Smart cities/ Smart lighting

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Overview

- Smart cities are data cities
- Lamp posts. The secret weapon in the data collection crusade.
- Cases
- Standards

Smart cities are data cities

- From 'smart' to 'smarter'
- This means we need to be able to
  - Instrument to collect data
  - Analyse data to work better and deliver better services
  - Repurpose data
  - Data for cities, data for residents
  - Balance 'open', 'proprietary', 'closed' data
- Data revolutionises how cities work
  - From silos to shared
  - New business models
  - New operating models
  - New resource utilisation

Data used at different timescales

- Strategy (months-years)
- Planning (weeks-months)
- Management (days-weeks)
- Operations (seconds-minutes-days)

Data has different value at different times

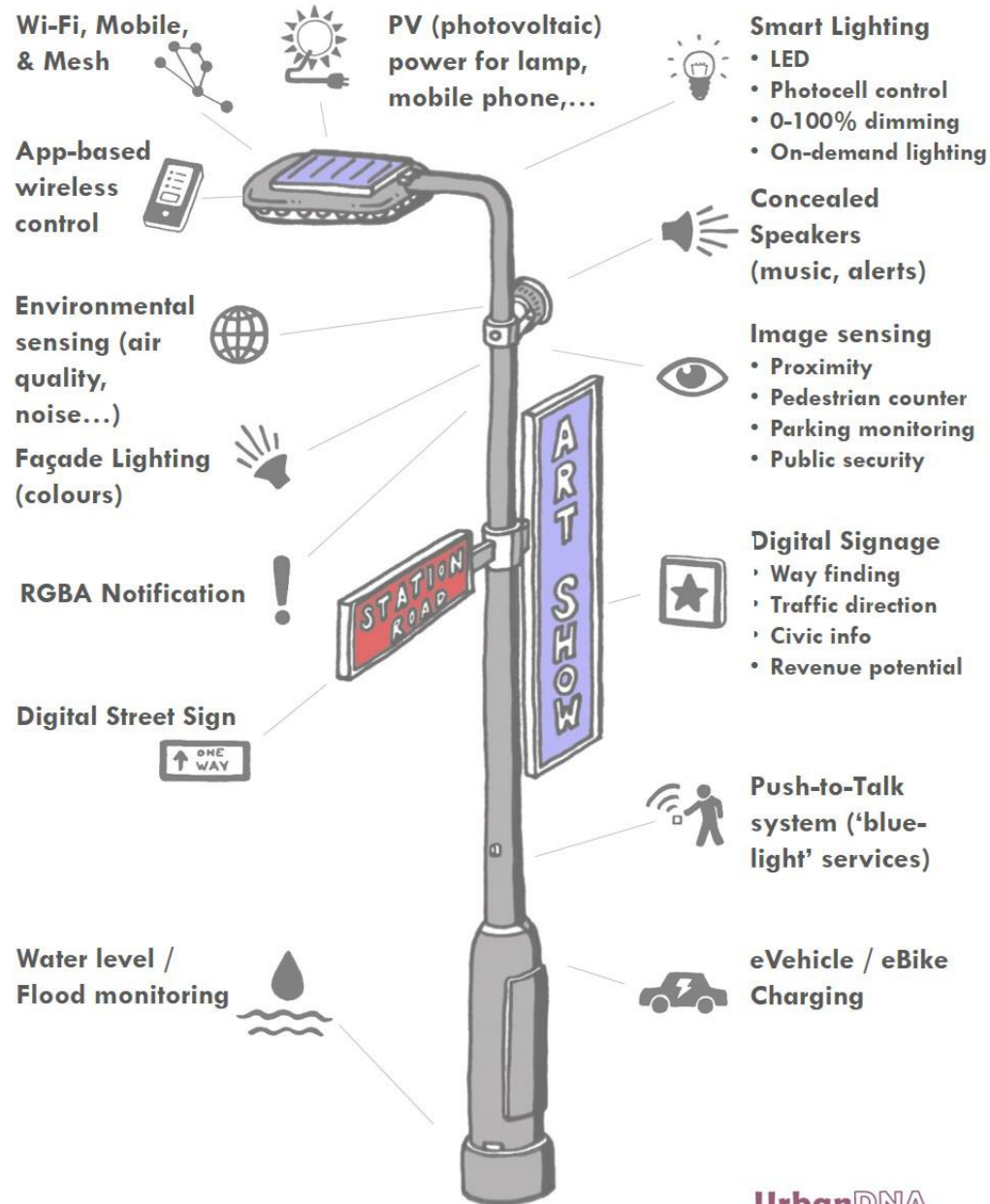- Consider traffic data that's 200ms old vs 10 minutes vs 3 hours.

Data used for different functions

- From routine through to emergency response

- Currently cities collect huge amount of data for specific purposes

- Data siloed, locked away

- Opening data collected for one purpose allows new opportunity
  - Eg from traffic light control to carbon reduction.

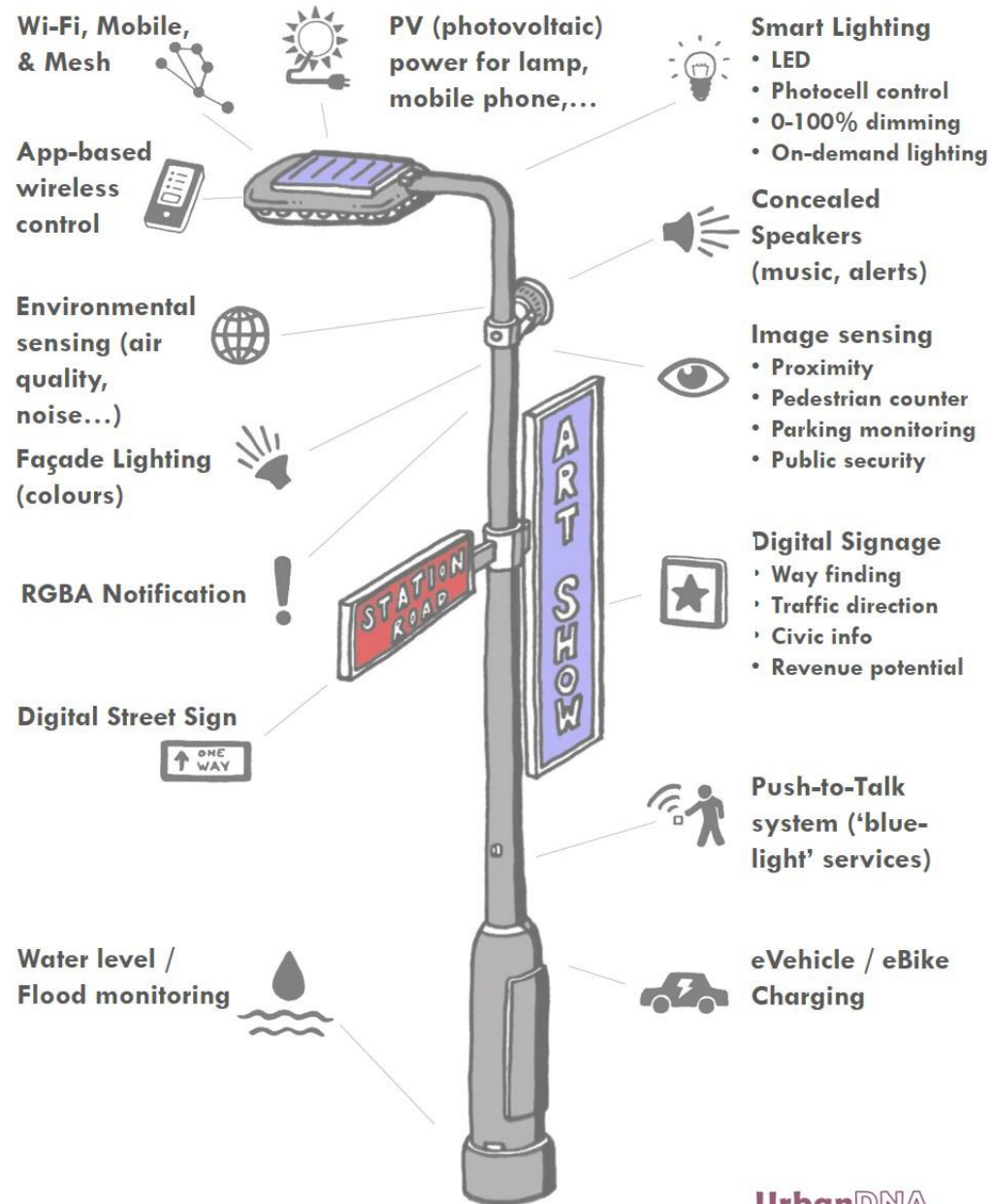# How to enhance data collection & improve 'city management'

The humble lamppost – the most valuable square foot of real estate in a city

The "Humble Lamppost"

Wi-Fi, Mobile, & Mesh

PV (photovoltaic) power for lamp, mobile phone,…

Smart Lighting
• LED
• Photocell control
• 0-100% dimming
• On-demand lighting

App-based wireless control

Concealed Speakers (music, alerts)

Environmental sensing (air quality, noise…)

Image sensing
• Proximity
• Pedestrian counter
• Parking monitoring
• Public security

Façade Lighting (colours)

RGBA Notification

Digital Signage
• Way finding
• Traffic direction
• Civic info
• Revenue potential

STATION ROAD

ART SHOW

Digital Street Sign

ONE WAY

Push-to-Talk system ('blue-light' services)

Water level / Flood monitoring

eVehicle / eBike Charging

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- Communications
  - Wifi
  - Mobile
  - Mesh
- Environment
  - Air quality
  - Noise
  - Water/flood
- Signage
  - Digital, dynamic
- Control
  - Lighting
    - On/off, dimming, colour, strobing, etc
  - Other aspects

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- 'Seeing' things
  - Image sensing
  - CCTV
  - Radars
  - Bluetooth
  - Proximity
  - Pedestrians
  - Traffic
  - Parking
- Emergency calls
- Status
  - Location
  - Health
- Remote management
- EV charging

2 observations

That's nice, but what's it for?

Everything comes from DATA and COMMUNICATIONS

Some ways the humble lamppost can make cities smarter

- All of these need sensing + data + communications + analytics
- Understand and leverage how people use space
  - Light bubbles, space tracking, heat maps, journey paths, …
- Tracking for security:
  - CCTV, radars, Bluetooth, …
- Adapting to context
  - Events, pollution levels, density of people/cars nearby
- Parking management
- Traffic congestion management
- Every Humble Lamppost a wifi base station

Cases

- Electric vehicle fleet management
- Environmental sensing
- Traffic sensing and management
  - Flow, congestion awareness
- People tracking (for tourism, not individuals)
- Public WiFi
- Adaptive lighting
- Parking management (sensors on poles or in luminaires)
- Asset management and failure prediction
- Infrastructure integration

Metering

- Shifting to 24hr power-to-the-pole and metering is critical
- Pole power usage becomes variable
- Luminaires potentially only a small part of pole power usage
- Need mechanisms to manage metering, EV charging, variable use
- Need to cope with potentially much larger power loads per pole

Standards!

- Very important to ensure scalability and interoperability.
- DIN (Germany) leading EU effort on Humble Lamppost standards spec.
- BSI now collaborating, Australia invited to join.
- Will need to cover both new poles and retrofits.

Conclusions