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Artelys

Resilience of the critical supply chains for energy security and clean energy transition during and after the COVID-19 crisis

ECG meeting

22 September 2020

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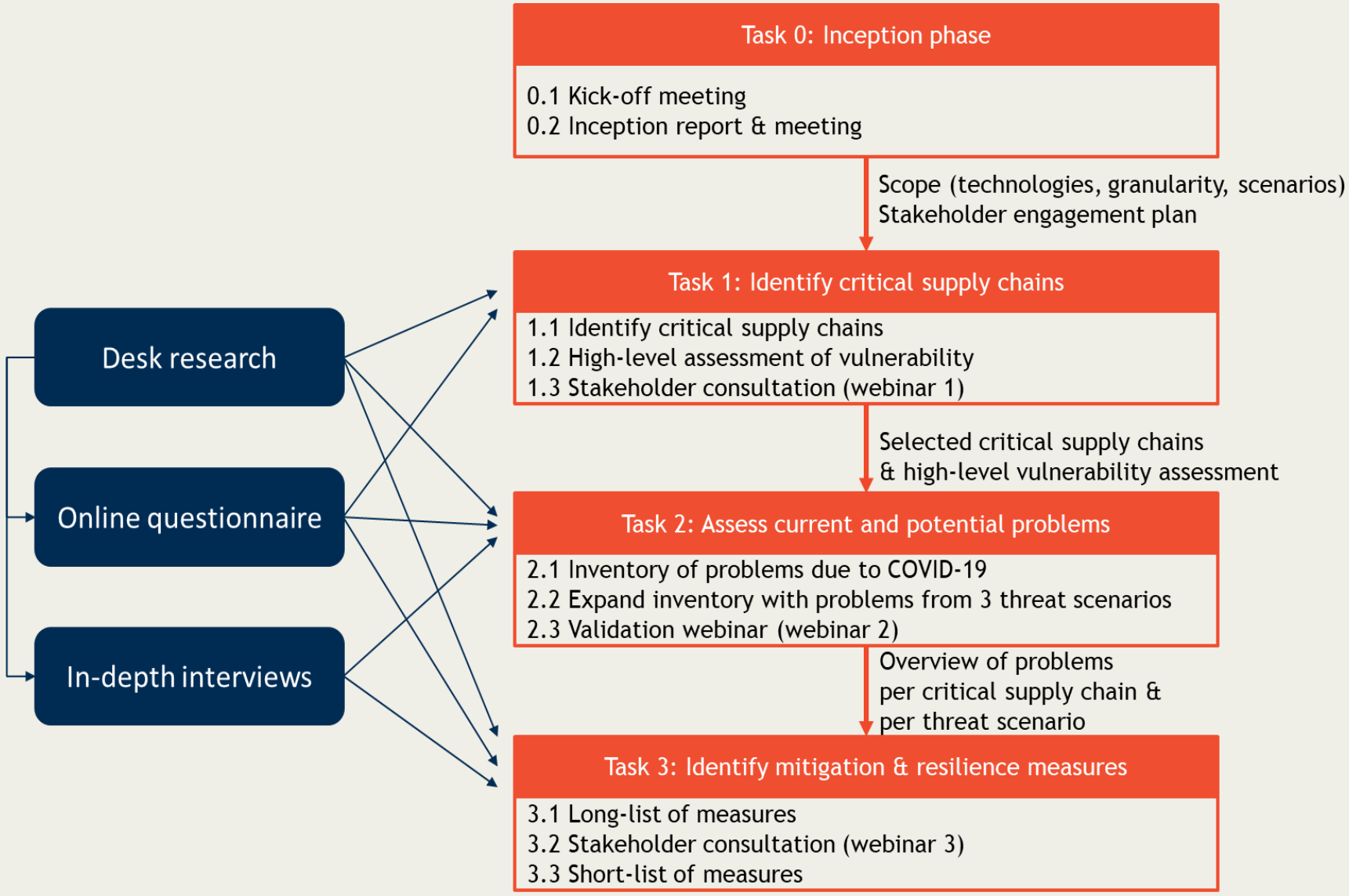
Project Objectives

- To identify the critical supply chains for ensuring:
  a) security of energy supply and;
  b) clean energy transition.
- To identify current and potential problems in the most critical supply chains
- To identify measures to strengthen the resilience of the European energy sector with respect to the above two objectives.

Overall Approach



Task 1: Identification of the critical supply chains for the energy sector

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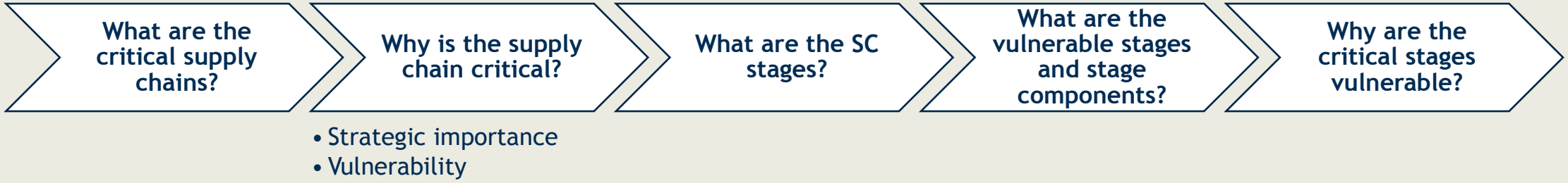
Task 1: Identification of the critical supply chains

Sub-tasks

- 1.1 Identification of critical supply chains
- 1.2 High-level assessment of vulnerability
- 1.3 Stakeholder consultation (addressed within stakeholder engagement plan)

Scope

- Supply chains criticality should be assessed from the EU perspective, with additionally attention to relevance to EU regions and/or MSs
- Consider international links with non-EU economies
- Time horizon is 2050
- Policy options focus on the EU level, with cooperation of the Commission with MSs and economic operators
- Distinction between raw materials & other supplies as they do not require the same policy action



Task 1: Identification of the critical supply chains

Definition of critical supply chains

Studies such as the DG RTD Energy Technology Dependence or the Critical Raw Materials Assessment combine two necessary conditions for criticality:

- Importance to the EU
- Risks to the EU regarding tangible and intangible elements of the supply chains

T1.1 Identification of the strategic supply chains

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Strategic importance criteria

- Current deployment/share
- Long-term deployment/share
- Resilience

Indicator & sources

Exhaustive/full EU filter

Ad hoc MS filter

Sub-chain proposed by stakeholders

Ranking according to strategic importance

Not strategic

Strategic

Highly Strategic

T1.1 Identification of the strategic supply chains

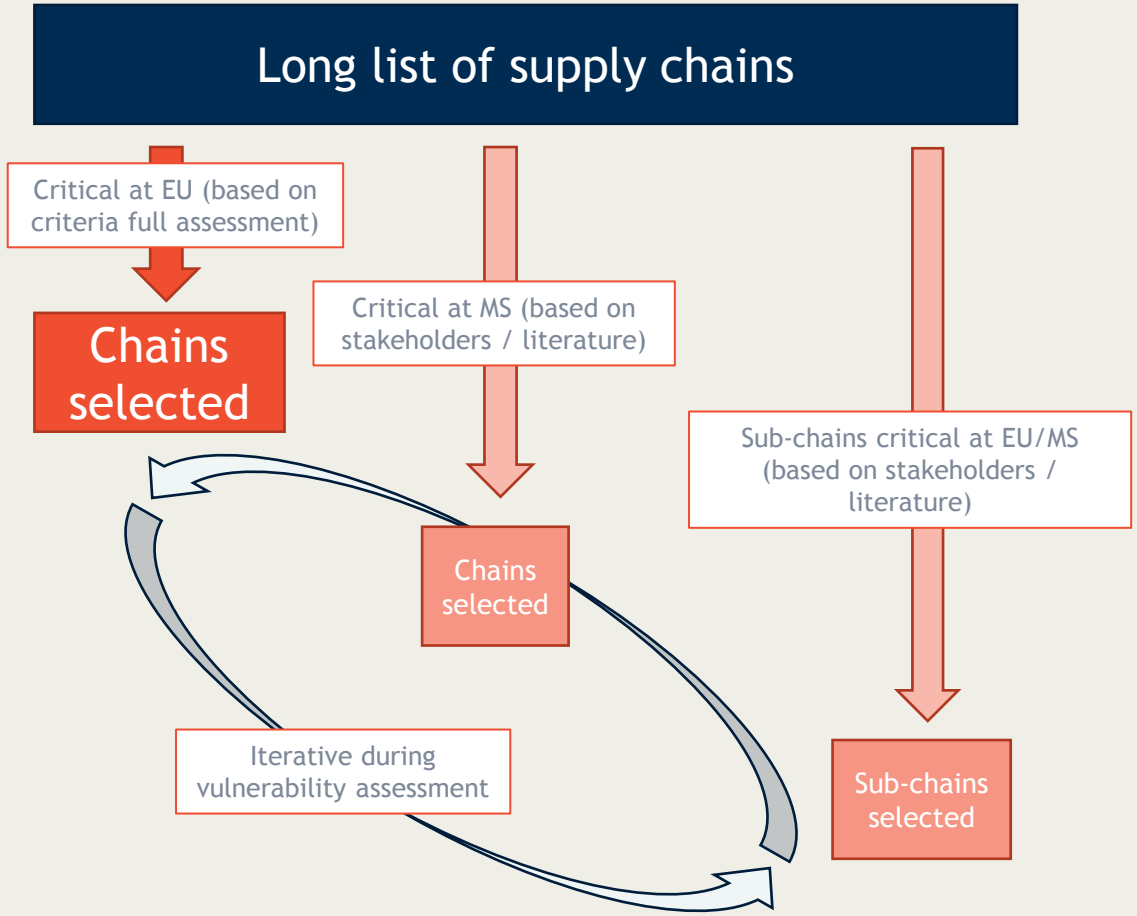
Proposed criteria to identify strategic supply chains

Horizon	Criteria		Indicator	Main source
Short-term	**SoS**	Share in existing system	% of energy supply/transport/ storage/demand/other	Eurostat, LTS
Long-term	**Clean energy transition**	Long term share of energy supply/ transport & storage/ consumption	% of energy supply/transport/ storage/demand/other	LTS
	SoS / Clean energy transition	Flexibility provision	% of seasonal flexibility provision % of daily flexibility provision	Energy storage study

T1.1 Identification of the strategic supply chains

Long-list of supply chains sent separately

- Focusing on technology supply chains (tangible and intangible)
- Granularity of longlist
  - List is separated by services provided by (combination of) equipment
  - Vulnerable individual sub-SC assessed in the aggregate supply chain characterisation
    - Questionnaire to allow for specific detailed inputs by stakeholders
- Strategic importance for specific MSs / regions to be considered iteratively



T1.2 High-level assessment of vulnerability

- Provides schematic summary of each supply chain
- Conducts preliminary assessment of SC vulnerabilities
- Provides additional inputs to T2

Overarching components for supply chain characterization

T1.2 High-level assessment of vulnerability

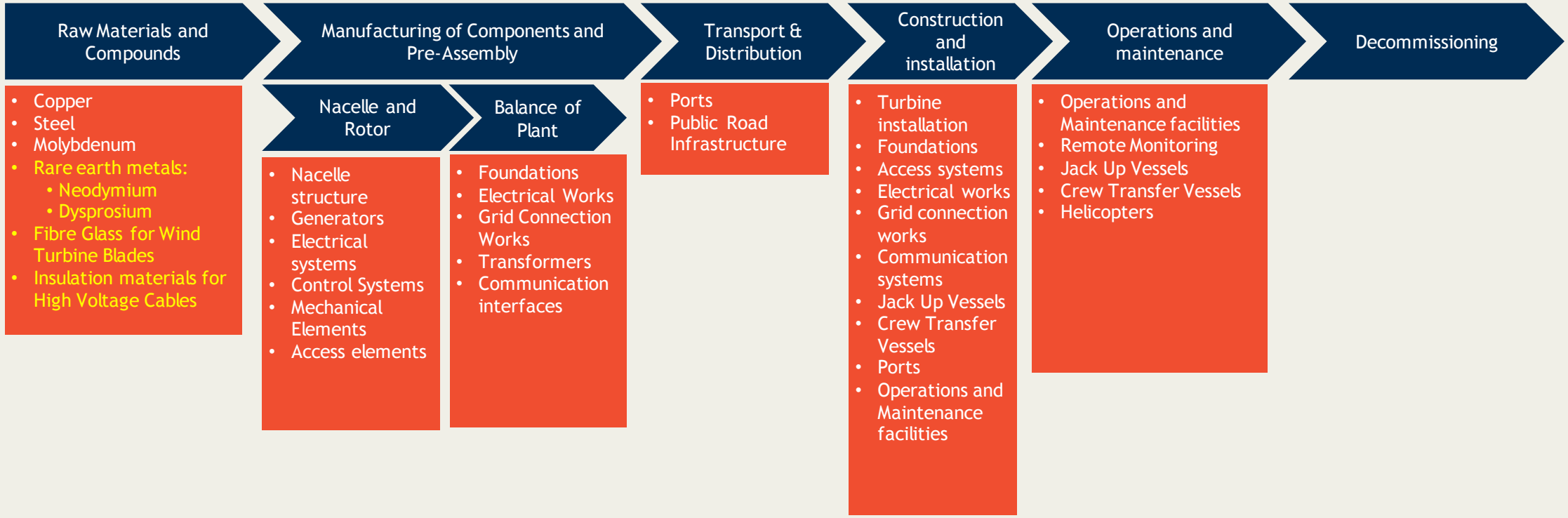
Vulnerability criteria

Criteria	Proposed metric
Import dependency	- Import share - Number/concentration of importers/sources
Extent of know-how/specialisation in Europe	Using EU patents as proxy / other
Market concentration	Number of manufacturers/suppliers
Easy of substitutability	Based on evidence from stakeholder interviews
Price stability of elements in the supply chain	Historic price trends

Example

T1.2 High-level assessment of vulnerability

Main output: schematic summary of each supply chain



Stakeholder engagement plan: Questionnaire

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Survey 18/09 to 09/10

Survey launched on September 18th, open until 9 October

https://s.chkmkt.com/?e=206869&c=93640232&h=E31634FE5A974D9&l=en

Target all concerned parties (cf. next slide on stakeholders list)

To ECG

* raise MS issues that may need specific attention
* Forward to concerned stakeholders that may have been missed

Components of questionnaire
Gather general information of participants
Opinion poll on resilience of EU's energy supply chains
Defining criticality and proposed indicators
Rating of the strategic importance and vulnerability of supply chains components
Indicating preference for which supply chains to perform in-depth analysis on*
Closing questions

List of stakeholders

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EU / national authorities and regulators	
National authorities – members of:	**Regulators**
Electricity coordination group Oil coordination group Gas coordination group	CEER ACER NRAs
EU associations	
Electricity	**Gas/Oil**
Eurelectric ENTSO-E E.DSO GEODE (also gas)	Eurogas ENTSOG Gas Infrastructure Europe Association of Oil & Gas Producers (IOGP) Europe's independent fuel suppliers (UPEI) Federation of European Tank Storage Associations (FETSA) Gas for Climate
Technology specific	
Solar Alliance for Europe (SAFE) Solar Power Europe European Solar Thermal Electricity Association (ESTELA) ETIP PV Bioenergy Europe European Biomass Association (AEBIOM) European Biodiesel Board (EBB) European Biogas Association (EBA) FORATOM	ETIP Bioenergy ETIP Renewable Heating and Cooling European Heating Industry European Heat Pump Association (EHPA) Euroheat & Power DecarbHeat WindEurope ETIP Wind Hydrogen Alliance / FCH JU Hydrogen Europe European Geothermal Energy Council (EGEC) Ocean Energy Europe

Industry	**Smart grids / system integration**
BusinessEurope IFIEC Europe - International Federation of Industrial Energy Consumers EREF (European Renewable Energy Federation) Euromines Eurometaux	ETIP Smart Networks for Energy Transition (SNET) SmartEn Digital Europe ESMIG Smart Grids Initiative European Smart Grids Task Force
CCU/S	**Research Associations / Academia**
Carbon Capture and Storage Association (CCSA) CCUS Projects Network ZEP ETIP (CCS)	European Energy Research Association European Renewable Energy Research Centres Agency (EUREC)
NGOs / Consumer organisations	**Storage and mobility**
European Climate Foundation European Environmental Bureau E3G BEUC Transport & Environment Birdlife Fern	AVERE EASE EUROBAT European Battery Alliance
Finance	
Invest Europe European Banking Federation European Capital Markets Institute' European Investment Bank	
International associations	
IRENA IEA Energy Community Ministerial Council	

Task 2 - Assessment of current and potential problems for the most critical supply chains identified

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Task 2 – Assessment of problems for the critical supply chains identified

Objective

Analyse in detail problems and vulnerabilities (according to time, quality and price dimensions) of T1 critical supply chains

T2.1 Structure and inventories problems resulting from COVID-19

- Supplier concentration
- (Inter-) dependencies with non-EU suppliers
- Reliability of supply chain
- Capabilities of critical suppliers
- Reliance on energy technology
- Ability to develop alternative supply sources
- Availability of substitutes
- Price volatility

T2.2 Selection and development of three threat scenarios

- Pandemics
- Climate change
  - Global warming
  - Extreme events
- Sabotage, terrorism, (cyber-) crime
- (Geo-)political uncertainty and tension
- Technological trends
  - e.g. technological or vendor lock-ins
- Critical labour unavailability
- War, famine, mass migration

T2.3 Stakeholder consultation

Task 3: Identification of possible measures to mitigate the identified risks and reinforce the resilience of the critical supply chains for energy security

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Task 3 – Identify measures to mitigate risks and reinforce resilience

Objective

Identify measures to mitigate risks and reinforce the resilience of the identified critical supply chains for energy security

Sub-tasks

- 3.1 Develop long list of measures
- 3.2 Develop short list with short and long-term measures

Summary and next steps

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Project Timeline

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Month	July				August				September					October					November					December					January				February					March				
Project week				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
start day of week (Mondays)				27/7	3/8	10	17	24	31/8	7	14	21	28	5/10	12	19	26	2/11	9	16	23	30/11	7	14	21	28	4/1	11	18	25	1/2	8	15	22	1/3	8	15	22	29
Task 0																																									
0.1 Kick-off meeting				29																																				
0.2 Inception report																																								
0.3 Inception meeting																																								
0.4 Launching of online questionnaire																																								
0.5 Conducting interviews																																								
Task 1																																								
1.1 Identification of critical supply chains																																								
1.2 High-level assessment of vulnerability																																								
1.3 Stakeholder consultation (webinar #1)																																								
Submission of Intermediate Report 1																																								
Progress meeting 1																																								
Task 2																																								
2.1 Developing an inventory of problems resulting from Covid-19																																								
2.2 Expanding the inventory with problems from threat scenarios																																								
2.3 Stakeholder consultation (webinar #2)																																								
Submission of Intermediate Report 2																																								
Progress meeting 2																																								
Task 3																																								
3.1 Develop a long list of measures																																								
3.2 Develop a differentiated short-list of measures																																								
3.3 Stakeholder consultation (webinar #3)																																								
Submission of Intermediate Report 3																																								
Progress meeting 3																																								
Final reporting																																								
Submission of draft final report																																								
Final meeting																																								
Submission of final report																																								
1-day training																																								
Inputs from the European Commission																																								
Written Feedback from DG ENER (and the steering committee)																																								

Legend

Task work | Meetings | Webinars | Report | DG/SC input