

# Smart Facilities Management for Smart Cities



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# Smart Facilities Management for Smart Cities

## Agenda :

1. Introduction and current status
2. Definition of Smart Cities
3. The role of FM best practice into smart cities transformation
4. Way Forward
5. Q& A



## 1. Introduction and current status

### ***Why are cities our greatest challenge?***

- ***50% of the world population***
- ***5 million people move to cities every month***
- ***70% of carbon emissions***
- ***Increasing congestion***
- ***New York loses \$13 billion per year to traffic congestion***
- ***Aging infrastructure***
- ***Falling budgets***
- ***Vulnerable to climate change***
- ***Energy and Water Shortage***

Then (Rev.2001)



# 1. Introduction and current status

## ***Traditional Cities features***

- 1.Ad hoc and decentralized ( Planning)***
- 2. Cost saving aren't realized***
- 3.Limited potential for investment scalability***
- 4.Runs inefficiently (Infrastructure)***
- 5.Costs more money and resources to run***
- 6.Guess at infrastructure conditions ( System operators)***
- 7.React to problem***
- 8.Can't deploy efficiently to address problems***

Then (Rev.2001)



## 1. Introduction and current status

### ***How are cities our greatest opportunity***

- **75% of GDP**
- **Access to Jobs**
- **Innovation Hub**
- **Tokyo is the world's largest economy, ahead of India and Mexico**
- **Mobility and mass transit**
- **International travel Hubs**
- **Industrial and commercial Hubs**
- **Culture and Entertainment**
- **70% of global energy consumption**
- **Integrate energy consuming devices using LoT to respond to grid requirements- Grid friendly appliances**
- **“ The most significant shift in the earth's economic centre of gravity in history.”  
McKinsey & Company”**

Then (Rev.2011)





## 2. Smart City Definition ?

- **Forrester Research**—*use of computing to monitor infrastructure and improve services” The use of smart computing technologies to make the critical infrastructure components and services of a city. More intelligent , interconnected and efficient”*
- **US office of Scientific and Technical Information & stresses infrastructure,”** *a city that monitors and integrates conditions of all of its critical infrastructures- can better optimize its resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens”*

Then (Rev.2001)



## 2. Smart City Definition ?

***The Global Smart Cities Council*** defines a smart city as one that “ uses information and communications technology(ICT) to enhance its livability, workability and sustainability”.

Then (Rev.2001)





## 2. Smart City Definition ?

### ➤ *How Cities benefit from Technology Enablers?*

- Smart Policing ( 20% drop in crime)*
- Smart Traffic ( 20% drop in congestion/ Predictable Transportation)*
- Smart Water ( 30% drop in Lost Water)*
- Digital government (Spend less to make citizen happier and employee more efficient)*
- Smart Buildings ( 10%-20% drop in energy use)*
- Smart Grid ( Renewables and distributed generation)*
- Smart Payments*
- Open Data ( Citizens and entrepreneurs invent improvement)*



## 2. Smart City Definition ?

### ➤ **What are the barriers to Smart Cities?**

- ❖ *Complexity “ Multiple Departments, stakeholders, process”*
- ❖ *Leadership “ Elected official/business leader needed to champion smart city vision”*
- ❖ *Finance “ shrinking tax revenues, budget cuts, austerity measures”*
- ❖ *Business “ Integrated services across departments, single citizen portal”*
- ❖ *Technology “ Public-private partnerships in infusing ICT*



➤ **Smart Cities Indicators and Metrics**  
**ISO 37120 Theme: Energy**

❑ **Core Indicators**

- ✓ **Total Residential electrical use per Capita (kWh/year)**
- ✓ **% of city population with authorized electrical services**
- ✓ **Energy consumption of public buildings per year (kWh/m<sup>2</sup>)**
- ✓ **Percentage of total energy derived from renewable sources, as a share of the City's total energy consumption**

❑ **Supporting Indicators**

- ✓ **Total electrical energy use per Capita ( kWh/year)**
- ✓ **Average number of electrical interruptions per customer per year**
- ✓ **Average length of electrical interruptions (in hours)**



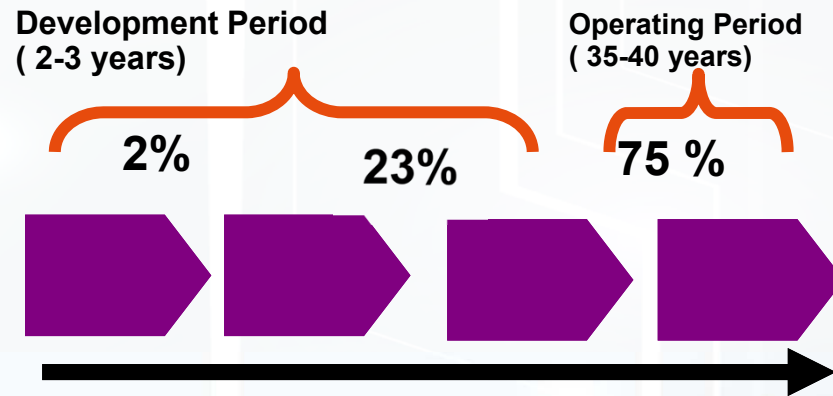
### 3. The role of FM best practice into smart cities transformation

- ✓ *Technology is Enablers*
- ✓ *FM strategy is the core foundation of any asset management strategy for buildings and infrastructure developments.*



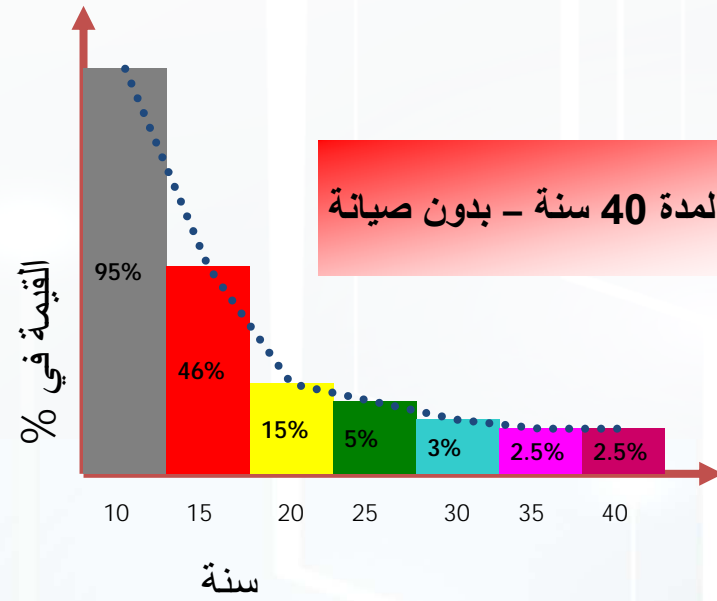
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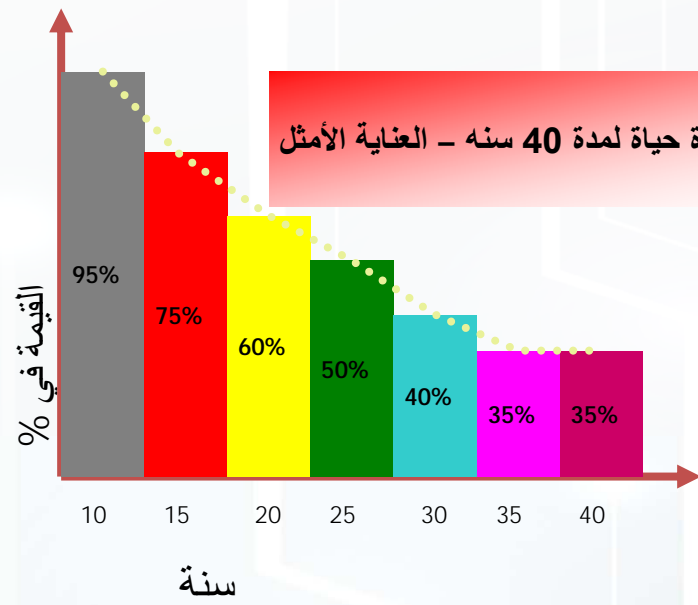
#### LIFE CYCLE COST – Issues & Challenges



التكلفه الكامله  
لمبنى

Reference ASHRAE



















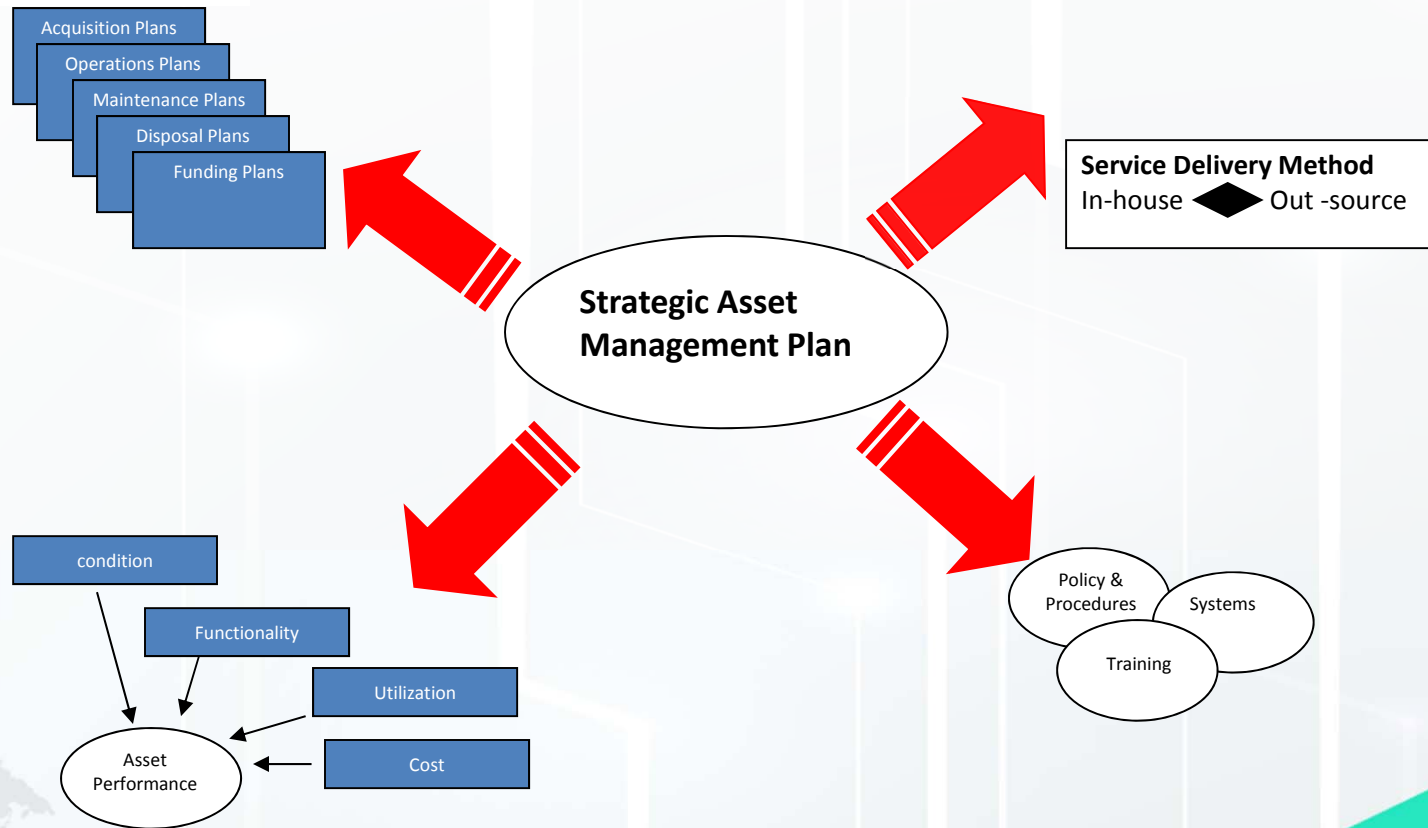








### 3. The role of FM best practice into smart cities transformation



## The Life-Cycle Costs Of Our Efforts

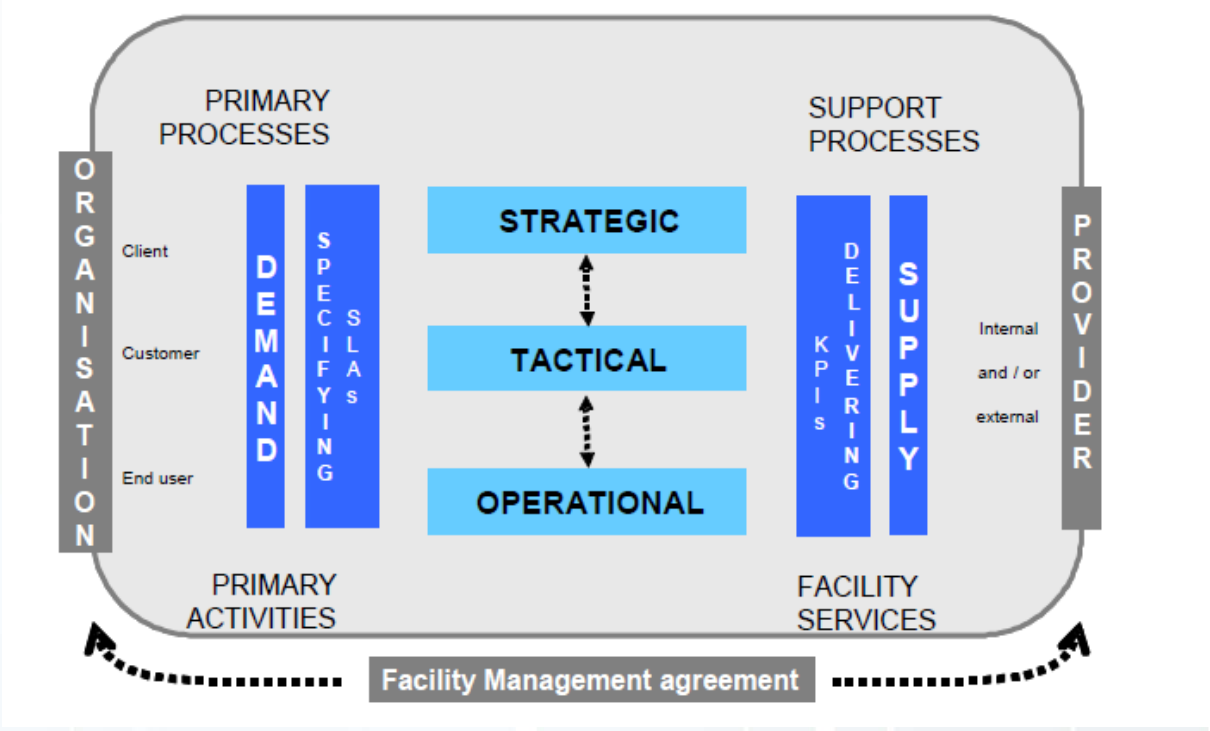
- Kitchen cupboard – 2009.
- We all live somewhere, this should be easy...



- Clearly the designers need help... Imagine this in an office building



The FM-model of EN 15221-1 is shown below.

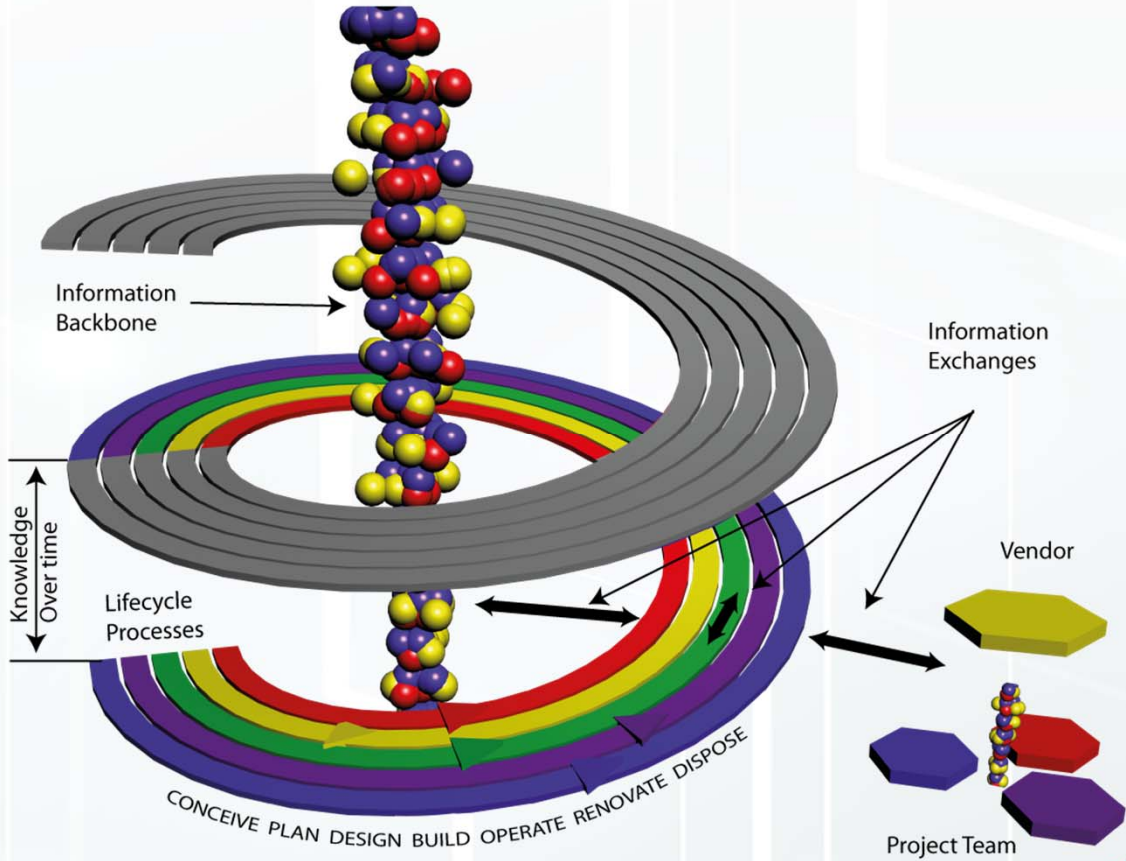


## FM Model Benefits

1. Clear & Transparent Communication between Supply and Demand side.
2. Simple & Manageable concept of internal and external responsibilities of services ( Systemic insourcing and outsourcing procedures).
3. Reduction of conflicts
4. Integration and Coordination
5. Transparency
6. Improve communication between stakeholders
7. Develop tools and systems



# Property Asset - Whole Of Life Approach



# 5 Components Of FM Quality



## Quality

The application of good design, efficient well considered layouts, use of the right materials and equipment, good workmanship and proper levels of maintenance and repair all contribute to the overall quality of the property asset and its performance throughout its lifecycle. The Quality Rating comprises a range of condition inspections and assessments covering a wide range of property assets that include the following;

## Health & Safety

Providing a property asset that is a safe place to live, work and visit is essential to meet quality performance and legal responsibilities. The performance of the property asset is directly impacted upon the level of fire, health and safety provisions, their design and management and the maintenance and procedures being implemented.

## Documentation

Fast and efficient document management is required throughout the life of a property asset to deliver property asset value. From the initial feasibility and concept design stages through to construction and into operation important documentation needs to be securely, accurately and properly produced to comply with various contractual, legal, regulatory and best practice management requirements.

## Sustainability

Saving money, conserving energy, reducing waste and water consumption, improving air quality, improving access, better building material choices and driving innovation are all sustainable attributes that add to the quality of the property asset. The Sustainability Rating includes a series of assessments that determine the level of sustainability performance for the property.

## Management

A competent management team can add significant quality and value to the property asset. The way the property management, owners, tenants and service providers perform their responsibilities, work together and communicate has a long term impact upon the property asset's quality and performance. As such an assessment is carried out that considers the following elements of the asset's management.

# One Of Most Comprehensive FM Inspection/Audits In The World

- 5 Property quality categories
- 44 property audits
- Weightings applied to property types & audit importance
- 5 scores combine to form a single quality rating score





## Smarter Buildings enable reliability, efficiency & sustainability

Lower energy costs

Improved operating efficiency

Greater occupant safety & satisfaction

Higher utilization

Improved revenue performance

### Solution Sets

#### Energy Management

Energy Consumption & Optimization

Carbon Management

Greenhouse Gas Emissions Tracking

#### Operations Management

Asset & Work Management

Portfolio Management

Facility Maintenance

Condition Monitoring

#### Space Management

Occupancy Management

Utilization Planning

Space Optimization

Move Management

### Core Capabilities

Analytics and Optimization

Reporting and Dashboards

Event Management

Service Request

Aggregation and Warehousing

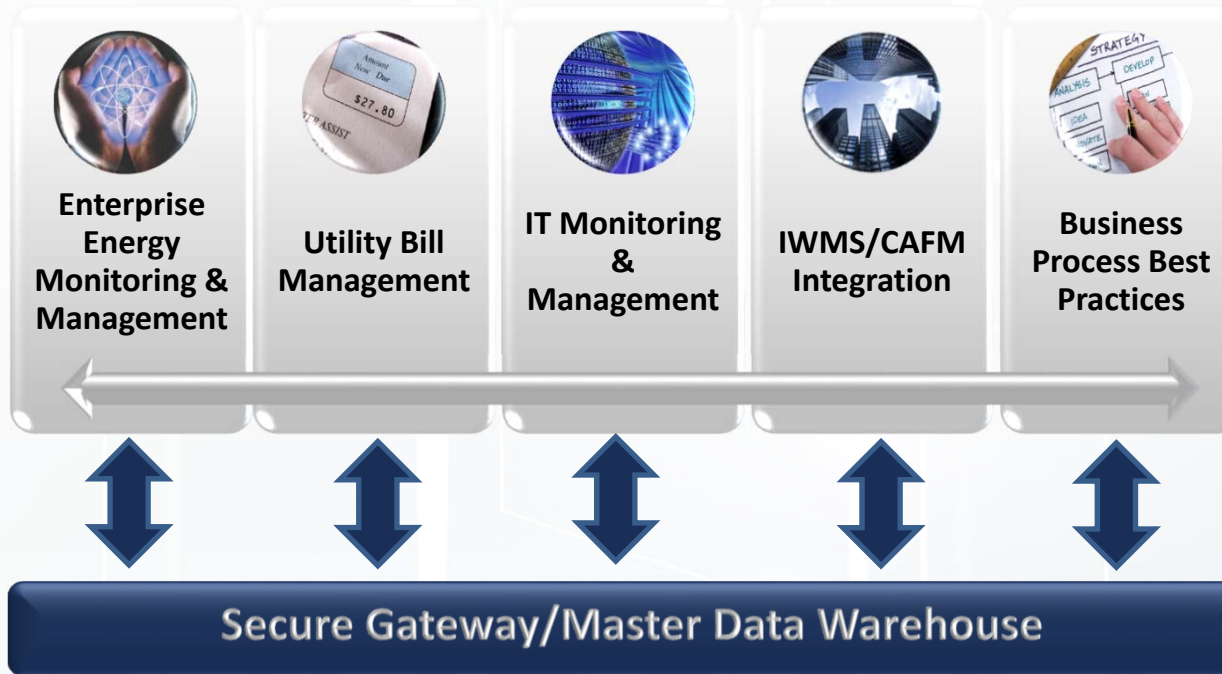
Equipment and Systems Monitoring

Security

## New Trend- Technology Base Operation



# Enterprise Sustainability Platform (ESP)

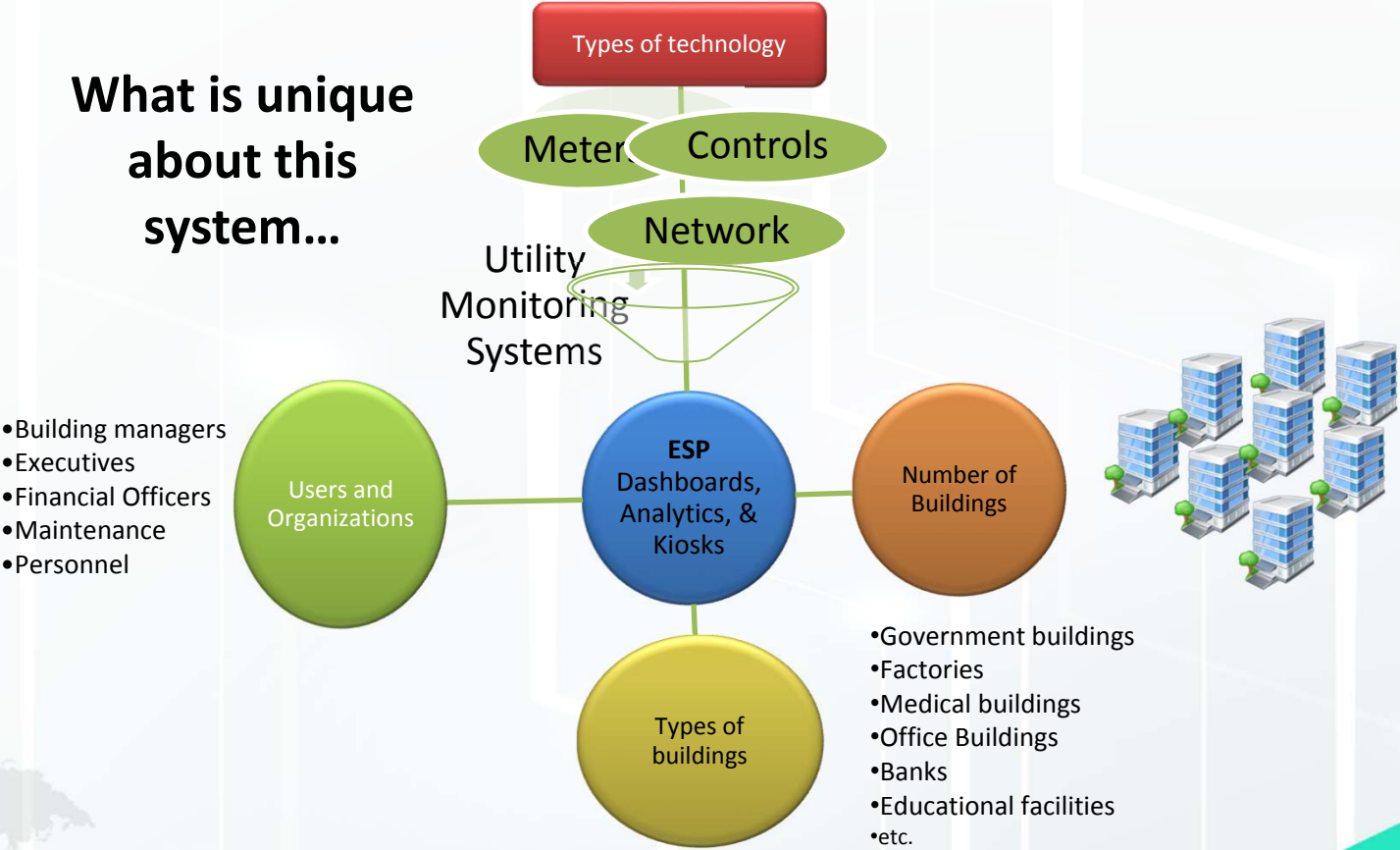


**Modules Serve as Building Blocks for the ESP Process  
& Database All Data is Accessed Through a Common  
Secure Portal**

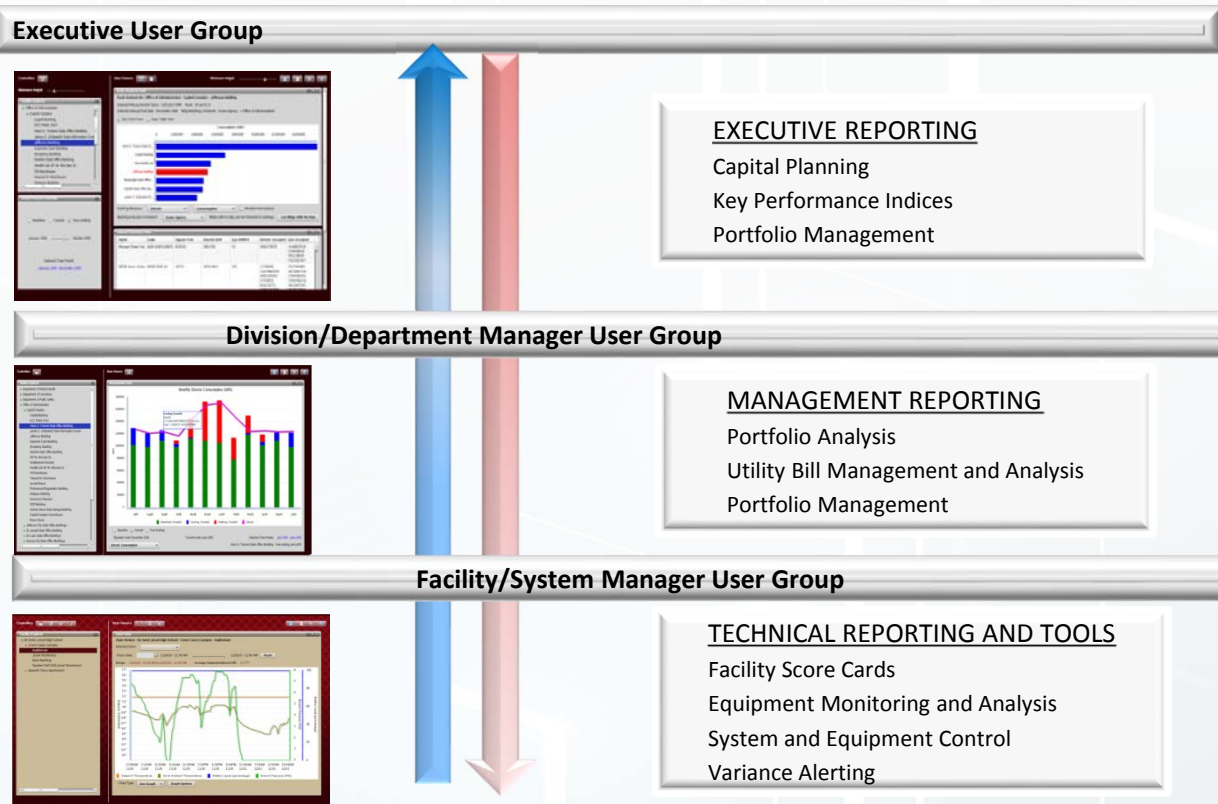


# ESP - Unique Success

**What is unique about this system...**



# ESP – Web Accessible Applications



## Smart city initiatives

### ➤ *Smart City Global Case Study : RIO De Janeiro, Brazil*

- ❑ *Established 'Center of operations' to better anticipate and respond to incidents*
- ❑ *Center integrates and house officials from 30 city agencies*
- ❑ *Setup weather forecasting and hydrological modelling system for 24-hr advance rain prediction*
- ❑ *Citizen's portal-citizens play an active role in operations via Facebook, Twitter, Instagram and YouTube*
- ❑ *Better Traffic management, emergency response*
- ❑ *Data analytics and citizen-city collaboration*





## Smart city initiatives

### ➤ **Smart City Global Case Study : Amsterdam, Netherlands**

- ❑ **Started in 2009, focus is reducing CO2 emissions by saving energy**
- ❑ **Sustainable Mobility: Easy access to electrical battery charges in the city**
- ❑ **Sustainable Living: Residents cooperatively own windmill park for energy**
- ❑ **Sustainable Working: Drop-in offices within 5 minutes biking creating flexibility and reducing car traffic**
- ❑ **Sustainable Public space: integration of energy management systems, solar panels, water management, rubbish disposal**

**C: Modern Crid solutions LLC and Smart Cities Council LLC**





## Intelligent Operations Center ( COC )

|  |                                   |                                     |                                    |
|--|-----------------------------------|-------------------------------------|------------------------------------|
| Maintenance Management                 | BMS / BAS Integration             | Safety and Security                 | Medical Services                   |
| City Traffic Management                | Transport Services (Taxi, Busses) | Tenant Billing Services             | Energy Management                  |
| Time and Attendance                    | Visitor Management                | Value added Dash boards (Revenue)   | ICT Network Management             |
| External Services / Postal / Concierge | Lifestyle Features                | Leisure and Sports Facility booking | Vendor hosting fee Transaction Fee |
| Help Desk Concierge                    | FM & Asset Management             | Mobile and Telecom Services         | Event Management                   |



## Universal Principles of Smart Cities

### ➤ ***Achieve Asset optimization***

- ✓ ***Automated Spare and inventory Management***
- ✓ ***CMMS***
- ✓ ***Design Documentation***
- ✓ ***Life cycle performance and budget***
- ✓ ***Online training specific to skills and organization***
- ✓ ***Asset life cost***
- ✓ ***Equipment's performance and costs***
- ✓ ***Machine Monitoring (Predictive)***
- ✓ ***Data analytics dash board***
  
- ✓ ***Results***
  - ❖ ***Improved Performance***
  - ❖ ***Asset integrity***
  - ❖ ***Higher quality***
  - ❖ ***Health and Safety***



## Universal Principles of Smart Cities

### ➤ *What are the benefits of Realizing Universal Targets?*

- ❑ *Enhanced Livability “ Better quality of life for city residents”*
- ❑ *Enhanced Workability “ Job opportunities, economic growth”*
- ❑ *Enhanced Sustainability “ careful use of natural and economic resources “*



المهندس علي السويدي  
Engineer Ali Al Suwaidi

Sustainability is not an added cost  
it is clever living

الاستدامه هي ليست تكلفه اضافيه  
وانما الاستدامه نمط حياة

Thank You

