



## Demand for 2 Time Zones in India

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**For Prelims:** Time Zones, Time Standard, GMT, IST, Atomic Clocks, Circadian Rhythm, Daylight Saving Time.

**For Mains:** India and the need for two time zones, Northeast India and the challenge of single time zone, Alternatives to multiple-time-zoning for India.

### Why in News?

In 2018, the [Council of Scientific & Industrial Research's National Physical Laboratory \(CSIR-NPL\)](#), which maintains the **Indian Standard Time (IST)**, published a research article describing the necessity of two time zones.

### What is Understood by Time Zone?

- The worldwide system of time zones was proposed by a Scottish-Canadian engineer - **Sir Sandford Fleming**, in 1879.
  - Eventually in 1884 the International Meridian Conference adopted a 24-hour day.
- Countries across the world keep different times **due to Earth's rotation and revolution** around the Sun.
  - As Earth turns  $15^\circ$  around its axis, time changes by one hour, a  $360^\circ$ -degree rotation yields 24 hours.
  - As a result, **the world is divided into 24 time zones shifted by one hour each.**

### What do We know about the Indian Standard Time?

- **About:**
  - The Indian Standard Time (IST) is based on a **longitude of  $82.5^\circ$** , which **passes through Mirzapur**, near Allahabad in Uttar Pradesh.
  - It is **5 hours 30 minutes ahead of Greenwich Mean Time (GMT)**, now called the **Universal Coordinated Time (UTC)**.
  - The CSIR-NIPL (New Delhi) is the keeper of the time in India, it records time using **five caesium atomic clocks**.
- **History:**
  - Time zones in India were first set up in 1884, during the British Raj. Before independence, India followed three major time zones - **Bombay, Calcutta and Madras Time**.
    - Indian Standard Time is an anachronism like many systems that were inherited from the British.
  - It was in 1906 that India had a single IST running through the center of the country.

# WHITHER TIME ZONES



India would save **2.7 billion units of**

**electricity** every year by shifting the IST meridian eastward (from 82.5E longitude in Uttar Pradesh to 90E near the Assam-Bengal border).

India stands to gain little, and could in fact suffer from negative energy saving, if two time zones are introduced

**Advancing IST** by 30 minutes saves more electricity than the corresponding proposals for introducing daylight saving time or introducing two time zones in the country staggered by one hour,"



**% of total energy consumption that can be saved if time is advanced by 30 minutes**

Karnataka	0.49
Tamil Nadu	0.21
Andhra Pradesh	0.28
West Bengal	0.64
Madhya Pradesh	0.68

## What is the Need for Two Time Zones?

- **Large Geographical Extent:** India is geographically the **second-largest country (after China)** to not have multiple time-zones.
  - India stretches from 97°25'E in Arunachal to 68°7'E in Gujarat — almost 30 degrees of longitude which is **more than enough to have two time-zones.**
- **Early Sunrise and Sunset:** The demand for two time zones rose because [northeastern India \(NER\)](#) and the [Andaman and Nicobar islands \(ANI\)](#), due to their geography, **witness an early sunrise and sunset relative to the rest of the country.**
  - The NER has long complained about the **effect of a single time zone on their lives and their economies, they lose important daylight** which can be used productively as the sun rises as early as 4 am in summer while the government offices open at 10 am.
- **Sync with Circadian Rhythm:** Many people in India operate in a time zone that is **not an appropriate diurnal cycle for them**, people's productivity and efficiency follows a biological clock that is synchronized with the daily light-dark cycles.
  - From the **body's circadian rhythm point of view**, the existing IST is highly suitable for Kanyakumari, Kavaratti, and Ghuar Mota, manageable for Alipurduar, Kolkata, Gangtok, Mirzapur and Gilgitum, but **highly unsuitable for Dong and Port Blair.**
- **CSIR's Suggestions:** In 2006, the erstwhile [Planning Commission](#) recommended the division of the country into two time zones. CSIR- NPL has supported the long-standing demand and has

suggested **two ISTs separated by difference of one hour:**

- **IST-I for most of India** (covering the regions falling between longitudes 68°7'E and 89°52'E).
- **IST-II for the Northeastern region** (covering the regions between 89°52'E and 97°25'E).

## What is the Circadian Rhythm?

- Circadian rhythm is the 24-hour cycle that tells our bodies when to sleep, rise, and eat—regulating many physiological processes.
- Internal body clock is affected by environmental cues like sunlight and temperature, and determines whether one feels wide-awake and energized or tired.
- **Jeffrey C. Hall, Michael Rosbash, and Michael W. Young**, who studied the molecular mechanisms controlling circadian rhythm, were awarded the **2017 [Nobel Prize in Physiology/Medicine](#)**.

## What will be the Implications of Having Two Time Zones?

- **Advantages:**
  - **Efficiency:** This would lead to **greater efficiencies among the workforce** and in energy consumption.
    - There are economic benefits to having two different time zones, **people will be able to work better and plan better**, according to their natural cycles.
    - In fact, **tea gardens in Assam** have long set their clocks one hour ahead of the IST, creating their own **informal time zone (Chaibagaan Time)**.
  - **Environment Protection:** Advancing IST by just a half hour would result in **saving 2.7 billion units of electricity every year** by using the wasted daylight hours.
    - Conserving electricity is critical for the Indian economy, which is suffering from a **[crippling power deficit](#)**.
      - According to CSIR-NPL, **India might save ₹1,000 crore per year** if it can conserve electricity by implementing two time zones.
    - Reduction in energy consumption will **significantly cut down [India's carbon footprint](#)** boosting India's resolve to fight climate change.
  - **Societal Benefits:** Many social policy objectives can be achieved by having two time zones such as **reducing road accidents and improving women's safety**.
    - Moreover, according to research, people in countries with more than one time zone were able to **concentrate better on their strengths and shortcomings**, resulting in the best outcomes.
      - Changing the time zone allowed employees to **develop healthier eating, sleeping, and working habits**, which had positive outcomes.
- **Disadvantages:**
  - **Timing Mismatch:** Mismatches in office timings, **different working hours for banks** and a chance that **railway accidents might become more frequent**.
    - Implementing two time zones will require synchronizing railway traffic which otherwise will **create utter confusion**.
      - It would lead to confusion in travel schedules as people travel mostly by road and not air as in the West where all they need to do is set their clocks right.
  - **Chaos at Border of Time Zones:** With significant illiteracy levels and low awareness, if the country were divided into two time zones, there would be **chaos at the border between the two zones**. It would mean resetting clocks with each crossing of the time zone.
    - Marking the dividing line of the two zones would also be a problem.
  - **Prone to Increase Divide:** Two time zones can have **adverse political consequences** as India, apart from getting divided on the lines of religion, caste, race, language, etc., now will get divided on the lines of Time Zones.
    - Bringing in two time zones will create a **divide between the NER and the rest of**



**the country**, a separate time zone would make them see themselves as separate from the rest of the country and **may provoke secessionist demands**.

- **Infrastructural Burden:** CSIR-NPL would need **a second laboratory in the new time zone**. This would consist of **'Primary Time Ensemble-II'**, traceable to the UTC at the **International Bureau of Weights and Measures (BIPM)**, France.

## Are There Any Available Alternatives to Two-Time-Zoning?

- **TimeShifting IST:** The National Institute for Advanced Science (NIAS) cited that **Permanent shift of IST to 30 minutes will be better than two time zones i.e., 6:00+ UTC to 90°East**.
  - In a four decade-old study concluded by NIAS, it suggested that advancing the IST by 30 minutes would help India boost productivity, save energy and **bring the North East into the mainstream fold**.
  - Doing so would translate into a hefty saving of energy of 2.7 billion units (as of 2009 estimates, which works out to nearly 3.5 billion units as of today).
  - There are also **other Asian countries** who have implemented a one-time advancement in their clocks - **China, Kyrgyzstan, Malaysia, Singapore and South Korea**.
- **Daylight Saving Time:** Daylight Saving is a procedure in which the **time in the clock is adjusted forward in spring & is readjusted backward in autumn**. It can be used from **April to September**. Daylight Saving would:
  - Help save energy
  - Provide additional daylight hours in the evening
  - Increase productivity
  - Help increase tourism (increased daylight hours would allow tourists to stay out for a longer period & spend more)

## Way Forward

- Implementation of the above mentioned recommendations must be supported by the **ability of the government to gather data and track changes** in the economic activity pattern of the nation.
- Factors like **impact of sunrise and sunset timings on biological activities** of people, **synchronizing sunrise and sunset timings with office hours** should be carefully studied.
- **Minimization of spatial extension** at the proposed border of time demarcation etc. needs to be taken care of.
- It is important to **consult all stakeholders and arrive at a better solution** so as to use the lost light hours that are dimmed by a common IST.

## What Else Do We Need to Know About Time Zones?

- **Time Standard v/s Time Zone:**
  - A time standard is a **means of measuring time**. This **can be done either naturally**, by our changing view of the sun as the earth rotates daily on its axis, or **by artificial means such as using atomic clocks**.
  - A **time zone is the agreed time standard** used within a specific geographical area.
    - It's **essentially based on local time and longitude** but may be modified by an hour or two as per convenience.
- **Time Zones Elsewhere:**
  - **France:** The **country with the most time zones -12** because of its territories around the world.
    - Although France lies along the same longitudinal lines as Greenwich, its politicians have decided to follow their neighbours and **adopt Central European Time (GMT + 1 hour) to help facilitate trade and communications** with the majority of European countries.
  - **Russia and US:** Russia and the US have **11 time zones each**.
    - The US has nine official time zones and two unofficial time zones for its uninhabited territories.
  - **China:** Before it became a Communist state, **China had five time zones** until they were

abolished by Mao Zedong (former President of China) for Beijing standard time so that a **centralised standard time (GMT +8:00)** would also keep the country united.

- **Space:** When talking about time in space, the [International Space Station \(ISS\)](#) follows GMT.

▪ **UTC v/s GMT v/s BST:**

- UTC (**Coordinated Universal Time**) is a **modern time standard** defined by a series of atomic clocks and is used as a standard reference time in many applications within transport, finance and scientific research.
- GMT (**Greenwich Mean Time**) is a **historic time standard** that was defined by observations of the sun made at the Royal Observatory, Greenwich.
- BST (**British Summer Time**) is the period when **daylight saving time is applied to GMT**, clocks are advanced by one hour at the end of March and then put back to GMT at the end of October.

▪ **Time Zones at the Poles:** The North and South Poles are two regions where the **application of time zones is unusual** due to their geography.

- Lines of longitude convene at both poles, so one could say that **all time zones also convene at the poles.**
  - In theory, one may use whichever time is best suitable provided they manage to locate the precise position of the poles.
- The North Pole is situated in the Arctic Ocean and without habitation **there is no need for an official time zone.**
- As the Antarctic continent remains largely uninhabited there is no official time zone either.
  - Instead, **each scientific research station based there adopts the most convenient time zone for them.**

## Which Countries Have The Most Time Zones?

Total number of time zones by country (including overseas territories)

