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Smart Hospitals
External Sales Presentation

SI Vertical Market storyline to address customer needs and demonstrate our value-add along the whole Hospital value chain

	Trends	Industry Challenges	Persona Challenges	Use Cases	Portfolio Structure	Why Siemens Portfolio Highlights	References
Examples							
Objectives	• Demonstrate awareness • Setting the frame	• Agree on challenges / prioritize • Create common sense • Initiate conversation on relevant KPIs and urgent needs		• Address the operational issues along the value chain • Highlight value add for customer in each case	• Demonstrate modular portfolio design • How to adapt to individual requirements	• Highlight differentiating portfolio elements	• Provide proof points for success with project examples

Source: SI Hospitals Vertical Market Team

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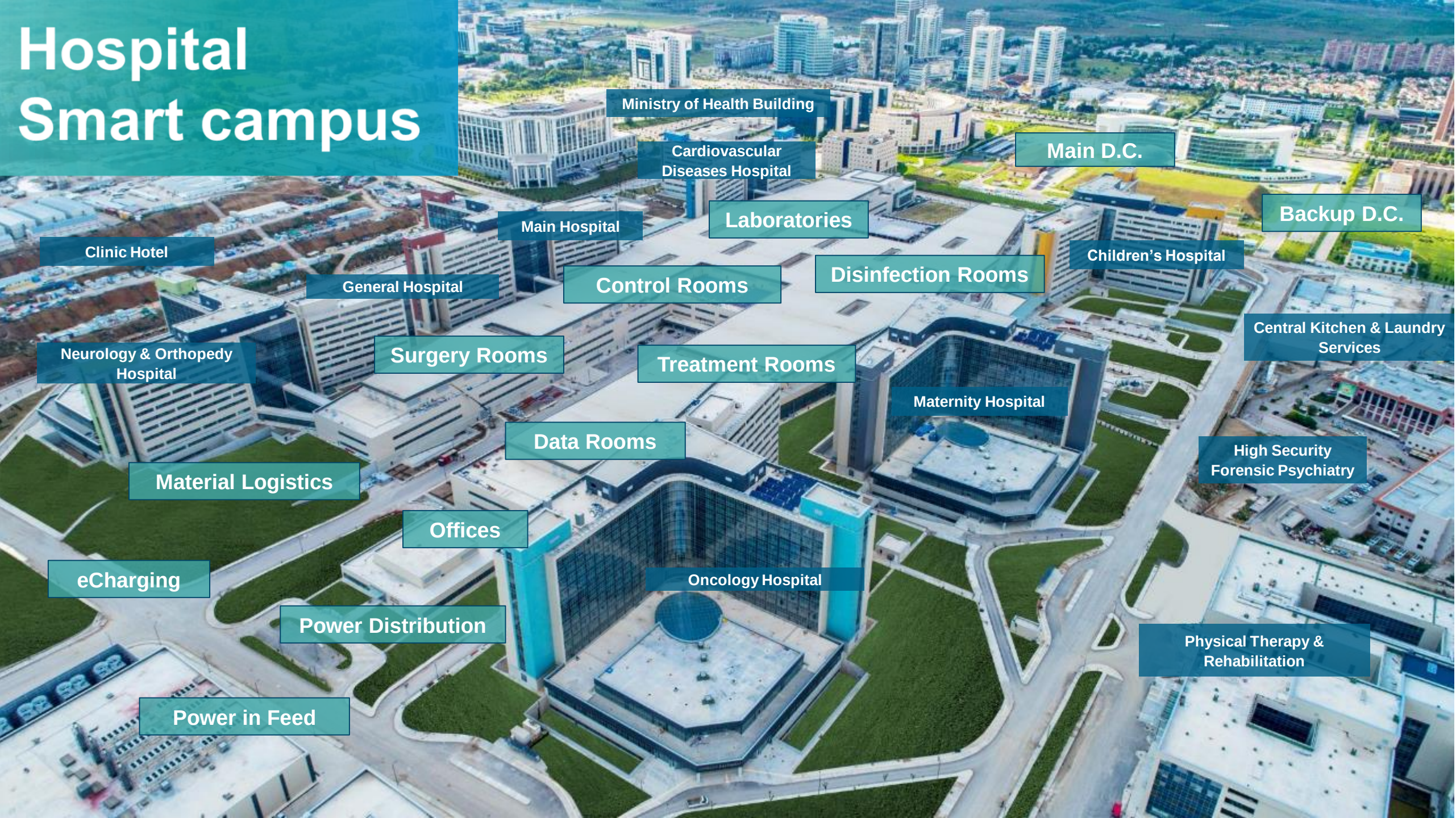
Smart infrastructure for Hospitals

Build to heal

Hospital Smart campus



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What is a Smart Hospital?


Reliability
Cloud
Patient Flow
Smart Building
Infection Control
AGVs
Apps
Asset Tracking
mHealth
Technology
Patient Satisfaction
Communication
Cost
efficient
Wearables
Telehealth
Efficiency
Wireless
Innovation
Internet
of Things
Real
Time
Data
Security
Less work stress
Transparency
Command Center
Artificial
Intelligence
Real Time
Location Services
EHR interoperability
Dashboards
Sustainability
Patient
Centered Care
Less beds


Is your Hospital campus
holding you back?


The journey towards a
Smart Hospital environment
starts with understanding the
market trends & drivers and the
resulting challenges.
Processes | Technology | Services

Trends with high impact on the hospitals' value chain

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Consolidation of organizations
Integration of systems

Increasing patient expectations
Healthcare Consumerism

Reduced reimbursement rates
Doing more with less

Reduce CO_2 footprint
Public Image and Energy Efficiency

Patient outcomes

New healthcare delivery models
AI, automation, IoT connectivity

Creating value from data
Dealing with big (and small) data

Regulatory Standards
Hygiene, Power safety, Security

Millennials workforce
Increasing workplace expectations

As patients increasingly “shop” for health care services, enhancing **patient experience** is regarded as a potential driver of hospital performance, since it may strengthen customer loyalty, build reputation and brand, and boost utilization of hospital services through increased referrals to family and friends. Deloitte research shows that good patient experience is associated with higher hospital **profitability**.

Source: Deloitte 2019 Global Healthcare Outlook

The challenges that need to be balanced

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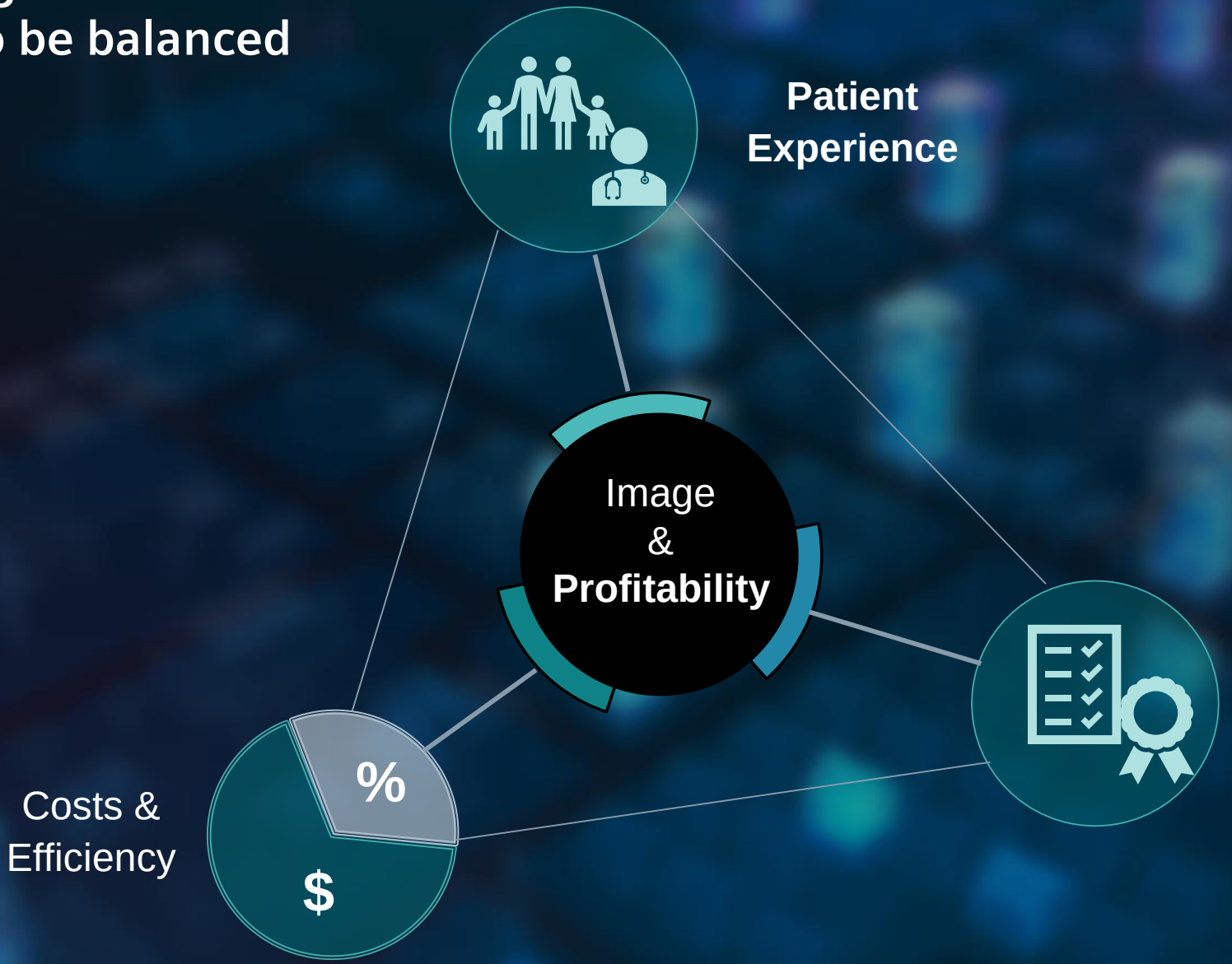

Resulting Business Objectives that need to be achieved

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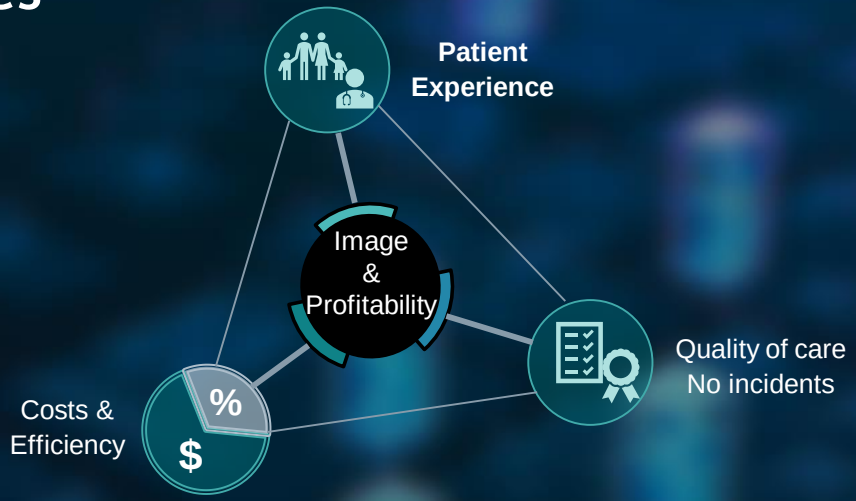

1 | Improve **Patient Satisfaction**

2 | Improve **Patient Outcomes**

3 | Improve **Staff Satisfaction**

4 | Increase **OPEX Efficiency**
- Staff
- Energy
- Maintenance

5 | Optimize **CAPEX Efficiency**
- Space
- Assets
- Construction Costs

6 | Reduce / Avoid **Risks & Incidents**

7 | Improve **Image**
- Climate
- Regulations
- Reputation

8 | Create **Alternative Revenues**

Operational issues in hospitals
Head of nursing/medical staff

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Make patients feel at home: comfortable, safe, oriented, connected, attended

Provide a supporting healing environment

Easy localization of needed equipment, co-workers or patients

Comfortable work environment with controllable lights, HVAC, room access

Increase percentage of time the staff is spending on direct patient care

Provide isolation room capacities for increasing pandemic occurrences

Curb/mitigate aggression to staff by patient or visitors/family

Prevent electrical damage to staff and patients

Reliable power supply to life-critical equipment

Operational issues in hospitals
Facility/security manager, technical director

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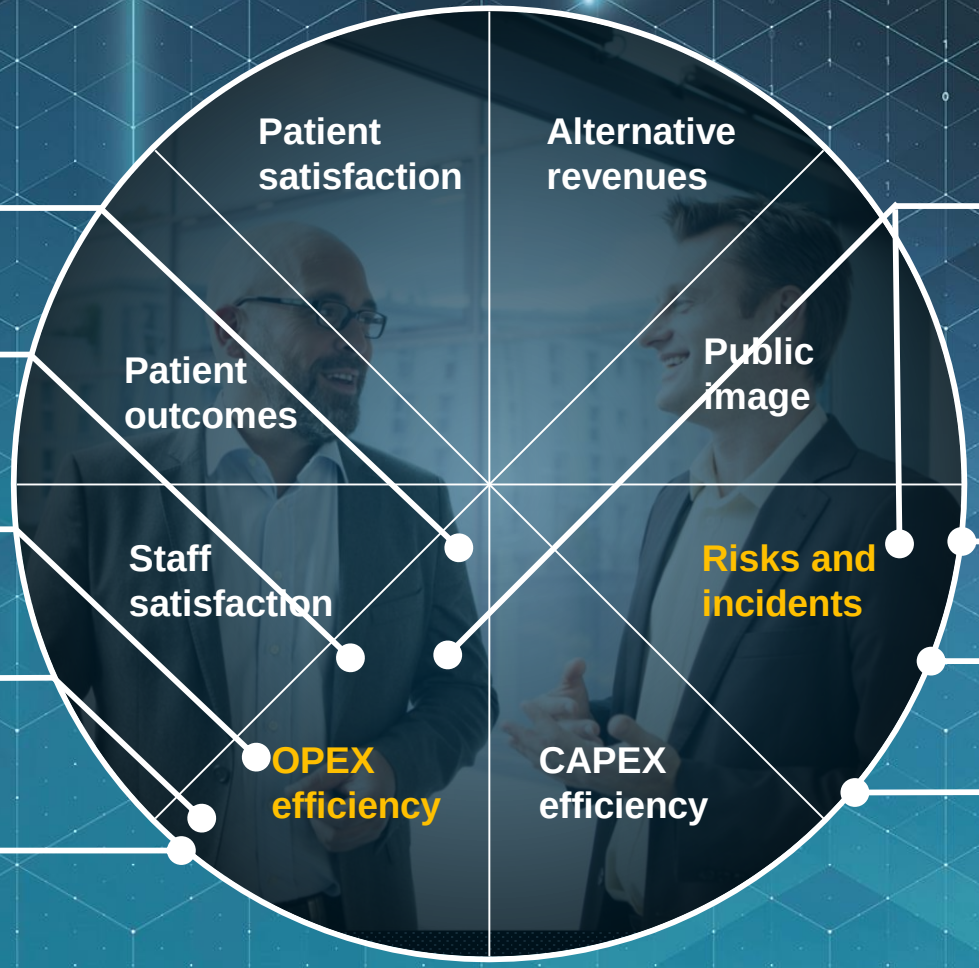

Improve staff efficiency

Improve asset utilization

Reduce energy consumption

Reduce energy costs
(per consumed unit/price tag)

Reduce maintenance cost

Provide performant & energy efficient laboratory facilities as reliable basis for treatment decisions

Effective emergency/incident communication (mass/multichannel)

Improve access control and security level

Stable power supply/minimized downtime

Operational issues in hospitals
IT manager

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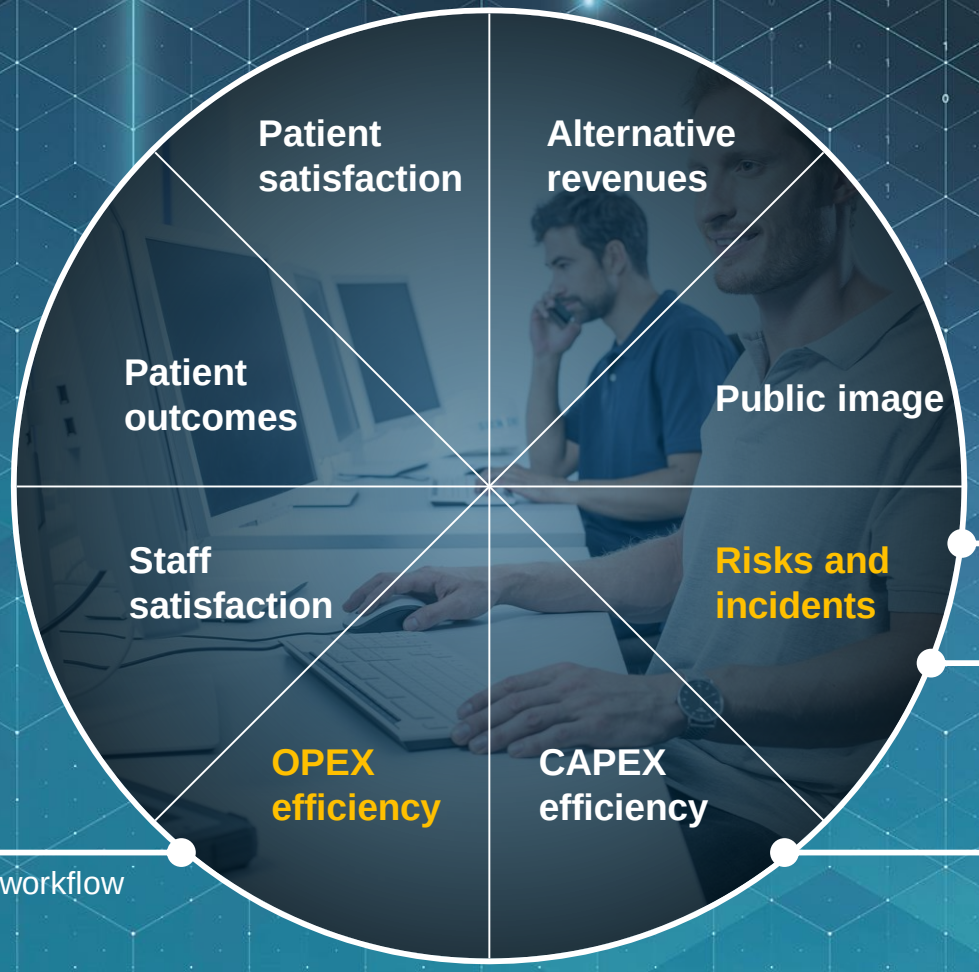


Holistic Cybersecurity

Secure and efficient data storage/patient data security

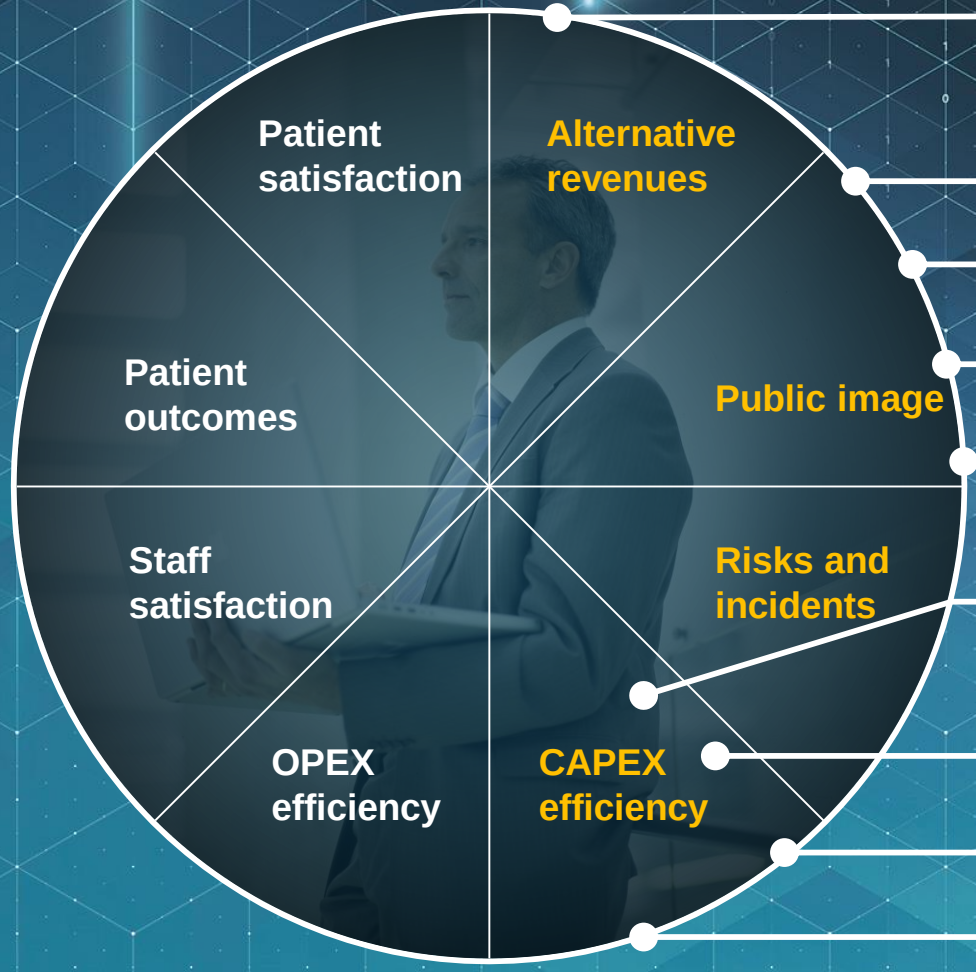
Seamless system integration and IT-supported workflow

Stable power quality

Operational issues in hospitals
Hospital (group) manager[1]

1 Specific additional issues for the overall hospital manager besides the previous issues for happy

- Patients
- Medical staff
- Facility managers
- IT managers



Act an energy prosumer monetizing distributed generation assets via flexible power trading

Offer eCar charging stations at parking

Reduce carbon footprint

Hospital building as a healing success factor

Incident-free operations for staff and patients

Scalable building and power management to new/acquired subsidiary facilities

Reduce construction costs for new buildings

Improve space utilization in existing buildings

Minimize CAPEX for black-out prevention

Operational issues in hospitals
Consultant/planner

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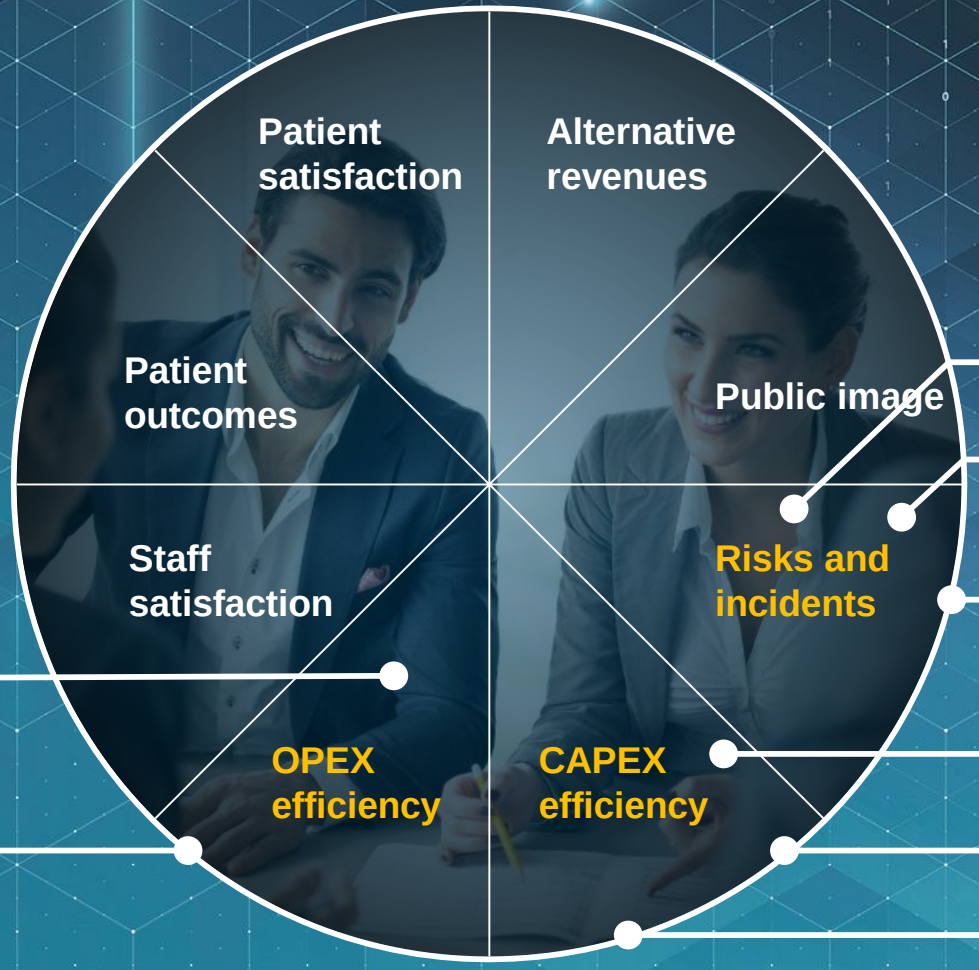

Develop power supply strategy

Comply with regulatory standards

Integration of public services

Develop design and monitoring for OPEX efficiency

Maximize space usability and flexibility

Optimize planning efficiency

Minimize construction costs

Apply scalable open industry standards

Smart Infrastructure value proposition – Our answer

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One of the **top 5** key factors in improving patient satisfaction in a hospital is **individual room control** of building systems such as

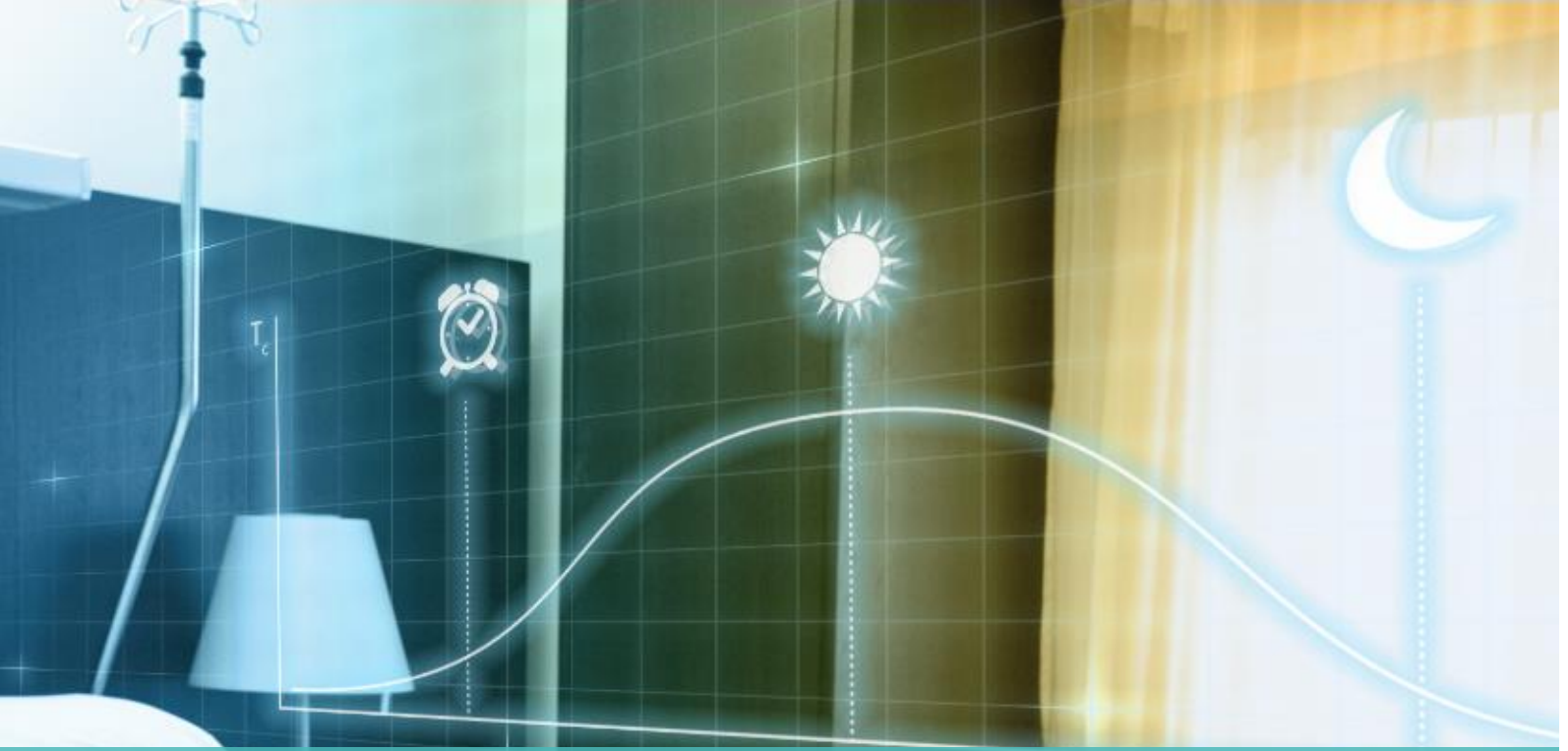
- Temperature
- Lighting
- Window shades

Source: Health Facilities Management/ ASHE 2016 Hospital Construction Survey

"I would like to feel at home. Being oriented and connected at any time while having control over my room settings is important to me."
– Patient

- Desigo Room Automation (DRA)
- Web-based Smart Room Operator
- "Annual Shading" via 3D simulation
- Way finding enlighted
- Command & signaling devices for wired nurse call systems

Patient Satisfaction | **Patient** Outcomes | **Staff** Satisfaction | **OPEX** efficiency | **CAPEX** efficiency | **Risk** avoidance | **Image** improvement | **Revenue** generation



Inappropriate lighting can interfere with the sleeping patterns that slow down the recovery process in patients. It may even trigger other additional medical issues in the patient

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Healing Environment
- lighting

Blue light shifts circadian rhythms

2x as much compared to other colors

Possible relation between shifted circadian rhythms and certain diseases

Human Centric Lighting (DRA)

The room controller from Siemens can control the lighting in such way that the color temperature follows certain curves throughout the day in order to optimize the patient recovery process

Lighting

Patient Satisfaction | **Patient Outcomes** | **Staff** Satisfaction | **OPEX** efficiency | **CAPEX** efficiency | **Risk** avoidance | **Image** improvement | **Revenue** generation

Positive Pressurized Rooms
- Operating rooms
- Delivery rooms
- Trauma rooms
- Newborn intensive care
- Laser eye rooms
- Protective environment rooms
- Pharmacy
- Laboratory, media transfer
- Central medical and surgical Supply clean workrooms
- Central medical and surgical Supply sterile storage

Negative Pressurized rooms
- ER waiting rooms
- Radiology waiting rooms
- Triage
- Airborne infection isolation (AII) rooms
- Cytology, glass washing, histology, microbiology, nuclear medicine, pathology, and sterilizing laboratories
- Autopsy rooms
- Soiled workrooms or holding rooms
- Soiled or decontamination room for central medical and surgical supply
- Soiled linen and trash chute rooms

Monitoring contaminants within critical environments and controlling air flow and air pressure are key to ensure an effective healing environment for successful patient outcomes.

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Critical Environment

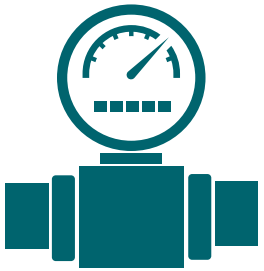
About **70%** of treatment decisions are based on laboratory results

In 2018, **77%** of surveyed US Hospitals were cited for poor control of airborne contaminants in their critical spaces due improper pressure relationships

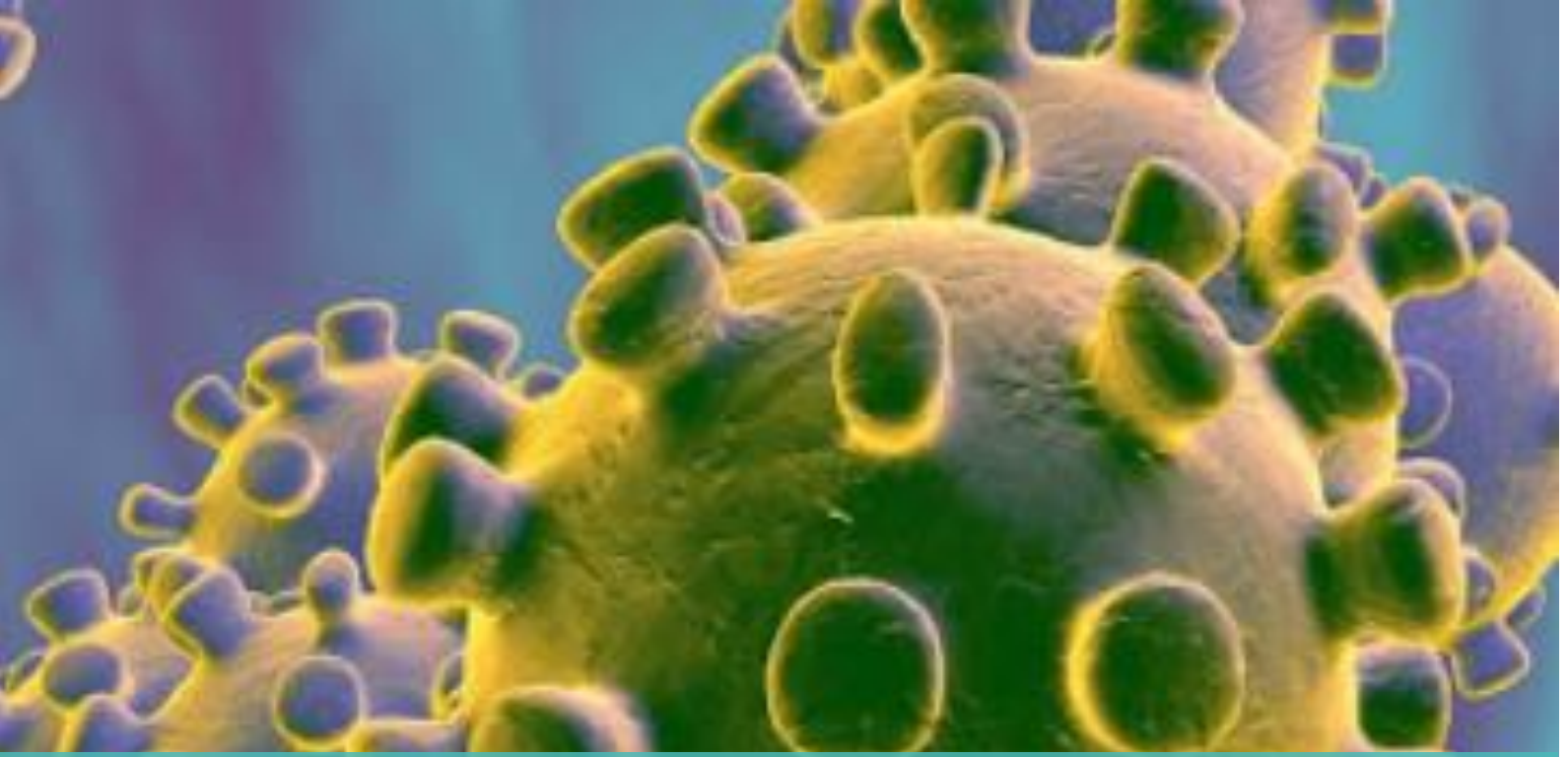
Sources: Evidence-Based Laboratory Medicine | FGI Standard 140

Pressurized Spaces Solution

- Advanced maintenance free sensing technologies
- Pressure & air flow tracking
- Fume hood control



Patient Satisfaction | **Patient Outcomes** | **Staff** Satisfaction | **OPEX** efficiency | **CAPEX** efficiency | **Risk** avoidance | **Image** improvement | **Revenue** generation



I need high flexibility in offering increasing capacities of **isolation rooms for virus pandemics** with reliable, easy and cost-efficient operation

– Medical Director, Hospital Manager

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COVID-19 Isolation rooms

Virus pandemics may infect **60-70%** of a population.

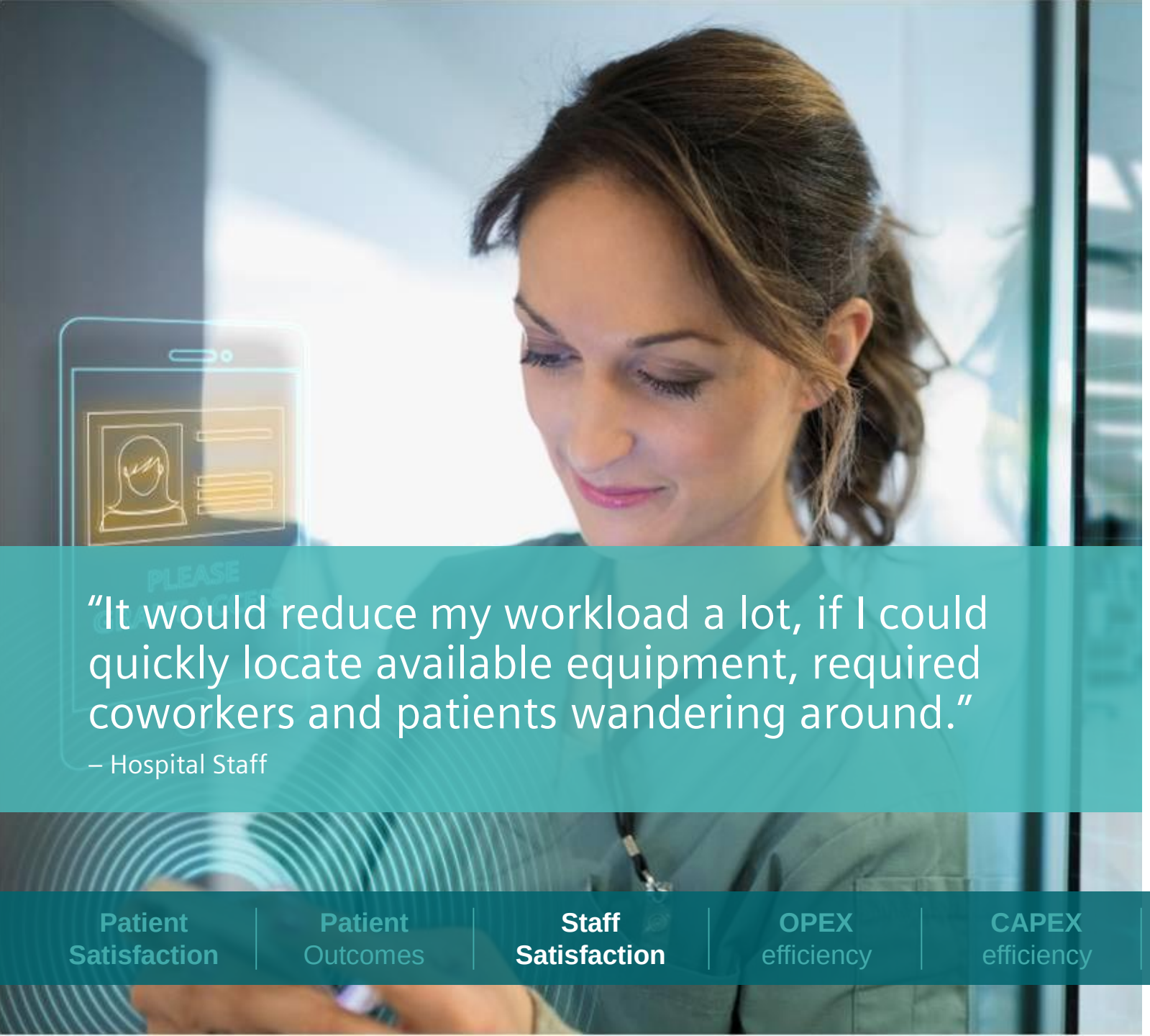
Hospitals need to react fast and flexible to offer and also reliably operate isolation rooms for infected patients as well as laboratories.

Sources: Internet sources on recent COVID-19 break-out, March 2020

Desigo pressurized room & fume hood control

- 6 different environmental parameters per room
- Supports up to 3 rooms with different user profiles
- Allows setpoint changes and individual visual + acoustical alarms

Patient Satisfaction | **Patient Outcomes** | **Staff** Satisfaction | **OPEX** efficiency | **CAPEX** efficiency | **Risk avoidance** | **Image** improvement | **Revenue** generation



"It would reduce my workload a lot, if I could quickly locate available equipment, required coworkers and patients wandering around."

– Hospital Staff

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Staff workload

Nurses spend an average

of **72 min** per shift searching for assets, coworkers and patients

ROI of Locatible RTLS for Healthcare, Frost & Sullivan

Real Time Location Service (RTLS)

- Assets – beds, instruments
- Coworkers – different specialists
- Patients – through put and wandering

enlighted

Patient Satisfaction | **Patient** Outcomes | **Staff Satisfaction** | **OPEX** efficiency | **CAPEX** efficiency | **Risk** avoidance | **Image** improvement | **Revenue** generation

"I would like to individually control my ambient workplace conditions and have hazzle-free entry to access-protected rooms to make my stressful work environment more comfortable! – Medical Staff

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Work environment

Increasingly **competitive** market for people with the required skills and **talent**

Entry of **millennials** into the workforce with different expectations and demands

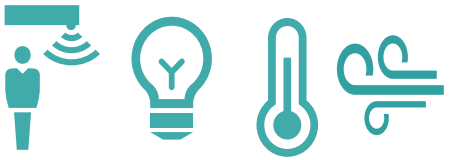
Source: Deloitte 2019 Global Healthcare Outlook

Desigo Total Room Automation

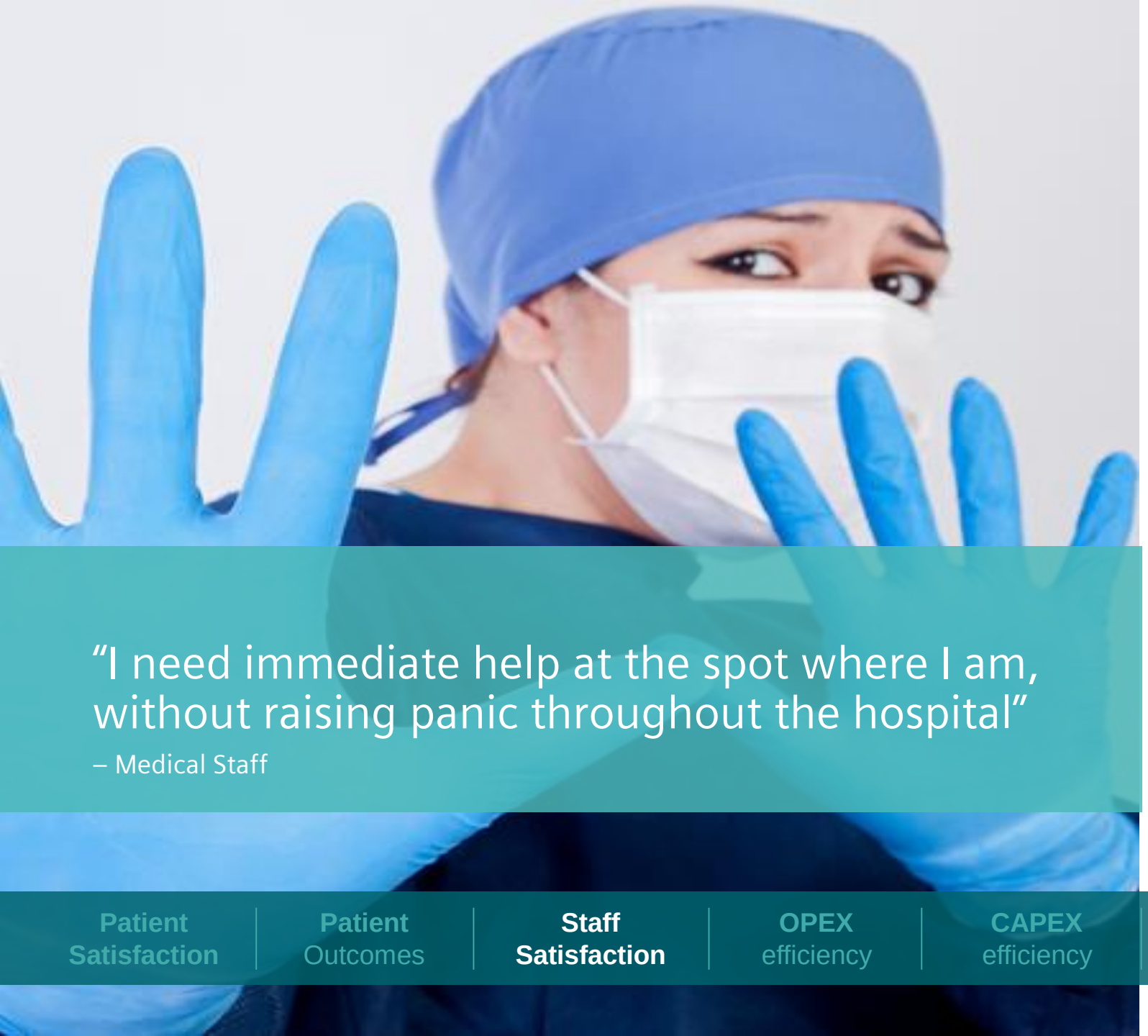
Personalized
- Access control
- Light adjustment
- Temperature setpoint
- Air flow

via RFID key

Surveillance Identity



Patient Satisfaction | Patient Outcomes | **Staff Satisfaction** | OPEX efficiency | CAPEX efficiency | Risk avoidance | Image improvement | Revenue generation



"I need immediate help at the spot where I am, without raising panic throughout the hospital"

– Medical Staff

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Workplace violence

Injury incidence rate **increased 65%** for all healthcare personnel over the last years

Optimized incident response procedures - **50% reduction** in security **man hours**

Source: Occupational Health Safety Network (OHSN)

Siveillance Viewpoint

- Advanced incidents handling
- Interactive visualization & bi-directional communication
- Zone-based alarming

Patient Satisfaction	Patient Outcomes	**Staff Satisfaction**	OPEX efficiency	CAPEX efficiency	Risk avoidance	Image improvement	Revenue generation

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Performant Laboratories

Challenge **#1** is **laboratory turnaround time**

70% of clinical **decisions** are based on in vitro diagnostic lab results, with ever growing test volumes to handle

Source: The Lewin Group, Value of Diagnostics

"We need our laboratories to be reliably available for quick treatment decisions and at the same time operating very energy efficient."
– Medical Director, Facility Manager

Desigo pressurized room & fume hood control

- **High performance** solution for safe room conditions / high speed controllers
- **Increased energy efficiency** with demand-driven volume flow control
- **Easy-to-use: one system** to operate, control and maintain, incl. lights and blinds
- **Open for 3rd party integration**

Patient Satisfaction | **Patient** Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX** efficiency | **Risk avoidance** | **Image** improvement | **Revenue** generation

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Condition based maintenance

average savings

25% reduction in maintenance costs

70% eliminations of breakdowns

30% reduction in downtime

Source: U.S. Department of Energy | Link

"I need early insights into what area is affected by an asset failure, ensure fast response and minimum impact in daily operation"

– Facility Manager

Building Information Modelling (BIM)

- 2D/3D visualization of asset location and status

Substation Device Management (SDM)

- Connectivity of power grid assets, electrical infrastructure assets, grid edge devices

Condition monitoring common Remote Service Platform (cRSP)

Patient Satisfaction | **Patient** Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX** efficiency | **Risk** avoidance | **Image** improvement | **Revenue** generation

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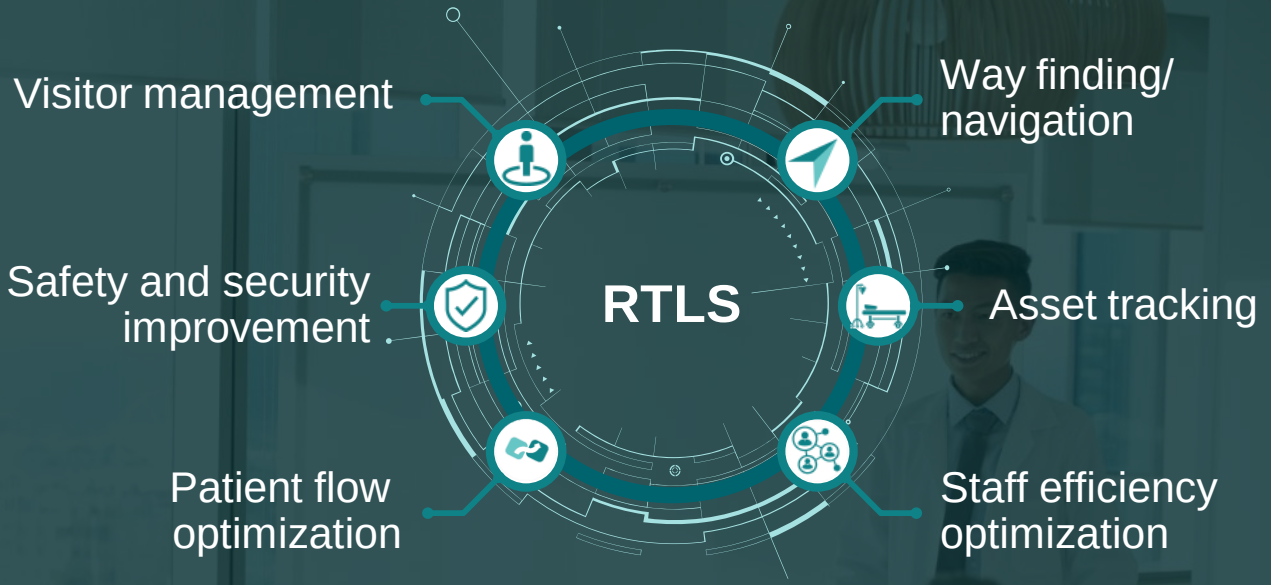
Maintenance cost reduction

A lot of maintenance calls at electrical installations can be significantly **reduced** by a better **selection** of appropriate devices.

"Maintenance time is the time of high staff cost and no productivity – we need to reduce the maintenance time to become more competitive"
– Facility Manager

- SENTRON protection devices are easy to service by trained staff
- **No** regular **testing** required for up to **4 years** for SENTRON FI (RCOs) with Sigres function

Patient Satisfaction | **Patient** Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX** efficiency | **Risk** avoidance | **Image** improvement | **Revenue** generation



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Staff efficiency

Nurses spend an average of **72 min** per shift searching for equipment

Average utilization rate of equipment is below **40%**

10% of equipment is lost or stolen during life time

Source: ROI of Locatable RTLS for Healthcare, Frost & Sullivan

Real Time Location Services (RTLS)

enlighted

Mobile Access Control

- digital access to restricted zones based on pre-defined protocols

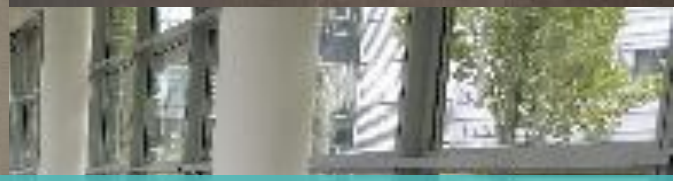
"Labor makes up about 60 percent of hospital noncapital costs and is the largest driver of operating expenses."

Source: 2018 blogs.deloitte.com › centerforhealthsolutions

~1.8 million € savings per year on labor, maintenance and lost/stolen equipment (400 bed hospital calculation available)

4,000 -5,000 Euro savings per bed per year

Patient Satisfaction | Patient Outcomes | Staff Satisfaction | **OPEX efficiency** | CAPEX efficiency | Risk avoidance | Image improvement | Revenue generation



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Staff efficiency by AGV

AGV integration can save **24%** of **shift time per day** for medical assistant staff

- Food transportation to the patient rooms
- Collection and transportation of used and clean laundry & waste transportation
- 24/7 vehicle operation time

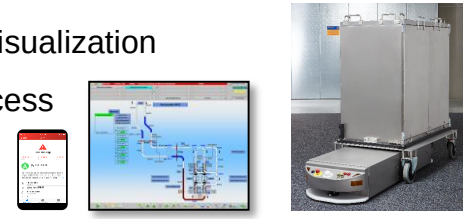
Source: ScienceDirect 2017, Procedia Engineering 192

"In order to leverage our high labor cost, we need to increase the time our staff is spending on direct patient care."

– Facility Manager & Head of Medical Staff

SIATRANS / SiriusAct

- Vehicles for every application with independent engineering partners
- Transport management visualization
- Remote maintenance access



Patient Satisfaction | **Patient** Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX** efficiency | **Risk** avoidance | **Image** improvement | **Revenue** generation

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Reducing Energy Consumption

Healthcare facilities consume

up to **2.5** times the amount of energy of a commercial building of the same size

Recommissioning of existing systems can drive **5-15%** operational savings

Source: US Bureau of Economic Analysis, McGraw-Hill Construction Forecasts, industry rep.

"Due to the high cost pressure in the market, I need to maximize energy savings along the whole value chain. This starts with transparency on consumption"

– Facility Manager

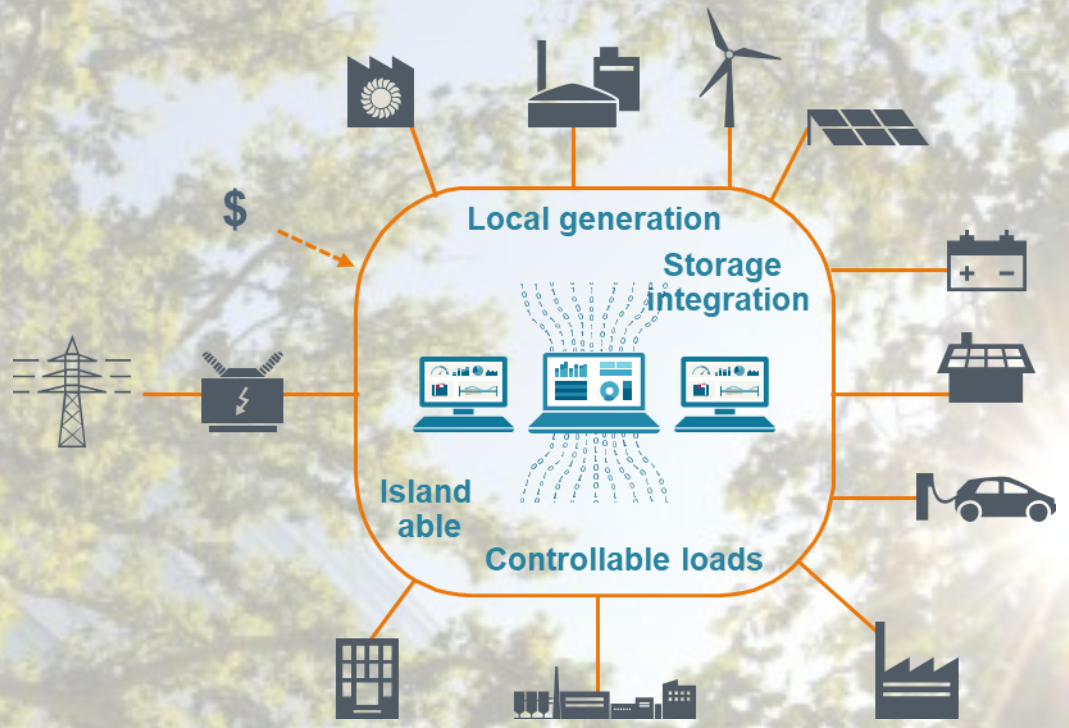
Energy Efficiency Analysis EEA

- 2D/3D visualization of asset location and status

Desigo CC and Navigator

- Integrated building management platform including Power Manager

Patient Satisfaction | **Patient** Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX** efficiency | **Risk** avoidance | **Image** improvement | **Revenue** generation



Integration of renewable energy with Microgrid reduces the required electricity from the public grid

In addition the dimension of the maximum power infeed from the utility substation can be decreased [1]

As a consequence the electricity rate is reduced.

1 | Utility customers pay a fee for their point of common coupling to the electrical grid which depends on maximum power used. This helps the electricity company to dimension their electrical grid capacity and ensures the user is receiving the power required.

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Energy Unit Cost Reduction

Intelligent **integration** of **own generation and storage** allows economic optimization of main grid supply to **reduce energy costs** and even provide increased **independence** from utility grid

Microgrid - Power Generation made smart

- Local generation & storage integration

Peak Shaving / Price & Load Forecasting

- Avoiding power from the grid during peak period

Distributed Energy Optimization (DEOP)

- Combines all power sources and power loads

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Space Efficiency

Which doctor/meeting rooms are booked but not used?

Which square meters are unused?

What are the peak times in the waiting rooms?

Where are conflicting flows of people?

"I need ongoing transparency on the actual use of spaces to make economic decisions on campus enlargements, along with maximum space flexibility in current buildings"

– Hospital Manager

enlighted IoT based multi-sensors

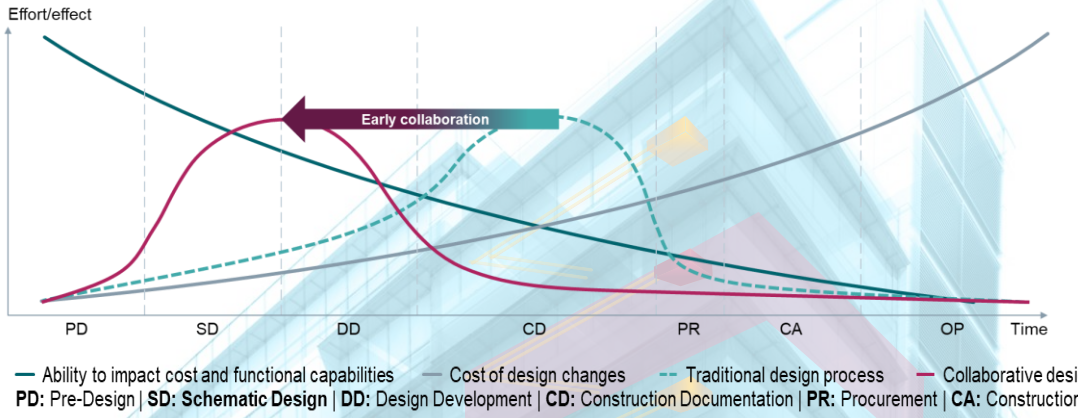
- visualizing defacto space utilization history

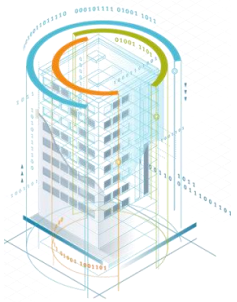
Desigo Room Automation

- maximum flexibility to adapt the building layout to the changing needs of the hospital

Patient Satisfaction | **Patient** Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX efficiency** | **Risk** avoidance | **Image** improvement | **Revenue** generation

Graphic courtesy of Patrick MacLeamy AIA/HOK





"Finding an integrated building and power management approach which optimizes the CAPEX and ensures a project execution within planned cost and time is key" – Hospital Manager & Planner

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Construction Costs

Cost reduction through early collaboration with an integrated technology partner right from the design phase

10% savings on cabling and hardware for Desigo Room Automation planned with BIM

Source: Karolinska University Hospital, Stockholm

Building Information Modelling (BIM) / Desigo Room Automation

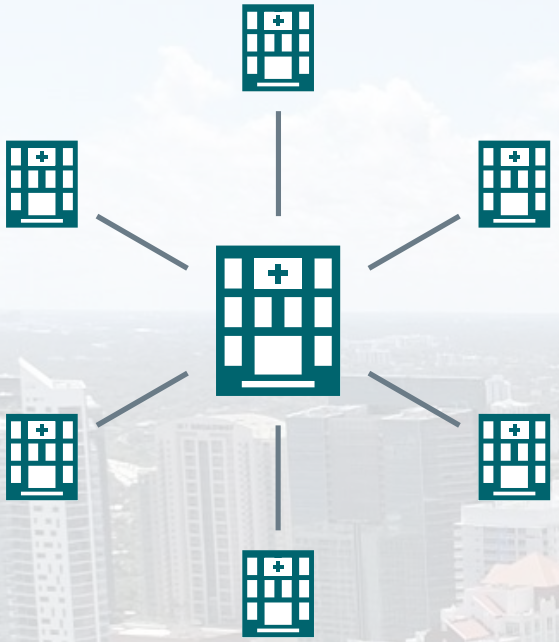
- Single source for building data optimizing IT & OT invest

Electrical Twin

- virtual image of the physical grid for modeling infrastructure power grids

Space efficient elec. products & solutions

Patient Satisfaction | Patient Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX efficiency** | Risk avoidance | Image improvement | Revenue generation



"When expanding to multiple sites, I want to maximize utilization of the distributed power assets and building management systems to minimize CAPEX spending"

– Hospital Manager

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Scalability & Adaptability

Increasing **consolidation** into hospital groups or chains

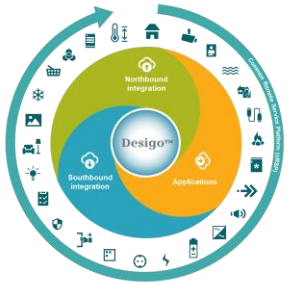
Facilities consist of **multiple buildings** of different age with different power & building management systems

Virtual Power Plant Demand Response (DEMS)

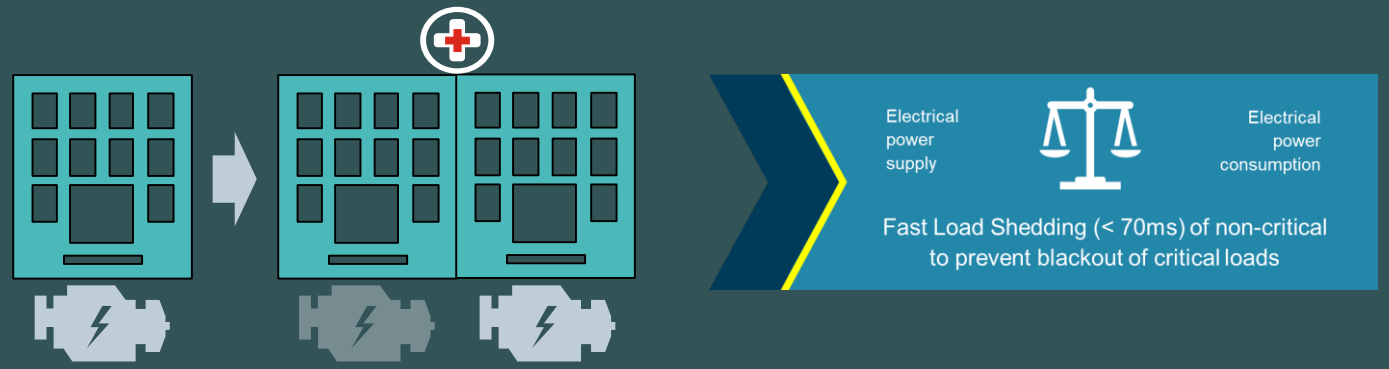
- Highly scalable platform to manage large pools of power supply assets

Desigo CC / **Cloud**

- **Open** building management platform **to 3rd party providers** of devices or applications



Patient Satisfaction	Patient Outcomes	Staff Satisfaction	OPEX efficiency	**CAPEX efficiency**	Risk avoidance	Image improvement	Revenue generation



"I want to ensure reliable black-out prevention at minimum CAPEX spending"

– Hospital Manager

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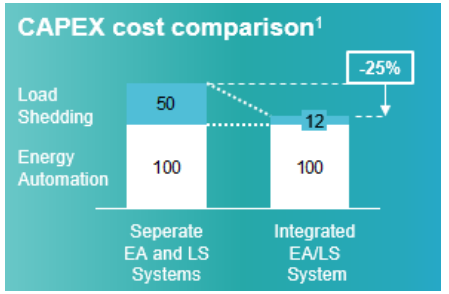
Load Shedding

Expanding the hospital with an additional wing usually requires **additional** back-up generators for blackout prevention.

- Intelligently prioritizing the critical loads utilizes existing diesel generators & energy storages without purchasing new ones

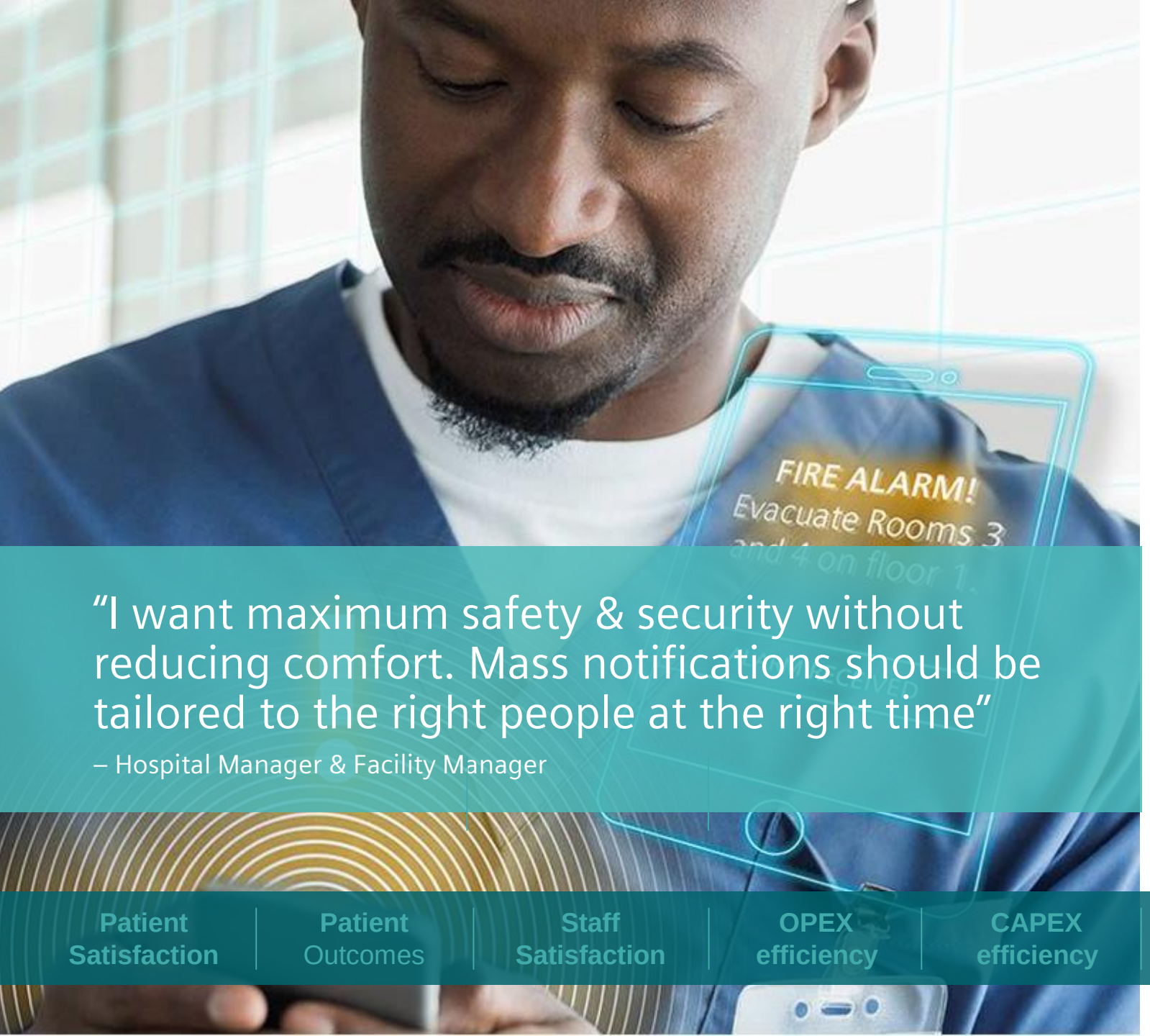
Power Management System with integrated Load Shedding system

- CAPEX optimized availability of infrastructure facilities



Patient Satisfaction | Patient Outcomes | Staff Satisfaction | OPEX efficiency | **CAPEX efficiency** | Risk avoidance | Image improvement | Revenue generation

1 | Depending on customer specific implementation;
EA: Energy Automation; **LS:** Load Shedding



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Safety & Security

366 hospital fires on average **per year** in the US

14 hospital shootings per year in the US

Source: Hospital fires | Hospital shootings

"I want maximum safety & security without reducing comfort. Mass notifications should be tailored to the right people at the right time"

– Hospital Manager & Facility Manager

Desigo CC
Siport and Sipass access control
Sinteso detectors with ASA Technology

- Continuous coding and certification
- No false alarms
- Safe and fast evacuation with workflow-assisted treatment
- Arc Fault Detection Devices (APDD)
- Emergency Stop

Fully integrated in BM platform

Patient Satisfaction | **Patient** Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX efficiency** | **Risk avoidance** | **Image** improvement | **Revenue** generation

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Cybersecurity

31.7 million patient data
stolen in the 10 biggest cyber attacks in 2019

1 patient account sells for up to **1,000 US$**

The **cost** of an average **cyber attack** on healthcare facilities exceeds **$5 million**

Source: HeathITSecurity 2019; Becker`s Health IT & CIO Report

"In the age of digitalization I need an experienced partner to continuously achieve highest possible levels of cybersecurity"
– IT Manager

- 24/7 Cyber Security Helpdesk
- Certified products as per ISO 27001
- Continuous OT Network Monitoring and Reporting Service
- Periodic Risk Assessment through System CyberRisk Audit & Security Process Audit

Patient Satisfaction | **Patient** Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX efficiency** | **Risk avoidance** | **Image** improvement | **Revenue** generation

"A black out during an operation is the worst scenario which can happen during a surgery"

– Medical Staff / Surgeon

Lawsuits and image loss would be a nightmare"

– Hospital Manager

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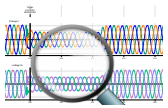
Stable power supply

40% of global healthcare organizations have experienced an **unplanned outage** in the last 12 months at a cost of **$432,000** per incident

Source: EATON Blackout Tracker Annual Report 2019c

- Blackout prevention with **Fast Load Shedding**
- Fault isolation with **Self Healing Grid**
- **Black Start** and **Auto Islanding** (Microgrid)
- Power **Quality** Monitoring & Analysis



Patient Satisfaction | **Patient** Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX efficiency** | **Risk avoidance** | **Image** improvement | **Revenue** generation

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Minimize Downtime

In case of a fault in the electrical grid, it takes time to locate the fault and restore the electrical grid manually

Spectrum Power Control Center *

- Clear pinpointing of the location
- Restoration of the electrical grid **within seconds**

Medium Voltage Ring-System-Concept

"Hospitals are critical environments where power downtimes have to be minimized"

– Hospital Manager & Facility Manager

*): Andreas Luxa on "Utility service argumentation/use case

Patient Satisfaction	Patient Outcomes	Staff Satisfaction	OPEX efficiency	CAPEX efficiency	**Risk avoidance**	Image improvement	Revenue generation

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Electrical Damage Protection

For example **22%** of unconfined, larger **fires** in **hospitals** over a span of 3 years were caused by **electrical malfunctions**

Source: 2018 Healthcare Facilities Today

"A fault in the electrical installation may injure patients and staff and cause damage to high investment assets"

– Hospital Manager & Facility Manager

Comprehensive protection concept for personal safety, system protection and protection against fire based on the completely coordinated portfolio of protection devices:

- Residual current protective devices
- Circuit breakers
- RCBOs
- AFD units
  (Preventative protection against fires caused by electricity due to insulation faults)

Patient Satisfaction | Patient Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX efficiency** | **Risk avoidance** | Image improvement | Revenue generation

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Secure Data Storage

36% of annual **growth rate** of **healthcare data** through 2025

Main drivers for growth
- Artificial intelligence, eHealth, mHealth
- Health information exchange, Blockchain

Source: BusinessWire 2018

"I need to know the state of my data center at any given time and make sure that the availability and performance of the data center is optimal."
– IT Manager

On-premise Data Center Management
- Continuous monitoring and data insights
- Right level of detail for every user role

Power Supply Management
- Consistent and permanent grid quality monitoring
- Integrated back-up generation from diesel and/or battery

Patient Satisfaction | **Patient** Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX efficiency** | **Risk avoidance** | **Image** improvement | **Revenue** generation

"I want all hospitals in my city to not only deliver perfect healing for the patients, but also support our local sustainability initiative by integrating renewable resources and make our city a greener place to live."

– City Mayor

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Reduce Carbon Footprint

With **4.4%** of **global CO_2 net emissions** the healthcare sector is a major contributor to the climate crisis.

More than half of healthcare's footprint comes from energy use of **fossil fuel combustion**

Source: European Healthcare Climate Summit 2019

- Microgrid Control
  Intelligent systems to convert your infrastructure to a smart energy system and prosumer facility
- SiStorage / Fluence
  Battery solution to store renewable energy from own photo voltaic systems or windmills
- Navigator
  Continuous energy KPI monitoring
- Photovoltaic solutions

Patient Satisfaction	Patient Outcomes	Staff Satisfaction	OPEX efficiency	CAPEX efficiency	Risk avoidance	**Image improvement**	Revenue generation

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eCar Charging

- Lack of efficient charging stations is one of the most serious barrier for eCar use.
- No home-charging possibility in high-density urban areas.
- Global need of 40 mill chargers representing a $50 bn invest until 2030

Source: McKinsey 2018

"I would like to leverage my investment in own renewable energy assets to generate additional revenues and improve public image at the same time."

– Hospital Manager

Siemens E-car Operation Center

- Manages the charging infrastructure and the grid connecting the charging points
- Provides semi-processed data to external systems for use in further processes like billing, telematics

Patient Satisfaction | Patient Outcomes | **Staff Satisfaction** | **OPEX efficiency** | **CAPEX efficiency** | **Risk avoidance** | **Image improvement** | **Revenue generation**

Our offering

Products, applications and services for power supply, power distribution and building technology for Hospitals

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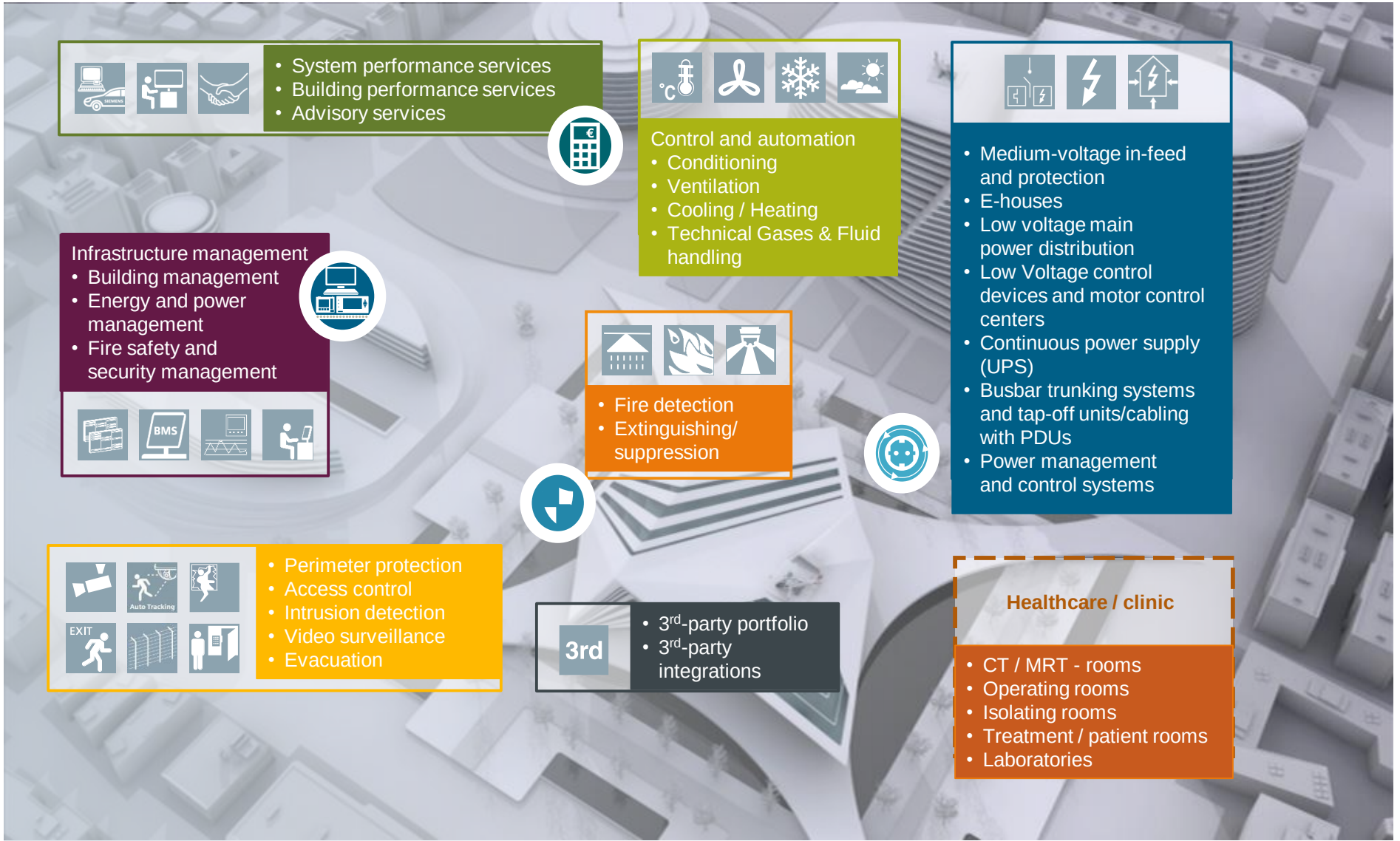

- Fire safety
- Totally Integrated Power
- Security
- Services
- BACS
- Infrastructure Management
- 3rd-party

SI application portfolio to improve patient satisfaction, staff performance and facility productivity in hospitals

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Applications for Hospitals

Infrastructure Management & Room Automation

Power & Energy Management	Building Management	System Monitoring	Facility Performance Optimization	User Centric Applications
Benefits				
• Power availability (24/7) • Grid / System resilience	• Control • OPEX • Business performance	• Transparency & actionable insights • Risk mitigation	• Facility productivity • OPEX reduction	• Workplace simplification • Comfort • Staff productivity
Portfolio examples				
• SENTRON powermanager • SENTRON powermind • EPMS [1)] • Energy IP cloud incl energy efficiency analytics	• Desigo CC	• Desigo CC • Lab Hub • SIMOCODE pump control incl. energy monitoring • SIRIUS monitoring	• Navigator • Soft Starters SIRIUS for ventilation and pumps • Long-life and silent switching with 3RF2 solid state devices	• Enlighted • Comfy • Lab Hub

1) Energy and Power Monitoring System

Highest value-add potential lies with people productivity & comfort

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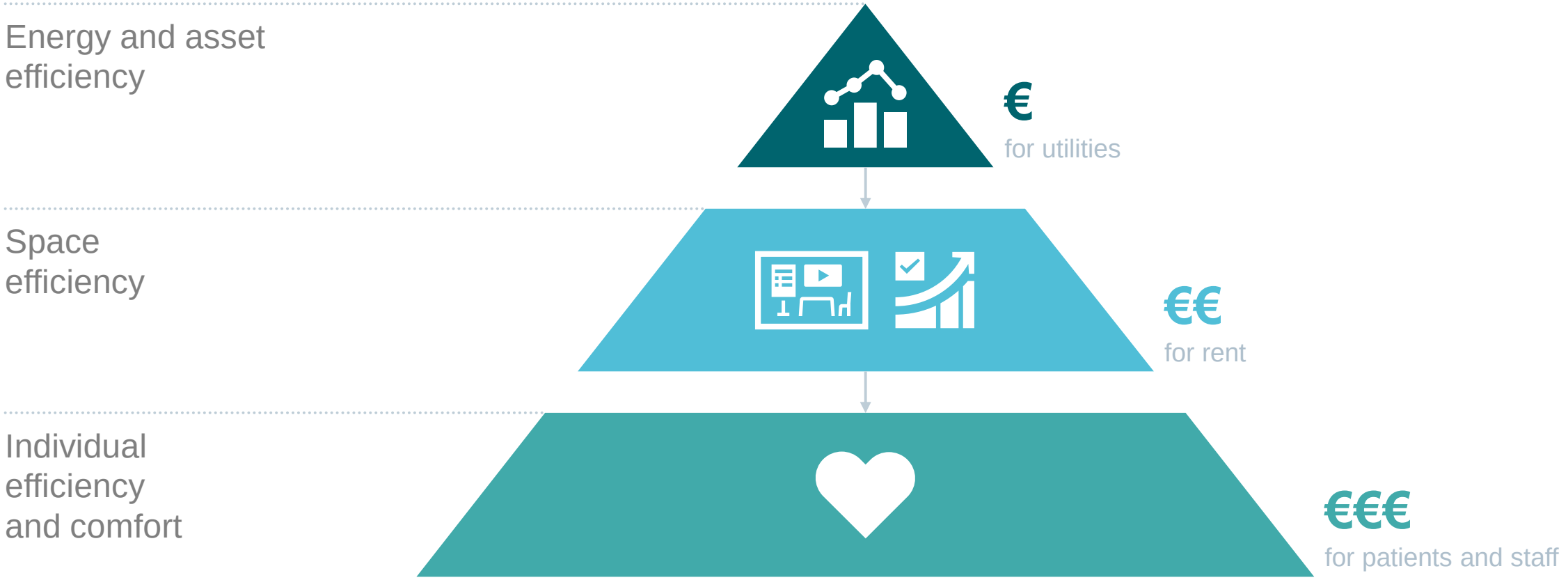

Source: JLL, Trends & Insights 2016

SENTRON power manager supports your demand for 24/7 power availability

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Direct business relevance	Monitor, analyze & optimize	SENTRON power manager
Load peaks may create extra charges from power supplier	Identify patterns and create workarounds to avoid or reduce load peaks	Detailed load and influencing factor monitoring for root cause analysis
Reporting required to comply with regulations [1] from environmental authorities	Consolidate relevant metrics and create tailored reports for audits	Reports for consumption and cost allocation to specific cost centers
Opex reduction through energy consumption optimization & quick fault detection	Tracking and analysis of energy consumption; visualization	Visualization features to illustrate load profile & measured values in characteristic curves

1) e.g. ISO 50001

Power Manager provides multiple features to support energy efficiency and system resilience

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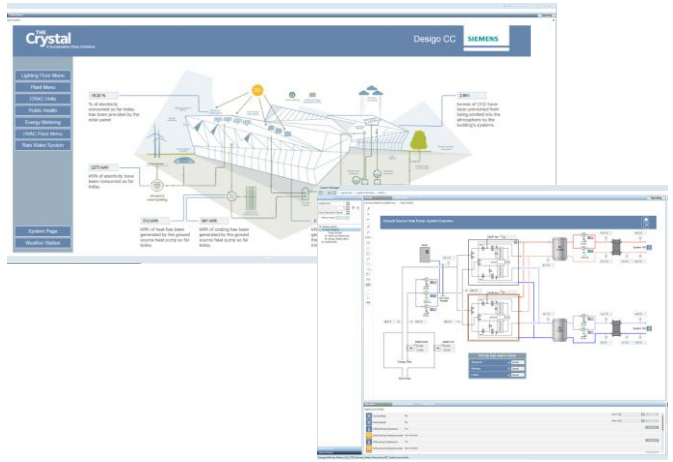
Dashboards (web server / app)

- Graphic library provides hundreds of predefined elements
- Revised workflows for setting up the system, graphically displaying the data and processing it in reports

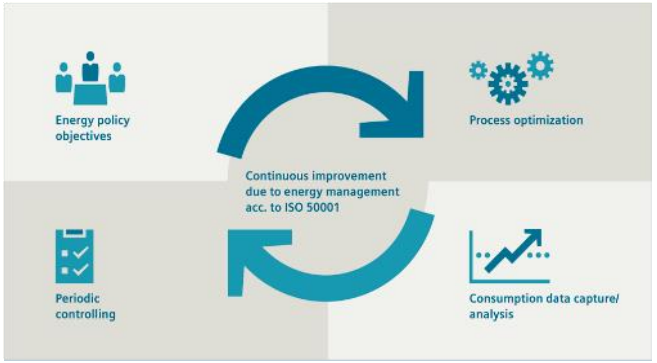


Analyze energy

- Direct comparison of individual loads
- Transparency of power flow and use
- Identification of power peaks
- …

Data-driven actions

- Develop energy efficiency measures
- Direct relation to energy bill
- Educated dialogue with power utility
- Energy management system reporting and continuous improvement according to ISO 50001 series



Dynamic building management automation platforms and applications harness data and transform operations

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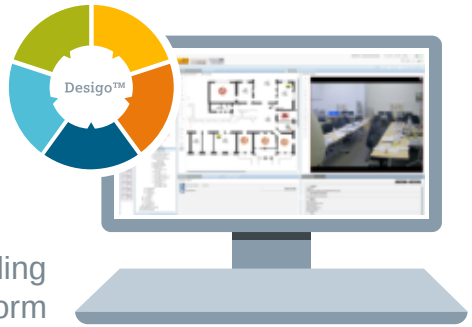
Building performance tools and analytics

Navigator

Service Portal

Integrated management platforms and applications



Integrated Building Management Platform

Integrated Security for Critical Infrastructure

Room, automation, field devices

Enlighted elevates your critical environment to the next level

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Creating actionable insights from operation

Capacity planning

Asset management

Demand-driven Energy optimization

Apply analytics to integrated ecosystem of smart sensors and building automation

Utilization maps

Motion patterns to analyze workflows and asset utilization

Motion-based lighting and pressurization

Enlighted IoT platform

Staff and people motion

Asset and item motion

Motion-based workflow integration

Enlighted Space Utilization Suite – look and feel

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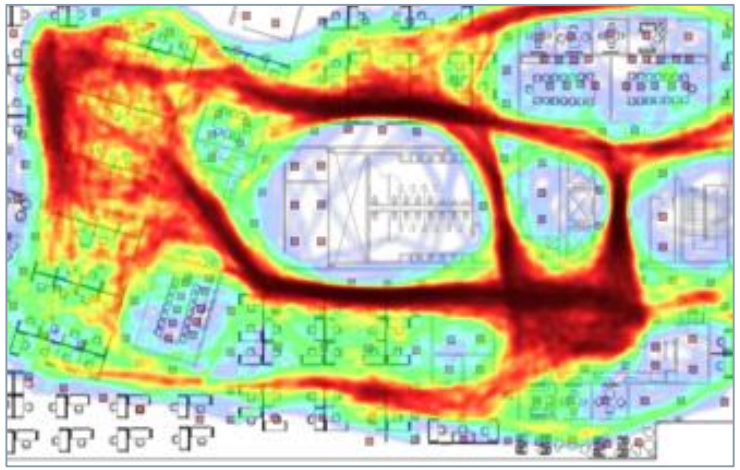
Dashboards

Key portfolio-, campus-,
and building-level metrics

Analyze Space

Utilization, motion, occupancy
per zone and/or floor with
visualizations and reports



Data-Driven Actions

- Increase space utilization
- Optimize space design
- Improve workspace flow
- Facilities management

Comfy pushes staff productivity by simplifying operations across office and life science spaces

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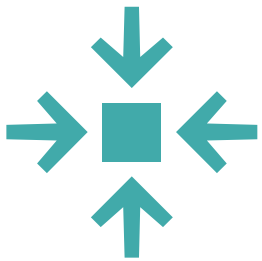
Create outcome-centric operations

Process-based lighting adjustments

Simplified work request generation

Easy room and desk booking



Bundle the relevant workplace adjustments to a single interface

Adjust brightness and light temperature acc. requirements

Order useable and set work requests from the app

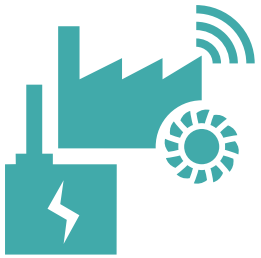
See availability and book in real time

Comfy smart campus – smart building

Integrated building automation and smart lighting

Facility Management workflow integration

Smart sensors and integrated panels



Comfy – Examples of features

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Temperature

Warm or cool workspaces on-demand

Lighting

Adjust the lighting in the workspace

Rooms

Find and book available meeting rooms

Desks

Find and book available desks

Work Requests

Submit work requests or flag issues

Maps & More

Find nearby amenities

SI products & systems portfolio to address the challenges in today's Smart Hospitals

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Products, systems and solutions for Hospitals

Infrastructure Management & Room Automation

Power grid in-feed	Medium Voltage Distribution	Low Voltage Distribution	Fire Safety	Comfort	Security & Access	Healing Environment
Benefits						
• Power independence • Power supply resilience	• Security of supply • eMobility revenues	• Safety • Flexibility • Protection and control	• Safety • Business continuity	• Control • OPEX • Patient experience	• Staff productivity • Business resilience	• Patient satisfaction • Patient outcomes
Portfolio examples						
• HV/MV-Transformer substation • E-houses • Substation automation • Renewable integration (DES/EPS)	• Transformer substation • MV Switchgear • Protection relays • Battery storage • Microgrid controller • eVehicle charging infrastructure	• LV Switchgear • Busbar trunking systems • Protection Devices • Motor control centers / soft starters • Simocode motor management • Control cabinets • Storage • Monitoring • Smart edge devices	• Detection • Mass notification • Extinguishing	• Real Time Location Services • Annual Shading • Monitoring devices • Ventilation • Lighting • Controllers • Actuators • Valves • Sensors • Push Buttons	• Mobile access management • Real Time Location Services • Video surveillance • Intrusion detection • Evacuation • Cybersecurity (patient data)	• Circadian lighting • Individual room control / patient terminal • Isolation room solutions (air pressure) • Operating room solutions (UV disinfection)

Power Building Hospitals specific

Power Grid | MV | LV | Fire Safety | Comfort | Security | CET

Electrical energy:
As indispensable as blood in our veins

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Electrification

Efficient power

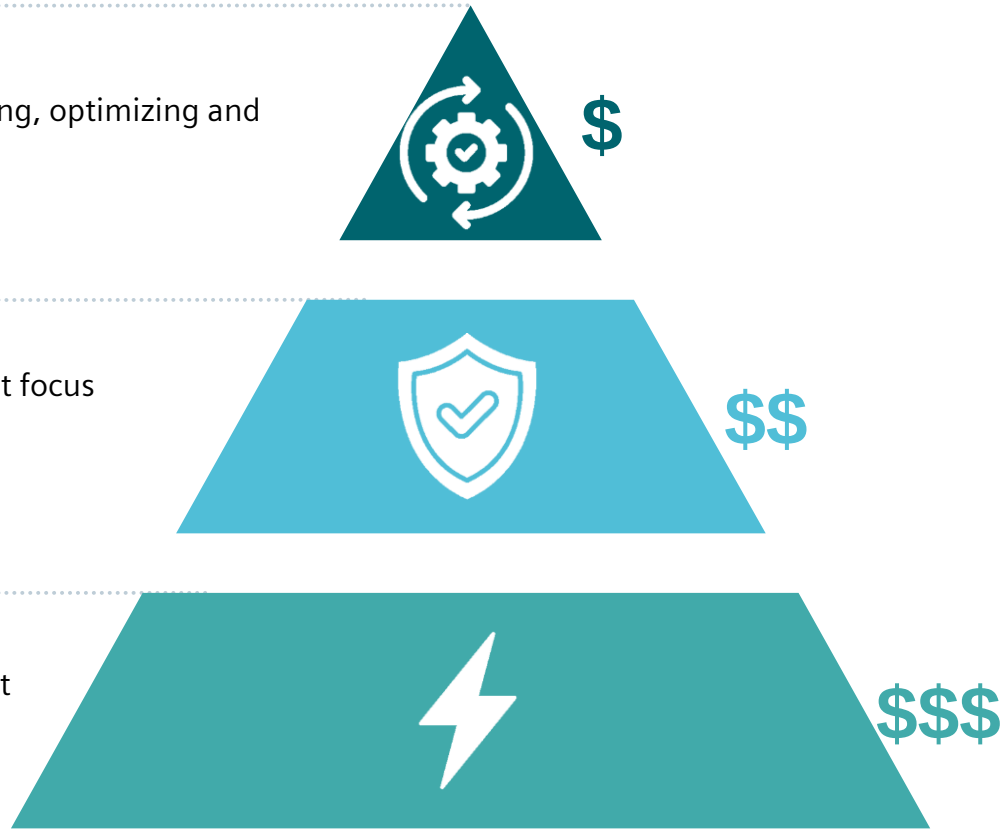
Energy monitoring allows benchmarking, optimizing and analysis of power flows.

Secure power

Personal safety and IT security – a must focus for Siemens technology.

Reliable power

High planning, production and product quality for a long reliable life time



E-House creates flexibility to adapt capacities in a modular and cost-effective way

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Adapt capacities

Capacity extension to react on demand for new production lines or new applications (e.g. eVehicles, storage)

Need for **connecting renewable energy sources** to campus

Incidents like fire/flooding that damage/destroy existing substations

Complex infrastructure

Short lead time for extensions require reliable solution and short-term availability

High complexity to extend capacity of existing infrastructure

Unexpected business downtime requires immediate workaround

Modular power substations

Customized, fully equipped and pre-tested modular power substation; improved EHS performance (reduced on-site presence)

Cost optimized (CAPEX / OPEX)
Fast and easy to install; time efficient (parallel design, factory built and tested)

Battery storage system SIESTORAGE enables transition towards energy distribution as an active success contributor

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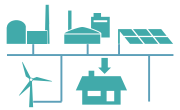
Increasing number of on-site electricity loads

- CO2–footprint objectives to be achieved
- New electrical loads, e.g. eVehicle charging
- No strategy towards electrical storage application in place
- Expectation of high system resilience and 24/7-power supply, while grids become less reliable

Unclear business case for battery storage

- Uncertain **CAPEX/OPEX model**
- **New loads & load fluctuation**, e.g. eVehicle charging
- Power supply constraints & **peak-load penalties** due to low grid capacity
- Higher demand for **peak load shaving**
- **Inefficient use** of self generation / **RES** 1)
- Higher **supply resilience** & capable power back-up required

Tailored integration of battery storage system



- Evaluate **CAPEX/OPEX model** and power grid **feasibility**
- Ensure plant power capacity coverage for new loads and **independence from grid supply**
- Provide **flexible load management** and **grid balancing** offering to utility, incl. eVehicle charging from RES 1)
- Negotiate for **power supply cost rebate** from utility / grid operator

1) Renewable Energy Systems

Two ways of PV power connection:

SINACON PV central inverter and KACO Blueplanet BP string inverters

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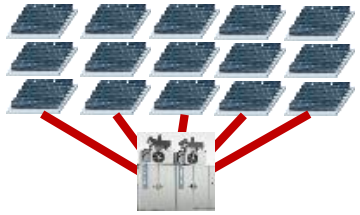
SINACON PV



PV Central Inverter
(2.5 & 5 MVA)

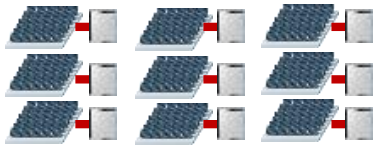
PV arrays connected centrally to inverter

- High performance
- Flexible design
- Digitally enabled
- Comprehensive “plug & play”
- Grid management services

Siemens delivers inverter or embedded skid
(inverter + transformer + RMU)

Examples:
- Trung Nam, VN (258MWp)
- Troja, IT (63MWp)

KACO blueplanet



PV String Inverter
(3 kVA – 150 kVA)

PV string connected to each inverter

- Compact design
- High efficiency
- SiC technology
- Smart
- PV, Storage, eMobility

Siemens delivers inverters and power skid
(LV switching + transformer + RMU)

Globally 12GW delivered:
- Residential
- C&I
- Utility scale PV

Advanced storage solutions for grid, renewable integration, C&I applications and e-mobility

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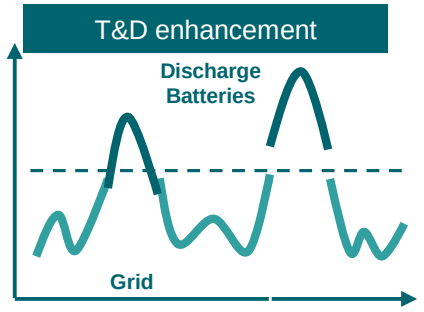
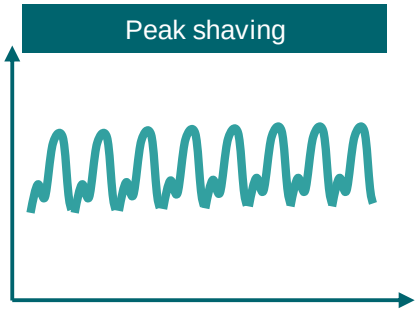
AC grid-scale energy storage

2 MW – 100+ MW
30 minutes – 4+ hours



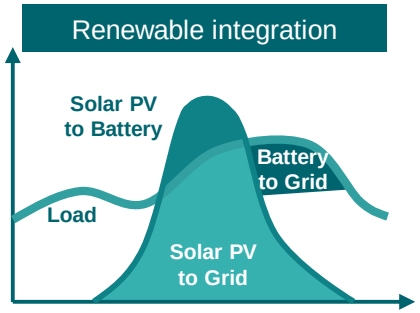
AC energy storage C&I applications

500 kW – 2 MW
30 minutes – 4+ hours



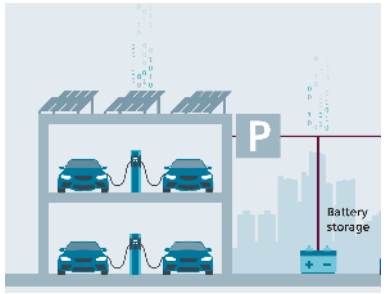
DC coupled energy storage for solar

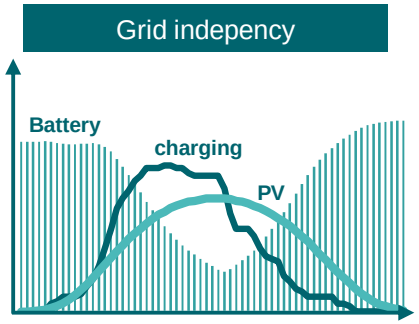
1 MW – 100+ MW
1 – 4+ hours



PV & Storage to support e-mobility charging

e.g. 600kWp PV
2MWh battery storage





Medium voltage distribution with secured operation for staff, assets and building

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A serious topic

Blackouts affect everybody's life

Critical in hospitals and commercial buildings

Many blackouts caused by insufficient insulation or false operation

Blackouts can endanger lives and loss of data

Lack of insulation

Switchgear in the past:

Open AIS switch disconnector
or
Open AIS fuse protection

protect or disconnect standard lines but are sensitive to environmental conditions

Improving safety & security of supply

Gas Insulated Switchgear Type 8DJH:

- hermetically sealed
- metal encapsulated
- no ageing of insulation
- uniform operating scheme
- interlock control

High operational reliability, maintenance free

Prevented maloperation

Worldwide applicable and certified

GEAFOL Dry-Type Distribution Transformers provide safe and flexible solution for grid access

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Power supply in-feed required

Demand for direct building power in-feed and in-building installation

High safety and fire protection requirements and regulations

Demand for high power supply reliability and resilience

Specific requirements for industrial environment

Multiple challenges: safety, flexibility, efficiency

Shortage of space due to building size optimization

Incoming power lines are **close to people and working areas**, e.g. in production lines

Conventional transformers with oil cooling create unmanageable **risk of fire or explosion**

Strict **environmental and safety requirements** limit the create conflicting goals

Enhancement of fire / environmental safety & energy efficiency

Safe and eco-friendly insulation:

- Epoxy-resin insulation; no water or soil contamination by insulating fluids
- Hardly inflammable / explosion-resistant
- Compliant to the EU-Eco design directive [1)] with minimum load losses

Flexibility of location operation:

- The direct vicinity of people
- Functional buildings
- Residential and work environments
- Suitable for high humidity climates

1) IEC 60076:
- E2 Environmental class (E3 on request)
- F1 Fire behavior class (highest class)
- C2 Climate category (C3, C4, C5 on request)

Outdated classic cabling approach creates various unnecessary challenges

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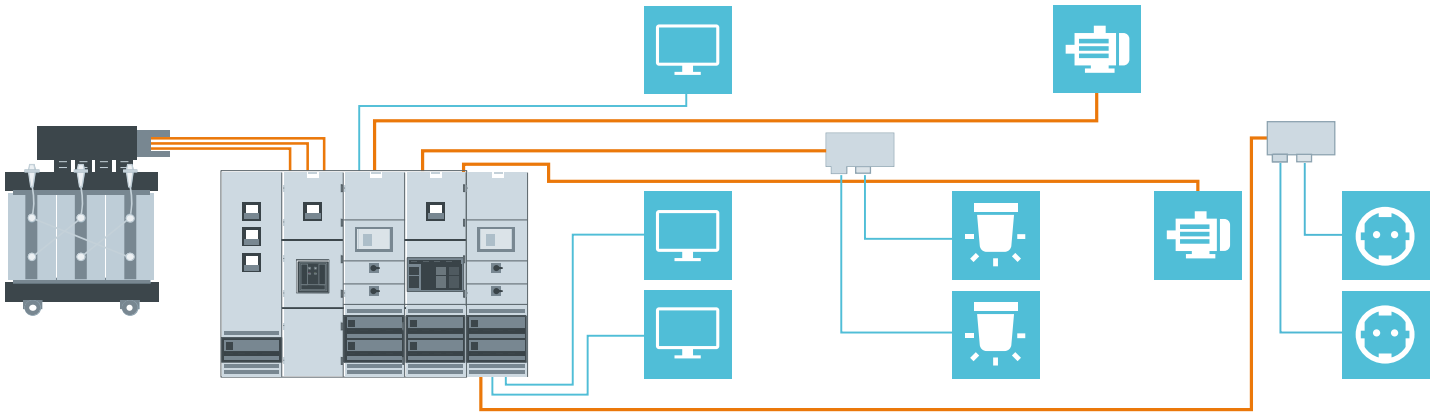
Centralized power distribution
with **classical cables**



Installation

- High installation effort
- Limitations due to bending radii
- Power losses in cables

Changing needs

- Complex to deploy changes
- Costly adaptions
- Long downtimes

Fire load

- High fire load due to PVC and halogen
- Electromagnetic issues can be delicate

SIVACON busbar trunking systems lower your project and operational cost while improving safety and Life Cycle cost

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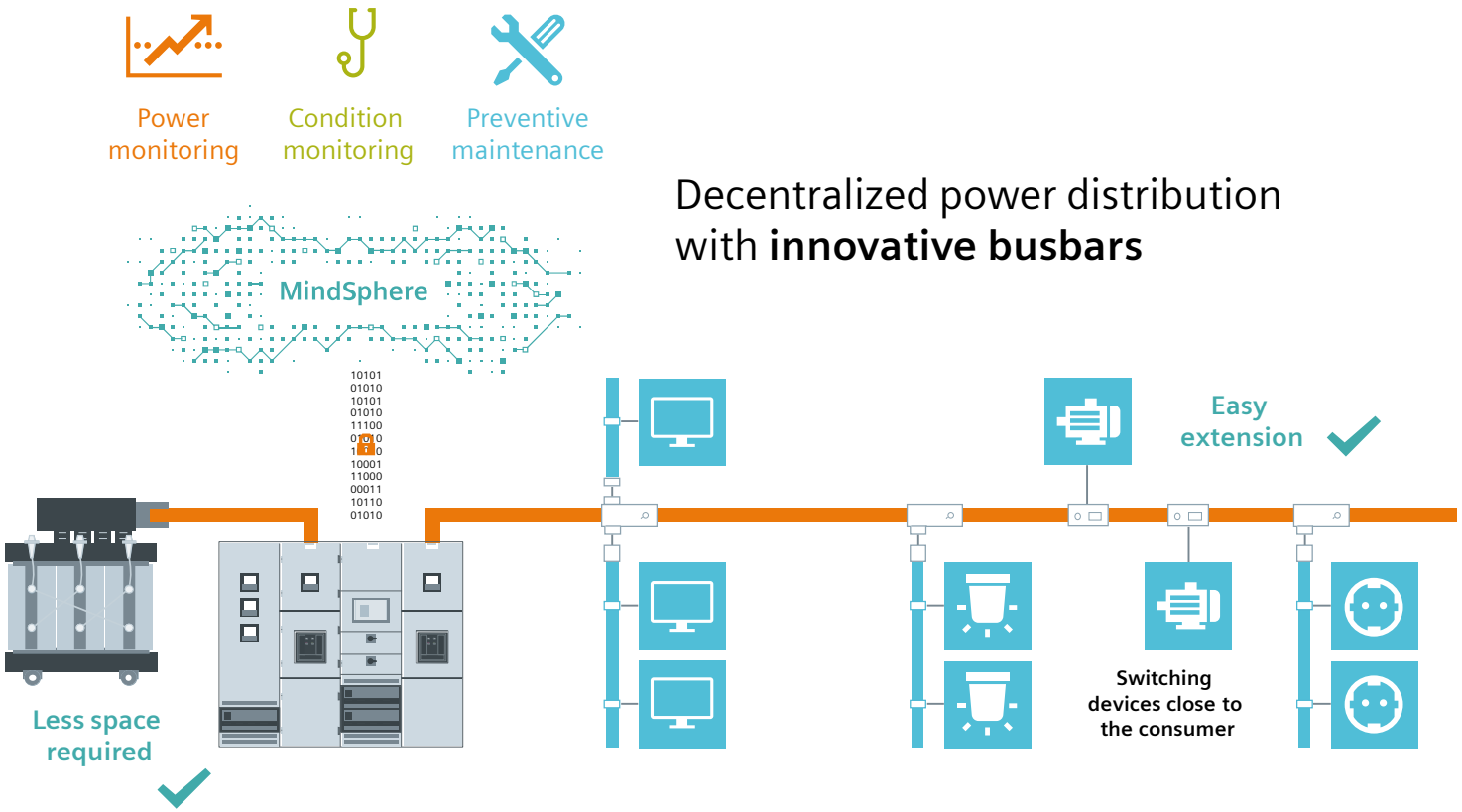

Decentralized power distribution with **innovative busbars**

Life Cycle

- High quality documentation
- Predictive maintenance
- Improved energy efficiency

Flexibility

- Simplified planning, e.g. EMC[1]
- Simple changes through tap-off units
- Space efficient and flexible by compact design

Safety

- Minimized fire load
- Easy trouble shooting
- Integrated short circuit rating

1 Enhanced Electromagnetic Compatibility

Semi-public charging at hospitals

Offer to keep the vehicle charged attracts customers

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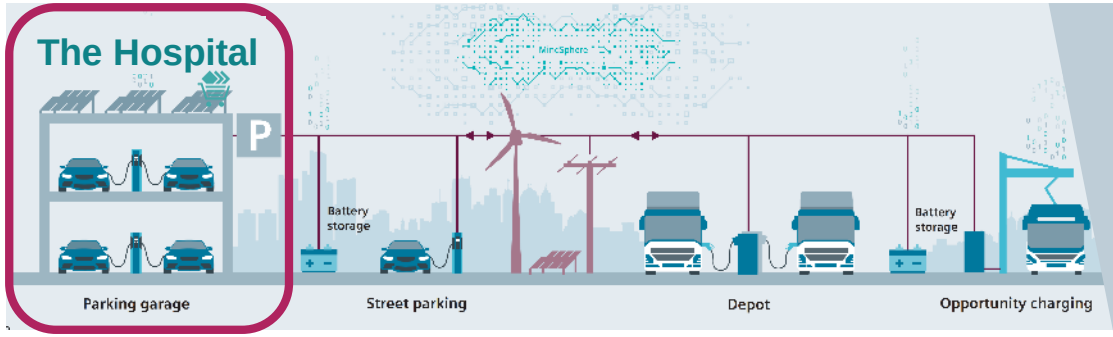


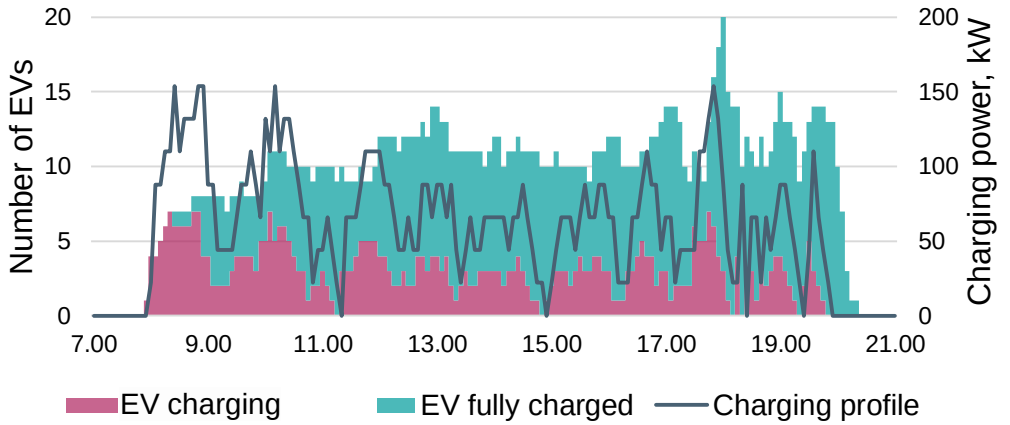
Example Use Case:

~150 EVs per day
20 Charging stations with 22 kW
Stochastic parking behavior

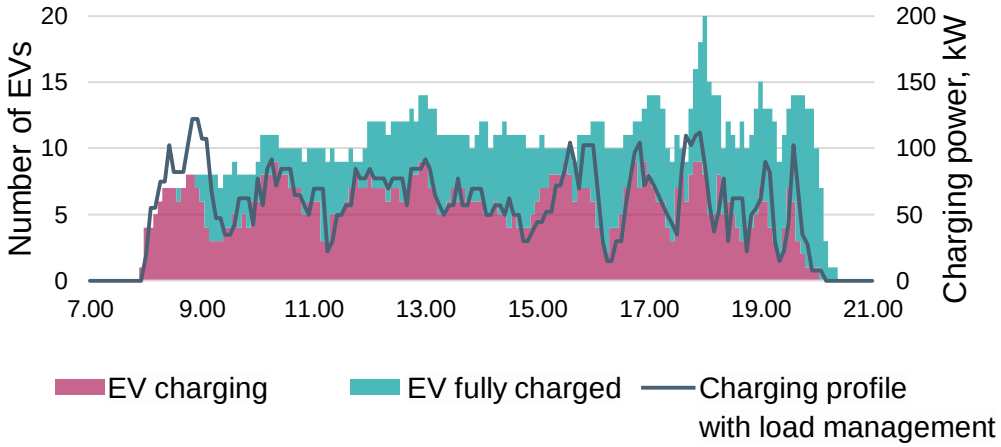
System optimization:

120 kW grid connection required by implementation of load management using charging set points

Charging pattern without load management



Charging pattern with load management



Well tested low voltage power distribution products and systems

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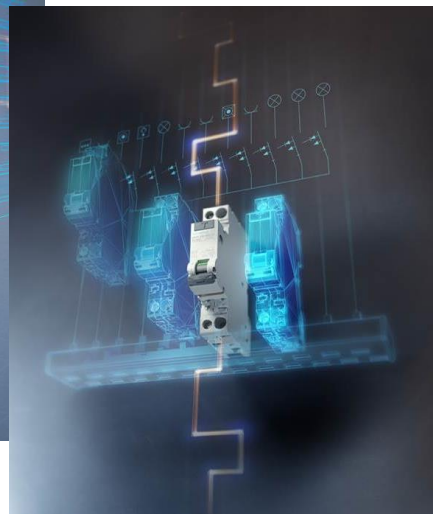
Ingenuity for life

Siemens solutions and products are the best guarantee for a high reliable energy distribution



Your advantage of our conscientious and thorough principles and philosophy

- Thousands of certified tests for our distribution systems
- Highest reliability with confirmed long-term tests of our products
- Perfectly coordinated protective functions of the different devices
- **=> Maximum availability and security for staff, visitors and patients**

Complete transparency of the low voltage energy

SIEMENS
Ingenuity for life

Measuring, detecting and analyzing for higher efficiency, secure power and higher reliability

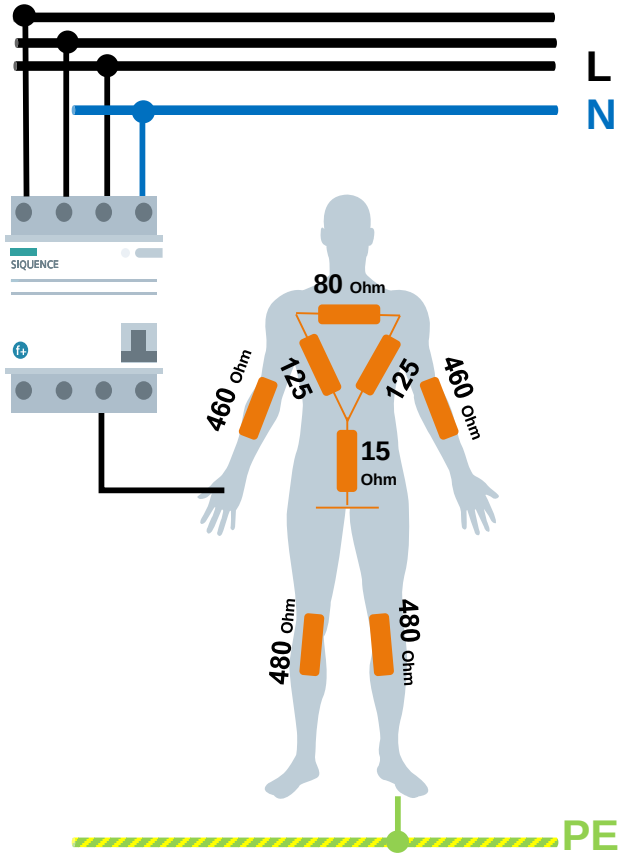
Your advantages of digitalization of low voltage power distribution

- Basis for energy management such as: ISO 50001
- Early detection and prevention of downtimes
- Reduction of error frequency and duration
- Local- or cloud based visualization / data aggregation
- **…and our IT experts ensure that you don’t need any other for this**

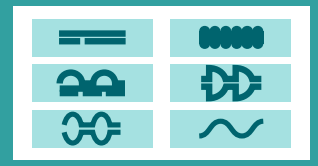
Risidual Current Devices with SIGRES function for less maintenance costs and higher reliability

SIEMENS
Ingenuity for life

Protect staff and patients optimally and save maintenance costs with longer inspection periods



Your advantages to equip your building with SIGRES- RCDs:



-Reliable detection of:

+ AC fault currents
+ DC fault currents
+ Pulsating DC fault currents
+ Sinusoidal alternating fault currents up to 1.000Hz

-Save maintenance costs with longer inspection periods up to 48 month instead of normally 6 month

Low voltage distribution with patented fire protection for staff, patients, assets and building

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Ingenuity for life

A serious topic

2 million fires reported each year in Europe

20% in commercial building

30% are caused based on defects in electrical installations

500,000 fire injuries and 25,000 fatal incidents

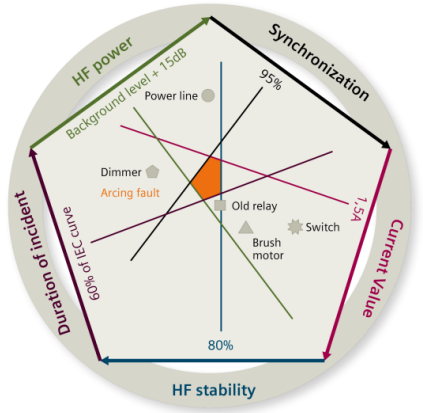
Lack of protection

Circuit breakers like **Miniature Circuit Breakers (MCB)** and **Residual Current Protective Devices (RCD)** protect from line faults but cannot detect weak line insulation

Type of fault		Protection options
Parallel phase – neutral / phase – phase	L, Load, N	MCB
Parallel phase-protective conductor	L, Load, PE, N	RCD / RCBO
Serial	L, Load, N	AFD unit

Improving fire safety

Patented SIARC technology closes safety gap



Distinguishing between harmless faults and hazardous arcs

2 versions:

- 16A & 40A, combination with MCBs (1 & 2 MW)
- **RCBOs (2 MW) AFD** units with integrated **MCB in only one modular width**

Improving maintenance and energy transparency for reducing cost in Hospitals

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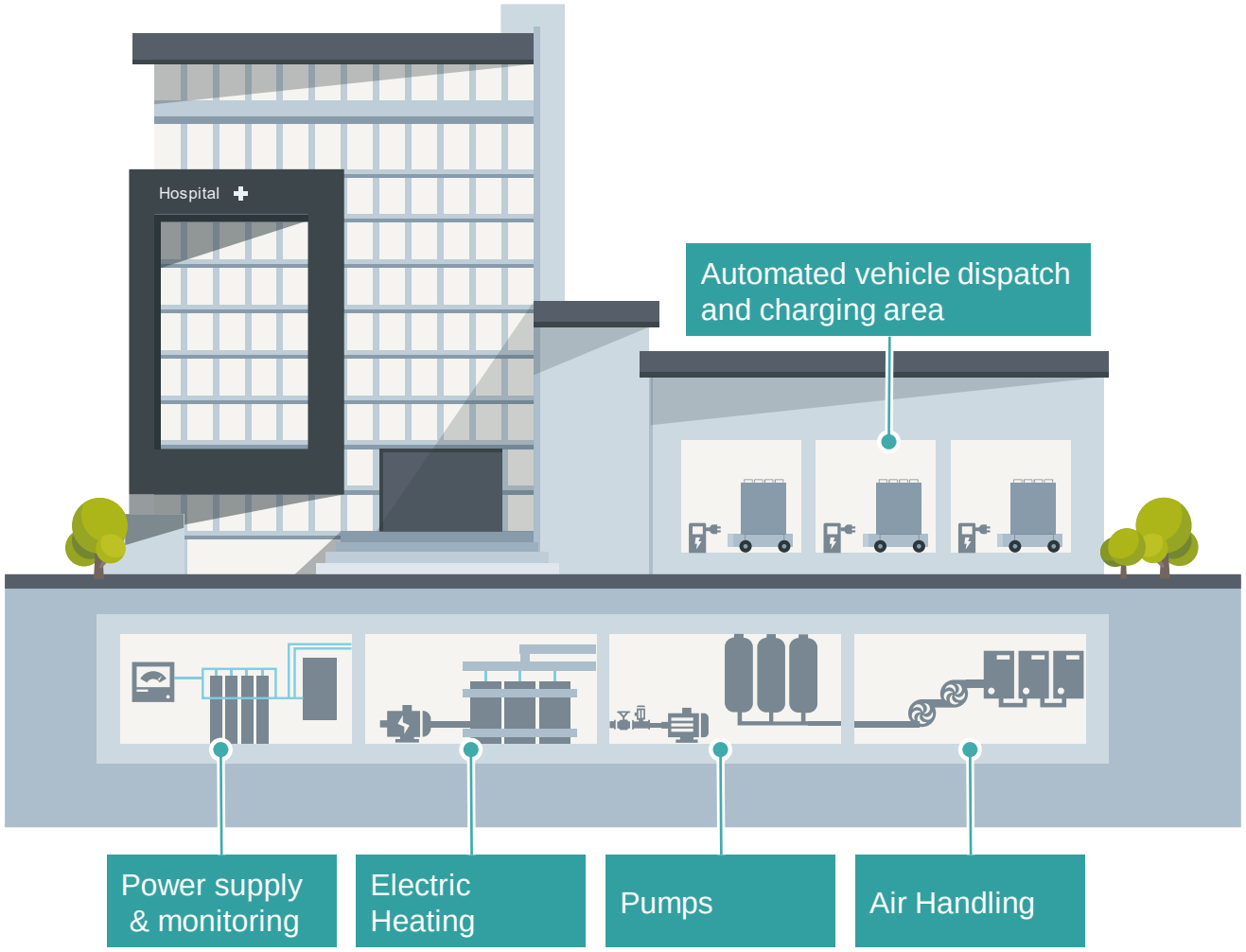
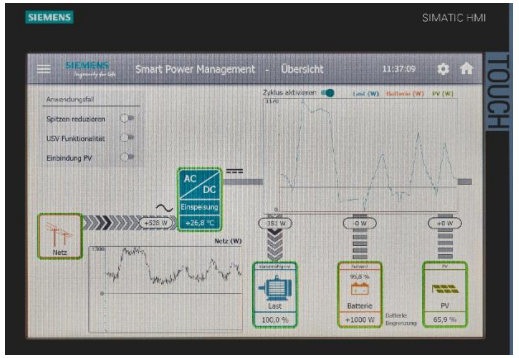
Ingenuity for life



Logistics support for staff



Monitoring of energy consumption of loads, controlled peak shaving

Low voltage power distribution and control for machine operated / automated processes in Hospitals

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Ingenuity for life

Manual start / stop devices need high installation efforts

New installations and modification of set-up need **integration in wiring & process automation**

Un-intentional operation of emergency stops are **difficult to detect**

Time consuming root cause analysis for service personal

Re-start permission only after site inspection

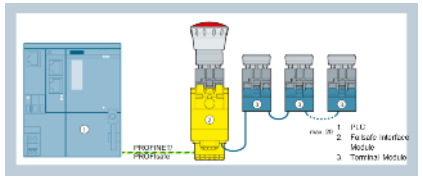
Reduced wiring outlay and simple hardware configuration

High **flexibility** for modifications

Reduced wiring outlay and thus **less sources of error** during installation and commissioning

Integrated Safety option
EMERGENCY STOP does not need to be wired separately

Extended diagnostics and parameterization options



SIRIUS ACT - Communication bus connected devices

Modular and plug-in design

Communication solution for **PROFINET** (control panel), **IO-Link** (enclosure solution/ID key-operated switch) and **AS-i** (enclosure solution/emergency stop connection for the control panel)

EMERGENCY STOP incorporated via **PROFIsafe/ASIsafe** communication

Monitoring products for availability and efficiency with SIRIUS monitoring products

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Ingenuity for life

Siemens monitoring products for efficient processes and system monitoring

Simocode motor management

SIRIUS monitoring relays

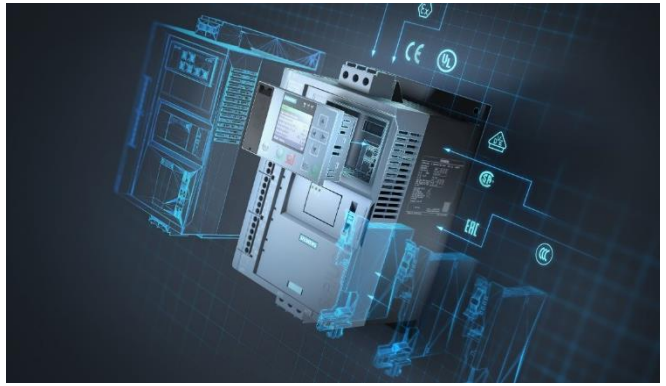
High efficiency as a result of conscientious and thorough principles and philosophy

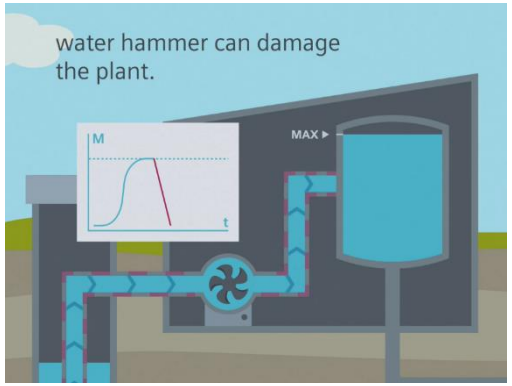
- Monitoring of line, current, voltage, power factor and residual current and insulation
- Temperature monitoring for heating and cooling
- Pump control including energy monitoring with SIMOCODE motor management for smart motor control cabinets
- **Maximum availability and reliability for staff, visitors and patients**

Efficient power and motor management with SIRIUS control products

SIEMENS
Ingenuity for life

Control and protection for high efficiency, secure power and high reliability





Soft starters SIRIUS for pump control

Command devices

Control and protection devices SIRIUS

Solid state device

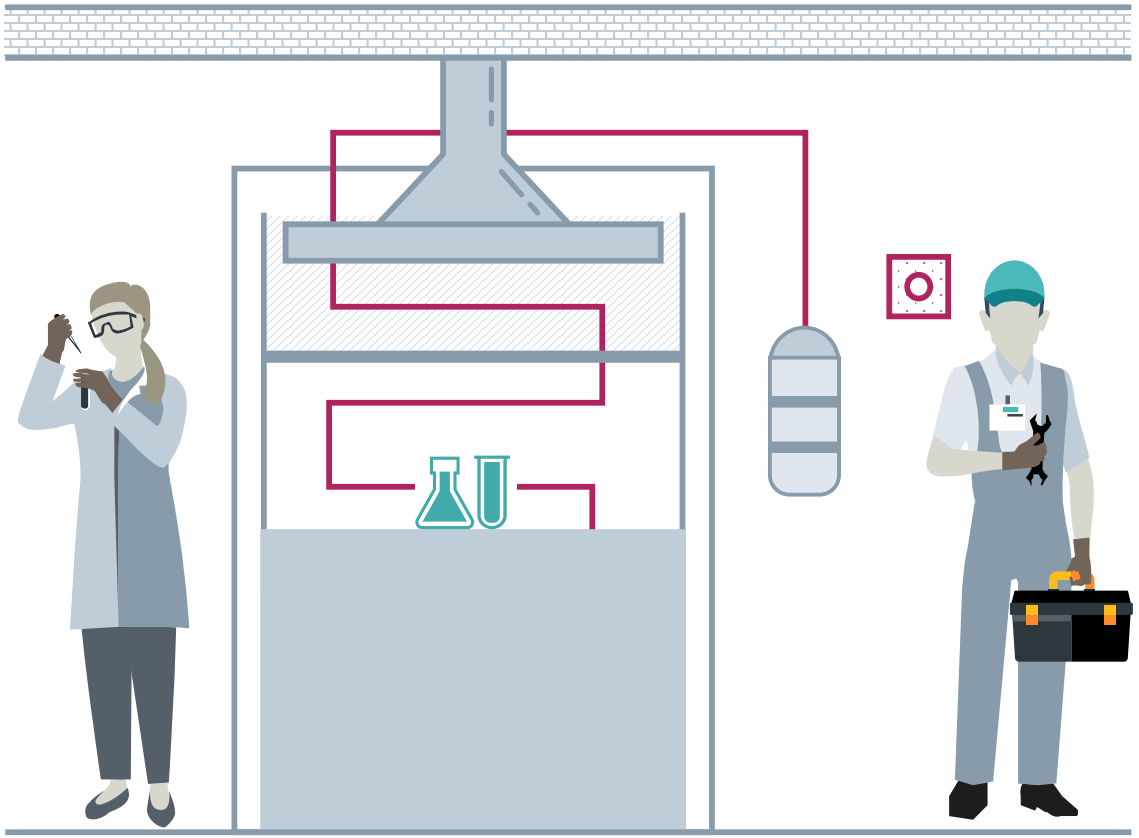
Your advantages of soft starters and control products:

- Soft pump stopping to prevent against water hammer. Pump cleaning function reduces maintenance cost
- Electrical and mechanical protection for pumps, fans and ventilation and energy cost savings thanks to avoiding inrush current peaks
- Long-life and comfortable silent switching with 3RF2 solid state devices for electric heating control, lighting, for single and three-phase switching
- **Maximum availability and reliability for staff, visitors and patients**

Fail safe fire extinguishing solution for fume hoods with full system integration capability

SIEMENS
Ingenuity for life

Siemens Fire Extinguishing Solution – Safe and reliable protection for hospital laboratory staff



Your advantages in the lab

Fire safety & User protection

Maximum fire protection by fail safe extinguishing system with Object Extinguishing Technology (OET) (even in case of a power failure/blackout)

No disturbance of operations

No false alarms of fire extinguishing system possible – no disturbance of operations

Ease of use and low maintenance

Easy maintenance system allows you to focus on research and analysis tasks

Non-reactive extinguishing gas

Extinguishing gas complies to regulations and all common requirements

Isolation room solution – Avoiding contamination, maintaining flexibility and lowering expenses

SIEMENS
Ingenuity for life

High work safety in critical environments

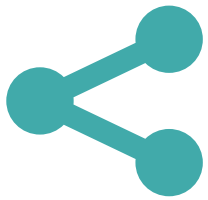
- **Safe and secure** operations
- **Energy optimized** operation of the room
- **Resilient** environment to minimize downtime
- **Flexibility** for multipurpose rooms

Centered around requirements

- **Coordinated** concepts include, ventilation, light, fire safety and access management
- **Specific** control strategy for isolation rooms
- **Robust** solutions and system design
- **Cross-discipline** solutions for optimal room operation and usage

End-to-end approach along Life Cycle

- CET solution **portfolio**
- **Design and engineering** support
- **Installation** and **Commissioning**
- **Service** 7*24*365 (on call, dial-in option)
- Preventive **maintenance**



Desigo solution for room pressurization and fume hood control

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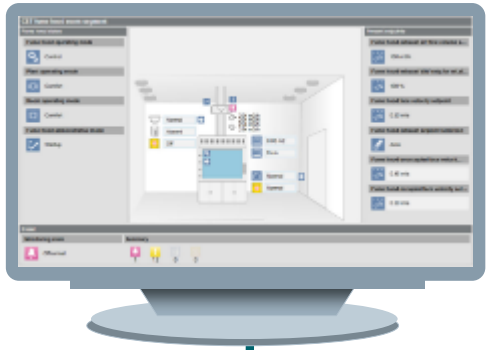
Ingenuity for life



Desigo CC, the integrated building management platform

- User-friendly operation and monitoring of entire system from primary level to room level
- Comprehensive reports to analyze consumption for efficient management
- Enhanced comfort and safety thanks to centralized operation of lights, blinds, HVAC, power, fire and security

Room condition monitor

- monitors pressure, temperature, humidity, air charge rate, etc. within the rooms.
- High resolution capacitive color display for full touch user response with medical gloves.

ASHRAE BACnet™

BACnet/IP

etc.

KNX PL-Link

Room pressurization control

KNX PL-Link

Fume hood control

Room Automation

- Energy efficiency, enhanced room comfort and increased productivity of users
- Green Leaf indication for energy-saving operation

Primary Automation

- Reliable control of all building automation tasks for AHU, boilers, chillers, etc.

Customer benefits with Desigo pressurized room and fume hood control

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Increase safety, productivity and comfort
Ensure the right temperature, humidity and room pressure in cleanrooms and laboratories

Ease of operation and monitoring of entire system with Desigo CC – the building management platform

Optimize energy consumption and lower (energy) costs with optimized VAV

Protect people, assets and the environment with high-speed controllers

High level of flexibility thanks to innovative room segment application concept, securing investment for layout changes at a later stage!

Ensure efficiency with one system to use and maintain

Lower lifecycle and energy costs through improved efficiency

Minimized risks and maximum reliability as a result of proven solutions and many years of expertise from Siemens

Interoperability – one single solution from field devices to room automation and building management platform– reduced engineering & commissioning effort without interface problems

Automated Guided Vehicles (AGV) solution SIATRANS with SiriusAct improves hospital staff efficiency significantly

SIEMENS
Ingenuity for life

Modular construction of your AGV

- Mechanical construction of length and width according to customer requirements
- Implementation as a sub-vehicle or as a towing vehicle
- Depending on the application, the size of the battery is adjusted for you
- Additional protection through individual sensors on the vehicle in addition to the personal safety scanner

High flexibility through adjustments to the AGV for their applications in the Hospitals field

Technology according to open industry standards

- Each vehicle includes the same Siemens Simatic control
- Long-proven in-vehicle technology for industry-standard navigation and guidance
- Support and service by Siemens with a worldwide community
- Spare parts availability in a few days and > 15 years

Industry standard technology for long-term investments > 15 years

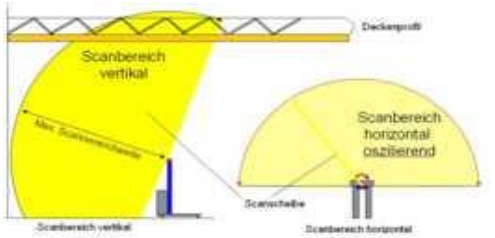
Siemens as innovation driver

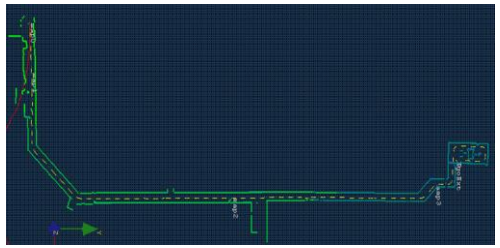
- Siemens as the innovation driver in Europe
- Strong partner for all your requirements
- Integration in existing infrastructures of construction and technology, as well as in software
- Further development of the systems and simple retrofitting or extensions

Siemens as your strong partner for your logistics solution

AGV navigation - on existing infrastructure

no placemarks like laser reflectors or induction loops necessary





- Creation of a map for self-sufficient localization
- Self-sufficient isolation with environment map
- Definition of virtual routes in the area map

Vehicle data:

V max = 1.5 m / s

Slope / slope to +/- 7%

Accuracy at
Target position: +/- 1cm; +/- 0.2 °
Ride: +/- 5cm; +/- 1 °

IP54 compliant
Ready for IP67 – washable

Dimension height x width x length:
270x600x1850mm

stroke: 70mm

With LED-Light

max load of 500kg
Vehicle in stainless steel

Technology:

Drives: differential

Personal safety with laser scanner in front and back

Drives in both direction

Two separat modular areas for automation and battery

Rotatable on the spot

Low energy standards for long distance: 6h – 20km

Remote access for each AGV

“Why Siemens?”
Unique Offerings - Portfolio Highlights

Integrated tender approach – Bring smart technologies in one package

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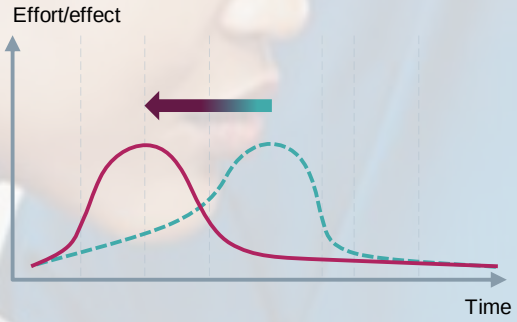
Instead of traditional contracting, do this

1 | Early involvement



Ask Siemens in the conceptual design phase to be your Smart Hospital partner to help you identifying the most important use-cases

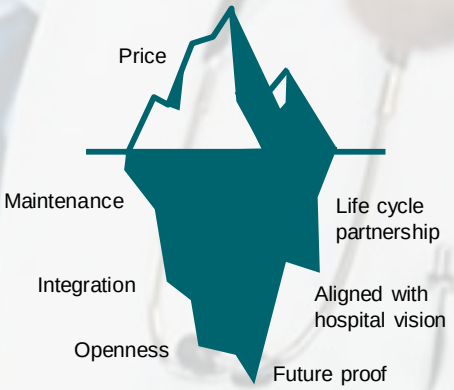
2 | Identify use-cases

Prioritize use-cases based on the business cases

3 | Procure one low voltage Smart Hospital package

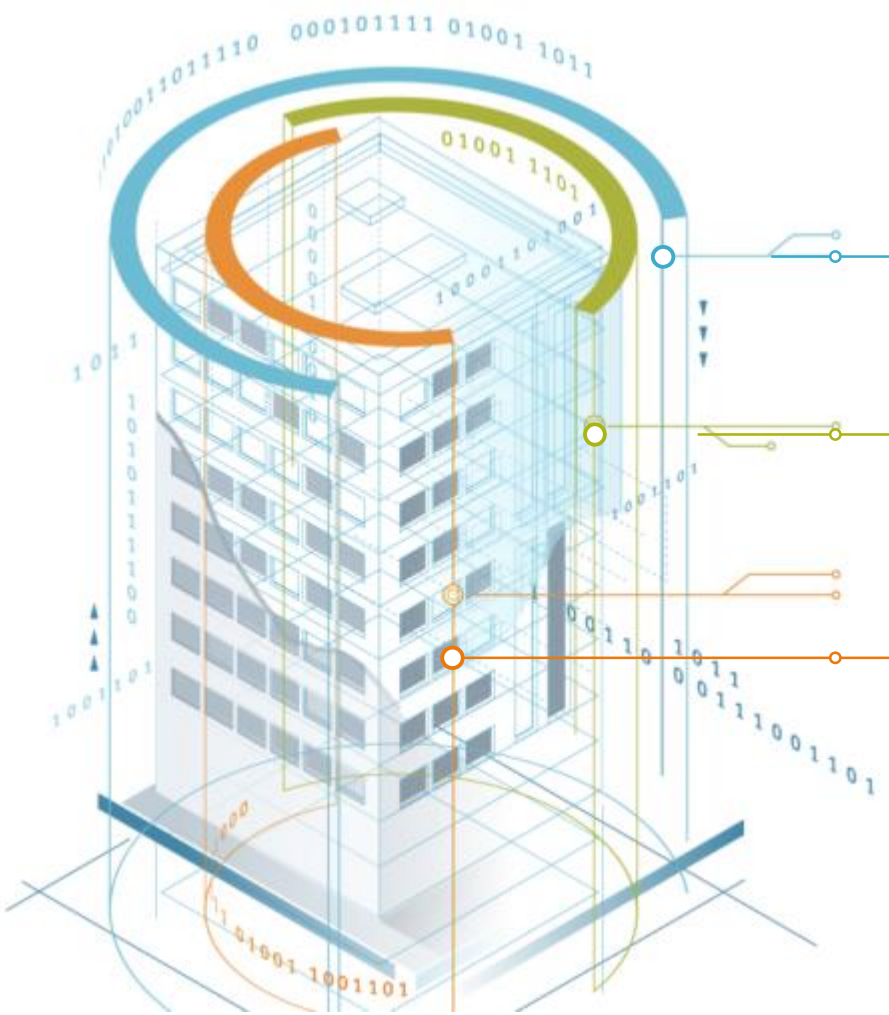
Procure/tender one low voltage package containing all smart hospital technologies (BMS, RTLS, power metering, networking, CCTV, etc.)

4 | Evaluate true TCO



Evaluate true cost of ownership over the entire life cycle

Siemens enhances building performance through the power of data with a combination of people, technology and services



People

Highly experienced in data analytics and delivering increased value to your hospital

Technology

Open, scalable and vendor-agnostic solutions, increasing the productivity and efficiency in the hospital

Services

Global expertise in the hospital space combined with increased connectivity delivers impactful advisory and remote services

Take advantage of global expertise and local presence

SIEMENS
Ingenuity for life

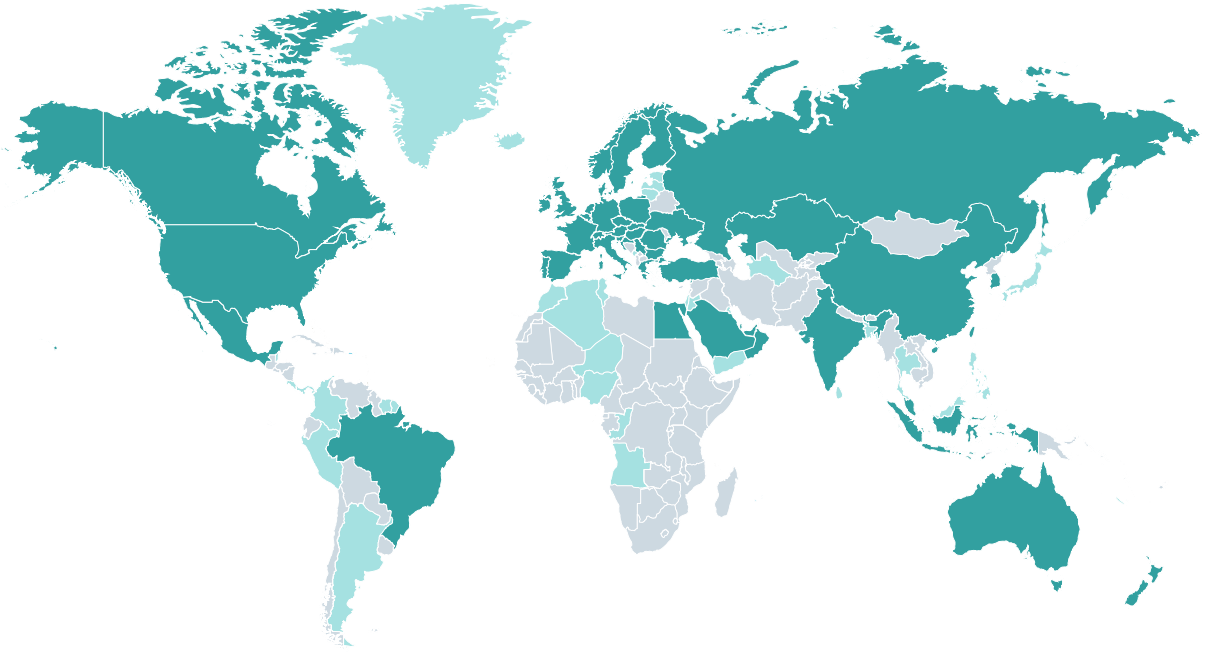
People
Technology
Services

More value by expertise

Our global network of over 200 engineers within the **Digital Service Centers** monitor and diagnose issues and create data-driven insight.

Wherever you need us

Close to **10,000 service technicians** across our branches are dedicated to taking action and ensuring the optimization of your systems.



Comprehensive Siemens network

Dynamic power grid management automation platforms are the back-bone of real-time grid control

SIEMENS
Ingenuity for life

People
Technology
Services

Digitalization business models

Vertical Software
(on-premise and SaaS)

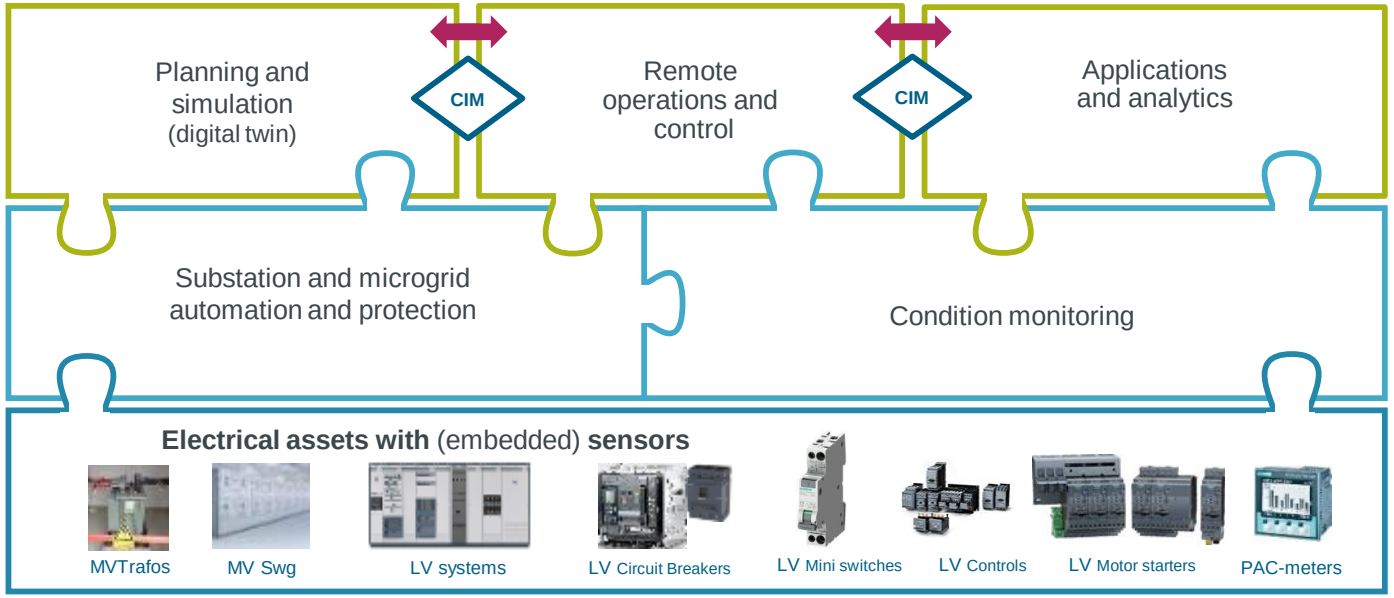
+

Digital Services
(enabled by Software)

Digitalization

Automation

Electri-fication



Energy Management Applications

Substation | Transmission | Distribution substations and lines | Microgrids | Campus infrastructure power supply | Building Power Supply

- **2 business models** on a common SW platform
- **EnergyCloud with embedded PaaS** currently reuse in MindSphere validated
- **Cybersecure** communication with **near-realtime remote control**
- **Application specific bundles** of protection and control asset guard+ electrical assets
- **Controllable/Smart Electrical assets** with embedded sensors

Lifecycle services across your building's disciplines

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Ingenuity for life

People
Technology
Services

Responsive and scheduled

Digitally enhanced maintenance

Real-time event response

Ongoing commissioning

Condition-based maintenance

Energy and sustainability consulting

Advisory services

Safety | Security | HVAC | Lighting | Power | 3rd Integration

Digital solutions for power management in Hospitals – Clear architecture with standardized and open platforms

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Emergency | Security | Facility Management | Maintenance | Operating Theatre | Nursing Personnel | Patient Rooms | Visitors

Enterprise IT: GIS, asset management, workforce management, forecasting, web portals, CIS/CRM, billing, …

Consulting and simulation based on digital twin

Data model

Monitoring and Control/ Operation

Data model

EnergyIP application suite powered by MindSphere

Smart communication

Substation
Automation and protection

Field area networks
Sensors, meters, controls, concentrators

Primary equipment

Grid cyber security

Managed/cloud services

IT/OT integration, consulting

Digital architecture framework for building management based on a strong connectivity and control system foundation

SIEMENS
Ingenuity for life

Emergency | Security | Facility Management | Maintenance | Operating Theatre | Nursing Personnel | Patient Rooms | Visitors

Building Operations | **Security** | **Service/ Migration** | **Building Performance** | **Smart Spaces** (Comfy)

Cloud/ MindSphere

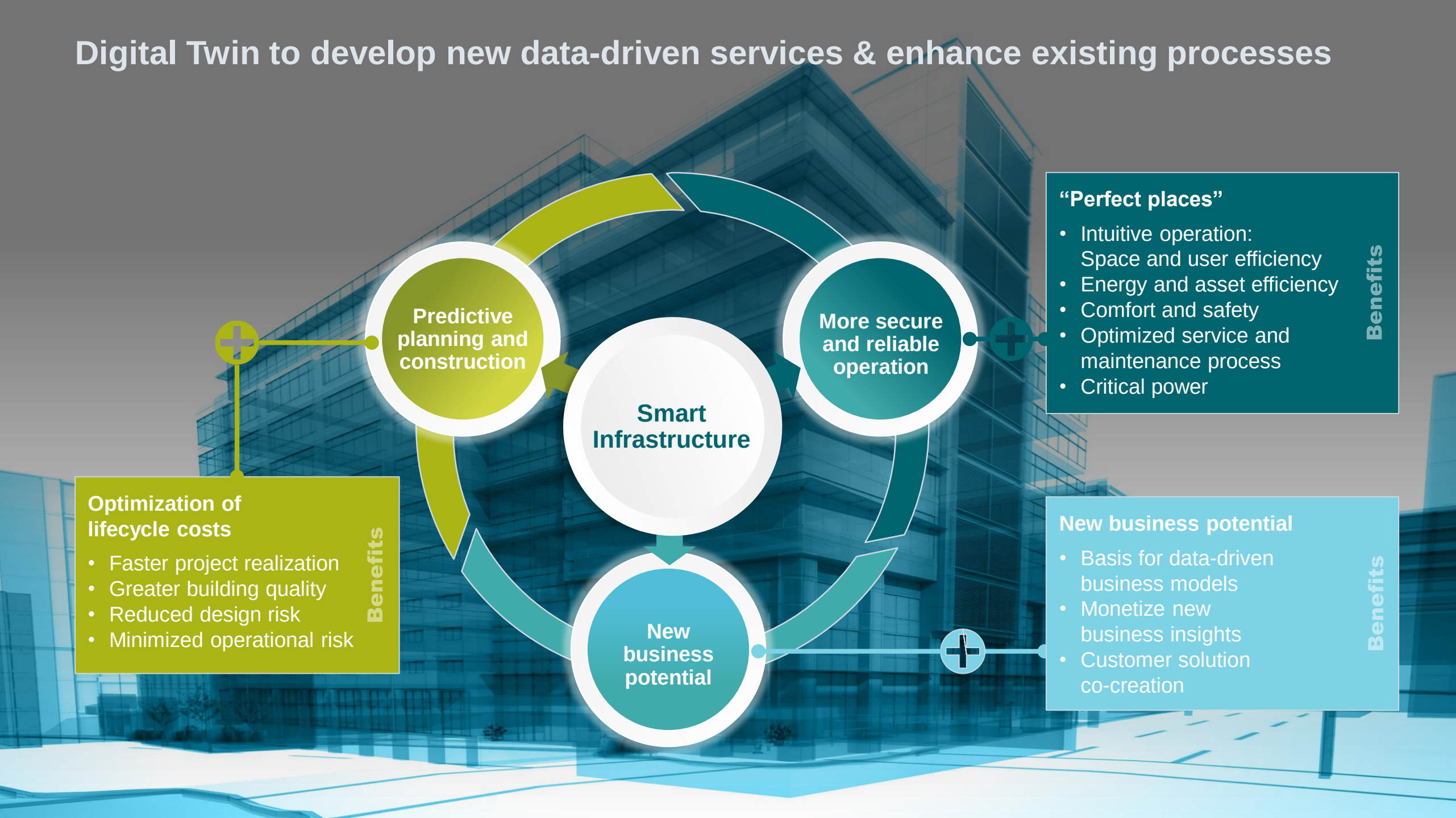
Building automation

Desigo™ — Energy Efficiency — 3rd Integration — enlighted

Field devices

Safety | Security | HVAC | Lighting | Power

Digital Twin to develop new data-driven services & enhance existing processes



Integrated support along the building life cycle for greenfield Hospitals with the “Digital Twin”

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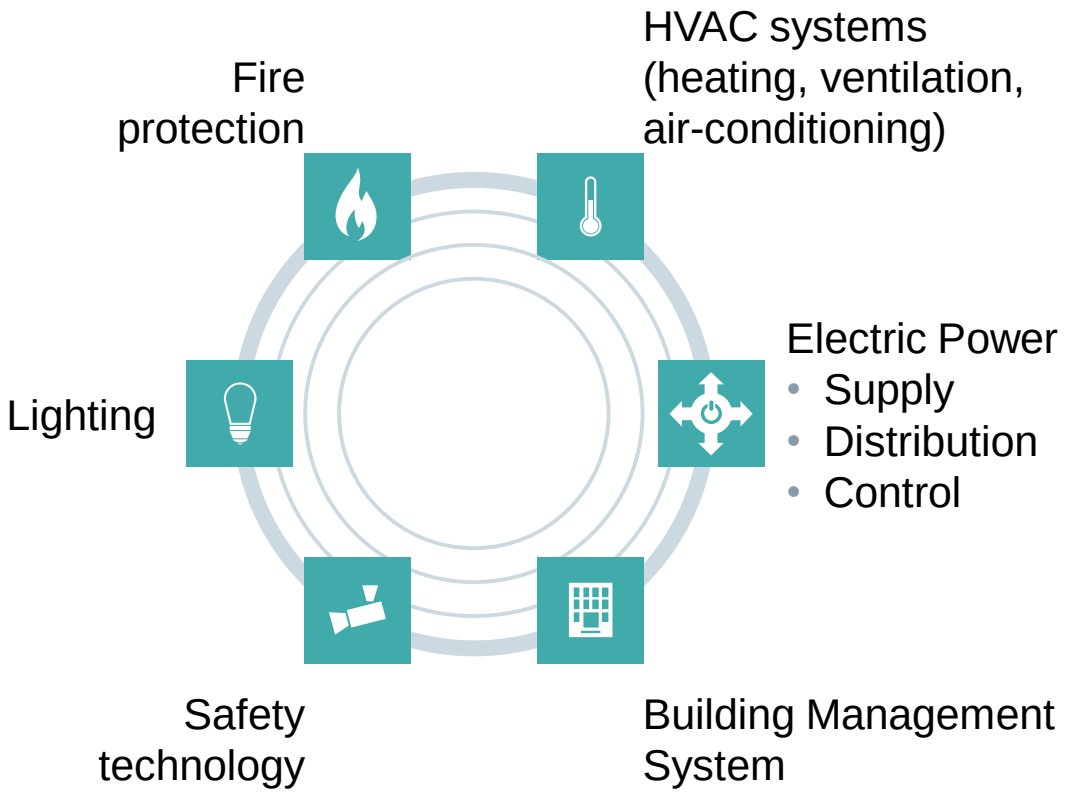
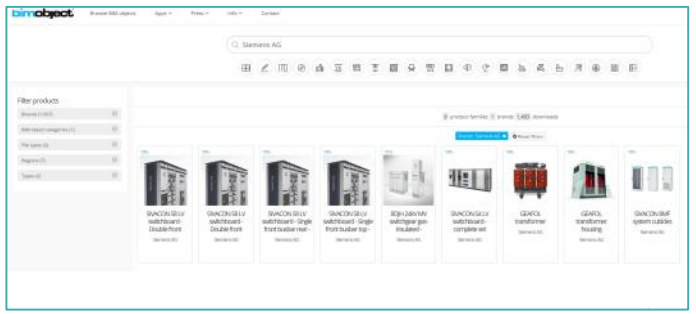
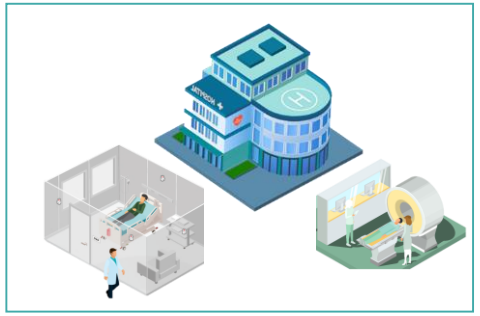


Project data	Design	Planning	Tender	Con-figuration	Implemen-tation and operation
Planning manuals	Simaris design	**Simaris project**	Simaris project	Simaris configura-tion	Support tools
Planning manuals/ Room value calculator	EPC Application guides	**BIM Data**	Tender documents	Configu-ration tools	Support tools





Buildings as digital twins – Increased added value with Building Information Modeling (BIM)

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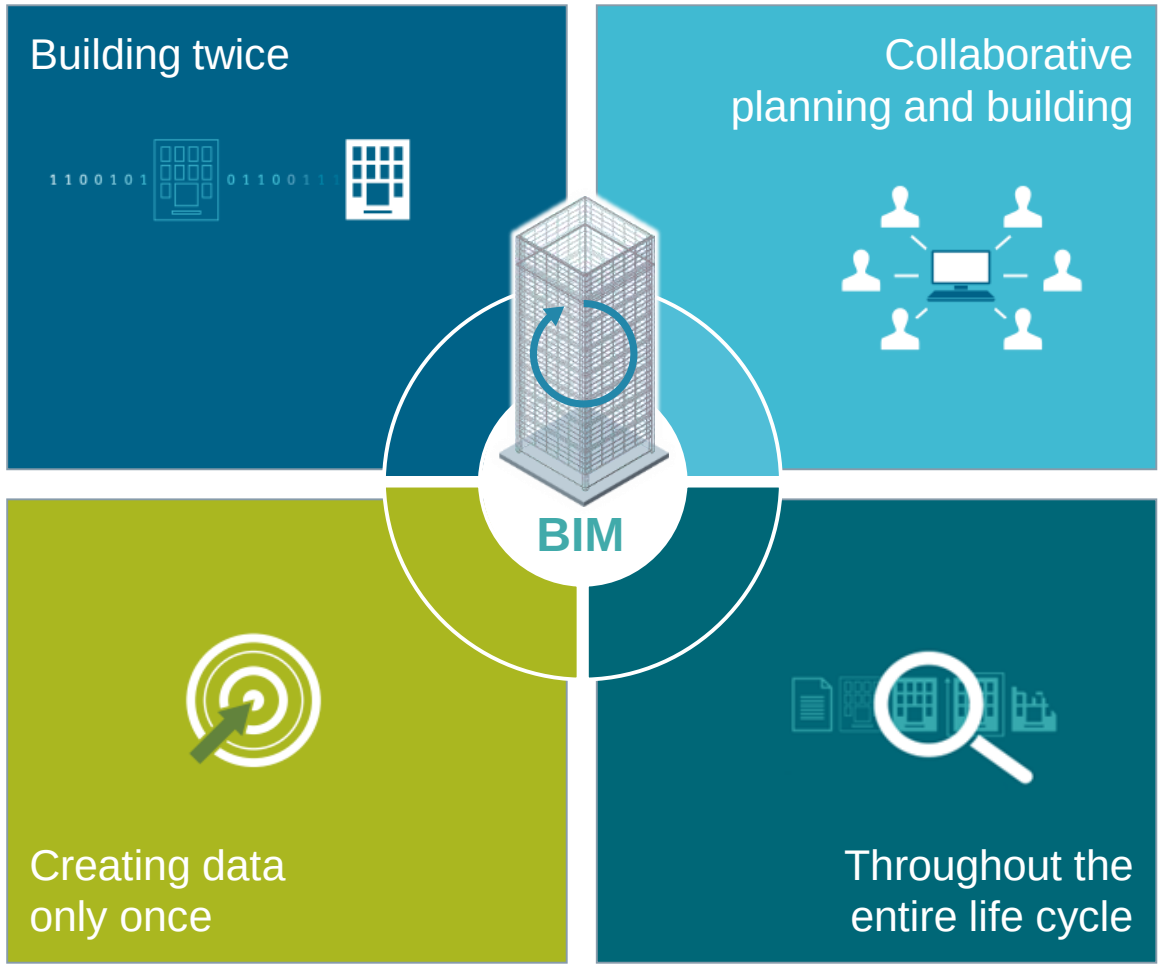

- Earlier conflict and fault detection
- Faster project delivery
- Fewer accidents at construction sites
- Foundation for life-cycle cost optimization
- Higher building quality
- More reliable budget planning

- Up to **40%** fewer change requests
- Up to **10%** cost savings thanks to collision mgmt.
- Up to **9%** lower operating costs
- Up to **7%** shorter project schedule

Source: CIFE, Center for Integrated Facility Engineering, Stanford University

Intelligent data management in every project phase – Engineering data & techn. documentation: “Electrical Twin”

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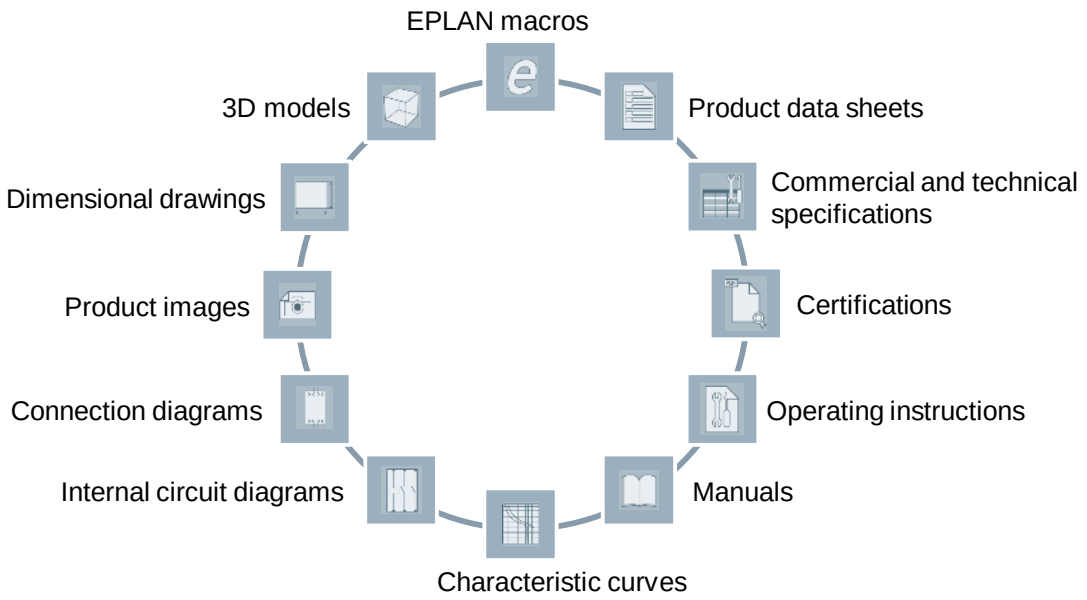
Concept and selection | Mechanical assembly | Electrotechnical assembly | System documentation | Ordering | Installation, service, commissioning, diagnostics

> 80% Cost savings
through efficient engineering

> 95% Time savings
compared to manual data procurement



24/7 service – Online, free of charge, round-the-clock

Flexible access to product data – Ultra-fast compilation, downloading and integration into configuration software

Error-free configuration and documentation – Thanks to high-value data and automated processes

Handling the complexity for enhanced energy efficiency – Energy supply and consumption analytics

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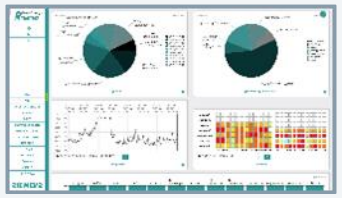
- Quick overview about the status of grid assets
- Risk detection and condition monitoring
- Ensure fast fault location and reduce outage duration
- Monitor grid and asset utilization
- Identify peak times, unbalances, unusual grid behavior
- High-frequency sampling of the energy consumers across the entire production facilities

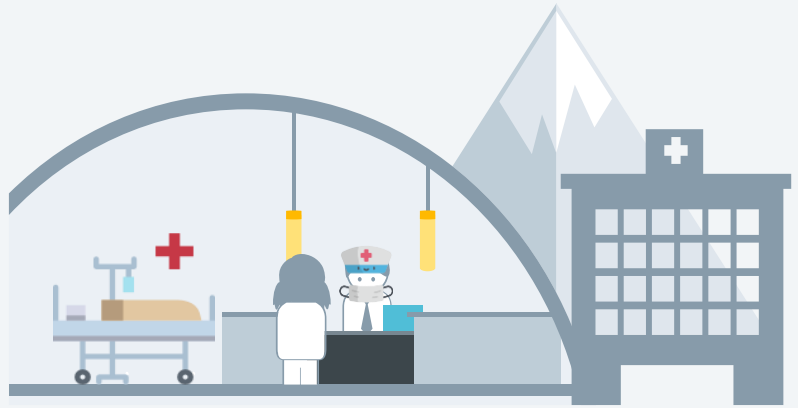


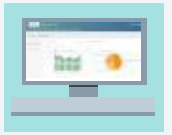



Desigo Navigator


Power Manager


Building energy and power con-sumption




SICAM Navigator

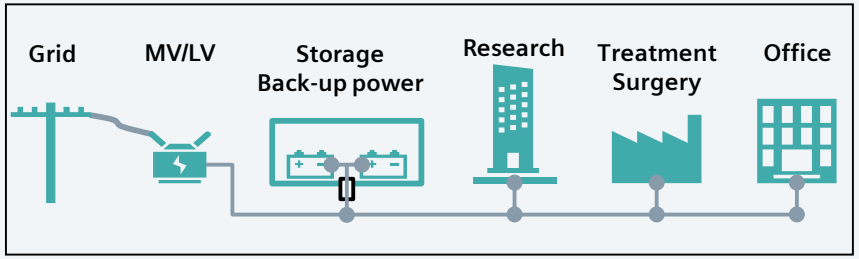

Power Monitoring


Building power supply


Industrial power supply



Hospital power consumption



Smart Infrastructure data APPs for Hospitals – Safe | Comfortable | Energy intelligent | Resilient | Sustainable

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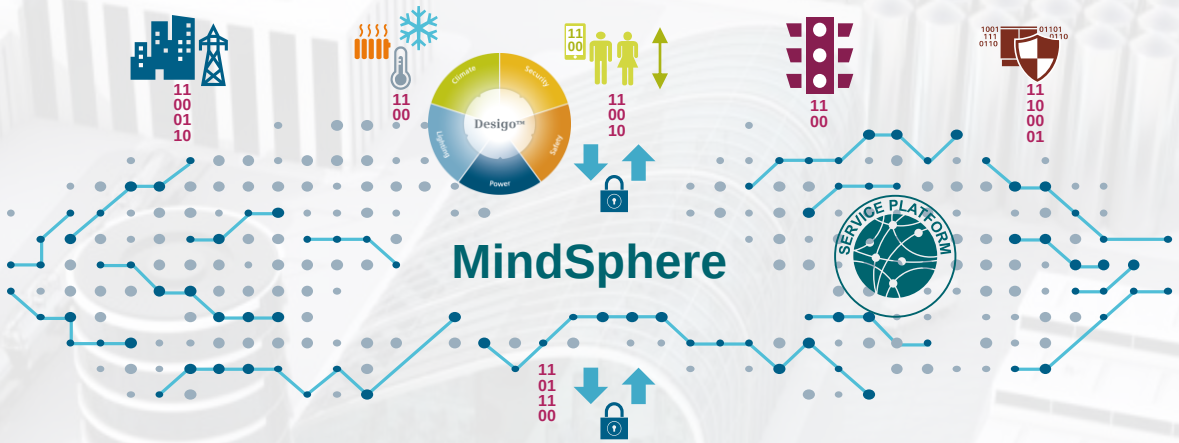
Ingenuity for life

The needs:

- Power
- Heating
- Cooling
- Mobility
- Security
- Comfort

Data from building and power applications



- Optimizing energy consumption, generation and supply
- Ensuring 24/7 energy availability, reliability, power quality and resilience
- Reducing CO2 footprint and improving public acceptance

Comfort
Heat
Cooling
Security

Heat pump
Charging Points
Energy-mgmt.-system
Combined Heat and Power
Photovoltaic
Battery storage system

TIP [1] engineering enables effective power distribution planning & optimization of energy consumption

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24/7 power supply & complex project mgmt.

- Complex to **comply** with international and local standards, including documentation
- Large number of **requirements** (application in infrastructure, buildings & industry)
- **Integrated power supply solutions** and comprehensive solutions for a wide range of applications are in demand
- **24/7 power availability** is mission critical
- Increasing demand for **tools** to **simplify & speed-up work** of electrical planners

Support in different planning stages with ...

Professional **consulting services** from experienced technical specialists

Software & online tools:
SIMARIS planning tools, BIM object files and online tender specifications

Technical documents:
planning / application manuals, technical series and planning checklists

Trainings:
TIP Academy, customer events, in-house workshops

Holistic approach from user requirements to installation

- Support for **power supply concepts, network calculations** for medium- and low-voltage networks, design and coordination of network protection at the medium- and low-voltage level and in **cost estimates**.
- The **SIMARIS planning tools** provide efficient support in **dimensioning** an electric power distribution system as well as **determining equipment** and **distributing systems** for it.
- **Examples** for power distribution concepts & aids to estimate power demand. **Checklists** support the creation of the spatial and functional program.

Reducing energy cost and achieving sustainability targets with Distributed Energy Systems for Hospitals

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Increasing energy cost, stretch sustainability targets

Growing electricity cost for building/facility operation

New peak loads, e.g.,
- New diagnostic devices
- Extended heating/cooling
- eVehicle charging

CO_2 - footprint target not achievable with current energy consumption mix

Electricity from RES [1] is the preferred energy carrier

Security of power supply and resilience is essential

Business case for self generation

CAPEX/OPEX economic value and power grid feasibility

Variable power in-feed from renewables

Manage balance of generation and load

Autonomous backup alternative to keep power availability

New loads need flexible supply and compliance to network codes

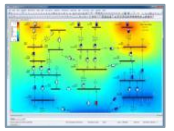
Implementing a Distributed Energy System

Grid acceptance and economic value feasibility study

Leveraging on excellent knowledge relation with grid operators and utilities

Distributed generation, participation in the energy market

Electrical equipment and power electronics



Energy automation and management, software

Storage solutions

1| Renewable Energy Systems

Improving CO_2 footprint and security of supply – Distributed Energy Systems and MICROGRID approach for Hospitals

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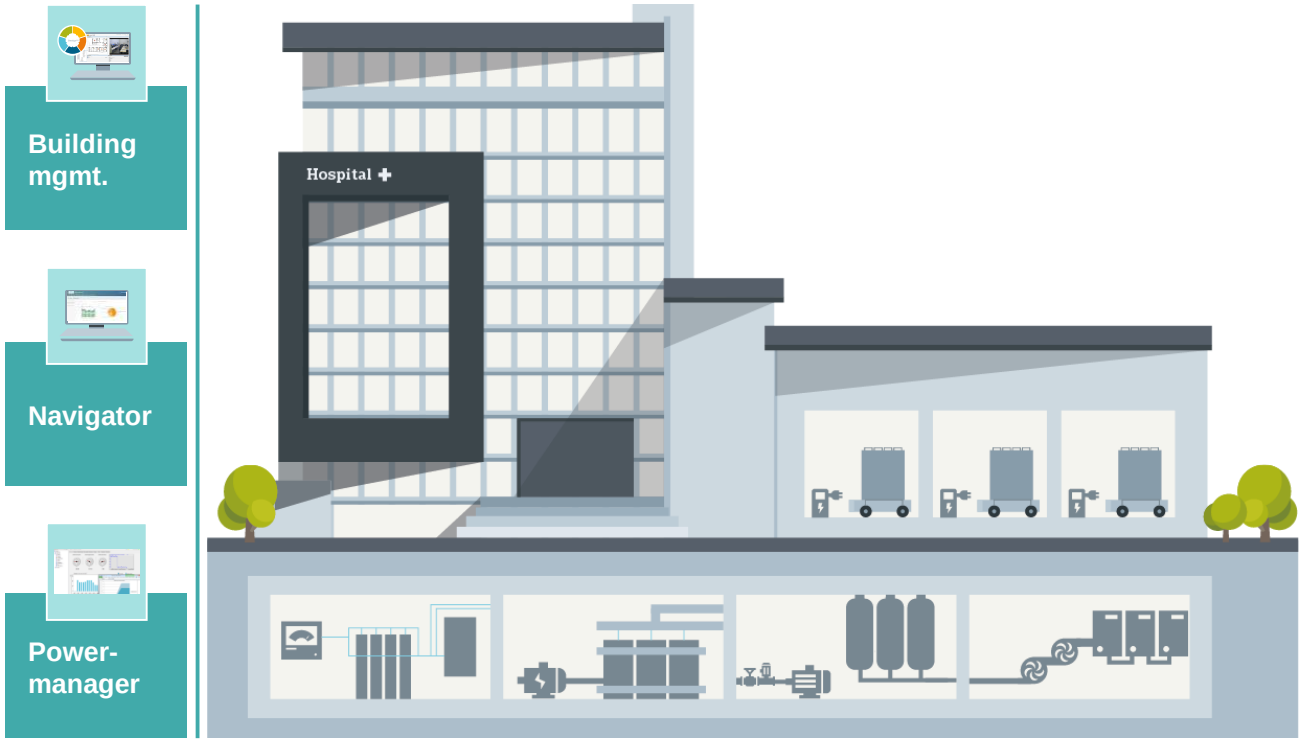
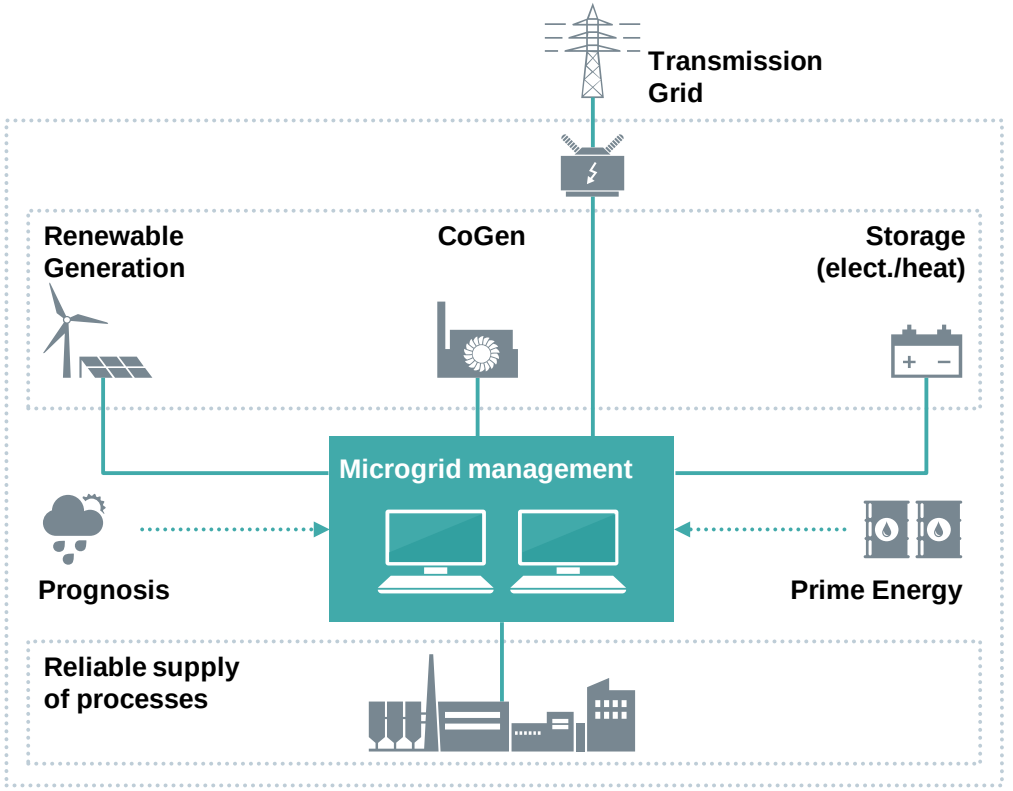
DES: Industrial sites integrating production, logistics and multi-purpose building with renewable generation and storage



Enhancing energy efficiency, power quality and resilience further through a Microgrid solution



Productivity gains achievable with MindSphere cloud and Energy Efficiency Analytics EEA

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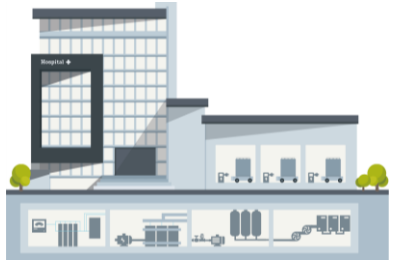
Typical assets to monitor

- Compressors
- Transformers
- Furnaces
- Pumps
- Drives and motors
- Lasers
- Centrifuges
- Dryers
- Bottling lines, blowers
- Packaging equipment
- Air and gas flow
- Lighting
- Cooling and heating systems
- …

+ Integration of process data from SCADA, MES, DCS (optional)

Selected analysis area

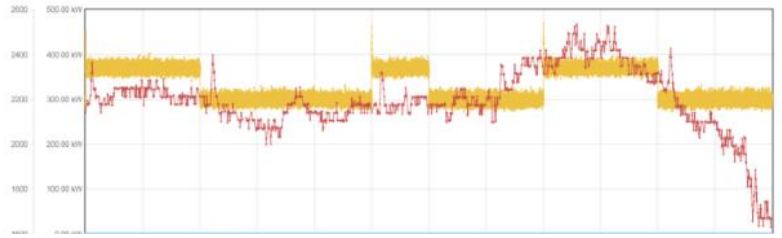
- Definition and monitoring of energy-based KPIs per factory throughput (e.g., mJ/litre)
- Performance benchmarking between assets, lines and factories
- Overall active and reactive a power consumption of transformers
- Correlation of transformer loads and asset performance (e.g., centrifuges)
- Asset usage, utilization and pattern analysis and optimization incl. failure detection
- Identification of impending maintenance needs



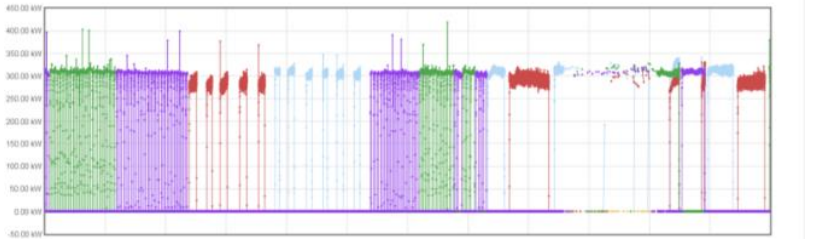
Benefits

- 6 – 12% reduction in energy costs
- Full transparency on process level from an energy perspective
- Typical payback period of less than 2 years

Pump load vs. volume flow



Anomaly detection of compressors



Siemens eMobility Charging

End to end charging solutions for all customer applications

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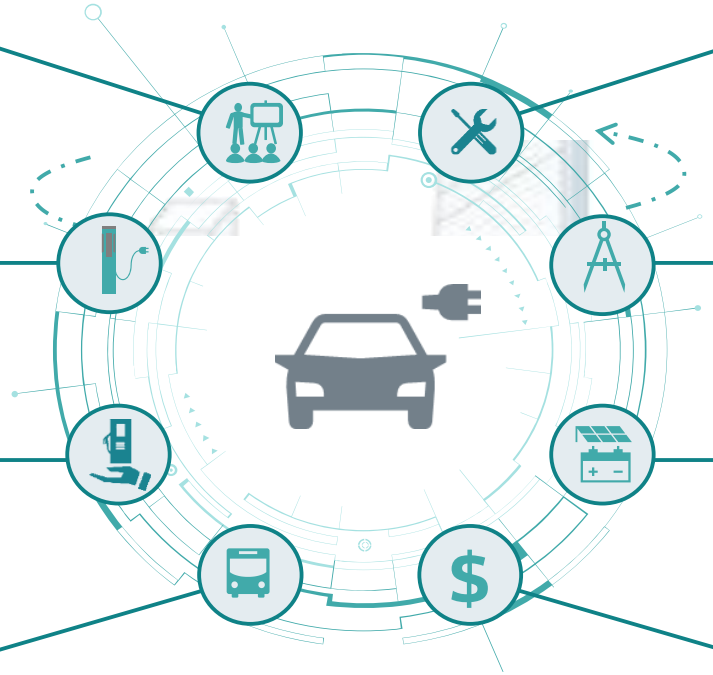
Consulting

Charging hardware

Charge Point Management
Fleet Charging Management

Depot Management



Service & Training

Solution engineering

Grid integration
PV & storage

Energy
Management

Charge Point Operation (CPO) and Mobility Service Provider (MSP)

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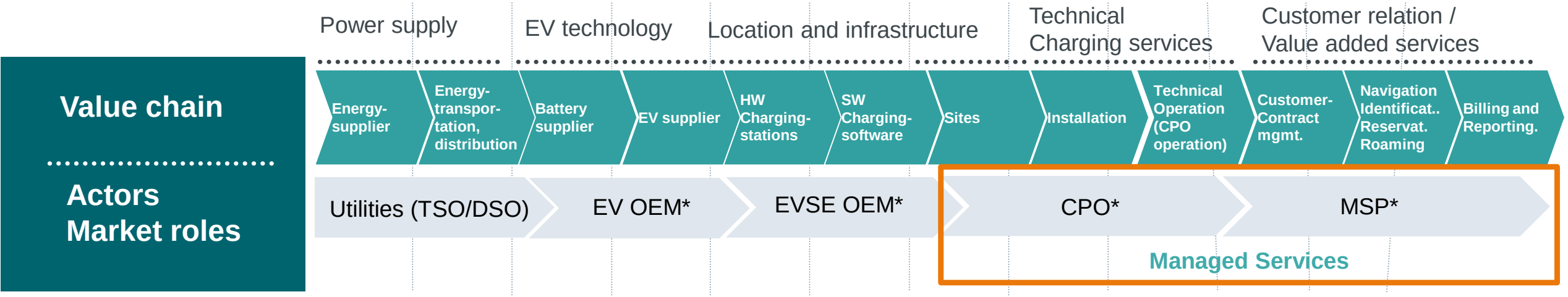
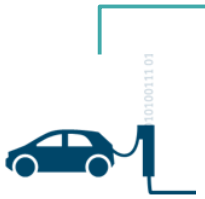


- EVSE OEM = Electric Vehicle Supply original equipment manufacture
- CPO = Charge Point Operator
- MSP = E-Mobility Provider / Mobility Service Provider
- EV OEM = Electric vehicle original equipment manufacture

Charge Point Operator

… taking care of units

- Technical operator of charging units
- Remote Monitoring & Maintainance
- Access right management
- Load Management
- Operator of Backend



Mobility Service Provider

… taking care of vehicles and drivers

- Corporate Fleet Charging Management
- Offers charging services for eV drivers (B2B) in enterprise fleets
- Supports charging at work, public & home
- Mobile App & RFID card

eMobility Regular Services = Lifecycle Partnership

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- Supervision
- Erection and Commissioning
- Project Management
- Preventive Maintenance

- Spare Parts
- Strategic Spare Part Prog.
- Spare Part Management

- Monitoring & Diagnostics
- Remote Services
- Asset Management
- Cyber Security

- 24/7 customer support
- On-site Condition Assessment
- Asset Consulting

Field and Maintenance Services

Repair and Emergency Services

Spare Part Services

Modernization and Retrofit Services

Digital Services

Training Services

Support and Consulting Services

- Repair Services
- Emergency Services

- Modernization Upgrade & Uprate
- Extension

- Product Training
- Customized Training
- On-site Training
- Certification & Qualification

On Demand
Our competence for your individual demands

Frame Agreement
Reliable terms and conditions tailored to your needs

contracts

Supply
E.g. availability guarantees for your reliable spare part supply

Performance based

Full Service
Your trusted partner for the entire maintenance of your assets

Support & Supply
E.g. expert know-how and spare parts supply supporting your maintenance organization


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Medical Research Environment v2.0.556
Future solutions

Disinfection
Hospital Associated Infections (HAIs)

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- An average of **7.1% of patients** in European hospitals get an HAI.
- In low- and middle-income countries the HAI infection rate is between 5.7% and 19.1%.
- **4 131 000 patients** are affected by health care-associated infection of which 37000 patient die in Europe every year.
- Infections cost on average 15.000 Euro. Total cost for healthcare facilities in Europe approximately **€7 billion per year**

Source: World Health Organization

UV disinfection

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CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

CDC Research from 2015

- 9 hospitals, 28 months, 600.000 patients
- Adding UV to “quats” (ammonium-based cleaning compounds) at terminal clean led to a **32% reduction in HAIs**.
- Adding UV to bleach led to a **37% reduction in HAIs**. Chemical disinfection alone is not enough.

Source: http://infectioncontrol.tips/2016/01/21/1423/

Ionization Technology

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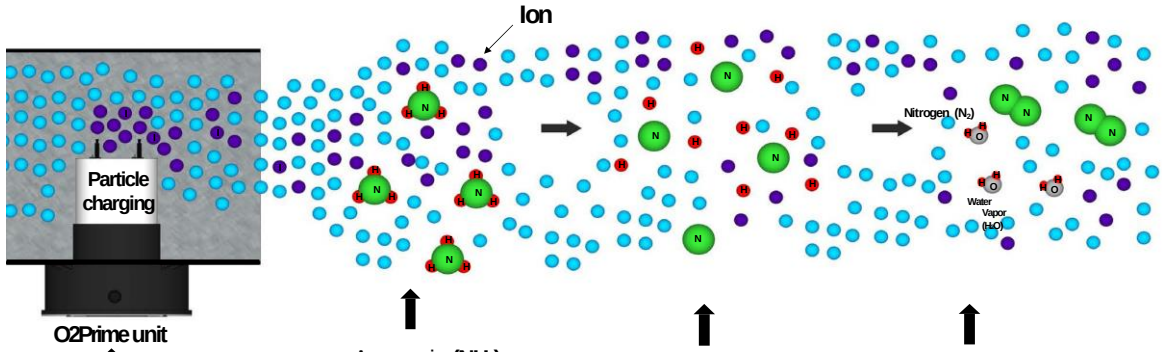
VOC Removal



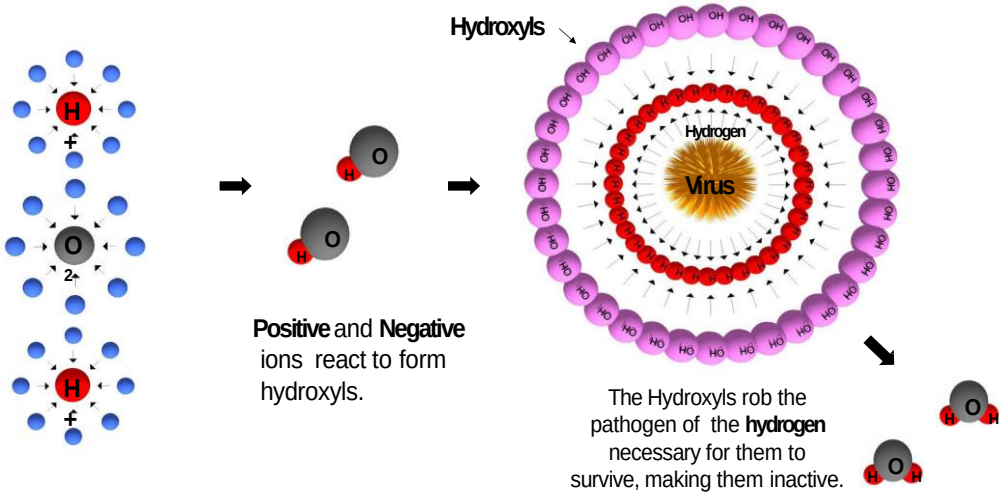
IONS created in forced air stream.

Ammonia **(NH_3)** Molecule.

Free floating positive and negative ions produced by the O2Prime unit breaks down gases.

The gases regroup to form safe & desirable gases already prevalent in our atmosphere.

Bacteria & Pathogen Removal

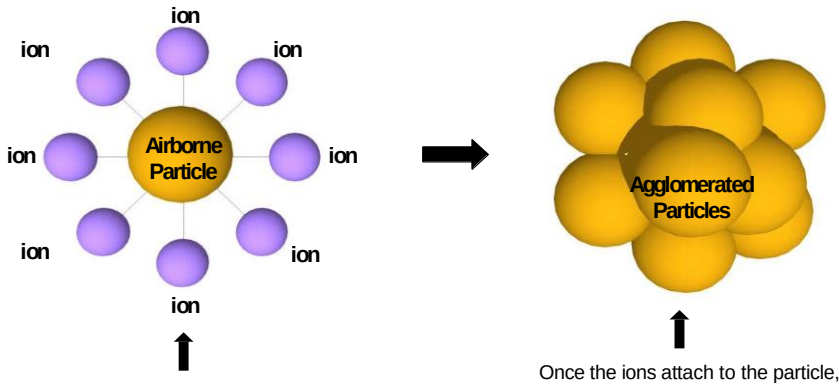


Positive and **Negative** ions react to form hydroxyls.

The Hydroxyls rob the pathogen of the **hydrogen** necessary for them to survive, making them inactive.

Creating water vapor (H_2O) in the process.

Airborne Particle Removal



Once the ions attach to the particle, the particle grows larger by attracting nearby particles of the opposite polarity, thereby increasing the filtration effectiveness.

Artificially creates millions of positive & negative IONS and releases them into the forced air circulation of an HVAC system travelling into spaces inside the building(s).

Smart Hospital
Your building acting as a team member

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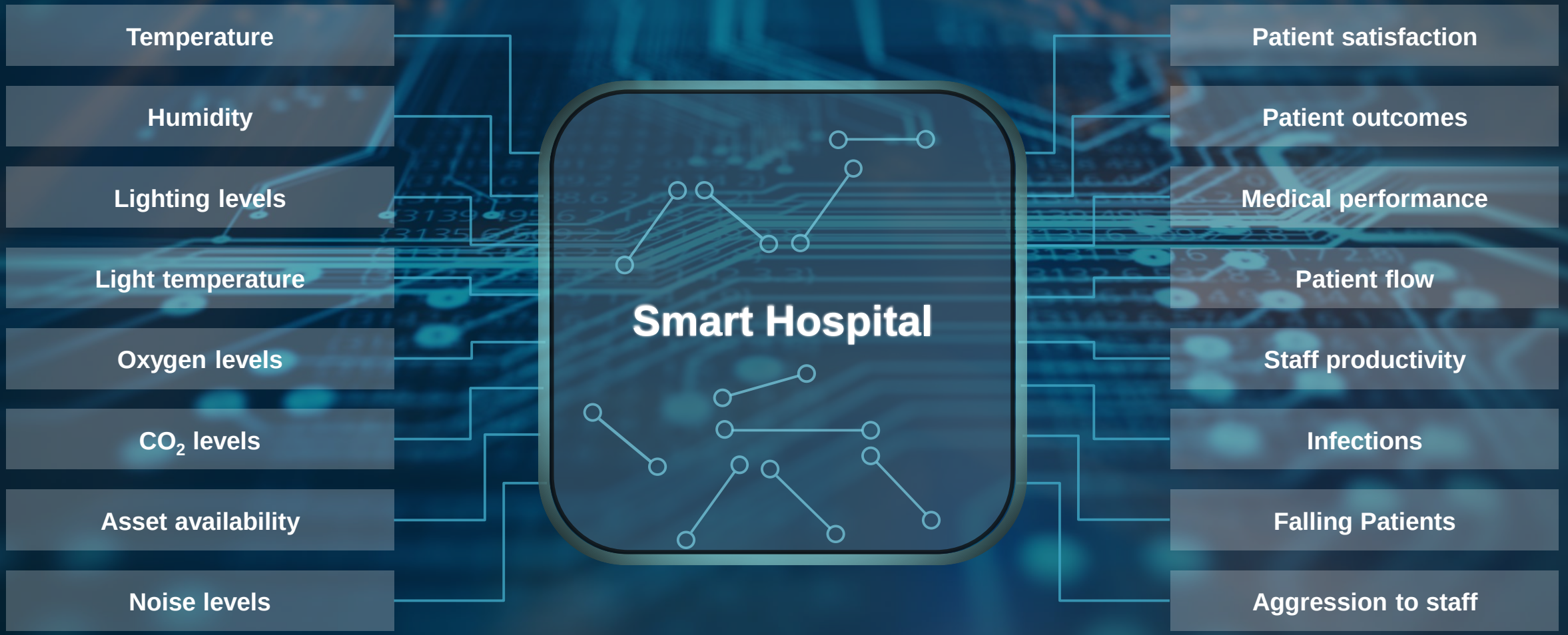

We walk the talk (proof)

Healthcare References

Further reference cases online (internal): Siemens References

Reference – Ankara City Hospital, Turkey

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Customer Benefits

- **Back to back** SLA responsibility.
- **One Energy system** to monitor and control all subsystems
- Ensure **reliable, available and safe energy supply**
- Improve operational efficiency due to **load shedding**
- **One stop shop** for all weak current systems
- **Operational efficiency** due to one **integrated** building management platform for mechanical & electrical subsystems.
- Elimination of one point of failure due to **Distributed Server Architecture**
- Operational excellence due to active & **emergency scenarios to be performed automatically**

Project Scope

Design, supply, installation, testing and commissioning of entire Substation Automation Solution:

- SICAM RTU
- Spectrum Power 5 SCADA

Design supply, installation, testing & commissioning of 22 systems integrated under Desigo CC w. a total of 800.000 data points:

- Fire alarm, HVAC & KNX, Access, MCC panels & Energy SCADA
- Other systems: PAVA, IP CCTV, Nurse Call, Data Network, Baby Tracking, Car Park Automation Systems, Pro-A/V, Telemedicine, Surgery Automation, Central Clock
- 5 Years of Service Agreement with SLA responsibility

Customer Testimonials (video)

Own customer video (Anadolu Agency)

Background

Ankara City Hospital Bilkent with 3,704 beds is the largest single phased hospital project in Europe and the 3rd largest in the world funded through a financing deal.

Financing for Ankara City Hospital Bilkent, which opened from 2018 in phases, has been secured for total €890 million from eight local and foreign banks.

Ankara City Hospital Bilkent, Turkey

Reference –
Sint Maarten Hospital, Belgium

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Customer Benefits

- Highest possible **comfort, safety and security** for staff, patients and assets within the building by using **state-of-the-art technology** and networked systems
- **One BMS system to monitor and control all subsystems**
- **Increase availability and safety**
- **Improve operational efficiency** for facility managers and building owners

Project Scope

Building Automation: the Siemens Desigo PX and TRA automation systems guarantee a pleasant and comfortable environment with the added benefit of maximum energy efficiency. They will be backed up by a tried and tested CMT surveillance solution.

Fire Safety: from smoke detectors through to Sinteso fire detection systems and Sinorix extinguisher systems, taking in the emergency unit and the short-circuit isolator, all fire protection is provided by BT throughout the building. In total, 5,900 smoke detectors will be installed.

Security: A Salto off-line system is fully integrated into the SiPass system, with more than 2,000 off-line door locks in the hospital, added to the 600 online Sipass readers. Furthermore, a comprehensive CCTV solution consisting of 180 cameras enables patients and staff to move about the hospital in complete safety.

Desigo CC: The new Desigo CC building management system integrates all these techniques in an intelligent and user-friendly way

Background

The new Sint-Maarten hospital building in Belgium is in use since 2018. The hospital provides patients with a very high level of care, comfort, safety and security, while paying close attention to its own sustainability and functionality. The hospital provides around 700 beds and is equipped with fully integrated state-of-the-art technology .

Sint Maarten, Belgium

Reference – Hvidovre Hospital, Denmark

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Customer Benefits

- **Siemens financed costs in advance**, and Hvidovre Hospital will pay them back over ten years from the achieved energy savings
- **Drop of heat consumption of 41%**
- **Reduction of electricity consumption of 23%**
- **Energy saving of 33%**

"This project will help us make real progress towards our environmental goals within a short period of time"
said hospital director Anders Agger

Project Scope

- Analysis of 245.000 m^2 hospital to reduce energy consumption and CO_2 emissions
- Optimizing the technical plants and expanding the hospital's own renewable energy sources

- Systems that have been expanded and updated in this project are
- Photovoltaic System
- Geothermal Storage Systems
- Wind Turbines
- Building Management System

Background

The Hvidovre hospital was built from 1968 to 1979 and was officially opened in March 1976. The hospital stands out for not being built high – the four main building are just three stories. It is one of Denmark's largest hospitals with more than 40,000 patients admitted each year

Hvidovre Hospital, Denmark

Reference –
Methodist Charlton Medical Center, United States

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Customer Benefits

Compliance – keeping a priority focus on fire and life safety and the impact it has on patient safety and care

Organization – implementing a proven scheduling and documentation system

Testing – understanding life safety systems and applying the NFPA standards while performing the required task

Acumen – remaining versed in the healthcare accreditation process and requirements

Project Scope

Siemens provides total building solutions for all fire alarm, life safety, and security.

The hospital's Fire and Life Safety System service plan includes inspection, testing, and customized test reports on the following

- Supervisory Signal Devices
- Valve Tamper Switches and Water-Flow Devices
- Duct Detectors, Electromechanical Releasing Devices, Heat Detectors, Manual Fire Alarm Boxes, and Smoke Detectors
- Visual and Audible Fire Alarms, including Speakers
- Fire alarm equipment for notifying off-site fire responders
- Automatic sprinkler systems
- Automatic fire extinguishing systems
- CO_2 and other gaseous automatic fire extinguishing systems
- Smoke detection shutdown devices for air-handling equipment
- Sliding and rolling fire doors for proper operation and full closure

Background

Methodist Charlton Medical Center is a full-service general acute care community hospital. Over the last several years, Methodist Charlton has added a US$ 116 mio expansion project, which includes a new 180-bed patient tower, a new physician office building and parking garage, completed a new Post Coronary Intervention Unit (PCIU), and renovated the Cardiac Catheterization Labs and MRI suites

Methodist Charlton Medical Center, USA

Reference –
Clinica Universidad de Navarra, Madrid

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Ingenuity for life

Customer Benefits

One BMS to control the whole facility

Organization Optimization – Less different systems to be learned by operators. Easy user interface

Safety and Comfort – Full control and overview of all systems status create highest safety and comfort levels

Maintenance – Good overview of condition of installation. Less components results in lower maintenance costs

Project Scope

The university hospital wanted to have one building management system to manage the whole facility and ensuring the highest safety and comfort levels

The Desigo CC BMS will include

- Desigo PX
- Desigo TRA's Green Leaf function
- Combi valves
- Fire Safety detection with Sinteso FC2080
- Extinguishing control with XC10 and Sinorix 1230
- Energy Management

Background

The new university hospital building in Madrid will be a similar hospital like the one in Navarra. It will have seven surgery rooms, two intensive cares units, 60 rooms and a state-of-the-art medical equipment for image diagnosis and onto-logical treatments

Clinica Universidad de Navarra, Madrid

Reference –
Sidra Medical and Research Center, Doha

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Customer Benefits

One BMS to control the whole facility

Improvement of operational efficiency –
Easy information exchange between building systems to support users, increasing safety and comfort

Project efficiency – Having one integrator that takes care of interfaces between the systems, making sure that the BMS and subsystems behave like one system

Project Scope

Design, engineering, supply, installation, testing, commissioning and warranty of the supplied systems for:
Fire Finder XLS (300 field sensors)

Supply and integration of 3rd party systems including
- Audio Visual System
- Genetec Access Control System
- ICT Systems (Data Network, Storage, WLAN, Servers)
- Video Wall
- Passive Infrastructure
- Nurse Call System
- Wireless Clock System

Background

Over the past three decades, the Qatari government has invested heavily in developing its healthcare services, resulting in significant improvements in the well-being of the population as reflected in its health indicators. Aligned with this vision, Sidra Medical and Research Center aims to provide world-class patient care throughout Qatar. The first of its kind in the Middle East, the center is designed to offer state-of-the art research facilities, education and healthcare locally and across the Gulf

Sidra Medical and Research Center, Doha

Reference – Hospital St. Vinzenz, Austria

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Customer Benefits

Due to the **new Desigo CC management station**, the customer will be able to optimize the use of his installations and **save a significant amount of energy** in the future. This will **increase operating margins** and **reduce the CO2 footprint**

Project Scope

The contract covers the complete control, regulation and visualization of the building automation system including

- 5,656 data points (DESIGO PX),
- 20 ISP with 31 PX controllers,
- 36 heat meters,
- 325 BSK loop modules,
- 22 frequency converters,
- 822 sensors and 199 valves with actuators,
- flap actuators,
- 35 cabinet fields,
- and the integration of various refrigeration and compact ventilation systems (Modbus and BACNet)

Background

The hospital St. Vinzenz in Austria has a long history going all the way back until 1805. Back then it had 50 beds and 15 rooms.

Today it has developed itself into a hightech hospital with a capacity of 328 beds and 800 employees

Hospital St. Vinzenz, Austria

Reference – Landeskrankenhaus Feldkirch, Austria

Customer Benefits

- **High level of compatibility of our products** and solutions is very important to the customer
- **Precise energy readings** can quickly reveal any weak points and serve as the basis for further optimization
- One controller for **all parameters** within the **operator theatre** for **high performance** and **ease of use** for surgeons

Project Scope

Providing an integrated safety and building automation solutions. The components includes control and visualization of the plants

Systems/Solutions in the project are

- BMS Desigo CC
- Total Room Operation (TRA)
- The new operating rooms are controlled via TRA, with the system managing the room ventilation air flow, heated and chilled ceilings, LED lighting, blinds, hot water, steam, medical gases and heat recovery
- Cooling and heat recovery in the existing hospital has been upgraded from the ground up
- Eight recoolers use free cooling to in the winter to meet the entire cooling demand – an enormous savings because chillers are no longer needed in the winter months
- Desigo PX controllers
- Remote monitoring of systems

Background

The 540-bed Feldkirch State Hospital is a major regional medical facility in the Austrian state of Vorarlberg. It features fourteen operating rooms and a 4-bed intensive care unit

Landeskrankenhaus Feldkirch, Austria

Reference – Columbia Asia Hospital, India

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Customer Benefits

- **One BMS system to monitor and control all subsystems**
- **Increase availability and safety**
- **Improve operational efficiency** for facility managers and building owners

Project Scope

Design, supply, installation, testing and commissioning of Total Building Solutions comprising of

- Desigo CC with 2,330 data points
- XLS Fire Finder with 1,727 addressable points
- Sinorix 1230 extinguishing solution
- Public Address System with 460 speakers
- Talk Back System

Integration of third-party solutions

- IP based CCTV System (Integration with 84 cameras)
- Access Control System (Integration of 30 doors)

Background

With 28 hospitals across the region, Columbia Asia was established to provide optimum and affordable medical services through its community hospitals. Serving more than a million patients yearly, the company has rooted its brand in all major cities across Malaysia, India, Indonesia and Vietnam. Columbia Asia plans to build a 230-bed specialty hospital in Bangalore, India

Columbia Asia Hospital, India

Reference –
Royal Edinburgh Hospital, Great Britain

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Customer Benefits

- **Fast reaction time to prevent blackouts**
  Cost reduction
  ~130k€ per power outage incident
  Fulfilment of governmental requirements
  for critical infrastructure
- **Increase reliability** of Energy supply due high level redundancy
- **“One face to the customer”** via Siemens SI RSS

Project Scope

Design, supply, installation, testing and commissioning of Emergency Power Management System (EPMS) incl. Medium Voltage protection relays:

- Remote Control units: SICAM AK3/ SICAM A8000
- Measuring/ Quality devices: SICAM P50/ SICAM Q100
- SICAM SCC + RuggedCom: SCADA System
- SIPROTEC: Protection Devices

Background

The **Royal Edinburgh Hospital** is a psychiatric hospital in Morningside Place, Edinburgh, Scotland. It is managed by NHS Lothian. A modern hospital on the same site was procured under the Scottish government's non-profit distributing model in January 2015. The first phase of the new hospital was built by Morrison Construction at a cost of £45 million and completed in January 2017.

Royal Edinburgh Hospital, Great Britain

Reference – Clinical Centre of Serbia

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Customer Benefits

- **Safe and reliable power supply**
  with principle of n-2 security implemented
- **Efficient energy management system**
  Protection and control of all MV and LV switchgears via SICAM and SIPROTEC customer tailored system
- **Safe operation and monitoring**
  Real time supervision of every aspect in energy supply process

Project Scope

Delivery, testing and commissioning of:

- MV Switchgears type 8DJH for substations 806-1N, 2N, 3N, 4N, 5N and central switchgears.
- SIPROTEC protection relays 7SJ82
- GEAFOL NEO dry-type transformers 1600kVA
- LV Switchgears
- SICAM control and automation system (SCADA and RTUs)
- RUGGEDCOM communication solutions

Integration of third-party solutions:

- Busbar trunking systems
- Building Management System

Background

Clinical Centre of Serbia is located in Belgrade and it provides specialized healthcare services for the inhabitants of entire country. After being entirely reconstructed, it will have area of 86,000 sqm., new emergency room, laboratories, offices, 30 operating rooms with high tech equipment and 3,150 beds in total, which is one of the highest capacities worldwide.

The total investment is €110 million and it will be implemented in two phases.

Clinical Center of Serbia, Serbia

Reference – Berkshire Medical Center, USA

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Customer Benefits

- **Operation on self- sufficient island grid,** disconnected from the main grid and combined controlling of heat and power resource
- **Increase power availability and safety via** Resynchronization, Black Start, Load shedding and load restoration
- **Providing of needed resiliency** for City of Pittsfield's critical infrastructure

Project Scope

Design, supply, installation, testing and commissioning of Microgrid Solution

- 1 MGC based on SICAM A8000 CP8050
- 1 remoter I/O panel
- 1 remote MGC HMI
- Web Navigator

Integration of third-party solutions

- 725 kW CHP unit
- Switchboard incl. Protection relays
- Main Breakers

Background

Berkshire Medical Center is a 307-bed community teaching hospital and the recipient of numerous national recognitions for service excellence and patient safety. BMC has been ranked among the safest hospitals in the nation by Healthgrades, earning the Healthgrades Patient Safety Excellence Award three years running, from 2017 to 2019, and has been recognized for patient safety by The Leapfrog Group.

Berkshire Medical Center, USA

Reference –
Smart Energy Distribution System for Health Authority - North Italy

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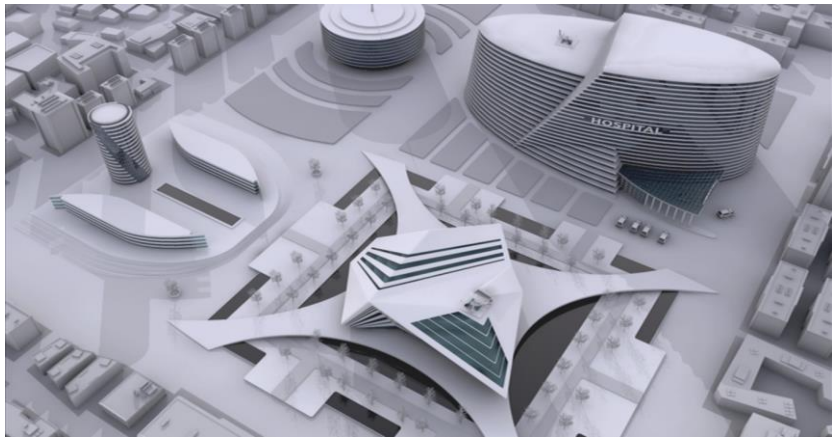

Customer Benefits

Siemens generates value by providing a smart, state of the art solution, therefore ensuring long-term business continuity and maintaining the value of already existing assets.

Project Scope

- The renovation project has been supported by Siemens with a revamping of low and medium voltage distribution systems. The aim of the end user was to upgrade both ordinary and emergency distribution networks in order to support a double power supply.
- Migration to Siemens Desigo CC supervision platform
- 10 Siemens Simatic S7 PLC Systems to control automation
- A ring fiber optic TCP/IP Siemens Scalance network: 10 switches and 3000m of optic fiber network
- 100 Siemens transformers to sustain the increased power request of the ordinary and emergency distribution network
- 8000 m of new power cables to support the increased power demand

Background

The Health Authority counts as many as seven hospitals, which are connected to each other and have specific assistance levels that include the psychological, the physical and social spheres. It provides various areas of application such as prevention, emergencies, acute & chronic diseases and rehabilitation.

Health Authority - North Italy

Reference –
Totally Integrated Power, Hospital - Belgium

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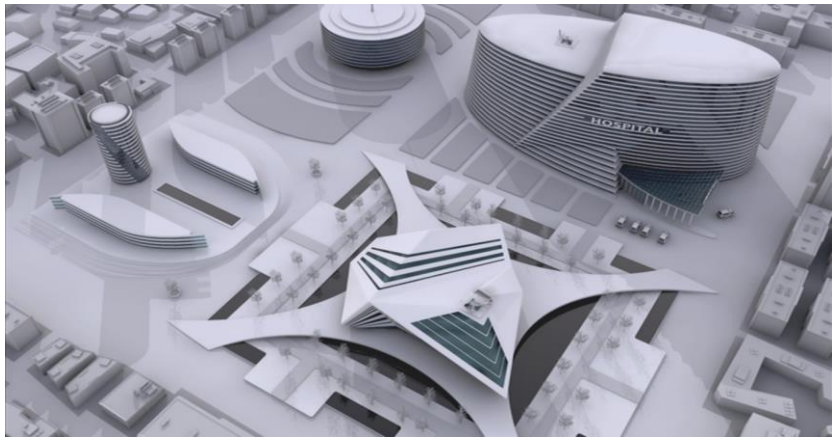

Customer Benefits

Thanks to these cutting edge electrical cabinets, the electricity is distributed in a simple, structured and safe way, while at the same time meeting the aesthetic criteria of a modern hospital.

Project Scope

As part of the project of renovation and construction which started in 2009, the Hospital Center called on Siemens and its partner in automation, Technord, to install the principal low voltage boards that ensure the protection of the electricity distribution of one of the new buildings.

Siemens defined the technical requirements of a customized distribution system based on a detailed functional analysis. After many calculations in terms of both design and system programming, SIVACON S4 and S8 type systems were installed.

Background

One of the most important hospitals with approx. 2500 employees (including 300 physicians) and 24,500 patients per year.

Hospital, Belgium

Reference –
Integrated Low-Voltage Solution, Regional Health Center, USA

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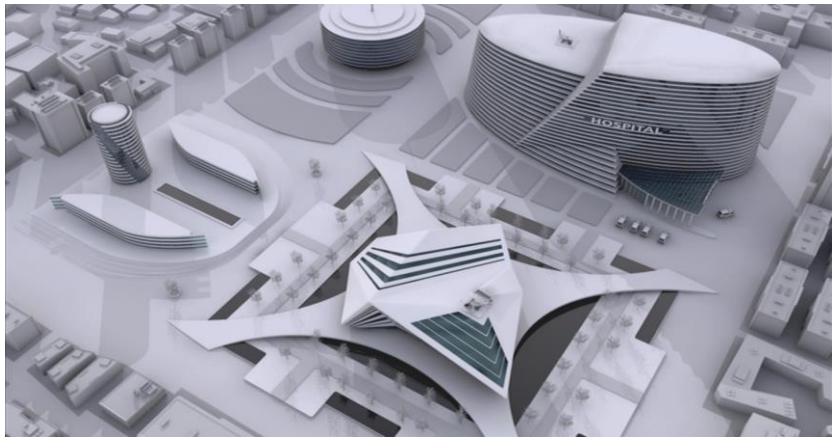

Customer Benefits

- Integrated, harmonized and efficient healthcare environment via technology

Project Scope

Our customer requested a comprehensive hospital solution with environmental, security, life safety and communications systems tightly linked.

Siemens provided several technologies to fulfill the requirements.

Background

The Regional Health Center includes the main hospital, a medical office building and a long-term care facility. The two-story hospital encompasses approximately 189,000 square feet and houses a 25-bed critical access hospital and 128 licensed long-term care beds. The construction and renovation project added approximately 105,000 square feet of new space and feature the focused renovation and improvement of the existing facility's low-voltage systems.

Regional Health Center, USA

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Thank you

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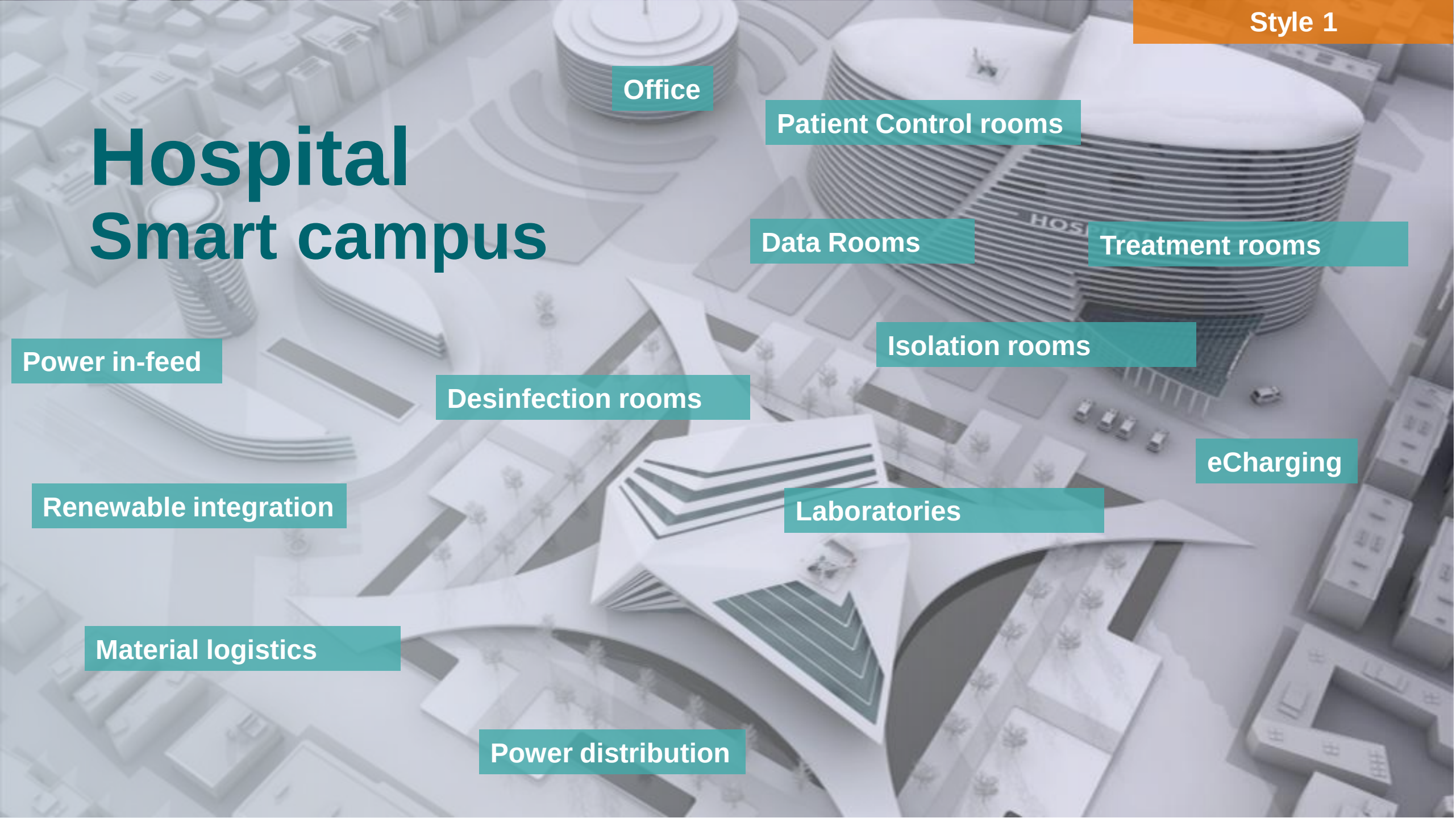
Hospital
Smart campus



Style 2

Hospital
Smart campus

Power in-feed

eCharging

Renewable integration

Power distribution

Material logistics

Office

Data Rooms

Treatment rooms

Patient Control rooms

Desinfection rooms

Laboratories