

Critical Infrastructure Protection – on the interface of safety and security

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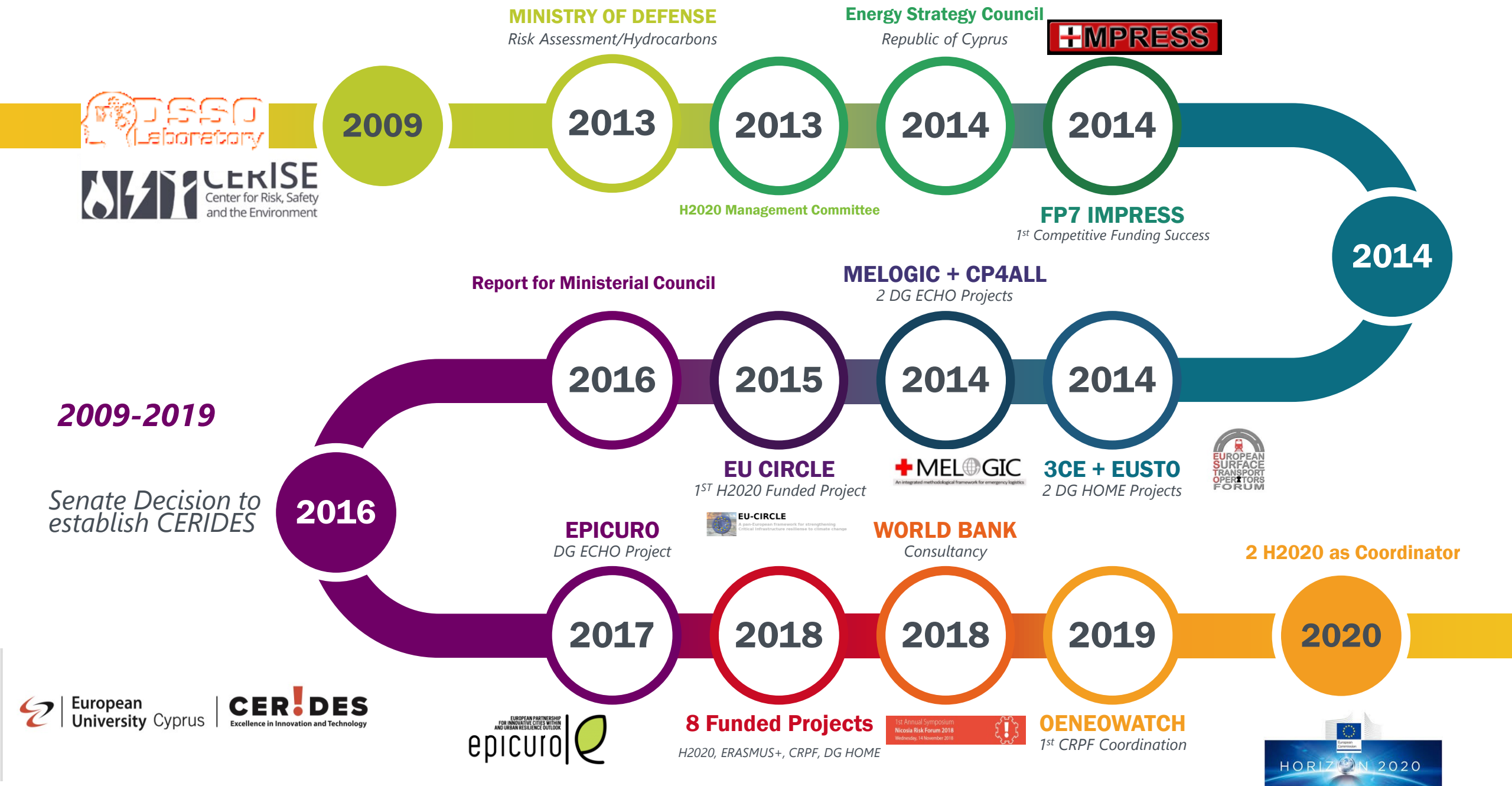
CERIDES Aim

- The **areas of focus** of **CERIDES** revolve around the development, use and evaluation of primarily quantitative and to a lesser degree qualitative methods in order to measure, assess, manage and communicate risk, and to analyze, design and implement decision-making mechanisms and systems.
- CERIDES aims to create high quality output and build a high caliber reputation along three main areas:
 - Research: **CERIDES** aspires to create a vibrant research community within Cyprus and the region.
 - Education / Training: **CERIDES** intends to provide an academic framework for risk science and create a career path for researchers emerging from the University. The Centre will provide high-quality teaching that will challenge students and help them develop skills in critical thinking, research and problem-solving.
 - Consultancy: One of the key aims of the **CERIDES** is to assist organisations to effectively manage risk and uncertainty and assist decision making in the fields of occupational, industrial, natural and environmental hazards.



Facts and Figures

- Established in 2016
- Employs 6 Faculty + 10 Researchers + 8 PhD Cand
- Has attracted already in excess of €4 M
- 20+ EU funded projects
 - H2020
 - FP7
 - DG ECHO
 - DG Home
 - DG Justice
 - Research Promotion Foundation



What is CI – Critical Infrastructure

- A relatively new concept, traced back to the US in the mid-1990's
- Came to Europe quite some time later (after 9/11)
- Literature made of official documents, handbook and studies (scientific part followed)
- Defined in 1997 by the US President's Commission as "basic foundations for society"
- "European critical infrastructure" or "ECI" means critical infrastructure located in EU States, the disruption or destruction of which would have a significant impact on at least two EU States.

Council Directive 2008/114/EC, December 8, 2008

- An Initiative after the 2004 terrorist attack in Atocha, Madrid, Spain
- It establishes a procedure for identifying and designating European Critical Infrastructures (ECI) and a common approach for assessing the need to improve their protection. The Directive has a sectoral scope, applying only to the energy and transport sectors.

Atocha Attacks

On March 11, 2004, 193 people are killed and nearly 2,000 are injured when 10 bombs explode on four trains in three Madrid-area train stations during a busy morning rush hour.



Mari Explosion

- On 11 July 2011, a large amount of ammunition and military explosives that had been stored outdoors for over two years at the Evangelos Florakis Naval Base near Zygi, Cyprus, self-detonated, killing 13 people, including the Commander of the Navy, the base commander and six firefighters. A further 62 people were injured.
- The ammunitions had been seized in 2009 from a cargo ship bound for Syria, and were awaiting disposal. The explosion severely damaged hundreds of buildings in Zygi and the nearby Vasilikos power station, Cyprus' largest one, causing widespread disruption in the supply of power to the island.

- The €700 million-power station was reduced to a "mangled shell", and the electricity supply to approximately half of Cyprus was interrupted. The Electricity Authority of Cyprus (EAC) later instituted rolling blackouts in order to conserve the supply and stated that it would import generators from Greece and Israel while the damage, estimated at €2 billion, was being repaired. The rolling blackouts lasted for two to three hours in each area and were planned to affect only residential areas.
- EU estimates that the cost of the explosion to the island could amount to US\$2.83bn, with cost of the power plant itself coming to US\$992m. This was weeks before the Bank of Cyprus and other business leaders said "deep spending cuts are needed fast."

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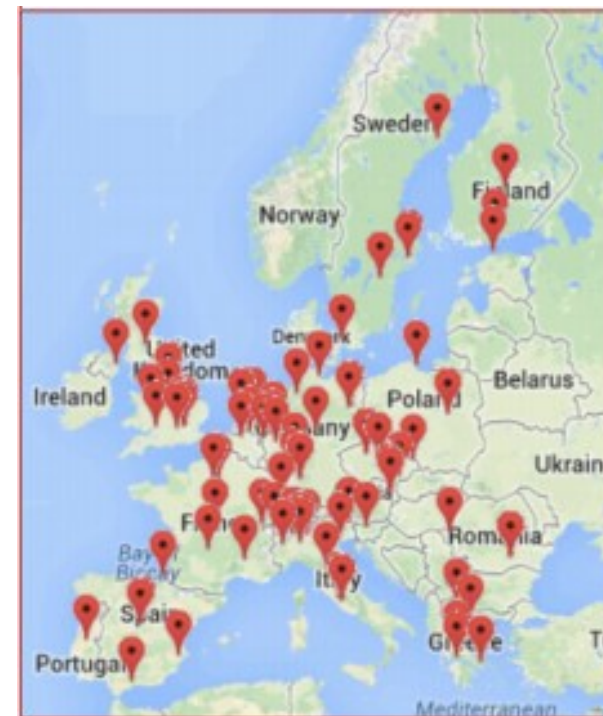


European Critical Infrastructure (ECI) Operator Security Plans (OSP) Procedure

- Identification of important assets
- Conduct of a risk analysis based on major threat scenarios, vulnerability and potential impact
- Identification, selection and prioritization of counter measures with distinction between
 - permanent security measures
 - graduated security measures

European Reference Network for Critical Infrastructure Protection

Provides a framework within which experimental facilities and laboratories will share knowledge and expertise in order to harmonise test protocols throughout Europe, leading to better protection of critical infrastructures against all types of threats and hazards.



From Protection to Resilience

- Currently little attention is paid to recovering from disasters
- Protection can never be guaranteed
- The advantage of the move towards resilience is that measures are substantially less expensive
- Create societal resilience capacity based on training, planning AND including all the society

Examples of Resilience

- London 5/5 attack on the Underground system – the city was “business as usual next day”
- Hurricane Katrina 2005 – emphasis on terrorist attacks and not on natural disasters



Issues

- Public Private Partnerships – who is responsible?
- Physical or Cyber Attacks?
- Energy Systems (focus on oil & gas offshore and onshore installations)

EU's Vision for Energy Security

I want to reform and reorganise Europe's energy policy in a new European Energy Union. **Jean-Claude Juncker** (March 19th 2015)

Energy Security Priorities

1. **Supply security** Diversifying Europe's sources of energy and making better, more efficient use of energy produced within the EU.
2. **A fully-integrated internal energy market** Using interconnectors which enable energy to flow freely across the EU - without any technical or regulatory barriers. To enable increased competition and **lower energy prices (affordability)**
3. **Energy efficiency** Consuming less energy in order to reduce pollution, preserve domestic energy sources, and reduce the EU's need for energy imports (less strain on **supply security**).
4. **Emissions reduction** Rebuilding the European emissions trading scheme, pushing for a global deal for climate change in Paris in December 2015, and encouraging private investment in **new infrastructure and technologies**.
5. **Research and innovation** Supporting breakthroughs in low-carbon **technologies** by coordinating research and helping to finance projects in partnership with the private sector.

Cyber Related Threats in CIP

- Do they ever happen? (Lodz, PL – 2008)

The Telegraph

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Schoolboy hacks into city's tram system

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By Graeme Baker

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Cyber Related Threats

- Do they ever happen?
- *"He treated it like any other schoolboy might a giant train set, but it was lucky nobody was killed. Four trams were derailed, and others had to make emergency stops that left passengers hurt. He clearly did not think about the consequences of his actions."*
- *"The first sign of the chaos came on Tuesday afternoon, when a city tram driver tried to steer his vehicle to the right, but found himself helpless to stop it swerving to the left instead."*

Cyber attacks on CIP can affect societal safety

- Particular emphasis should be paid on the relationship of cyber safety and safety in Critical Infrastructures. Energy Critical Infrastructure is the main supporting pillar of National and International economic activity. Possible interruptions on their functionality can cause serious damage to the wider workplace (Varianou et al, 2017). Domino effects from possible interruptions to Critical Infrastructure can cause serious financial damage, among others. “Hundreds of shops across south-east London and north Kent were forced to close and commuters spoke of “incredibly frightening” conditions on the roads as traffic lights failed” (Evening Standard, 2009).

Nuclear Industry

- As always high impact, high cost industries are first to lead the change
- It is possible to imagine terrorists marrying such information with the safety weaknesses exposed by the Fukushima catastrophe and targeting spent nuclear fuel or core cooling systems at other nuclear plants. In other words, Fukushima has implicitly exposed the relationship between the nuclear safety problem and the nuclear security problem

Identifying external dependencies in EU: Energy Sector

- ✓ High dependency on Swiss power grid (due to centrality), especially for Italy
- ✓ Russian oil dependence
- ✓ South Europe dependency on gas from Russia
- ✓ LNG form an important set of physical and logical dependencies for EU MS in the Mediterranean area
- ✓ Dependency not only on the supply side but also on the security of the infrastructure

Identifying external dependencies: Transport

- ✓ EU the largest exporter and second largest importer in the world:
74% of goods in EU are transported using maritime transport
 - ✓ Suez canal is identified as an important external critical infrastructure
- ✓ One third of passenger air transport is extra-EU.
 - ✓ The volcanic ash incident provoked a 90% reduction in air traffic over 5 days in Finland, Ireland and the UK

Assessing external dependencies: Submarine cable disruption scenario

- ✓ EU-Africa-Asia connected through submarine cables passing through Suez canal
 - ✓ A geographical single point of failure
 - ✓ Limited redundancy in the connectivity between EU-Africa-Asia
 - ✓ Several Telco services are outsourced in third countries that depend on this connectivity
- ✓ Internet traffic serviced by submarine cables passing through Suez accounts to 5.4% of the total EU internet traffic
 - ✓ A disruption of these cables is assumed to impact 5.4% of the EU internet traffic
 - ✓ We assess the aggregated economic impact for 5 days of inoperability for the 5 biggest EU economies: Germany, France, UK, Italy, Spain

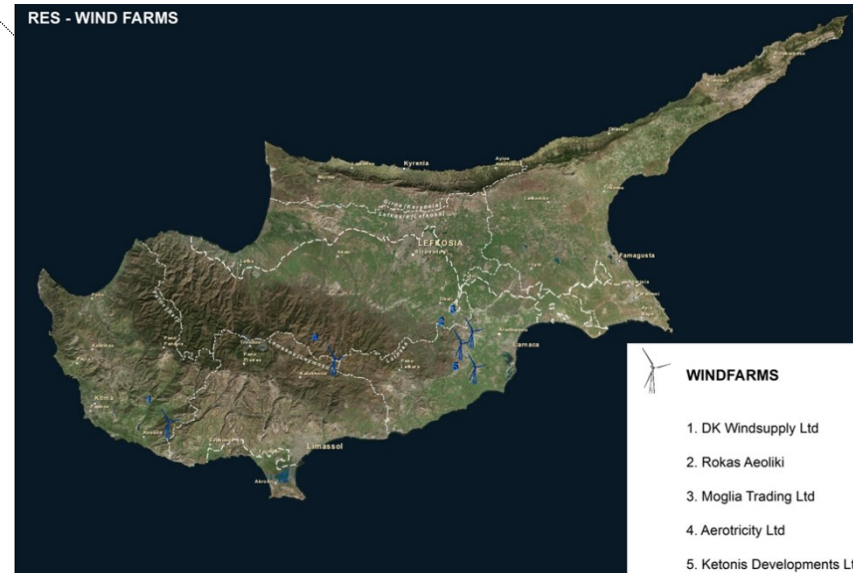
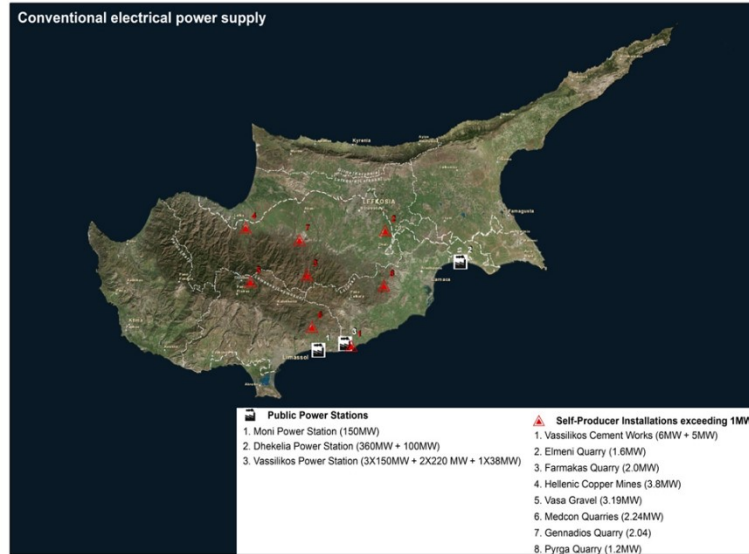
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#success stories

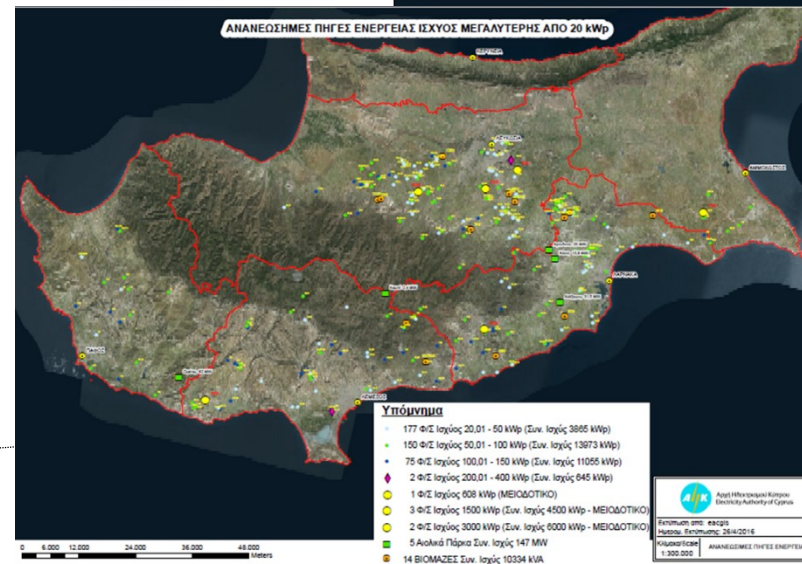


Vulnerable areas in Cyprus with regards to Energy CI

27



Maps of
conventional
and
alternative
energy
installations



Currently
creating a full
registry of CI
assets in EU

Resilience Assessment Tool (RAT)

- ✓ Web-based
- ✓ User Accounts
- ✓ Auto-completion of values using a questionnaire
- ✓ Assessments creation for scenarios' sandboxing
- ✓ Creation and comparison of scenarios
- ✓ Radar chart as visual output of the results

Infrastructure resilience

Ability to prepare, respond and recover



Earthquake



Hurricane



Cyber A

Resilience Assessment Tool (RAT)



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Nicosia Risk Forum #NRF2020 – 26 November 2020

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Thank you !
Ευχαριστώ!
תודה !
Gracias !
謝謝 !



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