PSE Polskie Sieci Elektroenergetyczne

Cyber@PSE
Case study

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www.pse.pl

About us

Polskie Sieci Elektroenergetyczne S.A. (PSE) is the State Treasury company. Its responsibilities are specified in the Energy Law Act.

⇒ **PSE acts as:**

- **the transmission system operator (TSO)** in Poland, with responsibility for carrying tasks specified in national and EU regulations

- **the owner of the transmission infrastructure** within Poland

- **Energy Market Information Operator** (OIRE)

- **a member of the European Network of Transmission System Operators for Electricity** - ENTSO-E

⇒ **Total employees: ~ 3100**

Our activities

⊖ **Scope of activity:**

The subject of the PSE's activity is to provide the **services of electricity transmission** in compliance with the required criteria of the security of the **Polish Power System** operation.

⊖ **Company's tasks:**

- **ensuring the secure and cost-effective operation** of the Polish Power System as part of the common European power system, taking into account the requirements of synchronous operation and asynchronous connections,

- **ensuring the necessary development** of the domestic transmission grid and cross-border interconnections,

- **market-based allocation** of transmission capacity for cross-border exchange purposes,

- **creating the technical infrastructure** for the operation of the domestic wholesale electricity market.

Transmission infrastructure

NCC

National Control Centre – main and emergency locations

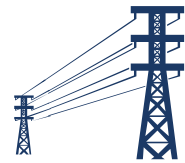**5** **Regional units responsible for maintaining and operating the Extra High Voltage (EHV) lines.**
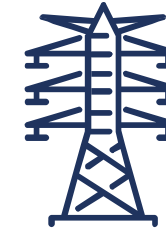
109 **EHV substations.**

HIGH VOLTAGE POWER GRID MAP

ZYD

— 220 kV lines
— 400 kV lines
● ■ substations

Owner of 306 lines in service with a total length of 16133 km including:

135 lines @ 400 kV
171 lines @ 220 kV

Submarine interconnection

450 kV DC (direct current) Poland - Sweden

Synchronous interconnections

400 kV with the German system
400 kV and 220 kV with the Czech system
400 kV with the Slovak system
400 kV with the Ukrainian system
400 kV with the Lithuanian system

ICT Infrastructure and the optical network of PSE

Assets	Approximate count
ICT systems	>250
Physical servers	DC: 400 BDC: 300
Virtual servers	1100
Active LAN/WAN devices	3000
Optical network	16000 km
SDH devices	360
Air conditioning devices	1300
48 V DC Power supply systems	250
PABXs	80
Data Centers	2 + 2 under construction
Locations	1 HQ + 5 reg. + 109 SS

LEGENDA
- Przewody OPGW na liniach 220kV (PSE SA)
- Przewody OPGW na liniach 400kV (PSE SA)
- Kable ziemne (PSE SA lub współwłasność)
- Linie NN PSE SA bez traktów światłowodów
- Trakty światłowodowe w trakcie budowy lub planowane
- Rekomendowane inwestycje liniowe
- włókna/kable światłowodowe dzierżawione
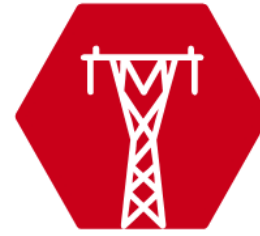- kable światłowodowe obce
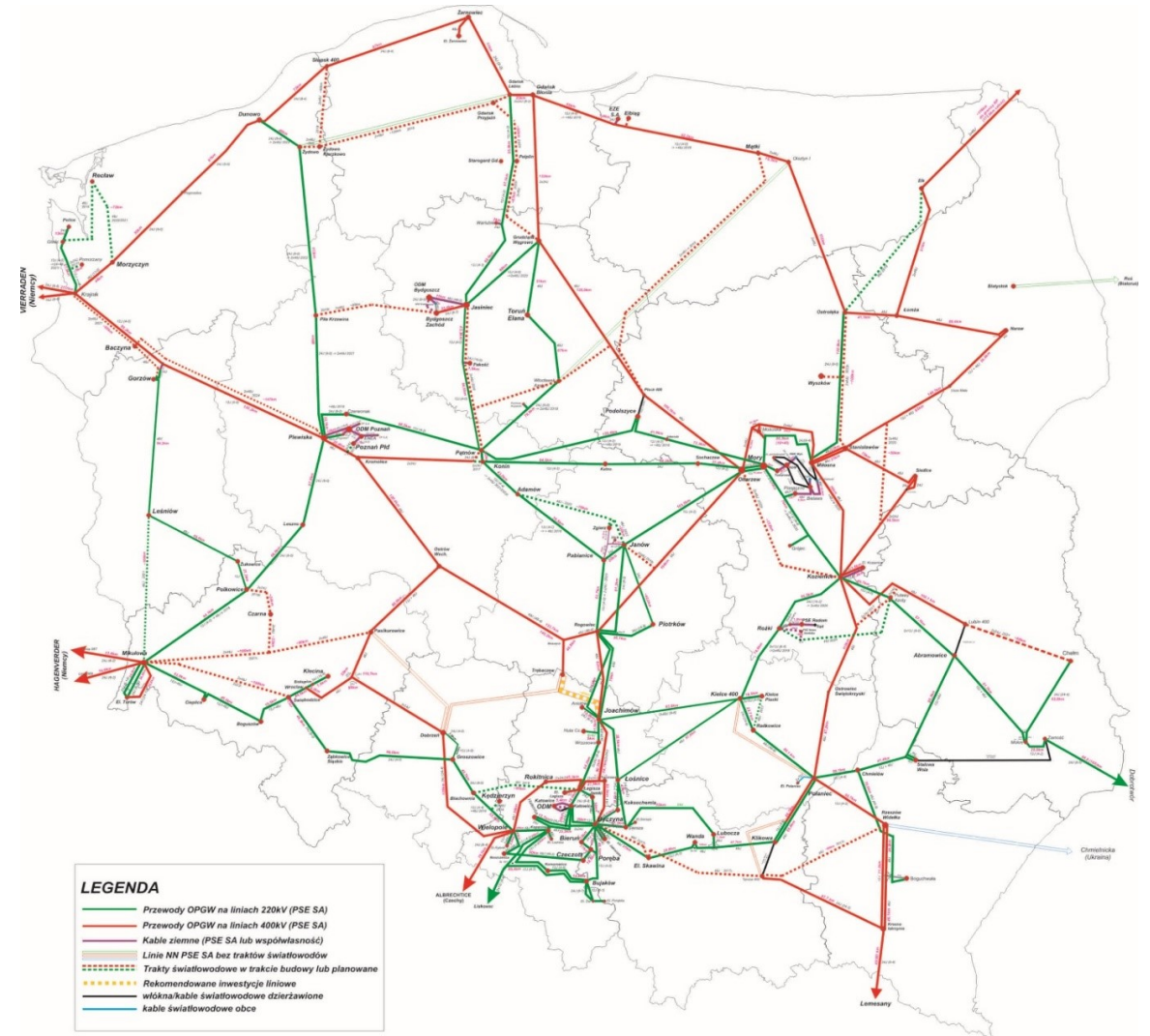
Main ICT Systems at PSE

IT

- **Business**
  - Power and Energy market management systems
  - Asset management & GISS
  - Simulation and forecasting
  - Energy Data Hub (CSIRE/OIRE)
- **Support**
  - ERP + HR
  - Project management & Collaboration
  - ITSM and ICT security management
  - Office, Exchange, SharePoint…

OT

- **Business**
  - SCADA (multiple levels)
  - Energy management (EMS)
  - LFC (Load and Frequency Control)
  - Metering
  - Facility management

Supported at the physical, OS, database, integration and application layers primarily by own administration teams, according to SLAs as required by BIA

Energetyczny Kompas (Energy Compass) App

Energy production and consumption guidance for the public

- Provides the public with guidance on energy usage, aiming to support the eco-friendly and low cost operation of the Polish Power System

- PSE daily defines 4 tiers of time slots depending on emissions required for generation and energy cost:
  - **Congestion** – system struggles to satisfy the needs, very high energy prices
  - **Rush hours** – majority of production satisfied by high emission / high cost sources
  - **Standard usage** – standard mix of energy sources
  - **Off-peak** – too much energy produced in the system

- Published on the company webpage + dedicated portal www.energetycznykompas.pl

- Also available through Android and iPhone mobile application
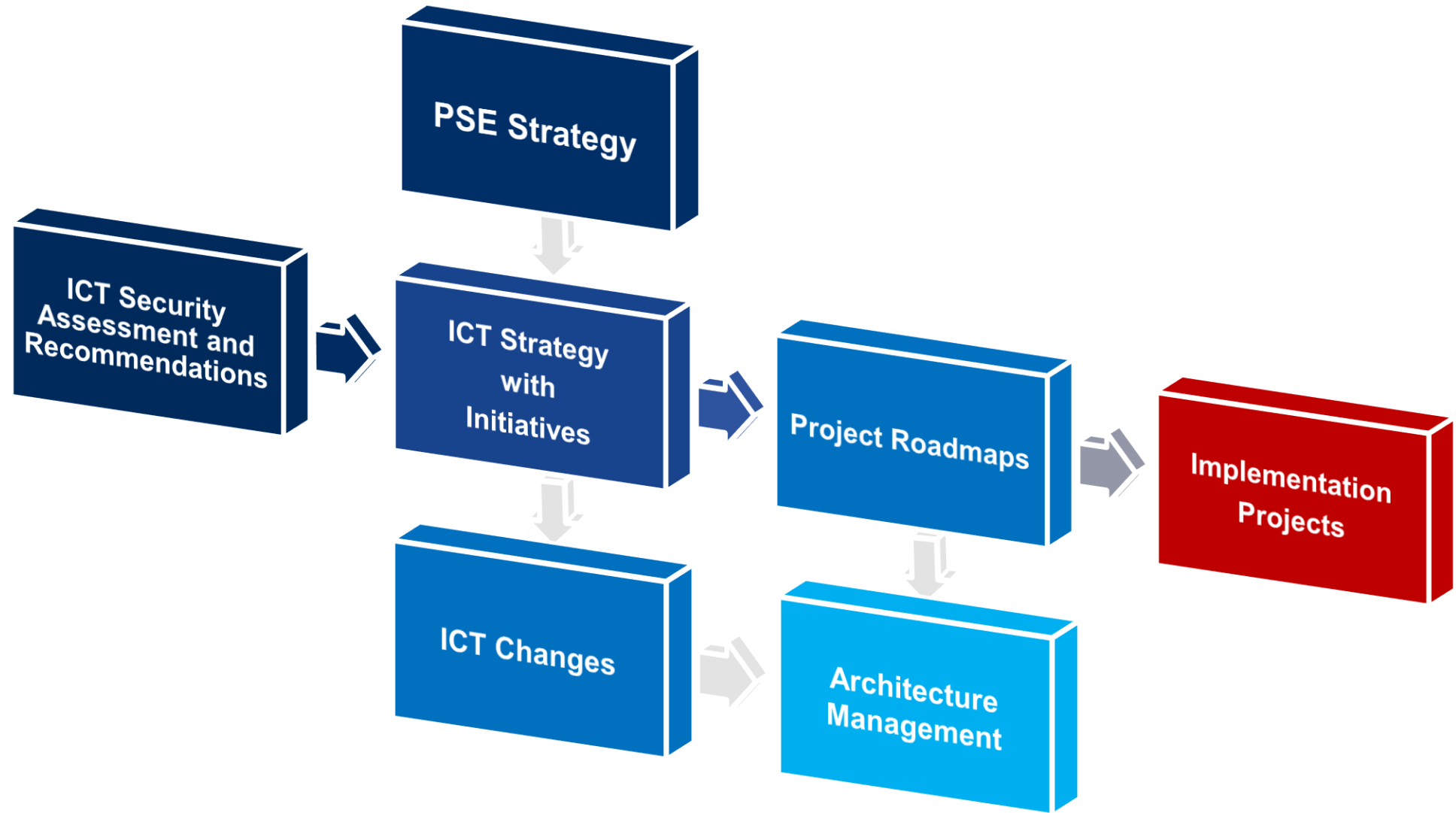
- Polish and English language

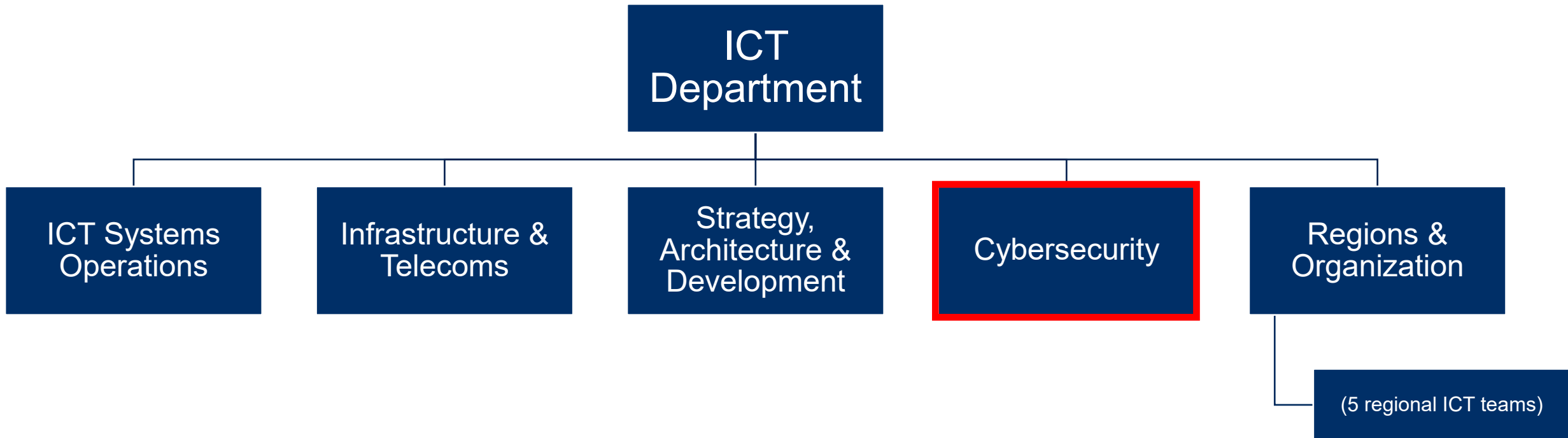# ICT Governance Driving the Project Portfolio

PSE Group ICT Teams

ICT Department

System Management Department
Dispatch Application Division

PSE Innowacje Sp. z. o. o.
subsidiary
Application Development
Research Development
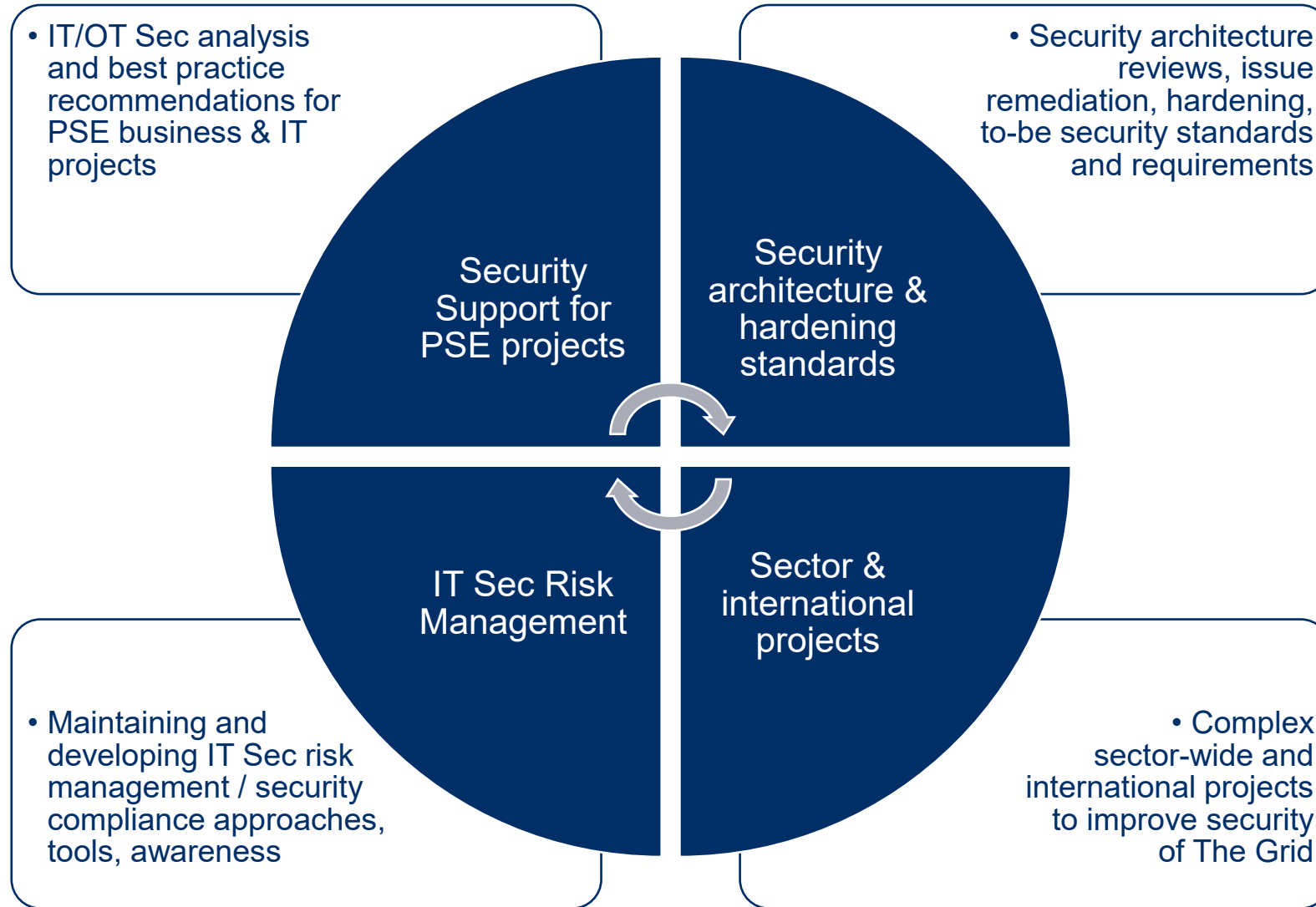
Over 320 employees

ICT Department Organization

PSE ICT Security / Cybersecurity Teams + NOC

Security Analysis Team

• IT/OT Sec analysis and best practice recommendations for PSE business & IT projects

• Security architecture reviews, issue remediation, hardening, to-be security standards and requirements

Security Support for PSE projects

Security architecture & hardening standards

IT Sec Risk Management

Sector & international projects

• Maintaining and developing IT Sec risk management / security compliance approaches, tools, awareness

• Complex sector-wide and international projects to improve security of The Grid

Security Systems Team

Security Systems

- IT systems serving security
- Vendor coordination
- Local tools development
- Support of dev of other IT tools
- IT Sec Lab

SIEM	Log Management
Privileged Identity	Identity Governance
AV/EDR	MDM
HSM	Data diode

...

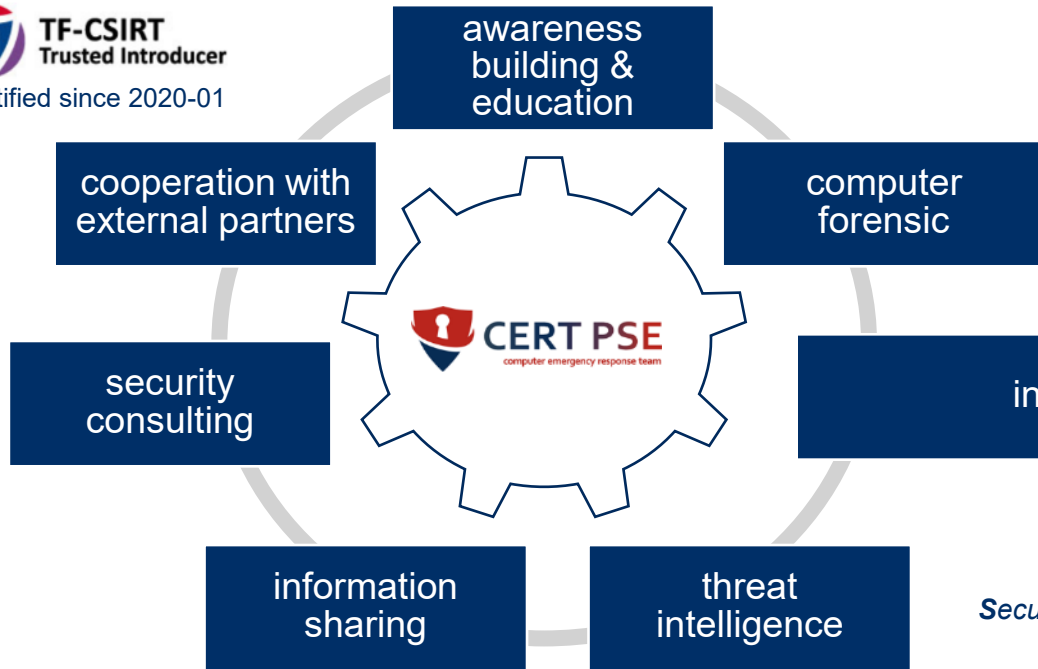PSE Polskie Sieci Elektroenergetyczne
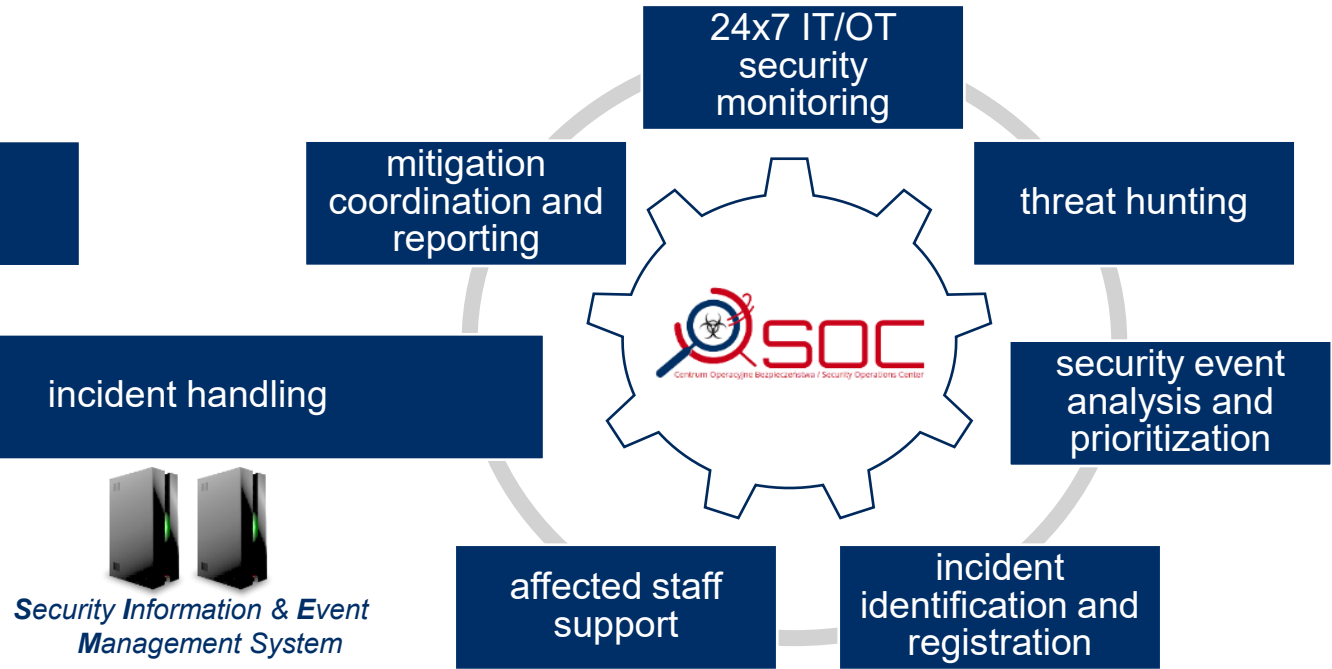
Security Testing Team

Security Testing

- Penetration tests – applications and infrastructure
- "Certification" of selected OT solutions for implementation in PSE
- White-box / Black-box / Gray-box
- Internal / External
- Security code audit
- DDoS reviews – web & infrastructure
- Security configuration audit

CERT and SOC @ PSE

Computer Emergency Response Team

TF-CSIRT Trusted Introducer
Certified since 2020-01

Security Operations Center since 2015

CERT PSE side:
- awareness building & education
- cooperation with external partners
- computer forensic
- security consulting
- information sharing
- threat intelligence

CERT PSE computer emergency response team

incident handling

Security Information & Event Management System

SOC side:
- 24x7 IT/OT security monitoring
- mitigation coordination and reporting
- threat hunting
- security event analysis and prioritization
- affected staff support
- incident identification and registration

SOC Centrum Operacyjne Bezpieczeństwa / Security Operations Center

Cybersecurity services provided to external bodies

In addition to directly supporting:
- PSE
- 2 subsidiaries

Coordination of Joined Cybersecurity Team:
- Polish Ministry of Climate & Environment
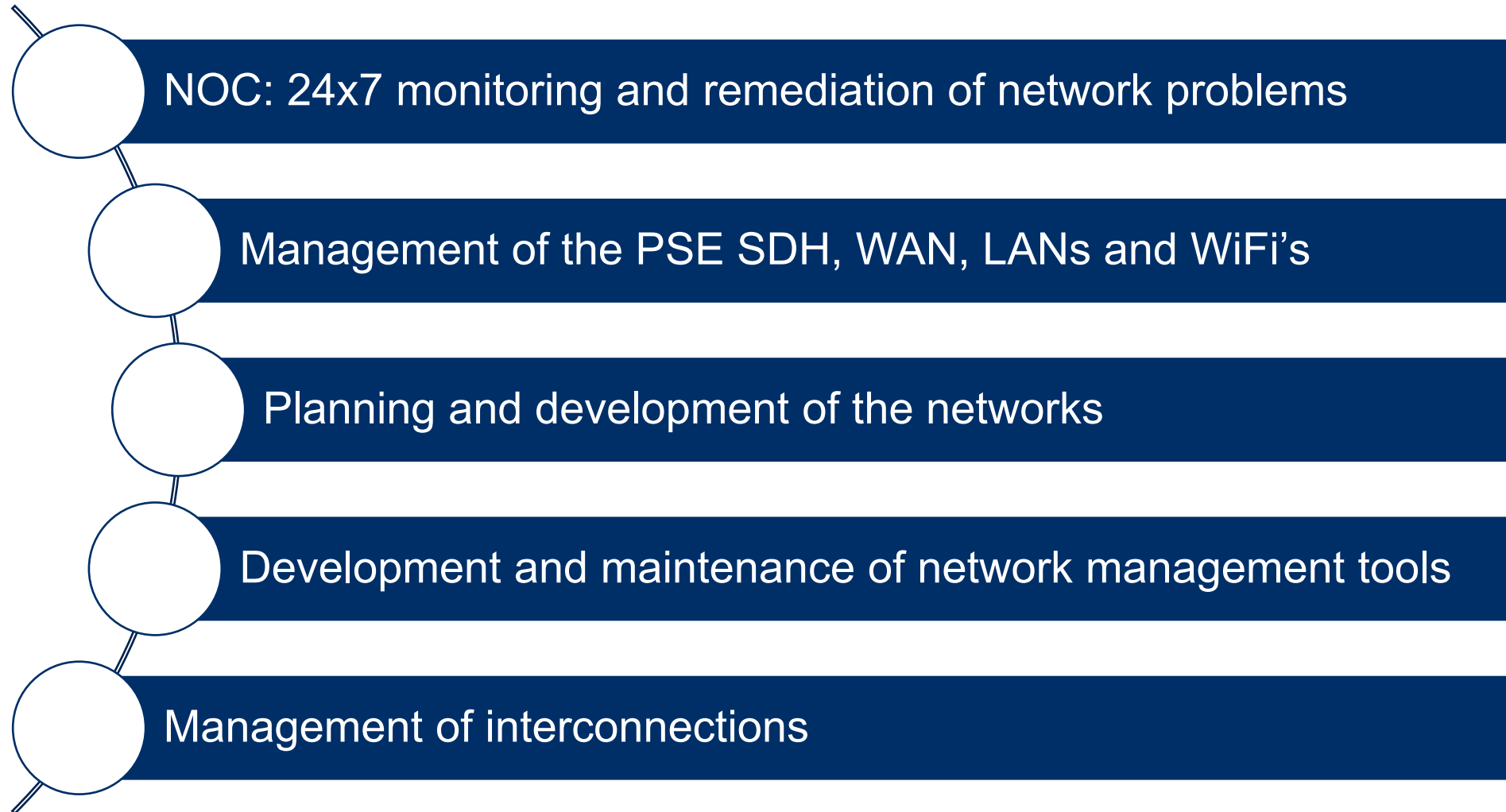- Energy Sector companies

CERT PSE
Close cooperation with:
- Polish Oil TSO
- Polish Gas TSO
- National, European, US, Japan CSIRTs
- ...

Security services for pan-European level, TSO-shared:
- ICT systems supporting energy market and grid management
- Data exchange platform
- Private communications network

ICT Network Management Team

NOC: 24x7 monitoring and remediation of network problems

Management of the PSE SDH, WAN, LANs and WiFi's

Planning and development of the networks

Development and maintenance of network management tools

Management of interconnections

ISO 27001/ISO 22301

- Certified since 2012
- Recertified with NIS centric scope in 2019
- 2025 recertification
  - NIS2
  - Network Code for Cyber Security
  - Current ISO standard
  - Updated scope

Cybersecurity @ PSE Summary

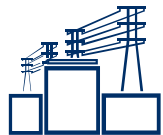Strong InfoSec team, with experienced risk management function

CERT Team certified since 2020-01, supporting more than just the PSE Group

24x7 SOC in operation since 2015, with operational, proven SIEM tools

ISO 27001/ISO 22301 certifications

Integrated coverage of IT and OT

International involvement in TSO & DSO cooperation, especially in cybersecurity matters