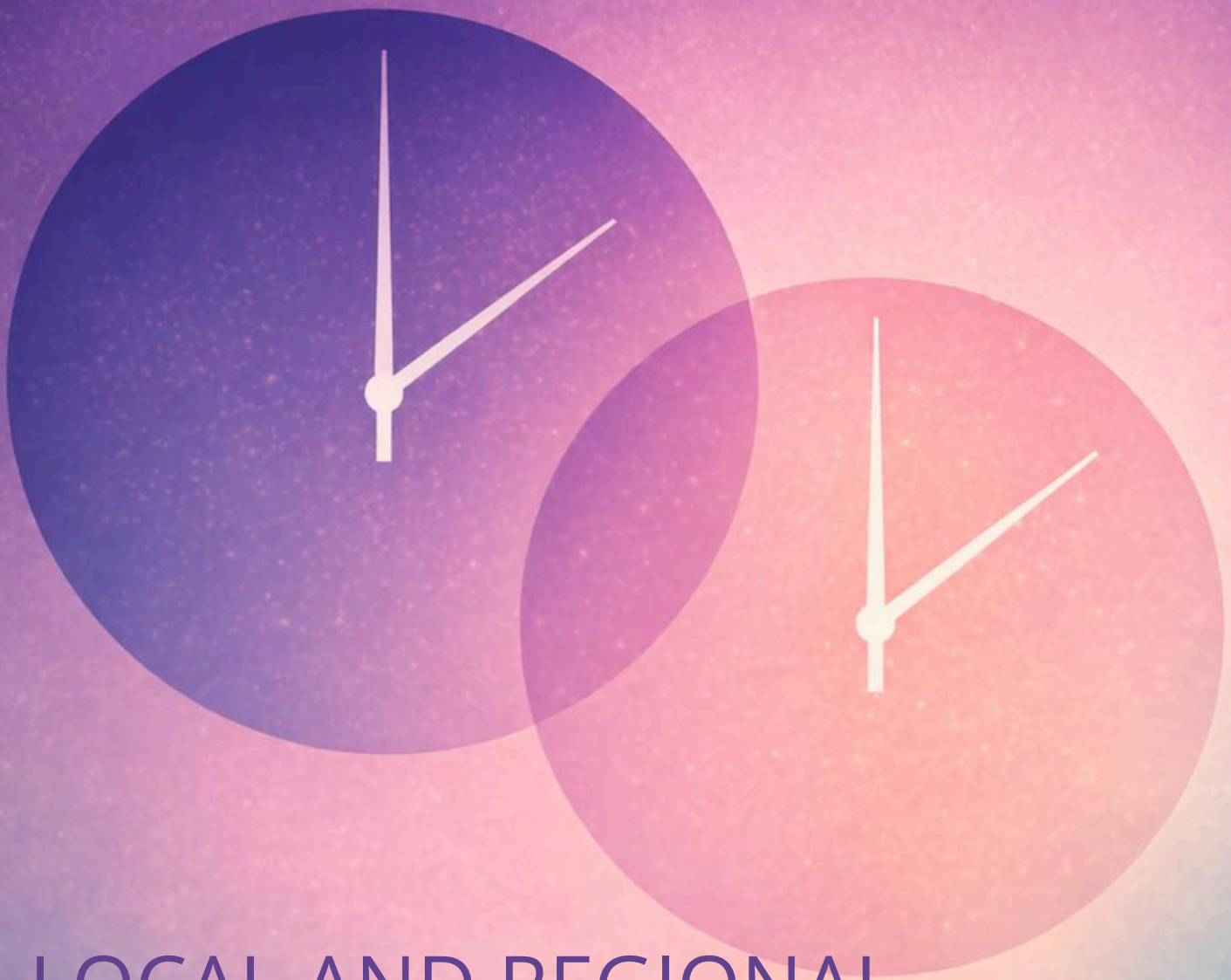

LOCAL AND REGIONAL **TIME** AGENDA

Topic 6

CHRONOCITIES FOR **SUSTAINABLE FUTURES**

Local and Regional Time Network

The **Local and Regional Time Agenda (LRTA)** is a pioneering compilation of time policies implemented by local and regional authorities around the world. It provides an updated compendium of time policies grouped by topic and practical recommendations on how to implement them.

The Agenda is coordinated by the **Local and Regional Time Network**, the international alliance of cities, metropolises, and regions aimed at promoting the right to time where people need it most. It is the main forum to exchange and promote implementable time policies that are already changing daily life for more than 90 million people in Europe, Asia, and the Americas.

More information:
https://timeuse.barcelona/local-and-regional-time-network/

The **Time4All 2.0** project is a two-year initiative (2025-2026) that includes a series of exchanges and workshops in partner cities. Its main objective is to raise awareness about time policies and promote a balanced and sustainable use of daily time, engaging citizens and cities in discussions on the right to time. The project targets 1,800 participants, focusing on young people and women, who are disproportionately affected by time poverty.

Funded by the European Union through the EACEA Agency (European Education and Culture Executive Agency), Time4All 2.0 seeks to explore the value of time organisation while developing policies that enhance health, equality, productivity, sustainability, and civic participation. The project is part of the Citizens, Equality, Rights and Values (CERV) programme and builds upon the achievements of its predecessor, Time4All project, implemented in 2023-2024.

The project is led by the city of Bergamo and Time Use Initiative (TUI), the international organisation promoting time policies and the right to time, which currently runs the Network's secretariat.

More information:

https://timeuse.barcelona/time-networks/time4all-2-0/

This project has received funds from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Education and Culture Executive Agency (EACEA). Neither the European Union nor the granting authority can be held responsible for them.

Co-funded by the European Union

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HOW TO PLAN FOR CHRONOSENSITIVE TERRITORIES

Secretariat
Local and Regional Time Network

Philosopher Bernd Magnus (1978) argued that we live in chronophobic environments —a reality describing that the built environment, and even the schedules organising urban societies, are structured as if time does not affect their residents. This potentially means ignoring how humans live according to social rhythms, with changing needs depending on life cycle (young or old), care responsibilities, gender, and racial expectations.

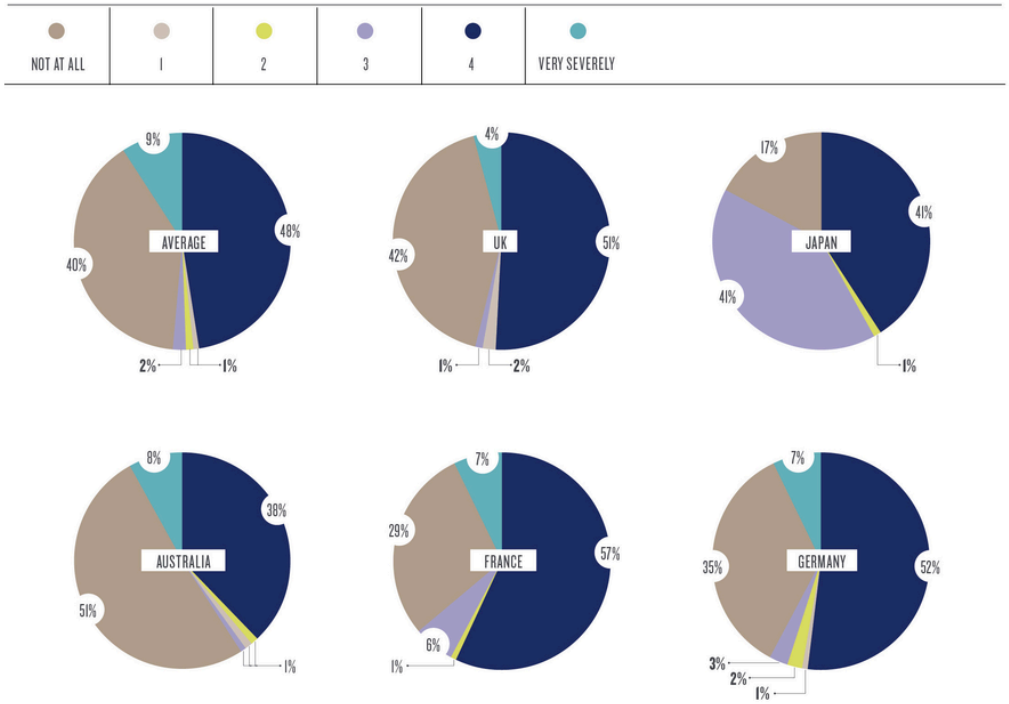
However, as seen in previous *Local and Regional Time Agendas*, cities and territories are increasingly looking to time-use needs to inform their designs, such as the now-famous 15-minute city model. They even go beyond that, analysing how urban life can affect care and life balance, mobility and urbanism, democracy and participation, life at night, and even the organisation of work. Nevertheless, they tend to overlook a more physical reality: human bodies themselves undergo temporal changes throughout the day.

Like all diurnal mammals, humans have evolved within a specific biological framework that optimises life-supporting functions—performing better physically in the morning and requiring less demanding tasks in the evening hours. Although these patterns may vary depending on individual biological characteristics, as explored in this publication, it can be affirmed that the sun and natural light continue to govern our daily lives. Access to daylight, and the extent to which schedules align with it, significantly impact physical well-being.

If residents' well-being is to be fully considered, cities and territories must rethink how they plan infrastructure, services, and their overall functioning to respect human circadian rhythms. This implies incorporating chronosensitive criteria into urban planning and design, recognising that different activities are better suited to specific times of day across various sectors of society. Current urban realities tend to favour early schedules, effectively representing only 20–30% of the population (Wieden, 2022). How can more equitable societies be created if existing schedules contribute to one of today's major public health concerns—a chronic sleep deprivation epidemic?

Sleep deprivation is a detrimental by-product of modern urban life, leading to insufficient sleep and reduced productivity (Figure 1).

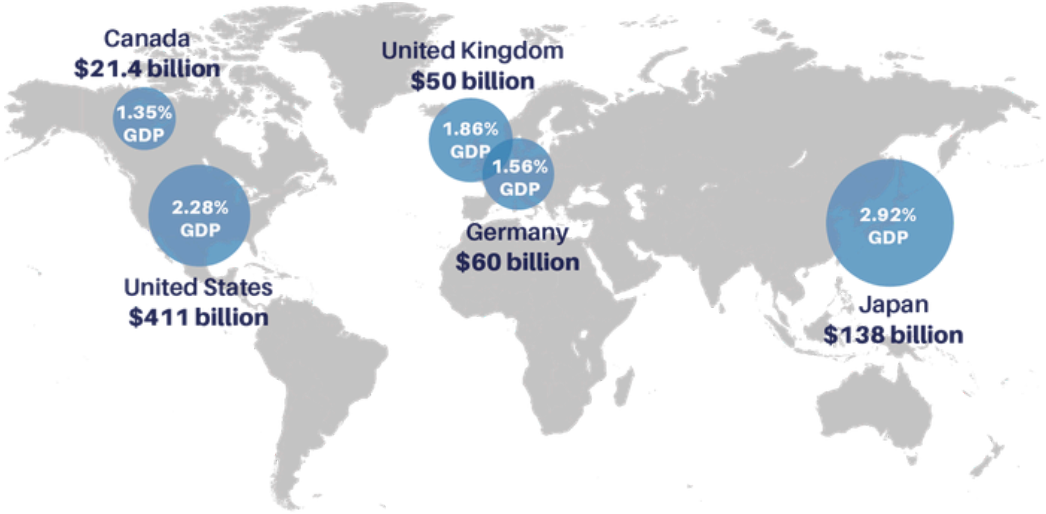
Figure 1. "How severely does a bad night's sleep affect your productivity at work?"



Reference: Hafner, Marco *et al.* (2016).

Within the time-use equation, sleep is one of the most frequently sacrificed life-sustaining activities: when time runs short, sleep is often the first to be reduced. However, adults who sleep fewer than seven hours per night face increased risks of adverse health outcomes such as heart disease, obesity, and depression. This has a clear impact on worker performance, which in turn affects national GDP (Figure 2).

Figure 2. Map showing economic costs of sleep across five OECD countries



Reference: Jess Plumridge/RAND Europe.

Chronosensitive territories—and chronocities in particular—are key to identifying practical solutions to the misalignment between urban systems and urban rhythms. In this volume of the *Local and Regional Time Agenda*, the Secretariat is pleased to present innovative best practices for building a chronocity.

These examples show that the path toward designing chronosensitive territories rests on two main pillars, aimed at improving residents' sleep, protecting local ecosystems, and reducing energy consumption.

- **Pillar 1. Regulation, urban planning, and legislative measures that create environments aligned with human and natural rhythms.** These include policies such as adapting street lighting to warmer tones that are less disruptive to sleep, or reducing light intensity at night to improve rest and save energy. Other measures involve rescheduling noisy services—such as waste collection or street cleaning—to avoid rest hours. Most importantly, this pillar includes aligning public services, such as healthcare, hospitals, and educational institutions, with circadian rhythms. The example of **Bad Kissingen** (pp. 21–25) illustrates such a pioneering initiative, and the example of **Viladecans** (pp. 26-29) illustrates how a city can demand the implementation of healthier schedules for both human health and climate adaptation, as a formal demand towards supra-local institutions.

  Additionally, the Secretariat has identified some practices that go beyond coordinating municipal services, but can be categorised as chronosensitive measures—although they have not been systematically compiled in this Agenda. On the one hand, in several countries and contexts, such as Spain and Mexico, TV prime time is central to organising dinner and sleep schedules. Advancing their start time (i.e., by 30 minutes or one hour) may create a positive effect on healthier nighttime schedules.

  On the other hand, humans are not the only beings that consider urban environments as their habitat: other animals, especially smaller mammals, birds, and insects, are also part of it, and urban lighting or noise disturbs their lives, which in turn can disrupt fragile urban ecosystems. By creating low-light or quiet zones, some initiatives in countries such as France promote a more respectful human-nature balance while generating cleaner and more resilient urban environments.

- **Pillar 2: Awareness, social habits, and data collection to support informed decision-making.** Due to its novelty, chronobiology is a growing scientific field that is not yet widely known beyond specialised circles. If cities and territories are to be planned according to its findings, they need to demonstrate the importance and

benefits for city residents. Actions toward collecting data and publishing analysis on healthy daily habits, screen light awareness, the gender gap in rest, or the relation between extreme heat and sleep are initiatives that may bridge the gap between academic concepts and citizen knowledge. One example is the report published by **Barcelona** (pp. 31-33).

The showcased policies are complemented by expert insights from Professor **Diego Golombek**, Dr. **Camilla Kring**, and Professor **Joan Costa-i-Font**. Together, they offer a comprehensive introduction to the varying dimensions from which a chronocity can be understood, and its positive effects on areas as diverse as public health, sleep, and productivity.

The Secretariat extends its gratitude to all the experts, institutions, and city officers involved in making this publication a reality. The Network is defined by its different local and regional governments, but, more importantly, by the committed people working towards a healthier, more egalitarian, more sustainable, and more efficient use of time.

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Marta Junqué Surià, Ariadna Güell Sans and **Marc Martorell Escofet** are part of the Local and Regional Time Network Secretariat.

A CHRONOCITY FOR SUSTAINABLE FUTURES

A Blueprint for Designing the Cities of Time

Diego A. Golombek
Professor at the **Department of Life and Behavioral Sciences, Universidad de San Andrés,** and Senior Advisor at **National Research Council (CONICET), UNESCO Chair for the Interdisciplinary Study of Time**

In the 21st century, urban planning has traditionally focused on space: the optimisation of square meters, green spaces, transit routes' efficiency, and housing density. However, a critical dimension has been largely neglected: time. As we face the challenges of the **24/7 society**, characterized by perpetual lighting and blurred boundaries between rest and labour, the concept of the Chronocity emerges as a necessary pillar for sustainable development. A Chronocity is an urban environment designed not just for the movement of people, but for the biological harmony of its inhabitants.

By integrating the principles of chronobiology (i.e., the science of biological rhythms) into public policy, we can transform our cities into spaces that respect the **right to time** as a fundamental human right, as championed by the Time Use Initiative and the Barcelona Declaration on Time Policies.

The Biological Foundation: The Internal Clock

To design a Chronocity, one must first understand that every citizen is a "walking clock". Deep within the nervous system lies a biological master clock (the suprachiasmatic nucleus) that dictates the timing of sleep, hormone release, and cognitive performance. This internal rhythm must be synchronized daily with the external world through environmental signals known as zeitgebers, the most powerful of which is the cycle of light and darkness.

When urban design ignores these rhythms, it results in social jetlag, a chronic misalignment between biological and social time. The consequences are staggering: research indicates that sleep deprivation and circadian disruption cost developed economies billions of dollars—roughly 1-3% of a country's GDP—due to lost productivity, accidents, and increased healthcare costs.

Designing the Chronocity: Key Strategies

1. Circadian-Friendly Urban Lighting

Modern cities have waged war on darkness. While artificial light provides security and extends economic activity, nocturnal light pollution is a major disruptor of melatonin production and, ultimately, sleep. Designing a Chronocity requires a reengineering of light. Indeed, public spaces should be designed to maximize exposure to natural morning light, which is the fuel that resets the biological clock. Moreover, urban lighting should transition from **blue-rich cool lights during the day** (to boost alertness) to **warm amber tones at night** (to preserve sleep cycles). Finally, streetlights should be designed to project light horizontally or downward, preventing the glow that spills into bedroom windows and disrupts residents' nocturnal rest.

2. Chrono-education: aligning school with biology

Perhaps one of the most urgent design interventions in the Chronocity is the reform of school schedules. During adolescence, the biological clock naturally shifts, creating a delay in sleep and wake times. Forcing teenagers to start school at 7:00 or 7:30 AM creates a **perfect storm of sleep deprivation**, leading to poor academic performance, depression, and increased risk-taking behavior. Therefore, delaying secondary school start times to at least 8:30 AM aligns with the adolescent chronotype, significantly improving cognitive function and mental health.

3. Labor and the 24/7 economy

Economic sustainability depends on a healthy workforce. However, the Chronocity must manage the necessary evils of shift work and rotative schedules. For example, implementing fatigue risk management systems (FRMS) and educational programs for shift workers can **mitigate the risks of metabolic syndrome and cardiovascular disease associated with night work**. Moreover, encouraging flexible hours that **respect individual chronotypes** (whether an employee is an "owl" or a "lark") **enhances productivity and reduces burnout**.

4. The circadian hospital: healthcare in time

A Chronocity treats **health as a temporal variable**. In circadian hospitals, the timing of medical interventions is as important as the intervention itself. Administering medications (such as chemotherapy or blood pressure drugs) at specific times of the day can maximize efficacy and minimize toxicity. Also, hospital rooms should be designed to provide clear light-dark signals to patients, as a robust circadian rhythm is essential for recovery and immune function.

5. Governance: the Geography of Time

Designing a Chronocity also involves larger-scale geographical decisions. For example, most scientific evidence argues for **maintaining Standard Time** (the "winter time") over permanent Daylight Saving Time. Permanent Standard Time ensures that the sun rises as close as possible to the start of social activities, providing the morning light necessary for biological synchronization. Local and regional governments must also address time poverty, particularly among women, who often bear the double burden of paid labor and unpaid care tasks. Sustainable urban planning must ensure that essential services are accessible in a way that minimizes wasted transit time and maximizes restorative time.

Conclusion: Towards a Chrono-equitable Future

The Chronocity is not a utopia; it is a scientific and social necessity. By respecting our internal rhythms, we foster a city that is more productive, healthier, and environmentally sustainable. Sustainability is often defined as meeting the needs of the present without compromising the future. If we continue to compromise our biological time, we are borrowing against the health and well-being of future generations.

Only by respecting our times (and our sleep) will we be able to fulfill our dreams.

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CHRONOLEADERSHIP
Designing Time Architecture for Chronocities

Camilla Kring
PhD, Founder of **Super Navigators & B-Society**

In the industrial era, time was designed for machine. In the knowledge era, time must be redesigned for human biology.

For decades, cities, workplaces, and institutions have operated on standardized schedules—fixed starting times, synchronized routines, and uniform expectations of performance. This model was efficient when value was created by machines. Today, however, **more than 90%** of value is created by people through knowledge, creativity, and collaboration. Yet, we have modernised everything except time.

Research in chronobiology shows that humans are not biologically equal across the day. We are born with different circadian rhythms, our internal biological clocks, that determine when we sleep, focus, and perform at our best. **Around 30%** of the population are early chronotypes, **30%** are intermediate, and **40%** are late chronotypes. Still, most of society is structured around early schedules. The result is a systemic mismatch between biological time and social time.

More than 80% of people live in conflict with their circadian rhythm, often waking up with an alarm clock and starting the day at a biological disadvantage. This is not a matter of comfort. It is a matter of performance, health, and long-term sustainability. If chronobiology provides the science, and chronocity provides the vision, then chronoleadership provides the missing capability: the ability to design time.

Chronoleadership as Time Architecture

Chronoleadership is the practice of designing time architecture based on human biology. A chronocity is a territory designed to respect human and natural rhythms. It

aligns public policies—such as lighting, working hours, mobility, and urban planning—with the biological needs of its citizens. Policies alone do not create chronocities. They must be translated into daily rhythms.

Time is not only structured through regulation. It is structured through everyday decisions: when meetings are scheduled, when services operate, when schools begin, and when people are expected to perform. These decisions are made—and reinforced—through leadership.

Chronoleadership shifts the focus from "*how many hours people work*" to "*when people work best*." This shift is critical for cities aiming to become chronosensitive. Working hours, for example, shape traffic patterns, energy consumption, sleep quality, and family life. Standardised schedules concentrate activity into narrow time windows, creating congestion, stress, and inefficiency. By contrast, more differentiated and rhythm-sensitive time structures distribute activity more evenly across the day—reducing pressure on infrastructure and improving overall wellbeing.

In this sense, chronoleadership is not only a workplace issue. It is an urban and societal design principle.

The Hidden Bias in Time Systems

Modern societies are built on what can be described as chrononormativity—the assumption that there is one "normal" way to organise time. Typically, that means early start times, fixed schedules, and synchronised routines. This creates a form of invisible inequality—one built into time itself: people who perform best in the morning are often perceived as more committed or productive, while those who peak later in the day are disadvantaged despite delivering equal or higher value. This early-riser bias is embedded in education systems, labour markets, and cultural norms.

Chronodiversity is not a deviation. It is a biological reality. When systems ignore this diversity, they do not create neutrality—they create structural disadvantage.

From Chronodiversity to Chronoinclusion

Chronoleadership builds on three interconnected principles, which challenge the assumption that everyone should perform at the same time of day.:

- **Chronodiversity:** humans differ in their biological rhythms
- **Chronoequity:** these differences should be treated fairly
- **Chronoinclusion:** systems must be designed to accommodate them

These principles also redefine flexibility. Flexibility is often framed as an individual benefit—something employees can negotiate. Chronoinclusion reframes it as a structural responsibility.

In chronoinclusive systems, performance is measured by outcomes rather than presence. Collaboration is designed around overlapping energy windows. Time autonomy becomes a prerequisite for wellbeing, creativity, and sustainable performance. This shift moves time from a personal preference to a design parameter.

A New Time Architecture for Sustainable Futures

For centuries, societies have been organised around external clocks—church bells, factory shifts, school timetables. These systems were designed to synchronise people for efficiency and control. Today, we face a different challenge.

We must design systems that synchronise with human biology, not override it. Chronoleadership represents a shift from standardisation to synchronisation—from imposing time to aligning with it.

For cities, this shift has far-reaching implications. It can improve sleep and public health, reduce energy consumption, ease urban congestion, and create more liveable environments. It can also unlock human potential by allowing people to contribute at their best, rather than at a fixed time.

A Chronocity in 2050

In 2050, cities are no longer organised around a single clock. Time has become a matter of equity. Societies have come to recognise that designing systems around

one standard rhythm created invisible inequality—favouring early chronotypes while systematically disadvantaging others. What was once considered "normal working hours" is now understood as a structural bias.

Looking back, it seems almost incomprehensible: that entire education systems were built on early start times; that children were woken against their biological rhythm; that performance was measured by presence rather than timing. We thought we had inclusive systems. In reality, we had systems that worked best for a minority.

Performance is no longer evaluated independently of when it takes place. Schools, workplaces, and public institutions are designed around biological rhythms, allowing people to contribute when their cognitive and physical capacities are at their peak. Adolescents start school later in the morning. Exams are scheduled in alignment with chronotypes. Work is organised around overlapping energy windows rather than fixed hours.

Chronodiversity is not accommodated—it is designed for

Cities themselves have changed. Rush hour has largely disappeared, replaced by more distributed patterns of activity. Energy consumption is smoother. Transport systems are less congested. Urban life flows across time rather than compressing into narrow peaks. Healthcare systems have also adapted. Treatment, prevention, and recovery are increasingly synchronised with circadian rhythms, recognising that timing can be as important as dosage.

When cities align time with human biology, they unlock something more than efficiency. They unlock energy, health, learning, and a society designed for how humans actually function.

In the past, we standardised time. The future belongs to those who design it.

Dr. Camilla Kring is a leading expert in applied chronobiology and a global pioneer in chronodiversity, chronoinclusion, and chronoleadership. She was named to the Thinkers50 Radar Class of 2026 for her work connecting circadian science with leadership and the future of work. For more than two decades she has advised organisations across 17 countries on how biological rhythms influence performance, wellbeing, and collaboration.

TIME AND THE CITY

When Rest is as Important as Race

Joan Costa-i-Font
Professor of Health Economics
London School of Economics

Sleep and Rest

Modern societies are increasingly recognizing that time is not only a social and economic construct, but also a biological and environmental one. Circadian rhythms regulate sleep, metabolism, cognitive performance, and overall health of living organisms such as humans, even though our lifestyles and often our social organisation are driven by a ***"productivism"*** view that often excludes or ignores rest.

Sleep is not a purely individual responsibility, but a structural and societal matter shaped by working hours, urban environments, school schedules, and institutional organization. Sleep times and bedtime routines entail overcoming the multiple distractions we face that keep us awake. Yet, poor sleep is not only associated with chronic diseases, but also reduced productivity, mental health problems, and social inequality, and it is even an economic concern that limits a country or city's productivity.

Circadian rhythms regulate sleep-wake cycles, hormone production, body temperature, and cognitive performance. Unsurprisingly, when social schedules conflict with these rhythms, individuals experience fatigue, stress, and reduced performance. At a societal level, this leads to higher healthcare costs, lower productivity, and environmental degradation. Furthermore, these effects are not equally distributed across the population and give rise to significant socio-economic inequalities in healthy behaviours. Therefore, sleep and circadian rhythms must be protected, just as we protect air quality, nutrition, and physical activity.

Urban policy as health policy

Many current urban and institutional systems operate in ways that disrupt these rhythms, creating stress, sleep deprivation, and environmental harm. Regulations, urban

planning, and legislative measures that create territories respectful of human and nature's rhythms are therefore essential to improving wellbeing and sustainability. Policies that focus on human and natural rhythms represent a new model of health governance. This includes policies such as healthy street lighting, silent public services, traffic limits, circadian hospitals, adapted school timing, and protected night zones, all of which aim to create environments that support sleep, health, and ecological balance.

Time Governance

Time governance refers to the tools we use to structure life through schedules, regulations, and institutional practices, including customs and mealtimes. For decades, time has been treated mainly as an economic and administrative tool, structured around productivity, transportation, and consumption. However, growing scientific evidence shows that ignoring biological rhythms has significant health and social costs. Restaurant meal, opening times, and late-night leisure customs, as well as practices such as daylight-saving time, are examples of practices that limit rest. Cities offer around-the-clock schedules that raise expectations in individuals about time and employment alertness, when the associated time stress and fatigue entail costs in later life health. Integrating sleep and circadian science into public policy, therefore, becomes essential for creating sustainable and healthy communities.

A time-sensitive governance model does not simply reorganize schedules; it redesigns environments and institutions to align with human and natural rhythms. Urban planning and legislative measures play a key role in achieving this transformation, similarly to ending practices such as daylight savings time, which reduce individuals' well-being and are estimated to give rise to large welfare consequences. Below are a few:

a. Healthy Street Lighting

One of the most visible and impactful measures to improve sleep quality is the development of healthy street lighting. Artificial light at night, particularly blue-rich LED lighting, interferes with melatonin production and disrupts sleep cycles. Excessive or poorly designed lighting reduces sleep quality, increases stress, and affects both human health and wildlife. Cities that update street lighting to use warmer colours and reduce intensity at night can significantly improve sleep conditions for residents while saving energy. Healthy lighting policies also reduce light pollution, protect biodiversity, and create more comfortable urban environments.

b. Silent Nights

Another important initiative is the reorganization of noisy public services, such as garbage collection, street cleaning, and logistics, to avoid sleeping hours, and more generally access to cars and the racket of buses. Noise pollution is a major factor in sleep disruption, especially in dense urban areas. Night-time noise increases stress levels, contributes to cardiovascular diseases, and reduces overall well-being. Hence, the promotion of silent public services can reduce unnecessary disturbances during the night by scheduling noisy activities outside of sleeping hours or using quieter technologies.

c. Circadian Hospitals

Healthcare institutions have a unique responsibility in promoting circadian-friendly environments. Circadian hospitals are designed to align medical care with biological rhythms by adjusting light levels at night, timing medication appropriately, and organizing staff shifts to minimize sleep disruption. Patients recover faster in environments that respect natural sleep cycles, and healthcare workers perform better when their schedules reduce fatigue. Stable and well-designed temporal environments reduce medical errors, improve recovery rates, and enhance overall quality of care.

d. School Timing and Biological Needs

School schedules are another key area where time-sensitive policies can improve health and performance. Adolescents naturally have later sleep cycles due to biological changes during puberty. Early school start times often force teenagers to wake up before their bodies are ready, leading to chronic sleep deprivation. Adapting school start times to biological rhythms improves academic performance, mental health, and emotional stability. Students who sleep better show higher concentration, better memory, and lower stress levels. Flexible school schedules also help reduce inequality, as sleep deprivation disproportionately affects disadvantaged communities.

A Comprehensive Time-Sensitive Governance

All the interventions mentioned point to the needs of a comprehensive governance system centred on sleep and biological rhythms. This entails coordination between governments, municipalities, healthcare institutions, schools, and communities, and it requires system-level interventions as well as changes in the choice architectures individuals face, affected by present bias, and lead them to ignore bedtime reminders, or to follow the social practices of a local culture that primes nightlife over rest.

Citizens and institutions need to recognize sleep as a collective good rather than a private matter. Policies that respect sleep and biological rhythms can reduce healthcare costs, improve productivity, and enhance quality of life across societies.

Respecting human and natural rhythms is becoming a central challenge for modern societies. Interventions such as healthy street lighting, silent public services, circadian hospitals, adapted school timing, and night zones demonstrate how this vision can be implemented in practice. By designing territories around biological and natural rhythms, societies can create healthier, more sustainable, and ultimately more productive environments, reinforcing the idea that “rest is as important as race”.

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Joan Costa-i-Font is an economist, specialised in Health economics. His work examines the origins and economic consequences of health and economic disadvantage, especially at old age.

Pillar 1

REGULATIONS, URBAN PLANNING, AND LEGISLATIVE MEASURES

that create a territory respectful of human and nature's rhythm

LIFE AROUND SLEEP — BAD KISSINGEN'S CHRONOCITY PILOT PROJECT

A municipal initiative that restructures civic life around chronobiology, aligning school schedules, working hours, lighting conditions, and health services with residents' natural sleep-wake cycles and individual chronotypes.

POLICY OBJECTIVE

- Address sleep deprivation and circadian rhythm disruption by tackling both their behavioural and environmental causes at a municipal level.
- Integrate chronobiology principles into everyday civic life, including:
  - Adjusting school and work start times to better align with residents' natural sleep needs.
  - Optimising urban and indoor lighting to support circadian synchronisation.
  - Improving working conditions for shift workers through chronotype-based scheduling.
  - Applying chronotherapeutic approaches in health and rehabilitation clinics.
- Position Bad Kissingen as a global reference model, the world's first ChronoCity, using temporal justice as a strategic framework for urban development and public health policy.
- Reduce the systematic disadvantage experienced by the majority of the population whose natural chronotypes conflict with standardised social and institutional schedules.

CONTEXT

Bad Kissingen, a historically prestigious spa town in Lower Franconia (Bavaria), had come to be perceived primarily as a retirement destination, limiting its capacity to attract younger, skilled workers and businesses. As a spa town rooted in prevention and health, it provided a natural fit for a project built around chronobiology — the science of how internal body clocks interact with natural and social rhythms.

In 2012, such a project was identified as a strategic opportunity to simultaneously improve residents' wellbeing and give Bad Kissingen a distinctive, globally relevant identity.

The broader problem the project sought to address was one of widespread temporal injustice: current urban structures are calibrated to the chronotype of only 20–30% of the population (early types), systematically disadvantaging the majority, which affects all schedules from school start times to shift work models. Over 80% of the working population in Germany relies on an alarm clock each workday, accumulating chronic sleep deficits linked to depression, obesity, cardiovascular disease, and reduced cognitive performance.

At the same time, chronobiology was virtually unknown to the general public, making awareness-building a precondition for any structural change.

POLICY DESCRIPTION

The ChronoCity project was initiated in October 2012, but formally launched in October 2013 following the signing of a Letter of Intent by the Municipality of Bad Kissingen, the Staatsbad Bad Kissingen GmbH, the Ludwig Maximilian University of Munich, and chronobiologist Dr. Thomas Kantermann. The project aimed to raise awareness of chronobiological principles within the municipal context and to initiate concrete optimisation measures across multiple sectors.

In the field of education, the local secondary school (Jack-Steinberger-Gymnasium) chronotyped over 600 students and recommended that teachers avoid scheduling assessments before 10:00 am. A student-led seminar on chronobiology raised awareness among the school community about the structural disadvantages linked to early start times.

In the health sector, the Hescuro Clinic explored chronotype-based shift planning to reduce absenteeism and improve staff wellbeing, while the St. Elisabeth Clinic began preparing a study on light settings in the maternity ward to reduce postpartum depression. The Staatsbad Bad Kissingen GmbH incorporated the project into its health tourism strategy through the concept "Entdecke die Zeit" (Discover Time), and introduced flexible working hours for office staff.

Architecturally, the project promoted the use of natural light systems (such as Solatubes) and biodynamic lighting to support indoor circadian synchronisation. The project also included a public debate on abolishing daylight saving time locally, grounded in scientific evidence of its harmful effects on health.

BAD KISSINGEN

Beyond the pilot, the project evolved into the ChronoCollege and ChronoCampus initiatives, developed in collaboration with the University of Lübeck, with the goal of creating a centre for applied human chronobiology focused on knowledge transfer, training, and research partnerships.

KEY ASPECTS

Considerations for implementing a ChronoCity policy:

- Chronotypes vary genetically across the population and cannot be changed. Any effective policy must accommodate this diversity rather than ignore it.
- Structural changes in one sector (e.g. school start times) require coordinated adjustments in others (e.g. public transport, parental working hours), making cross-sectoral political commitment essential.
- Long-term projects of this nature are particularly vulnerable to changes in political leadership and electoral cycles; embedding the initiative in legal or institutional frameworks early on helps ensure continuity.
- Public information campaigns are a prerequisite, not an afterthought: without basic chronobiological literacy among citizens, managers, and decision-makers, even well-designed measures face resistance.
- Visible, short-term results must be generated early to build public trust and political support for longer-term structural goals.

Why this project is innovative:

- It is the first attempt in the world to apply chronobiology systematically at the urban scale, treating temporal justice as a public policy goal on a par with spatial planning.
- It demonstrates that improving health and productivity does not require choosing between individual well-being and economic performance. Aligning schedules with biology benefits both.
- It offers a replicable model for small and medium-sized cities looking for a distinctive, evidence-based positioning strategy in health tourism and urban development.

BAD KISSINGEN

RESULTS

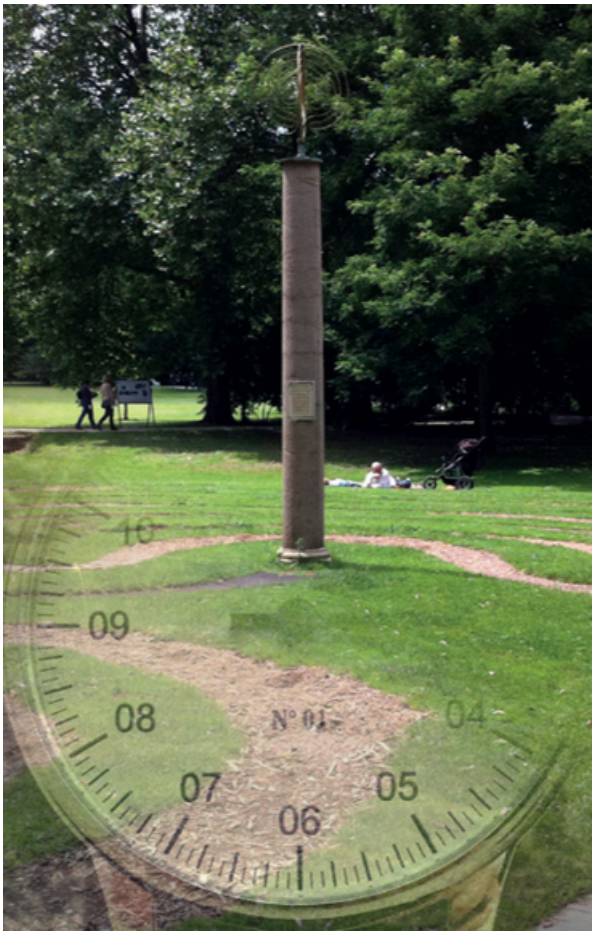
The ChronoCity project generated significant international attention, with media coverage across Europe and North America reflecting broad public interest in its approach.

At the school level, chronotyping of more than 600 students at the Jack-Steinberger-Gymnasium revealed that approximately 40% of pupils were experiencing two to four hours of social jetlag per week, and a further 10% between four and six hours — equivalent in biological terms to weekly transatlantic travel. This data directly informed recommendations to delay assessments and explore later start times. Students who participated in the chronobiology seminar developed a measurably greater awareness of temporal inequities in the school system.

Other results were:

- The Staatsbad Bad Kissingen GmbH introduced flexible working hours for office staff based on chronobiological principles.
- The Hescuro Clinic piloted a voluntary chronotyping process for shift workers, leading to a refined multi-step information and engagement model replicable across sectors.
- A Letter of Intent was signed between Bad Kissingen and the University of Lübeck in 2016 to establish a centre for applied human chronobiology (ChronoCampus/ChronoCollege), combining research, education, and change management.
- First Round Table “Keeping the Standard Time” against the Daylight Saving Time with Experts and politicians (e.g., former Member of European Parliament Herbert Reul, Peter Spork, Hubertus Hilgers, Rene Gräber, and Frank Oette, Director of Staatsbad GmbH).

The project also surfaced key lessons about implementation barriers: insufficient public funding, inadequate information infrastructure, the fragility of political support across electoral cycles, and the challenge of making an abstract scientific concept tangible to a general audience. These lessons have since informed more robust models for chronobiological change management applicable to future ChronoCity initiatives.



Promoting institution
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LOCAL COUNCIL MOTION CALLING FOR THE PERMANENT MAINTENANCE OF WINTER TIME AS A CLIMATE CHANGE ADAPTATION MEASURE

Institutional initiative to eliminate seasonal clock changes and adopt winter time throughout the year to improve health, reduce energy consumption, and support climate adaptation.

POLICY OBJECTIVE

- Promote the elimination of seasonal clock changes in the EU and in Spain.
- Adopt winter time (UTC+1) as the permanent time in Spain.
- Improve public health through better circadian synchronisation.
- Reduce energy consumption and the associated economic cost of cooling.
- Facilitate the natural cooling of homes in a context of rising temperatures.
- Reduce inequalities linked to energy poverty.
- Contribute to climate change adaptation and emissions reduction.
- Align the hottest hours of the day with working hours.

CONTEXT

The sustained increase in temperatures, especially in summer, is intensifying episodes of persistent and extreme heat, reinforcing the urban heat island effect and making night-time rest and the cooling of homes more difficult. The proliferation of tropical nights (minimum temperatures >20 °C) has tripled in urban environments such as Viladecans, alongside a very significant increase in torrid nights (minimum temperatures >25 °C), reflecting a trend associated with climate change and urbanisation.

The current system of clock changes, particularly summer time (UTC+2), artificially delays sunset, prolonging hot evenings and reducing the time available for the dissipation of heat accumulated in buildings, streets and public spaces. This increases dependence on artificial cooling, energy consumption and emissions, with a more severe impact on vulnerable households. Difficulties in achieving night-time rest due to heat over many weeks pose a risk to physical and mental health, affecting daytime concentration and behaviour.

At the same time, scientific evidence shows that clock changes generate a misalignment between the biological and social clocks, with impacts on physical and mental health. In 2018, the European Union, in its Proposal for a Directive of the European Parliament and of the Council discontinuing seasonal clock changes and repealing Directive 2000/84/EC (COM/2018/639 final), already proposed ending clock changes in EU Member States, leaving it to each country to decide which time zone or zones to adopt permanently throughout the year.

In this context, defining the time model becomes a structural issue of climate adaptation, public health, economic vulnerability and energy efficiency.

POLICY DESCRIPTION

The policy takes the form of a municipal motion that promotes an institutional position to advocate for:

- The EU to drive the elimination of seasonal clock changes at both national and European levels.
- Spain to permanently adopt winter time (UTC+1) throughout the year as the option most aligned with solar time.
- The inclusion of the time model debate within climate change adaptation and public health policies.
- The promotion of scientific studies on the impact of time models on energy consumption, thermal comfort, and health.

The proposal is based on the physical principle that natural cooling of homes only begins when the external temperature falls below the internal temperature. Artificially extending sunset in relation to natural time delays the natural cooling of buildings, reducing the duration of passive cooling and resulting in homes being less naturally cooled than if winter time were maintained. Maintaining winter time would imply sunset occurring earlier, allowing the gain of a crucial hour for passive cooling and reducing the need for artificial cooling.

In addition, the change would facilitate a reorganisation of working hours, with earlier working days that would reduce exposure to peak heat hours and contribute to occupational safety and the prevention of forest fires, as most fires start in the early afternoon when temperatures peak, and humidity is at its lowest, coinciding with the resumption of afternoon work activity.

AJUNTAMENT DE VILADECANS

KEY ASPECTS

- Structural and low-cost measure: does not require technological investment or infrastructure.
- Cross-cutting impact: affects energy, health, urban planning, work, and the environment.
- Evidence-based: aligned with studies in chronobiology and climatology.
- Climate justice: particularly benefits vulnerable populations without access to cooling.
- Improved rest and health: facilitates the nighttime temperature drop needed for sleep.
- Climate change adaptation: reduces thermal stress and associated emissions.
- Fire prevention: aligns human schedules with lower-risk hours.
- Multi-level governance: involves local, regional, national and European administrations.

RESULTS

Currently at an initial stage (motion approved by the City Council), but with significant potential impacts:

- Increase in the natural cooling time of homes (+1 hour).
- Reduction in energy consumption for cooling.
- Improved night-time thermal comfort and rest.
- Reduction in greenhouse gas emissions.
- Decreased risk of heatstroke and improved occupational safety.
- Potential reduction in fire risk during critical periods.
- Improved health.
- Reduction in workplace accidents.
- Improved academic and work performance.

The policy exemplifies how an apparently organisational decision (the time model) can become a key climate adaptation tool. In a particularly vulnerable Mediterranean context, maintaining winter time throughout the year emerges as a simple, cost-effective intervention with high potential impact on health, energy use and quality of life.

Establishing a standard motion on this issue to be debated and, when applicable, approved by multiple municipalities could be a joint initiative worth exploring.

Promoting institution
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Pillar 2

AWARENESS, SOCIAL HABITS, AND DATA

to help citizens understand the importance of rest and collecting data to make better decisions.

THE CIRCADIAN CITY. INFLUENCE OF BIOLOGICAL RHYTHMS AND CLOCKS ON HEALTH AND SOCIETY. CHRONOBIOLOGY, BIOLOGICAL RHYTHMS, AND PUBLIC POLICIES

The study highlights the need to advance towards a city model that takes people's biological rhythms into account through chronobiology, analyzing the impact of schedules, urban design, and lighting on health and well-being, and proposing an approach to public policies from the perspective of a circadian city.

POLICY OBJECTIVE

- Generating applied knowledge on time-use patterns and their relationship with health and the urban environment.
- Raising awareness among citizens and public officials about the impacts of misalignments between social and biological rhythms.
- Promoting the integration of a time use perspective across municipal policies, identifying new areas for intervention (such as urban planning).
- Translating evidence from chronobiology into the reflection and orientation of municipal public policies.
- Establishing an empirical foundation to develop municipal policies aimed at advancing towards a more equitable, healthy, efficient, and sustainable city.

CONTEXT

Contemporary cities are defined by an increasing misalignment between people's biological rhythms and the social and urban rhythms that structure daily life. Factors such as nighttime artificial lighting, extended activity hours, screen exposure, or the dynamics of a 24/7 city disrupt the functioning of the biological clock and directly affect citizens' health and well-being.

This desynchronization, described in the report as "social jet lag," occurs when social schedules do not align with individuals' natural rhythms, leading to effects such as sleep disorders, stress, reduced performance, and long-term health problems. These impacts are not distributed evenly; they vary depending on people's schedules and living and working conditions, potentially resulting in greater social inequality.

In this context, the Barcelona City Council, as a leading city in time policy innovation, recognizes the need to further integrate a time-use perspective into municipal policies, extending it to areas such as urban planning.

POLICY DESCRIPTION

The report, promoted by the Barcelona City Council within the framework of its time policy initiatives, serves as a tool to generate and transfer knowledge. It draws on scientific evidence from the field of chronobiology to examine how different aspects of the urban environment, such as social and work schedules, lighting, screen exposure, and the city's activity patterns, affect the population's circadian rhythms. The study also introduces concepts such as "social jet lag," which describes the mismatch between biological rhythms and social schedules, a phenomenon that, according to the author, must be addressed both individually and collectively.

Based on this analysis, the report suggests approaching public policies from the perspective of a circadian city, one that adapts its functioning to the natural rhythms of its citizens, with the objective of improving well-being and fostering a healthier and more efficient urban environment.

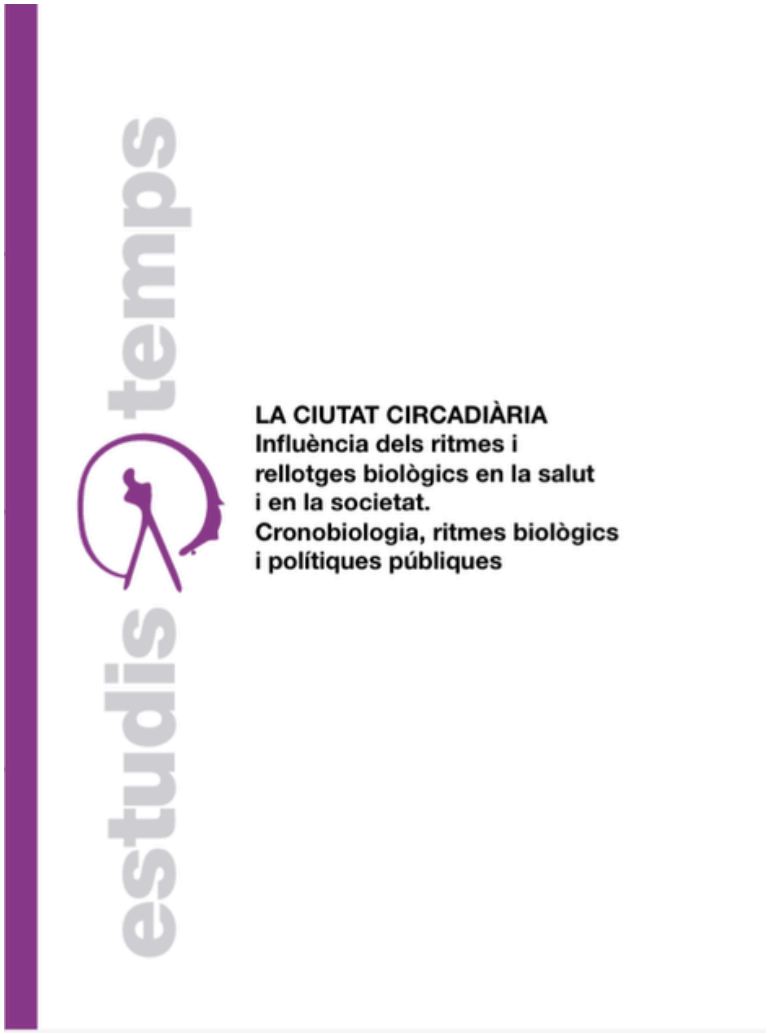
Within this framework, the report identifies key areas for municipal intervention and outlines potential lines of action, especially areas such as time organization, urban design, and public space management.

KEY ASPECTS

- Applied knowledge: The report is based on scientific evidence and translates it into the field of public policy in a clear and practical way.
- Integration of the time dimension across municipal areas: It helps identify implications across different municipal areas connected to urban design.
- Serves as a tool for reflection and decision-making support: It provides a framework to guide the development of new municipal policies.
- Awareness-raising function: It helps both policymakers and citizens understand how biological rhythms affect health and well-being.
- Knowledge transferability: It offers a conceptual framework that can be applied to other urban contexts interested in adopting this perspective.

RESULTS

Since the report is intended as a tool to generate knowledge, it offers, primarily, qualitative insights. It helps bring the circadian perspective into public and institutional debate and lays the groundwork for future municipal policies that incorporate this approach.



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AI Disclosure: the cover image has been created using AI, with the base design property of Time Use Initiative. The original image was created by designer Romina Sampietro and was intended as a template for the Local and Regional Time Agenda visual identity.

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