

ENTSO-E R&D Plan

Umbrella – iTesla Workshop

Brussels, 21 June 2012

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ENTSO-e R&D Plan



ENTSO-E has a significant role in delivering European energy and climate change objectives

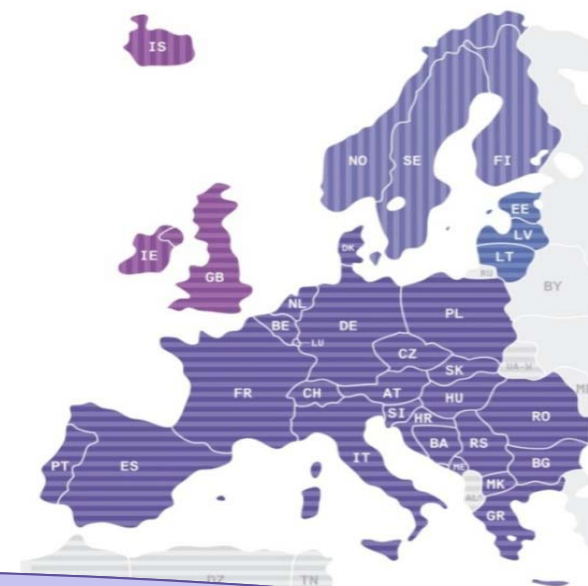


Key activities set out in Regulation 714/2009 (on cross-border electricity trade, part of the 3rd Internal Energy Market Package)

- Deliver **network codes** binding to all network users (Comitology)
- Ten-Year **Network Development Plan** “TYNDP”
- Enable **internal market** (“market coupling”)
- **R&D Roadmap** (fully included in EEGI – the SET Plan)

Through its members deliver the infrastructure to:

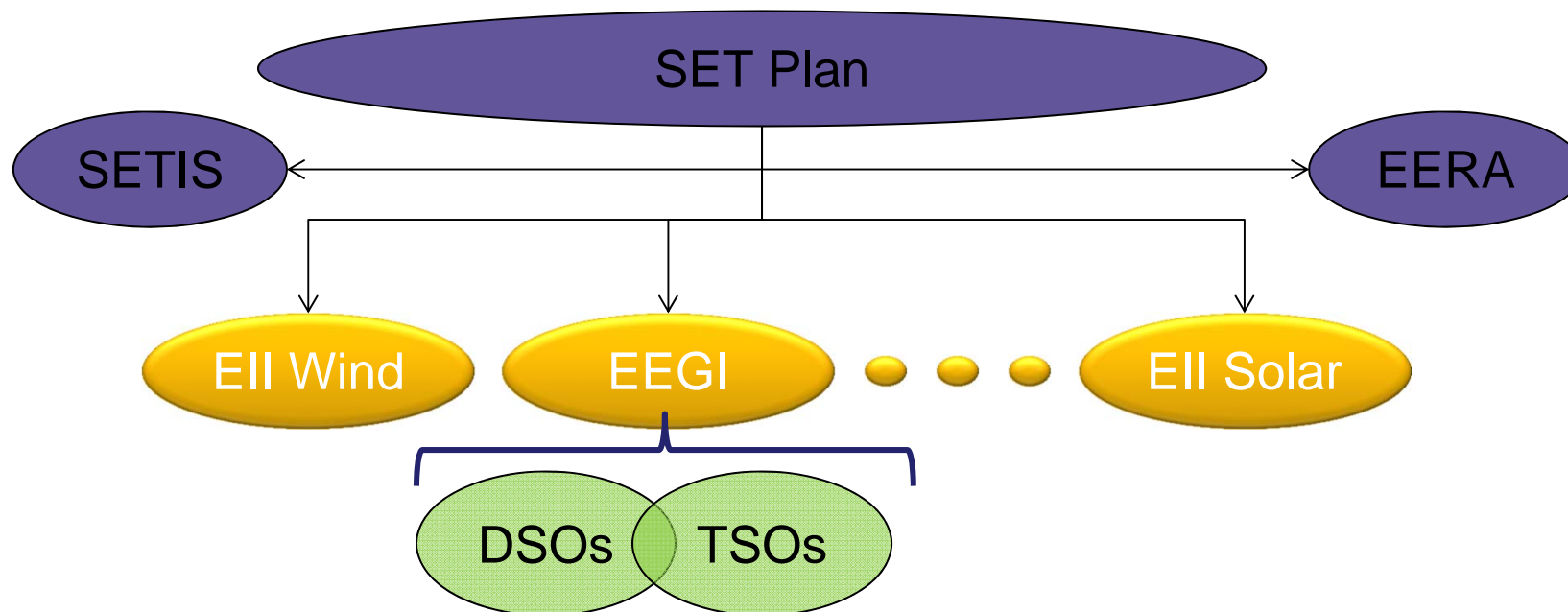
- Deliverable markets to function
- Secure energy supply
- Meet climate change objectives with RES



**41 TSOs from 34 countries;
530 million people; 910 GW gen.; 300 000 km transm.**

The collaboration framework of European Strategic Energy Technology (SET) Plan

In the context of the SET Plan, the European Electricity Grid Initiative (EEGI) constitutes a common platform for EU and MS representatives, Industry, Grid Operators, and other relevant stakeholders.



European Electricity Grid Initiative: a shared vision

2000 B€ is estimated to roll out Smart Grids

SMART GRIDS Functional level

Level 5: Smart Customers

Customers aware and actively participating

Level 4: Smart Energy Management

Management of end-use energy efficiency, aggregation, retail

Level 3: Smart Integration

Renewable energy, DG, electric vehicles, electricity storage and aggregation

Level 2: Smart network and processes

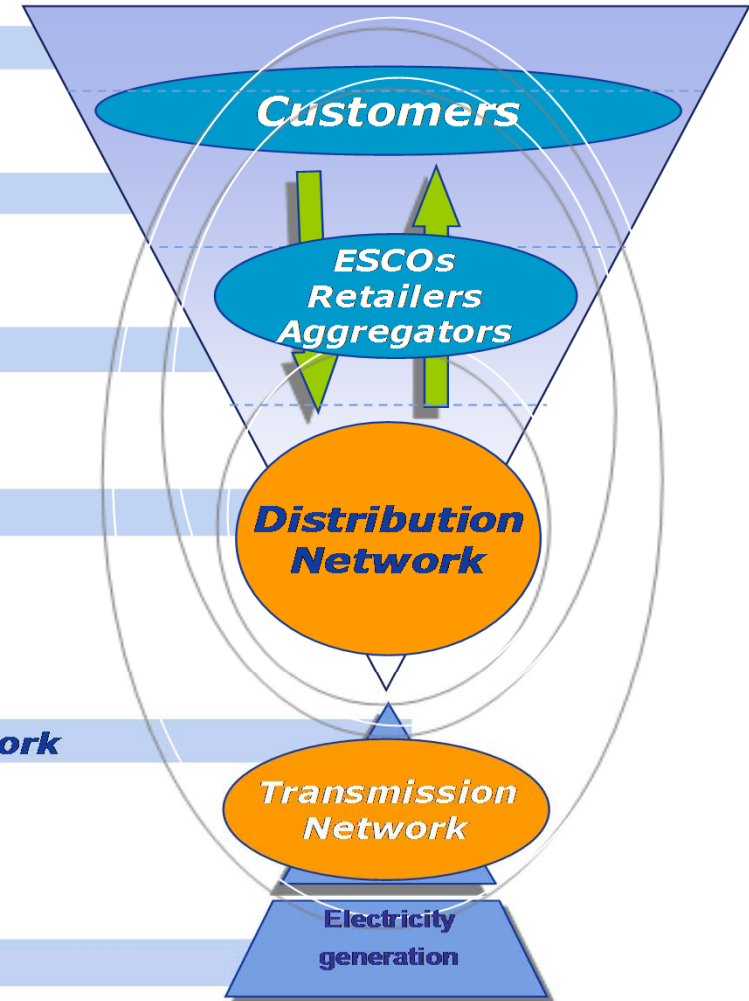
More automated MV distribution networks with self healing capabilities.

Monitored and controlled LV networks
IT supported monitoring process

Level 1: Smart Pan-European Transmission network

Innovative transmission grid architectures
State-of-the-art transmission/power technologies
Novel monitoring, control and storage methodologies
Shared electricity market simulators

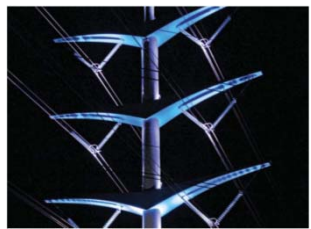
Level 0: New generation technologies



Need for R&D coordination at European level

Challenges for 2020 and beyond...

- +20 projects currently ongoing
- 9 FP7 project
- +170 M€ mobilised in total
- Participation of 25 TSOs from ENTSO-E



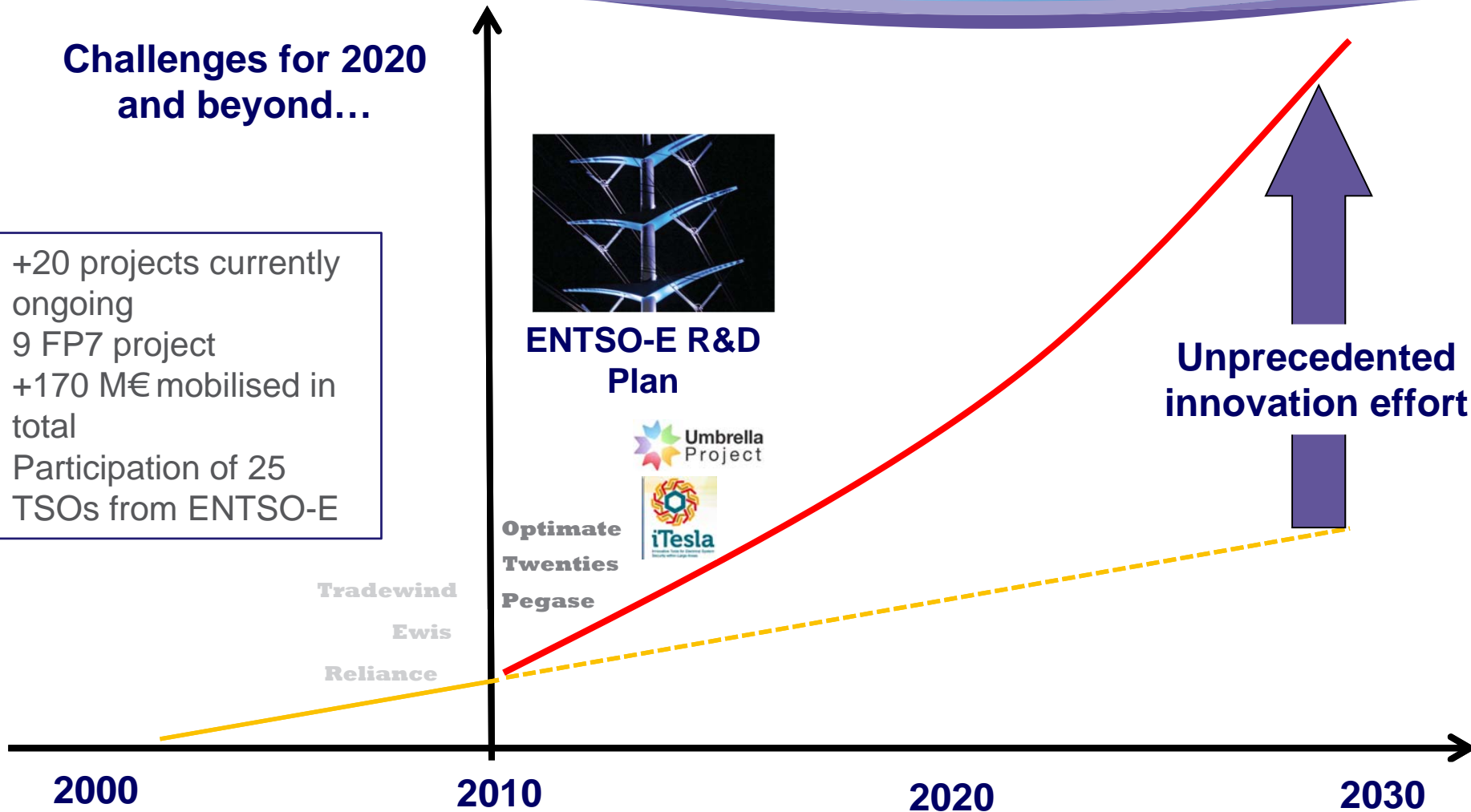
ENTSO-E R&D Plan



Optimate
Twenties
Pegase

Tradewind
Ewis
Reliance

Unprecedented innovation effort

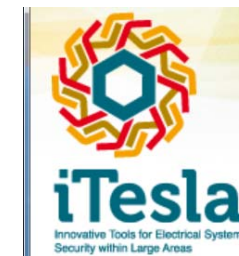


New FP7 projects supporting the ENTSO-E R&D Plan (starting 2011)

- **Umbrella** - Toolbox for Common Forecasting, Risk assessment, and Operational Optimisation in Grid Security Cooperations of Transmission System Operators (TSOs)
 - 2012-2015
 - EU funding 3.86 M€, Project costs 5.25 M€
 - 9 TSOs, 6 other partners



- **iTesla** - Innovative Tools for Electrical System Security within Large Areas
 - 2012-2015
 - EU funding 13.23 M€, Project costs 19.38 M€
 - 7 TSOs, 14 other partners



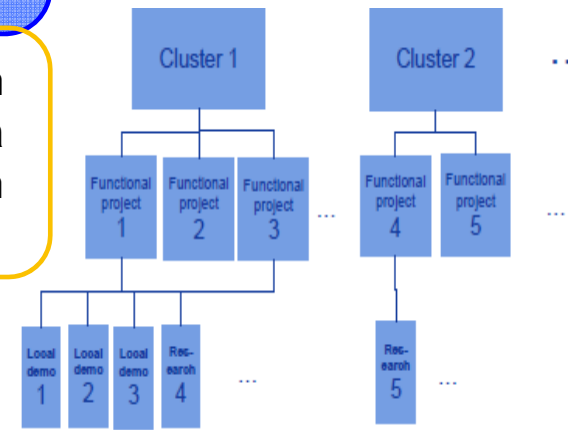
- **GRID+**: Project providing support to the EEGI Team
 - 2011-2014
 - EU funding ~3 M€, Project costs 3.9 M€
 - 12 partners



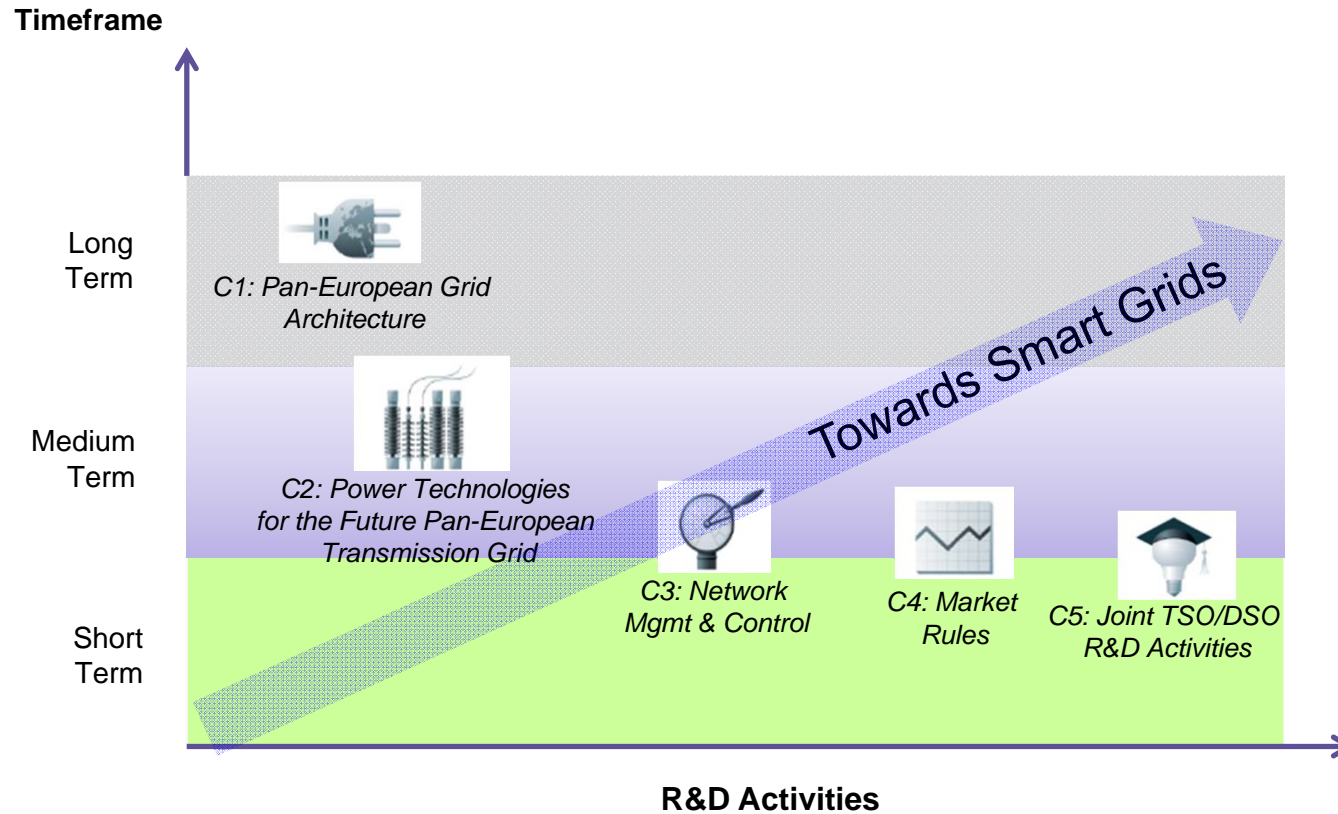
R&D Plan structure



Cluster	set of functional projects dealing with common issues that need to be managed all together to avoid overlaps and guarantee the most complete coverage of these issues.
Functional project	functional description and definition of demonstration and/or research activities needed to reach specific functional goals.
Local demo & research project	practical realization of the demonstration activities and of the research activities (at a specific location), respectively, described in the functional objective.



R&D Topics of the R&D Plan 2011



- 4 Clusters TSO part: 14 Functional Projects
- 1 common Cluster TSO/DSO part: 5 Functional Projects
- Total estimated cost: 790 M€

Cluster 3: Network control & management

Context:

- Increased volatility due to massive variable RES, DER and increased demand side mgmt technologies
- Operation of the system close to its limits as consequence of new market rules and difficulty of building new infrastructure
- New means to improve observability, controllability and monitoring of the system

Objective:

To provide solutions for improving the observability and controllability of the pan-European system to operate the system close to its limits while maintaining an adequate level of reliability. For this, we need:

- New simulation techniques to help moving pan-EU network closer to its limits
- New training methodologies & improved coordination
- New interfaces & decision making tools to support operators
- New methodologies & tools to improve the system flexibility

Cluster 3: Network control & management



Functional project	Before					
	2011	2011	2012	2013	2014	2015
T6 Tools for pan-European network observability	The Cell Controller Project					
	Smart Grids and Energy Markets (SGEM)					
	PEGASE					
	SafeWind					
	Twenties					
T7 Tools for coordinated operations with stability margin evaluation	Smart Grids and Energy Markets (SGEM)					
	PEGASE					
	After					
	Twenties					
	Umbrella (proposal submitted to EC)					
T8 Improved training tools for improved coordinat	iTesla (proposal submitted to EC)					
	Smart Grids and Energy Markets (SGEM)					
	PEGASE					
	After					
T9 Tools for pan-European network reliability assessment	Twenties					
	EWIS					



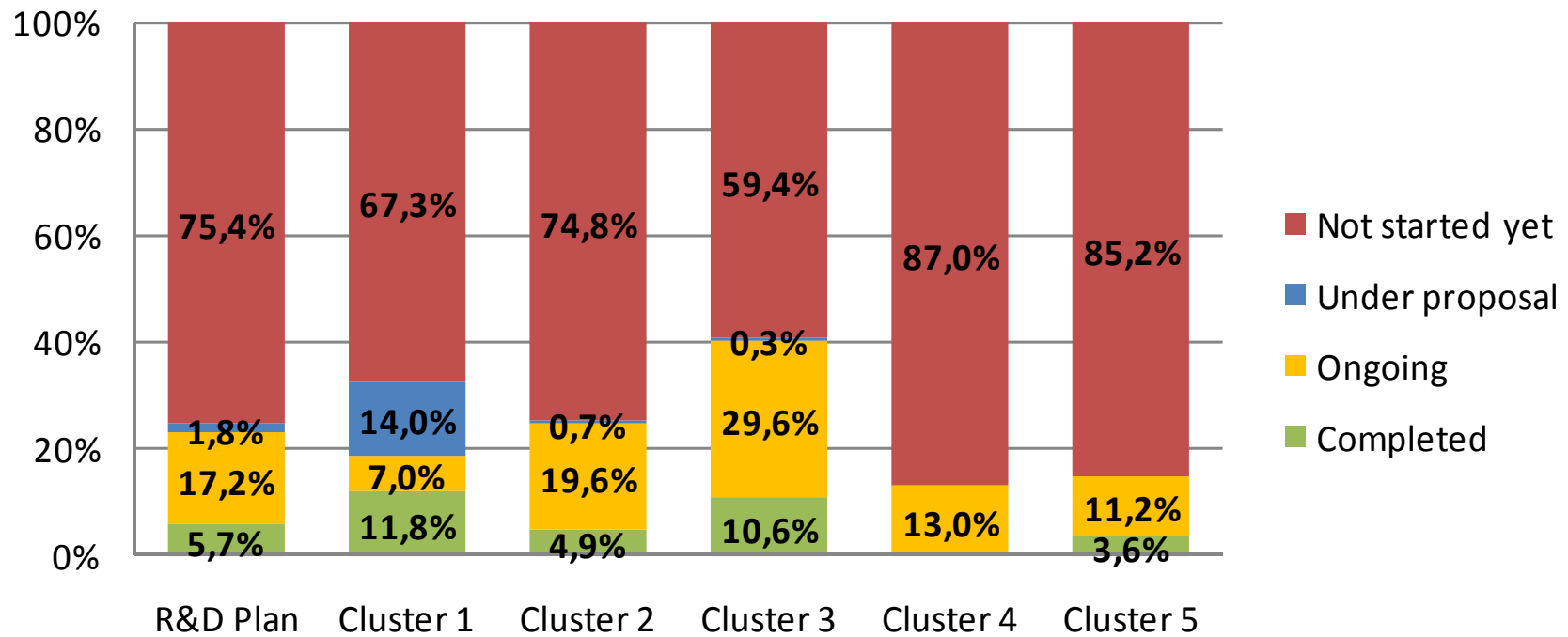
T7: Innovative tools for coordinated operations with stability margin evaluation

- Assess effectiveness of control actions to deliver the right level of reliability while facing uncertainties (generation, load,...)
- Implement stochastic approaches to critical optimization variables in order to cope with uncertainties
- Propose data exchange procedures.
- Facilitate convergence of policies for operational planning & support harmonization of operational rules at ENTSO-e level
- Coordinated defence plans

Large effort of R&D still needs to be done



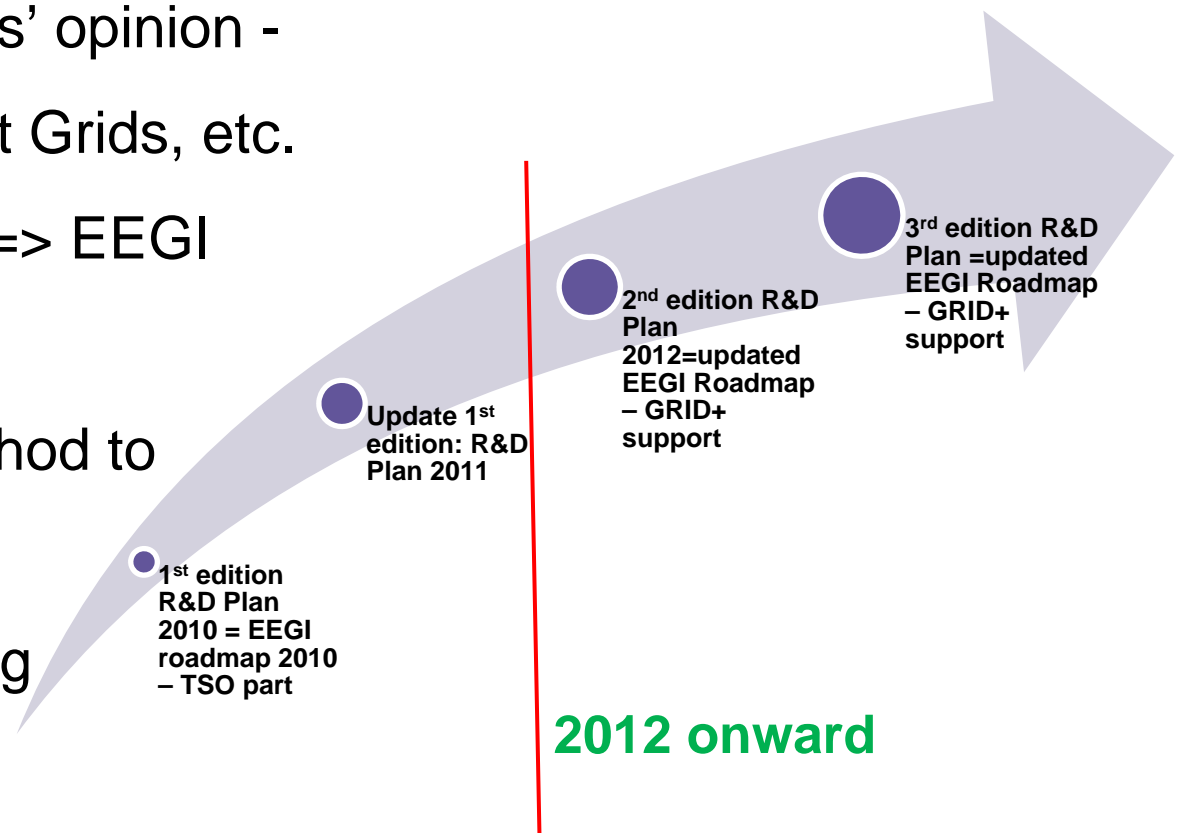
Progress of the ENTSO-E R&D Plan



R&D Roadmap 2012 – Challenges of structure



- To comply with the legal mandate
- To consider stakeholders' opinion - T&D Europe, ETP Smart Grids, etc.
- To be a basis for Grid+ => EEGI Roadmap
- To find a consistent method to update the R&D Plan
- Reference for EC funding



Future releases of the ENTSO-E R&D Package

R&D Roadmap

- Release every 5 years; activities for the next 10 years, but taking into account a 20 years time horizon; Next new edition in 2012
- Provides global overview of needed developments; necessary links to SRA 2035 and eHighway 2050; Raw cost estimate

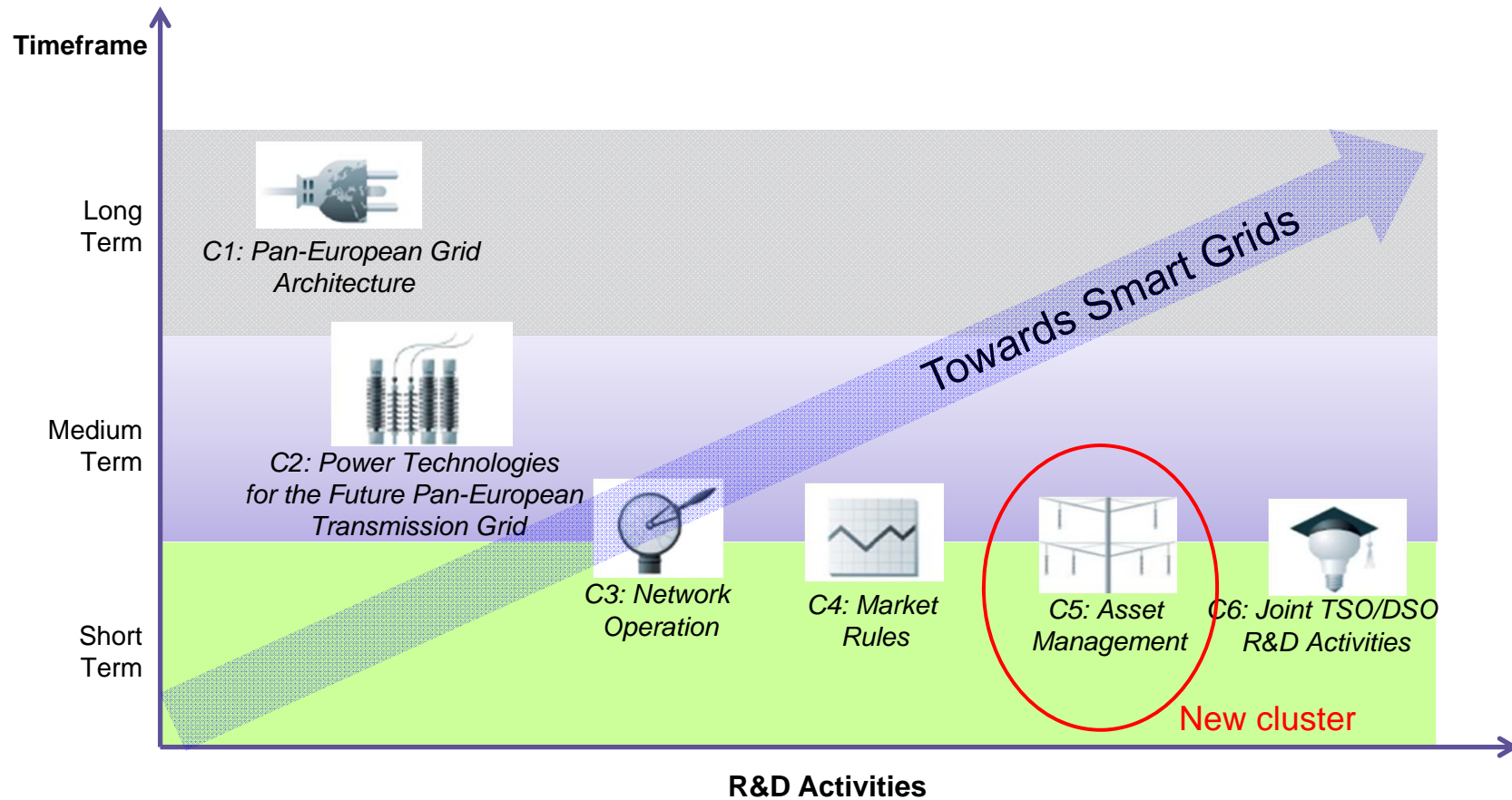
Implementation Plan

- Released released every year. Next new implementation plan in 2012.
- 2 – 3 year R&D planning- yearly input to FP7, Horizon 2020 work programs
- Precise (20%) cost estimate and funding proposal

Work programme

- Monitoring of the R&D Roadmap
- R&D activities and timetable for the next year
- Released every year – the answer to ENTSO-E task in the 3rd Package

R&D Topics of the R&D Roadmap 2012



Main points in the initial wish list for R&D Roadmap 2012

- Asset management cluster:
 - Approaches for modelling & validate life-time of current & new assets coexisting in the grid
 - System approach for maintenance & replacement policies
 - Demonstration & learning from new methods & technologies
- Put emphasis on novel technologies, e.g. Storage, HVDC, FACTS, etc
- Relation with ICT projects, standardization and cyber security issues
- Interaction with R&D needs from other EIs (e.g. EWI)
- Review and prioritize functional projects considering KPIs
- Funding estimation (justifications on data, best estimation)

Cluster 3: Network control & management

Some proposed changes....



T6: Innovative tools and methods for pan-EU network observability & controllability

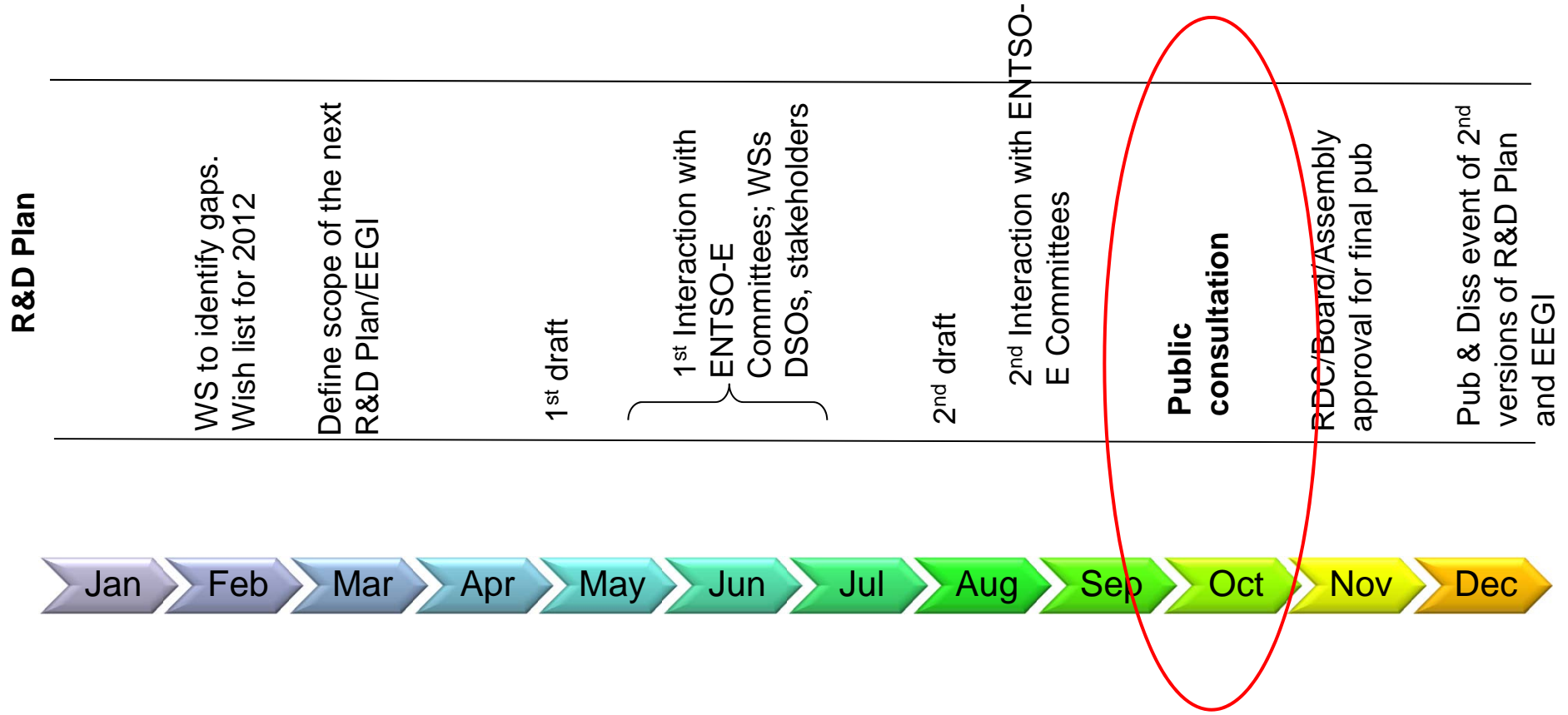
T7: Innovative tools and methods for coordinated operations with stability margin evaluation

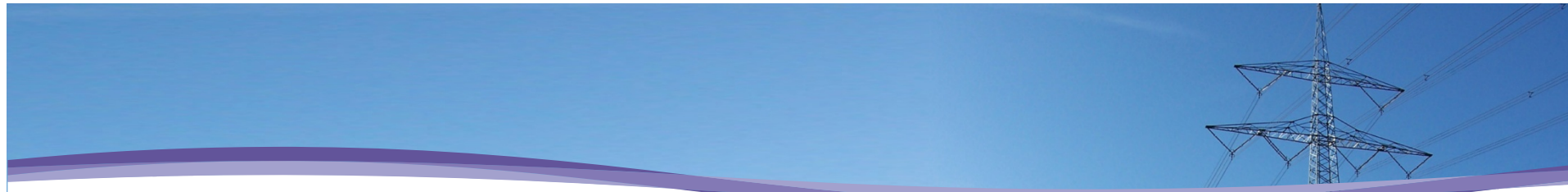
- Assess effectiveness of **control actions** to deliver right level of reliability
- Develop approaches to optimal dimensioning of **reserves** in order to maintain **system stability** while performing a dynamic reserve mgmt at regional & pan-EU level
- Enable **real-time detection of instabilities** to prevent overpassing limits of the transmission system,
- ...

T8: improved training tools and methods to ensure better coordination at the regional & pan-EU levels

T9: Innovative tools and approaches for pan-EU network reliability assesement

R&D - Planning 2012 – Milestones





Thank you for your attention,

Questions?

