

Data Science and Next Generation Communications in Electricity Networks

Expedite Grid Sustainability using IIoT: Kickoff Models & Roadmap

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Summary

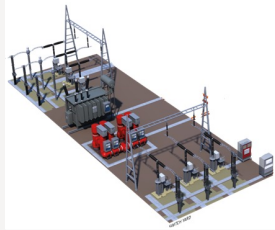
- The Electrical Transmission systems are facing sustainability challenges of turning on into green infrastructure and empowering the circular economy.
- 4th industrial revolutions tools, especially IIoT, represent an innovative way to accelerate grid sustainability development.
- Two pioneer implementation models in the upcoming slides which can help us find a suitable implementation technique.
- Finally, we will go through some recommendations and a roadmap to utilize the IIoT system on grid sustainability.



Transmission Systems Ecological Impacts



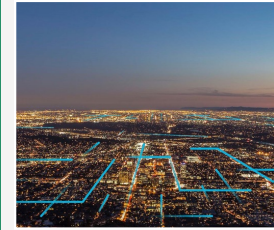
Electromagnetic Fields



Aesthetics



Noise and Lighting



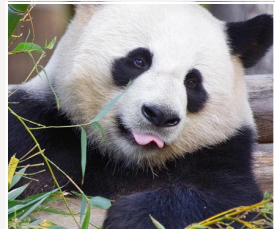
Land Use



Habitat Loss



Waterways/Wetlands



Endangered



Vegetation Management




Cultural Resources




Public Safety

Green Grid Challenges




Prepare
Workforce



Big Data
From Existing Systems



Development
Cost



System Scalability
From energy cluster to
large Interconnected Grids



**New Electrical
Equipment**
(FACTS, HVDC, ...)



Renewable Deployment
CO2 free energy New Generation Mix




**Business Model
Change**
New regulation



Environment
Public Safety
Storm Restoration GHG



**IT Architecture
& Services**
Systems Complexity



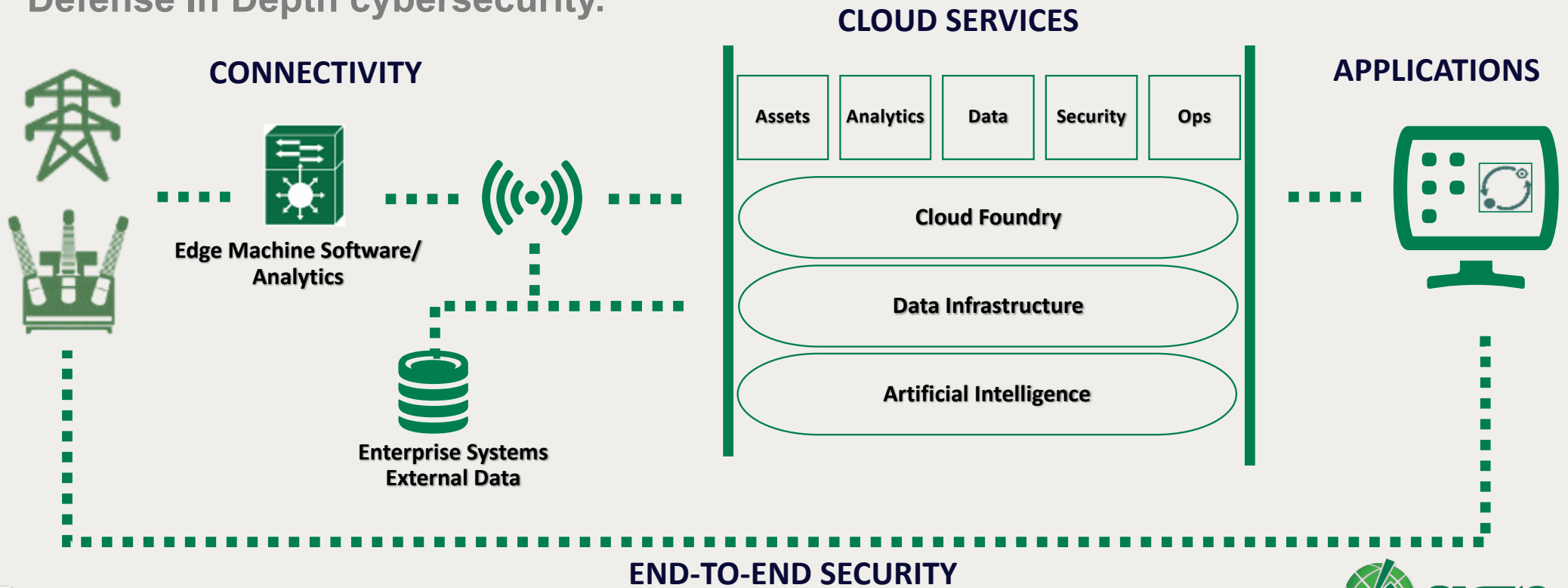
System Dynamics
Operating near to True real
Time Limits



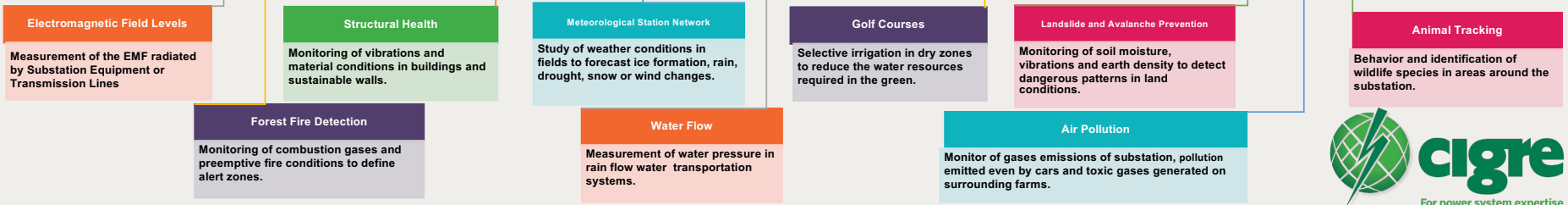
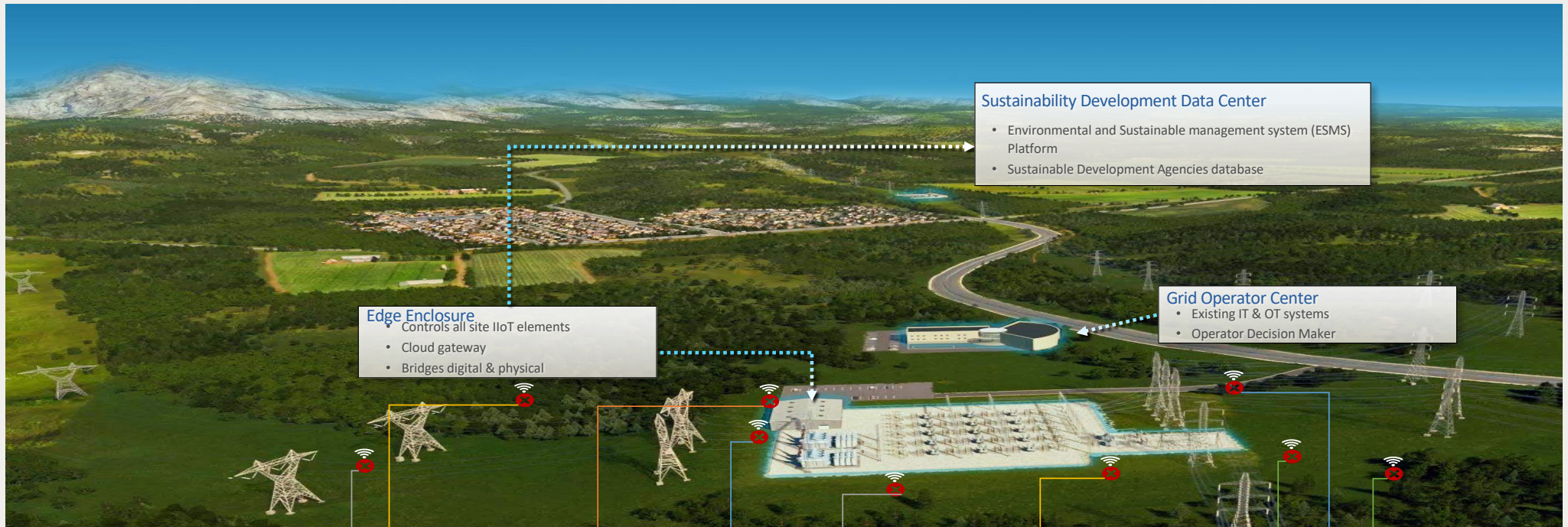
Cyber-Security

IloT Into Grid

Simple solutions for Industrial Internet. Analytics at the Edge and optimizing control. Defense In Depth cybersecurity.

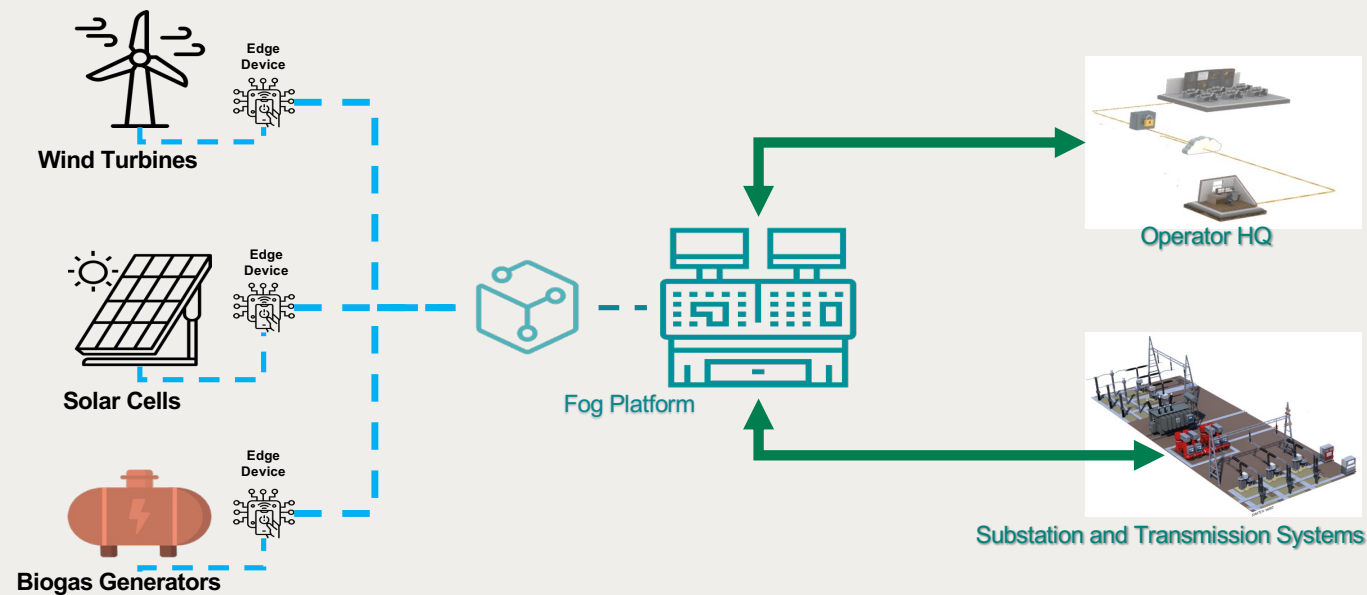


Model (1): Substation and Transmission Lines Sustainability IIOT

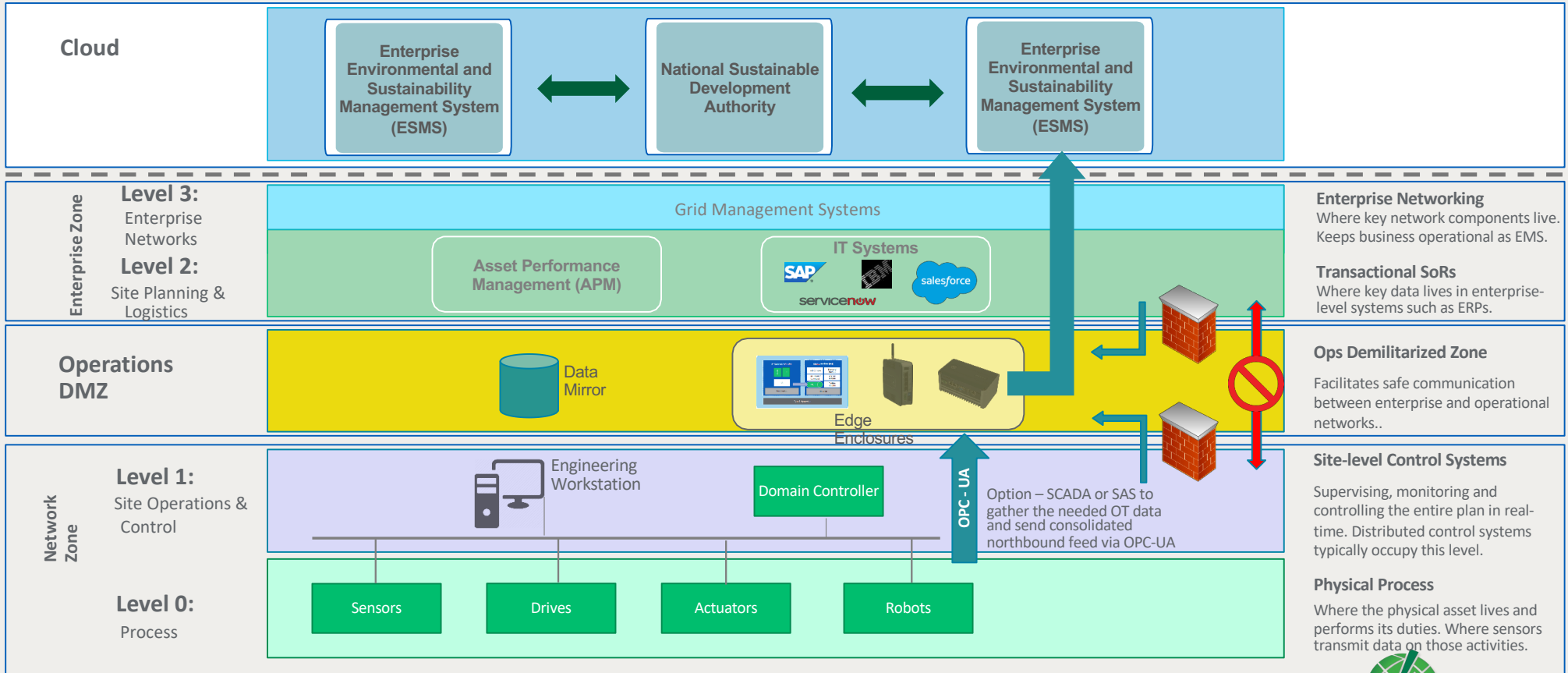


Model (2): Renewable Energy Integration with H.V. Systems

- Close the gap of standardization
- Cost savings
- Minimum Complexity

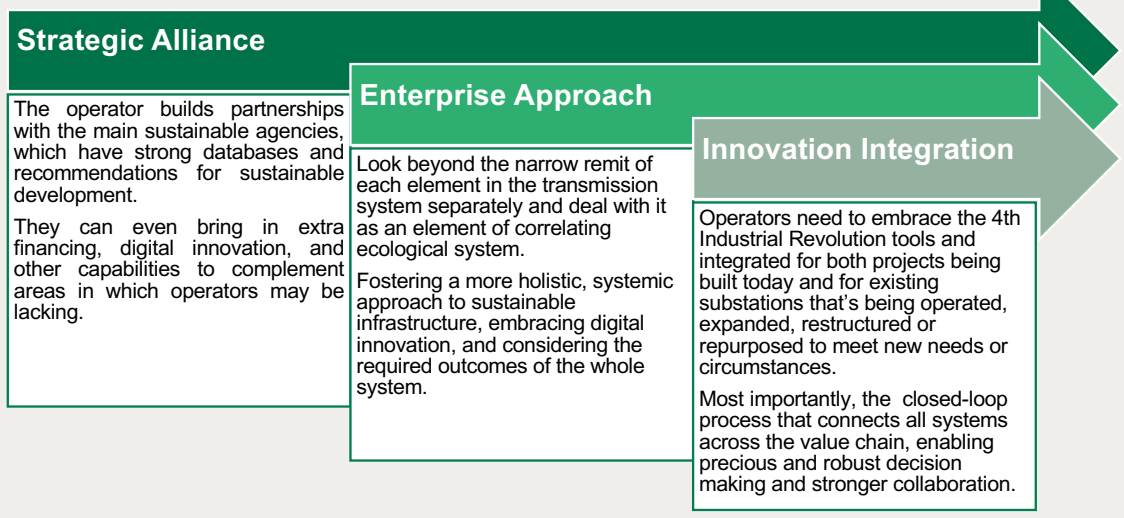


Substation and Transmission lines Sustainability Management System



Technology Adoption

- IIoT will capture data, analyze it, and help grid operators to help make smarter, better, more sustainable decisions.
- Plenty of digital tools now allow operators to generate better, harvest, integrate, and analyze data—to better see, plan for, manage, and understand the enormous complexities of substations and transmission lines' sustainable development.



Strategy - Green Growth & Digital Transformation

STRATEGIC
GROWTH

Ecosystem &
Business Model

Business
Process
Transformation

Society
Engagement &
Experience

Product or
Service
Digitization

ORGANIZATIONAL
CULTURE

Conclusions

- Eight years have passed since world leaders met in New York and agreed on 17 Sustainable Development Goals (SDGs).
- We live in a world of internet of things that helps us make sense of data in our everyday lives.
- Now the industrial IoT economy is evolving... and utilities are joining the game.
- IIoT + AI will drive the dawn of a new era of grid sustainability where substation and transmission systems will be a green beacon for their societies.
- But this will require out-of-the-box thinking plus high-level collaboration with all sustainable development stockholders.

The background image shows two men in safety gear (hard hats and high-visibility vests) standing in a field of solar panels. The man on the left is gesturing towards the panels. The entire image has a green color overlay.

Thank You!

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