



León at a Glance

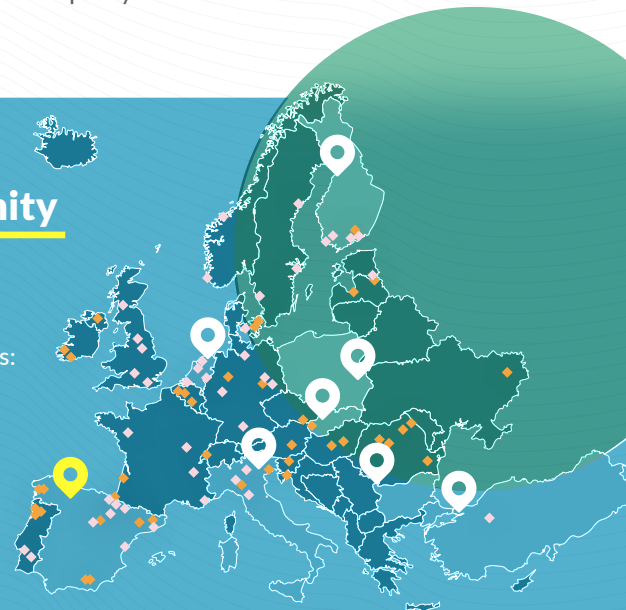
León, home to **121,281 residents**, basks in a continentalized **Mediterranean climate, boasting 2,624 hours of sunshine yearly**. Welcoming over 450,000 visitors annually, it thrives as a cultural hotspot steeped in history and architecture. With leading economic sectors in **biotechnology, cybersecurity, and agri-food**, León grapples with urban challenges, from urban decline to energy transition.

As a **follower city** in MAKING-CITY, it pioneers a Positive Energy District, emphasizing renewable solutions like **LED lighting, sustainable transport, and solar energy**. Engaging local stakeholders, including public entities, companies, and academic institutions, León strides toward a sustainable future, ensuring a comfortable, accessible, and safe quality of life for its inhabitants.

Follower City in the Scalable Cities Community

León is part of the community of 120 cities that is working on its energy transformation as a partner in one of the 18 European Smart Cities and Communities projects. Collectively, the CCI has achieved impressive results:

- 53% energy saved
- Up to 88% CO₂ emissions reduced
- 5,270+ electric vehicles introduced
- Nearly 500 e-charging stations installed
- Over 1 million m² of floor space refurbished
- 17,500+ smart meters installed
- Over 260,000 engaged citizens



-  León
-  The 7 other MAKING-CITY cities
-  48 Lighthouse Cities
-  72 Fellow Cities



Scan the QR code to access the interactive online map with all 120 cities or access the list of the 18 EU projects.

Climate Neutrality Roadmap by 2050

Objectives:

- Reduce **GHG emissions** via efficiency and renewable energy
- Strengthen **resilience**
- Alleviate **energy poverty**

Main orientations to change trend scenario:

- Address transport emissions (main local GHG source)
- Long-term solutions for industrial natural gas
- Additional measures beyond residential/tertiary electrification

León City Initiatives:

- Covenant of Mayors member since 2015, PACES approved in 2022
- €70M Heat Network and renewable energy park for 28,000 homes and 150 public buildings
- Programmes of Urban regeneration for neighbourhoods
- Energy efficiency and renewable programs for municipal buildings
- Sustainable mobility: Intelligent Transport System, fleet transformation, active mobility, Low Emission Zones
- Pilot project for intelligent urban waste management
- City Vision 2050 for urban energy system transformation

Leon 2050 Vision: A Sustainable, Inclusive, and Smart City

- Sustainable: Low-carbon economy, environmental protection, resource efficiency
- Inclusive: Social inclusion, poverty reduction, anti-discrimination
- Smart: Improved access to quality ICTs

León's roadmap to PED implementation

What is a PED ?

A **Positive Energy District (PED)** is a eco-friendly urban area that produces more renewable energy than it uses. Featuring sustainable tech, energy-efficient buildings, and smart grids for eco-resilience, community engagement, and reduced carbon footprints. **PEDs exemplify sustainable urban living and a greener future.**

Technologies selection (package):

- PV, roof-top wind, PVT panels coupled with heat pumps and solar thermal panels (FPC)
- Storages for electricity and thermal demand (batteries and thermal storage)
- High-level controllers for optimization of energy use
- E-mobility integration and electrolysers to obtain hydrogen with the exports

Three PED scenarios

Scenario 1: All PV + All heat pumps



Retrofitting (-20% H+C)
 Change to HP (HVAC+DHW)
 New PV (166kW)
Nren Primary Energy= -0.25 GWh
 PV: 895.5kW (1328.7 + 5835.3 m2)
 HP: 1732 kW - 61.9W/m2

Scenario 2: PV + Solar thermal & heat pumps in residential and sugar factory



Retrofitting (-20% H+C)
 Change to HP (HVAC)
 New PV (472.3kW) +ST (218.2kW)
Nren Primary Energy= -0.08 GWh
 PV: 1314.2kW (3037 + 6516 m2)
 ST: 217.2 kW (189.8+119.2 m2)
 HP: 1130 Kw - 40.83W/m2

Scenario 3: PV + Solar thermal & heat pumps in residential and sugar factory + Hydro generation



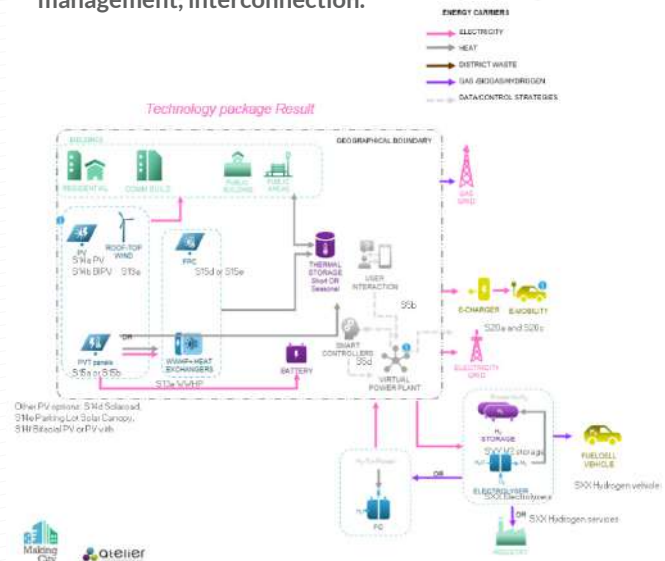
Retrofitting (-20% H+C)
 Change to HP (HVAC)
 No need of new PV
 New ST (218.2kW) needed
Nren Primary Energy= -2.39 GWh

PV: 729.4kW (5835.3m2) HP: 1578 Kw - 57.02W/m2
 ST: 217.2 kW (189.8+119.2 m2)

A PED for León: Case study

Former sugar factory area selected for study after MAKING-CITY tools application:

- Total area: 73,146 m2
- Buildings studied: 21 (19 residential, 2 public)
- Interventions: Energy rehab, renewable facilities, storage, management, interconnection.



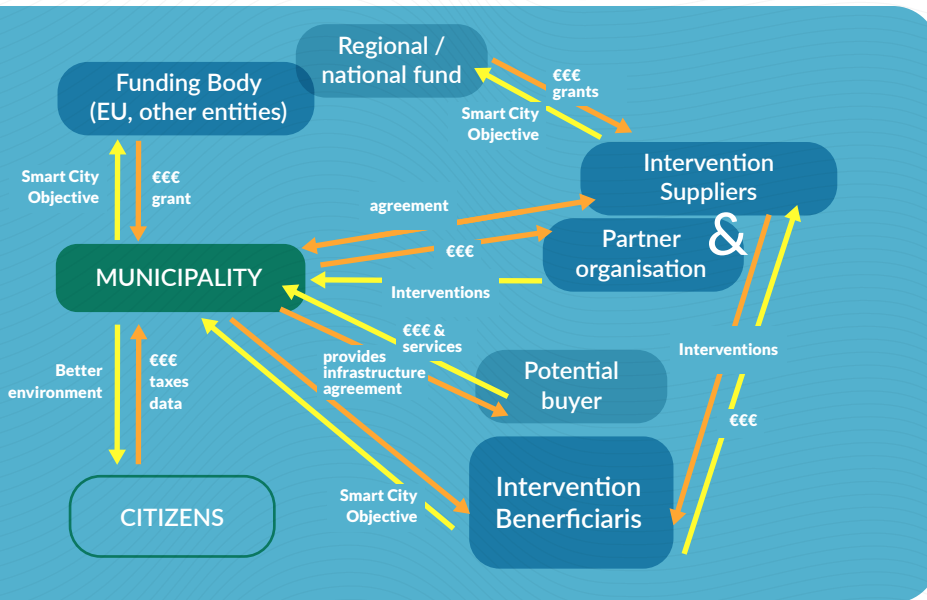
Decarbonization Scenario Actions:

- On-site electricity generation via solar PV systems
- Long-term building refurbishment rate (1% annually)
- Supplying heating via district heating (residential and commercial)
- Replacement of LPG and heating oil with aerothermal heat pumps and biomass
- Replacing natural gas with aerothermal heat pumps, biomass, and district heating
- Reduction in heating demand, domestic hot water demand, and lighting/appliances usage (44%, 15%, and 50% respectively)
- Renovation of traffic lights and public outdoor lighting
- 50% energy savings target in industry (utilizing biomass, electricity, and hydrogen)
- Revamping municipal and public transport fleets (biofuel, electric vehicles, and hydrogen)
- Generating renewable energy within city spaces (solar and district heating)

Ongoing Facilitator Activities

- Energy efficiency refurbishment of commercial buildings (FEDER-NextGeneration EU)
- Renewable energy projects (hydroelectric, solar PV on public buildings, cogeneration at wastewater plant)
- District heating network development with renewables (biomass, solar, green hydrogen)
- Public EV charging network establishment
- Smart City platform integration (energy, transport, waste)
- LED public lighting deployment

León's PED Business Model



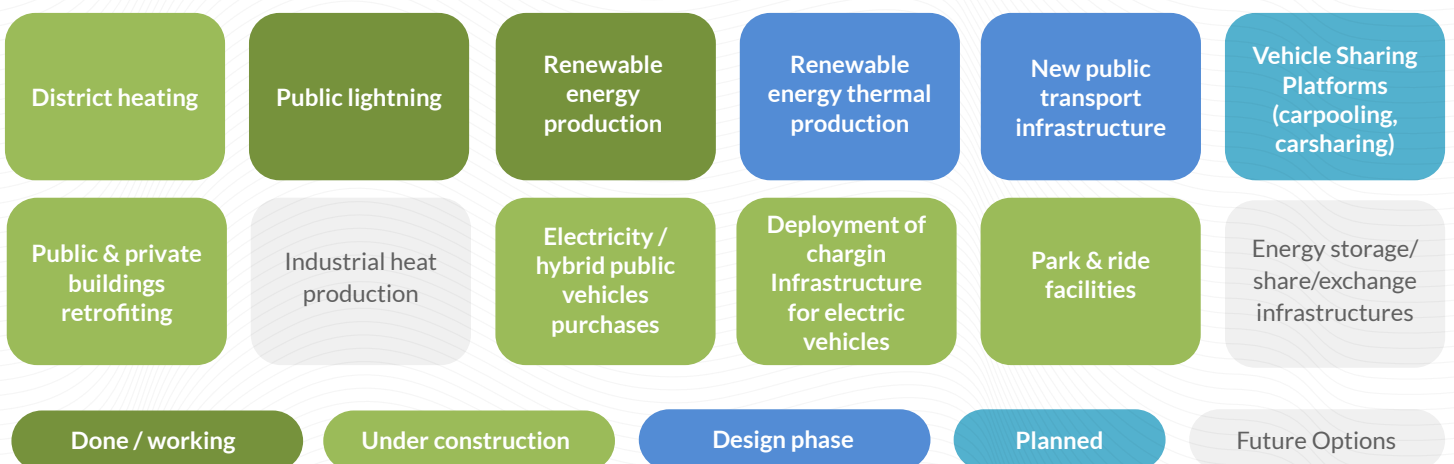
Financing Sources / Tools Schemes



Financial providers



Types of Projects



Capacity-Building Strategy for Promoting León's Local Energy Transition

CITIZENS CAPABILITY

Empower citizens to actively participate in the energy transition by enabling them to implement energy citizenship actions that complement political efforts toward achieving transition goals.

ENERGY & URBAN POLICY COORDINATION

Align energy and urban planning to set goals for decentralized generation, vehicle electrification, and district network integration, aiming for emission reduction.

COLLABORATION

Promote collaborative energy transition involving public, private, and citizens through tools like "local energy communities" to engage local administration, businesses, and residents.

FINANCIAL OPPORTUNITIES

Explore and exploit diverse financial opportunities to fund the local energy transition and avoid energy poverty.



Empowering every stakeholder, from citizens to government, through capacity building, is key to fostering a successful local energy transition.

Ana Belén Gómez Minguela, Researcher, CARTIF

Tools & Instrument Mix

SOCIAL	TECHNICAL	ORGANISATIONAL	FINANCIAL	LEGAL	POLITICAL
IN PROGRESS OR ALREADY IN OPERATION					
Public webs Apps Campaigns & questionnaires	Electric mobility network Smart City / ICT Platform	Integrated urban regeneration management Living Lab Energy Transition Funding Officer Energy manager Urban design competitions	Fiscal incentives Energy service companies (ESCOs) Energy poverty funds Subsidies Loans	Local ordinances Urban and building permits	Strategy and Planning (city vision, SECAP, SUMP, EDUSI, ERUCYL, etc.)
PROPOSED OR POSSIBLE USE					
Participatory planning workshops Participatory mapping Eco-Energy Cluster	Technology availability Infrastructure existence Energy Coaches District Energy Approach and District-level Energy Manager	Citizen energy community Renewable energy community Renewable energy strategy	One-stop shop (for integrated home energy renovation) New financial schemes PPP (Public-Private Partnerships)	Favourable regulatory and normative framework	Political portfolio management (inclusion of the topic Energy/ Energy Citizenship)

Engaging citizens in meaningful processes is key but citizen-led action is paramount.

Nora Fernández, TECNALIA

Collaboration is the win-win way to do things.

Mónica Prada, Architect, City Council of León

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