Policies for Resilience of Critical Infrastructure Protection with Dynamic Changes of Operational Conditions: SUNRISE project insights

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- Technology

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SUNRISE project at a glance

SUNRISE at a glance

Strategies and Technologies for United and Resilient Critical Infrastructures and Vital Services in Pandemic-Stricken Europe	
Call	HORIZON-CL3-2021-INFRA-01
Grant Agreement	101073821
Website	https://sunrise-europe.eu/
Duration	36 Months (01-10/2022 – 30/09/2025)
Budget	Around 11,5 M€
Consortium	42 partners
Project Coordinator	Aljosa Pasic (Atos / Eviden)
Objectives	***O1:*** *Facilitate collaboration among CIs within and across European borders, within and across different sectors, between public and private stakeholders* ***O2:****Identify pandemic-specific vital services and CIs in Europe, their interaction and dependencies, the risks and cascading effects among them, and effective countermeasures at European level* ***O3:*** *Develop a comprehensive strategy and a set of mature technologies for CIs resilience and business continuity in a pandemic* ***O4:****Pilot the new strategy and technologies in real-world conditions across Europe* ***O5:****Enhance knowledge, awareness and capacities for unity and resilience in Europe*

SUNRISE Pilots

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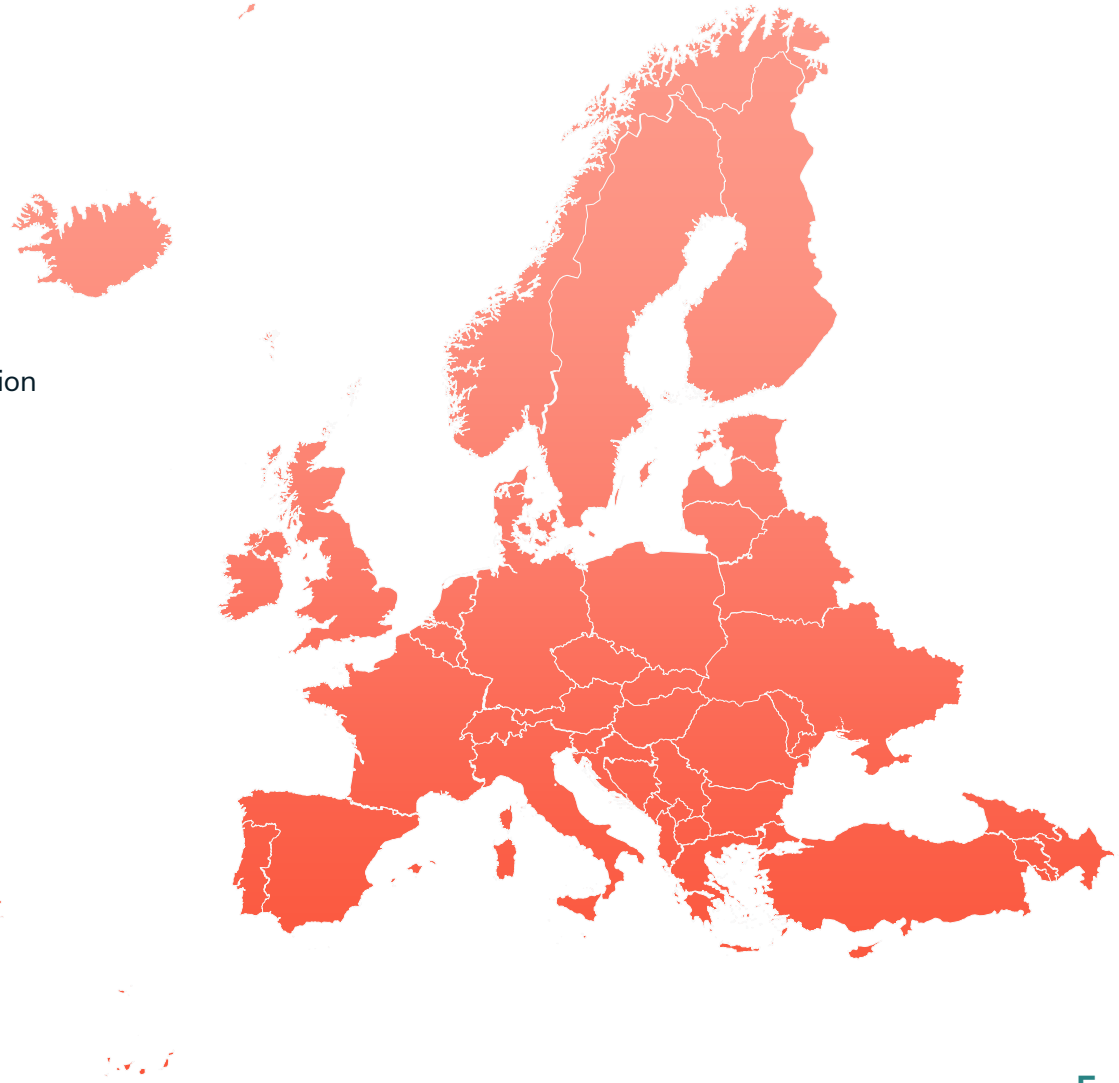
+ **18 pilots in 8 different countries**
  - Most pilots are in ES, IT and SI, defined as strategic national clusters
  - There are some others in FR, EE, RS, IL and CZ
  - Represented sectors: Health, Digital, Energy, Transport, Water and Public Administration
+ **Participation of National Ministries**
  - Internal Affairs in ES
  - Infrastructures in SI
+ **Participation of Regional Government:** Friuli Venezia Giulia in IT
+ **Participation of Municipality:** Jerusalem in IL



Main Pillars

Mission Statement

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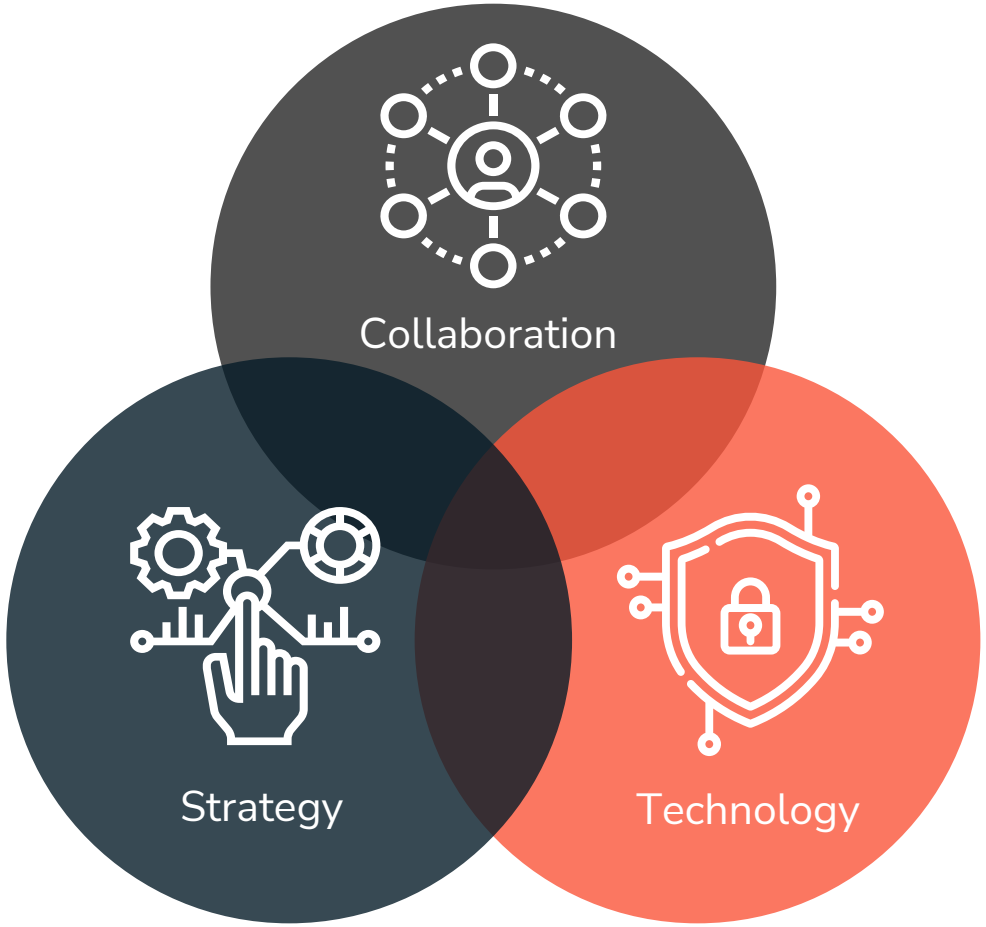
"Strengthening Critical Infrastructures through Collaboration, Strategy and Technology"

- BEFORE: Critical infrastructures' preparedness for emergency scenarios and temporary conditions. Consideration of human factors and climate change as a 'threat multiplier'
- DURING: Adaptable mitigation and collaboration when those scenarios materialize.
- AFTER: Lessons learned, and alignment of strategy and Business continuity plans with uncertain availability of skilled workers and other "temporary condition threat multipliers"



Retro-assessment about IT systems of CI operators

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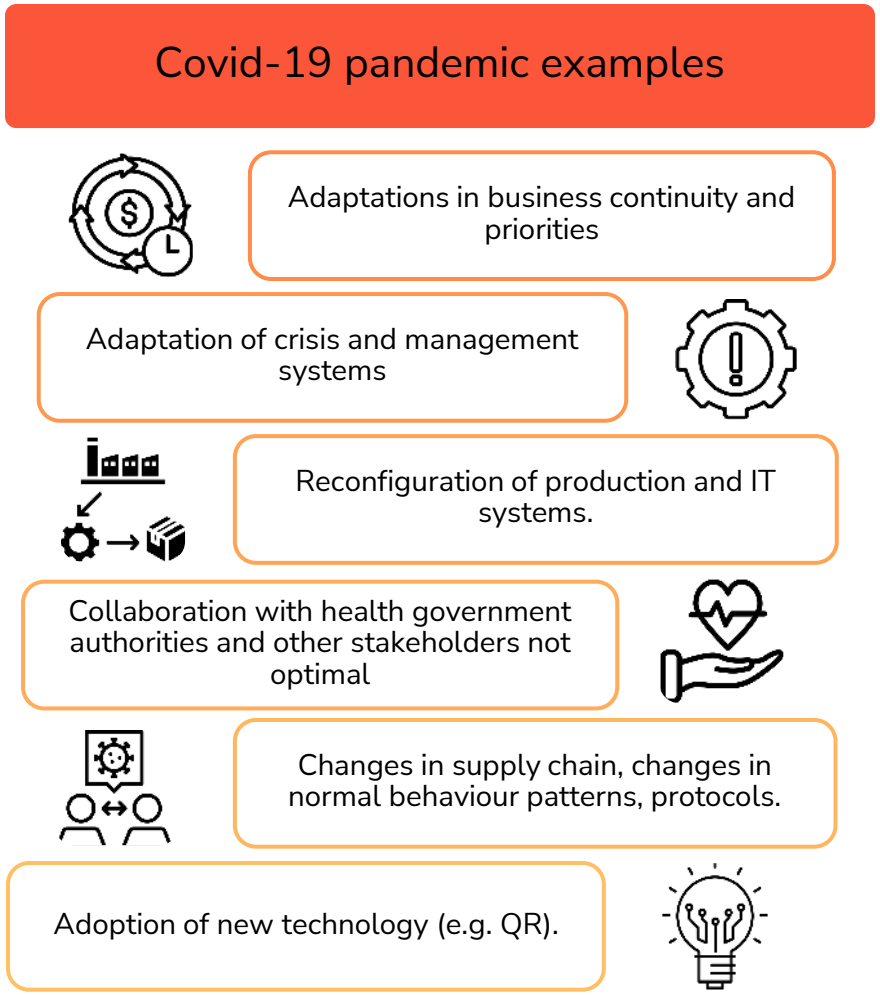

- **Essential employees** and operators of digital parts of CIs were **affected physically and mentally,** both directly and indirectly, producing increased absenteeism.
- Measures implemented to contain pandemic spread (e.g. lockdown, restrictions) sometimes **destabilized normal maintenance and support** of cyber infrastructure, or incident response teams.
- Changes of national, regional or organizational strategy had an **impact on priority**, as well as the collaboration with the other operators of CIs

Challenges of Dynamic Operational Conditions

Observation and Orientation

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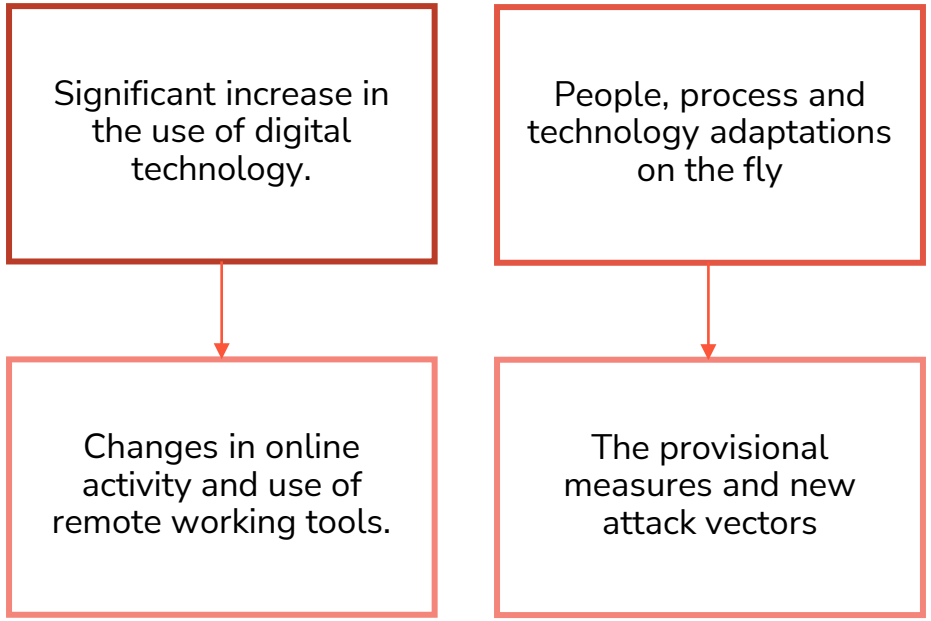
- OODA loop (Observe, Orient, Decide, Act) focuses on **contextualization** of the available information, while also **making sense** of newly arrived data and changing circumstances.
- **Re-adjusts risk baselines** by sensing ("observation") of external environment and a cognitive process of "orientation", to make optimal decision.
- Observation works with **outside- in sensory information**, orientation works with **inside-out created operational condition configurations**, that might contain cognitive bias, but can also work better with uncertainties, partial information, diversity or degree of randomness and disorder.
- **Probabilities of a risk vary depending on OBSERVATION and ORIENTATION including OPERATIONAL CONDITIONS,** including sources of data (trust in them), timeliness and other data

- Focus on cyber risks as a "threat multiplier":



Solutions in SUNRISE

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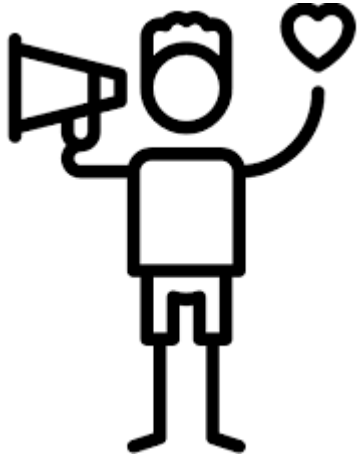
+ ***Scenarios: adaptivity, collaboration, absenteeism…***
+ ***Technology design, development, piloting and validation***
  - Risk-based access control to protect the essential workers and societies at large
  - Remote physical infrastructure inspection to enable safety of CIs while lacking of human resources
  - Increased cyber-physical resilience to address new threats in remote working conditions
  - Resource demand prediction and management to address the changes in the demand o physical goods
+ ***Awareness and impact creation***
  - Enhance knowledge, awareness and capacities for unity and resilience in Europe



Policy Task Force in SUNRISE

Methodology

- Policy assessment done at **several levels**, in several WP, crossing strategic, tactical, and operational issues
- The SUNRISE Strategy Implementation Process addressing identification of general conditions, but also temporary conditions, together with **possible scenarios potential consequences and available countermeasures**, that include special economic policies to tackle the effect of the pandemic (or other adversary events) or non-pharmaceutical interventions (NPI)
- "Default" EU and CI policies are based on **assumptions about normal or emergency operations**, with a limited number of in-between situations or operational scenarios where collaboration and adaptivity depend on workforce and supply chain availability
- Assessing what worked well in SUNRISE pilots helps **identify "operational level" constraints**, allowing policymakers to revise or update policies for better alignment with different scenarios.
- Understand trade-offs and whether decision and policy makers have time to understand the capabilities, limitations or risks reported from "operational level" due to **dynamic changes in operational conditions**
- Task Force established in June 2024 with representatives from all WP
- Scoring and ranking was done in a collaborative manner to prioritize and focus on specific findings that might have impact on policy

Findings and link to SUNRISE work

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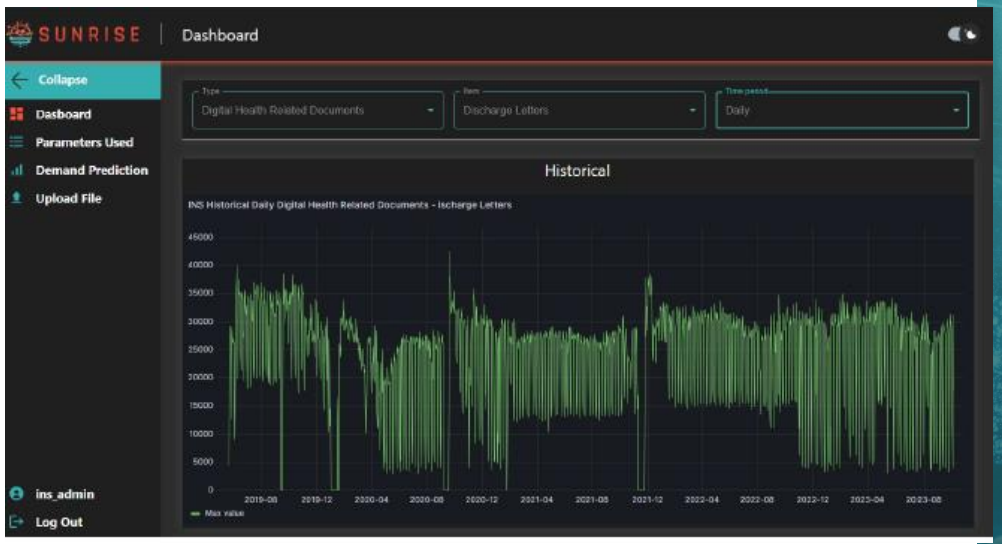
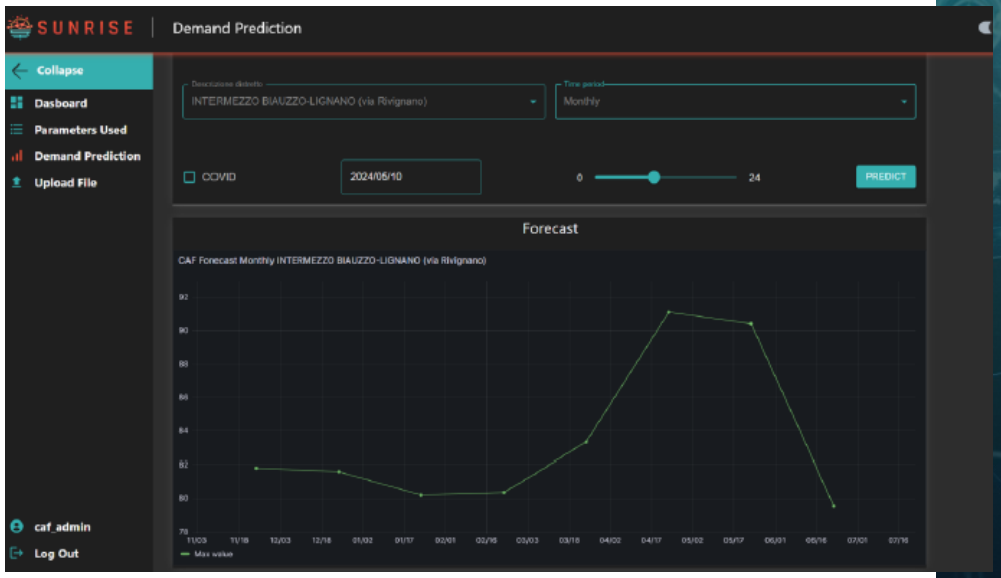
- **Scenario based planning** to improve dynamic orientation: implementing an automated integration between the Risk Assessment Tool, What If Analysis and Cascading Effects Simulation: what would next pandemics look like?
  - CI profiles recorded via the Risk Assessment Tool will be automatically and periodically exported to form a network of PSCEs (pandemic-specific critical entities) and their relations between each other.
  - The What If simulation (technically planned as an *i-frame* integration directly inside the Risk Assessment Tool) then provides results
- **Data driven decision making** to improve dynamic observation
  - Integration of external data (e.g. threat intelligence sharing incl trust score and relevance) to adapt probability dynamically
  - Integration of real-time data
  - Integration of temporary condition variables (e.g., change of priority that changes impact in risk assessment)
  - Resource availability (data, human, supply chain…), Demand prediction

Demand Prediction and Management (DPM) Tool

1. Societal stability during pandemics
2. Contributes to strategic decision-making in business and government
3. Utilizes climate and weather data for a holistic macroeconomic impact
4. Adaptation to changing demands for economic resilience
5. Minimization of disruptions to critical services





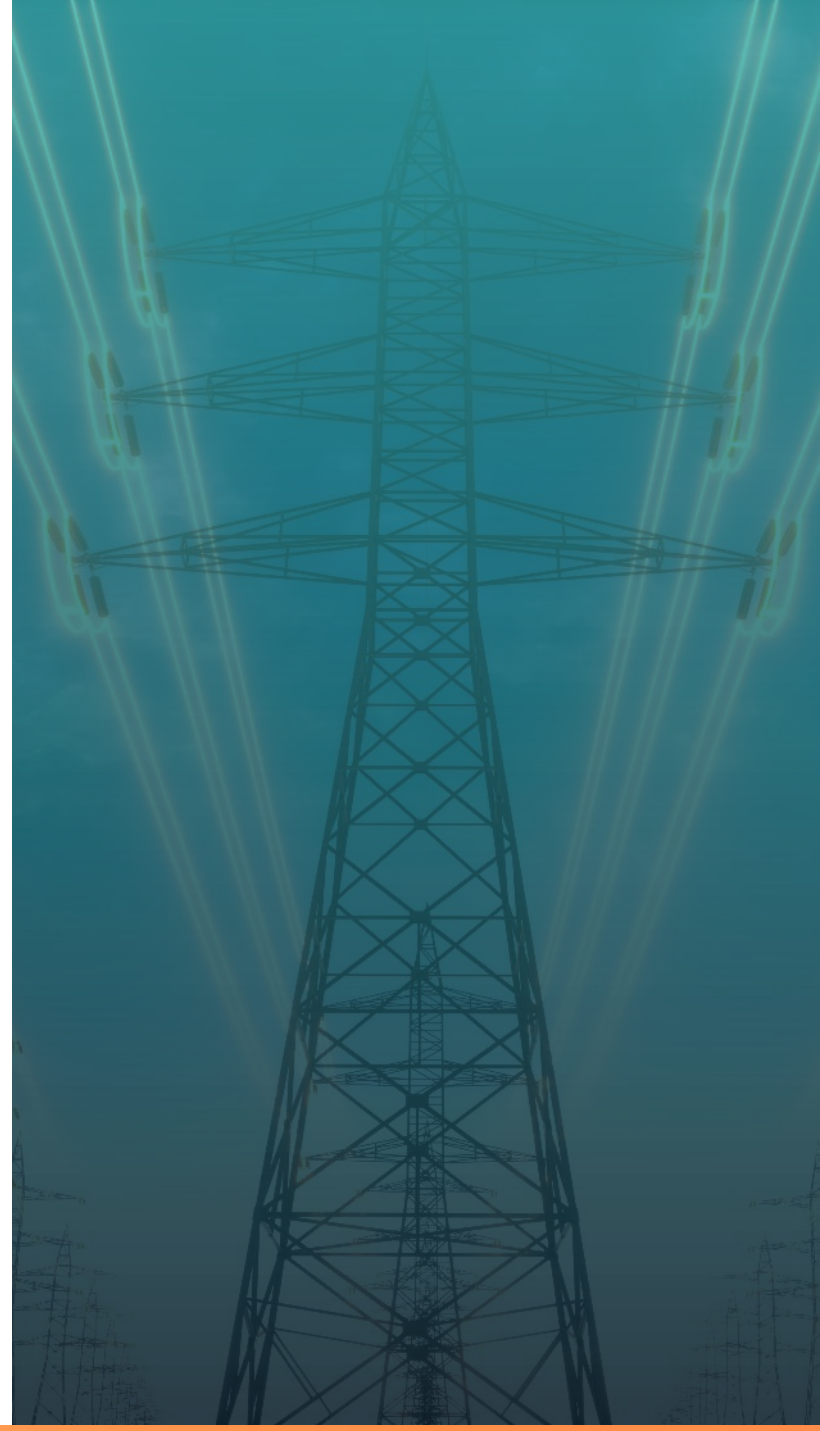
Other issues in Policy Support Taskforce

- Focus on DYNAMIC conditions of each CI: Practicable definitions and criteria to characterize CIs or CEs during a temporary event e.g., specific pandemic. What parts of temporary conditions are **generic and applicable to all CI operators from all sectors, and which parts are specific** for sector or CI operators?

- Focus on DURING phase: Broader definition of resilience: not only limited to the ability to recover or “bounce back” from a perturbation such as a pandemic, i.e., involving post-incident activities, but also pre-emptive activities and measures before the incident, as well as **concurrent activities while the incident is happening.**

- Focus on “CROSS” feature of EU policies: **Integration or interoperability** of SUNRISE strategy process with already existing risk management processes, and frameworks for assessing pandemics

- In case of pandemic, is 100% NIS2 or CER compliance more important than other priorities?



Conclusions

SUNRISE: model, share, control, predict, detect

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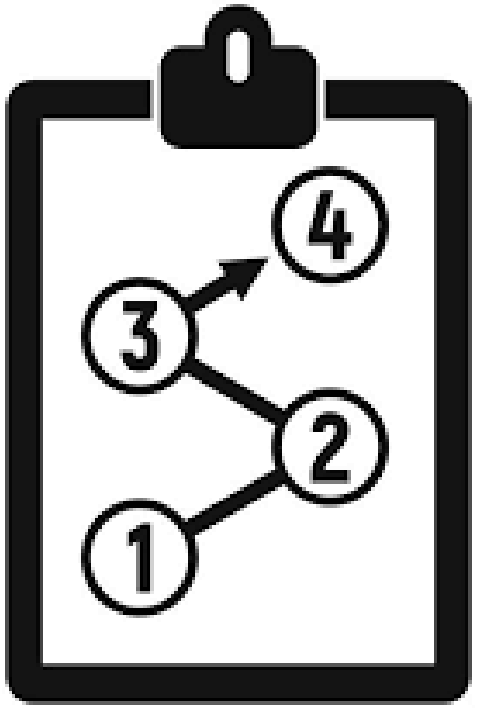
- Lessons learned from COVID-19:
  - Need for adaptivity (dynamic impact assessment, dynamic changes of probability of adverse events, risks derived from new mitigation measures e.g. NPI)
  - Need for better collaboration
    - vertical – between govt levels and CI operators
    - horizontal operational level between sectors
  - Need to use real-time and external data for monitoring risk evolution and context/scenario changes (e.g., resource availability, demand prediction, threat landscape)

- "Threat multipliers" and Multi-hazard scenarios: human factors (absenteeism, stress…), supply chain disruptions, cyber-physical attacks…
- Cross-sector and cross-EU dependencies: cascading effects, collaboration dynamicity, trust erosion…
- Continuous resilience management: monitor attack vectors, derived risks, reasoning with uncertain/missing data, use of real time data, anomaly detection, etc

From lessons learned to policy inputs

- *We have many lessons from pandemics, but gaps in CI resilience and protection still need to be addressed*
- *Dynamic contextualization (for outside-in sensing), but also context adaptation (inside-out decisions) need both scenario-based planning (BEFORE) and data driven decision making (DURING)*
- *Considering CI technology, people, and processes at operational level and in temporary operational conditions (e.g., pandemics or any "threat multiplier" scenarios) is a key for stress testing of resilience of CI*



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Thank you for your time

Any Questions?

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