Meeting Climate and Resiliency Goals with Advanced Microgrids

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SAME JETC 2024

Siemens

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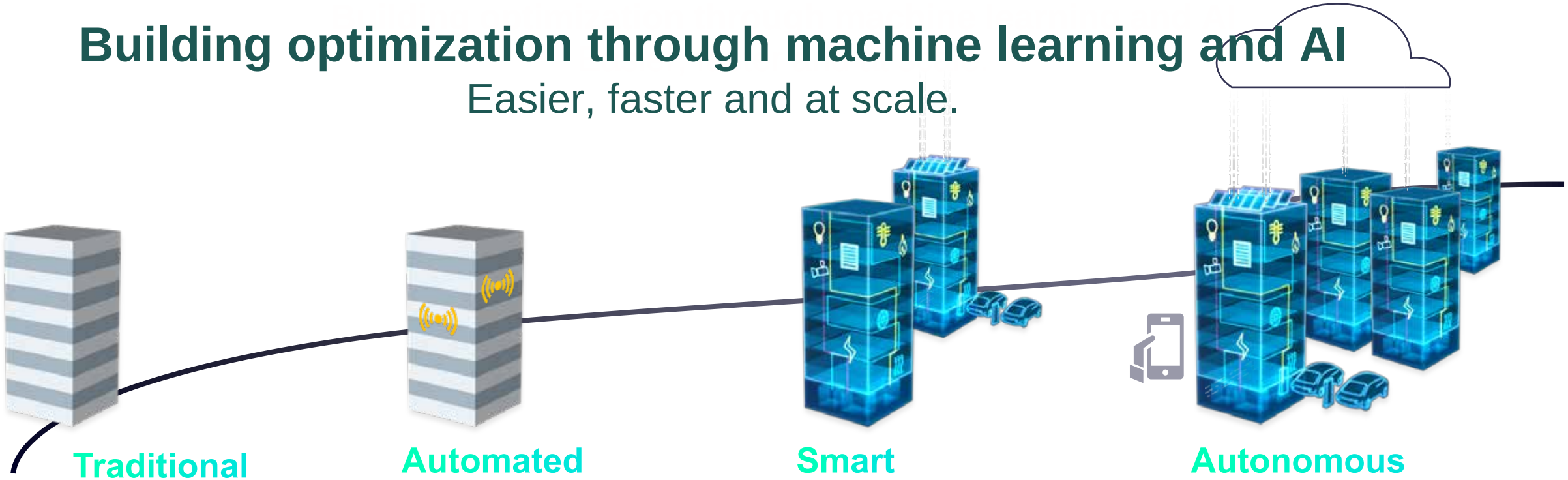
Building optimization through machine learning and AI

Easier, faster and at scale.



Traditional building

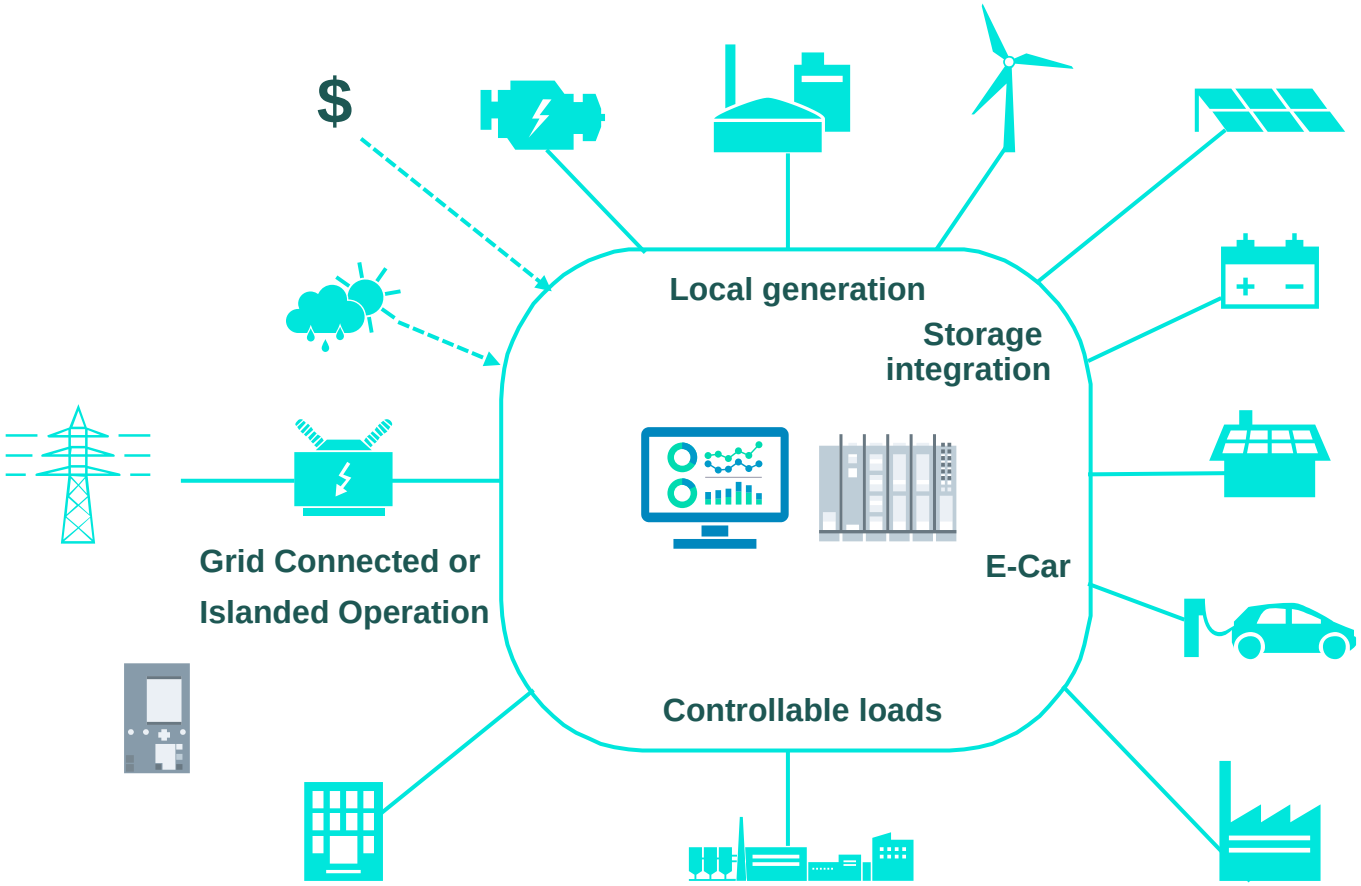
Automated building

Smart building

Autonomous building

From …	To …
• Reactive on-site service & connected remote • On-site solutions • Complex integration process • Siloed domain control	• Predictive & prescriptive • AI-enabled remote operations • Simple & easy integration • as a Service

Intelligent power control enable the transition to a sustainable and resilient energy environment



Economic & energy efficiency

- Peak shaving
- Demand charge reduction
- OPEX optimization
- Dynamic market interaction

Resiliency & reliability

- Blackout detection and black start
- Generation, storage and load control
- Day ahead optimization
- Grid synchronization

Sustainability

- Renewable integration
- Dispatch based on CO_2
- Generation and load forecast

Powermanager addresses different customer needs

Building Owner

How do I make my buildings future-proof?

Flip the Switch to energy-efficiency.

Facility Manager

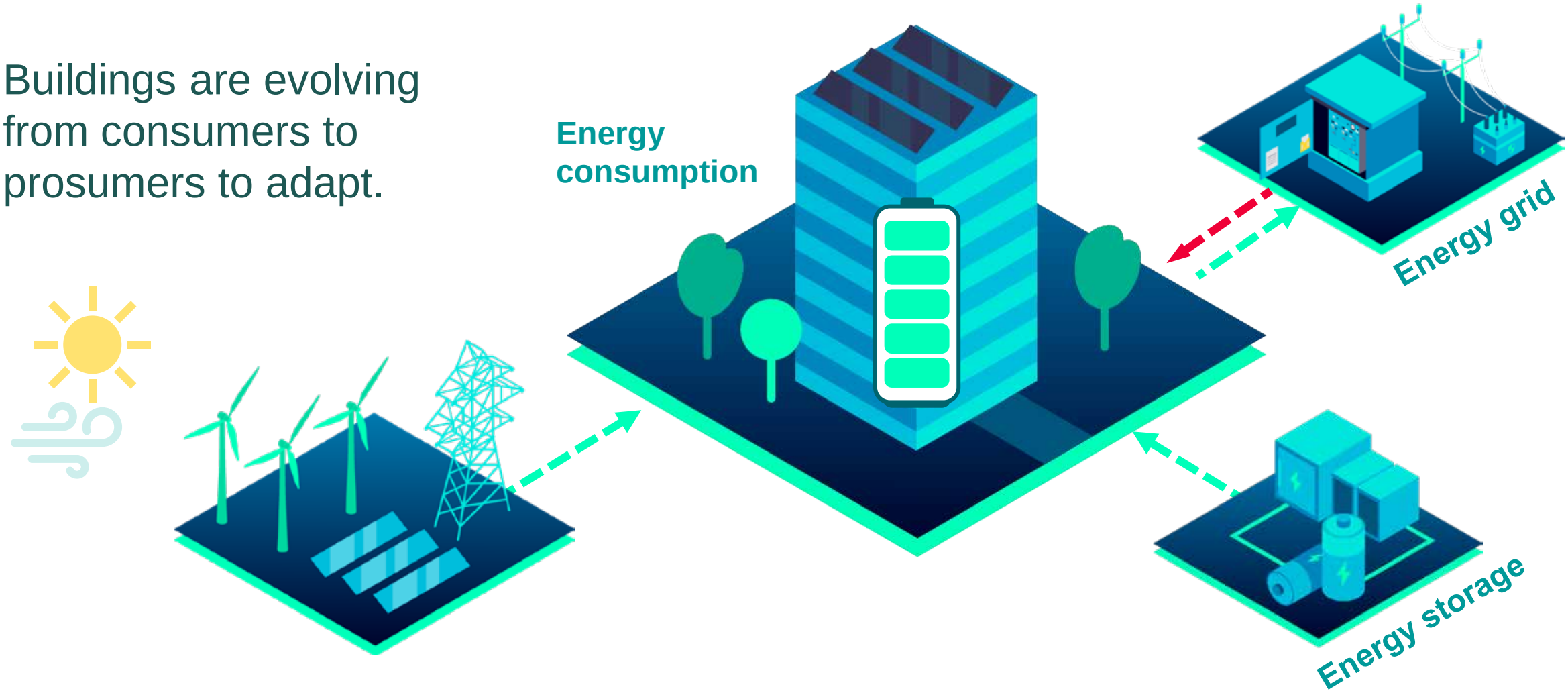
How do I and reduce operational costs?

Sustainability Manager

How do I improve energy-efficiency and achieve my sustainability goals?

Todays Challenges will be tomorrow's opportunities

Buildings are evolving from consumers to prosumers to adapt.



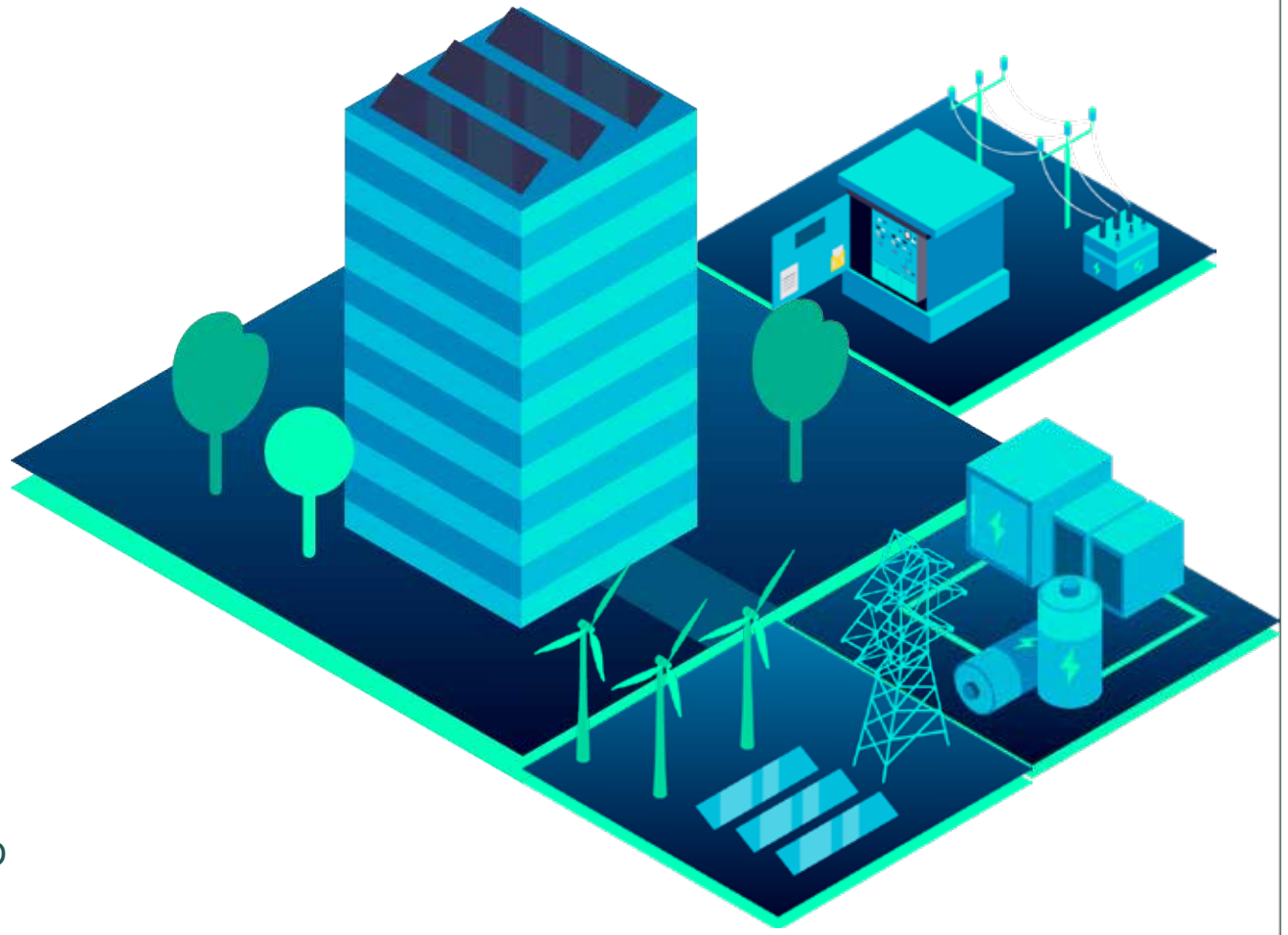
Todays Challenges will be tomorrow's opportunities

People centric buildings
Focus is on people's health, comfort and productivity

Dynamic pricing models
Expensive electricity at peak times and increasing risk of peak demand charges

Fluctuating energy sources
Production of fossil and nuclear energy replaced by renewable energy

Regulations
Energy efficiency standards such as LEED and EPBD pushing the need for integrated energy management



Microgrid Enables Smart EV Charging

Principle:

The charging power for the EV chargers will be controlled based on:

- Time of departure, state of charge and need for readiness
- Forecasted PV generation and building load profile
- Additional available on-site generation assets like battery and gas engine

Advantages:

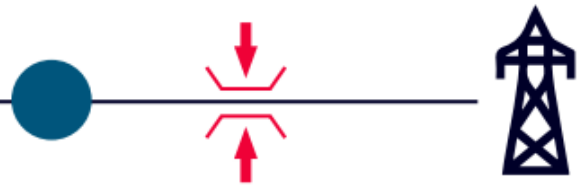
- Optimized utilization of PV energy based on EV-charging load management considering expected time of departure, energy to be charged and PV generation forecast
- EVs will be fully charged until time of departure, based on control of additional power generation assets, load capacity forecast and vehicle to grid support opportunity

Microgrid Enables Smart EV Charging

Charging Point Management
- Charging power management of all connected charging points
- Energy metering based on given regulatory framework

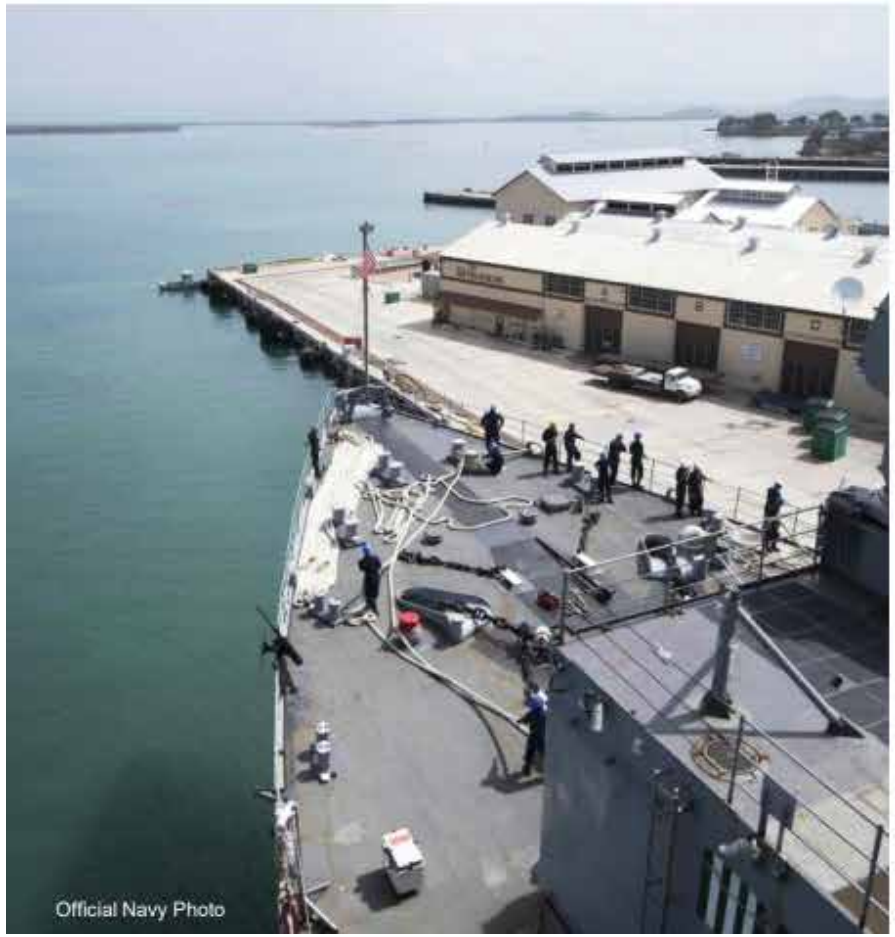
Prioritized High Power Charging
Allocating power capacities for prioritized charging

On-Site Generation & Energy Storage
Adding additional power capacities by photovoltaic and energy storage



Limited Grid Connection Capacity
Ensuring that demand limitations are not exceeded (physical or economic defined)

Building Load Management
Integration of building systems into total power management of real estate

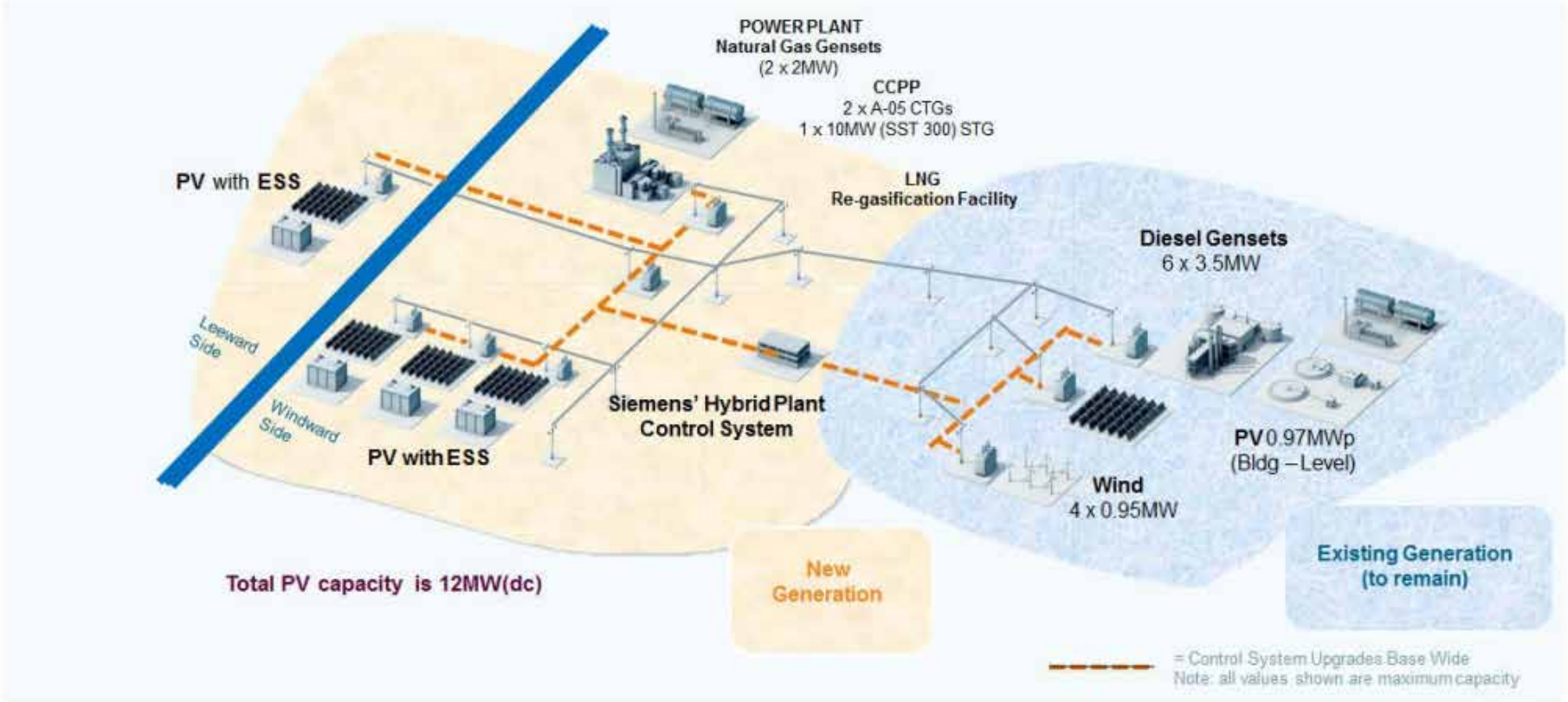


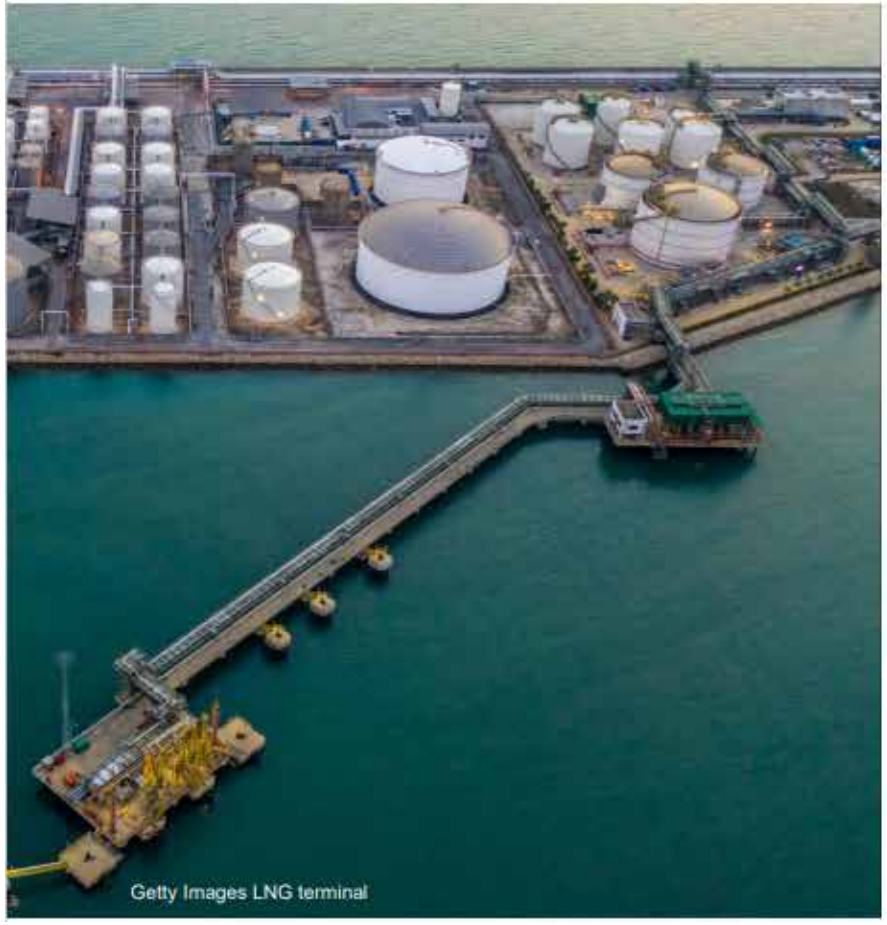
- Largest Energy Savings Performance Contract in Department of Defense
  - $344 million implementation period
  - $828 million total contractor payments
- Siemens teamed with AECOM to bring the strength of two ESCOs
- Schedule:
  - Construction and acceptance: 31 months
  - Performance period: 21 years, 2 months

Key Features of the ESPC:

- Whole base solution providing energy resiliency, reliability and efficiency
- Liquefied natural gas (LNG) as primary fuel source
- LNG procured through Defense Logistics Agency (DLA)
- Cyber secure architecture
- Renewable energy – Photovoltaics, battery storage, and monitoring of the existing wind turbines
- Dual fuel capability providing resilience of supply
- Microgrid management system connecting together the installation's power generation
- Enhanced maintenance, repair and replacement paid for through guaranteed savings

Where Old Meets New





Scope:

- Distributed Generation –24 MW nominal combined cycle power plan (CCPP) with 4000 m3 LNG facility and storage
- New dual fuel power plant
- New LNG regasification and fuel storage terminal
- Two Siemens 5 MW class SGT-A05 high-efficiency dual fuel gas turbine generators
- One Siemens 10 MW nominal SST-300 steam turbine generator
- Two 2 MW natural gas engine generators
- One air-cooled condenser
- New seawater intake

- Additional 12 MW direct current photovoltaic capacity
- New 8 MW / 4 MW hour battery storage capacity
- Increased electric grid resiliency, reliability and stability from new microgrid management system

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