

An aerial night view of a city skyline, likely Chicago, with numerous skyscrapers illuminated against a dark sky. The buildings are lit up with warm yellow and orange lights, creating a vibrant contrast with the dark blue and purple tones of the twilight sky. The perspective is from a high angle, looking down and across the city.

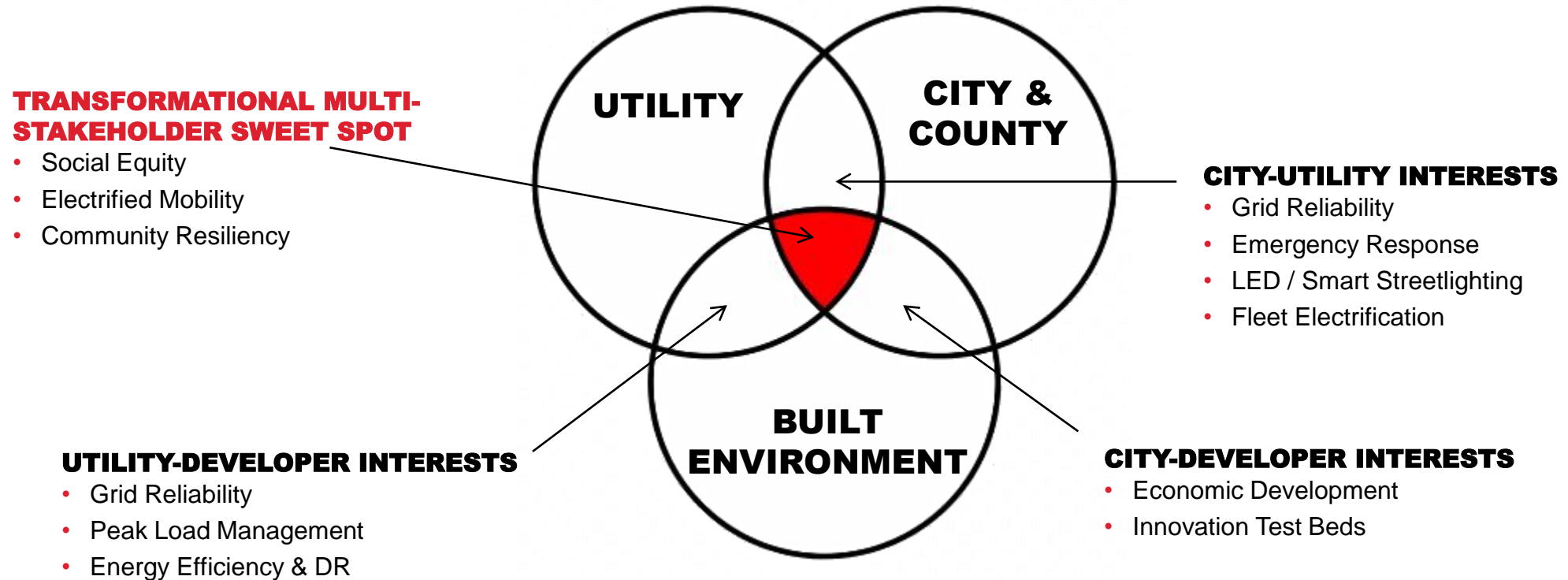
# **SAFE RESILIENT SUSTAINABLE COMMUNITIES**

**FOR THE IEEE PES  
18 FEBRUARY 2022**

**GEORGE KARAYANNIS, NORTH AMERICAN SMART CITIES LEAD  
GEORGE.KARAYANNIS@HONEYWELL.COM**

**Honeywell**

# MARKET CONTEXT & KEY DRIVERS OF SUCCESS



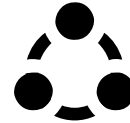
1) Multi-Stakeholder Alignment; 2) Sustainable Business Models; 3) Show Quick Wins

# SMART CITY SOLUTION ELEMENTS

## OUTCOMES FOR CITY ADMINISTRATION & CITIZENS



Ensure continuity of city infrastructure & improved response time to deliver city services



Improved quality of life for citizens



Higher citizen awareness & engagement

## HONEYWELL CITY SUITE & THIRD-PARTY APPLICATIONS



City Operations Center



Public Safety



Emergency Response



Muni Building Management



Smart Streets



Multimodal Mobility



Sustainability & Resiliency



Energy Equity



Omnichannel Engagement

## HONEYWELL'S CITY SUITE IOT & AI PLATFORM



IOT Hub, Service Bus



Stream Analytics



GIS Engine



Analytics Engine

### CITY IOT NETWORK

## FIELD DEVICES + SENSORS



Utility Meters



Parking Sensors



Street lighting controllers



Bin Sensors



Environmental Sensors



Cameras



Traffic controllers



Vehicle mounted displays



Social Networks

Comprehensive capabilities that lead to compelling outcomes

# READY-TO-DEPLOY AI TEMPLATES



## **PUBLIC SAFETY**

Video Analytics

Emergency Response



## **CITIZEN ENGAGEMENT**

Citizen Services

Resource Planning

Social Media Analytics



## **TRANSPORTATION**

Yield Analysis

Bus Scheduling

Predictive Maintenance



## **INFRASTRUCTURE**

Water & Wastewater

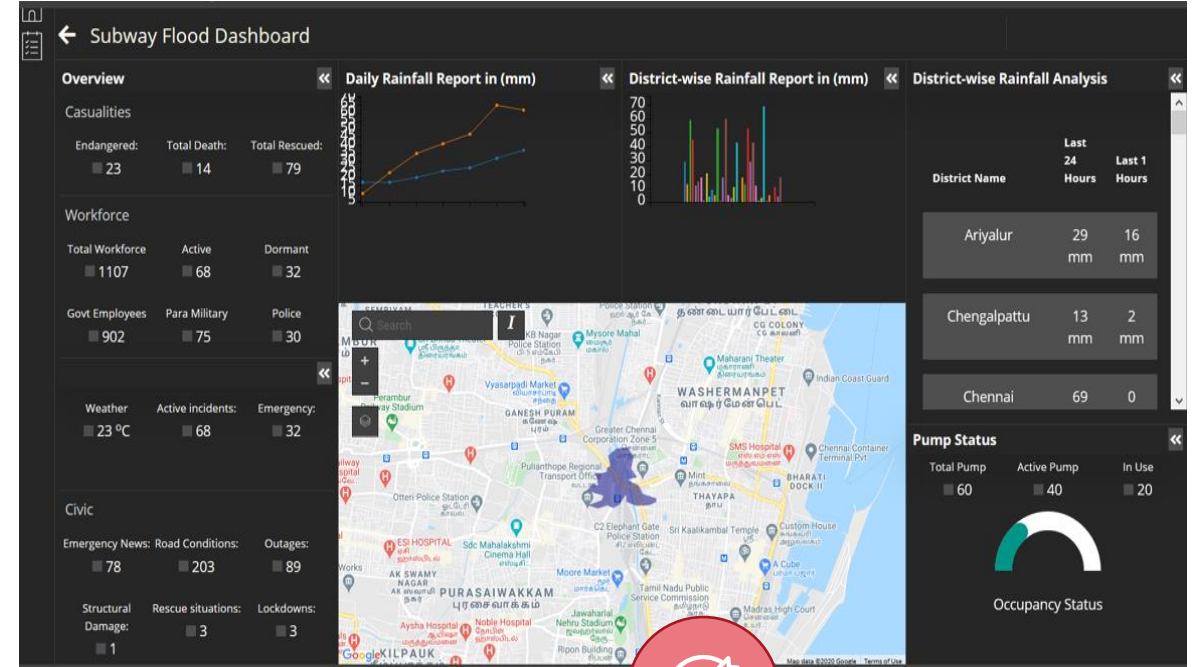
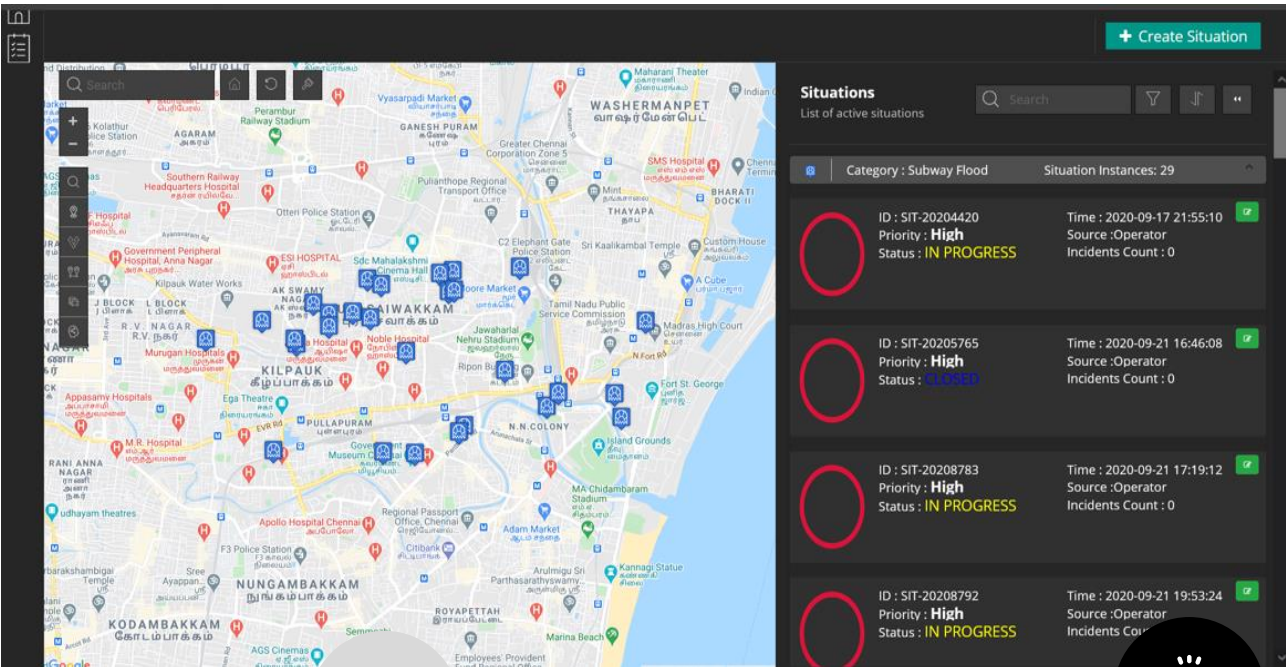
Parking

Garbage

Energy

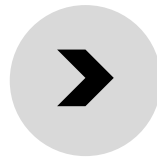
**Accelerating time to value for multiple departments**

# PREDICTIVE EMERGENCY RESPONSE



## INPUT

- IoT data – rain, flood & sewage sensor
- Weather data
- Rainfall and flooding records
- Terrain level



## OUTPUT

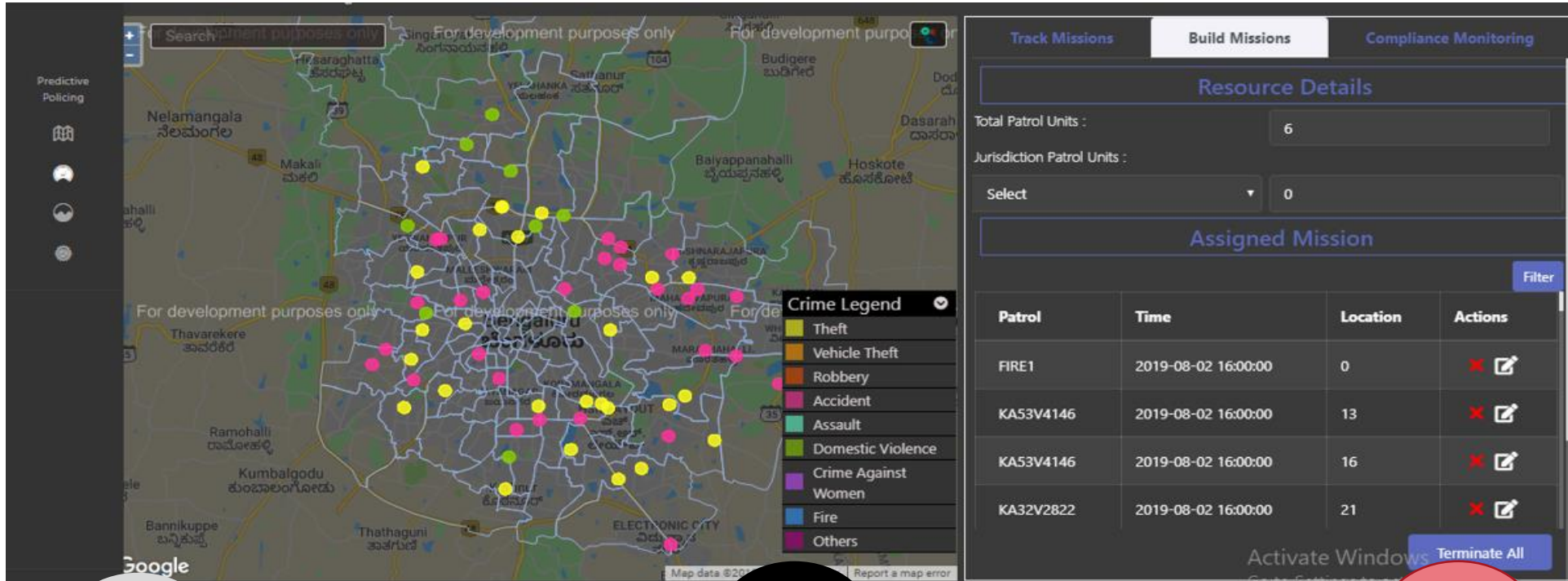
- Flood impact area
- Resource planning
- Citizen alerts



## VALUE

- Improve situation awareness
- Coordinate response
- Save lives and property

# PREDICTIVE PUBLIC SAFETY



## INPUT

- 911 calls
- Crime records
- Weather data
- Census data



## OUTPUT

- Crime type prediction
- Crime location prediction
- Event count prediction
- Patrol recommendation



## Value

- Reduce response times
- Create safer communities
- Optimize public safety resources

# CITY-UTILITY USE CASES



## Streetlight & IOT Management

- Native support for streetlight management & 3<sup>rd</sup> party systems
- Provides granular and grouped control (on/off/dim) & reporting
- Can manage individual or multiple commercial & municipal customers
- Can manage multiple pole-attached IOT devices across entire territory from “single pane of glass”



## Integrated DSM

- Integrates various loads and stakeholders for flexible, feeder-level control to reduce peak demand and improve grid reliability
- Integrates key utility systems & offers integrated DERMS functionality tightly coupling utility and customer loads when needed
- Supports wide range of customer load types and systems



## Community Resiliency

- Monitors & controls a diverse set of DERs and microgrids
- Integrates city and utility IT & OT systems for collaborative resource management
- Extends City Suite’s IDSM features to help cities & utilities monitor and optimize system-wide resiliency resources during service interruptions



## Energy Equity VPP

- Eases energy burden of low- and moderate-income (LMI) households
- Extends traditional VPP program to provide additional & focused benefits to LMI households
- Addresses a critical need of city leaders nationwide
- Can help utilities gain rate case support

**Smart City Platforms Help Utilities Evolve and Better Serve Municipal Customers**

# **ACUD, EGYPT – THE WORLD’S ‘SMARTEST CITY’**

## **THE ADMINISTRATIVE CAPITAL FOR URBAN DEVELOPMENT**

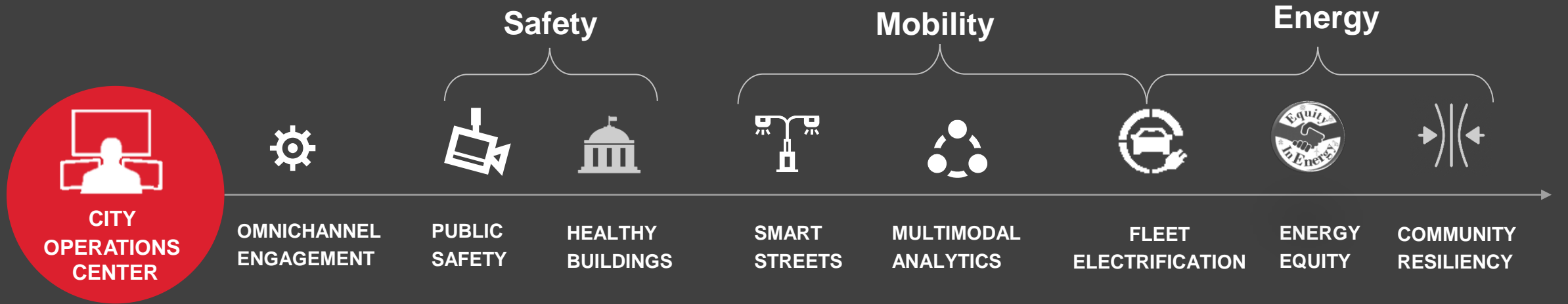
**275 Square Miles**  
**8 Million Citizens**  
**4 Million Visitors / Year**  
**50 Petabytes Data / Year**

**80% reduction in response time**  
**20% reduction in energy cost**  
**200% increase in revenues**  
**20% reduction in crime**

**Unmatched Scope, Scale & Impact**



# HONEYWELL CITY SUITE



>

Includes City Operations Center and pre-integrated analytics

>

Enables situational awareness and control across all city systems

>

Provides system-of-systems integration and data analytics

>

Supports both Honeywell and third-party applications

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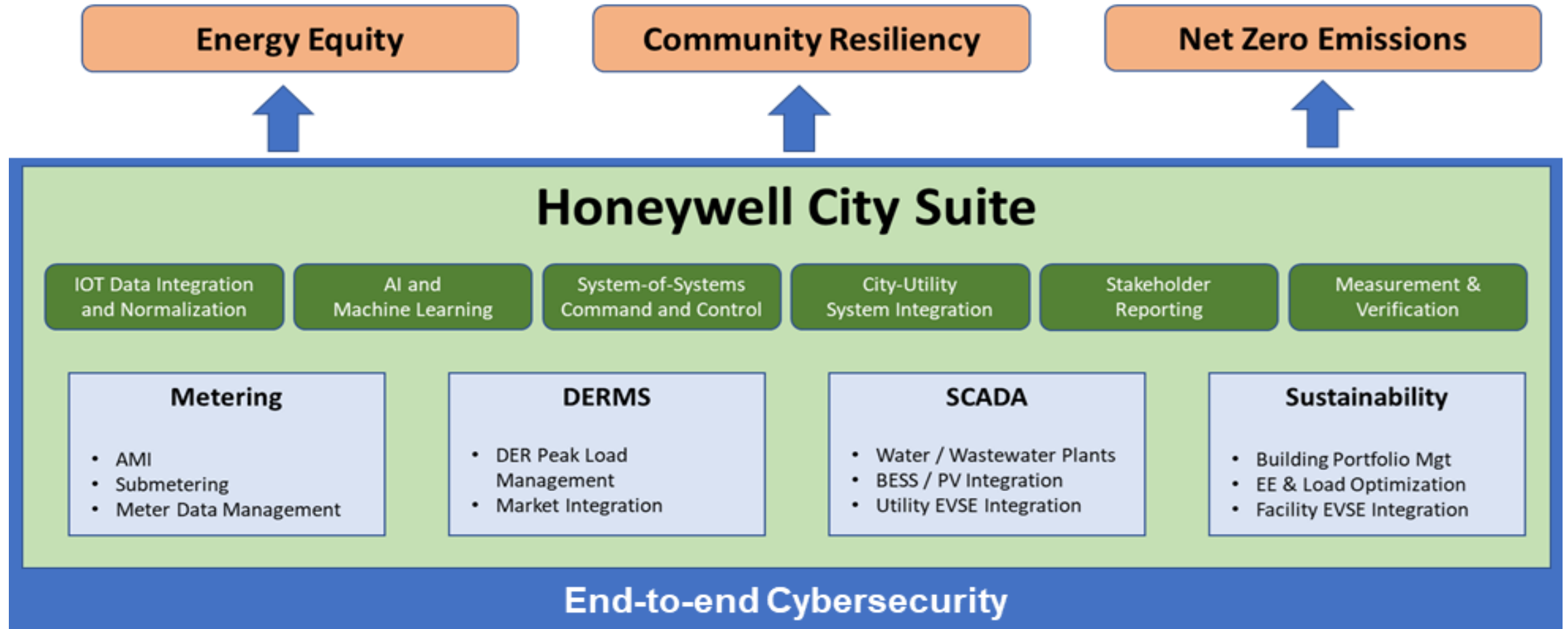
Speeds response times and improves operational efficiency

>

Enables data-driven decision making and city-scale management

**Integrated Insight, Monitoring and Control Across City Silos**

# HONEYWELL ENERGY EQUITY & RESILIENCY (HEER)



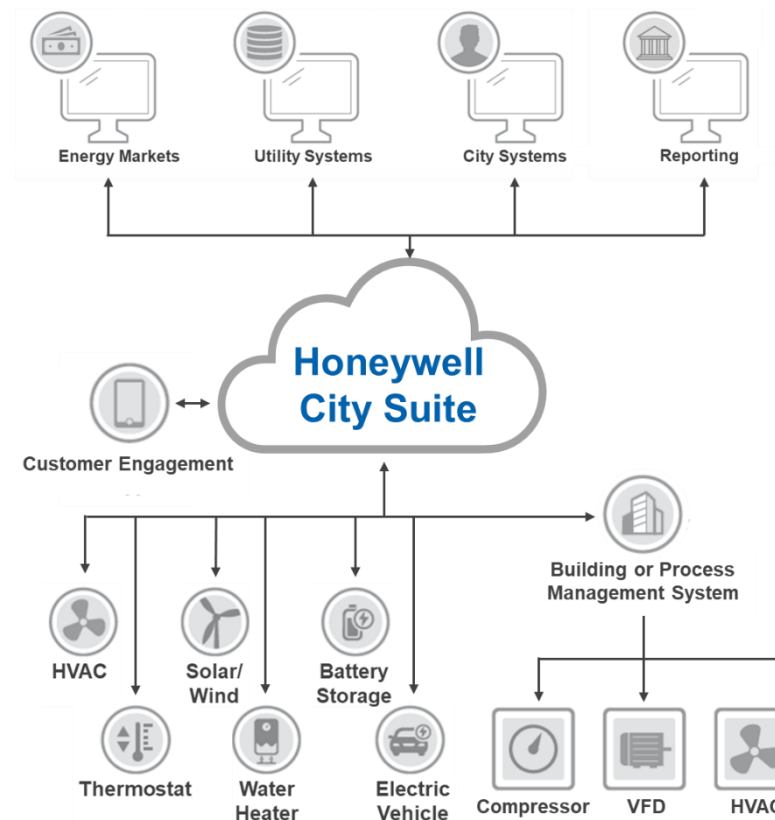
Unique energy innovation delivered via single point of accountability

# ENERGY EQUITY VIRTUAL POWER PLANT (VPP)

*Reducing Peak Electric Load Through Energy Efficiency and Demand Response*



## Energy Equity VPP Solution Architecture



## Program Benefits

- Enables energy flexibility at different time scales to improve grid reliability & resiliency
- Accurately values full system benefits (grid benefits, emissions benefits, etc.) of energy efficiency and demand response resources (more lucrative)
- Integrates a diverse set of Commercial and Residential loads and systems (t-stats, PV, batteries, heat pumps, fuel cells, EVs, etc.)
- Can uniquely address energy burden of LMI households, who typically struggle with energy efficiency project financing due to credit rating

## Program Summary

- DOE-supported program combines market integration (Recurve), project financing (Dividend) & delivery (Honeywell)
- Supports multiple utility business models and aligns city-utility strategic priorities
- Provides focused benefits for low- & moderate-income (LMI) households via shared risk-reward ESPC model

**Integrated demand side management delivered through a social equity lens**

# COMMUNITY RESILIENCY (1)

*Creating Resilient and Sustainable 'Net Zero Multifamily Microgrid Communities'*

**\$3.5B Loan Guarantee\***



**INNOVATUS  
CAPITAL PARTNERS**



**Honeywell**

## Program Summary

- DOE-supported program combines modular builder (Guerdon), project financing (Innovatus) & energy resiliency solutions (Honeywell)
- Complexes typically 300-500 units, \$350M value & can be mixed-use
- 10% of units workforce / affordable via P3 model if city donates the land



## Program Benefits

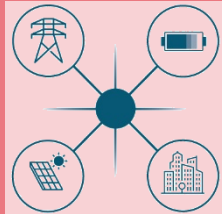
- Creates market-based model for resilient multifamily development nationwide (targeting 10 US cities initially)
- Advanced apartment-level load management via smart breaker panel and mobile app (manage 'energy budget' during microgrid islanding)
- Accelerates EV infrastructure build out and adoption of EVs among traditionally underserved communities
- Can uniquely address energy burden and resiliency gap for low-and moderate-income (LMI) households

**Resiliency and EV charging integrated into sustainable apartment living**

# COMMUNITY RESILIENCY (2)

## Creating Interconnected Municipal Microgrids

### Municipal Microgrids



TBA Investor Owned Utility

**Honeywell**



**Water Service Continuity**  
(large microgrid ex.)



**Community Shelters**  
(medium microgrid ex.)



**Fire & Police Stations**  
(small microgrid ex.)



**Large EV Loads**  
(neighborhood microgrid ex.)

### Program Benefits

- Creates market-based model for municipal microgrid development nationwide
- Comprehensive approach can drive resiliency broadly throughout a city
- Batteries and natural gas generators (for long-duration large loads) replace unreliable and dirty diesel generators
- Business model reduces capital investment needs for cities and provides more consistent service
- Offloads need for city staff for advanced skill sets to plan, operate and maintain complex microgrids

### Program Summary

- Commercially financed nationwide program combines project financing (TBA utility) & municipal microgrid solution development (Honeywell)
- Comprehensive resiliency solutions span municipal needs (e.g., large, medium, small & highly distributed)
- Local utility gets time-limited right of first refusal on asset ownership

**Resiliency and EV charging integrated into sustainable apartment living**

# Honeywell

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**THE  
FUTURE  
IS  
WHAT  
WE  
MAKE IT**