



LAND USE PLANNING FOR INCREASED CARBON ABSORPTION



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ABOUT THE LOCAL GoGREEN PROJECT



Clean Energy Transition process in 6 small European municipalities

8 partners from 7 European countries leading the capacity building, participatory decision-making and collaborative actions for the design and implementation of integrated climate and energy plans.

Aims:

- Provide **technical assistance** to local pilots in a comparable transnational framework
- Improve **synergies among public & private stakeholders** in implementing ICEPs
- **Facilitate the deployment of targeted investments** provided by the European Funds for improved ICEP planning
- Replicate & upscale the integrated measures for CET through **transnational municipal cooperation**
- Enable green & circular climate & inclusive decarbonisation **plans that support sustainable development**

300 stakeholders with increased skills in the area of Clean Energy Transition

90 local and regional authorities committed to accelerate the implementation of ICEPs

5GWh/year of renewable energy generation

1,600tCO₂/year CO₂ reduction in the 3-year period & 4,500 tCO₂/year in the period 5 years after the project

2.94GWh/year of energy savings in the 3-year period & 8.4 GWh/year in the period 5 years after the project



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AGENDA

- Importance of land use planning for carbon absorption
 - Urban planning strategies
 - Techniques to minimize urban/suburban sprawl
 - Encouraging infilling and densification of existing urban areas
 - Utilization of abandoned sites for green zones
 - 15-minute city concept
 - Sponge city concept
- Benefits of Green Zones
 - Establishing additional green zones in urban areas
 - Community benefits and local carbon absorption increases
- Rural land use strategies
 - Encouraging tree planting on non-agricultural land
 - Maintenance and expansion of wetlands
 - Promoting high energy efficient vegetation

LEARNING OBJECTIVES OF THE TRAINING

After this training you will be able to:



- Understand how land use planning can be used for improved carbon absorption
- Understand the benefits of urban green areas in mitigating climate change and ensuring well-being of citizens
- Importance of land use planning for carbon absorption
- Understand rural land use strategies and benefit of growing high-energy efficient plants



IMPORTANCE OF LAND USE PLANNING FOR CARBON ABSORPTION



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URBAN PLANNING STRATEGIES

- **Strategic comprehensive approach** to urban planning allows to create **sustainable, resilient,** and **livable** cities across Europe while significantly contributing to carbon absorption.

Urban Agenda for the EU	Integrated sust. urban dev. strategies	Smart growth principles	Green infrastructure	Urban growth boundaries	Local initiatives
Multilevel cooperation	Place-based strategies	Compact development	Urban green spaces	Controlled expansion	Community- led projects
Action plans	Cohesion policy	Transit-oriented development	Blue-green infrastructure	Preservation of natural areas	Public-private partnerships
Priority themes	Carbon sequestration	Carbon footprint reduction	Carbon sequestration	Carbon storage	Carbon absorption

Sources: [Urban Agenda for the EU](#), [Handbook of Sustainable Urban Development Strategies](#), [HANDBOOK OF SUSTAINABLE URBAN DEVELOPMENT STRATEGIES - europa.eu](#)

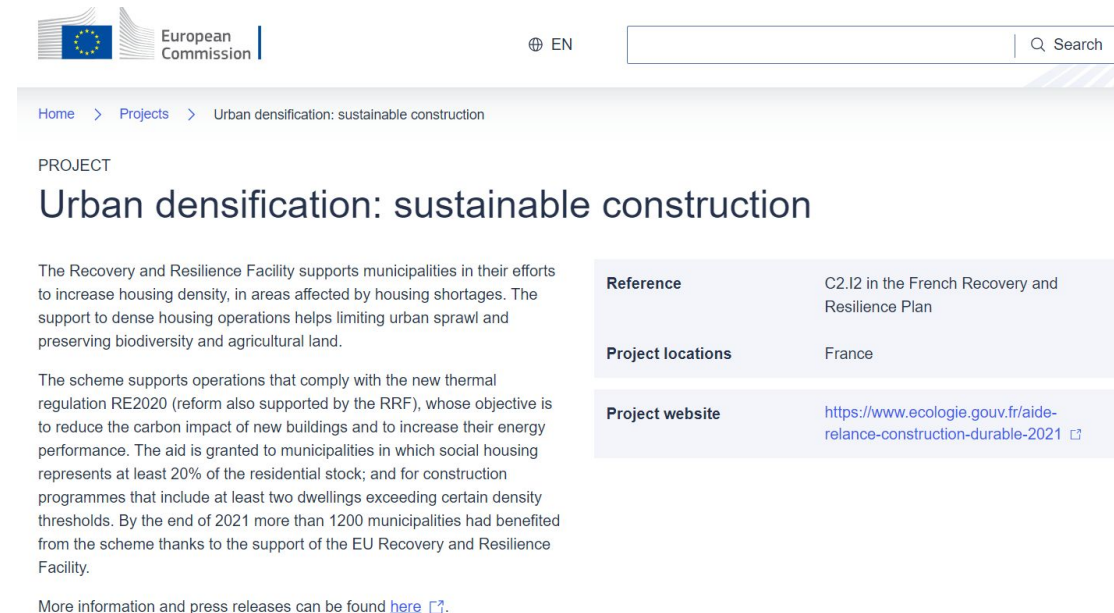
TECHNIQUES TO MINIMIZE URBAN/SUBURBAN SPRAWL

Compact urban design	Transit-oriented development (TOD)	Green building practices	Brownfield re-development	Smart growth initiatives	Green spaces and parks	Adaptive reuse	Community-engaged design
High-density development	Public transport integration	Sustainable architecture	Revitalize abandoned Sites	Urban growth boundaries	Urban green zones	Repurpose existing Buildings	Public participation
Mixed-use zoning	Pedestrian-friendly environments	Eco-friendly infrastructure	Environmental cleanup	Infill development	Biodiversity conservation	Sustainable renovations	Collaborative planning
Efficient land use	Reduced traffic congestion	Low-impact development	Community revitalization	Cluster development	Recreational areas	Cost-effective development	Social equity

Sources: Solutions to Solving Urban Sprawl - RTF | Rethinking The Future, Curbing urban sprawl to make cities more sustainable, Better targeted measures needed to tackle urban sprawl in Europe, Handbook of Sustainable Urban Development Strategies, Urban sprawl - Europe's ignored environmental challenge, Solutions to Solving Urban Sprawl - RTF | Rethinking The Future

ENCOURAGING INFILLING AND DENSIFICATION OF EXISTING URBAN AREAS

- **EU Urban Agenda:**
 - Promotes compact city models to reduce urban sprawl and enhance sustainability.
 - Encourages coordinated efforts across different levels of government.
- **Recovery and Resilience Facility (European Commission):**
 - Provides funding to increase housing density in areas with shortages.
 - Ensures new developments meet energy performance and carbon standards.
- **Infill and densification approaches:**
 - Focusing on developing vacant or underutilized parcels within urban areas.
 - Involving local communities in planning.
 - Adding new floors or extensions to existing buildings.
 - Enhancing energy performance through retrofits.



The screenshot shows the European Commission website page for 'Urban densification: sustainable construction'. The page includes the European Commission logo, a search bar, and a breadcrumb trail: Home > Projects > Urban densification: sustainable construction. The main heading is 'PROJECT Urban densification: sustainable construction'. The text describes the Recovery and Resilience Facility's support for municipalities to increase housing density and preserve biodiversity. A table on the right provides details: Reference (C2.I2 in the French Recovery and Resilience Plan), Project locations (France), and Project website (https://www.ecologie.gouv.fr/aide-relevance-construction-durable-2021). A link for more information is also present.

Reference	C2.I2 in the French Recovery and Resilience Plan
Project locations	France
Project website	https://www.ecologie.gouv.fr/aide-relevance-construction-durable-2021

15-MINUTE CITY CONCEPT

The 15-minute City transition pathway focuses on rethinking the existing mobility system and urban morphology to encourage sustainable mobility choices, redistribute urban space and reorganise our daily activities so to make our cities more climate neutral, liveable and inclusive. It is based on the idea that **city dwellers should be able to cover the vast majority of their daily needs** (such as education, retail, and healthcare) **within a 15-minute radius, by walking and cycling**, while connecting to further districts and travelling larger distances by other forms of sustainable transport. It promotes polycentric urban structure, where multiple centers within a city provide diverse amenities, thus improving local walkability and reducing the need for long commutes and reducing negative impacts associated with cars.

While the concept has many benefits, it also faces challenges such as the need for detailed planning and the risk of physical determinism, where goals are set without clear implementation strategies. **Successful implementation requires careful planning and consideration of local contexts** to address potential challenges and **ensure that the benefits are realized for all residents**.



**Driving Urban
Transitions**

EU DUT partnership with their designated funding calls for cities
<https://dutpartnership.eu/dut-call-2024/>

IMPACTS OF 15-MINUTE CITY CONCEPT

- **Environmental Benefits:**

- Reduction in Greenhouse Gas Emissions: minimizing the need for car travel and promoting sustainable transportation options like walking and cycling
- Improved Air Quality and Reduced Noise Pollution: decreasing reliance on private vehicles helps lower air pollution and noise levels, contributing to healthier urban environments
- Enhanced Green Spaces: integration of green spaces within urban areas can mitigate heat island effects and improve overall environmental quality

- **Social Benefits:**

- Increased Civic Engagement: stronger community ties and civic engagement through more accessible and vibrant public spaces
- Enhanced Quality of Life: Proximity to essential services and amenities improves the overall quality of life
- Reduction in Inequality: addressing social inequalities by providing affordable access to essential services and sustainable travel options, benefiting lower-income residents

- **Economic Benefits:**

- Boost to Local Economies: promoting local businesses and reducing the need for long commutes, stimulates local economies and creates job opportunities within communities
- Cost Savings: Reduced transportation costs and improved energy efficiency can lead to significant economic savings for both residents and municipalities
- Resilience and Adaptability: The model enhances urban resilience by creating self-sufficient neighborhoods that can better withstand economic and environmental shocks

UTILIZATION OF ABANDONED SITES FOR GREEN ZONES

- **Green Revitalization:**

- **Transforming Brownfields:** Converting former industrial sites into parks and community gardens
- **Environmental Cleanup:** Remediating contaminated sites to make them safe for public use

- **Benefits:**

- **Climate Adaptation:** Green zones help mitigate urban heat islands, balance heavy rainfalls and flash floods, and improve air quality
- **Social and Economic:** Enhance community well-being and property values

- **Challenges and Considerations:**

- Redevelopment of post-industrial sites can face **barriers** such as high costs, potential environmental contamination, and the need for financial support.
- Ensuring **equitable access to green spaces** is crucial to avoid socio-environmental injustices and potential gentrification

UTILIZATION OF ABANDONED SITES FOR GREEN ZONES 2

EU Policies and Programmes:

- **New Leipzig Charter**: Promotes nature-based solutions to regenerate ecosystems and transform neglected sites into green spaces
- **New European Bauhaus**: Encourages sustainable and aesthetically pleasing urban development, including the reuse of abandoned sites

Case Studies:

- **Catalonia, Spain**: Regenerating public spaces linked with affordable housing projects
- **Murcia, Spain**: Revitalizing neighborhoods through community-driven projects
- **Turin, Italy**: NbSs transformed brownfields into sustainable, inclusive urban living labs and promoted green tourism.



SPONGE CITIES

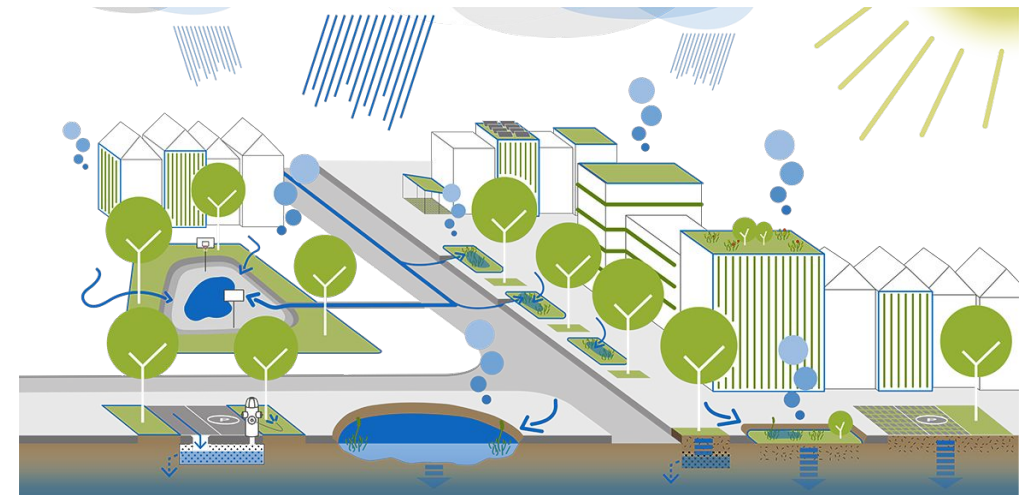
Sponge cities are an **innovative urban water management strategy** designed to address issues such as urban flooding, water scarcity, and pollution.

Key Characteristics

- Permeable Pavements enhance water infiltration, retention, purification, evaporation, and drainage
- Low Impact Development (LID) Techniques: Incorporation of bio-retention facilities, grassed swales, sunken green spaces, and storage tanks to manage stormwater and flash floods
- Green Water Networks
- Multi-Objective Optimization: Use of optimization methods to minimize rainfall runoff, pollutant discharge, and costs while maximizing environmental benefits

Benefits

- Flood Mitigation
- Water Purification
- Urban Heat Island (UHI) Mitigation
- Sustainability and Ecological Benefits
- Economic and Social Benefits: cost-effective stormwater management and improved social well-being
- Public Awareness and Participation





BENEFITS OF GREEN ZONES



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THE GREEN ZONES

Designated urban areas developed and maintained to promote environmental sustainability, enhance biodiversity, and improve residents' quality of life.

Advantages:

- Improves air quality by reducing pollution
- Enhances urban biodiversity and supports local wildlife
- Provides recreational spaces for residents
- Mitigates urban heat island effect

Disadvantages:

- Requires significant funding for development and maintenance
- May face space constraints in densely populated areas
- Needs ongoing community engagement and support



ESTABLISHING ADDITIONAL GREEN ZONES IN URBAN AREAS

Key Strategies:

- 1) Urban Greening Plans as part of the EU Biodiversity Strategy
- 2) Biodiverse and accessible urban forests, parks, and gardens
- 3) Green roofs and walls, tree-lined streets, urban meadows, and hedges
- 4) Green zones integrated into urban planning and development



COMMUNITY BENEFITS AND LOCAL CARBON ABSORPTION INCREASES

Community benefits:

- Economic empowerment
 - >> jobs, savings
- Educational opportunities
 - >> training, upskilling
- Social cohesion
 - >> ownership, collective action
- Living environment
 - >> balancing adverse climate effects

Local carbon absorption:

- Renewable energy production:
 - solar, wind
- Sustainable land use:
 - sequestration, biodiversity
- Reduced grid losses:
 - efficiency, emissions



RURAL LAND USE STRATEGIES



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ENCOURAGING TREE PLANTING ON NON-AGRICULTURAL LAND

Tree planting on non-agricultural land is a vital strategy for enhancing carbon absorption and promoting biodiversity. The EU's commitment to planting 3 billion additional trees by 2030 underscores the importance of this initiative

Benefits:

- **Carbon sequestration:** trees absorb carbon dioxide, helping to mitigate climate change by reducing greenhouse gas concentrations in the atmosphere
- **Biodiversity enhancement:** planting diverse tree species supports local wildlife, creating habitats and promoting ecological balance
- **Soil health improvement:** trees prevent soil erosion, improve water retention, and enhance soil fertility, contributing to sustainable land management

EU guidelines and initiatives:

- **Biodiversity-friendly practices** - guidelines by EU for biodiversity-friendly afforestation and reforestation
- **3 Billion Trees Initiative** - planting trees in forests, urban areas, and along infrastructure corridors, promoting ecological principles and enhancing green spaces
- **Community involvement**

MAINTENANCE AND EXPANSION OF WETLANDS

The EU's Nature Restoration Law emphasizes the importance of restoring Europe's degraded ecosystems, including wetlands.

Benefits:

- **Carbon sequestration:** wetlands store significant amounts of carbon, helping to mitigate climate change by reducing greenhouse gas emissions
- **Water purification:** wetlands act as natural filters, removing pollutants and excess nutrients from water, thus improving water quality for local communities
- **Flood mitigation:** wetlands absorb excess rainwater, reducing the risk of floods and protecting infrastructure and human lives
- **Biodiversity support:** wetlands provide habitats for a wide range of species, promoting ecological diversity and resilience

EU guidelines and initiatives:

- **Nature Restoration Law:** sets rules for the restoration of wetlands, aiming to unlock their potential for carbon storage and biodiversity enhancement
- **Community Involvement**

PROMOTING HIGH ENERGY EFFICIENT VEGETATION

High energy efficient vegetation means the strategic **use of vegetation to optimize energy use, mitigate climate impacts, and support ecological balance.**

Integrating energy-efficient vegetation into land use planning involves multiple strategies, including the **use of shade trees, biomass crops, and optimized vegetation around renewable energy installations.**

Effective land use planning models and frameworks are essential to balance ecological, economic, and energy needs, ensuring a holistic and sustainable approach to land management

Benefits:

- **Energy savings:** High energy efficient vegetation, such as green roofs and walls, and trees, reduces the need for heating and cooling in buildings, leading to significant energy savings
- **Climate resilience:** Vegetation helps to moderate urban temperatures, reduce the urban heat island effect, and improve air quality, and increase urban biodiversity, contributing to climate resilience
- **Biodiversity support:** Incorporating diverse plant species supports local wildlife, creating habitats and promoting ecological balance.
- **Restoring ecosystem services:** Native vegetation management at solar energy facilities can restore ecosystem services and improve land use efficiency, creating synergies between energy production and ecological benefits, like pollination.



HIGH ENERGY EFFICIENT VEGETATION - REGULATIONS

The EU's commitment to energy efficiency and climate resilience highlights the importance of integrating energy-efficient vegetation into land use planning.

EU Guidelines and Initiatives:

- **Energy Efficiency Directive**: encourages the adoption of energy-efficient practices, including the use of vegetation to reduce energy consumption in buildings
- **Green Infrastructure Strategy**: promotes the integration of green infrastructure, such as parks, green roofs, and urban forests, to enhance urban sustainability and resilience
- **Community Involvement**

HIGH ENERGY EFFICIENT VEGETATION - CHALLENGES

Energy-Landscape Optimization models can help in sustainable urban expansion by considering biophysical constraints and socioecological objectives.

Challenges in Implementation:

- Modeling the effects of vegetation, especially shade trees, in urban land surface models is complex and requires advanced numerical frameworks.
- Land use changes often involve trade-offs between different benefits, making it difficult to achieve "win-win" scenarios.
- Integrating energy planning with spatial planning requires innovative tools and public-private partnerships to overcome traditional top-down approaches



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