The Smart City Building Blocks & Their Synergy with Smart Villages

Invited Speech

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ARI

What is a Smart City

- There is no single consensus definition of a smart city, but there is some agreement that a smart city is one in which information and communication technology (ICT) facilitates improved insight into and control over the various systems that affect the lives of residents.

Picture from: http://politic365.com/2017/09/01/smart-cities-require-smart-planning-policy-to-benefit-communities/

Smart City

A **smart city** is an urban development vision to integrate information and communication technology (ICT) and Internet of Things (IoT) technology in a secure fashion to manage a city's assets.

To be fully “smart,” a city must be “connected.”

Building Blocks of a Smart City

Range of Deployments in Smart Cities

Cities across the world are deploying technology to gather data trying to become cleaner, reduce traffic, and improve urban life. Starting with energy management, to disaster preparedness, to public safety, to parking spot assistance, to paying bills online, to facilitate emergency vehicle movement, and much more.

Elements of a Smart City

A neighborhood in a smart city:

- A smart traffic crossing sensitive to traffic volume
- Synchronized traffic lights for smooth flow
- Emergency vehicle priority access

Optical based traffic signal preemption system for emergency and transit vehicles

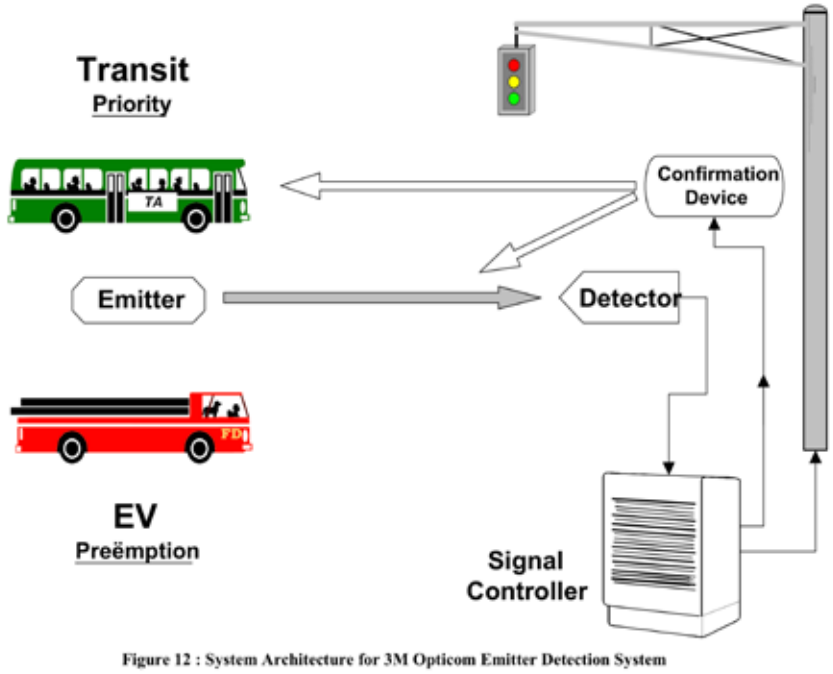
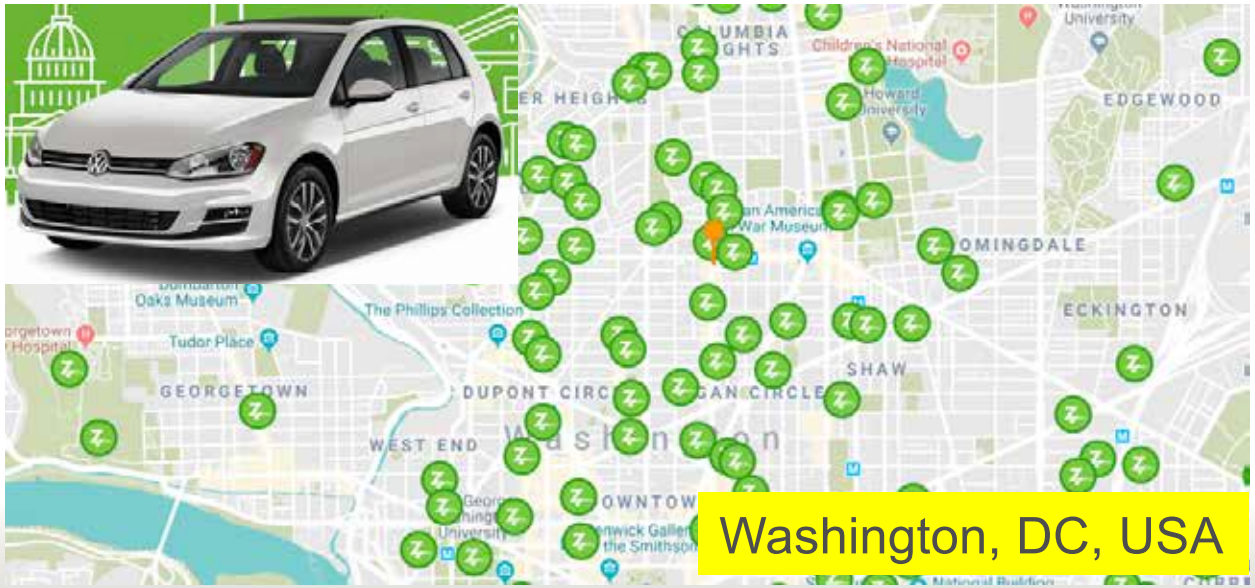


Figure 12 : System Architecture for 3M Opticom Emitter Detection System

https://vtechworks.lib.vt.edu/bitstream/handle/10919/31319/ThesisFinalVersion.pdf?sequence=1

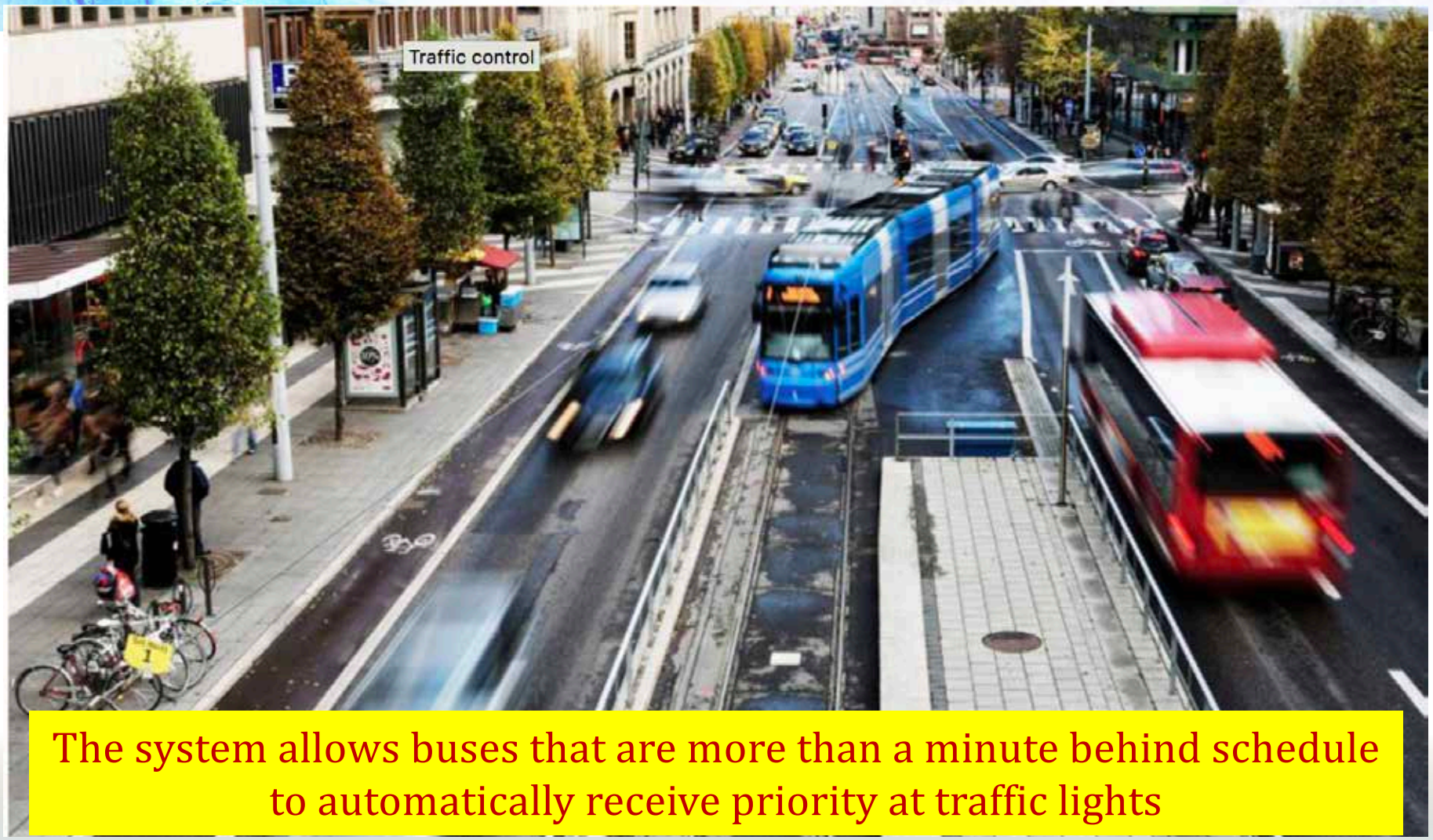
Connected Transportation

- Connected vehicles and travelers will be able to share data with all sorts of equipment, and be able to procure mobility as a service, whenever wherever.



Vancouver Can Do This

Stockholm City Traffic Management



The system allows buses that are more than a minute behind schedule to automatically receive priority at traffic lights

US Deployment: Smart Lamppost with Camera

Camera provides surveillance and locates empty parking spaces

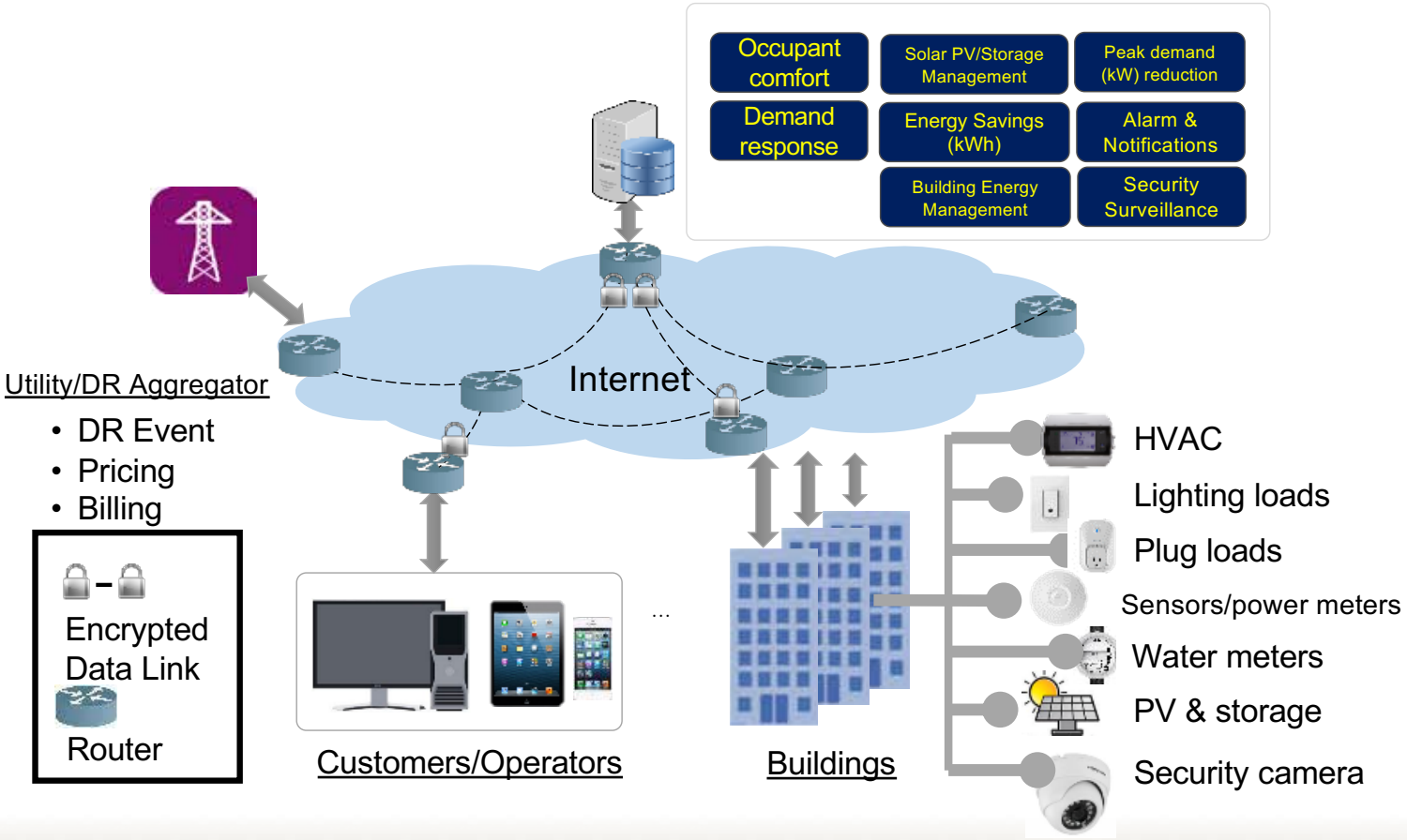
Smart Trash Can in Baltimore, USA

Reduces the number of times a trash can needs to be emptied.

Smart Trash Can in Stockholm, Sweden

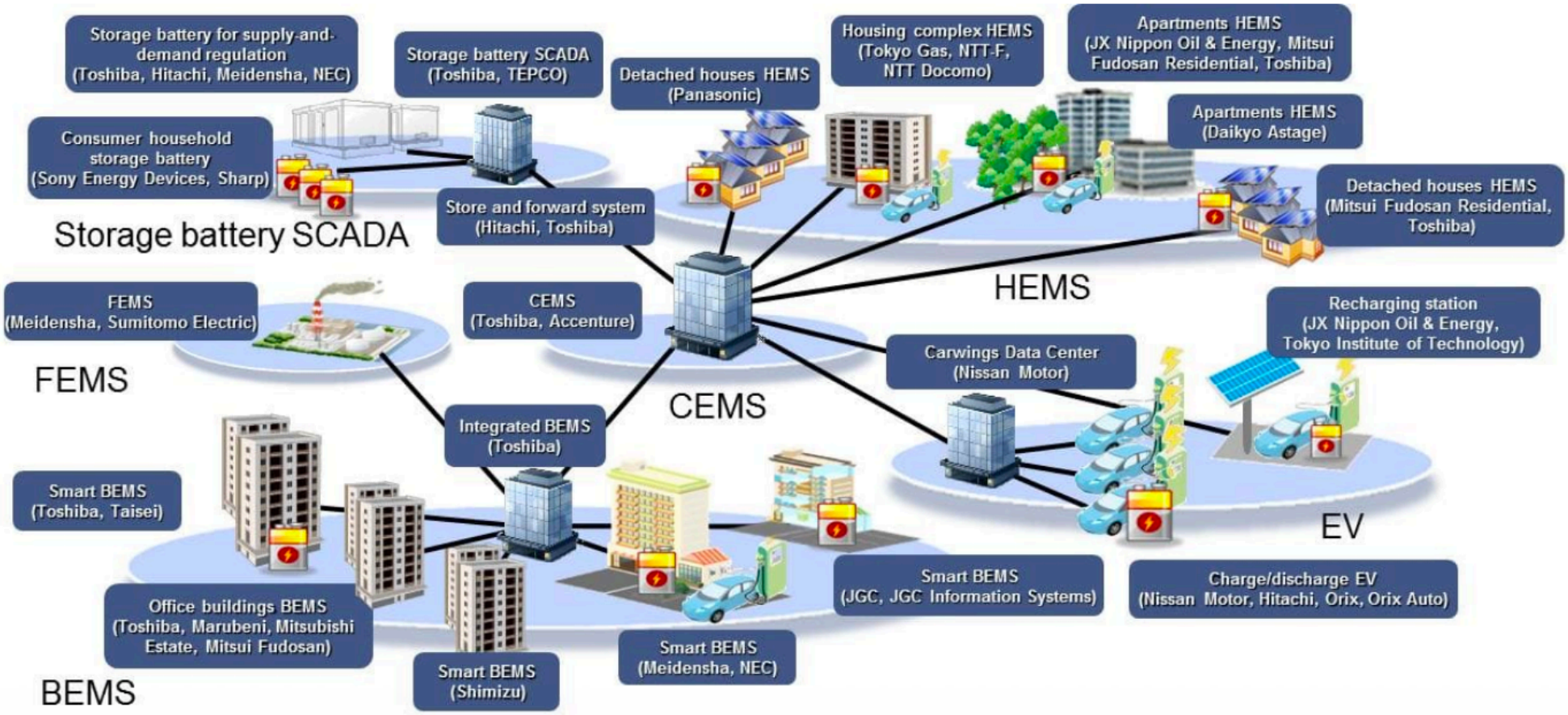
Regular trash cans need to be emptied 1–3 times per day
Smart ones only need to be emptied four times a week.

A Building Energy Management Platform



Source: www.bemcontrols.com

Yokohama, Japan Smart City Demonstration



Smart Cities in India (60)

What is Normal

The New Normal

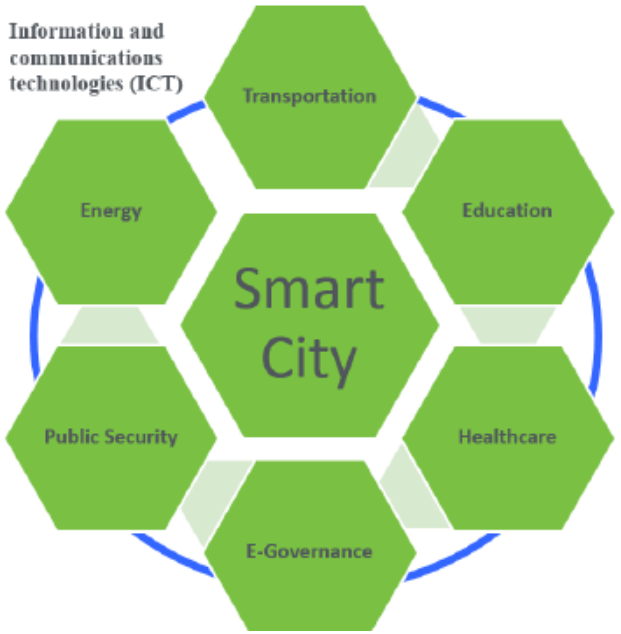

IEEE
Smart Cities

Synergy


IEEE
smart village™
Power a Village, Empower Community

Smart/Connected City

- A smart/connected city is a system of interconnected systems including:
  - **Employment**
  - **Health care**
  - **Retail/entertainment**
  - **Public services**
  - Residences
  - Energy distribution
  - Transportation
- The system of systems is tied together by information and communications technologies (ICT) that transmit and process data about all sorts of activities within the city.



Solar Nanogrid in Bangladesh

ICT-based power meter and bill payment using smart phones

IEEE smart village™

Power a Village, Empower Community

Introducing Technology

- Enables light after sunset using solar micro-grids
- Illuminates kitchens, schools and clinics
- Lets communities live cleaner, safer, and more prosperous lives
- Stimulates local commerce and builds new enterprises

IEEE smart village™

Power a Village, Empower Community

Expanding Education

Photo by Paula Bronstein

- Creating a network of engineers, entrepreneurs, and practitioners
- Facilitating ongoing learning and mentorship for continued success
- Innovative Global Classroom helps people around the world access the internet and educational resources

IEEE Smart Village Success Story

Global Himalayan Expedition, India

Lingshed Monastery – Ladakh Region, Indian Himalayas – Elevation 12,000 feet.
Founded in 1440 Illuminated with IEEE Smart Village in 2016
Global Himalayan Expedition

Villagers working with LED Lights

Loads served by roof-top Solar Photovoltaics

Locally Driven Initiatives

Source: Grameen Shakti, Bangladesh

Ownership by Citizens

- **Development of local technicians and entrepreneurs at the grass-roots level:**

  To create local stakeholder for promoting, installing and providing efficient after-sales service of the technologies.

- **Local capacity development and creation of green jobs:**

  Local entrepreneurs, especially women are offered financial and technical assistance to set-up a renewable energy technology business.

Source: Grameen Shakti, Bangladesh

Life Changing Experience

"The customers love coming to my shop, now that I have bright light . "They can see what they are buying and what I have in stock. And they can watch television and charge mobile phones. My sales have gone up by at least 50%."

Source: Grameen Shakti, Bangladesh

Children's Library in a Boat with Solar-powered Light

Source: Grameen Shakti, Bangladesh

Impact of Solar PV in Rural Communities

- Education
- Healthcare
- Retail Business
- Electricity

Some of the experience from the Smart Village can show examples of social interactions which can be transferred to the Smart City and help in community building

The Connected ~~City~~ Village

A connected ~~city~~ village is one where all relevant ~~city~~ village systems— utilities, transportation, employment, health care, public safety, education, and others—are capable of communicating with each other to allow coordination and reduce waste.

I would like to see a broader IEEE

We need to ensure that we are “READY FOR RECOVERY”, when we get back to the “NEW NORMAL” after COVID-19. Let us enhance cooperation, collaboration and community spirit.

For this we need to make IEEE broader so that IEEE is more relevant to the work our members do regardless where they work.

We need more participation from volunteers globally in IEEE governance. A broader based IEEE will make the Institute more relevant to technologists and academics from all parts of the world.

I would like to see more IEEE Senior Members and IEEE Fellows from Regions 8, 9 & 10

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PES accomplishments:
- PES University
- PES Corporate Engagement Program
- PES Chapters' Councils in China, India, Africa and Latin America

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