



From Smart Grid to Smart Cities

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An aerial perspective of a futuristic urban development. The scene features a mix of architectural styles: several tall, rectangular skyscrapers with glass facades in shades of green and blue; numerous smaller, multi-story buildings with textured, brownish-orange facades; and a few low-rise structures. The city is interspersed with lush green parks, tree-lined streets, and a prominent red running track with a green field in the upper left. A wide, multi-lane highway with a central divider runs along the bottom, with cars visible. A river or canal flows along the right side. The overall impression is one of a well-planned, integrated urban environment.

**Why
Smart Cities?**

**Smart Cities by
Connectivity**

**Smart Cities
by Design**

Smart Cities are the path forward

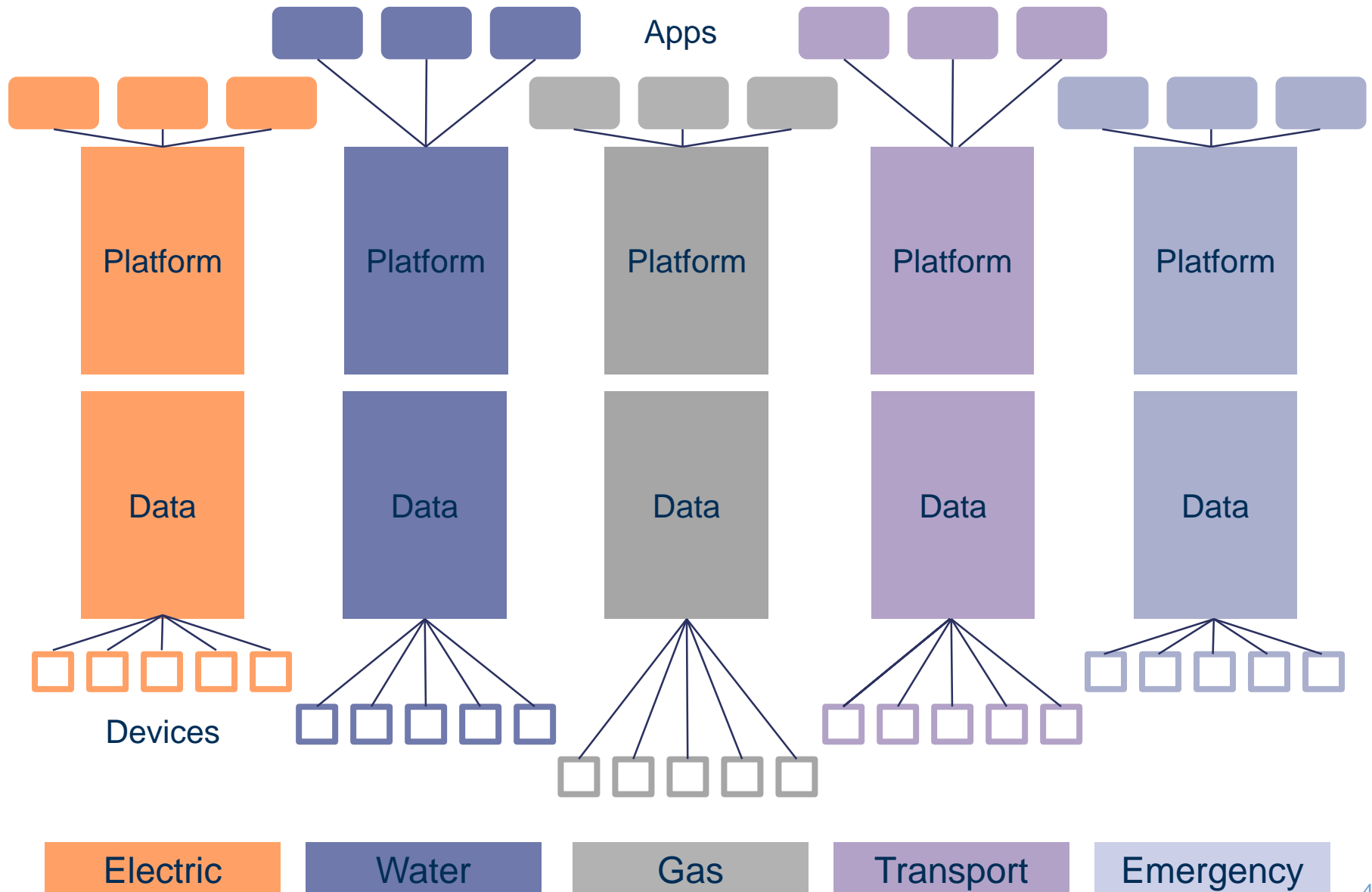
The Smart Grid
is an essential
early step

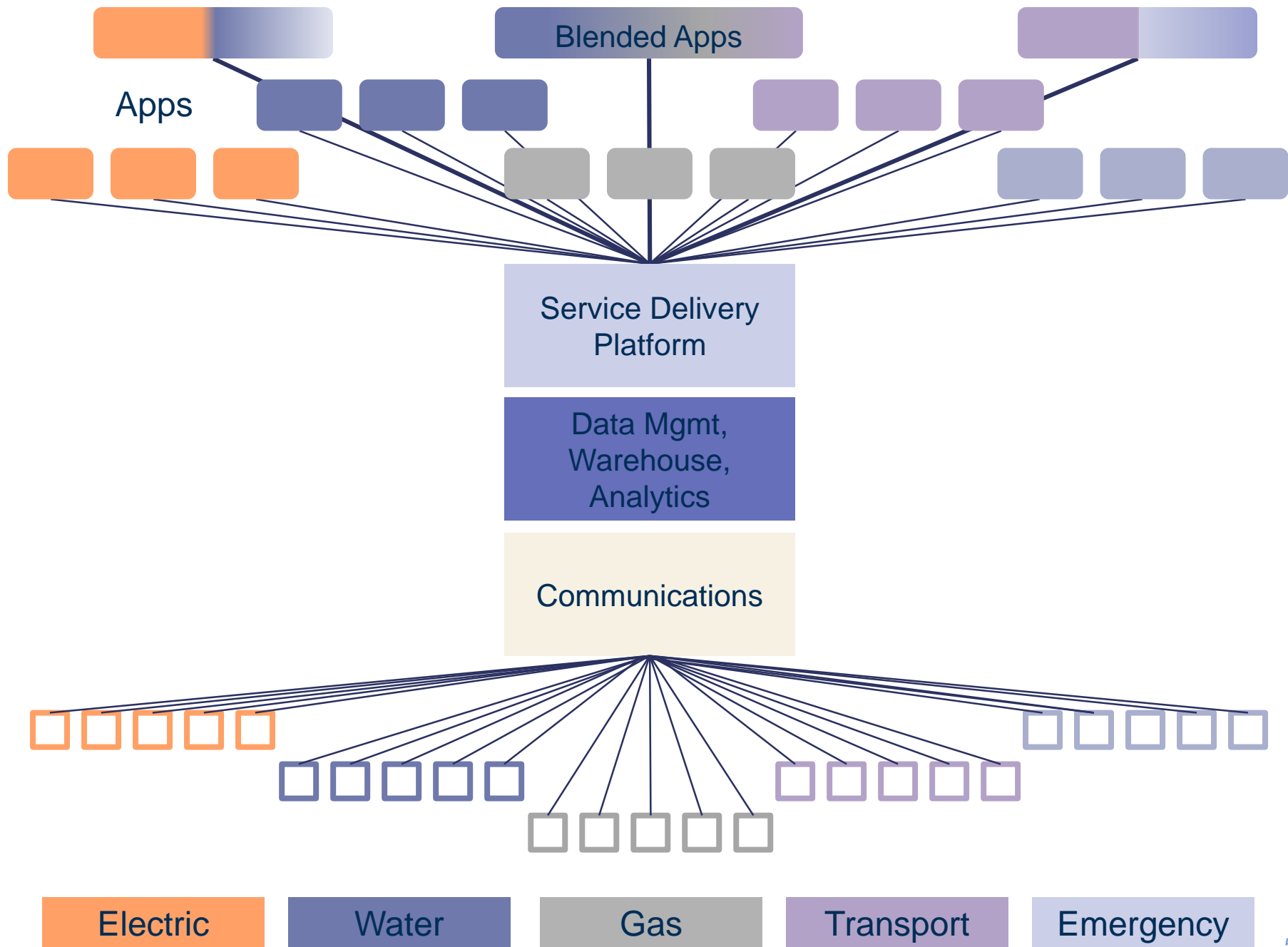
Embedded
sensors
and intelligence

Shared **digital**
infrastructure
(power, water, gas,
transport, etc.)

Shared **data**

Current applications live in “silos”





Smart Cities by Connectivity?

Collect

Communicate

Crunch

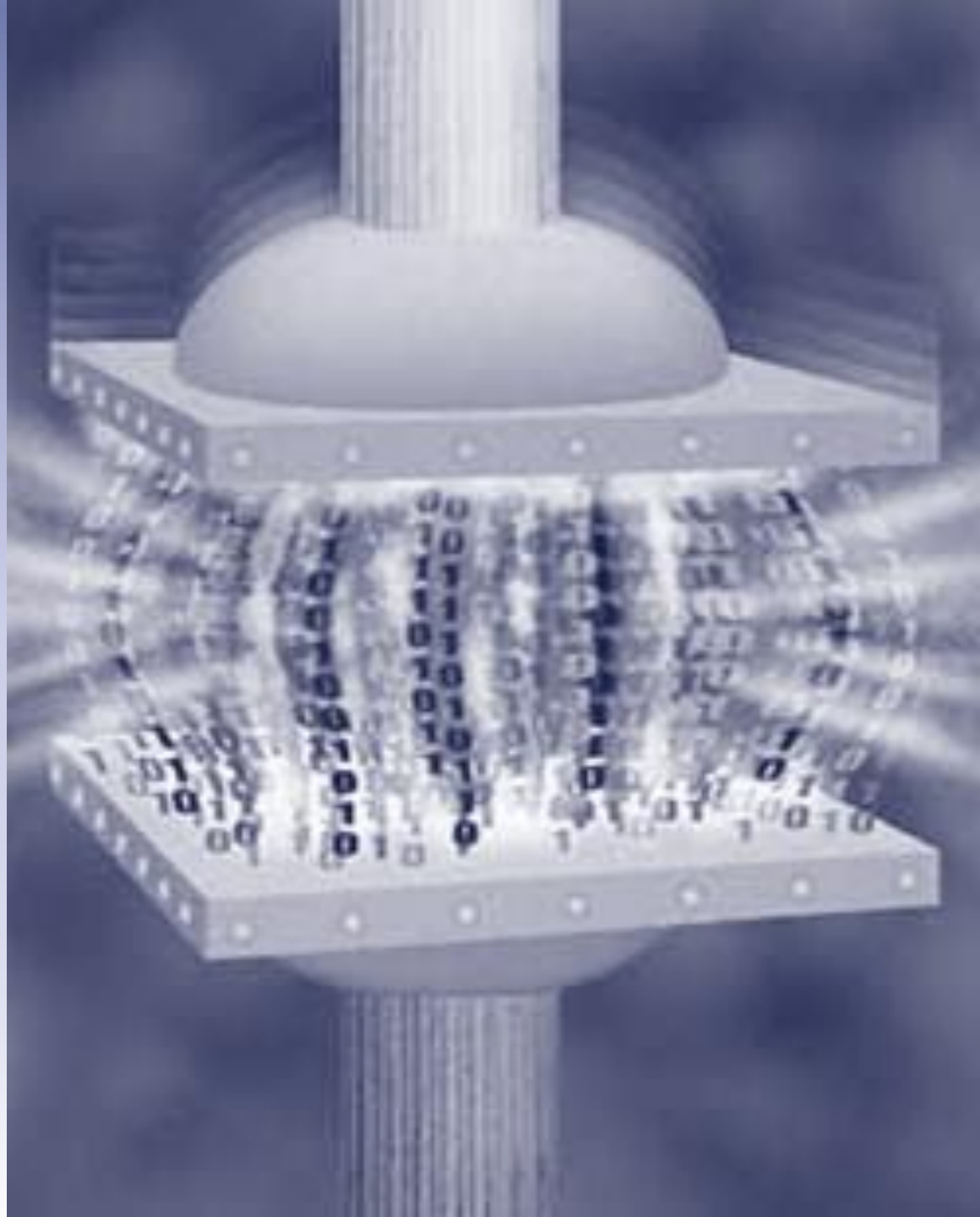


Then we
crunch
the data

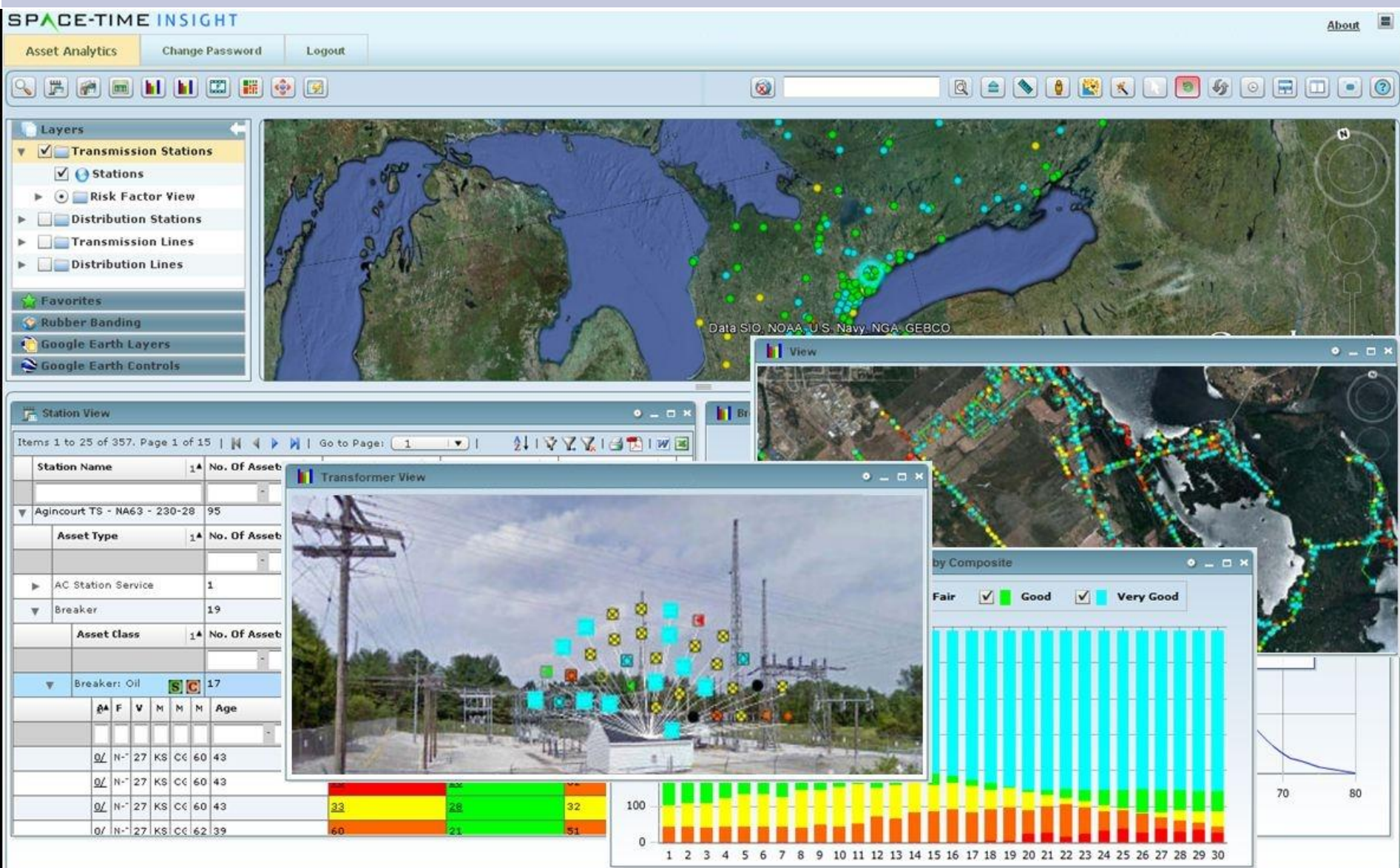
Present

Perfect

Predict



Present - Real-time situational awareness



Present: Rio control center integrates **30** depts



Perfect : Microsoft building management: 125 buildings, 58,000 employees (M\$ saved !)



Singapore: Predict congestion **before** it happens

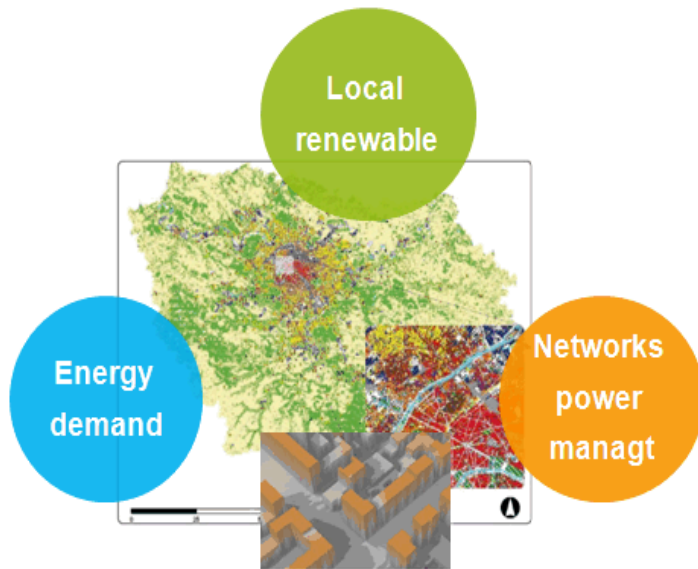


Memphis: Predicting crime = **30% drop**



Beyond ICT Technology improving operations: smartness from planning and design!

- Energy long term planning
 - local energy potential,
 - Energy demand - buildings, mobility
 - Energy Networks
- Solutions for low carbon and smart cities
 - Energy efficiency, eco-districts
 - Electric mobility
 - Smart grid to enable local renewable and demand response

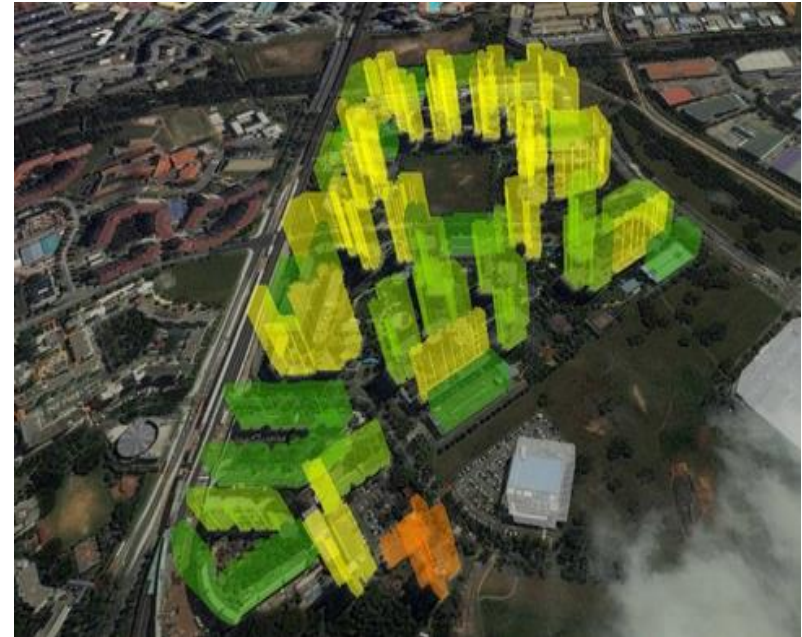
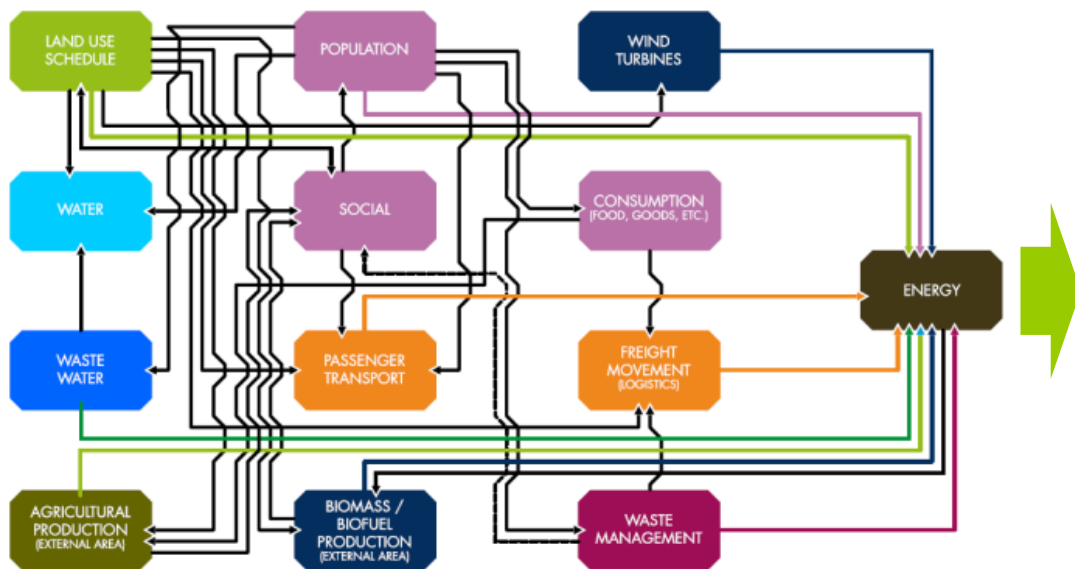


An integrated and systemic approach to better serve the citizens and improve cities' attractiveness and sustainability

How Energy and Urban Development are coupled?



Smart Energy planning: simulation to understand long term impact of today's decisions



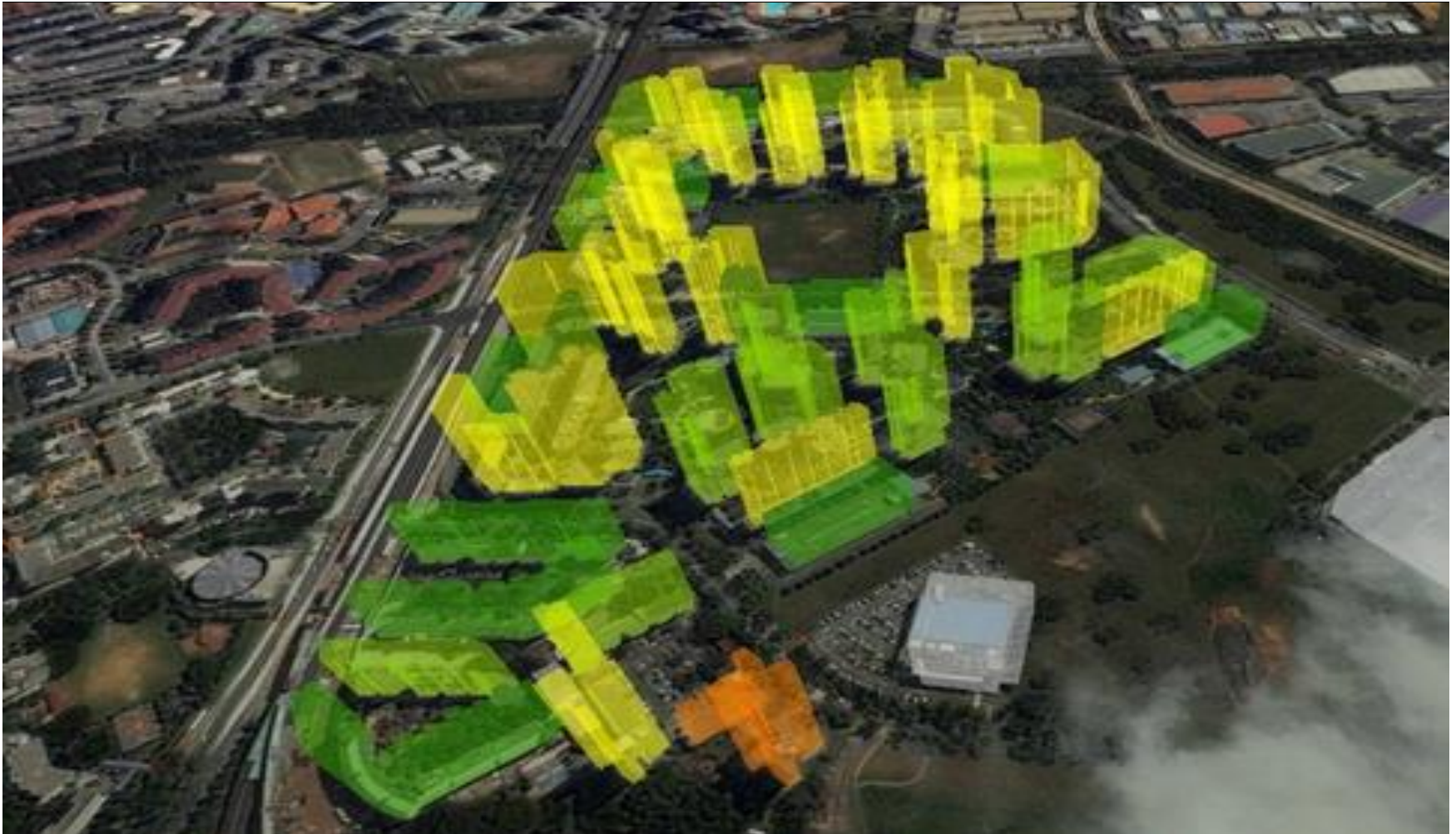
 **Singapore Government**
Integrity • Service • Excellence



Complex – system - modeling
Multi scale, Interactions, non deterministic
Persistent for the long term

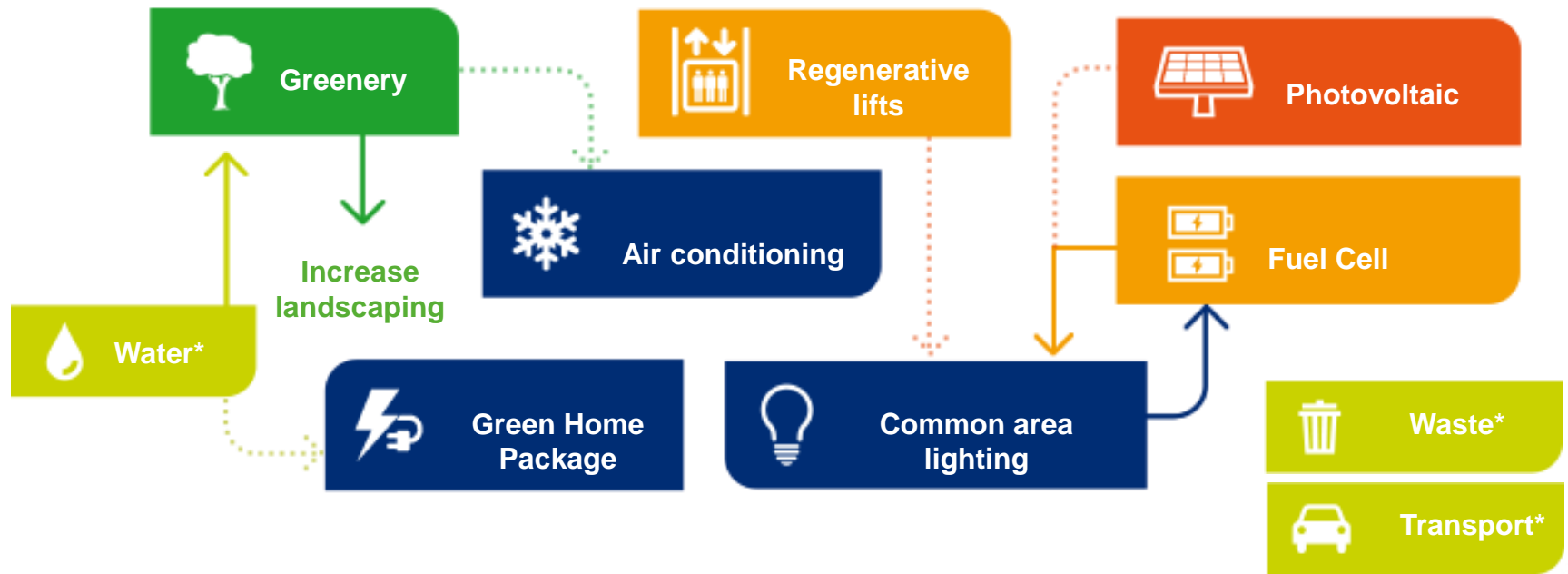
**3D intelligence for smart
actionable results**

Modeling & simulation to discover many counterintuitive clues!



**In this case: More MWh generated from PV installed
in fact on the less exposed buildings !**

Singapore – HDB Partnership: Urban Planning using Systemic approach



Singapore – HDB Partnership: Urban Planning using Systemic approach

ENERGY

Power
Heat
Fuel
+
Production

COST

Operation
Investment
Power Sold
Total

GHG

Emissions
Compensation

CITY BENCHMARK

Green Mark
Green Home
Package

Multidimensional Decision Support tool to optimize a Green Print

Singapore's "Housing & Development Board" (Yuhua-Jurong)



CONCLUSIONS

Cities can be designed and managed differently!

- ***Standards and interoperability***, taking a systems approach will help mastering the complexity and accelerate deployments
- The pervasive Information & Communication Technologies enable rapid ***development of “on line” intelligence to present, perfect, predict***
- The Smartness of a city resides also in its design taking into account ***long term planning from multiple viewpoints for sustainability***
- ***Understanding Human behavior, needs, aspirations, must be the driving force !***

standards = Smart Energy chromosomes

