

IMPLEMENTATION PLAN 2017-2019: CONSULTATION PROCESS AND OUTCOMES

The public consultation on the Implementation Plan 2017-2019 was carried out in February and March 2017, both through announcement on ENTSO-E website and through the direct contact (e-mail request) to some relevant stakeholders: ETIP-SNET, EERA Joint Programmes on Smart Grids, EWEA, EASE, EDSO4SG, T&D Europe, CORESO, Eurelectric, INEA, T&D Europe, Greenpeace, etc...

Stakeholders were invited to:

- a) Identify missing topics within the current Implementation Plan. Marked as [MT] in the comment Tables [10-14].
- b) Rank the Implementation Plan topics. The respondents were asked to rank topics from 1 to the number of topics in each cluster [Table 9]. For example, there are 6 topics pertaining Cluster 1, and so the topics could be ranked from 1 to 6, where 1 is the highest priority/rank and 6 is the lowest priority/rank.

CLUSTER	TOPICS	Total number of topics in cluster
C1	T1, T13, T15, T16, T18, T22	6
C2	T2, T3, T4, T19, T23	5
C3	T5, T6, T7, T8, T14, T17, T20	7
C4	T9	1
C5	T11, T12, T10, T21	4

TABLE 9: TOPICS IN CLUSTERS

- c) Express general comments about each Cluster. Marked as [GC] in the comment Tables [10-14].

ENTSO-E welcomes all the comments that were received and thanks the contribution to the participants: ABB, Intracom, Coresso, Open Energi, AESTechnologies OU, University Stuttgart together with VGB PowerTech, University Belgrade, Sintef Eneryg, ElaadNL.

All comments have been addressed and the Implementation Plan.

In addition, a graphic representation has been produced in order to show stakeholders preferences. The methodology applied for this representation adopts the following logic:

- all the ranks, from all respondents for each topic was summed up
- reciprocal value was found
- it was multiplied by 100 and round to one decimal digit

Following this logic, the highest possible value that could be assign to a topic, if all respondents ranked it "1", is 10. This is the case for Cluster 4, where there is only one topic associated to this cluster. When there are more options to rank, the variance of the obtained rank increases and the values of the rank goes down.

The following information report the ranking identified by the respondents, for each Cluster except C4. The full list of comments received, together with ENTSO-E comments and the description of the actions taken.

Cluster 1: Power system modernisation

Figure 5 shows the ranks of the topics in Cluster 1. Topic 15 has the highest rank, whilst Topic 22 the lowest one.

PUBLIC CONSULTATION RANKING - Cluster 1

Topic 15: Optimal grid design based on the use of cost effective solutions to enable more flexibility

T1: Power system planning for flexible transmission systems

T13: Smart asset management through use of Big Data

Topic 16: Public acceptance and stakeholder’s participation

Topic 18: Probabilistic methods for generation adequacy planning

Topic 22: Partially insulated OHL conductor

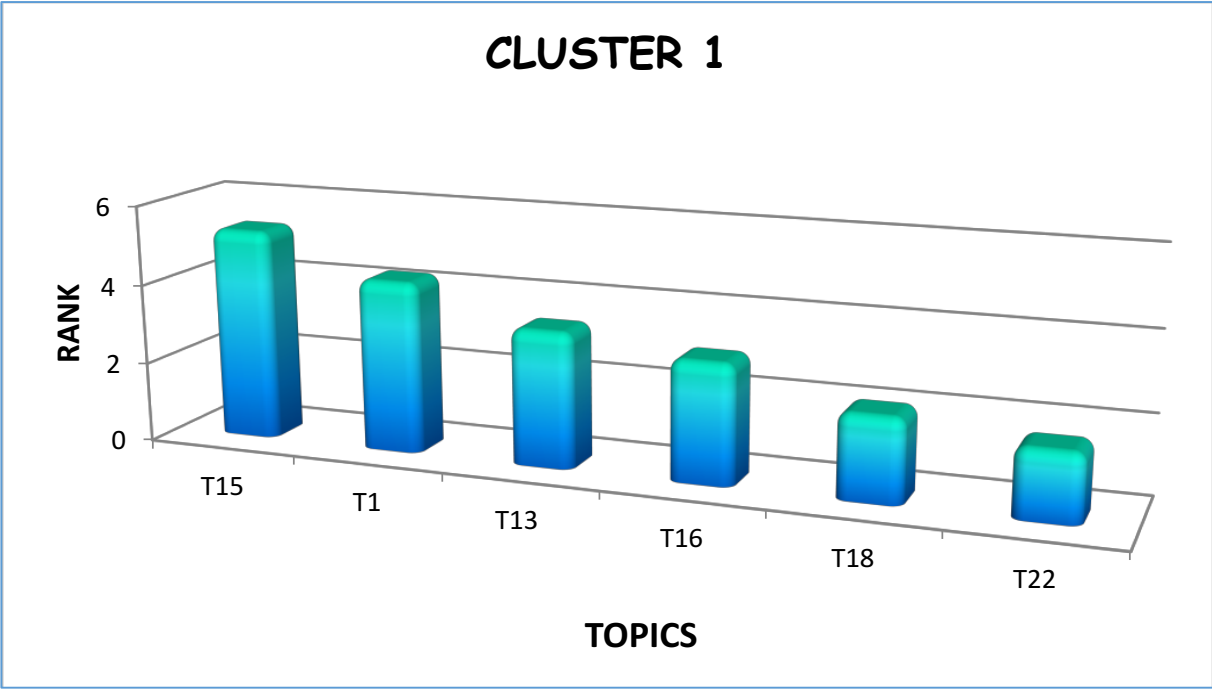


FIGURE 5: RANK OF TOPICS IN CLUSTER 1

In the following table the stakeholder comments and the ENTSO E reactions and actions taken within the present Implementation Plan are shown.

MT/GC	Stakeholder	Cluster	Comment from Stakeholder	ENTSO-E comments	Action taken
MT	EERA JP Smartgrids, SP Transmission	C1	Exploiting the possibility of integrating the main synchronous areas in Europe, and the offshore wind power clusters through a multi-terminal HVDC network is not mentioned anywhere.	Ongoing R&D funded projects [Best Paths and Promotion] are currently exploiting these possibilities. For this reason, these topics have not been considered within the current Implementation Plan.	This input does not modify the current implementation plan.
GC	EERA JP Smartgrids, SP Transmission	C1	Topics 1 and 15 could be merged into a single planning theme, which would include flexibility concerns, renewables integration, cost effectiveness, etc.	ENTSO-E considers that it is of important to keep the two different approaches expressed in Topic 15 (Optimal grid design and planning based on the use of cost effective solutions to enable more flexibility) and in Topic 1 (Power system planning for flexible transmission systems). Topic 1 deals with transmission system specific issues, whereas Topic 15 deals with the power system as a whole.	Topic 1 and Topic 15 have been slightly reworded in order to state clearly the different approaches.
GC	EERA JP Smartgrids, SP Transmission	C1	C1/T1 –also refer to Basic Research. Initial TRL can be lower.	ENTSO-E agrees with this comment.	Topic 1 initial TRL is set to TRL 4

TABLE 10: PUBLIC CONSULTATION INPUTS TO C1 AND REACTIONS

Cluster 2: Security and System stability

Figure 6 shows the ranks of the topics in Cluster 2. It can be seen that Topic 2 has the highest rank, whilst Topic 19 the lowest one.

PUBLIC CONSULTATION RANKING - Cluster 2

- Topic 2: Enhance grid observability
- Topic 23: Developing tools for better system awareness based on big data anlysis
- Topic 3: Cross border use of ancillary and flexibility services
- Topic 4: Assessment of pan European System Stability
- Topic 19: High impact low probability events

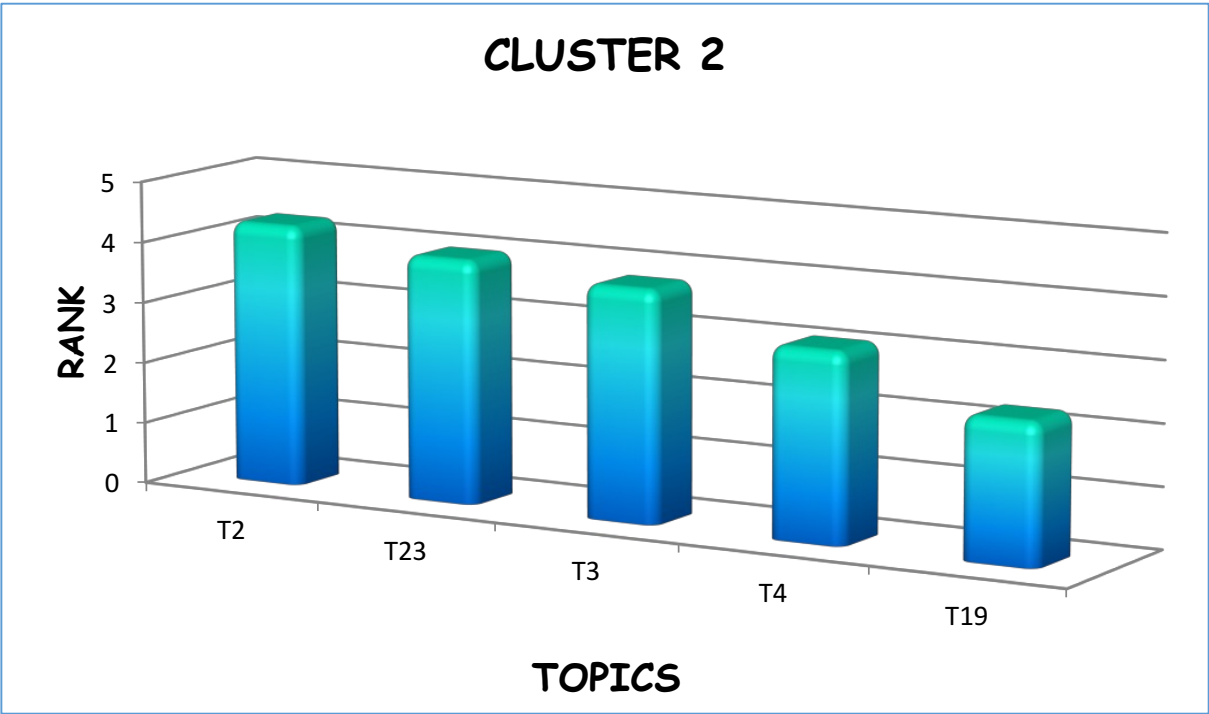


FIGURE 6: RANK OF TOPICS IN CLUSTER 2

In the following table the stakeholder comments and the ENTSO E reactions and actions taken within the present Implementation Plan are shown.

MT/GC	Stakeholder	Cluster	Comment from Stakeholder	ENTSO-E comments	Action taken
MT	EERA JP Smartgrids, SP Transmission	C2	"New technology" (new methods/ new approach/new devices/other...) for security and system stability could be added.	ENTSO-E agrees on this comment. Not only services, but also new technologies should be considered as a key enabler for security and stability of the system. In fact, Topic 4 (Assessment of pan European system stability) of the current Implementation plan already covers the system stability matters from the technology perspective and also from the software development point of view.	It has been included an specific reference to the technology assessment into Topic 4 scope, to strengthen the contribution of new technologies for security and system stability.
MT	EERA JP Smartgrids, SP Transmission	C2	Talking about a Pan-European interconnected power system raises the need for a generic grid code, which aggregates and integrates the key requirements of regional codes, taking on board the special needs of offshore wind and storage.	The design of Network codes is out of R&D activities scope.	This input does not modify the current implementation plan.
	Intracom Telecom	C2	For Topic 2, the role and impact of existing and emerging communication technologies in	ENTSO-E welcomes the comment on exploring the emerging communication technologies attached	Topic 2 (Enhance grid observability) has been updated adding an specific task to explore the role and impact of

			grid observability should also be explored.	to the specific functionality of grid observability.	existing and emerging communication technologies in grid observability.
GC	Intracom Telecom	C2	The budget for Topic 2 is rather underestimated.	Topic budget has been defined based on a specific project proposal. Nevertheless after an internal analysis it has been agreed that this amount could be slightly raised.	Budget for Topic 2 will be increased in 2 MEUR.
GC	EERA JP Smartgrids, SP Transmission	C2	Even if ranked as number 5, Topic 23 is still important (i.e. all topics are important).	Thank you for your effort in ranking the topics. We also agree that they are all important, but the ranking is important to understand the priorities of the European transmission system stakeholders.	

TABLE 11: PUBLIC CONSULTATION INPUTS TO C2 AND REACTIONS

Cluster 3: Power System Flexibility

Figure 7 shows the ranks of the topics in Cluster 3. It can be seen that Topic 5 has the highest rank, whilst Topic 20 the lowest one.

PUBLIC CONSULTATION RANKING - Cluster 3

Topic 5: Coordination of centralized and distributed flexibility

Topic 6: Measuring grid flexibility

Topic 7: Multiservice storage applications

Topic 8: Demand response engineering

Topic 14: Smart interfaces between generation and transmission

Topic 17: Improve RES forecasting and optional capacity operation

Topic 20: Optimal use of storage plants.

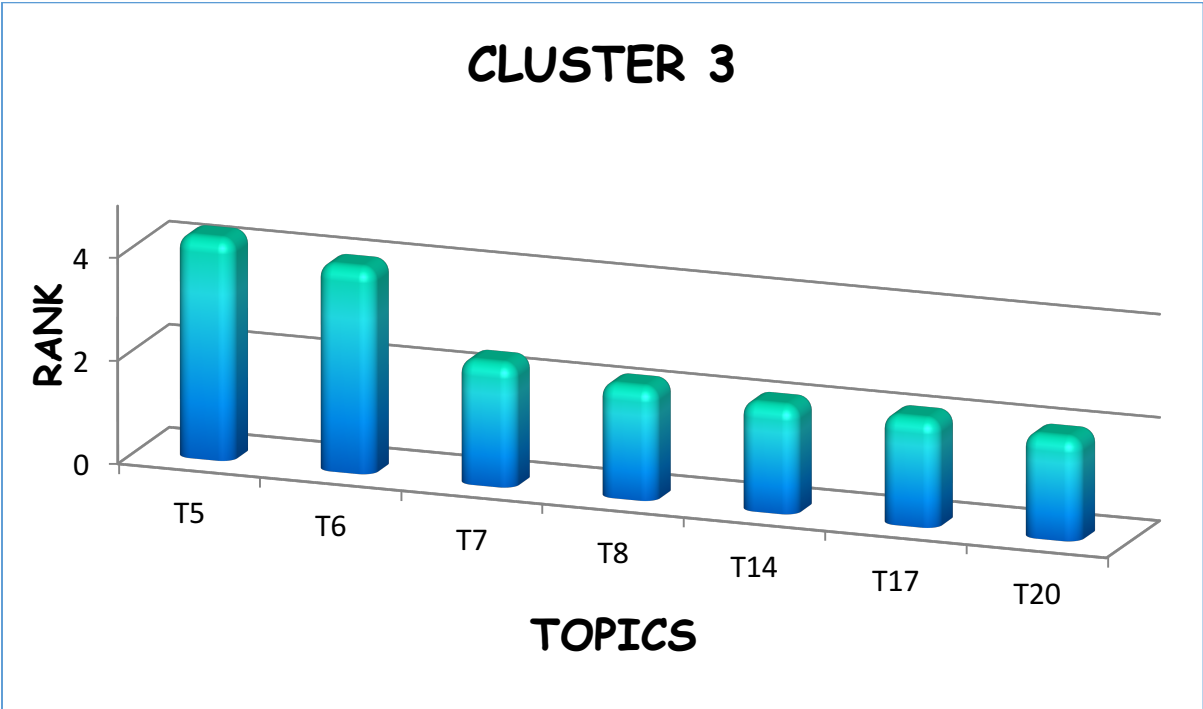


FIGURE 7: RANK OF TOPICS IN CLUSTER 3

In the following table the stakeholder comments and the ENTSO E reactions and actions taken within the present Implementation Plan are shown.

MT/GC	Stakeholder	Cluster	Comment from Stakeholder	ENTSO-E comments	Action taken
MT	EERA JP Smartgrids, SP Transmission	C3	Renewables generation control – although limited, the control (or curtailment) of renewables energy production should be considered and integrated in the global control schemes.	Renewable energy curtailment is a last option for European system operators. In fact, one of the TSO's R&D purposes is to avoid renewable energy curtailment. This is why the optimization of variable RES integration through other sources of system flexibility is considered first.	This input does not modify the current implementation plan.
MT	EERA JP Smartgrids, SP Transmission	C3	The interaction with other energy systems (gas, heat, ...) could be also included in this cluster.	The interaction with other energy systems is already considered in Topic 14.	This input does not modify the current implementation plan.
MT	SINTEF Energi	C3	Better use of grid-Connected large-scale Storage facilities by retrofitting reservoir Hydro to meet demands of large-scale Storage and balancing over time scales ranging from Seconds to Seasons. This could fill needs like demonstration of capability to meet demands of long-term, large-scale energy storage with very low carbon footprint which is already available now. Tools and models to evaluate the benefits of retrofitting existing storage options	Optimal use of storage facilities is a very relevant issue in modern power system, and imperative in the prosecution of the new European energy strategy. The TSO viewpoint is agnostic regarding the storage technology, as long as it provides the reliability and flexibility that the system requires. With the focus on reliability and flexibility, TSOs are looking for the optimal use of storage facilities, whether it is an existing facility or a new one. In particular, Topic 7 (Multiservice storage applications) and Topic 20	This input does not modify the current implementation plan.

			to future demands should also be developed.	(Optimal use of storage plants) seems to cover the issue raised by the stackholder.	
GC	Intracom Telecom	C3	IT providers should also be considered in the list of involved parties (Additional Information section).	ENTSO-E agrees with this comment. Taking into consideration that the role of IT as technology providers.	IT providers will be considered as technology providers within T11.
GC	EERA JP Smartgrids, SP Transmission	C3	Not easy to rank, all topics are important: all topics refer to an actual problem of flexibility. Topics ranking can also differ from country/region power system specific, generation profile, RES "availability" (more hydro, or PV).	Thank you for your effort in ranking the topics. We also agree that they are all important, but the ranking is important to understand the priorities of the European transmission system stakeholders.	
GC	EERA JP Smartgrids, SP Transmission	C3	We do not see a key reason to split Topics 7 and 20, actually they are inter-dependent.	Topics are interdependent, however they are addressing different aspects within the storage domain. While Topic 7 deals with multi services offered by storage facilities, Topic 20 is aiming at analysing the performance of different storage	

				technologies for ancillary services provision.	
GC	EERA JP Smartgrids, SP Transmission	C3	Topic 14 is vague and it represents a summary of certain tasks/scopes of the FO tasks, this is mainly noticed through Expected results. Hence it might be removed.	The topic 14 considers the main topics of interest to be consider in future H2020 calls. This topic will have to be further defined in future Implementation Plans.	Topic 14 has been renamed from: Smart interfaces between generation and transmission to 'Interaction with other energy systems' to clear identify the expected objective of the topic.

TABLE 12: PUBLIC CONSULTATION INPUTS TO C3 AND REACTIONS

Cluster 4: Power System Economic & Efficiency

The results for Cluster 4 are not shown graphically, as they consist of only one single column. In the following table the stakeholder comments and the ENTSO E reactions and actions taken within the present Implementation Plan are shown.

MT/GC	Stakeholder	Cluster	Comment from Stakeholder	ENTSO-E comments	Action taken
MT	SINTEF Energi	C4	Value, remuneration and market Development of grid-Connected Storage.	In order to properly address this comment, it has been divided into three separate topics: a) Value of grid connected storage; b) Remuneration of grid connected storage; c) market development of grid connected storage. The TSOs should consider studies on the a) and c), because, b) Remuneration of grid-Connected Storage, is out of TSO scope.	Regarding comment a) Value of grid connected storage: this aspect is intended to be researched within T7 (Multiservice application), nevertheless in order to make it explicit, a specific task will be included in the scope of T7 . Regarding comment c) Market development of grid connected storage. This activity is considered from the technology perspective in T7. Yet it make sense to reinforced this aspect in the market Cluster T9 (Flexible market design), and it has been added a specific task in this topic.

MT	ElaadNL	C4	<p>But there is a need for business rules regarding who can extract who's flexibility in what circumstances.</p> <p>We absolutely need operators (of smart DR devices) but aggregation possibilities are limited for DSO's so we should also look for alternatives. explore different alternatives for demand response (for DSO's).</p>	<p>Flexibility is a system need. It should not be made a distinction between flexibility for TSO and flexibility for DSOs. The flexibility should consider not only demand response, but also all different sources, such as storage, network development and any other one. Several Topics on the roadmap are dealing with system flexibility.</p>	<p>This input does not modify the current implementation plan. The assessment of who can extract who's flexibility in what circumstances could be partially covered in Topic 5 (coordination of centralized and distributed flexibility), under the scope of the task: Assessment of Roles and interactions of regulated and deregulated players.</p>
MT	EERA JP Smartgrids, SP Transmission	C4	<p>There might be a need to design separate market schemes for storage and for offshore wind power plants.</p>	<p>As far as wholesalemarket is concerned, TSOs are not directly involved in this subject. As general comment, market design should respect the technology neutrality approach.</p>	<p>This input does not modify the current implementation plan.</p>
MT	University of Stuttgart	C4	<p>Development of market mechanisms that implement sufficient dispatchable generation</p>	<p>Topic 9 (Flexible market design) seems to cover the topic raised by the stakeholder, since it intends to develop toolboxes and define new mechanism pushing forward the integration of RES ensuring the security of supply.</p>	<p>This input does not modify the current implementation plan.</p>
GC	EERA JP Smartgrids, SP Transmission	C4	<p>Not sure that initial TRL is 4, the topic still requires studies on tariffs and market design modelling, market facilitation criteria, to ensure optimal strategy for system services activation and investments needs.</p>	<p>ENTSO-E agrees with this comment.</p>	<p>Topic T 9 (Flexible market design) will consider TRL 3 as starting TRL.</p>

TABLE 13: PUBLIC CONSULTATION INPUTS TO C4 AND REACTIONS

Cluster 5: ICT & Digitalisation of Power System

Figure 8 shows the ranks of the topics in Cluster 5. It can be seen that Topic 10 has the highest rank, whilst Topic 21 the lowest one.

PUBLIC CONSULTATION RANKING-Cluster 5

Topic 10: ICT tools for data management

Topic 11: ICT systems and data handling for system control

Topic 12: Coordination on cyber-physical security within the energy sector (Cybersecurity improvement)

Topic 21: Best practices in cybersecurity

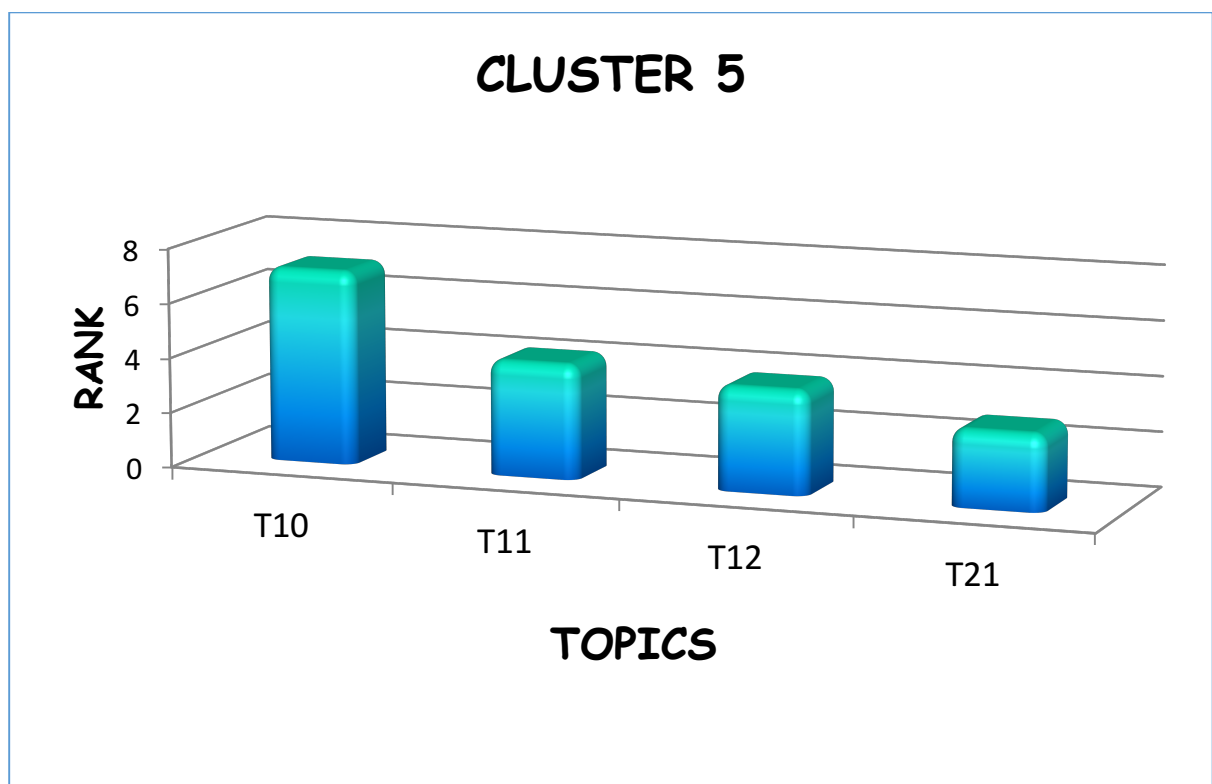


FIGURE 8: RANK OF TOPICS IN CLUSTER 5

The following table the stakeholder comments and the ENTSO E reactions and actions taken within the present Implementation Plan are shown.

MT/GC	Stakeholder	Cluster	Comment from Stakeholder	ENTSO-E comments	Action taken
MT	ElaadNL	C5	The connection (interfaces) between the ICT tools/systems for power system control and the e-mobility system (s interfaces). The interoperability between the protocols in the emobilty system and the grid/power system is a precondition for smart charging (demand response for Ev's).	This subject of electrical vehicle is partially covered by Topic 11 (ICT systems and data handling for system control). It is expected to be emphasized in future IP. .	This input does not modify the current implementation plan.
GC	Intracom Telecom	C5	For Topic 11, the impact of different SoA and emerging communication technologies in the future power system control should also be explored.	ENTSO-E agrees on this comment.	Topic T 11 will stress this aspect. Particularly addressing some key technologies such as 5 G technology.

TABLE 14: PUBLIC CONSULTATION INPUTS TO C5 AND REACTIONS