&O trades.

### What Can Retail Investors Learn?

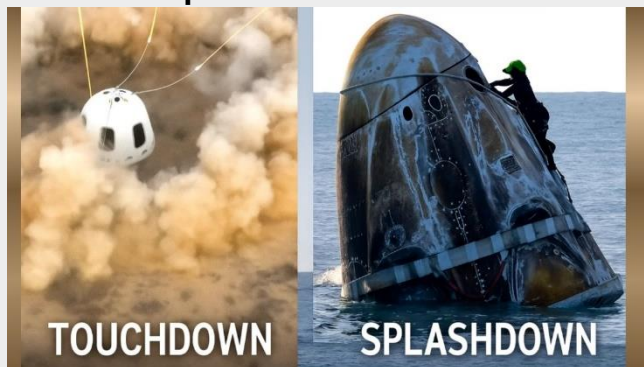
- F&O trading requires deep market understanding and risk management.
- Most retail investors lack tools and speed available to institutional players like Jane Street.
- Caution, education, and limiting capital exposure are key to avoiding major losses.

Relevance: GS Prelims & Mains Paper III; Economics

Source: Indian Express

## 4. Why Spacecraft Prefer Ocean Splashdowns Over Ground Landings

### Recent Example: Axiom-4 Mission



The spacecraft carrying Indian astronaut Shubhanshu Shukla and three others from the Axiom-4 mission safely splashed down in the Pacific Ocean after a 20-hour return from the International Space Station (ISS).

### Why Splashdowns Are Preferred

#### 1. Simpler and Safer

- Spacecraft re-enter the Earth's

atmosphere at extremely high speeds — up to 27,359 km/h.

- Slowing down enough for a vertical ground landing would require extra systems, like landing legs and strong brakes, making it complex and expensive.
- Water landings offer a natural cushion to absorb the impact, even at speeds of 25–30 km/h.

#### 2. Reduces Risk of Damage

- The high density and low viscosity of water help absorb shock during landing.
- This reduces the risk of damage to the spacecraft, instruments, and crew.

#### 3. More Room for Error

- Ground landings need precise targeting to avoid buildings, rocks, or people.
- Oceans provide vast open space, reducing risk even if the spacecraft is slightly off-course.

### How Spacecraft Are Built for Water Landings

- Most crew capsules are conical and designed to float.
- The rounded end acts like the hull of a ship, helping the capsule bob on the water's surface after landing.

### How a Splashdown Landing Happens

#### 1. Re-entry and Speed Reduction

- As the spacecraft re-enters the atmosphere, friction slows it down.
- Additional slowing is done using parachutes:
  - o At 18,000 feet, two drogue parachutes open to stabilize and reduce speed.

- o At 6,500 feet, four main parachutes deploy to further slow the descent.

## **2. Glide Angle and Distance**

- The spacecraft glides down at an angle, not straight down.
- It travels 5,000 to 7,000 km from re-entry to landing.
- Final landing speed is brought down to a safe 25–30 km/h for splashdown.

## **ISRO's Approach**

For its Gaganyaan mission, ISRO has also chosen sea landing for returning astronauts — following the same safe and proven method used globally.

Relevance: GS Prelims & Mains Paper III; Science & Technology

Source: Indian Express

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