Dublin’s Energy-Smart City Transition 2020 – 2050

Integrating Renewables, Storage, Hydrogen & Smart Systems for a Zero-Carbon, Resilient City

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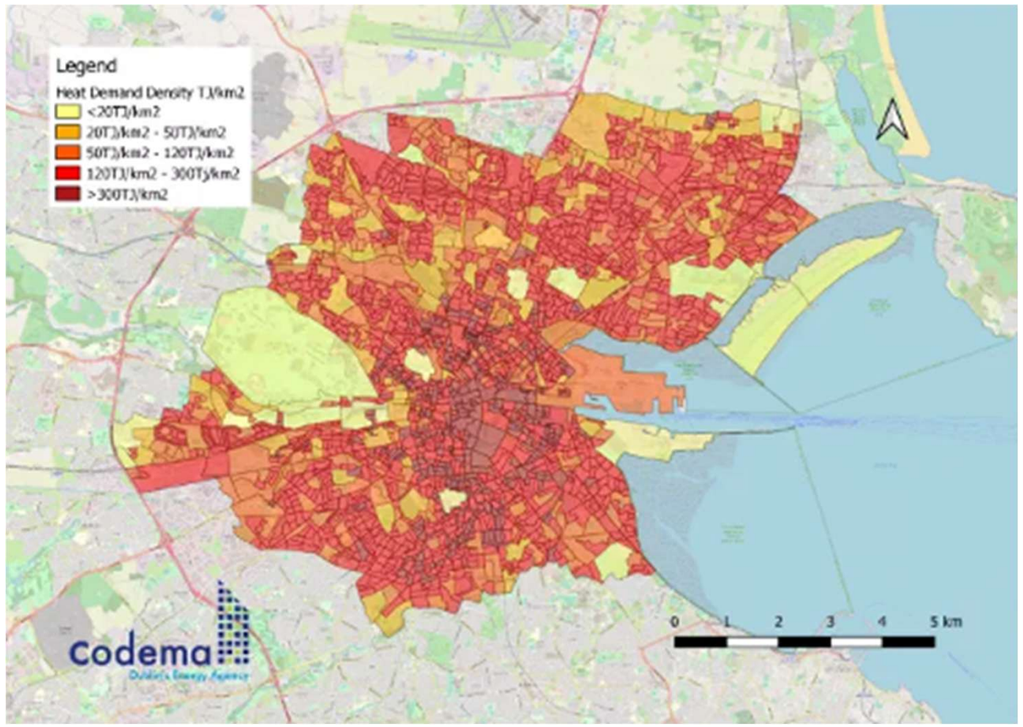
Context & Imperatives

- Dublin faced dual challenges: rapid industrial/tech expansion and deep decarbonisation.
- Smart Dublin initiatives align with Ireland's Hydrogen Strategy and Climate Action Plan.
- Industrial/Tech hubs demand 24/7 power reliability.
- Urban services need sustainable energy for transport, health, and digital infrastructure.
- Infrastructure stress demands integrated planning.



Strategic Energy System Overview

Dublin’s energy architecture combines renewables, batteries, hydrogen, firm capacity, and smart grids to deliver flexibility and resilience.

- Renewables: offshore wind, solar, geothermal.
- Storage: battery + hydrogen.
- Grid: smart, digital, interconnected.
- Demand: industry, buildings, transport integration.

Strategic Framework for Dublin

- Five pillars underpin Dublin’s transition:

- A. Supply – Expand renewables, district heat.
- B. Storage – Hydrogen + battery.
- C. Grid – Digital, flexible backbone.
- D. Demand – Smart integration for citizens & industry.
- E. Governance – Finance, policy, partnerships.

Smart Energy Transition Roadmap 2020–2050

Three phases guide Dublin’s transition:

- 2020–2026: EV, smart metering, hydrogen pilots.
- 2026–2032: Offshore wind, battery & district heating.
- 2032–2050: Full smart grid, hydrogen mainstreamed, net-zero city.

Energy Corridors & Pilot Districts

Pilot energy zones in Dublin illustrate integration:

Docklands / Smart D8: Smart energy districts.

Grange Castle: Data centre energy hub.

Port Area: Hydrogen logistics.

City Centre: District heating networks.

Industrial Integration – Data Centres & Tech Hubs

- Data centres anchor renewables and storage.
- Renewable PPAs ensure green supply.
- On-site battery buffers grid load.
- Hydrogen for flexible backup.
- Transparent ESG certification of energy use.

Citizen Services Integration

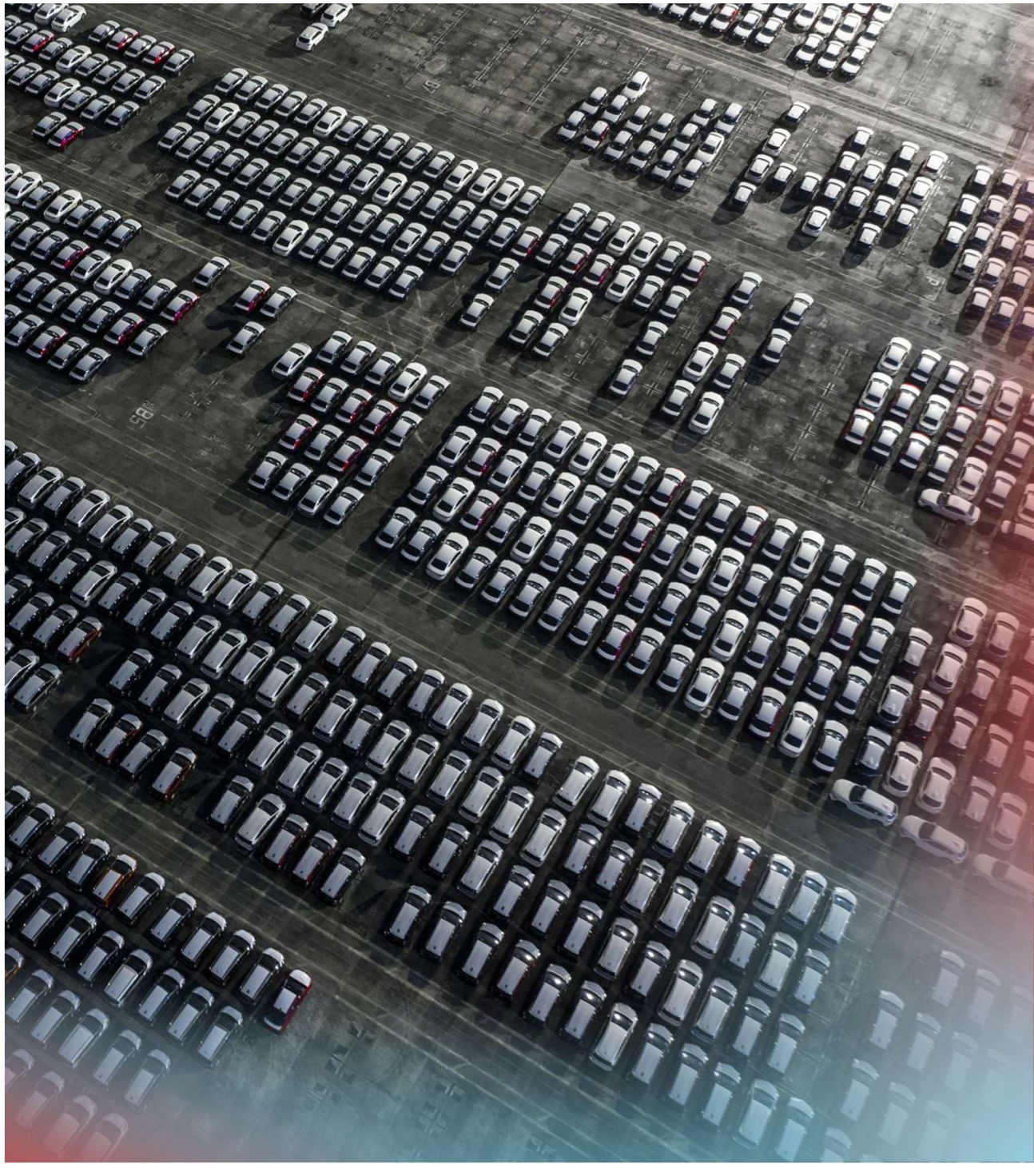
Smart energy enhances quality of life:

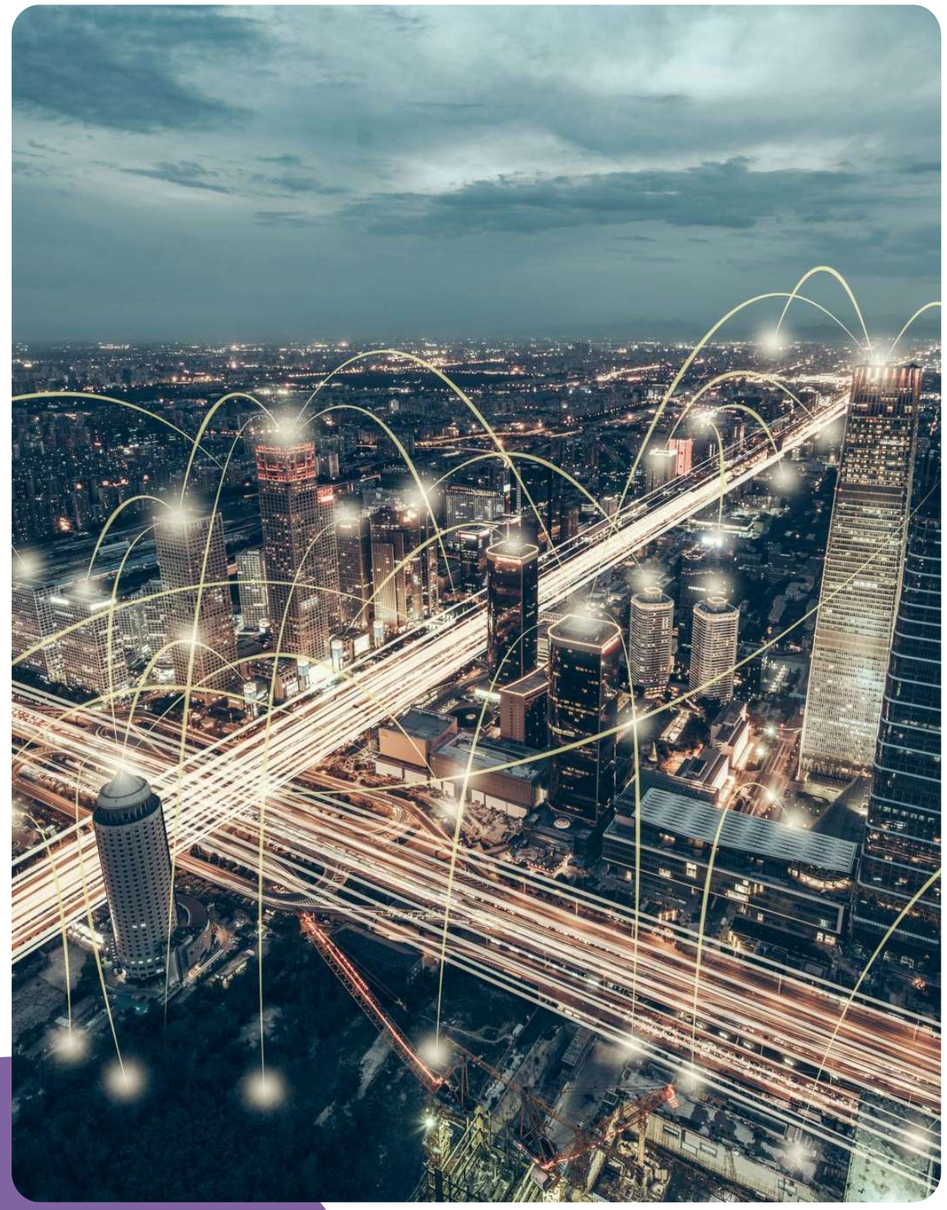
- EVs powered by renewables.
- Smart buildings and district heating.
- Public sector energy efficiency (25%+ cuts).
- Inclusive and equitable energy transition.

Governance, Financing & Partnerships

Multi-stakeholder governance drives success:

- Dublin Energy Transition Partnership.
- Green investment vehicle for storage & heating.
- Public-private collaboration for PPAs.
- Leverage EU/EIB funding mechanisms.





Risks & Enablers

Risks:

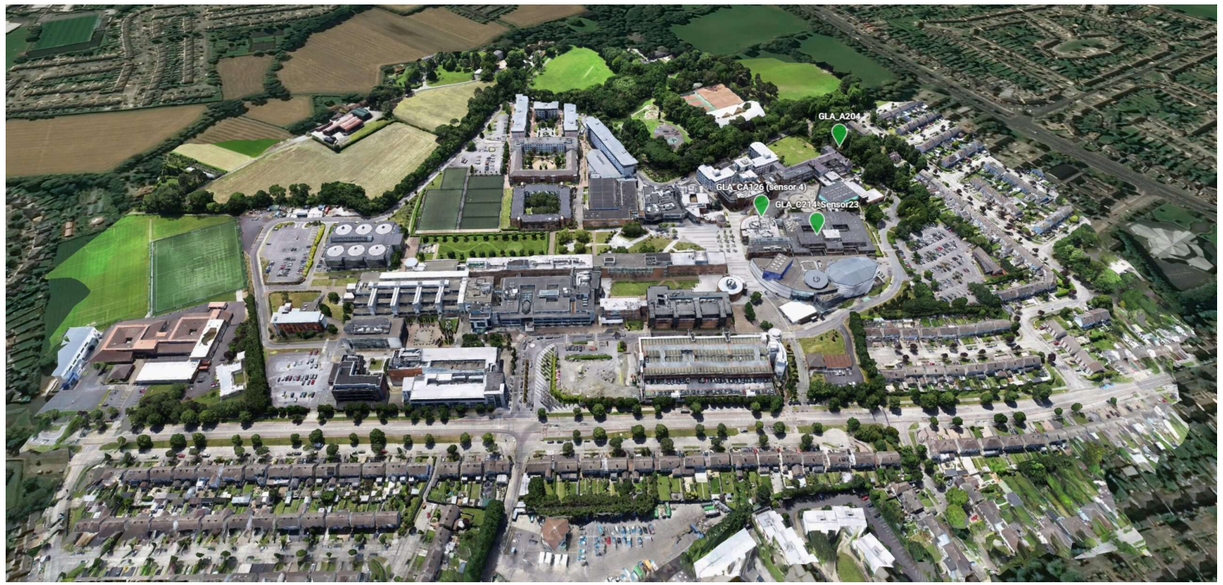
- Grid congestion, policy delays, capital cost.
- Coordination challenges.
- Public acceptance.

Enablers:

- National policy momentum.
- Smart city governance.
- EU funding & industry collaboration.

Key Metrics Dashboard (to 2050)

- % Renewable Power: 45%→100%
- Battery Capacity: 150→2000 MWh
- Hydrogen Production: 0.1→50 kt/y
- EV Penetration: 15%→100%
- Carbon Intensity: 250→0 gCO_2/kWh.



Vision 2050 – Dublin as a Smart Energy Capital

Dublin will become a model for Europe — integrating data, energy, and governance.

- 100% renewable supply.
- Fully integrated hydrogen and smart grid systems.
- Net-zero, digitally governed, resilient city.

Next Steps (2025–2028 Action Agenda)

MAP INDUSTRIAL ENERGY DEMAND.

LAUNCH DUBLIN ENERGY CORRIDOR PILOT.

DEVELOP HYDROGEN CLUSTER.

ROLLOUT SMART GRID INVESTMENTS.

CREATE FINANCING AND PPA FRAMEWORKS.

ESTABLISH CITY-REGION GOVERNANCE BODY.

PUBLISH ANNUAL PROGRESS DASHBOARD.