Project COCOON
Thessaloniki, 17/02/2025

Ensuring the Cybersecurity of the Future Power Grids

COoperative Cyber prOtectiON for modern power grids – COCOON

COCOON is a Horizon Europe-funded project dedicated to developing innovative cyber-physical protection solutions for modern power grids. With a consortium of academic, industrial, and utility partners, the project aims to deliver a comprehensive approach to energy security and system resilience.

Scope of COCOON

The electrification of the European Union (EU) is driving the decentralization and digitalization of Electrical Power and Energy Systems (EPES), incorporating Distributed Renewable Sources (DRES) as a pivotal pathway towards decarbonization and climate mitigation. However, the existing setups managed by Transmission System Operators (TSOs), Distribution System Operators (DSOs), and aggregators face cybersecurity challenges at the convergence of Information Technology (IT) and Operational Technology (OT). Recent geopolitical like the war in Ukraine, underscore the vulnerability of the interconnected EU power grid to malicious activities. In response, COCOON aims to deliver a practical cyber-physical sys solution for converged EPES. The ultimate objective is for the solution to achieve Technological Readiness Level 7 (TRL7).

COCOON includes four pilot setups:

1) Pilot 1: Chalkidiki, Greece
2) Pilot 2: Thessaloniki, Greece,
3) Pilot 3: Delft, Netherlands and
4) Pilot 4: Andalusia, Spain.

Through these real-world testbeds, COCOON will:

- Increase trustworthy information exchange by developing the **COCOON Programmable Node (CPN).**
- Implement an **Early Warning System (EWS)** for cooperative cyber-physical protection and operator training.

- Enable real-time cyber-physical protection by mapping explicit OT properties to IT vulnerabilities, addressing cybersecurity challenges resulting from the convergence of IT with OT technologies.
- Strengthen the resilience of interactions among entities involved in grid stability processes through practical network and system threat mitigation mechanisms.

COCOON Project Achieves Major Milestone in Cybersecurity and Energy Innovation

At the halfway point of the project, COCOON has successfully reached key milestones:

- The **Greek DSO (HEDNO)** has communicated with PV parks from its **SCADA system**—a first in Greece.
- The **Hoyas Grandes I photovoltaic (PV) plant** and its **Power Plant Controller (PPC)** were commissioned through a synergy between **Cuerva** and **Ingelectus.**
- Selene-CC has set up the test environment for Pilot 2, simulating its own setup while following the same rigorous security principles used in the electricity sector.
- The cyber-physical laboratory of the **University of Seville** has been set up to mimic the OT infrastructure of the pilots dealing with energy community (pilot 1, Chalkidiki, Greece) and PV power plant (pilot 4, Andalusia, Spain). This setup allows to analyze the interaction of actual components, such as the PPC of the PV power plant, with a real-time simulation of the corresponding pilot.
- The **University of Glasgow** developed the COCOON Programmable Node (CPN) software and network architecture, and integrated a prototype with Smart Grid Simulator (SGSim). This enabled development and testing of cybersecurity monitoring and analysis functions in a realistic power grid topology corresponding to project pilots. This work will subsequently be integrated into a hardware target and provide the platform for all partners' cybersecurity layer services.
- The **Aristotle University of Thessaloniki** and the **University of Seville** have developed a **generic** methodology for the **false data injection identification (FDII)** in Electric Power and Energy Systems (EPESs). Its distinct characteristic is the consideration of the physical system of EPES in the cyber security analysis, which provides an additional verification layer when examining the integrity of the EPES data, thus further increasing the cyber security level.

COCOON
Cooperative Cyber Protection for Modern Power Grids

A Holiday Message from COCOON's Coordinator

"As the year comes to a close, I want to take a moment to express my heartfelt gratitude. 2024 has been an incredible journey for the COCOON project, marked by innovation, progress and the meaningful connections. This is due to all the hard work put into by all the project consortium partners, the professionalism and their love to what they are doing. As we celebrate the holiday season, let's also look forward to the exciting opportunities that 2025 will bring. So, stay tuned, I'm expecting to see exciting progress and milestones, those will be reached with the goal to protect our energy grids for cyber threats, the COCOON project objective."

COCOON at Major Conferences and Industry Events

As part of its dissemination and engagement strategy, the COCOON project has actively participated in key conferences, exhibitions, and industry events across Europe. These events serve as important platforms for sharing project insights, networking with stakeholders, and reinforcing the project's impact in both the energy and cybersecurity sectors.

Notable events where COCOON partners have contributed include:

- **SEMICON Europa 2024**, Munich, Germany.
- **7th International Conference on Smart Energy Systems and Technologies (SEST 2024),** Turin, Italy.
- **SynergyMed2024,** Nicosia, Cyprus.
- **5th International Workshop on Electrical Power and Energy Systems Safety, Security, and Resilience (EPESec 2024) held alongside the ARES Conference,** Vienna, Austria.
- **IEEE PES General Meeting 2024,** Seattle, USA.
- **IEEE MELECON 2024,** Porto, Portugal.
- **IEEE ICC 2024**, Denver, CO, USA.
- **Intersolar Exhibition,** Munich, Germany.

By participating in these high-profile events, COCOON strengthens collaboration between academia, industry, and policymakers, ensuring its findings reach the right audiences and contribute to shaping the future of secure energy systems.

COCOON
Cooperative Cyber Protection for Modern Power Grids

Upcoming Events and Dissemination Efforts

COCOON will continue sharing its progress through **newsletters, podcasts, and public workshops.** The next **COCOON Workshop** will feature distinguished experts in energy and cybersecurity, engaging stakeholders, policymakers, and industry leaders. The event will take place in **Thessaloniki on March 21, 2025.**

For updates, visit: https://www.cyber-cocoon.eu

Contact Information:

Angelos Marnerides
Project Coordinator
Dept. of Electrical & Computer Engineering at University of Cyprus,
KIOS R&I Centre of Excellence.
E-mail: marnerides.angelos@ucy.cy

Fotios Fotellis
Dissemination Manager
Researcher in Hedno
E-mail: f.fotellis@deddie.gr

Follow us on:

- **LinkedIn:** COCOON on LinkedIn
- **X (formerly Twitter):** @Cocoon_cyber
- **Spotify:** COCOON Podcast on Spotify

COCOON
Cooperative Cyber Protection for Modern Power Grids