

# **PROPOSAL ON IMPLEMENTING PERMANENT TIME ZONES IN THE EUROPEAN UNION**

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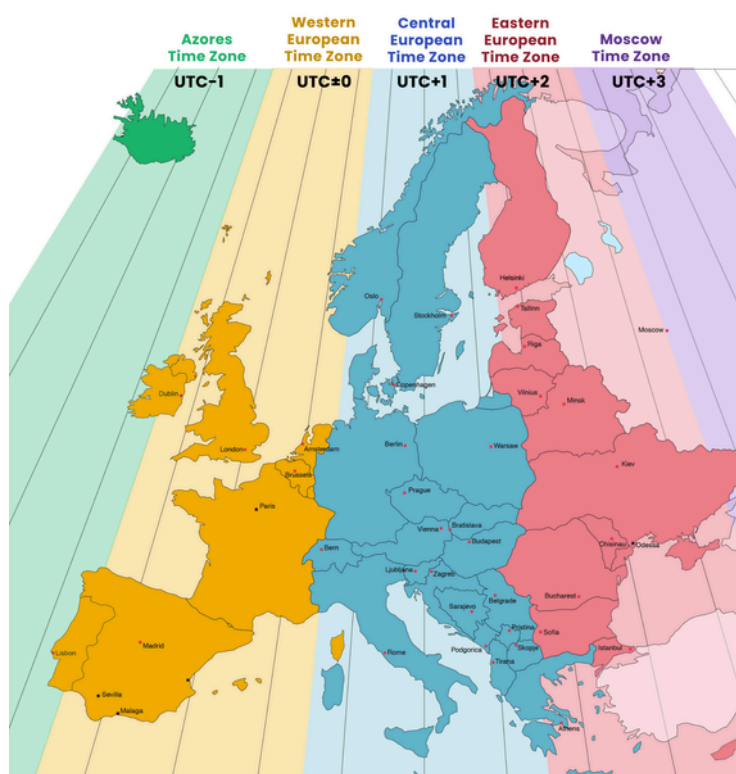
# EXECUTIVE SUMMARY: IMPLEMENTING NATURAL TIME ZONES IN THE EUROPEAN UNION

Considering the benefits of geographically correct time zones and the negative consequences of misaligned clocks:

- The **EU Commission** has the responsibility to reactivate the political process on this subject.
- The **EU Member States** have the responsibility to ratify the EU proposal (*European Directive on Discontinuing seasonal changes of time*) and agree to adopt the permanent time zones which are as close as possible to their solar time (natural time).

For the **European continent** there is an **easy solution** which does not require a patchwork of time zones. Figure 1 shows these recommended time zones for the European continent. Table 1 shows the recommended time zones and steps to be taken for all 27 EU member states. Specific solutions need to be found for European territories outside the European continent.

The identified territories where different solutions can be applied are: Northern Ireland and Ireland, Galicia and Portugal, Corsica, Continental Greece and the Greek islands.



**Figure 1:** Recommended time zones for the European continent

<b>EU Member State</b>	<b>Recommended Time zone</b>	<b>Steps to be taken</b>
Bulgaria Cyprus Estonia Finland Latvia Lithuania Romania	Eastern European Time (UTC+2), current standard time	1. Abolish clock changes and stay on standard time
Greece	Central European Time (UTC+1)	1. Abolish clock changes 2. Change the standard time from Eastern European Time (UTC+2) to Central European Time (UTC+1)
Austria Croatia Czechia Denmark Germany Hungary Italy Malta Poland Slovakia Slovenia Sweden	Central European Time (UTC+1), current standard time	1. Abolish clock changes and stay on standard time
Belgium France Luxembourg Netherlands Spain	Western European Time (UTC±0)	1. Abolish clock changes 2. Change the standard time from Central European Time (UTC+1) to Western European Time (UTC±0)
Ireland	Western European Time (UTC±0)	1. Abolish clock changes 2. Change the standard time (currently used during the DST period) from Irish Standard time (UTC+1) to Western European Time (UTC±0)
Portugal	Western European Time (UTC±0), current standard time	1. Abolish clock changes and stay on standard time

**Table 1:** Recommended time zones and steps to be taken for the European mainland of the EU member states

# 1. RECOMMENDATIONS FOR THE TRANSITION

After agreement of a common date within the EU, we recommend doing the transition in 1 to 2 steps depending on the member state:

**Step 1:** All EU countries abolish the clock change to Daylight Saving Time\* in spring and remain on the clock time they use in winter. For those countries whose recommended time zone is their current standard time, no further steps need to be taken.

**Step 2:** Those EU countries whose recommended time zone is not yet their current standard time, additionally turn back their clocks one last time by one hour in autumn, in order to adopt their recommended time zone as their new standard time.

## 2. FURTHER RECOMMENDATIONS FOR MEMBER STATES AND AMONGST CITIZENS

- **Create and implement a transition plan per member state** that allows for public and private institutions to facilitate the change, with special focus on those sectors that may expect a higher impact (e.g. emergency and transport services). It is proposed that each Member State collect the national concerns, evaluate them, and either assuage them or find solutions to tackle them.
  - The European Commission should be able to review and ensure the coordination among the member states to ensure the implementation of the measures. Some key aspects will require this inter-state coordination, as for example regional trains and other means of transports.
- **Raise awareness** amongst citizens about the benefits of living in their own time zone, and the negative consequences of the current system. Do this with the help of the press, social media, and apps such as *Solar Time*, which shows solar time for people to compare clock time with the real (solar) time of day.

*\*In this proposal we use the international term 'Daylight Saving Time (DST)' instead of the European 'summertime'*

## 3. CONTEXT OF CLOCK TIME IN EUROPE

### 3.1. History

Over thousands of years, people lived by their biological clocks, which are set by the natural day-night-cycle<sup>1-2</sup>. The sundial was invented with the purpose to measure the time of the day (solar time) in order to facilitate social organisation<sup>2</sup>.

Before the end of the 19th century, clock time was aligned with solar time everywhere on Earth and therefore reflected reliably the time of the day, with the sun being at its highest point at 12.00 noon local clock time<sup>1-2</sup>.

At the end of the 19th century, 24 artificial time zones were implemented worldwide to facilitate coordination for transportation and telecommunication purposes<sup>3</sup>. Within each time zone the sun is at its highest point at 12.00 o'clock only on the meridian of that time zone, and clocks are misaligned with solar time up to 30 minutes towards the east and 30 minutes towards the west of the meridian. This way, clocks display the time of day with a maximum error of only 30 minutes relative to solar time (natural time zone).

During the Second World War, Western European states were forced to adopt Central European Time by Hitler and Franco. After the war, this was not revoked, leaving the Western European states at a disadvantage to the Central European states due to the detrimental effects of misaligned clocks (see details below).

In the 1970s and 1980s Daylight Saving Time (DST), popularly known as "summertime" in the EU, was implemented in most European countries with the intent to save energy<sup>1</sup>. This increased the clock misalignment by one extra hour for part of the year. In 2000, the switch to and from DST was regulated EU wide in Directive 2000/84/EC. In addition DST was extended to 7 months of the year<sup>4</sup>.

## **3.2. Current political situation**

On September 12, 2018, the European Commission presented a proposal for a Directive of the European Parliament and of the European Council discontinuing the clock changes and repealing Directive 2000/84/EC.

On March 26, 2019, the European Parliament adopted the EU proposal to abolish the clock changes between Standard Time and Daylight Saving Time.

The EU proposal was put on hold by the Transport, Telecommunications and Energy Council (TTE) of the European Union, composed by the respective Ministers of the national governments of the Member States. They must ratify the proposal and state in which time zone they wish to remain permanently, in order for the proposal to enter into force.

For the past 6 years there has been no political progress on this matter.

## 4. WHY SHOULD PERMANENT TIME ZONES BE AS CLOSE AS POSSIBLE TO SOLAR TIME?

### 4.1. Summary of benefits

The proven benefits of clocks being aligned with solar time and the negative impact of misaligned clocks on health, economy, education, safety and environment urge for the implementation of permanent time zones as close as possible to solar time (natural time zones) in Europe.

### 4.2. The scientific consensus on natural time

The decision to abandon clock changes was welcomed by scientific organisations worldwide<sup>5-12</sup>. According to the **scientific consensus** it is best for human health, economy and safety to adopt permanent time zones as close as possible to solar time (natural time zones). That means implementing the current standard Time permanently and, in the case of the Western European member states, to reinstall the geographically correct time zone<sup>5-13</sup>.

Misaligned clocks that make schedules **even earlier** within the natural day-night cycle (like in Western European member states and everywhere during DST) increase sleep deprivation<sup>14-16</sup>, which is the main cause for the negative effects on human health, economy and safety.

### 4.3. Health

- From a medical and chronobiological point of view<sup>5-13</sup>, it is best for human mental<sup>17-22</sup> and physical health<sup>22-26</sup>, learning and work performance and alertness<sup>14 27-31</sup>, when clock time is aligned with solar time and consequently with people's biological (circadian) clocks.
- While clock changes provoke an acute disruption of people's circadian health<sup>16 30 32-37</sup>, living permanently with a clock time that is misaligned to solar time, provokes a permanent disruption on people's circadian rhythms, resulting in health implications, such as an increased risk of cancer<sup>22-24 38</sup>, metabolic syndrome<sup>22 39</sup>, heart problems<sup>5 22 32 38</sup>, sleep problems<sup>14-15</sup> and depression<sup>18 40</sup>.
- In addition, the new field of chronomedicine shows the importance of a stable and correct clock time to make accurate health recommendations, such as timing for harmful UV rays from the sun and the precise timing of medical and surgical interventions and treatments.

## 4.4. Economy

- There are no proven benefits for the economy of clocks being misaligned to solar time (e.g. during DST). However, it is known to have negative economic effects due to the reduction of health<sup>14 30 41</sup>, productivity<sup>14 30 31 37</sup> and safety<sup>16 36 41</sup>.
- In the case of DST, these negative effects are both experienced acutely<sup>16 30 36 37 41</sup>, the week after the switch to DST in spring, and chronically throughout the DST months<sup>14 30 31</sup>.
- There is on average no significant effect of DST on energy savings<sup>42 43</sup>. While some studies show only insignificant energy savings, others show an increase in energy spending<sup>42-48</sup>.

## 4.5. Safety & environment

- Publications on the topic of road safety establish that misaligned clocks due to DST increase the number of car accidents, not the opposite<sup>33 41 49 50</sup>.
- Sleep deprivation causes a marked decline in waking performance, judgement, and decision-making<sup>16 51 52 64</sup>. Sleep-related fatigue is an independent risk factor in work-related injuries and fatalities<sup>52</sup>. Some of the most devastating human and environmental health disasters have been partially attributed to sleep loss and night shift work-related performance failures, including the tragedy at the Bhopal, India, chemical plant; the nuclear reactor meltdowns at Three Mile Island and Chernobyl; as well as the grounding of the Star Princess cruise ship and the Exxon Valdez oil tanker<sup>52</sup>.
- Misaligned clocks and clock changes also cause extra pollution with negative impact not only on human societies but also on our planet's ecosystems and biodiversity<sup>42 43 53-57</sup>. This is because natural mechanisms that assist in pollutant dispersion and maintenance of the atmosphere depend on the time of the day<sup>56-59</sup>. Shifting social activity (industrial and otherwise) to earlier times, interferes with pollutant dispersion<sup>53 54 56 59</sup>, ozone maintenance and production<sup>42 53 54 56 59</sup>, and it increases primary pollutants from fuel burning<sup>42 43 53 54</sup>. DST has also been associated with increased man-made wildfires<sup>57</sup>. Not only are these effects worsened by the increasing light pollution<sup>60</sup> and global warming<sup>61 62</sup>, they can in return amplify these catastrophes: earlier social schedules increase industrial early-morning light pollution and traffic jams at the times of day when UV radiation is the strongest, which increases air pollution.

## 4.6. Human rights

Considering the current scientific knowledge about the negative impact on people's health and wellbeing, continuing the clock changes and the application of wrong time zones would be against human rights. According to article 12 paragraph (1) of the International Covenant on Economic, Social and Cultural Rights<sup>63</sup>:

“*The States Parties to the present Covenant recognize the right of everyone to the enjoyment of the highest attainable standard of physical and mental health.*”, which is followed by paragraph (2) *“The steps to be taken by the States Parties to the present Covenant to achieve the full realization of this right shall include those necessary for:*

*(a) [...] the healthy development of the child;*

*(b) The improvement of all aspects of environmental and industrial hygiene;*

*(c) The prevention of [...] epidemic, endemic, occupational and other diseases*”

### Call for action

Implementing natural time in the EU requires support from all over the continent. There are several ways you can help such a project in order to contribute to a healthier, more just and egalitarian, more sustainable and more productive Europe:

- **Join in** the Barcelona Declaration Working Group on natural time in order to contribute with your research, either as an individual researcher or as a research group.
- **Spread the word** sharing this proposal with your fellows –especially if you are a public official, it is important that municipalities, regions and states from all over Europe know the benefits of adopting permanent natural time zones.
- **Organise awareness actions** by doing events, performances, or any other creative ways to raise awareness about the importance of living in the right time zone. Contact us for ideas and support.

## 5. ANNEX

### 5.1. Working group members

As representatives of organisations that have **signed the Barcelona Declaration on Time Policies**:



European Biological  
Rhythms Society

–  
Martha Merrow



European Medical  
Association

–  
Guglielmo Trovato



Workers' Group of the  
European Economic and  
Social Committee

–  
Maria Nikolopoulou



International Alliance for  
Natural Time

–  
Ticia Luengo Hendriks,  
Manuela Lipinsky Nunes



Fundación Estivill Sueño

–  
Carla Estivill Domènech

**Deutsche  
Gesellschaft für  
Zeitpolitik**

**DGfZP**

Gemeinnütziger e.V.

Deutsche Gesellschaft für  
Zeitpolitik

–  
Dietrich Henckel



ARHOE - Comisión  
Nacional para la  
Racionalización de los  
Horarios Españoles

–  
Ángel Largo



Verein zur Verzögerung der  
Zeit / Association To Delay the  
Time

–  
Martin Liebmann



Barcelona Time Use Initiative  
for a Healthy Society

–  
Marta Junqué Surià,  
Ariadna Güell Sans

Several organisations have already endorsed the text. They are listed here:

<https://www.timeuse.barcelona/proposal-end-dst-eu>

As individual experts contributing to the text:



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**Erik Herzog**, Ph.D,  
Neuroscientist specialised in  
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(USA)



**Gonzalo Pin**,  
Pediatrician specialised on  
pediatric sleep medicine  
(Spain)



**Till Roenneberg**, Ph.D,  
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## **Barcelona Declaration on Time Policies**

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