PLAN.
INNOVATE.
ENGAGE.

ETIP SNET WG1

Consultation on Roadmap structure
Brussels June
20th 2019

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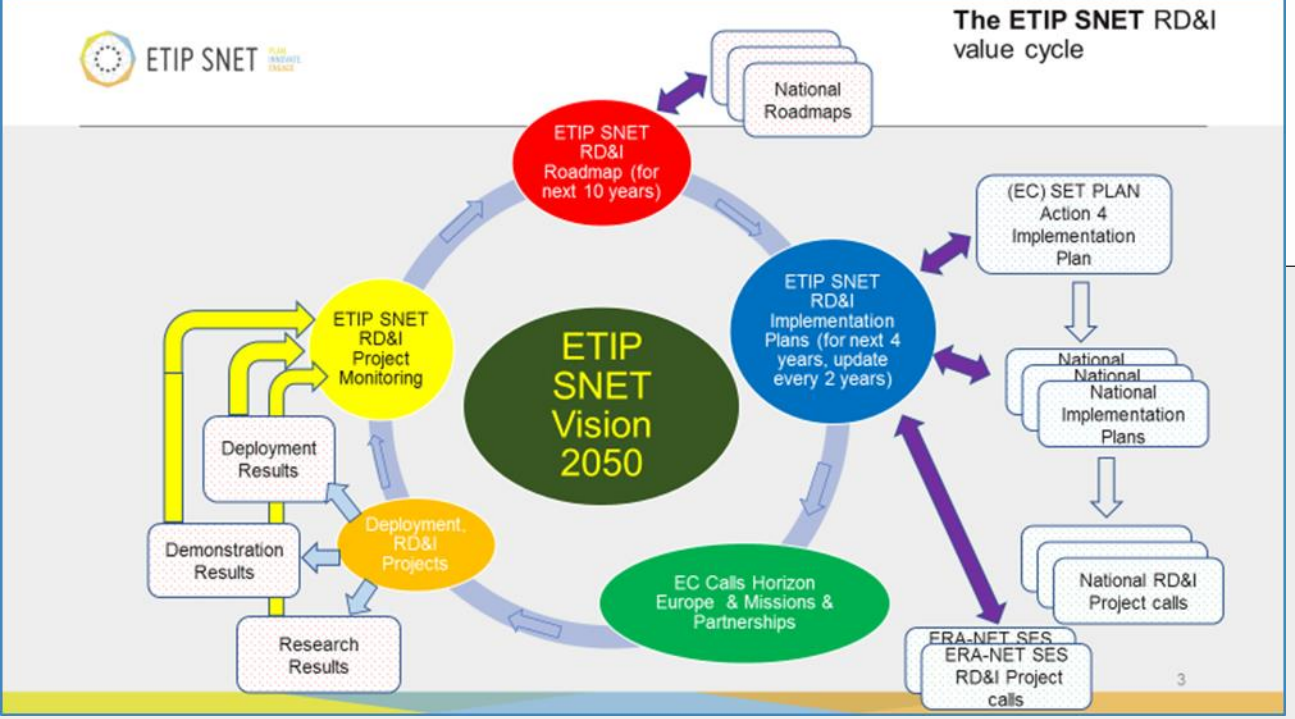
Basic concepts



- Vision2050 could be background under all concepts rather than in center; more precisely the end of a spyral, made of 10-years circles

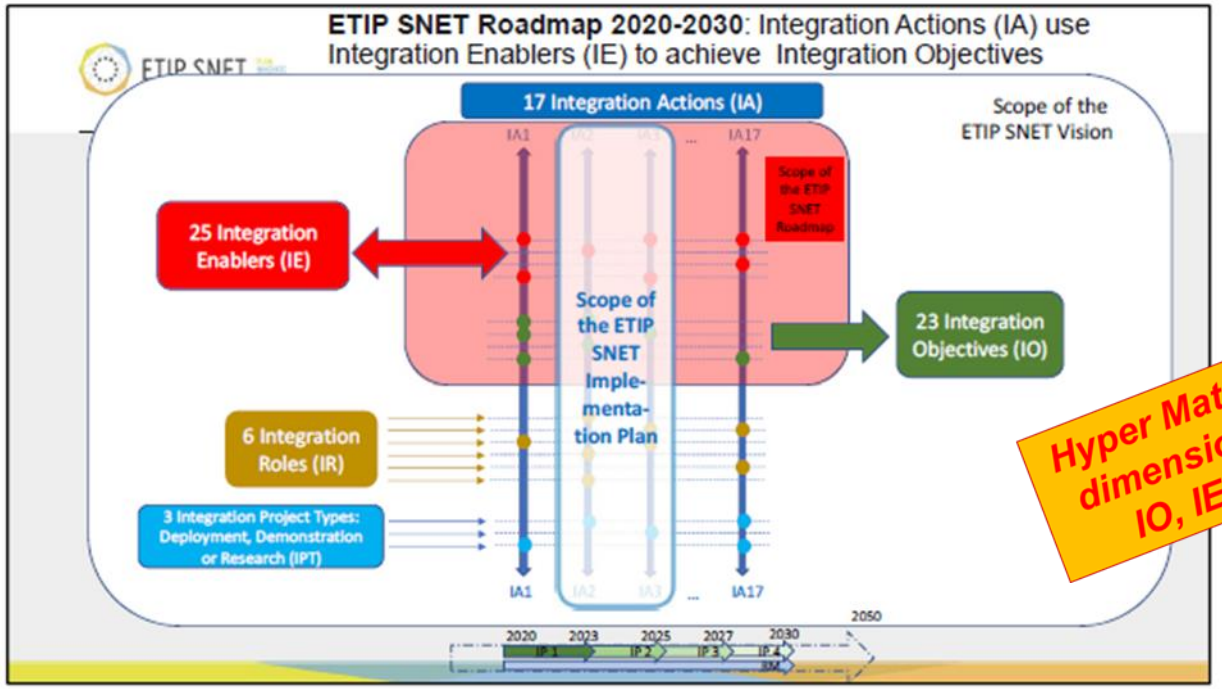
- in internal cycle, an arrow from Monitoring also to Implementation Plan

- in external cycle a reference also to Associations' Roadmap and Implementation Plans (and to TYNDP); indeed one of the aims is to keep alignment and synergies among the other existing Roadmaps, giving them a broader umbrella;

- in external cycle (Deployment phase) a reference also to R&D projects & results by Companies (grid operators, utilities and manufacturing, who are all stakeholders in Etip Snet), with which Etip Snet is striving to coordinate efforts and planning;

-In the orange box, "Execution" in place of "Deployment";
-In the yellow box, "roadmap monitoring and Projects survey" instead of "Project Monitoring";
-The box "Deployment Results" should read "Deployment/scale-up/market uptake of Results" without the arrow to Monitoring

Basic structure



Hyper Matrix with 5 dimensions: IA, IO, IE, IR, ITP

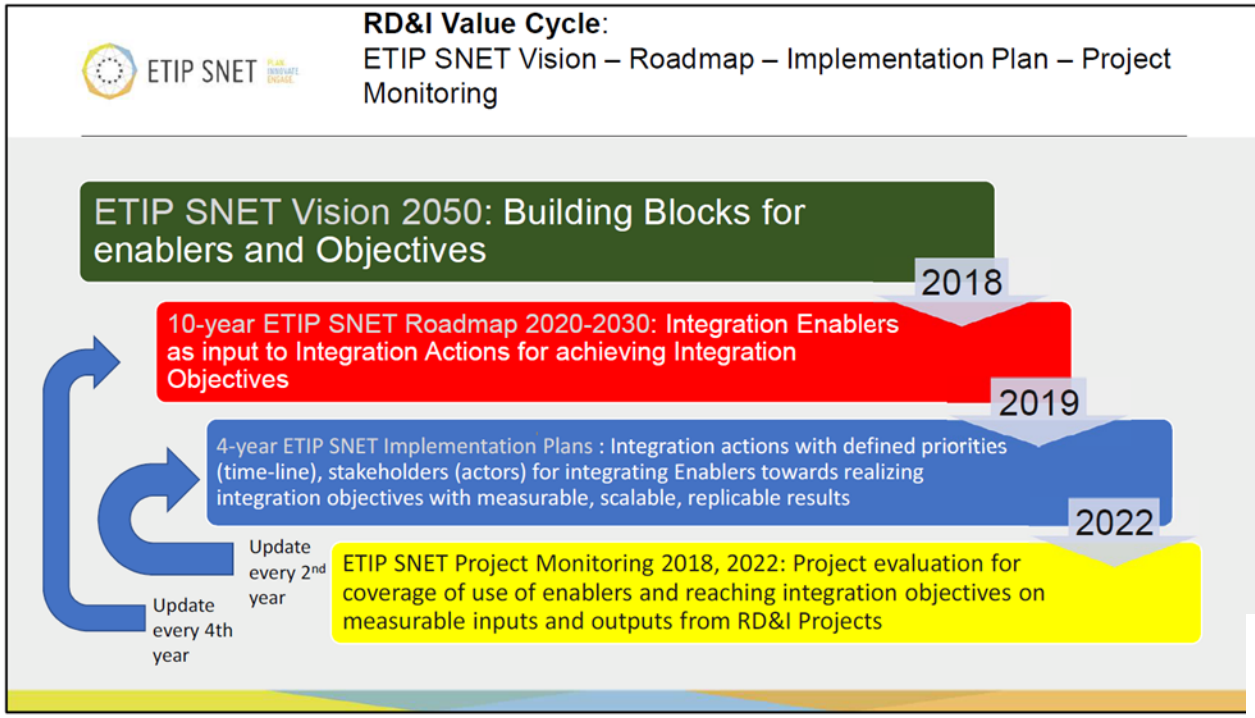
For brevity, we will call this new structure "5-dimensional Hyper Matrix" since it is based on meaningful intersections between the 5 dimensions of IA, IE, IO, IR, IPT

- The complexity of the structure could be difficult to disseminate in an easy to understand format that will appeal to a wider audience. Possible solutions could be a) Restructure, b) Improve graphical representation or use concrete examples

- The main concept in the center is the scope, but actually it shows structure or logical architecture. Looking at the graphic one can not fully understand scope or the sources of the IO, IE, IR

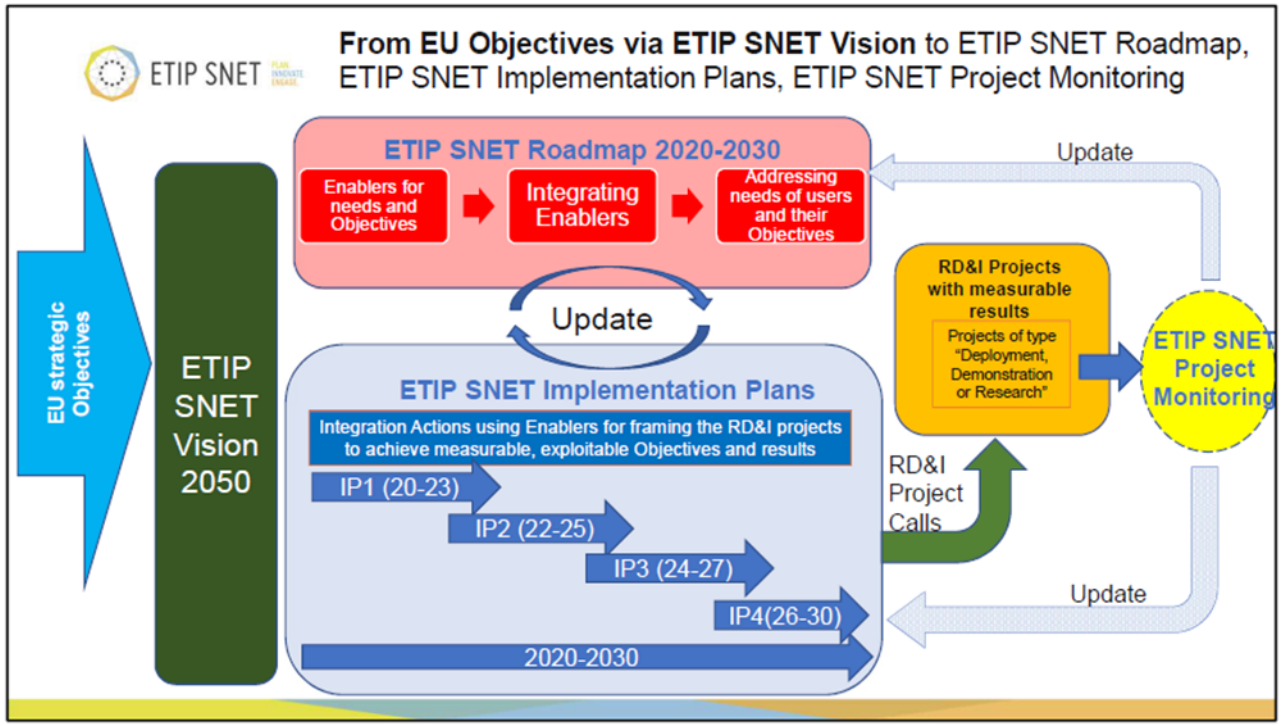
- Remove or at least change the label "integrated" which is now common to all concepts; indeed the power system needs also Actions, Objectives and Enablers without an integrated nature, and Etip Snet Roadmap must be the envelop of all innovation efforts by relevant stakeholders, both those aming at integration and those having an importance only within a sector of the value chain. So the acronyms can be avoided

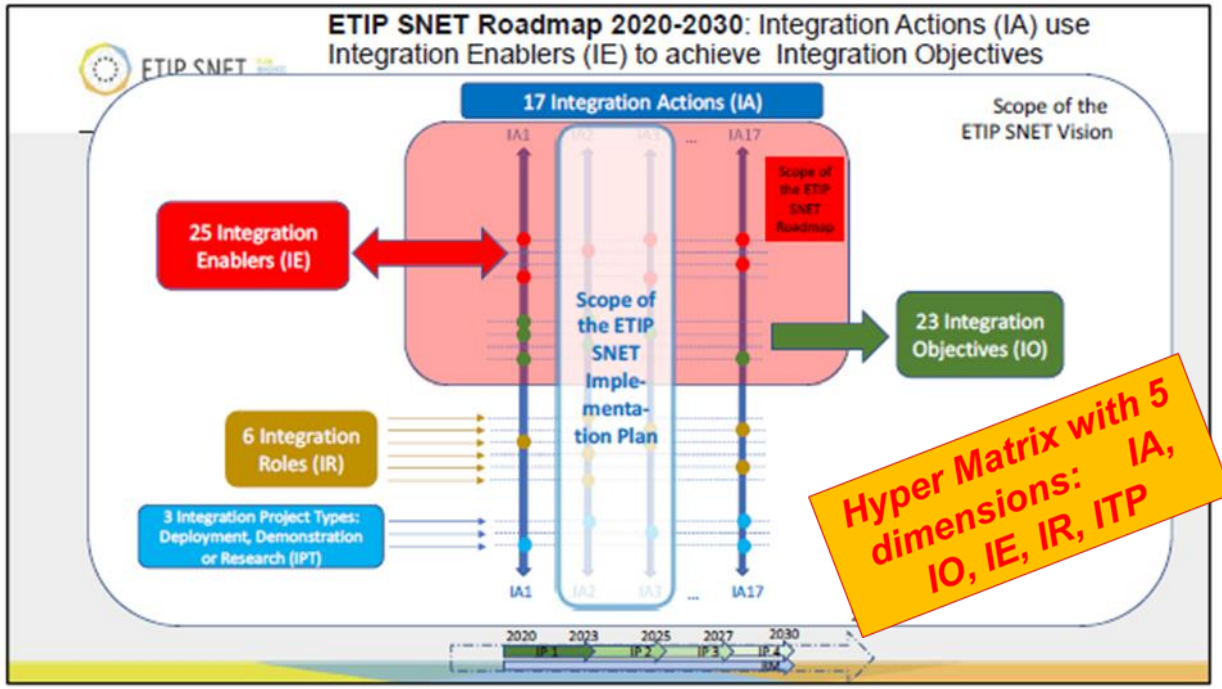
Value cycle



OK, both

They maybe merged in only one table





Architecture (question n.2)

In the slide there is maybe a conceptual misunderstanding in the Implementation Plan, which is not the place to give the list of detailed Enablers and Objectives: these must be set and agreed clearly already in the Roadmap for the whole Roadmap horizon. Differently, the Implementation Plan shall list and detail some of the Actions, those with higher priority/urgency/relevance as the first set of projects to be executed out of the broader view of the Roadmap.

§ R&D is needed also in some sector-specific topics and non-integrated actions, so we need to compromis between old Roadmap (based on sectors: TSO, DSO, storage, generation) and new one “Integrated”

§ Assets and physical grids/components/equipment deserve wider and specific attention (planning, operation, asset management, environmental impact, etc.)

§ While the logical sequence of Actions targeting an Objective (or a set of them) is straightforward, the Enablers raise doubts and perplexities, firstly due to their double nature as input of an Action or as intermediate output of an Action (towards a certain Objective). There can even be a loop (Action→Enabler→Action→Objective) to complicate things

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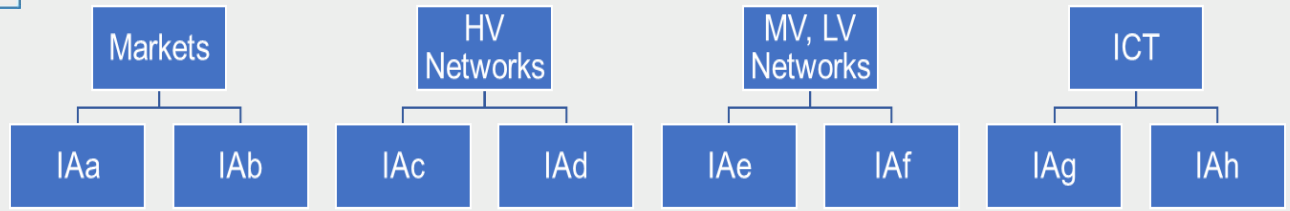
Proposed 17 Integration Actions (IA)

Previous RM: Functional Objective	Integration Action	Integrating enablers of … (see fields below) … with other enablers of the electricity system
T15, T17	IA1	Markets (with all participating users)
C2/T6	IA2	HV networks (with all connected users and sub-grids)
D8/D9	IA3	LV and/or MV networks (with all connected users)
D1/T11	IA4	Active Demand of non industrial users (flexibilities within buildings, behind point of common coupling)
D2	IA5	Buildings (system flexibilities of buildings) as heat/cold energy consumers
C1/D1/T11	IA6	Industry (system flexibilities within industrial processes, behind point of common coupling)
D6	IA7	EV (Mobile stored-energy related flexibilities)
D5/T10	IA8	Storage (Stationary storage related flexibilities; all types of storages)
D3/D4	IA9	DER (PV, Wind, Small hydro flexibilities)
D14	IA10	Thermal, decentralised generation (Flexibilities)
T22	IA11	Thermal, central (large) generation (Flexibilities)
D7	IA12	Non-electricity energy network systems (flexibilities)
T14/New	IA13	Conversion P2X, X2P (flexibilities)
New	IA14	Overall energy system design/planning, maintenance, recycling
D11	IA15	ICT
T4	IA16	Citizen attitude to infrastructure and environmental exposures
New	IA17	Citizen attitude to DR and digitalisation, self-responsibility (autonomy)

Actions

IA1, IA2 and IA3. There are aspects from many of the other IA's listed that should be considered as integration actions for Markets (these could facilitate the integration), HV networks and LV /MV networks (for example, storage, EV, thermal decentralised generation has to be integrated into the networks). A hierachy could be considered. For example:



- ✓ Imbalance of relevance: some are very wide, some have narrow-focused; some address topics very central for the power system, some address peripheric topics, some are even improbable (thermal decentralised generation)
- ✓ Several overlapping, at least in the titles
- ✓ Technologies and technical issues should be at least mentioned
- ✓ Several specific comments in the full reply document

Objectives

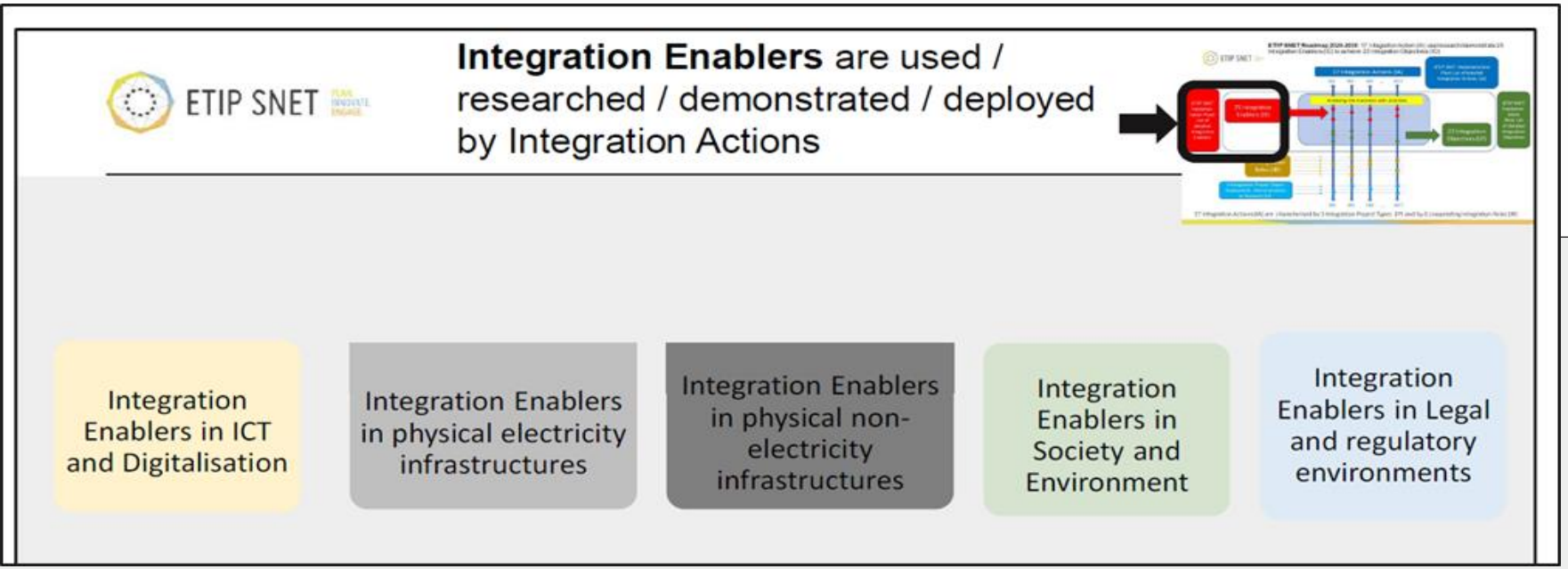
Proposed "23 Integration Objectives" (mapped from previous ETIP SNET RM)

Sustainability and circularity	Higher Welfare & better Affordability					Higher User Empowerment and Engagement			EU Excellence
IO1	IO2	IO3	IO4	IO5	IO6	IO20	IO21	IO22	IO23
Zero CO2 emissions; constant (low) CO2 in atmosphere, low GHG	Minimum asset maintenance costs, maximum lifetime (mainly regulated monopoly assets)	Minimum investment costs for overall grid-based energy systems (minimum cost system infrastructure designs)	Welfare-maximising pan-European Wholesale-Electricity and Gas market-based products and services (businesses)	Welfare maximising local and neighborhood / retail-market-based electricity, gas and heat/cooling products and services (businesses)	Actor roles, interrelationships, inputs, outputs, time and location dependencies, success factors	OT Sensoring (on all that comes in masses)	Standardized data exchange	Big data analysed (on all that comes in masses)	(Mass) Learning, Replication, Scaling up (deployment, masses)

Higher Security, Quality, Reliability, Resilience												
IO7	IO8	IO9	IO10	IO11	IO12	IO13	IO14	IO15	IO16	IO17	IO18	IO19
Flexibility-enabled new materials and new technologies	System operation optimising/supporting Expert Systems and tools (is too generic!)	Cybersecure equipment and systems	DC and hybrid AC/DC grid elements	Flexible large non-distributed thermal power generator based services (on all time scales)	Accurate RES forecast and response (on all time scales)	Accurate Demand (Electricity, Gas, Heat/Cooling) forecast and response (on all time scales)	Storage-based services (on all time scales)	Demand-based services (on all time scales)	RES-based services (on all time scales; including ancillary services)	Real-time restoration services after blackouts	Real-time coordinated, controlled flexibility enablers (in all energy carriers)	Real-time monitored/observed Electricity System State

- ✓ Several specific comments in the full reply document

Enablers



- The 5 categories of Enablers are good as they recall closely the "Building Blocks" of the Roadmap version 0; however, the name Integrated Enablers (IE) is confusing. It is expected that the Enabler is an actor or a process, in anycase a pre-requisite for reaching an Objective

- All the Enablers in physical infrastructures require a better explanation; if this means the technological evolution of the various components/assets of the energy system, then it is clear.

✓ In order to better fix the meaning and the role of the "Enablers", it might be opportune to categorise them differently; for example, splitting them among Internal to the energy (or only power) system and External, i.e. needed from collateral/overarching Actors (Regulators, Policy settings, non-energy sector, …).

✓ With the same mindset, to streamline the conceptual sequence, the Enablers could be seen as intermediate Objectives, necessary to achieve the major final Objectives; the criterion for splitting between intermediate and final could be if impacting on final users or not. So there would be a linear sequence: Actions → Enablers → Objectives

Proposed 25 Integration Enablers (IE)

ICT Infrastructure and Digital enablers:provide flexibility, security at low cost to the electricity system with integrated gas, mobility and heating/cooling sub-system and its users						Enablers in Physical Electricity Infrastructures: provide circularity, flexibility, security, reliability, resilience, quality to the electricity system users					
IE1	IE2	IE3	IE4	IE5	IE6	IE7	IE8	IE9	IE10	IE11	IE12
Data Management enablers	**Interoperability and standards enablers**	**Monitoring, control and automation enablers**	**Critical infrastructure protection (CIP) enablers**	**Cybersecurity enablers**	**ICT infrastructures related enablers**	**Non-renewable (fossil) generation enablers**	**Renewable generation enablers**	**Conversion (PtX, XtP [Generation]) related enablers**	**Electricity Transmission enablers**	**Electricity Distribution enablers**	**Storage (with electricity release) flexibility enablers (Hydro storage, Battery storage, Gas storage, Heat/cooling storage)**

seasonal), circularity at low cost to the electricity system, to mobility and to heating/cooling				Social and Environmental Enablers: provide circularity, renewables investments and siting, adapted user behavior, infrastructure acceptance, own responsibility within the society with its citizens					Legal and regulatory enablers: provide maximum welfare, low cost, fairness and empowerment to users			
IE13	IE14	IE15	IE16	IE17	IE18	IE19	IE20	IE21	IE22	IE23	IE24	IE25
Conversion (GtH, GtL) enablers	**Storage (Non-electricity release) enablers (Heat storage, Gas storage, Liquids storage)**	**Gas Network flexibility enablers**	**Heating and Cooling network enablers**	**Circularity enablers**	**Renewables enablers (for increased RES Siting, RES capacity)**	**Adaptive behaviour related enablers (for Efficient use, Knowledge)**	**Energy transmission and distribution, storage and conversion related acceptance enablers (for visibility, perceived dangers, costs, etc.)**	**Subsidiarity related enablers (for self responsibility)**	**EC and National Acts, Directives and Regulations as enablers (for sandboxes; unbundling; market versus natural monopoly; costs (CAPEX, OPEX), market design; Metering responsible; Control responsible)**	**Market rules as enablers (for access to markets, choice of products and services, price determination, congestion)**	**Grid rules as enablers (for natural monopoly, tariffs, connection, in-feed subsidisation, unbundling, self-prosumers)**	**End-Use Sector rules as enablers (for small and large users, for prosumers)**

Roles

1. Grid Operators
2. Telecom operator
3. Market participant
4. User (in masses)
5. Regulator
6. Owner (of any physical energy system infrastructure equipment (generation, transmission, distribution, conversion and storage equipment)

- Based on the given list the name Integration Roles is very confusing. It may be changed in Integration Actors
- Grid Operators are also typically owners of the grid infrastructure
- The Integration Roles should be unique and independent from each other
- Several specific comments in the full reply document

One quick-win improvement could be to interpret Roles as Actors, meaning which subjects must be involved/responsabilised for each Action/Objective.

Project types

- This categorisation is applicable to individual projects, which are defined in the Implementation Plan, not at Roadmap stage;

- This characteristic can be captured also with TRL, or at least it should be linked to it, in Implementation Plan

- In this way we simplify the HyperMatrix from 5 to 4 dimensions