D2.4 Report on regulatory/legal and financial aspects (T2.2)

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Executive Summary

This report, D2.4, is written for task T2.2 of the IANOS project and provides a standard interface, mapping the relevant legal, regulatory and financial aspects of the IANOS project and its use cases. It provides tools, in the form of a set of annotated questionnaires, for further defining and deepening these relevant aspects, using the experience and knowledge of the IANOS consortium. The questionnaires provide the relevant aspects based on the use cases and the task description of T2.2 and serve as a tool for getting deeper insights on the local regulatory, legal and financial conditions. The questionnaires will be further iterated and developed throughout the project, based on the feedback of the participating consortium members. The report also reflects on whether recommendations can be provided for ongoing European harmonization efforts. Whilst to date, based on the current stage of the project, it is difficult to provide such specific recommendations, this report does provide some guidance on potential future recommendations.

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1. Introduction

This document describes the method and interface which is used in the IANOS project for determining the relevant legal context of this project. Whilst the method and interface are used for IANOS, it is also designed with the aim to be replicable for other projects/ EU islands who would like to have similar insights on the legal and financial aspects of their decarbonization efforts. The objective of task 2.2 in the IANOS project is to provide EU islands with insight on the relevant (applicable) EU legal framework and, more specifically, islands in the Netherlands and Portugal with some further insight on the relevant national frameworks, corresponding to the EU's. More broadly, this task provides a standard interface for EU islands to make their own assessments on the relevant regulations and financial aspects for deep-decarbonization. This report provides the first version of this standard interface, including a first analysis of the relevant legal and financial aspects. This analysis is translated into a set of questionnaires. These will be utilized and iterated throughout the project duration, using the experience and knowledge of the IANOS consortium members.

This report is structured as follows. First, the method and methodology used for mapping the relevant aspects is described, including a description of how it will be applied for D2.5 and D2.6. Second, the standard interface is presented, including an outline of the key EU Directives and Regulations. The standard interface consists of three annotated questionnaires, mapping the relevant aspects of the IANOS project. Third, brief recommendations are provided on whether (considering the current stage of the project) recommendations can be provided to compliment ongoing European harmonization activities.

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2. Method and Methodology

Task 2.2 of IANOS will result in three reports, of which report 1 (D2.4), this document, provides the method and interface for task 2.2. It serves as a basis for the analysis of relevant regulatory and financial aspects, based on the experience of the project consortium. This document provides a **standard interface, mapping the relevant regulations, grid codes and financial aspects**. Throughout the project, the mapping (definition of relevant legal, regulatory and financial aspects) will be deepened and updated. This will result in a detailed analysis of the applicable legal and financial conditions on the IANOS islands, and a replicable method for other EU islands.

This section explains: a) what the standard interface is; b) how this deliverable interacts with D2.5 and D2.6; and, c) the method and methodology used for mapping the relevant aspects of the standard interface.

A. Standard Interface

The standard interface for task 2.2 is an interface that facilitates the analysis of the relevant legal and financial aspects of deep decarbonization of EU islands. It provides a map of the relevant aspects, based on the specificities of the IANOS project. It does so by providing the relevant **aspects** and **elements**, and the **methods** and **tools** to define the applicable legal and financial aspects on their island in more detail.

B. Interaction with D2.5 – D2.6

The standard interface developed in this deliverable will be applied for the analysis of the general legal framework and the further iteration, deepening and updates of the relevant legal, regulatory and financial aspects in D2.5 – D2.6. With the application of the standard interface for D2.5 and D2.6, feedback will also be collected on the standard interface. This feedback will be used to improve and enrich the standard interface during the project. This 'learn-by-doing' approach should result in a useful, user-friendly interface, providing a map of the relevant regulatory, legal and financial conditions and (potential) barriers, which can be used by islands throughout the EU for discovering the relevant regulatory and financial aspects of their decarbonization efforts. During the application of the standard interface, elements will also be added and expanded, based on the results of the application of the standard interface. These include, for example, reflections based on the IANOS experiences regarding the principles of the European Smart Grid Task Force work and Directives 2018/844/EU (Buildings Directive), 2012/27/EU (Energy Efficiency Directive), and Articles 167 and 107 TFEU, to also support/complement the ongoing European harmonization activities.

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C. Mapping of relevant aspects

The IANOS project includes a number of elements, defining the scope of the project. These elements are: a) relevant EU legal framework; b) relevant national legal frameworks; c) relevant island specific legislation (i.e. exemptions from national legal frameworks); d) relevant incentive programs and policies; e) the IANOS **use-cases**.

In order to **map** the **relevant** aspects, the above mentioned **elements** are translated into the standard interface. This means that the IANOS use cases (energy applications/solutions) are translated into a set of elements, a map, which is translated into **questions** that can be used to describe the applicable legal and financial aspects and conditions: a) in the EU (for all EU islands); b) for the IANOS islands (based on their national legal frameworks and Island specific laws and regulations). The questionnaires aid in quickly finding the relevant laws and regulations and identifying any relevant barriers.

IANOS use cases

The following use cases (UCs) are applied in the IANOS project and represent the framework for the relevant regulatory, legal and financial aspects:

1. Optimal dispatch of local energy generators and intra-day balancing services (using a Virtual Power Plant).

This UC focusses on the potential of a Virtual Power Plant (VPP) to estimate the optimal dispatch and provide intra-day balancing services to the power system (e.g. rescheduling dispatch for grid congestion management). The flexibility that this service will bring is important to ensure a stable power system, keeping island-specific challenges in mind.

2. Maximization of self-consumption in the community using demand-side management (using a Virtual Power Plant).

This UC focusses on self-sustainability of Local Energy Communities (LECs). This self-sustainability will be examined under optimal dispatch and control of LEC demand-side assets, and peer-to-peer energy transactive framework (participants would be able to exchange flexible energy products to their benefit with adjacent assets/prosumers).

3. Island-wide, any-scale storage utilization for fast response ancillary services.

The third UC focusses on the provision of fast response ancillary services that can be provided by distributed storage technologies. The goal of this UC is to enable the power system with distributed storage technologies with capabilities of frequency and voltage control.

4. Demand-Side Management (DSM) and Smart Grid methods to support Power quality and congestion management services.

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This UC focusses on the potential of the VPP to provide power quality services to the grid using available energy flexibility from demand resources. The DSM modules of the VPP will be applied to manage the local optimization of demand using: a) energy consumption forecasts; and, b) energy production forecasts.

5. Decarbonization of transport and the role of electric mobility to stabilize the energy system.

This UC focusses on making a roadmap for decarbonizing the transport sector from Ameland and Terceira, through available RES. This will happen by installing EV chargers on the islands and studying their future expansion potential.

6. Decarbonizing large industrial continuous loads through electrification and local energy generation.

This UC focusses on: a) electrifying the power intensive industrial sites, e.g. by connecting a natural gas platform to the electricity grid of the island (instead of the electricity grid on the mainland); b) using local RES to partly substitute fossil-based power, leading to significant reduction of emissions of greenhouse gases.

7. Circular economy, utilization of waste streams and gas grid decarbonization.

This UC will demonstrate: a) a small-scale Auto generative High-Pressure Digester (AHPD) to convert sewage, swill and other organic waste into green NG (CH_4), which can be used directly at the load points or injected later into the natural gas grid. This way, the waste streams, which have a generally negative value, can add value and decarbonize the island.

8. Decarbonization of heating network.

The eighth UC focusses on decarbonizing the heating networks, using four solutions: i) have operating hybrid heat-pumps in residential neighborhoods, which are connected to a VPP; ii) expanding existing heating grids; iii) phasing out natural gas with a technical approach, which is selected in the course of the IANOS project; iv) installing an innovative heating grid infrastructure in the city.

9. Active citizen and local energy community engagement into decarbonization transition.

This UC focusses on raising the costumer's environmental and energy efficiency awareness and fostering their participation in DSM programs.

Mapping: Annotated Questionnaires

The above described use cases are translated into a set of annotated **questionnaires**, which represent a map of the relevant legal and financial aspects and can be used to further define the relevant local aspects and barriers. The questionnaires are tested in an iterative process with the IANOS islands. For T2.2, the project works with, and builds on, the **experiences and knowledge** of the IANOS Islands and partners. The questions in the questionnaires are

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drafted on the basis of the IANOS use cases, in which the islands that are answering the questionnaires will provide information for the **use cases relevant to their islands (see table below)**. The questionnaires are annotated with brief explanations under the questions, explaining why the questions are relevant.

	Ameland (Netherlands)	Terceira (Portugal)	Bora Bora (French Polynesia)	Lampedusa (Italy)	Nisyros (Greece)
1. Optimal dispatch of local energy generators and intra-day balancing services (using a Virtual Power Plant)	•	•	•		
2. Maximization of self-consumption in the community using demand-side management (using a Virtual Power Plant)	•	•			•
3. Island-wide, any-scale storage utilization for fast response ancillary services	•		•	•	
4. Demand-Side Management and Smart Grid methods to support Power quality and congestion management services	•	•			•
5. Decarbonization of transport and the role of electric mobility to stabilize the energy system	•	•	•	•	•
6. Decarbonizing large industrial continuous loads through electrification and local energy generation	•				•
7. Circular economy, utilization of waste streams and gas grid decarbonization	•		•	•	
8. Decarbonization of heating network	•		•	•	
9. Active citizen and local energy community engagement into decarbonization transition	•	•	•	•	

For version 2 of this deliverable (D2.5), the questionnaires will be sent twice to collect the relevant input. With the input of the questionnaires, the deepened overview of the legal,

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regulatory and financial aspects of IANOS will be provided, including an overview and analysis of the applicable frameworks and local conditions at the IANOS islands.

The questionnaires are complemented by an **outline** of the most relevant EU Directives and Regulations in the scope of the IANOS project.

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3. Interface

Interface for the Assessment of existing EU and local legal and regulatory frameworks and the extent to which they promote decarbonization of geographical islands

As stated in the previous sections of this document, the standard interface provides a set of questionnaires, mapping the relevant legal aspects and barriers for the IANOS islands and use cases. Based on this map, deeper insights, including on local conditions, can be produced by utilizing and further developing the questionnaires within the consortium. This will be done for the following reports (D2.5 and D2.6).

In this section, first an outline mapping the key EU Directives and Regulations on this framework is provided. This outline gives an overview of the main Directives and Regulations and their key relevance for the IANOS use cases. As described in previous sections, this framework will be further analysed for D2.5 and D2.6. Thereafter, the questionnaires representing the map of the relevant legal and financial aspects are presented. These questionnaires will serve as a tool to further deepen and map the insights on EU and local level in the IANOS project (D2.5 and D2.6).

3.1 Applicable EU rules and regulations (EU legal framework)

Based on the IANOS use cases, the following legal sources are considered the main sources of the relevant legal framework for the IANOS use cases. The following list is not an exclusive list, but it highlights the most important main sources based on the IANOS use cases.

1. Electricity Directive (EU) 2019/944[1]

The Electricity Directive sets rules for the generation, transmission, distribution, energy storage and supply of electricity and aims to ensure affordable, transparent energy prices and costs for consumers. The Directive also holds specific provisions on ‘active consumers’ and ‘energy communities’, which empower consumers to become more active in the energy market, both on individual level and collective level. Furthermore, the Directive provides provisions on demand-side response and management, as well as electricity storage. The Directive provides guidance on how consumers and communities can engage in e.g. demand-side response, power generation and system operation.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L0944

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2. Electricity Regulation (EU) 2019/943[2]

The Electricity Regulation aims for further EU electricity market integration, e.g. by setting rules for cross-border exchanges in electricity and a well-functioning and transparent wholesale market. In light of the UCs, e.g. relevant provisions for congestion management (dispatch and redispatch) are provided.

3. Gas Directive 2009/73/EC[3]

The Gas Directive sets rules for the transmission, distribution, supply and storage of natural gas in the EU. It does so by providing rules on the organisation and functioning of the gas market, access conditions, distribution, supply, storage and the operation of natural gas systems. In light of the UCs, e.g. important provisions are considered third-party access and provisions on renewable gas.

4. Energy Efficiency Directive 2012/27/EU[4]

The Energy Efficiency Directive focusses on updating the Union's legal framework on energy efficiency. The Directive pursues the overall objective of reaching the energy efficiency target of at least 32,5% in the EU by 2030. The Directive also requires member states to set indicative contributions for the EU 2030 target. Most important provisions are considered provisions which require or provide guidance and incentives for increased energy efficiency, using demand-side management.

5. EU Electricity Network Codes[5]

The EU Electricity Network Codes consists of eight Commission Regulations, which are divided into three code families: i) **connections**; ii) **operation**; and iii) **market**. For the first family, connections, a code holding requirements for generators,[6] a demand connection code[7] and a code for high voltage direct current (HVDC) connections[8] is provided. For the second family, operation codes, a code on electricity emergency and restoration[9] and a code on electricity transmission system operation is provided.[10] For the third family, market, a code for electricity balancing is provided,[11] forward capacity allocation[12] and capacity allocation and congestion management.[13] Most of the provisions of the codes are targeted

[2] https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32019R0943
[3] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32009L0073
[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02012L0027-20210101
[5] https://www.entsoe.eu/network_codes/
[6] Commission Regulation (EU) 2016/631
[7] Commission Regulation (EU) 2016/1388
[8] Commission Regulation (EU) 2016/1447
[9] Commission Regulation (EU) 2017/2196
[10] Commission Regulation (EU) 2017/1485
[11] Commission Regulation (EU) 2017/2195
[12] Commission Regulation (EU) 2016/1719
[13] Commission Regulation (EU) 1222/2015

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at transmission system level, but they also have implications for system operation at distribution level.

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3.2 Questionnaires

Based on the description of T2.2, insights on the following should be provided throughout the project:

1) the relevant locally enforced regulations;
2) the relevant locally enforced grid codes;
3) the relevant financial aspects.

For these elements, a number of general aspects are to be included:

1) the general framework, which defines the basic rules and conditions, the relevant authorities and how the applicable frameworks correspond to mainland/national regulations. These aspects are relevant for the relevant locally enforced regulations, grid codes and financial aspects;
2) relevant main legal aspects of the IANOS use cases.
1) The identified aspects represent a map of the relevant regulatory, legal and financial aspects of the IANOS project.

The table below provides a more detailed overview of the general aspects and to what extent they are relevant for relevant locally enforced regulations, grid codes and financial aspects.

Table 1 Overview of relevant aspects map

Map	Locally Enforced Regulations	Locally Enforced Grid Codes	Financial Aspects
1. General Framework	●	●	●
1.1 Relevant authorities	●	●	●
1.2 Relation with mainland/national regulations	●	●	●
2. Virtual power plant	-	●	◌
3. Maximize self-consumption		●	●
4. Optimal dispatch (intraday) balancing		●	
5. Storage, for fast responsive ancillary services		●	
6. Power quality and congestion management services		●	

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7. Electric mobility and e-charging	●	●	●
8. Utilization of waste streams and gas grid decarbonization	●	○	◌
9. decarbonization of heating network	●		
10. active citizen and local energy community engagement	●	●	◌

● addressed	○ not addressed	◌ indirectly addressed	- not applicable/irrelevant

This map is translated into a set of questionnaires, which further map and specify the relevant aspects and conditions based on the experiences of the IANOS consortium, and which will be iterated, expanded and updated throughout the project.

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Questionnaire 1: Locally Enforced Laws and Regulations

In order to assess the applicable locally enforced laws and regulations, this questionnaire provides a map to get insight on:

- The general applicable legal framework on the island regarding energy supply.
- The applicable regulations and laws.
- The degree of autonomy the island has in setting its own regulations and laws.

1. General Framework

1.1. What are the applicable laws and regulations on the Island? Please fill in the table below.

Formal Name of the law or regulation	Version No./Date	Object and purpose	Internet link to formal law or regulation

Explanation:

Please state the applicable laws and regulations, their most recent versions and/or publication dates, their object and purpose (what do they regulate and why, what is their scope) and the official (online) finding place of the law or regulation.

1.1 Relevant Authorities

1.1.1 Who/which authority is responsible for: a) adopting and/or amending specific laws and regulations (see table Question 1); b) enforcing specific laws and regulations?

Formal Name of the law or regulation	Adopt(ed)	Amend	Enforcement

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Explanation:

Please mention here the relevant laws and regulations, governing the electricity, gas and heating market (e.g. electricity, gas, heat or energy law). If relevant, also mention any specific regulations dealing with guarantees of origin, system operation (e.g. on unbundling, system operators tasks), consumer protection in energy markets and supplier requirements (e.g. authorization procedures, licenses, etc.).

1.2 Relation with mainland/national regulations
1.2 Are the laws and regulations governing energy markets the same as those applied on main land?
Answer [20 words max]:

1.2.1 If not, how are they different?
Answer [80 words max]:

1.2.2 If so, in your experience, do the national laws and regulations work well for the island? If not, could you briefly explain why not?
Answer [80 words max]:

Regulation of System Operators
1.2.3 How are the system operators regulated under the applicable legal regime on the island?
1.2.3.1 Are they unbundled entities or are they exempt from the unbundling requirements?

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Answer [40 words max]:
1.2.3.2 Following the above question: are there differences between system operators for electricity, gas and (if relevant) heat network operators?
Answer [40 words max]:

Regulated Third Party Access
1.2.4 How is regulated third party access regulation on the island;
1.2.4.1 What are legally defined reasons for refusing system access (transport capacity)?
Answer [80 words max]:
1.2.4.2 What are the relevant categories of system users? (e.g. 'types' of users, such as households, SMEs, or industry; or based on connection size, for example 1*25A, etc.)
Answer [80 words max]:

Explanation:

The answers to the questions above should provide first insights on the position of the system operators operating at the island, the categories of system users, the relationship between system operators and system users (in terms of system access) and how the islands are interconnected to other/main land energy systems.

2. Electric mobility and e-charging

2.1 Are there any specific laws or regulations on electrical mobility infrastructure and charging?
Answer [60 words max]:

2.2 If not, are such specific laws or regulation anticipated?

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Answer [10 words max]:

Explanation:

For the use case of e-mobility and charging it is important to assess how e-mobility and charging is perceived in relation to the existing electricity system. E.g. whether it is considered to be 'regular' electricity demand, possibly generation and how it is framed into the existing electricity market structure and regulation. As a first step it is important to define whether any explicit differences from the existing/traditional electricity regulatory framework are in place. Is there a specific legal framework for electric mobility and charging?

3. Utilization of waste streams and gas grid decarbonization

3.1 To what extent does the national legal framework require waste streams to be utilized for energy purposes?
Answer [80 words max]:

3.2 If the national legal framework requires waste streams to be utilized for energy purposes, are there any specific requirements on such utilization?
Answer [80 words max]:

3.3 Are there any requirements on the forms of energy that need to be produced using waste streams? If so, which?
Answer [80 words max]:

3.4 Are there any requirements on the decarbonization of the gas grid, for example gas quality or composition requirements? If so, which?

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Answer [100 words max]:

Explanation:

The answers to the above questions should give an indication of the extent to which waste stream utilization for energy purposes are regulated. They should also indicate how the general (legal) requirements of gas grids require or could contribute the decarbonization of gas grids, e.g. by setting standards or targets.

4. Decarbonization of heating network(s)

4.1 How are heating networks regulated, e.g. is there a heating (network) act?
Answer [80 words max]:

4.2a If so, does this act or regulation also include requirements on the heat sources connected to the heating network? If so, which?
Answer [80 words max]:

4.2b If so, does this act or regulation also include requirements on access conditions for heating networks? If so, which?
Answer [80 words max]:

4.2c If so, does this act or regulation also include requirements on network tariffs for heating networks? If so, which?
Answer [80 words max]:

Explanation:

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In order to understand the legal framework for heating networks and their decarbonization, it is first of all important to understand to what extent these networks are nationally regulated and what the general principles of such regulation are. Unlike electricity and gas network, heat networks (and sources) are not specifically regulated by an EU Directive.

5. Active citizen and local energy community engagement
5.1 To what extent do national or local laws allow energy communities to be active on the energy market?
5.1a Is there a (legal) definition of energy communities in national or local laws? If so, which?
Answer [100 words max]:
5.1b To what extent do national or local laws provide exemptions for energy communities on general market or system requirements? For example, requirements on system operation, authorization procedures, consumer protection?
Answer [100 words max]:

Explanation:

In order to understand the potential engagement of energy communities, it is important to define what their (legal) position is. In the light of this position, it should be understood whether energy communities should operate as regular market players, or whether they are facilitated differently (e.g. by exemptions for licenses, permits, other (market) regulations, such as tariffs regulations, etc.). This defines the framework in which energy communities can play a role in e.g. demand side response/management.

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Questionnaire 2: Grid Codes

The rationale behind this questionnaire is to get insight on:

- The local grid situation at the island.
- The applicable regulations.
- The degree of autonomy the island has in setting its own grid codes.

1. General Framework

What are the applicable grid codes on the Island? Please fill in the table below.

Formal Name of the code	Version No./Date	Object and purpose	Internet link to formal code

Explanation:

Please mention here the relevant codes, such as codes holding requirements on balancing, congestion management, power quality, grid connections, grid tariffs, grid investment plans, definition codes and codes for system users (demand and generators). Please include a brief description of the object and purpose of each code; what does it regulate, and why? Usually this is stated at the preamble or first articles of the code. Please also include the relevant version number or date of adoption. Please include a link to the latest version of the code, published by the relevant authority.

1.1 Relevant Authorities

1.1.1 Who is responsible for drafting the grid codes?
Answer [20 words max]:

1.1.2. Who is responsible for adopting the grid codes?
Answer [20 words max]:

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1.1.3. What is the procedure for adopting new grid codes, or amend existing ones?
Answer [60 words max]:

1.1.4. How are system users involved in the drafting procedures of the grid codes?
Answer [60 words max]:

1.1.5. How are system users involved in the formal review procedure of the grid codes?
Answer [60 words max]:
1.1.5.1 Do they have a right to submit their views/positions, to be included in the decision-making process by the relevant authorities?
Answer [20 words max]:

Explanation:

Answers to the above questions should help understand who are responsible for both making and adopting the codes; who are responsible for the existing framework and who should take the lead in making amendments if needed. It is also important to understand how new codes or amendments can be made in order to get proper understanding of how complex making amendments might be. To get a better understanding of the dynamics and involvement of system users in the drafting and adoption process, a brief description of their options to get involved in either the drafting or formal legislative (adoption) procedure of the grid codes should be included.

1.2 Relation with mainland/national regulations

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1.2.1 Are the grid codes applied to the island different from the codes applied to the mainland?
Answer [20 words max]:

1.2.1.1 If so, what are the main differences? More specifically, if any, what are the differences on requirements for congestion management, power quality standards and requirements, balancing and balance responsibility, connection requirements, self-consumption requirements and demand response conditions.
Answer [120 words max]:

1.2.1.2 If not, are there any exemptions, or can they be made to better adapt to specific needs on the island which are not relevant for the mainland grid? Taking into consideration the UCs.
Answer [120 words max]:

Explanation:

The answers to the above questions help in clarifying the relevant framework for the islands in terms of: power quality, demand side response, congestion management and balancing. Here, the relationship and any potential differences between the islands and national and EU laws- and regulations is also relevant. The UCs help in assessing to what extent a higher degree of island autonomy can be achieved, how system reliability can be increased and how system users (consumers and local energy communities) can be involved in system optimization. Therefore, it is important to understand to what extent the existing conditions correspond to these possibilities and to what extent exemptions apply, or can be made if this would provide societal benefits.

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2. Virtual power plant

2.1 Are there any specific provisions with regard to Virtual Power Plants in any of the grid codes?
Answer [20 words max]:

2.1.1 If so, please summarize the scope of the provisions in one-two sentences. Please also include the definition used for VPPs in the code in your answer.
Answer [40 words max]:

Explanation:

In order to get an idea of how the codes are structured around the topics included in the use cases of IANOS, it is important to understand whether these topics are explicitly addressed in any of the grid codes. If not, the relevant provisions are purely implicit. This implies that more emphasis is put on the assessment of cases 1 – 4 (dispatching conditions for balancing and congestion management, maximisation of self-consumption (especially in energy communities) and demand-side management, peer-to-peer supply, distributed storage and power quality optimization).

3. Maximize self-consumption

3.1 Are there any specific provisions or requirements with regard to self-consumption in any of the grid codes?
Answer [20 words max]:

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3.1.1 If so, please summarize the scope of the provisions in one-two sentences.
Answer [40 words max]:

Explanation:

In order to get an idea of how the codes are structured around the topics included in the use cases of IANOS, it is important to understand whether these topics are explicitly addressed in any of the grid codes. If not, the relevant provisions are purely implicit.

4. Optimal dispatch (intraday) balancing

4.1 How are balancing mechanisms structured into the grid codes? Is there a specific grid code dealing with balancing?
Answer [20 words max]:

4.1.1 If not, which of the codes include the balancing mechanisms?
Answer [20 words max]:

4.2 How are the balancing mechanisms designed in relation to different system users? Do all system users have to take responsibility for their own balancing, or do the codes exclude some groups of system users from individual balancing responsibilities? If so, who has to balance on their behalf?
Answer [60 words max]:

Explanation:

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Balancing is an important aspect of the different use cases. In order to get some basic understanding of how balancing is structured into the grid codes, it is important to know where balancing is placed in the framework of grid codes and who are mainly responsible for balancing (their own portfolio).

5. Storage, for fast responsive ancillary services

5.1 Are there any specific provisions regarding storage in the light of ancillary services in any of the grid codes? (is storage considered differently from other resources used for providing ancillary services?)
Answer [20 words max]:

5.1.1 If so, please summarize the scope of the provisions in one-two sentences.
Answer [40 words max]:

Explanation:

In order to get an idea of how the codes are structured around the topics included in the use cases of IANOS, it is important to understand whether these topics are explicitly addressed in any of the grid codes. If not, the relevant provisions are purely implicit. For storage, one of the important questions is how storage activities are regulated. For example, as regular consumption (load), when taking electricity from the system, and production (generation) when feeding electricity back into the system, activities. Storage could also be considered as a specific activity, under certain conditions (e.g. for demand-side management).

6. Power quality and congestion management services

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6.1 Do the grid codes include a mechanism for congestion management?
Answer [20 words max]:

6.1.1 If so, please summarize the mechanism. Please also include which system users can make use of the mechanism.
Answer [120 words max]:

6.2 Do the grid codes provide options for system users to provide power quality services for system optimization, which can be acquired/purchased/procured by the system operator? If so, which?
Answer [60 words max]:

6.2.1 Are these options available to all system users?
Answer [60 words max]:

Explanation:

Congestion management and grid optimization is an important aspect of the different use cases. In order to get some basic understanding of how congestion management and grid optimization is organized into the grid codes, it is important to know whether there is a mechanism within the grid codes which system operators could use to acquire congestion management or power quality services from their system users.

7. Electric mobility and e-charging

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7.1 Are there any specific provisions with regard to charging infrastructure in any of the grid codes? (i.a. specific connection or system user category)
Answer [20 words max]:

7.1.1 If so, please summarize the scope of the provisions in one/two sentences.
Answer [40 words max]:

Explanation:

In order to get an idea of how the codes are structured around the topics included in the use cases of IANOS, it is important to understand whether these topics are actually explicitly addressed in any of the grid codes. If not, the relevant provisions are purely implicit. Above answers help in defining the questions for questionnaires 2 and 3.

8. Active citizen and local energy community engagement

8.1 Do the grid codes include any exemptions for active citizens and local energy communities from any of the requirements within the grid codes?
Answer [20 words max]:

8.2 If so, please summarize the scope of the exemptions in one/two sentences.
Answer [40 words max]:

Explanation:

In order to get an idea of how energy communities are positioned in the grid codes, it is relevant to assess whether they are considered as a separate user class, having specific

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requirements, or whether they are seen as for example regular consumers, as closed distribution systems, or whether their connections are simply seen as demand and/or generation connections.

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Questionnaire 3: Financial Aspects Relevant to Deep Decarbonization

The rationale behind this questionnaire is to get insight on:

- The local financial and energy market situation at the island.
- The applicable subsidies, taxes and energy and transport and distribution price conditions.

1. General Framework
1.a Please describe the relevant price components of the retails price for: a) electricity; b) green gas (if relevant); c) heat. Please include an overview of the relevant price components, being for example: a) relevant taxes; b) service costs; c) transport and distribution costs; d) guarantees of origin and/or CO_2 certificates; e) any other relevant components. Please be as detailed as possible.
Answer [180 words max]:
1.b Please describe any general incentives schemes and subsidies on: a) national; b) local (e.g. municipality, province, etc.) level. The described schemes should target either: a) sustainable energy production; b) energy saving or efficiency investments; c) any other relevant subsidies or incentives. Please note that tax reductions can also be considered as subsidies.
Answer [180 words max]:

1.1 Relevant Authorities
1.1 What are the relevant authorities; a) for setting tariffs for energy (if any); b) for setting tariffs for transport and distribution; c) for issuing/providing subsidies?
Answer [80 words max]:

1.2 Relation with mainland/national regulations

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1.2 To what extent are the financial conditions (e.g. price levels) of the islands comparable to the mainland and the EU conditions.
Answer [80 words max]:

Explanation:

In order to better understand the local markets on the islands and the economic and financial dynamics, it is important to understand how the price of energy (and related costs) is defined, what incentives are provided locally to support RES or energy efficiency, who is able to regulate these conditions and how the local islands conditions relate to national and EU financial conditions.

2. Maximize self-consumption
2 Which incentives are provided, if any, for self-consumption? E.g. tax reductions, direct subsidies for storage or energy management systems, etc.
Answer [80 words max]:

Explanation:

Self-consumption can be stimulated in various ways. They could receive benefits for not using the grid at certain moments in time for example, or they could receive a penalty for using grid capacity, e.g. in case of congestion or power quality issues. The answers to the above questions should help in defining the relevant applicable conditions on the IANOS islands.

3. Optimal dispatch (intraday) balancing

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3. Which incentives are provided to contribute to balancing; which penalties apply for imbalance? To whom do these incentives and penalties apply?
Answer [120 words max]:

Explanation:

System users can contribute to balancing in various ways. Simply because they have to because of their balancing responsibilities, or because they receive benefits by helping other system users with their imbalances. System operators could also provide specific benefits or schemes to increase balance. The answers to the above questions should help in defining the relevant applicable conditions on the IANOS islands.

4. Storage, for fast responsive ancillary services
4. How is storage rewarded (if)? For example: direct subsidies for storage, favourable capacity contracts, demand side response prices, tax advantages, etc.? If no specific advantages apply to storage, are the existing market conditions favourable enough for the integration of storage in the electricity system?
Answer [80 words max]:

Explanation:

System users can have various reasons for investing in storage systems. They can e.g. be persuaded to provide system optimization and congestion management services, e.g. by having local flexibility markets, providing attractive prices for reducing or increasing consumption or generation at specific moments in time. The answers to the above questions should help in defining the relevant applicable conditions on the IANOS islands.

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5. Power quality and congestion management services
5. How are system users, consumers and producers required or incentivised to contribute to maintaining power quality? For example, demand connection requirements, or reward schemes (e.g. using dynamic network tariffs) by system operators?
Answer [120 words max]:

Explanation:

System users can contribute to power quality in various ways. Simply because they have to due to demand connection or generation requirements, or because they have to engage in demand response schemes. System users can also be persuaded to provide system optimization and congestion management services, e.g. by having local flexibility markets, providing attractive prices for reducing or increasing consumption or generation at specific moments in time. The answers to the above questions should help in defining the relevant applicable conditions on the IANOS islands.

6. Electric mobility and e-charging
6.1 Are there any direct or indirect subsidies which apply to the development and operation of charging infrastructure?
Answer [120 words max]:

6.2 How are charging infrastructure operators charged for using electricity infrastructure?
Answer [60 words max]:

6.3 How are charging infrastructure users charged for using the charging infrastructure and/or the electricity infrastructure?

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Answer [60 words max]:

Explanation:

The development of electric charging infrastructure depends on the demand for it, which is driven by the uptake of electric mobility, targets for the development of electric charging infrastructure, commonly supported by subsidies, and the market and grid conditions (e.g. how much does a connection cost, what tariffs apply, which tax regime does apply, etc.). The answers to the above questions should help in defining the relevant applicable conditions on the IANOS islands.

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4. Recommendations

Current EU harmonization efforts focus, among others, on balancing (e.g. EU Balancing Network Code), facilitating energy communities and active consumers (Electricity Directive), the utilization of demand-side response and storage by system operators (Electricity Directive) and the use of smart grids for optimizing the integration of RES into the existing electricity system. The IANOS project is at the frontier of testing these efforts into the island conditions of its participating pilot and fellow Islands. To what extent do existing legal, regulatory and financial conditions support the harmonization efforts? And to what extent do the conditions between different EU islands can or need to be harmonized? More specifically, one could think of conditions and guidelines for energy communities, as well as potential recommendations for exemptions from existing (local or national) legal requirements or barriers. The UCs could also contribute to further harmonization levels e.g. on smart grid standardization.

However, at the current stage of the project, it is too early to make any concrete recommendations on these aspects. Yet, for D2.5 and D2.6, more recommendations are expected to be provided on the above described aspects.

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