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EU Circle Project

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A pan - European framework for strengthening Critical Infrastructure resilience to climate change

EU-CIRCLE

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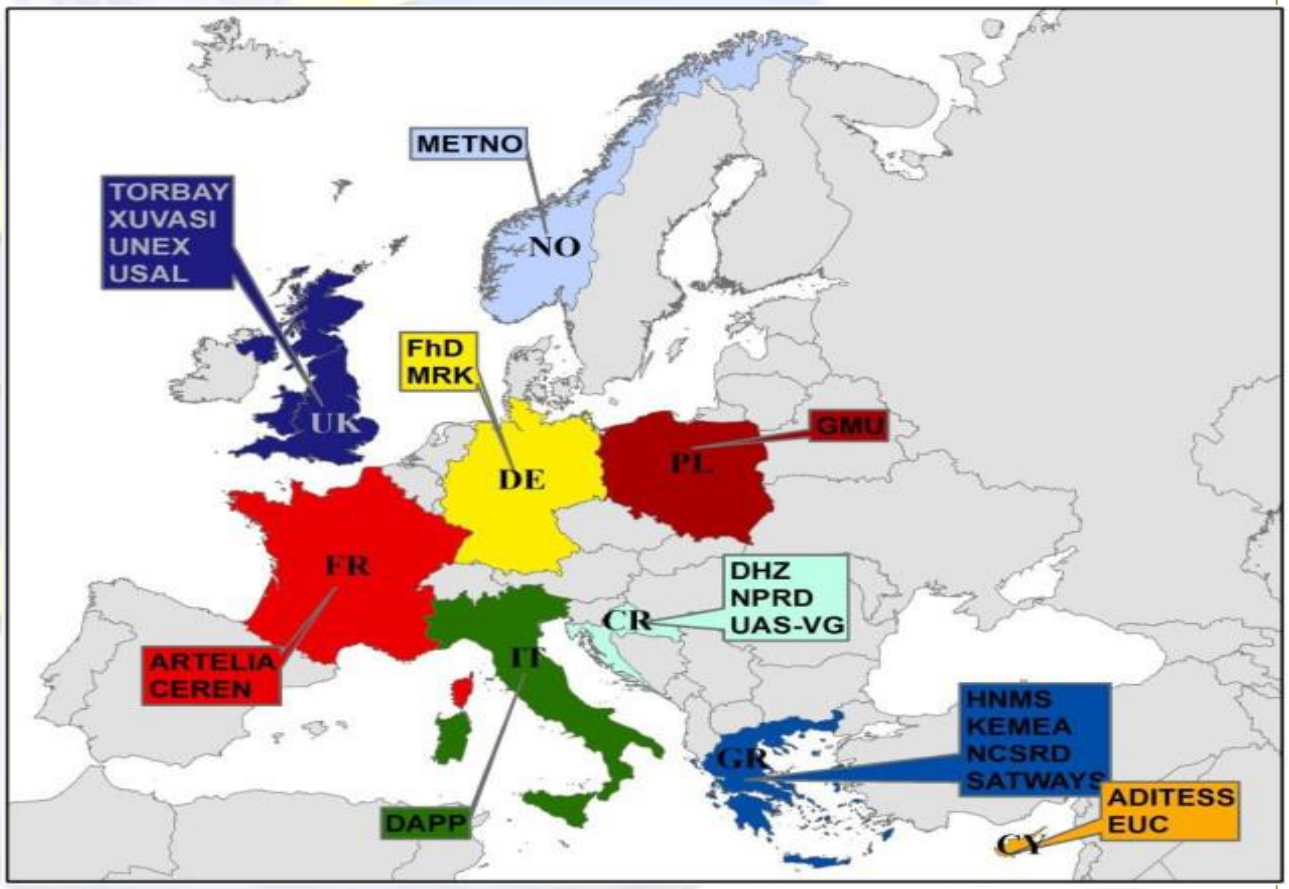
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 653824

EU-CIRCLE Consortium

20 partners

9 EU countries

13 International members of Stakeholder's Advisory Group



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EU-CIRCLE Main Scope

EU-CIRCLE's scope: to derive an innovative framework for supporting the ***interconnected European Infrastructure's resilience to climate pressures***.

Development of a validated Climate Infrastructure Resilience Platform **(CIRP)** that will:

✓assess potential impacts due to climate hazards,
✓provide monitoring through new resilience indicators and
✓ support cost-efficient adaptation measures.

Addressing community requirements, either in responding to **short-term hazards and extreme weather** events or in **deriving the most effective long term adaptation measures**.

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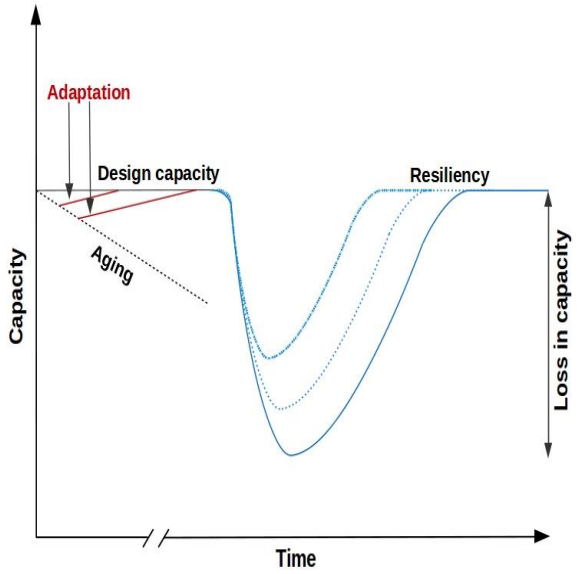
The Time Scales Involved

Critical Infrastructure (CI) are large scale projects, that will service the community for very long time frames.

- Climate change is expected to change the security / safety critical parameters of the CI ;
- Expose new vulnerabilities ;
- Impact the type and characteristics of the interconnections between CI.



- Impacts on CI span over different time scales
  - Short term (a few hours to days)
  - Medium term (service replacement)
  - Long term (major renovations – new infrastructures)
- Climate Hazards
  - Very distant future
  - Changes in extreme events (frequency – magnitude)

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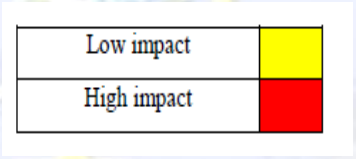
Climate Threats to CI - An Overview

	Research	Space	Chemical	Transport	Financial Health	Food	Water	ICT	Nuclear	Energy
High winds										
Extreme convection										
Extreme precipitation										
Ice storms										
Hurricanes										
Flood-inducing storms										
Fire weather										
Cold snaps										
Heat waves										
Drought										
Climate change										

Table 1: Critical infrastructure and threats



But of course this must take into consideration the specific characteristics and vulnerabilities of each CI.

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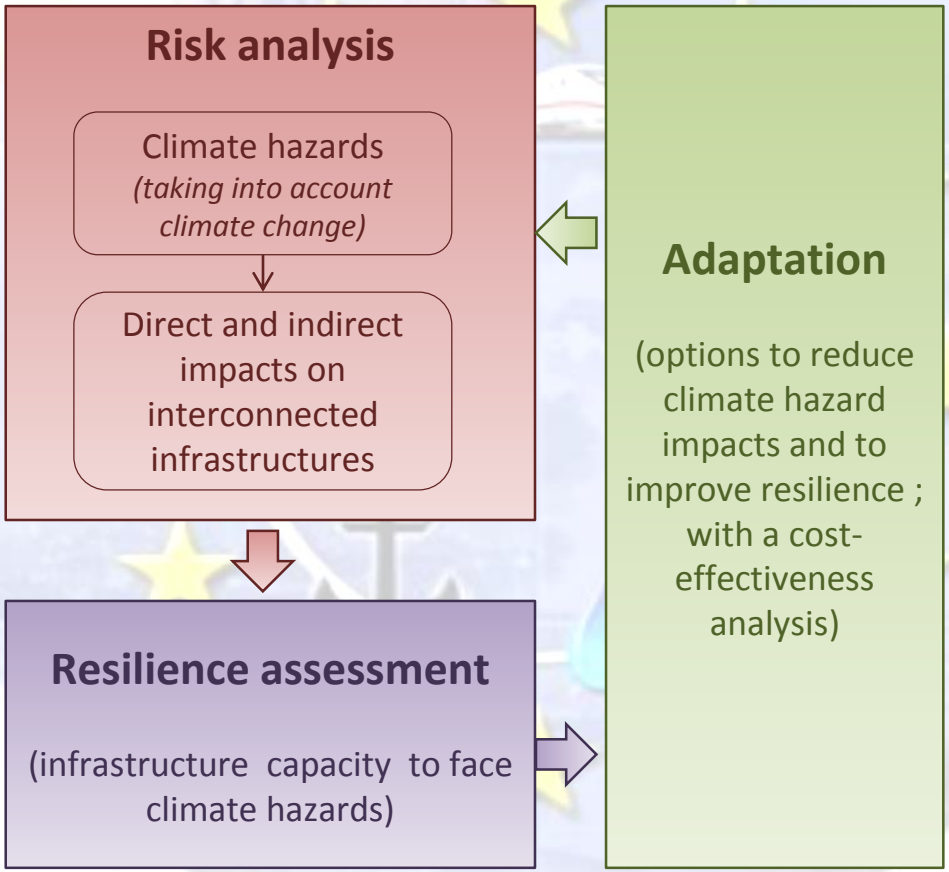
EU-CIRCLE in a picture



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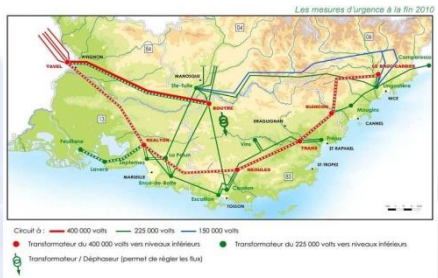
EU-CIRCLE Validation

Case Study 1: Extreme Dryness and forest fires on electricity and transport networks
Lead Partner: ENTENTE POUR LA FORÊT MÉDITERRANÉENNE



Case Study 2: Storm and Sea Surge at a Baltic Sea Port , Gdynia Poland
Lead Partner: AKADEMIA MORSKA W GDYNI

Case Study 3: Coastal Flooding (surface water, highway, sewer and watercourse flooding) across Torbay, UK
Lead Partner: UNEXE and Torbay Council

Case Study 4: International Event
Lead Partner: USAL and NCSRD

Case Study 5: Rapid Winter Flooding (melting ice, narrow mountain streams, flooding) around Dresden, Germany
Lead Partner: Fraunhofer IVI

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Case Study 1 : Heat Wave and Forest fire impacts on electric and road transport networks Provence-Alpes-Côte d'Azur Region (France)

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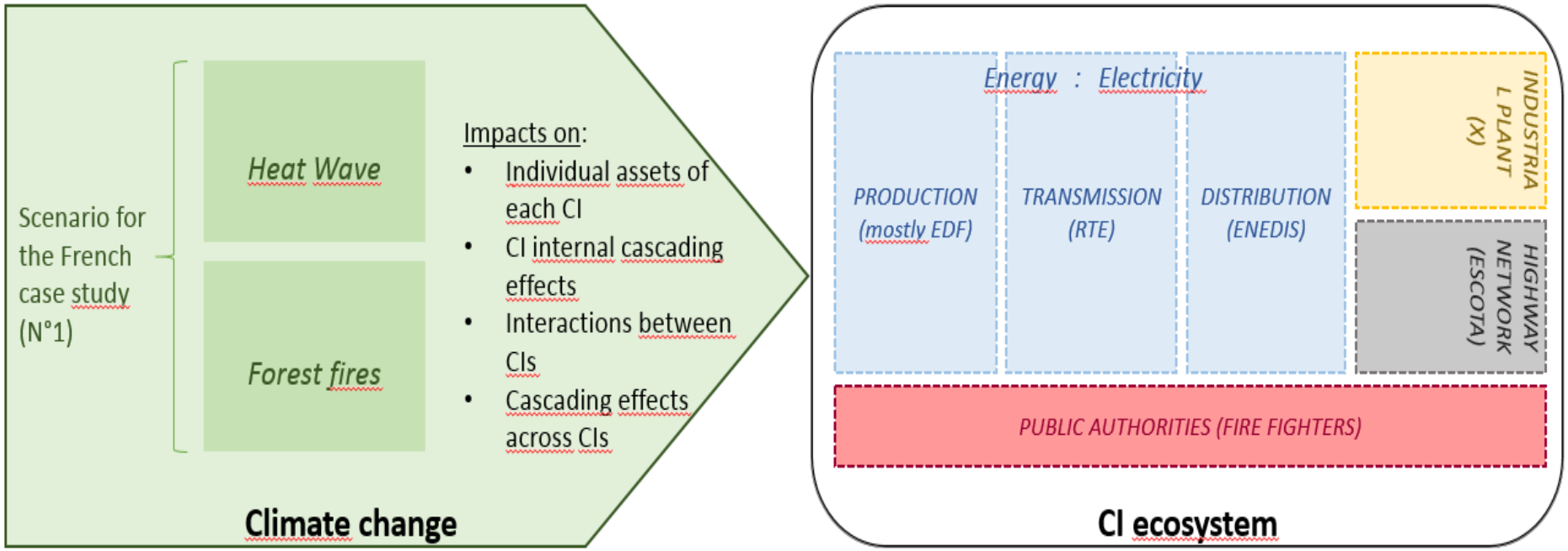
Case Study in a Nutshell



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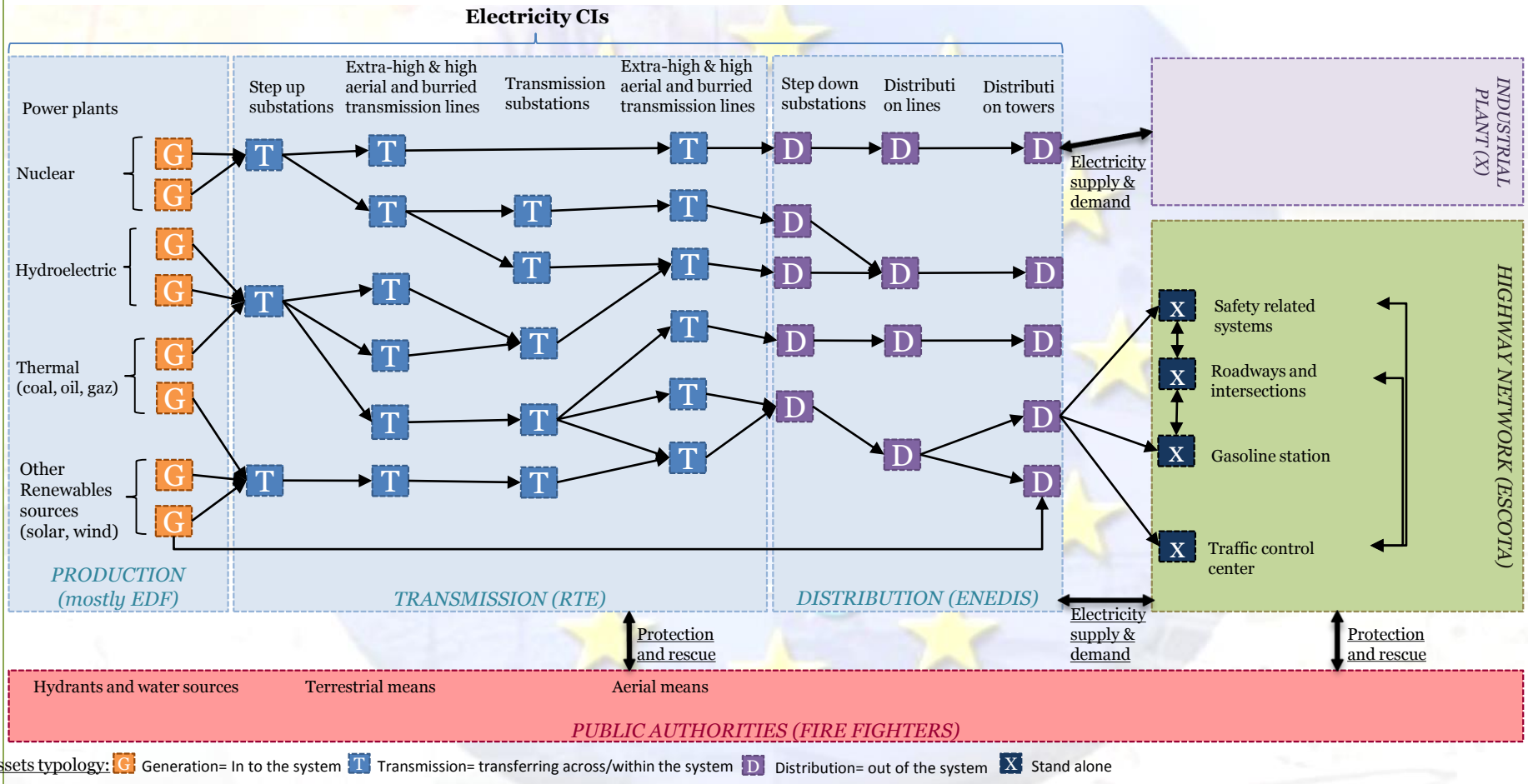
CI ecosystem of the French case study



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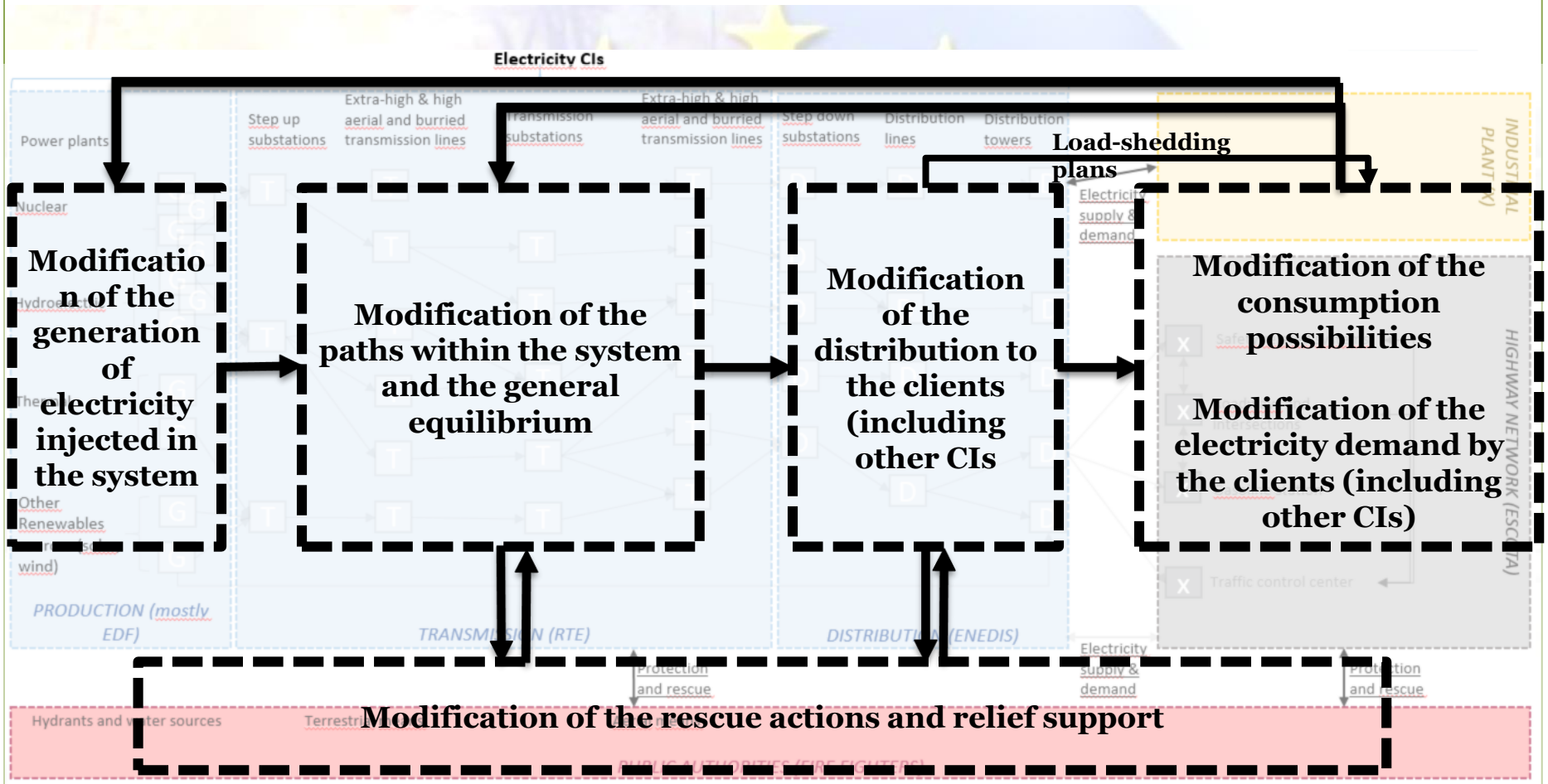
Cascading effects across CIs



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Conclusions

- For CI operators
  - Evaluation of the impacts of climate change on operators' assets and services/activities
  - Better understanding of interactions between interconnected infrastructures / domino effects
  - Information about how to improve resilience of CI in relation to climate change
  - Support in the integration of climate risks in prevention plans
  - Public communication, CC and risk management integration in corporate social responsability

- Maintain the infrastructure activity during the event
  - Work on prevention processes : ex clearing along highway networks or High Tension Line to limit the fire front power
  - If the activity is cut because of external events, set up protocols to restore the activity in a safe way for public and rescue services

- For EU-CIRCLE project
  - 1st case study, validation of analytical modules and resilience components

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