ETIP Wind

EUROPEAN TECHNOLOGY & INNOVATION PLATFORM ON **WIND ENERGY**

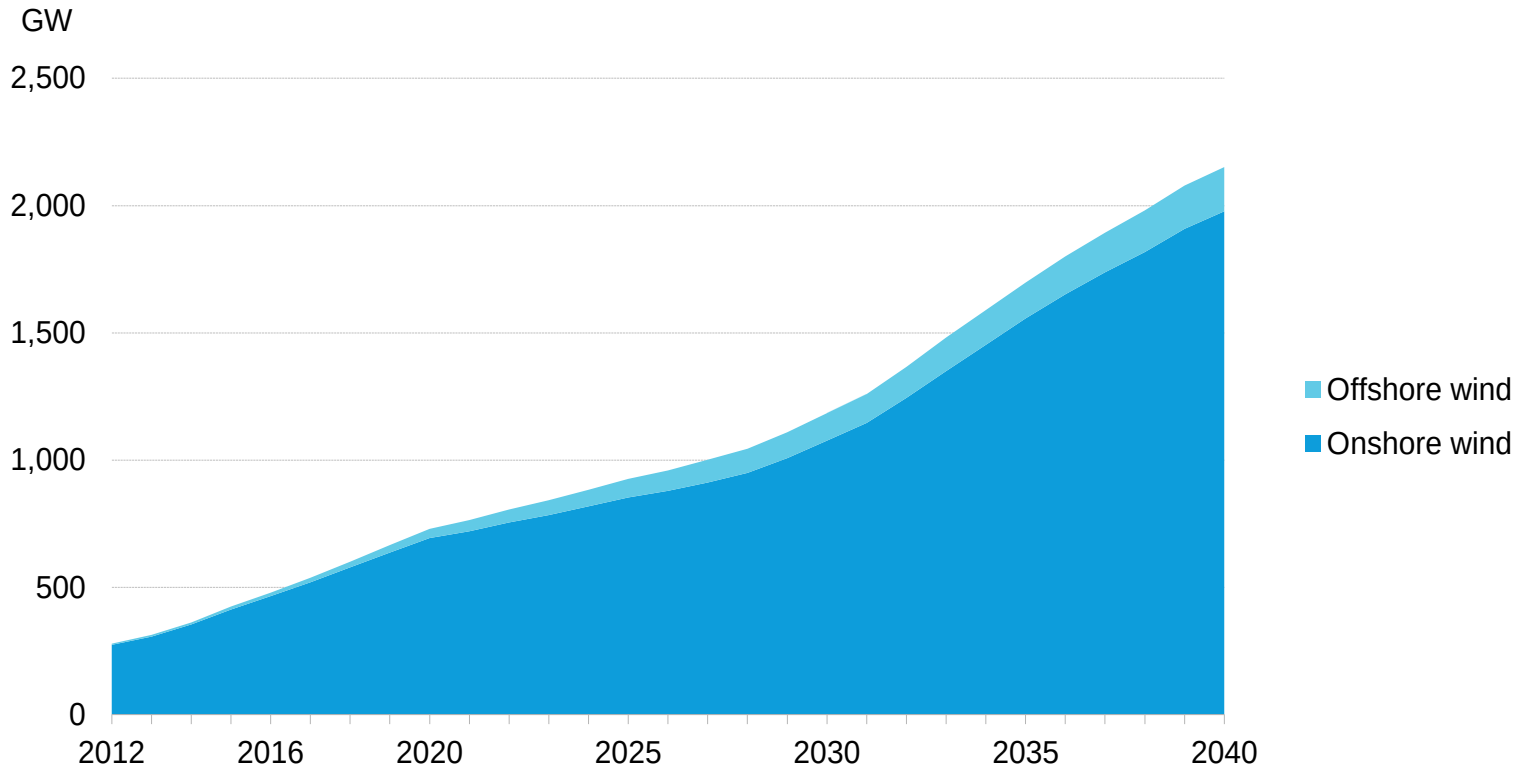
R&I Advocacy Strategy

Aidan Cronin
Chairman ETIPWind SC

etipwind.eu

June 2017

Onshore wind will remain the dominant technology, despite fast growth in global offshore deployment



Source: Bloomberg New Energy Finance

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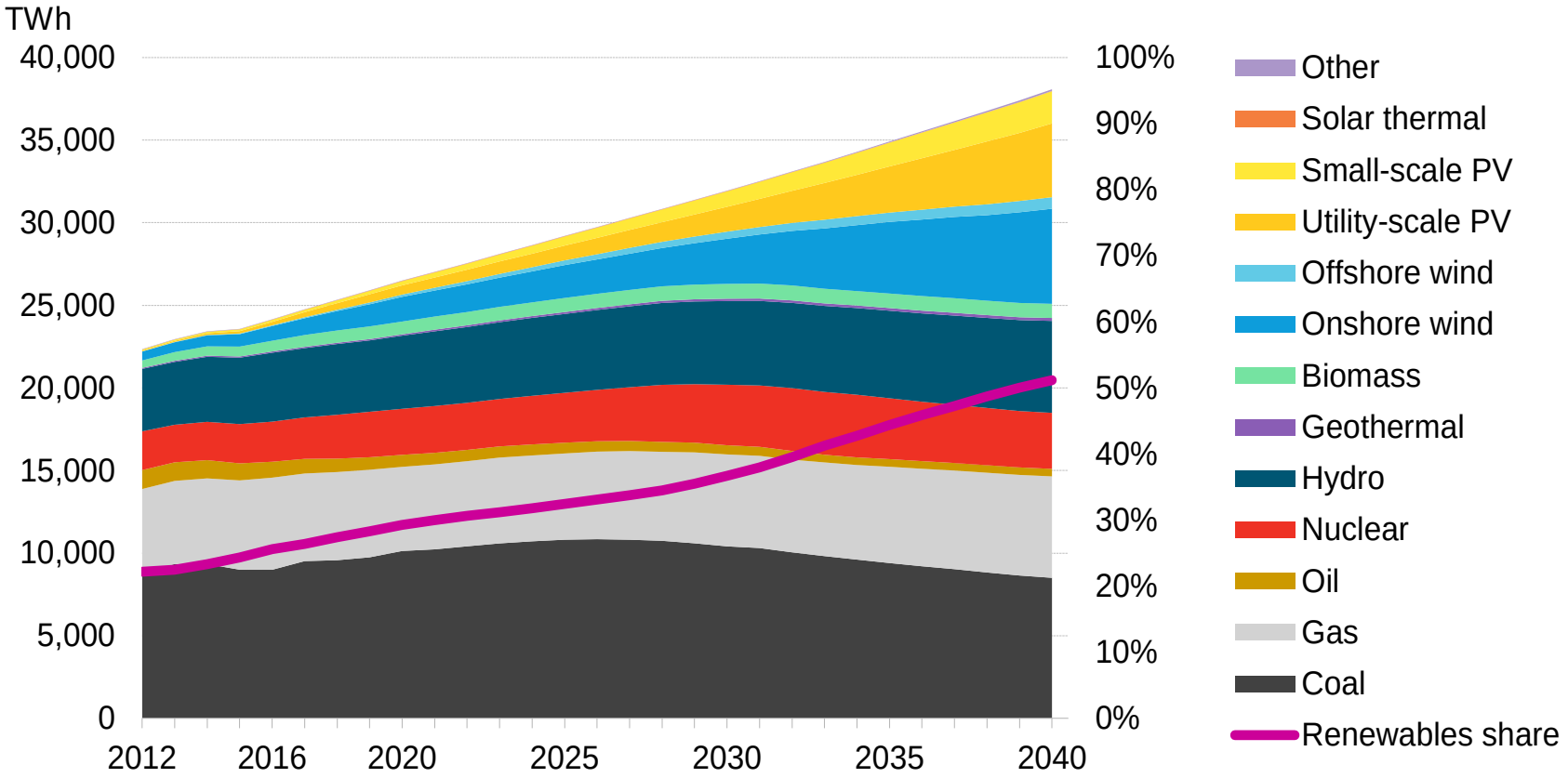
Global generation mix



Source: Bloomberg New Energy Finance.

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EUROPEAN TECHNOLOGY & INNOVATION
PLATFORM ON **WIND ENERGY**

Something had to change!

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Political context

- Energy Transition: towards a decarbonized energy system by 2050:
  - Wind is providing for 10,4% of EU electricity demand today. The goal is to achieve 23,9% by 2030.
- Global leadership in RES
  - EU wind turbine manufacturers held 39% share of the global market in 2015.
  - 92% of global installations offshore
  - Wind holds a majority share of the €35 bn. annual EU renewable energy exports.
  - Retain first-mover advantage in the global market

WIND IS EUROPEAN, LOW RISK, EMISSIONS FREE & CARBON FREE

Wind industry at a watershed

- Growing competiveness with “conventionals” & other RES
  - Onshore is most competitive & could see another 26% cost reduction by 2025*
  - Offshore: prospect of subsidy-free deployments in the next decade*
- Wind is a growing key strategic sector for the EU economy
  - 72 bn. Annual Turnover
  - 330.000 people employed
  - Strong EU presence across the value chain
  - +80% of components manufactured inside the EU

* Dependent on appropriate policies , heavy R&I investment deployment of ample volumes

Policy Caveats – EU still in Business as Usual mode

- EU R&I is under pressure
  - 13% decrease in patent applications by leading EU companies between 2013 – 2015.
- Growing competition in the global market
  - Need for a strong and stable home market (cfr. automotive & aviation)
  - Need for continuous innovation to bolster companies' ability to export at competitive prices
  - Industrialisation & standardisation of production
- Energy Management System
  - Ensuring the cleanest energy mix to society and the system

Narrative

Sharpening narrative for R&I advocacy

R&I drove cost reduction	Wind energy has achieved dramatic cost reduction thanks to major investments in R&I. **EU funded projects have had a significant contribution to achieving this objective both in the in scale of and complexity of deployed technology. Leading to the biggest rotating machines on the planet.**
R&I is needed for a clean & green EU Economy	As wind is becoming a mainstream source of power generation, **R&I needs to step-up its grid integration capabilities.** EU funded projects are a major opportunity to build synergies with other sectors. Using captive wind for water treatment.
Wind energy is a cutting-edge EU technology	The EU is the global leader on wind energy technology. However, **to maintain technological leadership and economic competitiveness, continuous R&I support is needed.** To support economic growth and the maturing of the industry, cutting-edge science/engineering and skilled scientists need to be delivered.
R&I is needed for ensuring the current prizes & pipeline	The wind energy sector is confident that further cost reduction is achievable thanks to R&I. Delivering on zero-support offshore wind will require continuous R&I investments. Decreasing this effort **puts a massive pipeline of projects at risk.** Especially in light of the large investment in APAC.

R & I Cost reduction priorities

1. Standardisation and creating an EU state-of-the-art technical protocol for components, fabrication & installation.
   Companies already working together but this has to be underpinned by research to boost this area further by supporting transnational initiatives and creating high quality lean and modular components.
2. Improved **operation and maintenance** planning and decision-making due to big **data analytics** plus common logistical coordination between different actors reduces cost considerably and onshore and offshore. *Development of active repair robotics is in its infancy and extensive testing of this will be needed onshore for later offshore.*
3. Demonstration of **innovative on-& offshore** wind **technologies**
   Wind is in a technological race as is aviation to develop and introduce new materials, better optimization and adaptive technologies as climate change comes.
4. Offshore wind farm research and innovation. Offshore wind is at such a scale that improvements in reliability and efficiency drive down the cost of wind dramatically.
   "The once a year visit dream"!
   Optimised floating technology is still 10 years away and much research and funding is needed to deliver the optimised solution.

System management integration, grid interaction = The Digital Age

R&I priorities

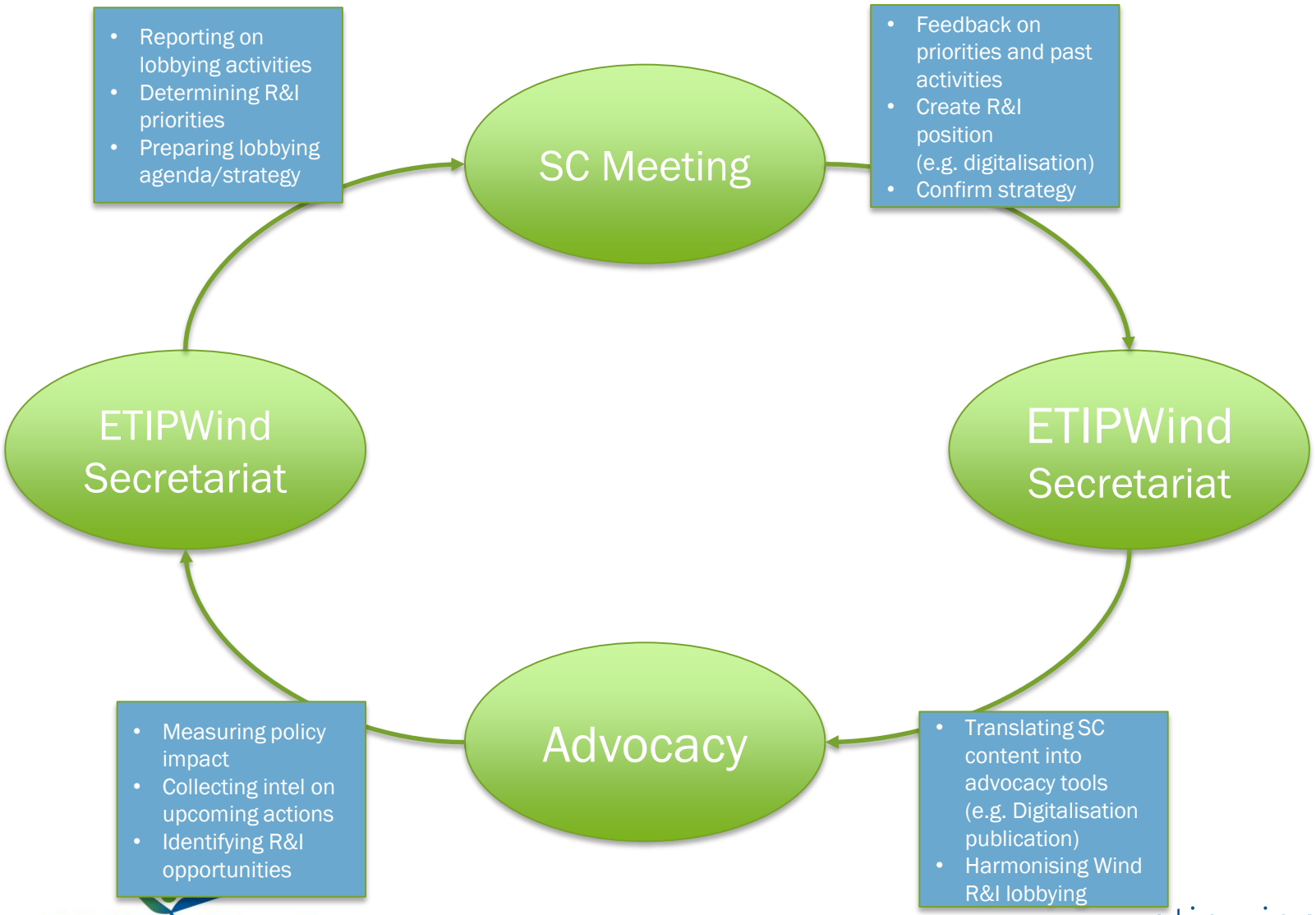
1. **Energy Management Systems** (EMS) with high RES penetration to optimise delivery to and storage of clean electricity to society. Digital is the key to delivery.
2. In depth technical and economic study for delivery of ancillary , black start and stand alone services throughout the entire value chain including technologies to be deployed and market value of these services;
3. Develop **Modular offshore grid** infrastructure enabling lower cost installation;
4. Development of next generation low loss and reliable electrical infrastructure within offshore wind farms. Including automised HV cable splicing
5. Integration of offshore meshed grids in the **power markets** to optimise technical solution and market value integration of offshore meshed grids in the power markets. Using captive wind for water treatment

Technological leadership

R&I priorities

1. Applied **real-time analytics** to improve reliability of components and predictability of failures and verification of new very large components**. Very large bearings or sliding bearings.**
2. Better **testing of current composite material** and development, testing of new and improved smart composite materials; optimised structural design and manufacturing for turbine blades. Giving optimised strength, lifetime and attributes;
3. **Floating offshore** wind farms – solutions for the biggest cost and design challenges;
4. Enhanced **cross connected intelligent sensor systems** for improved performance measurement and condition monitoring;
5. Demonstration of floating wind farms concepts.

ETIPWIND Advocacy process



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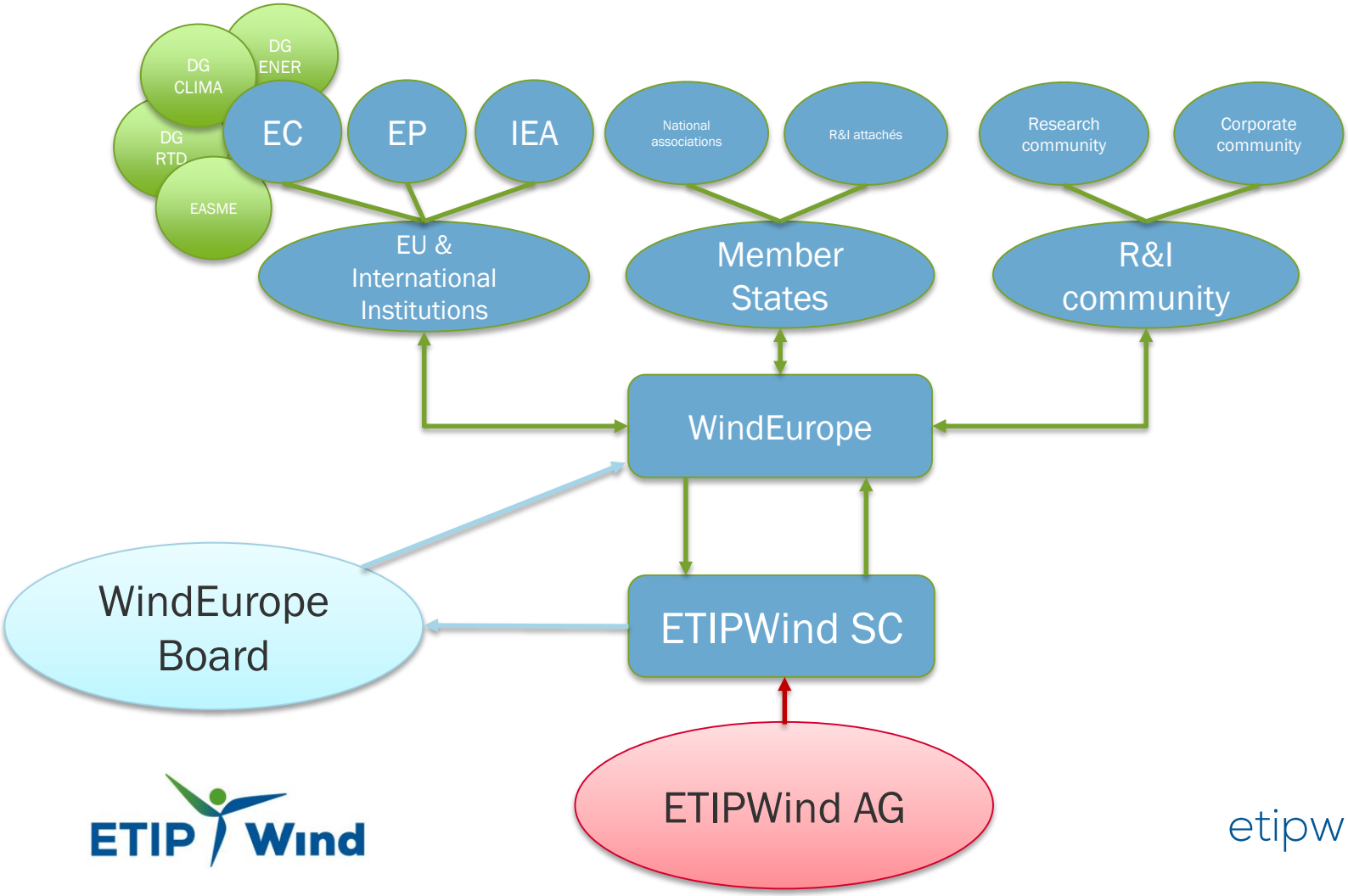
Advocacy via the WindEurope network



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Thanks for your attention

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ETIPWind advocacy Status update

Alexander Vandenberghe
Project Manager

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June 2017

High Level interactions - EC

- DG RTD

  Andras Siegler, Director – directorate G:

  Official reaction to H2020 draft WP

  Patrick Child – Deputy Director General

  Meeting request

- DG ENER

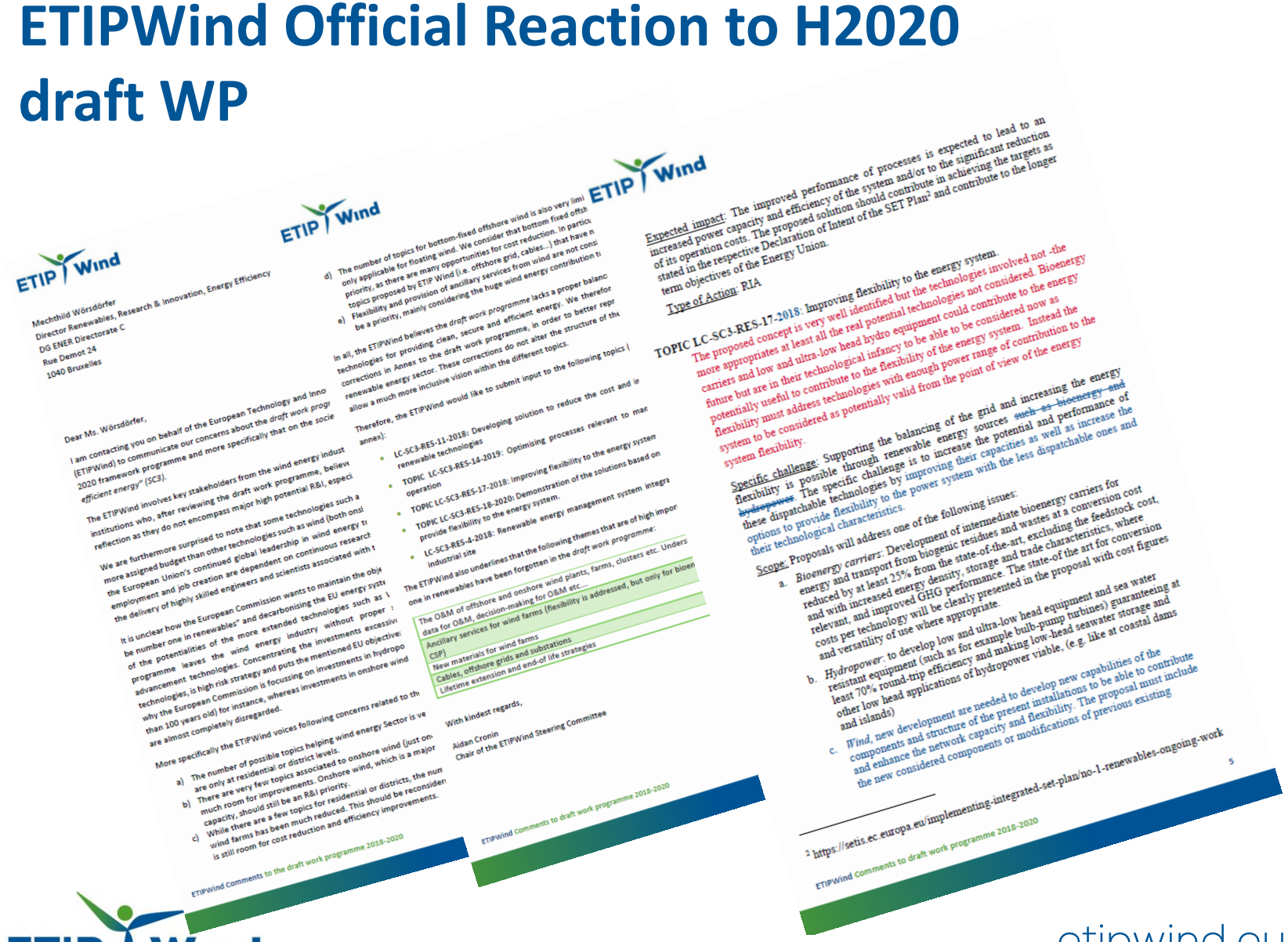
  Mechthild Wörsdörfer, director, directorate C:

  Official reaction to H2020 draft WP

  Mail (Aidan): H2020 draft WP & ETIPSNET

- Upcoming:
  - Physical meeting: Christopher Jones 21 June
  - Physical meeting: Mechthild Wörsdörfer 28 June
  - TBD: Patrick Child

ETIPWind Official Reaction to H2020 draft WP



Mechthild Wörsdörfer
Director Renewables, Research & Innovation, Energy Efficiency
DG ENER Directorate C
Rue Demot 24
1040 Bruxelles

Dear Ms. Wörsdörfer,

I am contacting you on behalf of the European Technology and Inno
(ETIPWind) to communicate our concerns about the *draft work progr*
2020 framework programme and more specifically that on the socie
efficient energy" (SC3).

The ETIPWind involves key stakeholders from the wind energy indust
institutions who, after reviewing the draft work programme, believe
reflection as they do not encompass major high potential R&I, especi

We are furthermore surprised to note that some technologies such a
more assigned budget than other technologies such as wind (both onsi
the European Union's continued global leadership in wind energy te
employment and job creation are dependent on continuous research
the delivery of highly skilled engineers and scientists associated with t

It is unclear how the European Commission wants to maintain the obje
be number one in renewables" and decarbonising the EU energy syste
of the potentialities of the more extended technologies such as
programme leaves the wind energy industry without proper
advancement technologies. Concentrating the investments excessiv
technologies, is high risk strategy and puts the mentioned EU objectives
why the European Commission is focussing on investments in hydropo
than 100 years old) for instance, whereas investments in onshore wind
are almost completely disregarded.

More specifically the ETIPWind voices following concerns related to th

a) The number of possible topics helping wind energy Sector is ve
are only at residential or district levels.
b) There are very few topics associated to onshore wind (just on
much room for improvements. Onshore wind, which is a major
capacity, should still be an R&I priority.
c) While there are a few topics for residential or districts, the num
wind farms has been much reduced. This should be reconsider
is still room for cost reduction and efficiency improvements.
d) The number of topics for bottom-fixed offshore wind is also very limi
only applicable for floating wind. We consider that bottom fixed offsh
priority, as there are many opportunities for cost reduction. In particu
topics proposed by ETIP Wind (i.e. offshore grid, cables…) that have n
e) Flexibility and provision of ancillary services from wind are not consi
be a priority, mainly considering the huge wind energy contribution t

In all, the ETIPWind believes the *draft work programme* lacks a proper balanc
technologies for providing clean, secure and efficient energy. We therefor
corrections in Annex to the draft work programme, in order to better repr
renewable energy sector. These corrections do not alter the structure of the
allow a much more inclusive vision within the different topics.

Therefore, the ETIPWind would like to submit input to the following topics (
annex):

- LC-SC3-RES-11-2018: Developing solution to reduce the cost and in
renewable technologies
- TOPIC LC-SC3-RES-14-2019: Optimising processes relevant to mar
operation
- TOPIC LC-SC3-RES-17-2018: Improving flexibility to the energy system
- TOPIC LC-SC3-RES-18-2020: Demonstration of the solutions based on
provide flexibility to the energy system.
- LC-SC3-RES-4-2018: Renewable energy management system integra
industrial site

The ETIPWind also underlines that the following themes that are of high impor
one in renewables have been forgotten in the *draft work programme*:

The O&M of offshore and onshore wind plants, farms, clusters etc. Unders
data for O&M, decision-making for O&M etc…
Ancillary services for wind farms (flexibility is addressed, but only for bioen
CSP)
New materials for wind farms
Cables, offshore grids and substations
Lifetime extension and end-of life strategies

With kindest regards,

Aidan Cronin
Chair of the ETIPWind Steering Committee

ETIPWind Comments to the draft work programme 2018-2020

ETIPWind Comments to draft work programme 2018-2020

Expected impact: The improved performance of processes is expected to lead to an increased power capacity and efficiency of the system and/or to the significant reduction of its operation costs. The proposed solution should contribute in achieving the targets as stated in the respective Declaration of Intent of the SET Plan[2] and contribute to the longer term objectives of the Energy Union.

Type of Action: RIA

TOPIC LC-SC3-RES-17-2018: Improving flexibility to the energy system.

The proposed concept is very well identified but the technologies involved not -the more appropriates at least all the real potential technologies not considered. Bioenergy carriers and low and ultra-low head hydro equipment could contribute to the energy future but are in their technological infancy to be able to be considered now as potentially useful to contribute to the flexibility of the energy system. Instead the flexibility must address technologies with enough power range of contribution to the system to be considered as potentially valid from the point of view of the energy system flexibility.

Specific challenge: Supporting the balancing of the grid and increasing the energy flexibility is possible through renewable energy sources ~~such as bioenergy and hydropower~~. The specific challenge is to increase the potential and performance of these dispatchable technologies by improving their capacities as well as increase the options to provide flexibility to the power system with the less dispatchable ones and their technological characteristics.

Scope: Proposals will address one of the following issues:

a. *Bioenergy carriers:* Development of intermediate bioenergy carriers for energy and transport from biogenic residues and wastes at a conversion cost reduced by at least 25% from the state-of-the-art, excluding the feedstock cost, and with increased energy density, storage and trade characteristics, where relevant, and improved GHG performance. The state-of the art for conversion costs per technology will be clearly presented in the proposal with cost figures and versatility of use where appropriate.

b. *Hydropower:* to develop low and ultra-low head equipment and sea water resistant equipment (such as for example bulb-pump turbines) guaranteeing at least 70% round-trip efficiency and making low-head seawater storage and other low head applications of hydropower viable, (e.g. like at coastal dams and islands)

c. *Wind*, new development are needed to develop new capabilities of the components and structure of the present installations to be able to contribute and enhance the network capacity and flexibility. The proposal must include the new considered components or modifications of previous existing

[2] https://setis.ec.europa.eu/implementing-integrated-set-plan/no-1-renewables-ongoing-work

5

ETIPWind Comments to draft work programme 2018-2020

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Other activities (1)

- EC meetings
  - DG RTD: Matthijs Soede
  - DG ENER: Roberto Gambi
- National Associations
  - Presentation during WindEurope's NA Task Force on impacting H2020 SC3 programme committee
- Internal meeting
  - Secretariat meeting with WE policy team on 4 May 2017: aligning R&I narrative & strategy and discussing next steps

Other activities (2)

- Event participation
  - Presentation of ETIPWind @ IRPWind booth at the OWE 2017 in London
- ETIPSNET
  - 5th Governing Board meeting – 27 March (attended by Daniel Fraile – WindEurope)
  - 6th Governing Board meeting – 30 May
- Innovation Fund
  - Round Table meeting – 3 May
  - Final Meeting – 12 June

Upcoming activities

- Start drafting *new* advocacy tools
  - Digitalisation priorities “factsheet”
    - Dual purpose: advocacy tool and IEA input
  - White Paper (work in progress)

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Thanks for your attention

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EUROPEAN TECHNOLOGY & INNOVATION PLATFORM ON **WIND ENERGY**

H2020
Status overview

Alexander Vandenberghe
Project Manager

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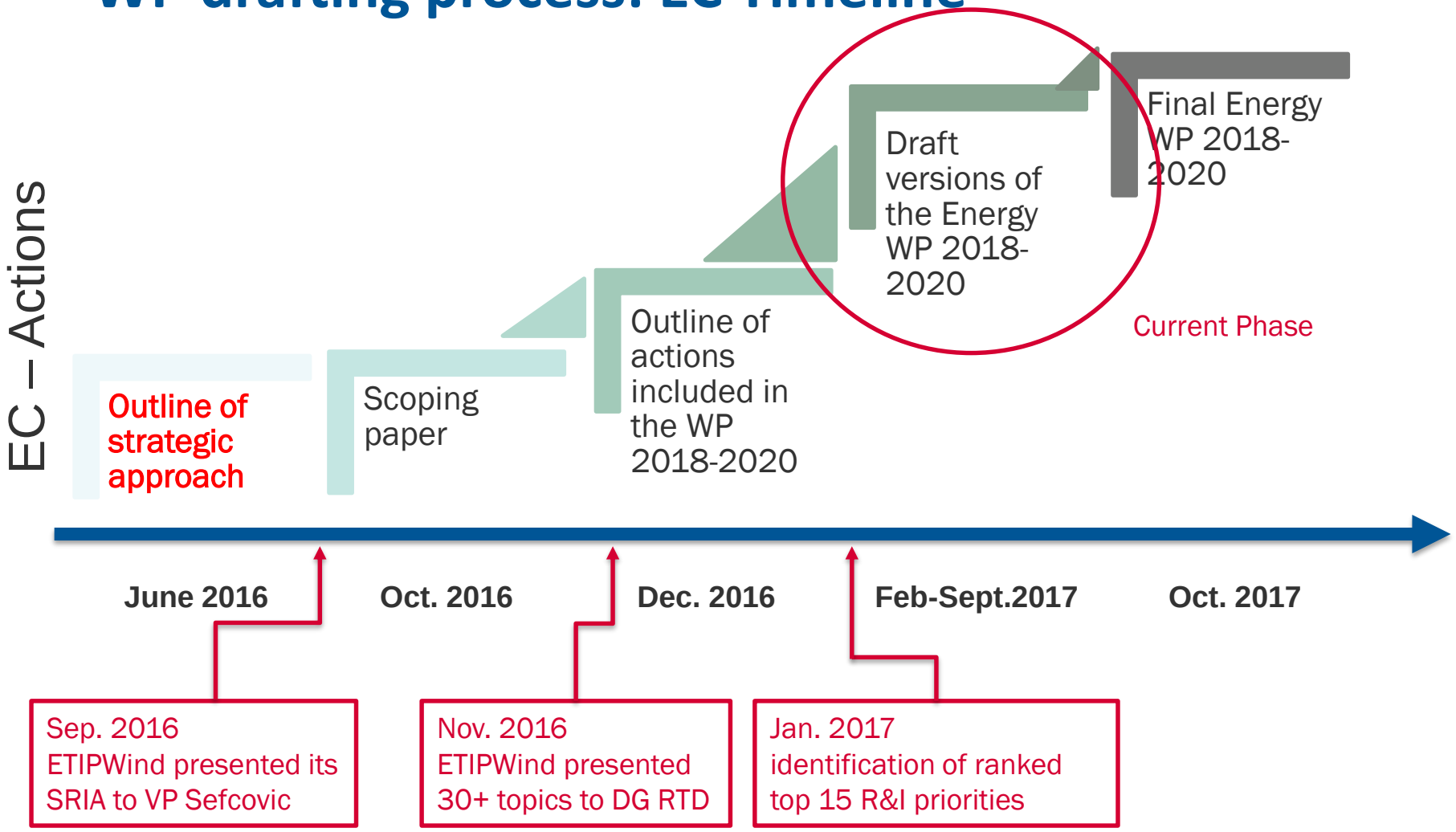
June 2017

WP drafting process: EC Timeline



Draft versions of the Energy WP 2018-2020 (1)

- Who's involved at this stage
  - European Commission: DG RTD
  - Member States' Programme Committee.
    - A forum where appointed national experts can give their feedback on the draft version of the WP.

Draft versions of the Energy WP 2018-2020 (2)

Overview

- 1st draft by DG RTD (EC) 31 march

  Based on input from AGE's, ETIP's, public consultation and other stakeholders (international bodies, member states)

- 2nd draft by DG RTD (EC): 19 May

  Based on Programme committee revision of the 1st draft on 27 April

- 3rd draft by DG RTD (EC): TBD

  Based on 2nd programme committee revision of the 2nd draft on 13 June

- Final version by DG RTD (EC): October 2017

Draft versions of the Energy WP 2018-2020 (3)

Our concerns

- Low total number of topics related to wind
- Following topics are not addressed enough:
  - Onshore wind
  - O&M and data analytics
  - Bottom-fixed offshore wind
- Following key issues are not addressed at all:
  - Ancillary services (for wind)
  - Cables, Offshore Grids & Substations
  - Materials for wind turbines
- Other technologies are “over-awarded”
  - Geothermal, Biofuels, Hydropower, Solar …

Draft versions of the Energy WP 2018-2020 (4)

ETIPWind involvement

- Providing Input to 1st draft

  Sep. 2016: Presentation SRIA

  Nov. 2016: ETIPWind presented DG RTD with 30 topics

  Jan. 2017: Ranking of 15 key priorities

- Providing feedback to the 1st draft – 25 April 2017

  Direct: letter to DG RTD & DG ENER

  Indirect: sharing our comments with programme committee members (support from DE, DK, ES, IRL & NL)

- Providing feedback to the 2nd draft – 2 June 2017

  Indirect: sharing our comments with programme committee members

H2020 lobbying activities Timeline

- 31 March: release of 1st draft
- 4 April: informing SC on 1st draft and collecting input
- 25 April
  - contacting programme committee members on Draft 1
  - Sent ETIPWind official reaction to DG RTD
- 4 May: R&I narrative & strategy meeting with WE
- 9 May: addressing NA Task Force
- 15 May
  - Received official reply from DG RTD
  - Sent ETIPWind official reaction to DG ENER
- 16 May: request for meeting: M. Wörsdörfer, P. Child & C. Jones
- 19 May: Release of 2nd draft
- 1 June: Confirmation C. Jones & M. Wörsdörfer meetings
- 2 June: contacting programme committee members on Draft 2

Reply from DG RTD – 15 May 2017

Dear Mr Cronin,

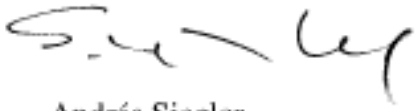
Thank you for letter of 24 April 2017.

What concerns Horizon 2020 Work Programme 2018-2020, topics are being currently consulted with the Member States. In its drafts proposals, which take a novel approach that responds to the recent Energy Union legislative package, the European Commission has put all efforts in applying a balanced approach towards all renewable energy technologies across the entire innovation chain.

It is worthwhile mentioning that available resources are limited. In the preparation of the Work Programme 2018-2020 we are paying special attention to prospective impacts and leverage opportunities for Horizon 2020 funds.

I would like to take this opportunity to thank you for your continuous participation in the research and innovation agenda of the European Union.

Best regards,



András Siegler
Director

Impact on the drafting process (1)

What has been added

- LC-SC3-RES-1-2018-2020 Developing the next generation of renewable energy technologies

  Innovative testing methods, and design tools, components and structures for the for acceleration of innovative wind technology development of the next generation wind energy conversion systems and increased life time extension

- LC-SC3-RES-4-2018: Renewable energy system integrated at the building scale

  Wind not explicitly mentioned in the call, but the requirements fit wind

- LC-SC3-RES-11-2018: Developing solutions to reduce the cost and increase performance of renewable technologies

  New subtopic for onshore next gen technologies
  Floating (instead of offshore)

- LC-SC3-RES-16-2019: Development of solutions based on renewable sources that provide flexibility to the energy s ystem(former 17)

  Virtual Power Plant (vs flexibility of energy system)

Impact on the drafting process (2)

What is still missing?

- The O&M of off- and onshore wind plants, farms, clusters etc.
- Ancillary services for wind farms
- Cables, offshore grids and substations
- End-of life strategies
- “Transforming the Energy Sector through Digitisation”

Impact on the drafting process (3)

What we suggested

- LC-SC3-RES-1-2019-2020: Developing the next generation of renewable energy technologies
  - ✓ Reintegrate the concept of “component and structures” which disappeared
- LC-SC3-RES-11-2018: Developing solutions to reduce the cost and increase performance of renewable technologies
  - ✓ Include bottom-fixed offshore
- LC-SC3-RES-13-2018: Demonstrate solutions that significantly reduce the cost of renewable power generation
  - ✓ Include onshore wind and more specifically the ETIPWind topic on real-time observation and testing
- LC-SC3-RES-17-2019: Demonstration of solutions based on renewable sources that provide flexibility to the energy system
  - ✓ Test and demonstrate virtual power plants
- LC-SC3-RES-4-2018: Renewable energy system integrated at the building scale
  - ✓ EMS

H2020 SC3 WP 2nd Draft - Factsheet

Topic identifier	Budget	comment
LC-SC3-RES1-2019-2020	2 – 5 million	
LC-SC3-RES11-2018	2 – 5 million	2 subtopics (1 on- & 1 offshore)
LC-SC3-RES13-2018	15 – 20 million	
LC-SC3-RES14-2019	3 – 5 million	
LC-SC3-RES-16-2019	3 – 5 million	Virtual Power Plant
LC-SC3-RES19-2020	10 – 15 million	Shifted to 2020 - indicative
LC-SC3-EC3-2018-2020	5 – 7 million	Consumers
LC-SC3-ES3-2018-2020	5 – 6 million	1 “wind” mention removed
LC-SC3-ES4-2018-2019-2020	7 – 10 million	RES Neutral
LC-SC3-CC4-2018	1 million	
Public Procurements	3 – 6 million	
8 LC’s & 3 PP’s 9 LC’s & 3 PP’s	47 – 70 million 57 – 85 million	Excluding RES19 Including RES19

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Thanks for your attention

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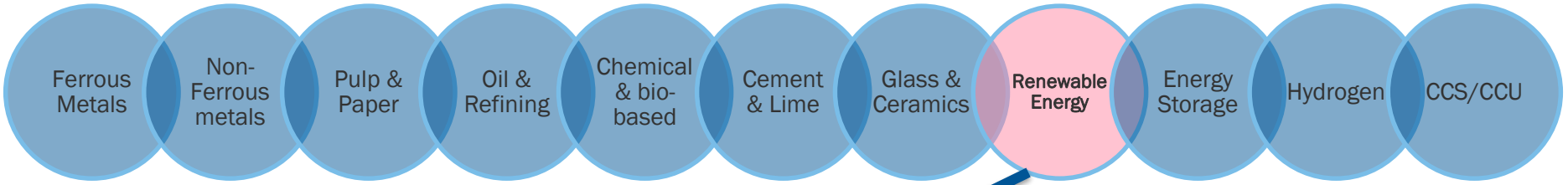
Innovation Fund

Aloys NGHIEM

June 2016

Innovation Fund

- 400 million allowances or **~2 bn€**



- **Innovations in wind (floating, next gen turbines, data and energy management systems)**
- Innovations in Solar energy
- Synthetic fuels
- Advanced biofuels
- Ocean Energy
- Geothermal Energy

Innovation Fund: roundtable in May

Categorisation:

- Technology neutral.
- The focus should rather be on the objectives (emissions reductions, cost reductions, potential volumes, system integration potential)

Project/Corporate finance:

- Banks would go more for corporate finance to decrease their risks.

Process/product

- this depends on the maturity of the technology: process for mature technology and product for new ones

Risks and barriers

- Sunk costs
- deadlines,
- performance criteria,
- lack of strategic finance
- reputation
- permitting

Size of projects:

- Experience from Horizon2020 suggested to go for smaller projects. The range mentioned by stakeholders is between 5 and 500 M€ (for CCS).

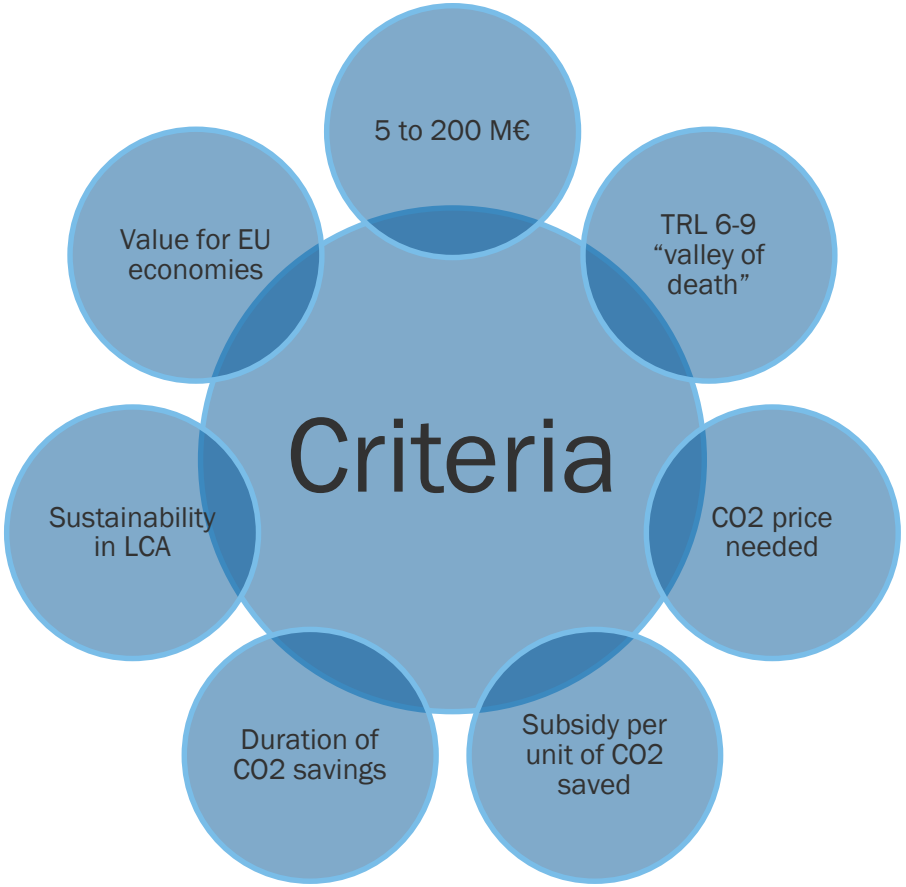
Staged/concentrated calls:

- staged calls were preferred to decrease risks and keep the possibility to fund during several years

Submission system:

- Despite the complicated bureaucracy the process was deemed necessary. 1) Expression of interest 2) Full project proposal (technical and financial due diligence) 3) Project selection

Selection Criteria



Technology-neutral application

Financing

- **Grants** will be preferred (TRL 6-7)
- **Partial grants** and **de-risked loans** will be used for close to delivery projects (TRL 8-9)

Process

- Application
  - **Stage 1:** “light” with simple descriptive requirements
  - **Stage 2:** More detailed information with technical and business intelligence
- Milestone based-support
  - Limit the support for underperforming projects
- Revolving fund
  - All the funds will not be spent at once

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Thanks for your attention

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ETIP SNET
Evolution and present situation

Jesús García Martín
IBERDROLA RENOVABLES
VC WG3 ETIP SNET

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20 June 2017

ETIP SNET Undergoing activities

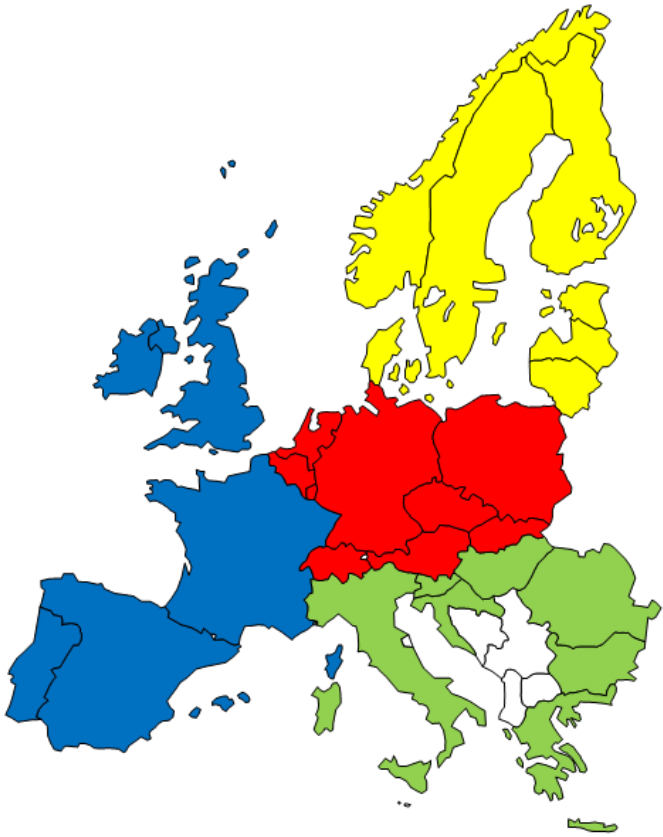
- Regional Workshops
- ETIP SNET feed-back on draft Energy Programme 2018-2020 WP
- ETIP SNET Implementation Plan
- Vision development
- Revision of targets and comments to the SET Plan Action 4 “Declaration on Strategic targetsin the context of an unitiative on Energy Systems” Document
  - Temporary Working Group 4 (TWG4)

ETIP SNET Undergoing activities
Regional Workshops (1/2)

- **When and where?** 4 workshops each year in 4 different regions (Western, Central, South-Eastern and Northern)

- **What for?**
- To present national and regional R&I projects
- To foster knowledge-sharing
- To ensure consistency between national and European views
- To identify R&I topics needs
- To monitor the implementation of R&I activities at national level

- **For what result?** To use the consolidated best practices, lessons learnt and outcomes as inputs for the next IPs and Roadmap



ETIP SNET Undergoing activities

Regional Workshops

REGION	*Central Region*	*Western Region*	*South-Eastern Region*	*Northern Region*
COUNTRIES	Belgium, Netherlands, Luxemburg, Austria, Germany, Czech Republic, Poland, Switzerland, Slovakia	United Kingdom, Ireland, France, Spain and Portugal	Italy, Slovenia, Malta, Hungary, Romania, Bulgaria, Croatia, Greece and Cyprus	Estonia, Latvia, Lithuania, Sweden, Norway, Finland and Denmark
Details	2017 Regional Workshop to be organized by E.ON Research Centre (Germany) on **September 18-19**	2017 Regional Workshop to be organized by EDP (Portugal) on **September 28-29**	2017 Regional Workshop to be organized by the University of Cyprus and the Joint Research Centre (Cyprus) on **November 23-24**	2017 Regional Workshop to be organized by the Institute of Physical Energetics (Latvia) on **December 7-8**
Projects identified	20	26	4	21

ETIP SNET Undergoing activities

ETIP SNET feed-back on draft Energy Programme 2018-2020 WP

- A long list of collected comments were sent to the Commission.
- Comments on wind onshore were included.

ETIP SNET Undergoing activities

ETIP SNET Implementation Plan (1/2)

Dec. 2016

Initial Implementation Plan prepared by Grid+Storage consortium:

- Transmission: 8 topics
- Distribution: 6 topics
- Storage: 8 topics

Jan. to April 2017

Submission of initial IP to ETIP SNET working groups 1 to 4 and collection of inputs:

- Transmission: 8 + 7 topics
- Distribution: 6 topics
- Storage and sector interfaces: 8 + 5 topics
- Flexible generation: 17 topics
- Digitalisation: 5 topics

ETIP SNET Undergoing activities

ETIP SNET Implementation Plan (2/2)

May 2016

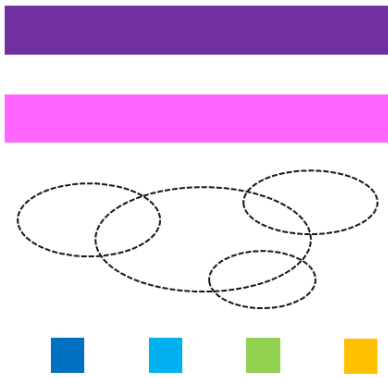
- Cross-checking and identification of synergies between topics
- Result of 24 May workshop:

Structure of the initial draft IP

- **Transmission**
- **Distribution**
- **Storage, sector interfaces**
- **Flexible generation**
- **Digitalisation**

56 topics

New structure of the IP:
Highlight the synergies and interfaces within the energy system



38 topics

High-RES and empowered end-user energy system: governance and market design

Digitalisation of the energy system

Integrated grid with improved interfaces between energy system components (such as gas and heat)

Improved components of the energy system: electricity networks (transmission & distribution), generation units (thermal, variable renewable, hydro, etc.) and storage

ETIP Wind

ETIP SNET Undergoing activities

Vision development (1/2)

The European Commission asked the ETIP SNET to elaborate an "**ETIP SNET Vision"**

This ETIP SNET Vision is NOT another scenario.

It will represent the **basis for future documents by highlighting issues which go beyond those already documented, researched, implemented, developed**, that are the keys for satisfy the needs of the future energy system towards 2050

ETIP SNET Vision will:

- consider targets for the needs of the future energy system for **2030** and progressively for **2050**
- rely on several documents, including EHighWays2050, EU's Energy Scenarios, PRIMES, ENTSO-E's 2016-2018 TYNDP etc…
- aim at extracting the main R&I challenges and defining qualitative and quantitative targets
- address challenges related to the electricity sector and its interfaces with other energy networks
- assess how each energy network can contribute to tackle and solve these challenges
- go beyond an individual scenario and potentially identify additional scenarios

ETIP SNET Undergoing activities

Vision development (1/2)

Vision Core Team

Who: RSE – BACHER ENERGIE – TECHNOFI (INTENSYS4EU technical team)

Task: to prepare draft documents which will be reviewed, enhanced and corrected by the Vision Kernel Team

Vision Kernel Team

Who: It is composed by 14 members:

- Vision Core Team
- 4 Association of INTENSYEU (EASE, ENTSO-E, EDSO and EERA
- Chair/Vice-chairs of ETIP SNET Governing Board
- 5 ETIP SNET WG 1-5 Chairs (or WG-representatives)

Task: to contribute to the 4 STEPS path towards the vision.

ETIP SNET Undergoing activities

Revision of targets and comments to the SET Plan Action 4 “Declaration on Strategic targetsin the context of an unitiative on Energy Systems” Document

Done		In progress	Planned
EUROPEAN ENERGY UNION ACTION 4: «RESILIENCE, SECURITY, SMARTNESS OF ENERGY SYSTEM»	TARGETS 4.1: «An optimised European power grid» TARGETS 4.2: «Integrated local and regional energy systems»	CONSOLIDATE WITH STAKEHOLDERS: CONSOLIDATE WITH STAKEHOLDERS: M.S., E.C, ETIP SNET AND OTHER ETIPS	**DEVELOP AND CONSOLIDATE ACTION PLAN** (SET Plan implementation plan)

A Set-Plan *implementation plan* is a EU **Research & Innovation strategy and actions** that are **shared** by all SET Plan Countries. An implementation plan is about **Coordination** of European **National** Research & Innovation activities in the energy domain including funding. A better Alignment of national programmes means avoiding unnecessary duplication and exploiting synergies, stimulating Joint Actions as much as possible to reach the targets agreed in the Declarations of Intent.

Specifically for the case of Action 4 of energy system, it is recommended **to look at synergies / Joint Actions** that can take place within existing bodies which have a national dimension (e.g. EERA, ENTSO-E, EDSO, EASE, etc.)

ETIP SNET
Evolution and present situation

Questions ?

Thank you for attention !.

Jesús García Martín IBERDROLA RENOVABLES
jgarcia.martin@iberdrola.es

Status of the topics in the Implementation Plan

Provisional titles!

I. High-RES and empowered end-user energy system: governance and market design	
1	Flexible market design
2	Market design for trading of heterogeneous flexibility products
3	Holistic model and unified technical / functional architecture for smart power systems

II. Digitalisation of the energy system	
4	Digital Technologies, Reference Architectures and Standards for a Scalable Energy Transition
5	Digital Energy Disruptive Use Cases and New Market and Business Models
6	Cybersecurity of the energy system
7	Grid digitalization, intelligent power routing, power marketing and dispatching
8	Digital grid information system and auxiliary decision system

Status of the topics in the Implementation Plan

Provisional titles!

III. Integrated grid with improved interfaces between energy system components	
III.A SYNERGIES BETWEEN ELECTRICITY AND HEAT SYSTEMS	
9	Interfaces between electricity and heat
10	Increase energy efficiency by utilising excess heat from the energy system via heat networks and thermal storage
III.B SYNERGIES BETWEEN ELECTRICITY AND GAS SYSTEMS	
11	Interfaces between electricity and gas
III.C SYNERGIES BETWEEN ELECTRICITY TRANSMISSION NETWORKS, GENERATION AND STORAGE	
12	Smart interfaces between generation and transmission
13	Improve RES and demand forecasting and optimal capacity operation
14	Multiservice storage applications

Status of the topics in the Implementation Plan

Provisional titles!

III. Integrated grid with improved interfaces between energy system components	
III.D SYNERGIES BETWEEN ELECTRICITY DISTRIBUTION NETWORKS AND STORAGE	
15	Increased control of MV and LV networks based on storage systems
16	Integrated management of MV and LV networks based on DER
III.E COUPLING BETWEEN FLEXIBLE GENERATION AND STORAGE	
17	Integration of storage in existing thermal generation for increased flexibility
18	Storage integration with fluctuating renewable sources
19	PV, CSP and storage

Status of the topics in the Implementation Plan

Provisional titles!

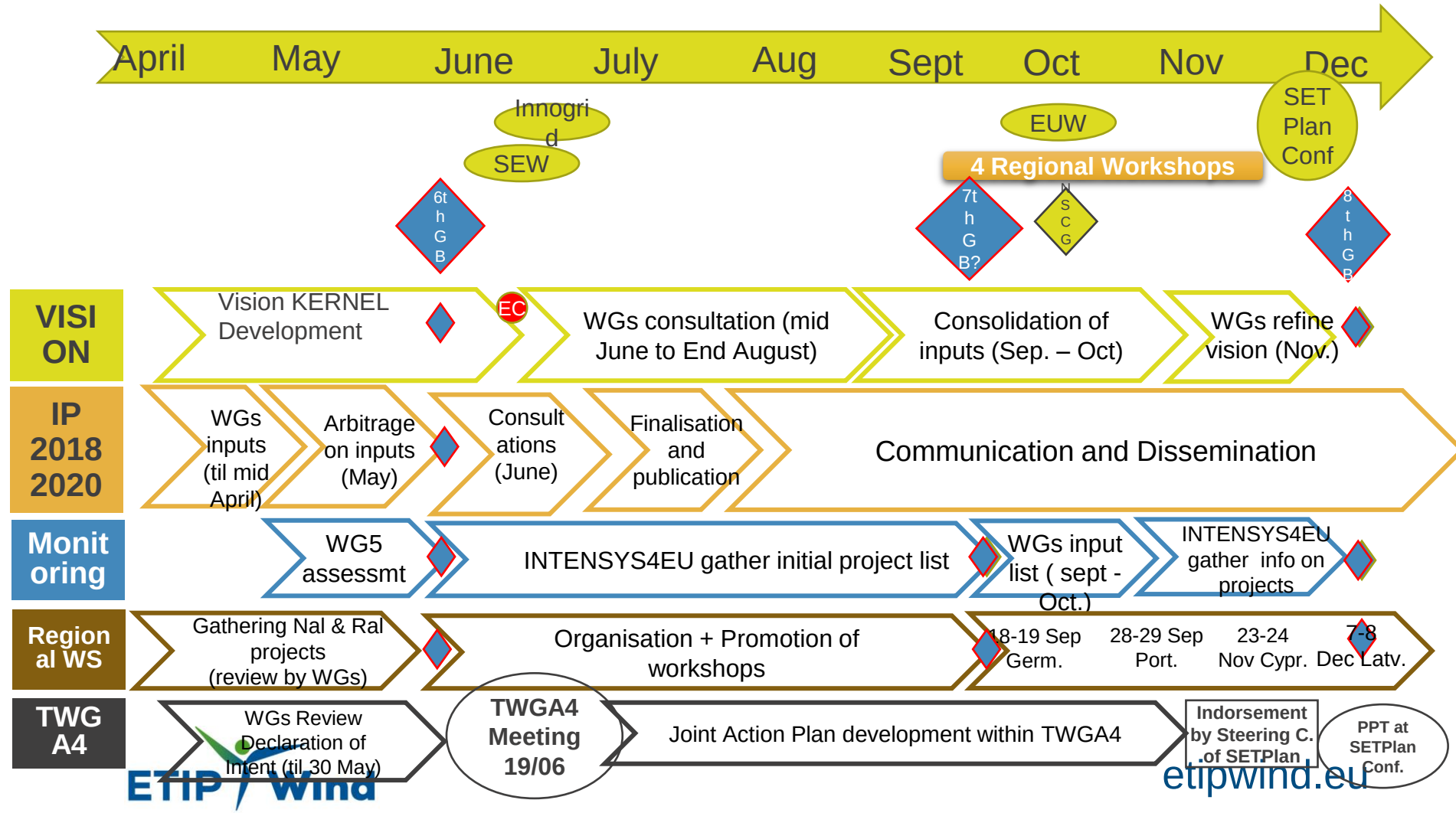
IV. Improved components of the energy system	
IV.A ELECTRICITY NETWORKS	
Joint transmission and distribution issues	
20	Smart asset management through the use of Big Data
Transmission networks	
21	Optimal grid design and planning
22	Public acceptance and stakeholders participation
23	ICT systems and data handling for control chain
24	Enhanced grid observability
25	Cross border use of ancillary and flexibility services
26	Demand response engineering
27	Measuring and coordination of centralized and distributed system flexibility mechanisms
Distribution networks	
28	Innovative approach for grid operation
29	Integration of EV charging infrastructure

Status of the topics in the Implementation Plan

Provisional titles!

IV. Improved components of the energy system	
IV.B STORAGE UNITS	
30	Technologies for electrical energy storage
31	Power-to-Mobility for integration of electricity and transport networks
IV.C GENERATION UNITS	
Thermal	
32	Improving flexibility and efficiency of thermal generation
33	Adaptation and improvement of technologies to novel Power-to-Gas concepts
Variable RES	
34	Improved flexibility and service capabilities of RES to provide the necessary ancillary services […]
35	Smart inverter functions for new grid control strategies in inverter-dominated grids
Hydro	
36	Refurbishment & upgrade of existing hydropower plants to increase flexibility and expand storage capacity
37	Environmental impact assessment of hydropower projects
Cross-cutting	
38	Digitalisation of Flexible Generation

ETIP SNET Time Line



ETIP Wind

etipwind.eu

ETIP Wind

EUROPEAN TECHNOLOGY & INNOVATION PLATFORM ON **WIND ENERGY**

Digitalisation Workshop

Aloys NGHIEM

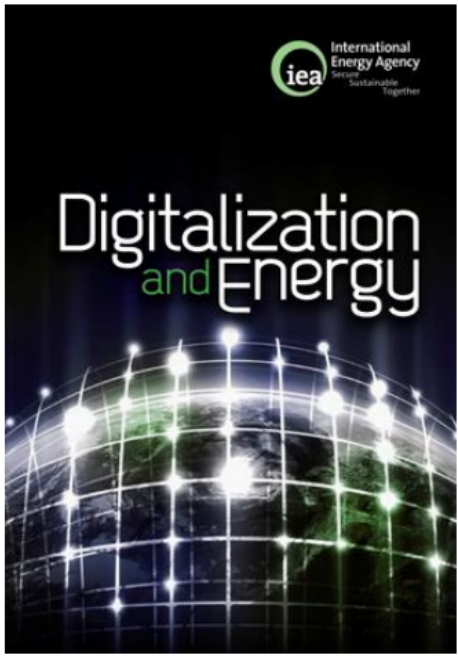
etipwind.eu

February 2016

IEA publication in October 17

An assessment of the implications of digitalization on the energy sector, bringing together new quantitative assessments, qualitative insights, and analysis of policy implications

- **The current state of interlinkage between energy and digital**
  - Investment flows: digital investment in the energy sector and investment by digital companies in energy
  - Assessment of digital readiness across the energy sector
- **Impact of digital economy on energy demand**
  - Past trends and outlook for electricity demand by digitalization
  - Assessment of digitally-enabled impact of energy demand in industry, transport, and buildings
- **Impact on energy supply – primary focus on the power sector**
  - Asset performance improvement and related avoided investment in physical infrastructure
  - Smart energy systems, flexibility, and demand response
  - Digital optimization in upstream oil and gas operation
- **New business models and markets**
  - Facilitating emerging business models to capture value and opportunities
- **Challenges and opportunities for policy-makers**
  - Data ownership, privacy, regulatory frameworks, digital resilience, economic disruption
  - No-regrets policy recommendations



Horizon 2020

Energy Efficiency

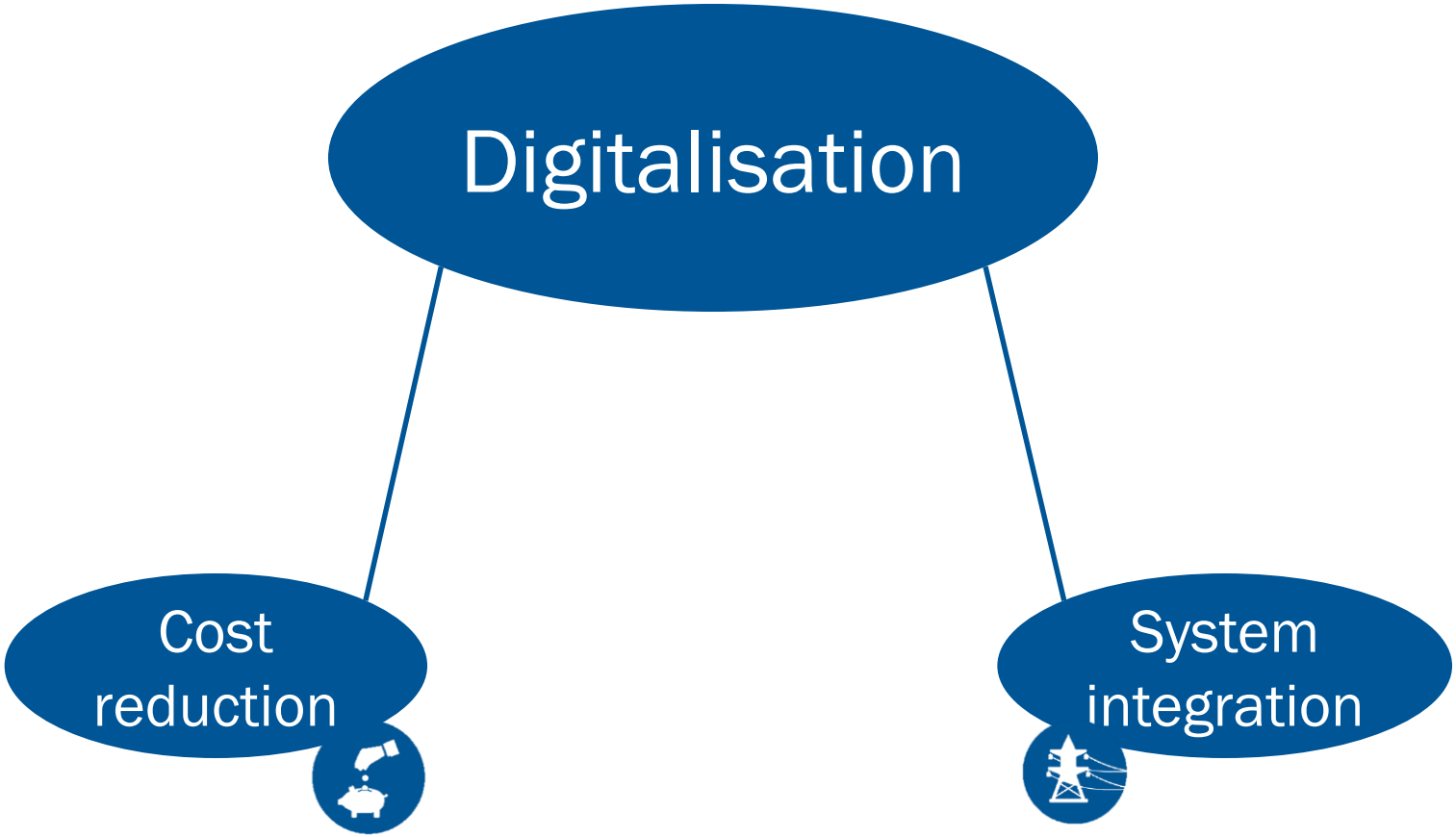
Global Leadership in Renewables

Smart and clean energy for consumers

Enabling near-zero CO2 emissions from fossil fuel power plants and carbon intensive industries

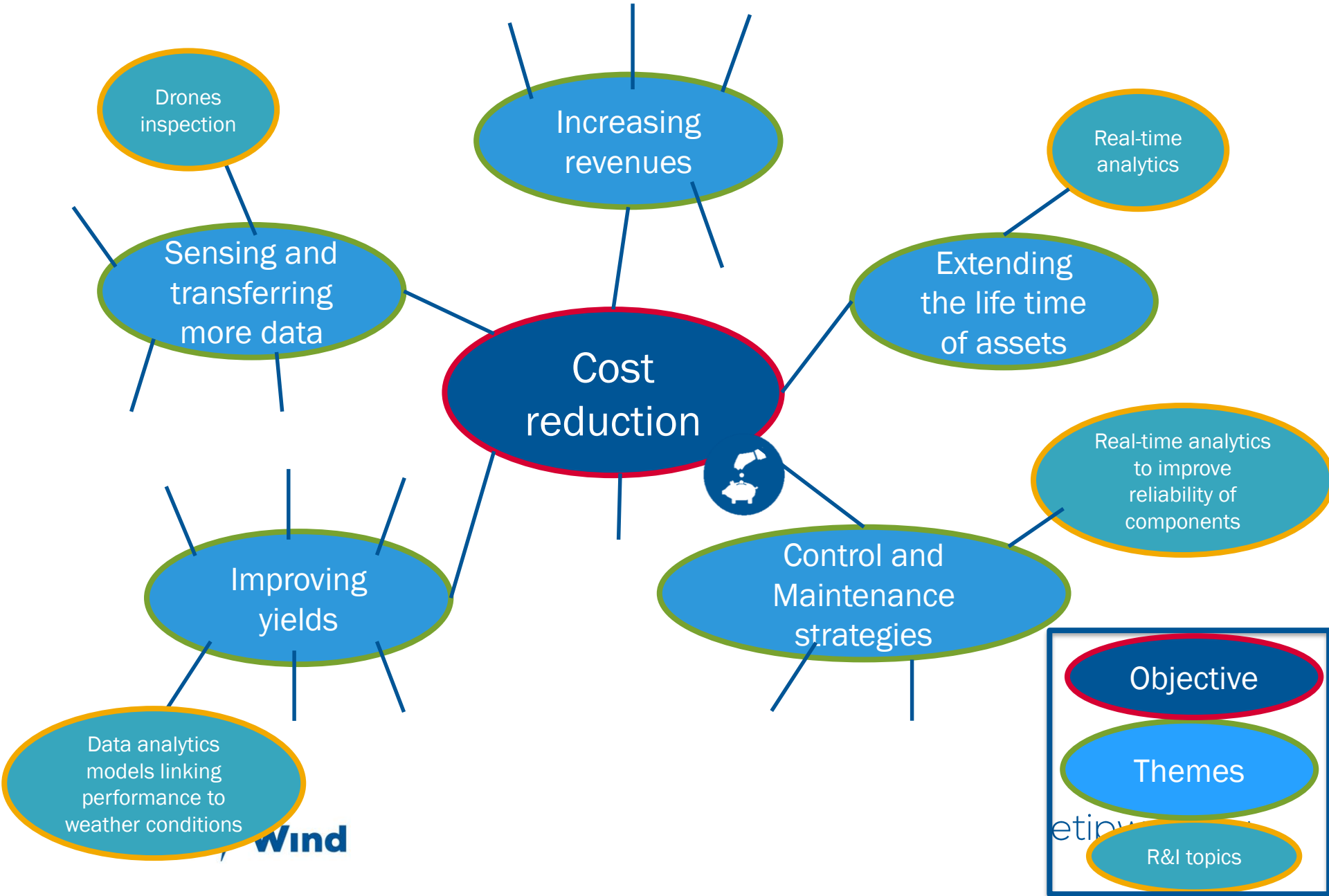
Transforming the energy sector through digitisation

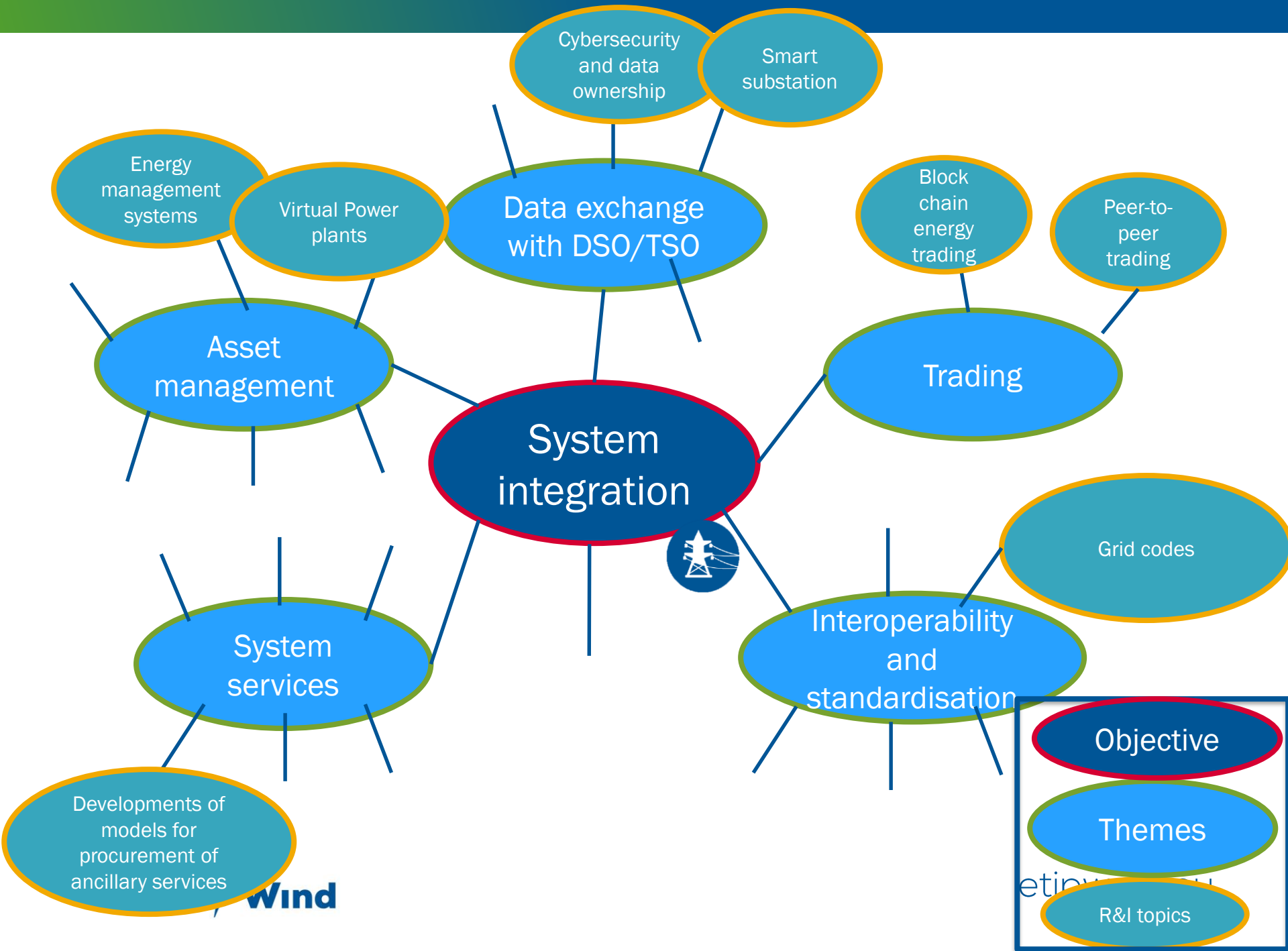
Objectives of digitalisation



Workshop objective

- Publish a leaflet (2-4 pages) summarizing:
  - Structure the themes around digitalization for wind energy
  - The wind R&I challenges linked to digitalisation
  - Strategic vision for future digitalized systems
  - “Mind map”
- Provide more digital content to policymakers:
  - IEA digitalisation publication
  - Horizon 2020 and beyond
  - Innovation Fund


Drones inspection
Increasing revenues
Real-time analytics
Sensing and transferring more data
Extending the life time of assets
Cost reduction
Real-time analytics to improve reliability of components
Improving yields
Control and Maintenance strategies
Data analytics models linking performance to weather conditions
Objective
Themes
R&I topics


Cybersecurity and data ownership
Smart substation
Energy management systems
Virtual Power plants
Data exchange with DSO/TSO
Block chain energy trading
Peer-to-peer trading
Asset management
Trading
System integration
Grid codes
System services
Interoperability and standardisation
Developments of models for procurement of ancillary services
Objective
Themes
R&I topics

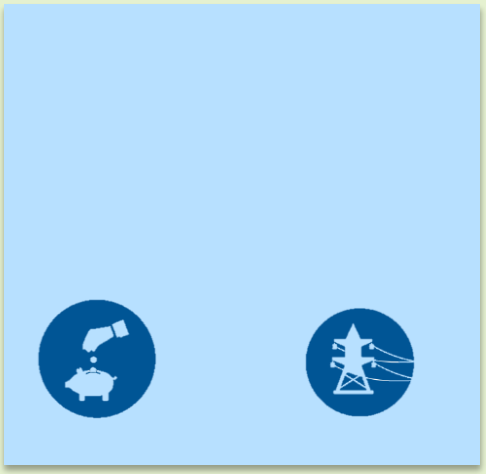
Digitalisation workshop: the rules

- Two parts:
  - **Cost reduction**
  - **System integration**
- Two groups:
  - **Turbine and component manufacturers**
  - **Operators and developers**
- Work with mind maps to structure input
- Agenda:
  - **2 * 20 minutes workshop and 10 minutes wrap-up**

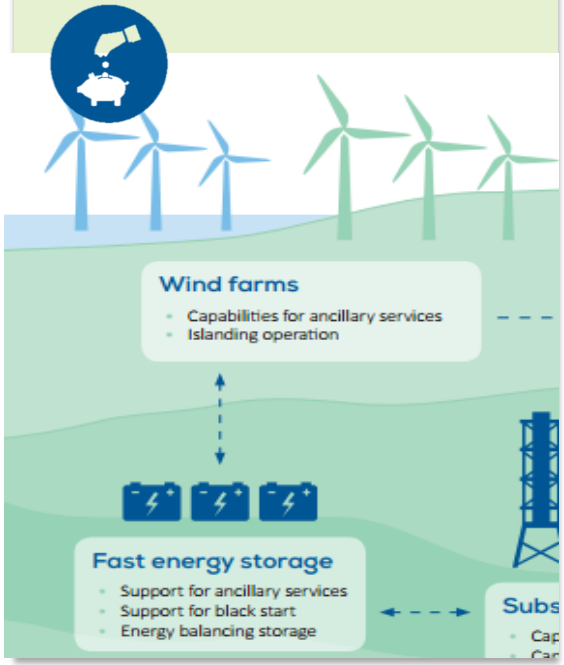
Deliverable

Digitalisation

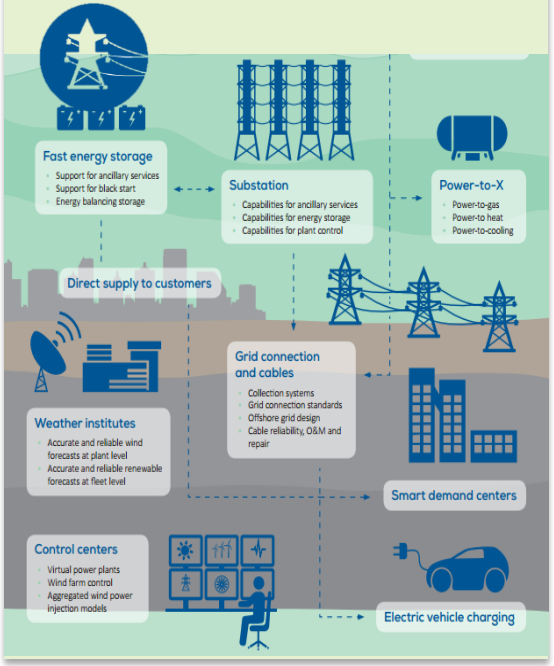
Context and objectives



Cost reduction



System integration



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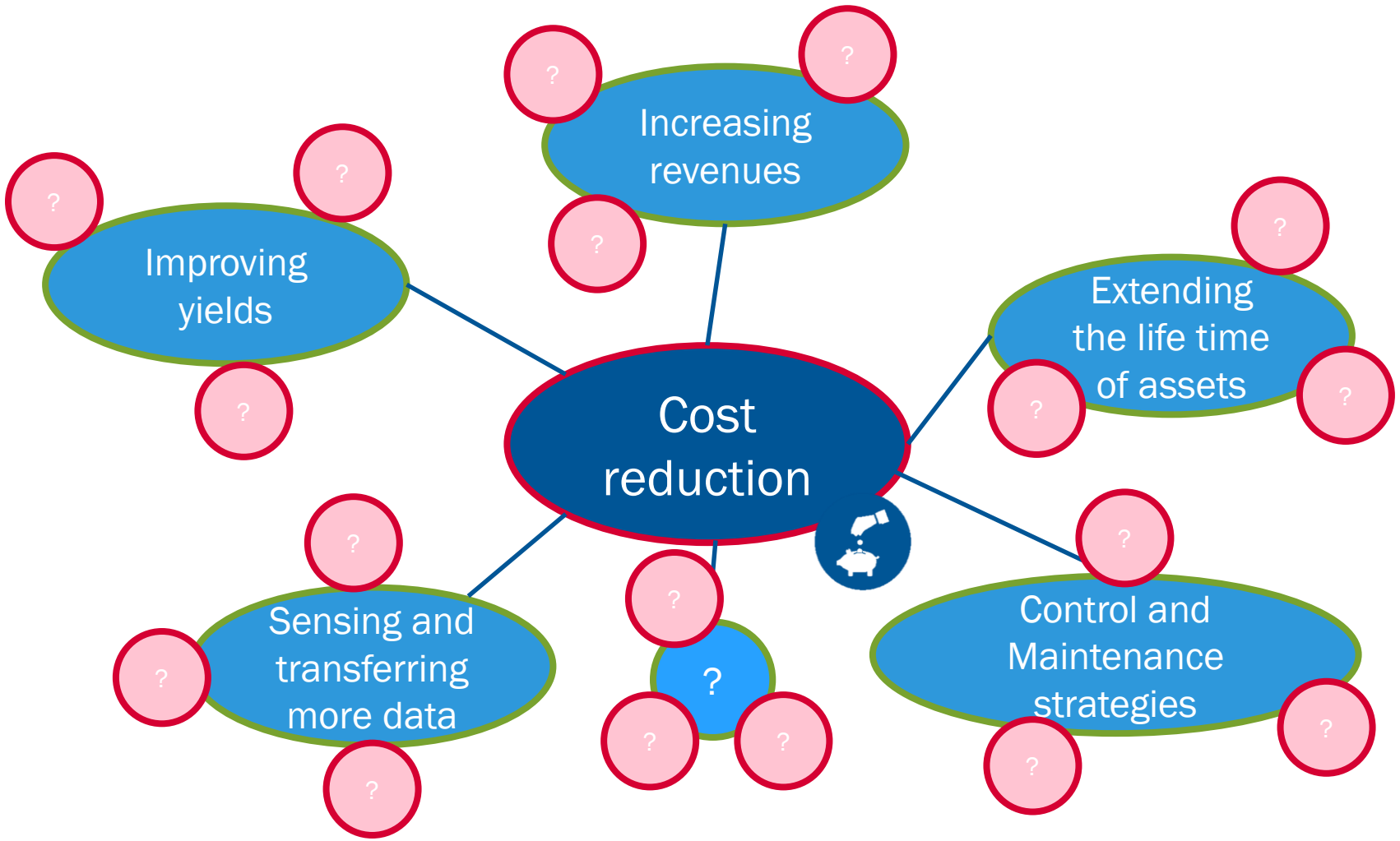
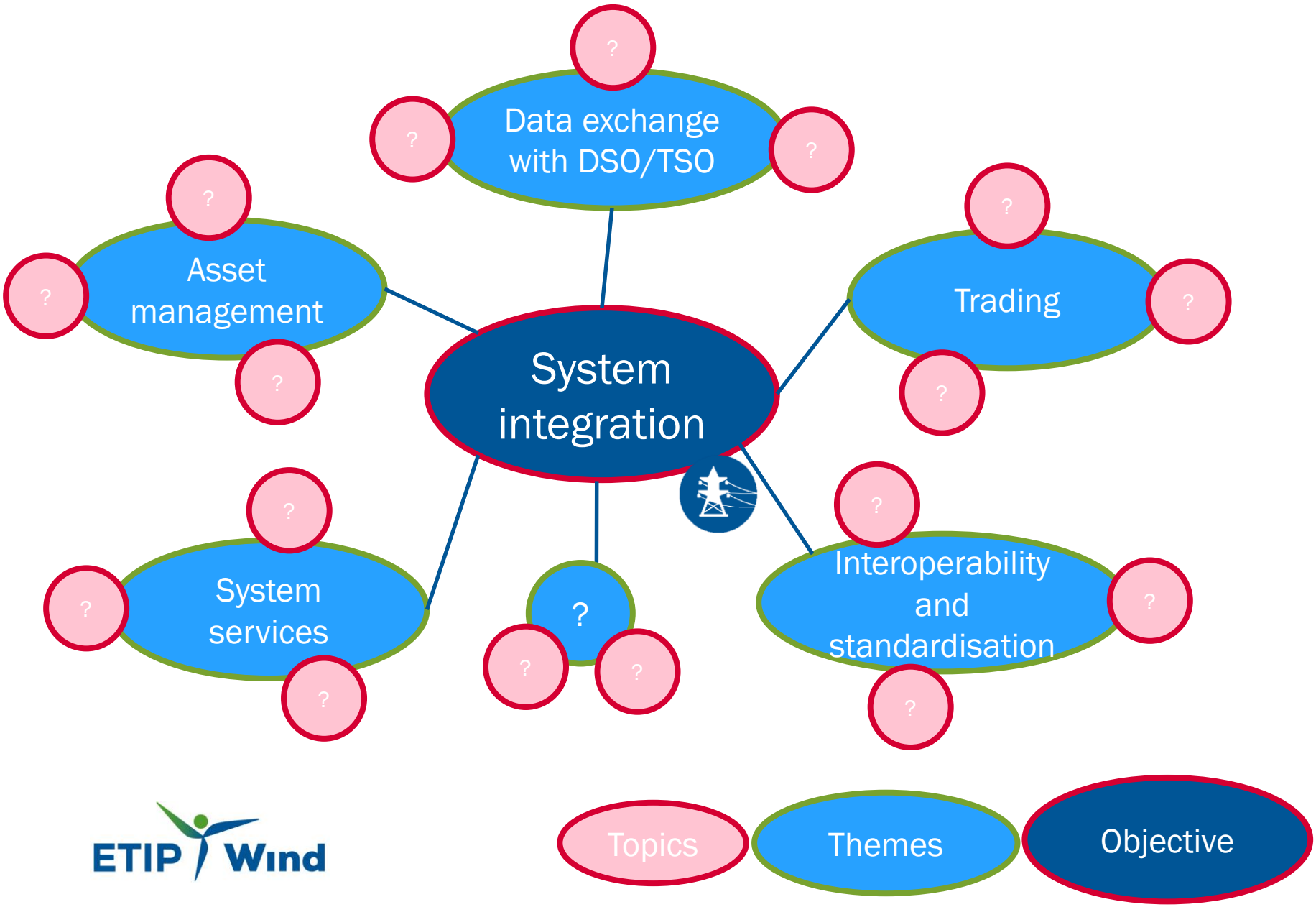

Increasing revenues
Improving yields
Extending the life time of assets
Cost reduction
Sensing and transferring more data
?
Control and Maintenance strategies
ETIP Wind
Topics
Themes
Objective


Data exchange with DSO/TSO
Asset management
Trading
System integration
System services
?
Interoperability and standardisation
ETIP Wind
Topics
Themes
Objective

ETIP Wind

EUROPEAN TECHNOLOGY & INNOVATION
PLATFORM ON **WIND ENERGY**

Thanks for your attention

etipwind.eu

Digitalization & Wind Energy

ETIP Wind Steering Committee

Brussels (Belgium) – June 20th, 2017

NEM solutions

diagnostic desk

Headquarters in San Sebastian, Spain

~ 50 Employees

2017 Most Innovative Company in Europe

Global Brands Magazine Awards

- Productivity improvement
- O&M costs reduction
- Life extension

Business-driven data management

Knowledge generation
Business benefits

Appropriate tools for on time decision making

Assets information management

Business value

Business & Knowledge

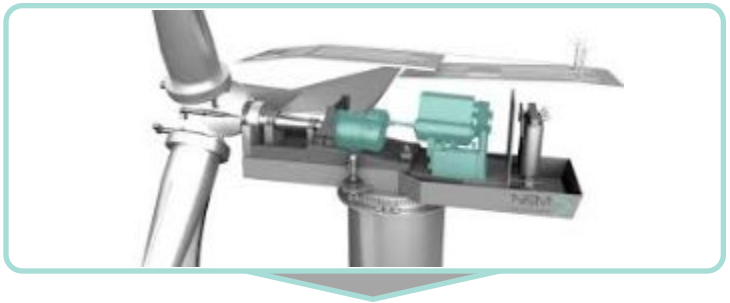
Avoid surprises
Your business under control

Reactive approach

The unexpected happens
Business plan fails

A.U.R.A. Technology

PATENTED



Data-driven Analytics

Domain Expertise

Normality model

Vs

Real time data

Failure Symptoms

Knowledge & Business

Digitalisation challenges

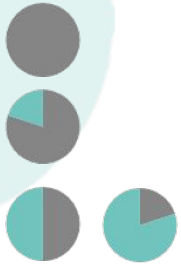
Data

Systematic and methodological data acquisition:

- Standardization.
- Data quality and availability.
- Metadata is also fundamental.

Strategy

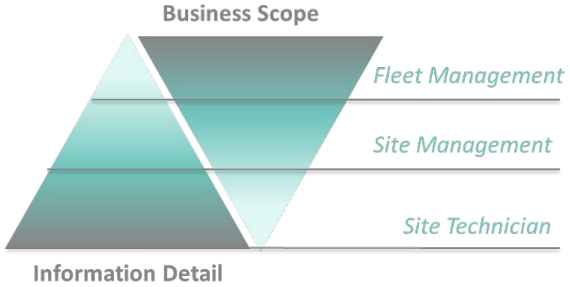
Define and promote a clear digitalisation strategy:



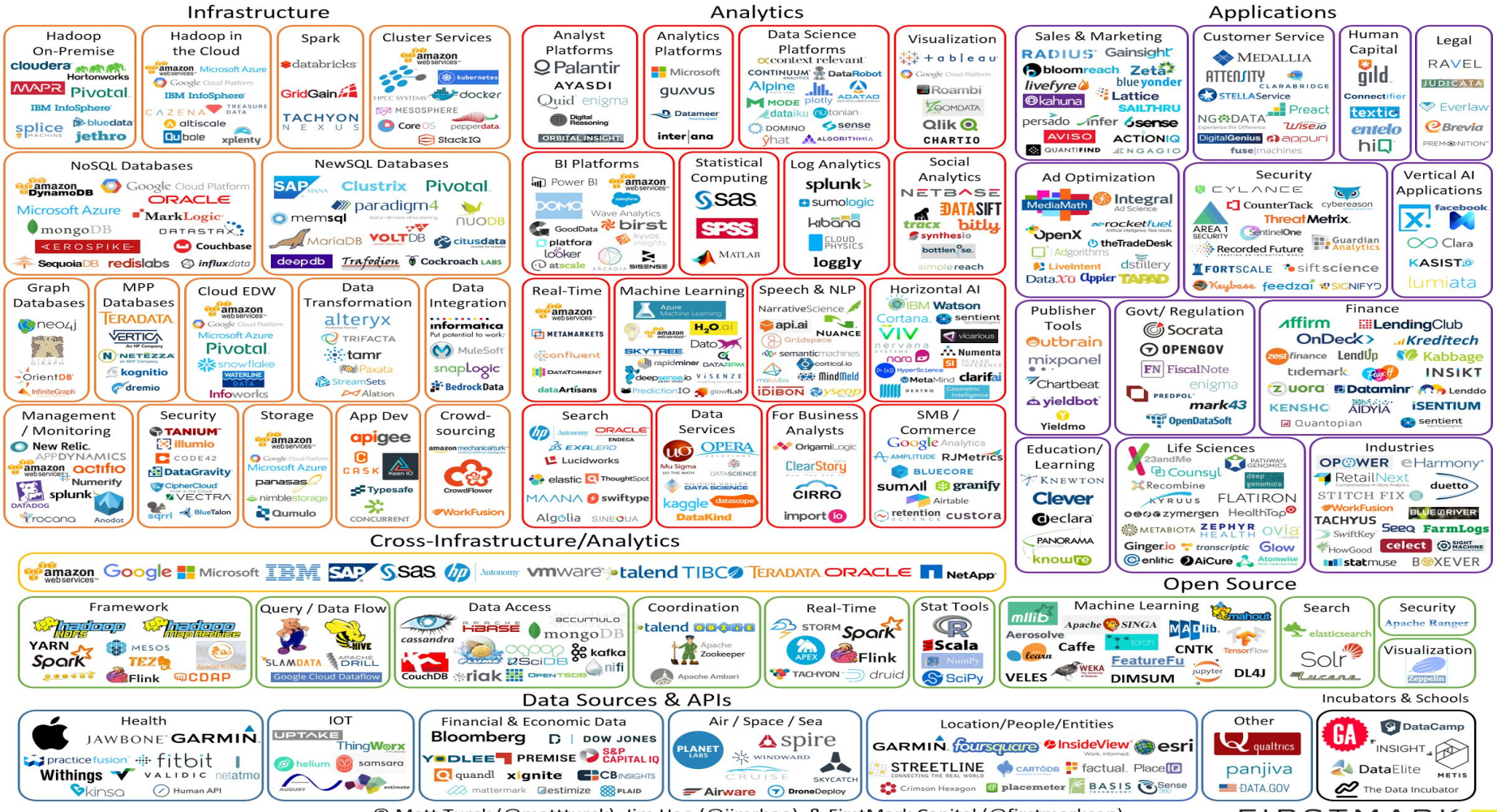
Full in-house

Mainly in-house

Hybrid-Partnership

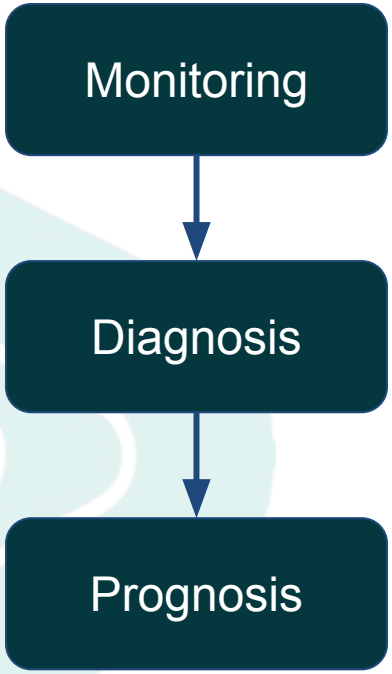


Big Data Landscape 2016



FIRSTMARK

Technological and scientific challenges



Technological challenge

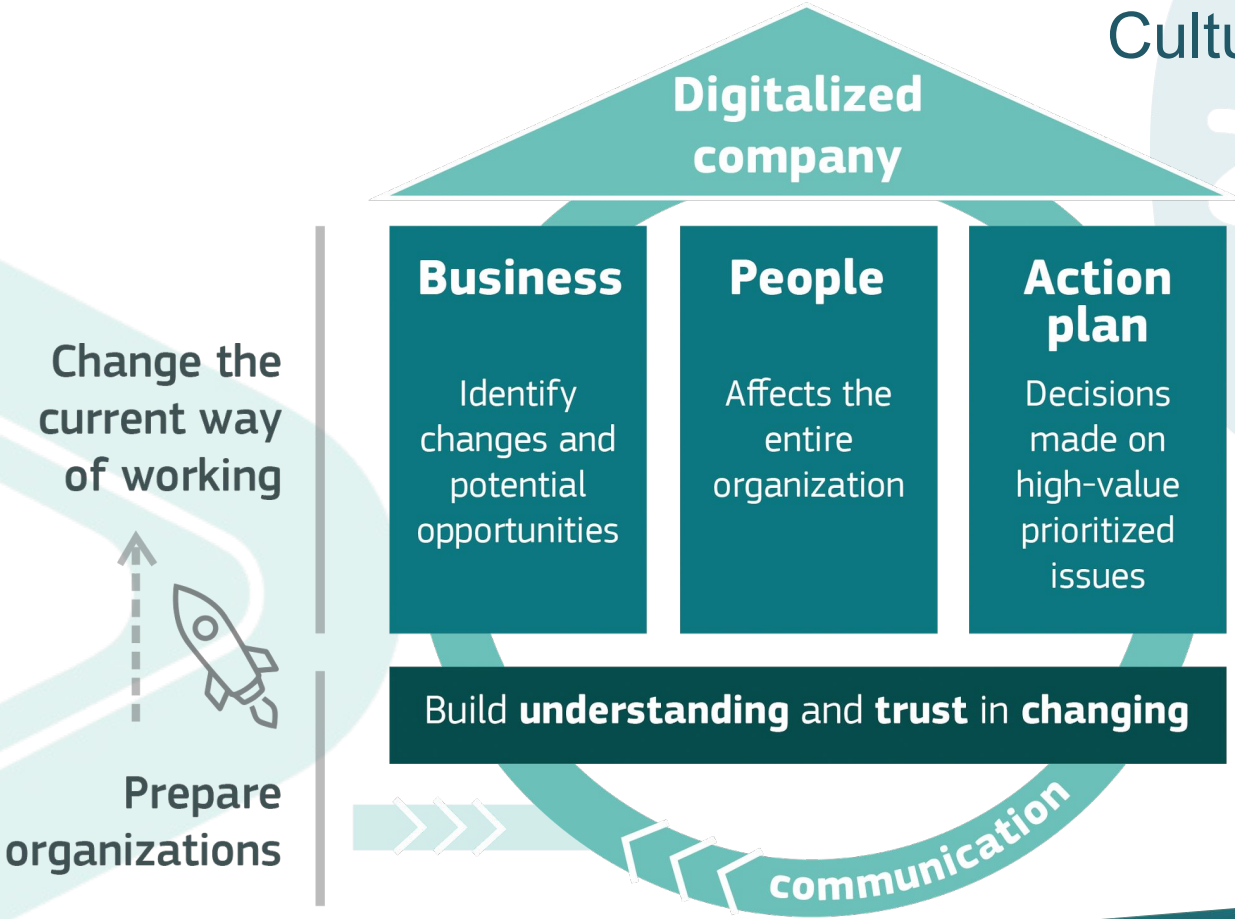
+

Domain and data-science challenge

+

Scientific challenge

Cultural challenge



Miguel A. VEGANZONES, Ph. D.
Senior Data Scientist

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Generation and Projection of Opportunities

NEM solutions