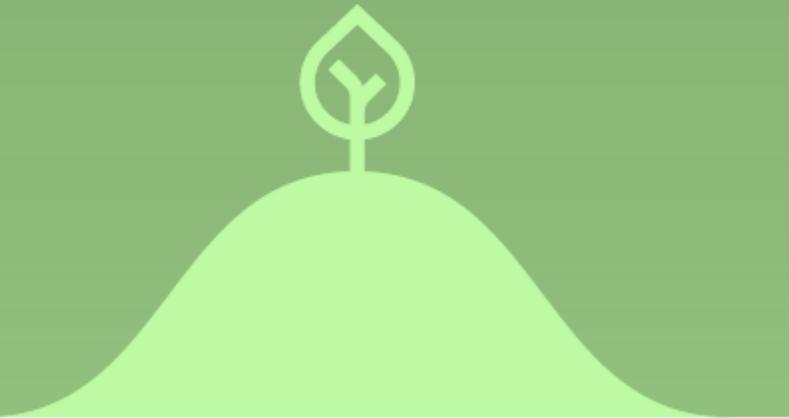


Innovation in Local Government

Oxfordshire's approach

Llewelyn Morgan - Head of Innovation Oxfordshire County Council



And we may ask ourselves, “Well..... how did we get here?”

Oxford University, the most prolific University innovator in Europe, the City and County is a vibrant centre of innovation.

One of the fastest growing Places in the UK, though, brings its own challenges.

In 2015 OCC, City and Oxford’s Universities set up Smart Oxford with partners and initiated significant developments to address our societal challenges in key areas like:

- Transportation and Smart Cities
- Health and Wellness
- Environment

So it's our regional innovation strategy to prioritise embedding innovations in the “Place” - a test-bed for innovation that can be shared with the broader world.

It started with learning from R&D Feasibility on mobility and embedding into OCC Policy; Science Transit Strategy

Innovation in Transport

- Creating an ecosystem of innovation
- Oxfordshire Living Laboratory

Intelligent mobility

- Optimised movement of people irrespective of mode

Key infrastructure Improvement

- Improve connections between key locations along the knowledge spine

Key route & service enhancement

- Improve connections between key locations along the knowledge spine

Multiple lead deliverers and project partners – consortium approach to project delivery and funding

Transport Impact In Oxford

Transport
Responsible
for 27% CO2 in
UK
Est. 17%
Oxford

45000+
Cars into
Oxford in
peak hrs

40% trips through
traffic

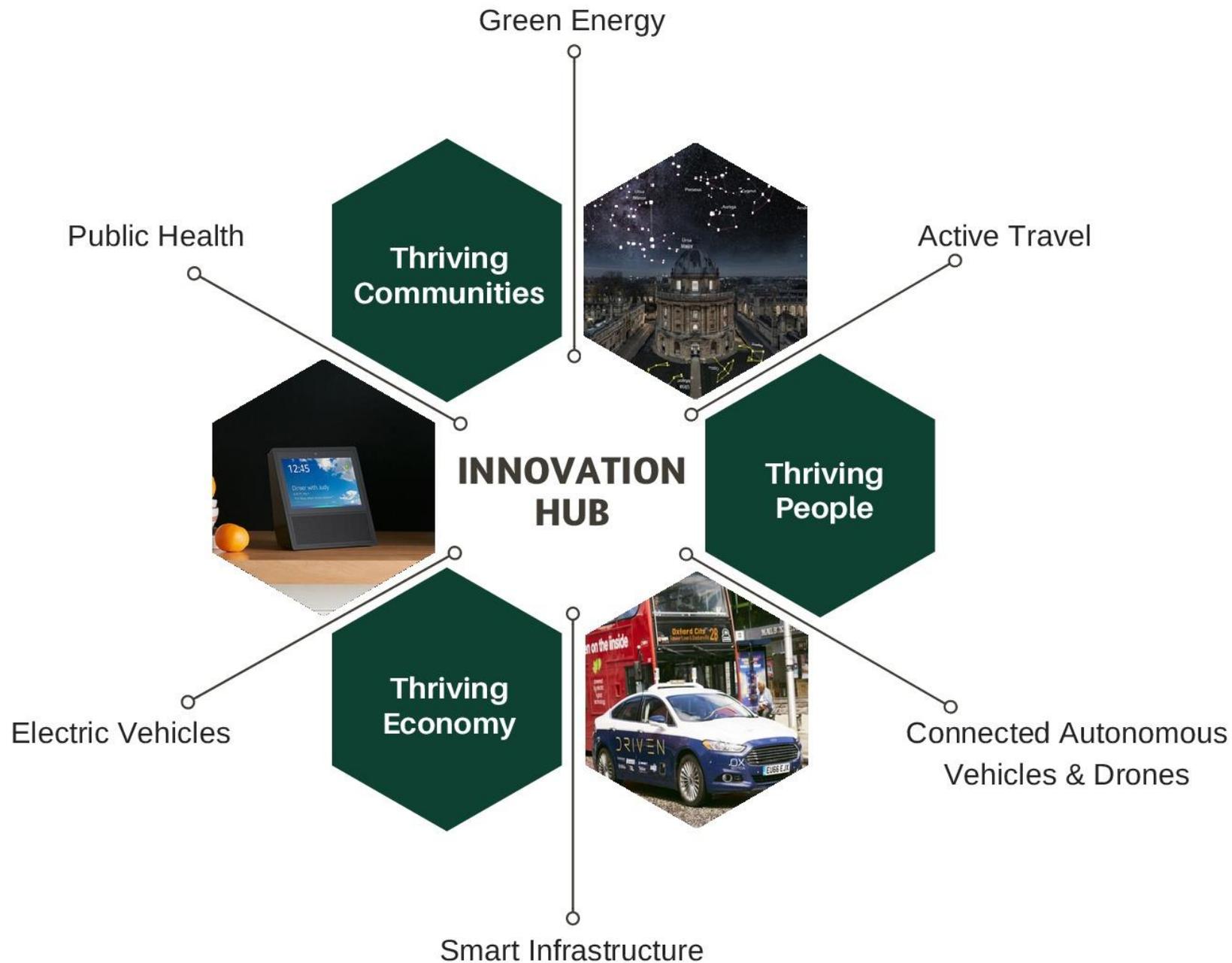
2nd highest level of
Cycling in UK

These challenges have led to a major policy direction

UK's first ZEZ phase 1 starts later this year

Work Place Parking levy

Focused investment into Cycling, Walking and Public Transport Infrastructure



Connected Autonomous Vehicles



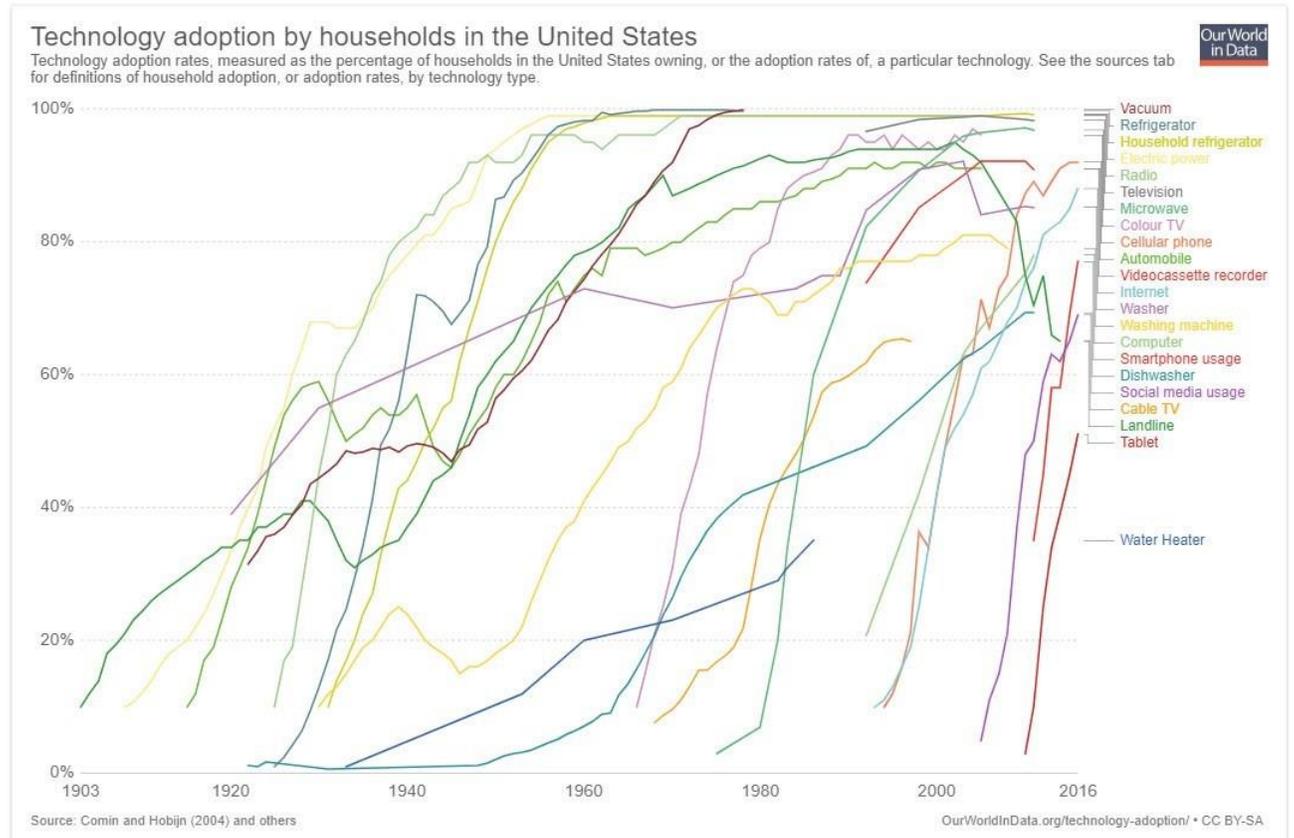
- Trials
- Standards
- Planning
- Communications
- Network Management
- Infrastructure
- Simulation/Modelling
- Education
- Strategy & Policy
- Drones

cav@Oxfordshire.gov.uk

Oxfordshire County Council
New Road, Oxford, OX11ND

Why are Local Authorities essential

Multiple Timescales



NEVFMA – AQ/RT Network Management project

INPUT DATA

EarthSense



- Zephyr AQ sensors on OCC fleet vehicles
- Zephyr AQ sensors on roadside infrastructure
- Data analysis and comparison vehicle vs roadside

OXFORDSHIRE COUNTY COUNCIL



- Local knowledge
- Highways authority
- Historical data provider
- Traffic management system owner

Siemen



- SCOOT data and ITS expert
- Adapt road infrastructure to Zephyr sensors
- cloud-connected edge module to link MOVA to SCOOT
- Adapt loops to provide count data

REAL-TIME TRAFFIC MANAGEMENT SYSTEM

aimsun.live

Data Manager

Recurrent data feeds for monitoring and visualisation

Historical Data → Traffic patterns
Pattern Statistics
Typical day OD matrices
Changes in supply, PT and signals

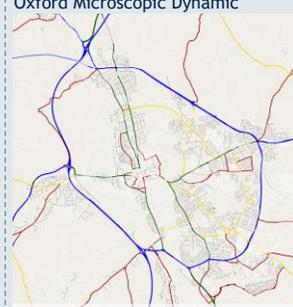
Air Quality predictions

Zephyr measurements

+ Traffic data → Air Quality prediction
+ Simulated outputs

Simulation platform

Oxford Microscopic Dynamic



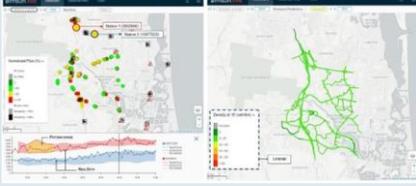
- Micro model
- Detailed infrastructure representation
- Dynamic model, lane based, individual generation of vehicles
- Scenario Manager for complex option testing

Real time SCOOT simulation
Quality manager
Simulation Storer

OUTPUTS

aimsun.live

Interactive VISUALISATION PLATFORM



MONITORING: current traffic and air quality conditions for the whole network

PREDICTIONS: short-term predictions of traffic and air quality conditions for the whole network

STRATEGIES: comparison of different scenarios to improve traffic and air quality conditions

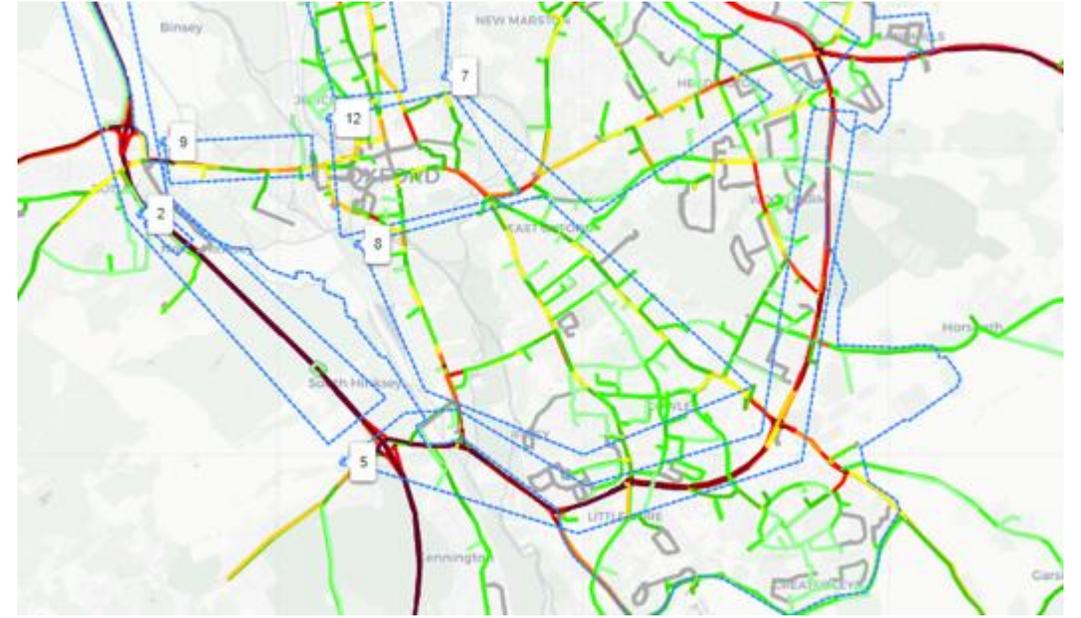
OBTENTION OF BEST STRATEGY FOR EACH SITUATION IN REAL-TIME

BBC Oxford, OCC Twitter

HE Traffic Management Centre

**OCC
UTMC
Centre**



Global KPIs

KPI	Evaluation	Value
Congestion Indicator	Simulated Prediction	16,960

Time Based KPIs

KPI	Evaluation	Value at 15	Value at 30	Value at 45	Value at 60
Global Fluidity	Simulated Prediction	22,560	24,250	28,950	27,570
Region 1: Oxford AQMA (Mean NO _x µg/m ³)	Simulated Prediction	58,000	56,000	53,000	51,000
Region 12: New zero emission zone (Mean NO _x µg/m ³)	Simulated Prediction	58,000	55,000	54,000	52,000
Region 13: A34 Highways England AOI (Mean NO _x µg/m ³)	Simulated Prediction	75,000	76,000	71,000	72,000
Region 2: A34 south of Botley AQMA (Mean NO _x µg/m ³)	Simulated Prediction	65,000	65,000	61,000	61,000
Region 3: A34 Eastern Bypass (Mean NO _x µg/m ³)	Simulated Prediction	65,000	64,000	61,000	60,000
Region 4: A40 Northern Bypass (Mean NO _x µg/m ³)	Simulated Prediction	62,000	60,000	56,000	54,000
Region 5: A4142 Southern Bypass (Mean NO _x µg/m ³)	Simulated Prediction	65,000	63,000	61,000	59,000
Region 6: A4144, A4165, (northern city centre) (Mean NO _x µg/m ³)	Simulated Prediction	58,000	55,000	53,000	51,000
Region 7: Headington Road, Marsdon Road (eastern city centre) (Mean NO _x µg/m ³)	Simulated Prediction	57,000	54,000	52,000	50,000
Region 8: Abingdon Road, Ifley Road (southern city centre) AQMA (Mean NO _x µg/m ³)	Simulated Prediction	57,000	55,000	53,000	50,000
Region 9: Botley Road, (eastern city centre) AQMA (Mean NO _x µg/m ³)	Simulated Prediction	59,000	57,000	55,000	53,000



Summary of deployment

Traffic Model

- based on 2019/20 (pre COVID-19)
- Demand covers 24h 7 days a week
- 10 different day profile types, including a COVID-19 profile

ITS

- 179 continually monitored vehicle flow locations via 3 key providers
- Live VMS feed
- Geographical data for signal control

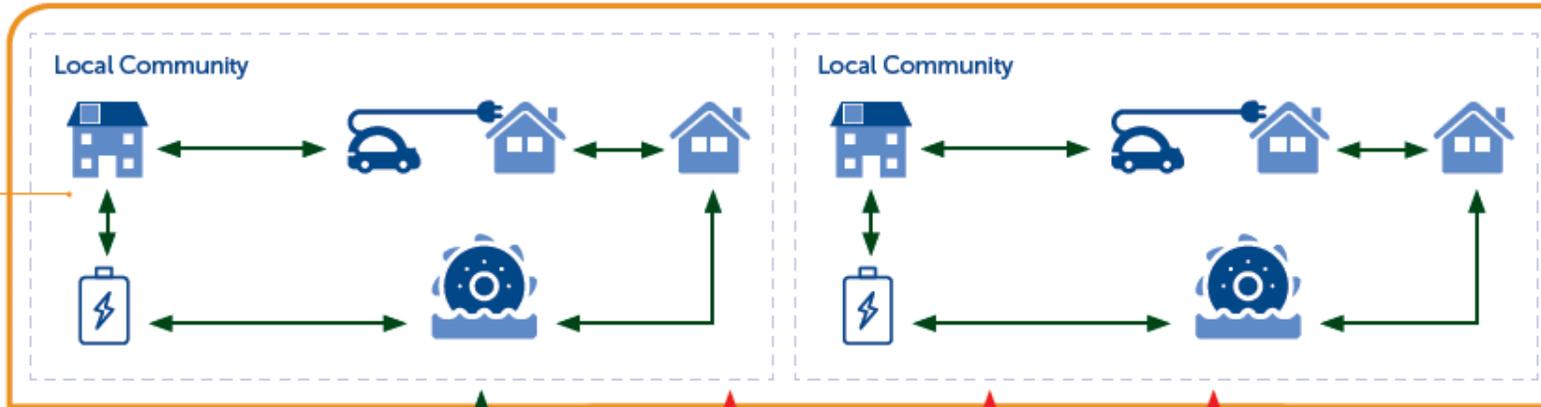
Air Quality

- Emission estimates available for CO₂ & NO₂
- NO₂ dispersion prediction and connectivity from EarthSense
- 18 freshly installed Zephyr AQ sensors

Real-time decision support:

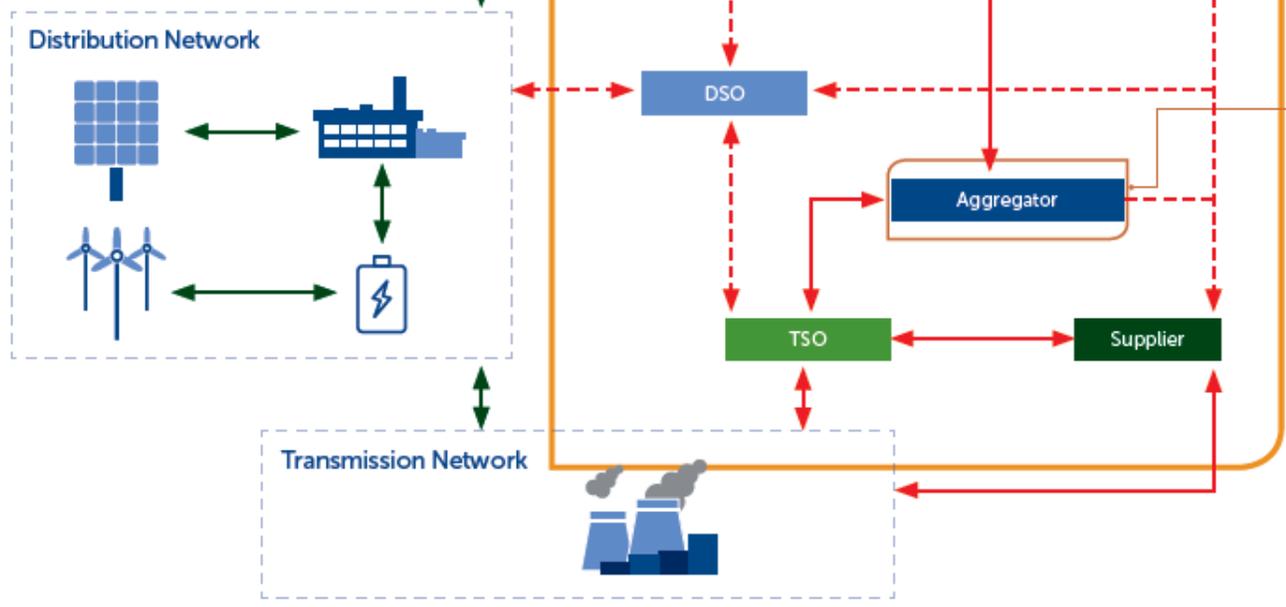
- 4 future (+15, +30, +45, +60min)
- simulated and analytical predictions available
- 3 response plans can be simultaneously compared

LEO enables local energy trading



LEO delivers a mature, quantified, and engaged supply of flexibility within a regional bound

Adapted from the SSEN
"Supporting a Smarter
Electricity System –
Our Transition to DSO" paper



LEO develops the interaction between marketplace operators

TRANSITION delivers the data exchange requirements and trading opportunities for a flexibility market.

Existing information flow
New information flow
Electricity flow

Our Solution

Design thinking approach – solution agnostic

- Starting point:
- natural
- sustainable
- off grid
- cost effective
- NOx and particulates

Beyond the obvious:

- sensors (AQ, humidity, soil...)
- power independent
- connected (LPWan)
- mobile

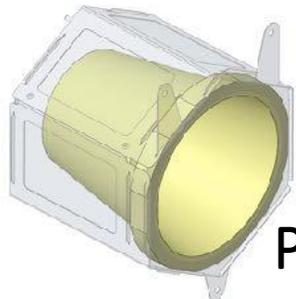
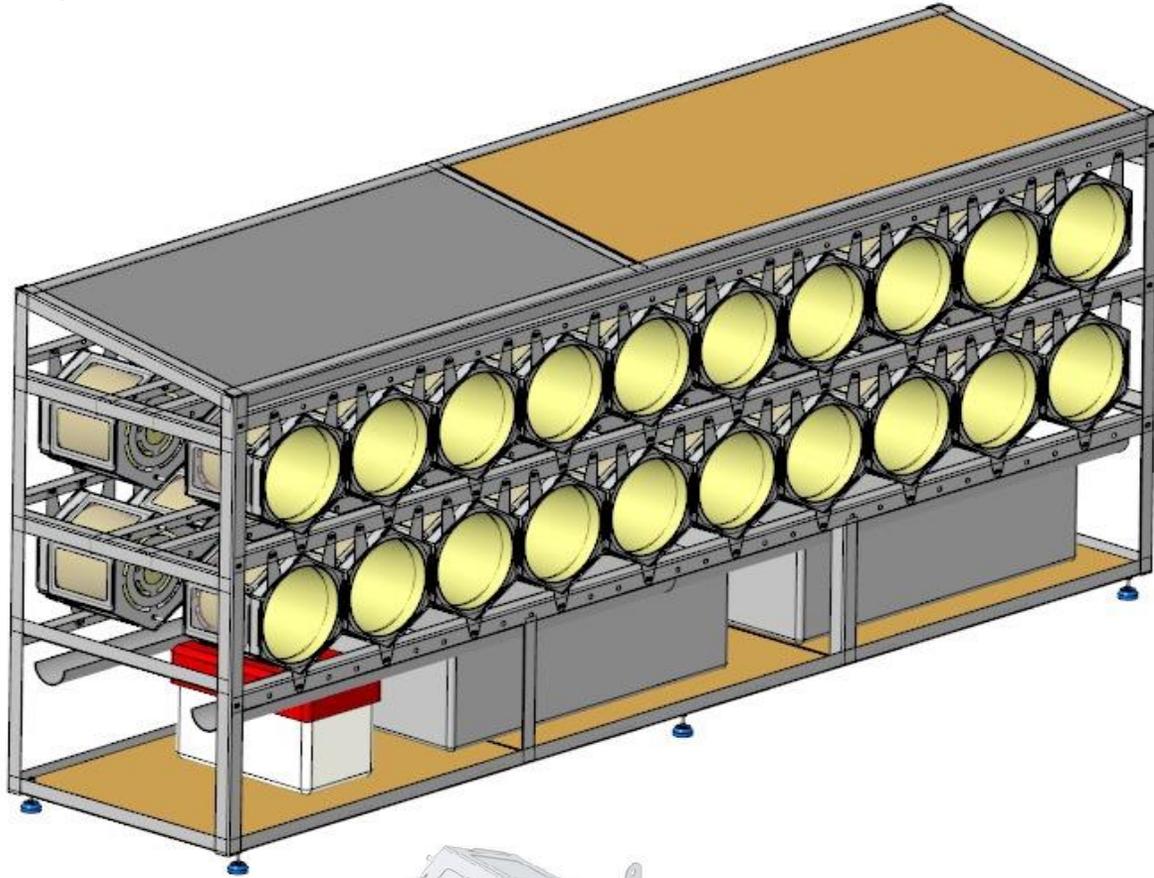
Moss...

36 out of 43 zones
have illegal levels of
air pollution

+
£54b pa UK economic cost (WHO)
Direct health & social care cost £5.3 billion by 2035

Moss Wall 1.0

12sqm for less than £3,000



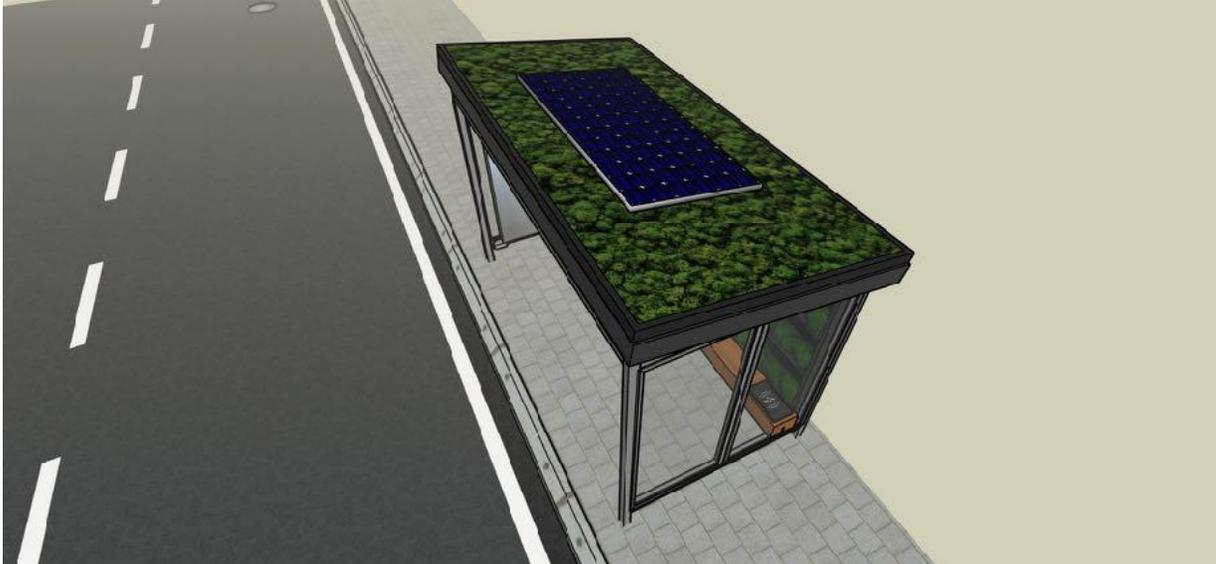
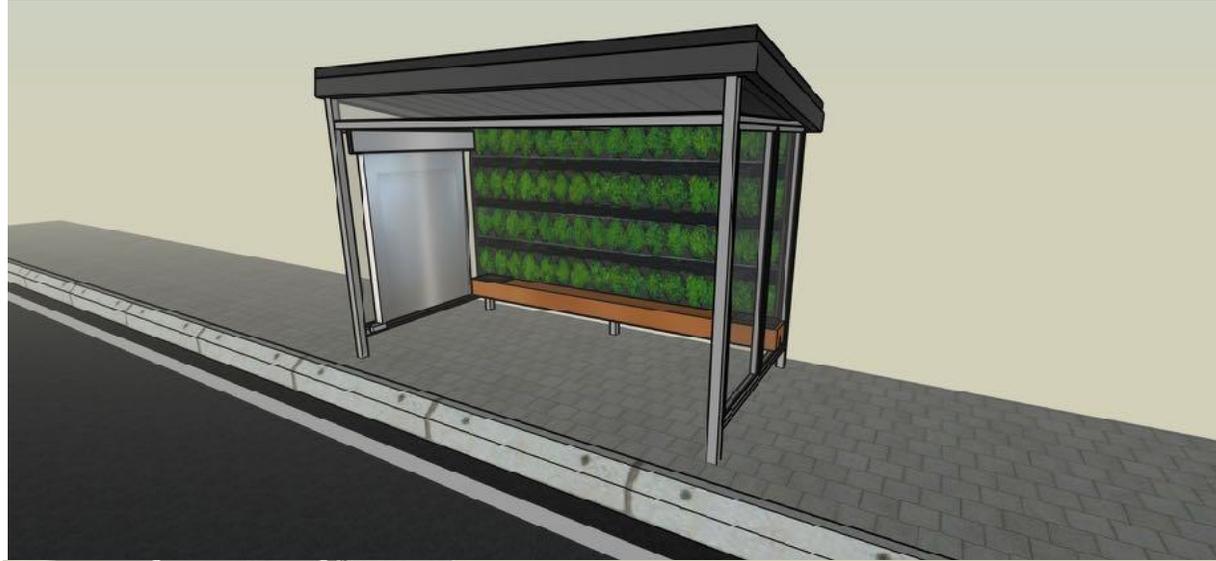
Pods

Removable

- Self Contained Structure
- Moss Life Support System integrated including Ph Sensors, Precipitation, H2O Saturation to ensure Moss integrity
- Reusable pods for holding the organic material
- Seeded Roof for Filtration
- IOT Sensors for Solar and Battery Life
- 120L water tank with Grey water collection
- All parts can be reused and repurposed
- Wall can be 'covered' to create street art / using organic and repurposed materials

Moss Stop 1.0

Modular Bus Stop



- Replace Back Section
- Replace Roof Section
- No Structural Changes or 'major works'
- Cedar Roof for Grey Water Collection
- Solar Powered / independent from Grid
- Wireless Phone Charging built into Seating Bench
- Water and Irrigation System in built in back wall
- IOT Sensors for maintenance / flush cycles / irrigation flow, 24/7 remotely
- Looking for initial Prototype Sites

Our Track Record

£135 million+
Revenues

60+
Projects

100s
Business & R&I
engaged

1
Local Authority



Get in touch; we are here to support others delivering innovation in public services

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Twitter: @llewelynmorgan

Connect on LinkedIn



**OXFORDSHIRE
COUNTY COUNCIL**