

# TOWARDS EFFICIENT IEC 61850 MULTI-VENDOR INTEROPERABILITY

## ENTSO-E PERSPECTIVE

**ENTSO-E AhG IEC 61850 @ UCA Booth, Cigré 2014**  
28 August 2014, Paris, France



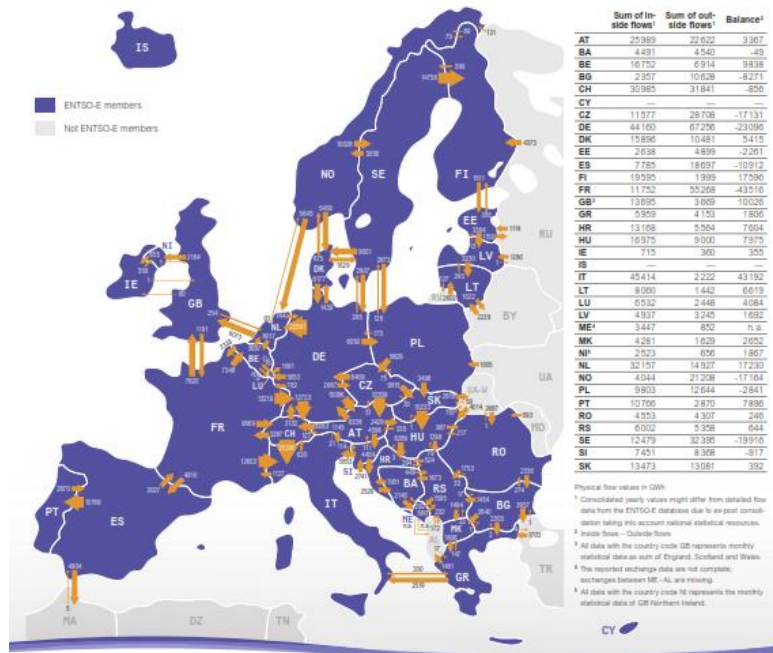
Reliable Sustainable Connected



European network of  
transmission system  
operators for electricity

Reliable Sustainable Connected

Physical energy flows



41 TSOs

34 countries

<https://www.entsoe.eu/publications/general-publications/memo-entso-e-facts-figures/>

A. Introduction

B. ENTSO-E Interoperability Specification Tool

C. ENTSO-E expectations towards UCAIug IOP

## A. Introduction

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## Observations:

- Multi-vendor systems very scarce 10 years after 1st standard publication
- Implementation complexity

## Recommendations:

- Improve interoperability, over life cycle of the systems of Assets
- Mask complexity by ergonomic tools

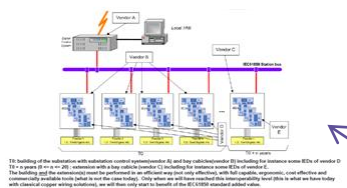
## Stakeholders:

- standardization bodies : **IEC**, ... ; Suppliers ; Conformance testing companies: **UCA lug**, ... ; Users (associations): **ENTSO-E**, ...

# ENTSO-E AhG IEC 61850 : membership & deliverable structure



ENTSO-E punchlist

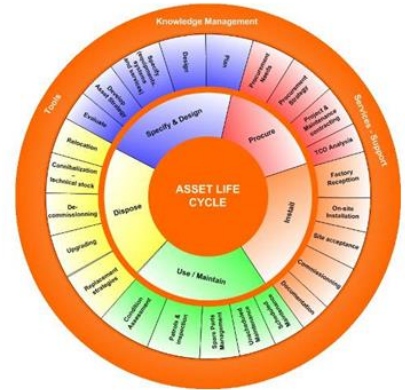
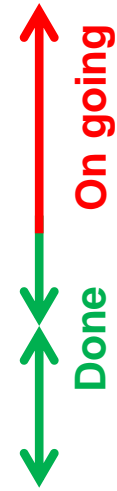
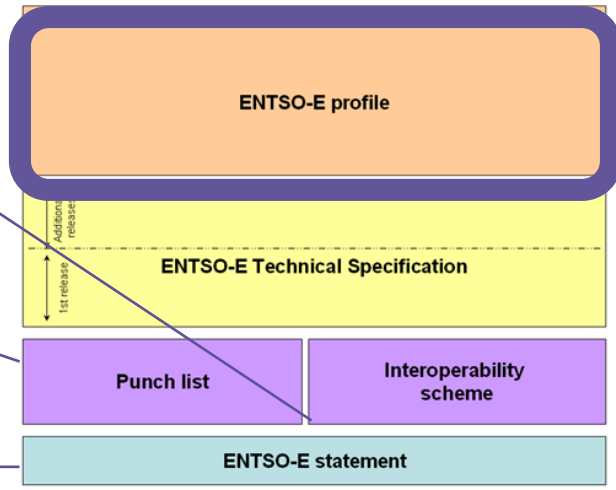


Interoperability scheme from ENTSO-E perspective

**ENTSO-E statement on the IEC61850 standard**

ENTSO-E asks for all IEC61850 stakeholders to take the appropriate actions in order to ensure the timely completion of the IEC61850 standard and to take into the account all the technical specifications defined in a timely and sustainable and precise manner for all stakeholders and the community.

This statement addresses the main interoperability issues in the development of the standard implementation of the IEC61850 standard on communication networks and systems for power utility automation. It provides a framework for the development of the standard implementation of the IEC61850 standard on communication networks and systems for power utility automation. It provides a framework for the development of the standard implementation of the IEC61850 standard on communication networks and systems for power utility automation.



1. Specify & Design / Plan
2. Procure / Acquire
3. Install / Commission
4. Use / Maintain / Extend
5. Dispose / Decommission

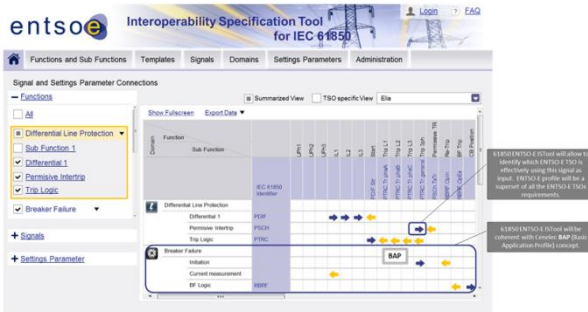
<https://www.entsoe.eu/about-entso-e/research-and-development/standardisation/>

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# ENTSO-E Interoperability Specification Tool for IEC 61850

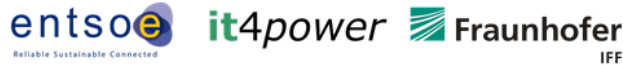


**What are the main ideas behind the ENTSO-E Interoperability Specification Tool for IEC 61850 (ISTool)?**

- Tool for **Transmission (sub)functions and signals collection @ ENTSO-E level**
- **Cornerstone for ENTSO-E profile @ information, communication and engineering levels**
- **Future proof** (e.g. integration of settings parameter, CIM, interfaces with system specification and configuration tools, ...)
- Basis for **gap analysis** between IEC 61850 and user requirements
- **Facilitator** between IEC 61850 complex world and utility world, finally enabling multi-vendor interoperability in an efficient and sustainable way



# ENTSO-E Interoperability Specification Tool for IEC 61850



## ENTSO-E INTEROPERABILITY SPECIFICATION TOOL FOR IEC 61850

The final objective of ENTSO-E is to reach multi-vendor interoperability over the life cycle of systems of assets, in an efficient way – see ENTSO-E statement on IEC 61850 standard (April 2012). IEC 61850 is the unique standard enabling to address multi-vendor interoperability at communication, information and engineering levels. Nevertheless, the standard provides many options which affects interoperability between various vendors. Some improvements (non exhaustive list) have to be done to reach the above final objective, by different stakeholders:

- Standards makers (IEC):
  - to support the profiling initiative of users, eg. by creating and managing the framework of BAP (Basic Application Profile)
  - to create the framework to enable efficiency and quality of the users multi-vendor systems purchasing process (eg. introduction of ISD file – IED Specification Description file)
  - to fill in the gaps between IEC 61850 standard and users expectations, expressed by their respective profiles (see below)
- Vendors: to implement standard improvements in their products and tools for systems specification and configuration
- Users: to draw up their IEC 61850 standard profiles in order to specify their needs and to help to identify the gaps between the current edition of the IEC 61850 standard and their requirements.

At the end of the day, conformance testing companies have to check in a qualitative and quantitative way that the above objective is effectively reached (eg. UCA lug – IOP 2012)

**ENTSO-E Role**

- Contribution to IEC 61850 standard improvement from user side
- ENTSO-E acts as user association, representing 41 TSOs of 34 countries in Europe.
- ENTSO-E wants to define one (super) profile, so that devices and tools that are conform to that profile can be used by each TSO of ENTSO-E
- To determine the required data model, function decomposition and signals are collected for each TSO of ENTSO-E → A tool was required in order to ensure data collection efficiency and quality, sustainable documentation and data conversion to IEC 61850 real world
- ENTSO-E contracted with it4power and Fraunhofer IFF to develop the ENTSO-E Interoperability Specification Tool for IEC 61850 (ISTool)
- ISTool will cover the three interoperability domains: information (data models), communication (services) and engineering (process) and will be the cornerstone of the ENTSO-E profile
- The developed ENTSO-E profile concept will be coherent with the concept of Basic Application Profile developed by Cenelec.
- Finally, ENTSO-E profile will be a superset<sup>(\*)</sup> composed of all the elements belonging to the different TSOs (bay) templates.

**Aim and Purpose of the ISTool**

- Enabling collaboration for building an ENTSO-E wide profile for IEC 61850 usage
- Flexible TSO definition of signal usage according to his needs
- Output aggregated signal usage respecting input from each TSO
- Enabling history documentation functionality

(\*) From a standardization vendor point of view, the ENTSO-E profile is only a subset

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**ISTool Concept**

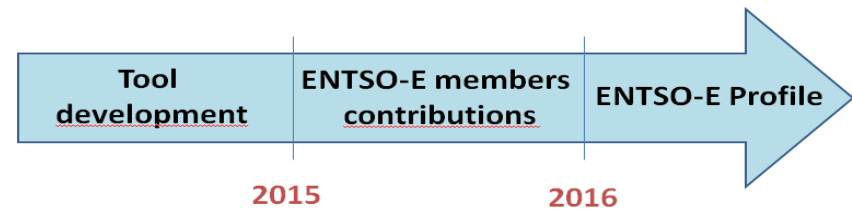
- Hierarchical information concept
  - Profile workspace, domain, functions, sub functions
  - Signal and settings parameter assignment
  - TSO specific bay templates
  - IEC 61850 logical node, data attribute and data object and
- Role based user concept
  - Admin, Chosen TSO users, IEC 61850 experts, Viewers, profile workspace manager
  - Flexible user rights assignment
- Keeping track of changes
  - Using versioning on different levels
  - Who created, edited, deleted what and when?
  - Activity log for all users
- Export functionalities as SQL or Excel

**ISTool and profiling planning**

## Do you want to know more about the ENTSO-E Interoperability Specification Tool for IEC 61850 (ISTool) ?

→ Visit the ENTSO-E booth and take a look on our poster

→ Come at the IEC 61850 Europe Conference 2014 in Prague to see our “click prototype”



A. Introduction

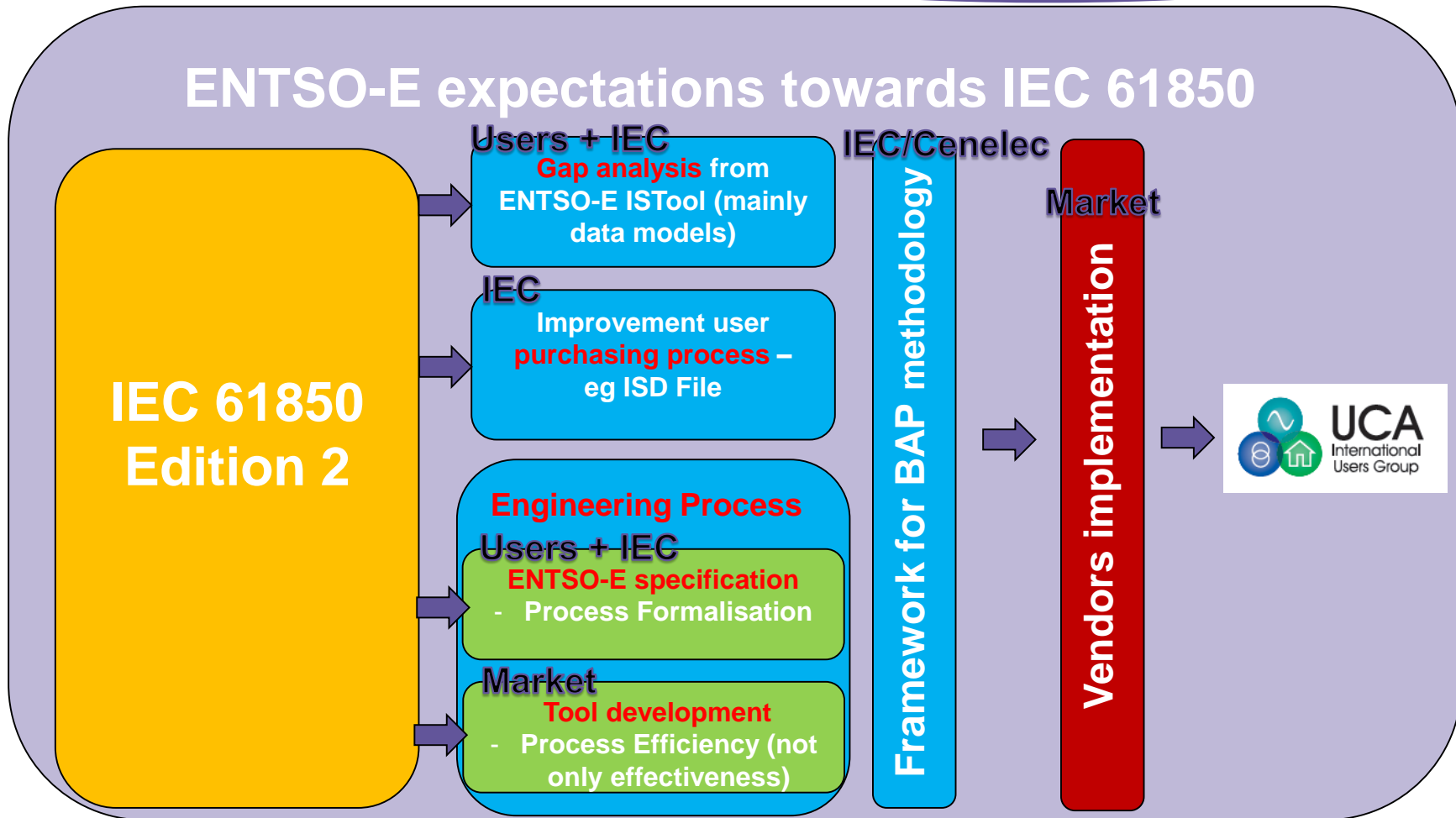
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# ENTSO-E expectations towards UCAIug IOP



## ENTSO-E expectations towards IEC 61850



# ENTSO-E expectations towards UCAIug IOP (2015)

- Need to focus in order to make IOP **efficient and realistic**
  - prerequisite for relays maturity?
  - Idea to develop : **test against a reference** so that all vendor combinations have not to be tested
    - Positive consequence: the tests are **independent of a specific vendor combination**
- **Incentive** for vendors to define (keep in mind ENTSO-E global expectations – see slide before and ENTSO-E statement)
  - Product and systems certification: to think about **enhanced certificates**, i. e. users evaluation process should be **univocal** and facilitated by **official and objective certificates**)
- From user point of view, need to consider **test of mixed systems is a must** (Ed.1/Ed.2, think Ed.2 vs Ed. 3, ... → need of methodology to test **backward compatibility**)

# ENTSO-E expectations towards UCAIug IOP (2015)



ENTSO-E **high-level** requirements towards

1. To test IEC 61850 multi-vendor concrete implementation through the complete general utility design process, independent of the TSO contracting model (turnkey, system integrator, in-house engineering, ...), and with a focus on utility applications
2. to give an objective overview on the IEC 61850 multi-vendor interoperability maturity level in all domains, a.o. engineering efficiency (not only effectiveness)

## Vendors expectations

**Marketing?**  
**Product improvement?**  
**... ?**

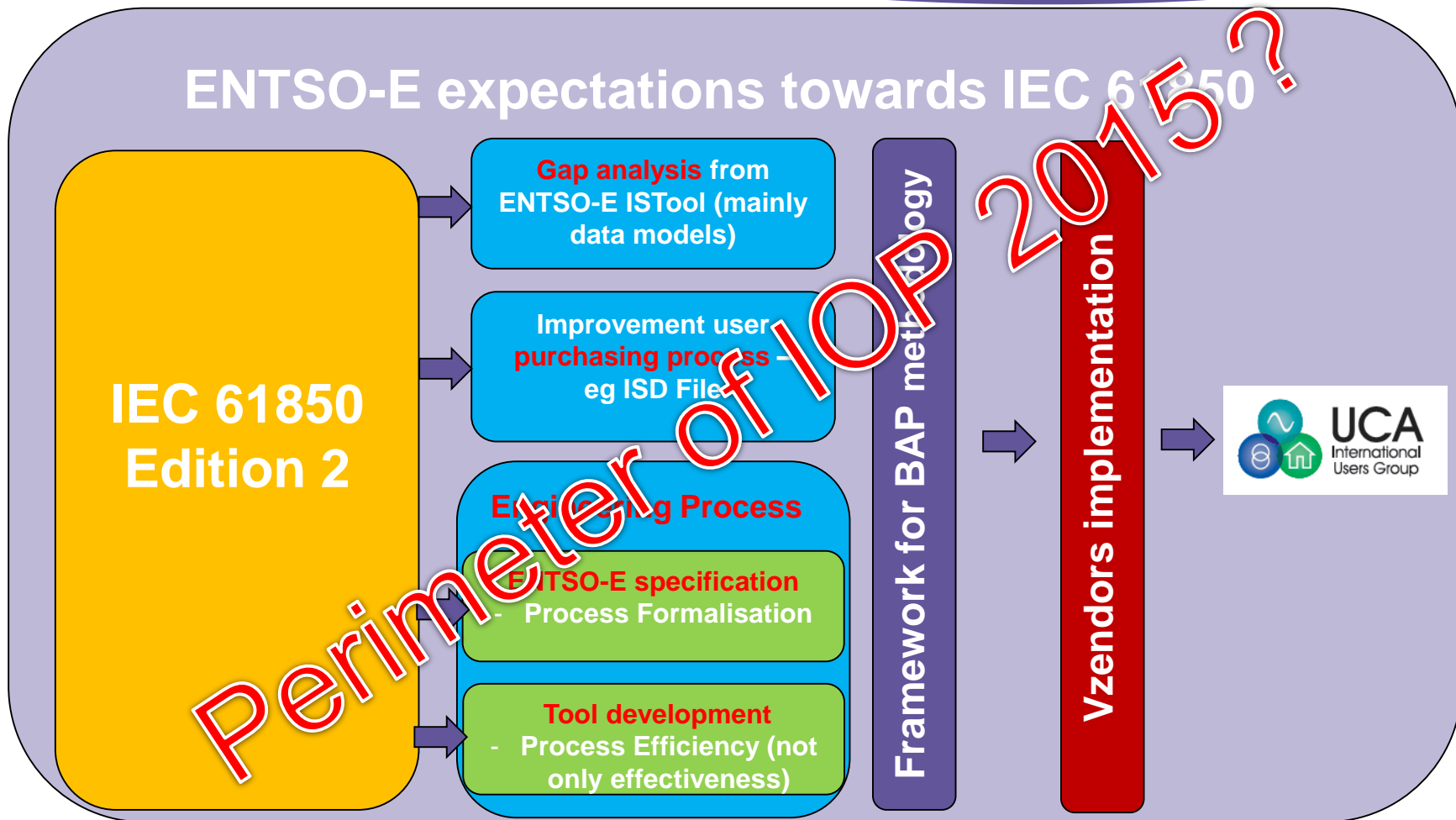


**Common & approved mission statement for UCA IOP (2015)**

# ENTSO-E expectations towards UCAlug IOP



## ENTSO-E expectations towards IEC 61850



# Conclusion



IEC 61850 is a strong **enabler** for the sustainable **substation of the future**

All the IEC 61850 community has to make it **multi-vendor interoperable** over **lifecycle of the systems**, providing the tools allowing **efficient configurations** of these systems

# Questions

