



Digital twins for urban intelligence: Computational Urban Sustainability Platform (CUSP)

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Re-think and pave the way to a built environment adapted to the challenges of the



Adopt a multi-disciplinary and multi-faceted approach underpinned by people, processes, and technology.

**WE MAKE A DIFFERENCE
ON A GLOBAL BASIS**

Together we can make your business more prosperous, your people safer, your property more secure and your operations more sustainable.



Impact of our Built Environment

- The population of cities is predicted to grow to **68% by 2050**.
- **Cities** are currently responsible for **75% of global energy consumption and greenhouse gas (GHG) emissions**, with over **40% of total energy consumption attributed to buildings**.
- The **building sector** is recognized as a key consumer of **natural resources**, also responsible for producing **22% of European waste**.
- New international climate agreement (**Paris COP21**), applicable to all countries, aiming to **keep global warming below 2°C**.
- Buildings are **long-lived assets**, and often have quite **high-operational costs**
 - the cost of maintenance over a building's lifetime can equate up to **3 times** the original construction cost.
 - the costs of the operation can equate up to **35 times** the build cost.



PARIS2015
BY QUALITY CONCRETE CRYPTECH
COP21-CMP11

Lower costs

33%

reduction in the initial cost of construction and the whole life cost of built assets

Faster delivery

50%

reduction in the overall time, from inception to completion, for newbuild and refurbished assets

Lower emissions

50%

reduction in greenhouse gas emissions in the built environment

Improvement in exports

50%

reduction in the trade gap between total exports and total imports for construction products and materials

The Global Construction Market is expected to grow by **over 70% by 2025....**

Smart Cities domain

6,122,475 kWh

1,824,710 KWH IN ELECTRICITY
4,297,764 KWH IN GAS

Average 9,110 kWh
per hour

2,398,441 kg
Carbon impact

1,289,489 KG FOR ELECTRICITY
1,108,951 KG FOR GAS

474,187

POPULATION

Energy



Waste



Transport



People



Water



Place

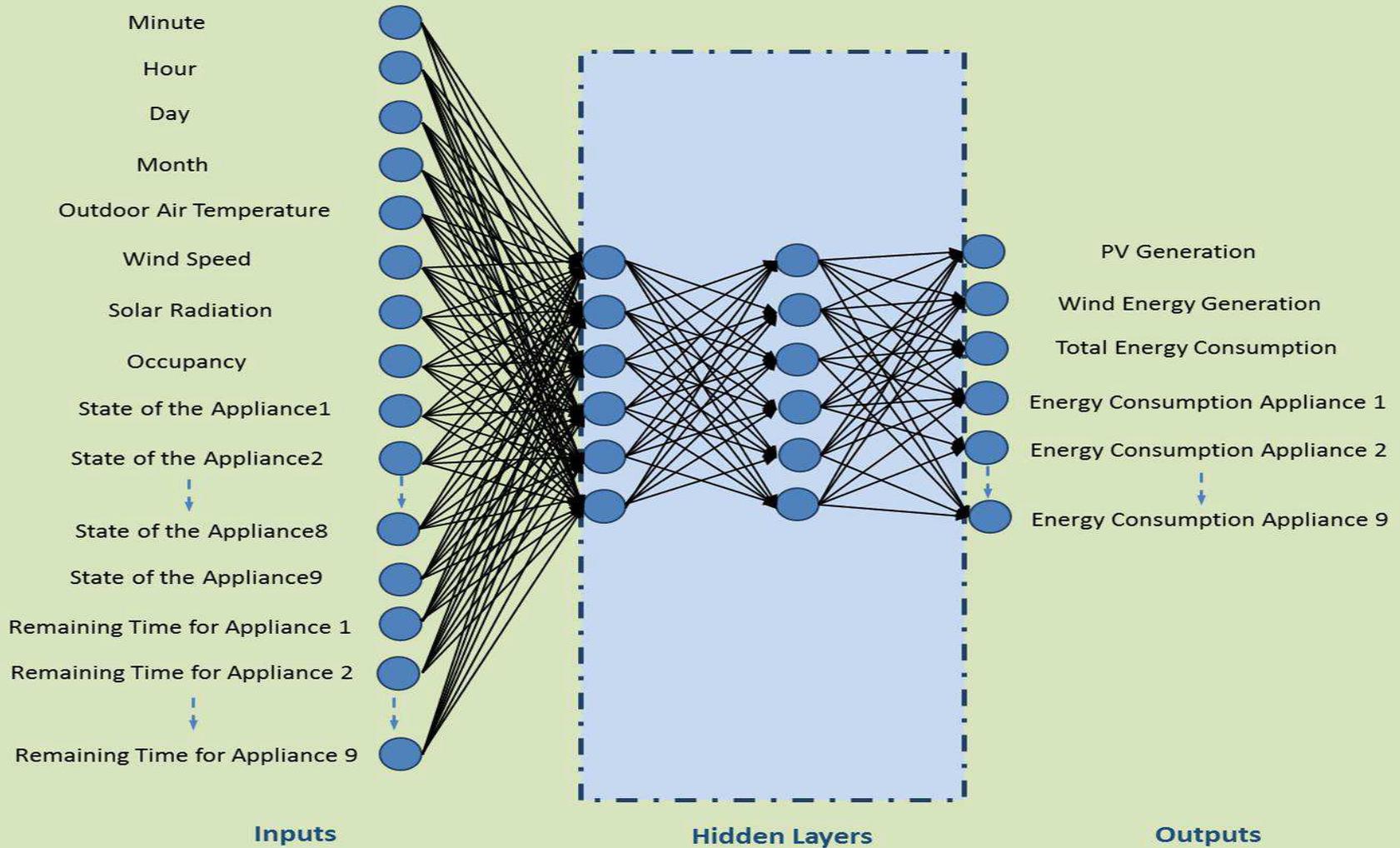


CUSP

- CUSP (Computational Urban simulation Platform) is a middleware system capable of interpreting (near) real-time data originating from a wide range of sensing nodes at a Zone, Building, Block of Buildings, or District level, to deliver performance accounts informed by optimisation models.

www.cusplatform.com

Optimization



INPUTS

Weather factors

- Outdoor temperature
- Wind speed
- Wind direction
- Solar radiation

Production factors

- Quantity energy produced

Consumption factors

- Ice-flake consumption
- Cold room consumption
- Box-washer consumption
- Lighting consumption

Price factors

- Price tariff

Demand factors

- Quantity to process
- Fishers arrival time

Time factors

- Time of the day

OUTPUTS

Total energy production

- Production per building

Total energy consumption

- Consumption per appliance

Total CO2 emissions

Optimum appliance schedule

Optimum appliance set point



DECISSION

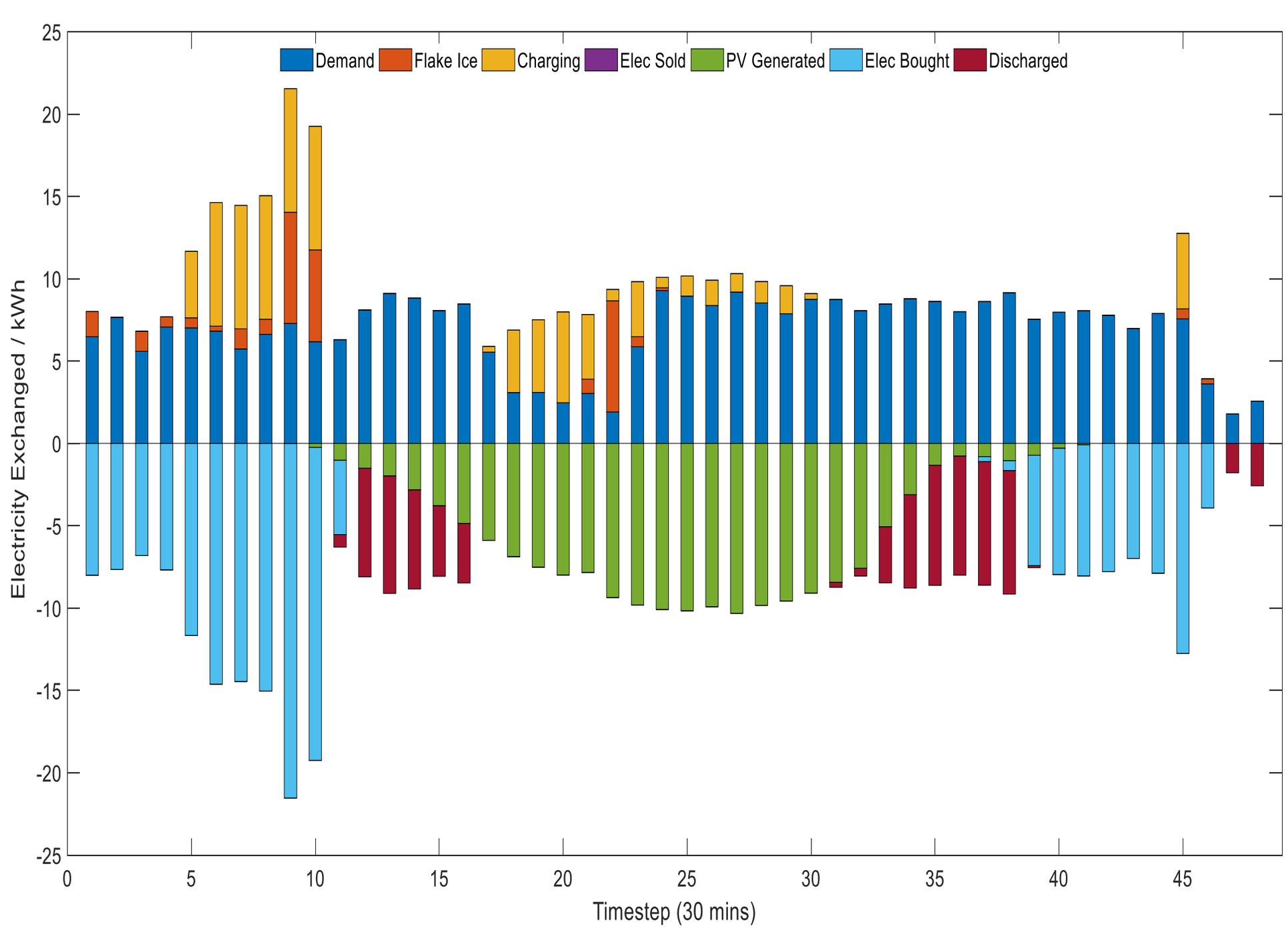
STORE

USE

SELL

BUY

SCHEDULE



2. Cardiff City



THE WAY FORWARD TO A ONE PLANET CITY!

One Planet Try our platform!



 831870 kWh

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POPULATION



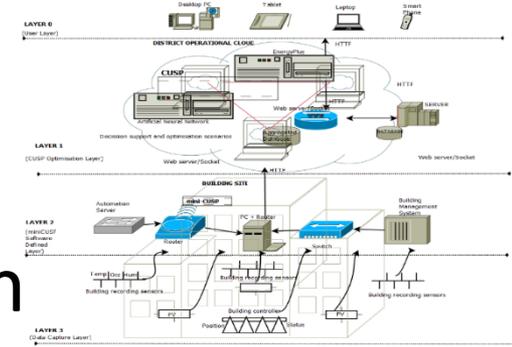
Cardiff City

- Energy usage and carbon emissions
- Water and Gas
- Traffic
- Pollution
- Noise

Summary and future

CUSP : a semantic driven optimization

- Buildings, districts, cities
- Semantics driven intelligence
- Trends, Environment, Economics, Efficiency, Optimization
- Net zero targets and urban intelligence



Overall objectives: To reduce energy consumption with sizeable carbon emission reductions

THANK YOU FOR LISTENING



Cusp

The way forward to a one planet city



Scan me



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www.cuspplatform.com