BRIDGE WG Data Management Action #2 – EU data exchange reference architecture Common Information Model workflow

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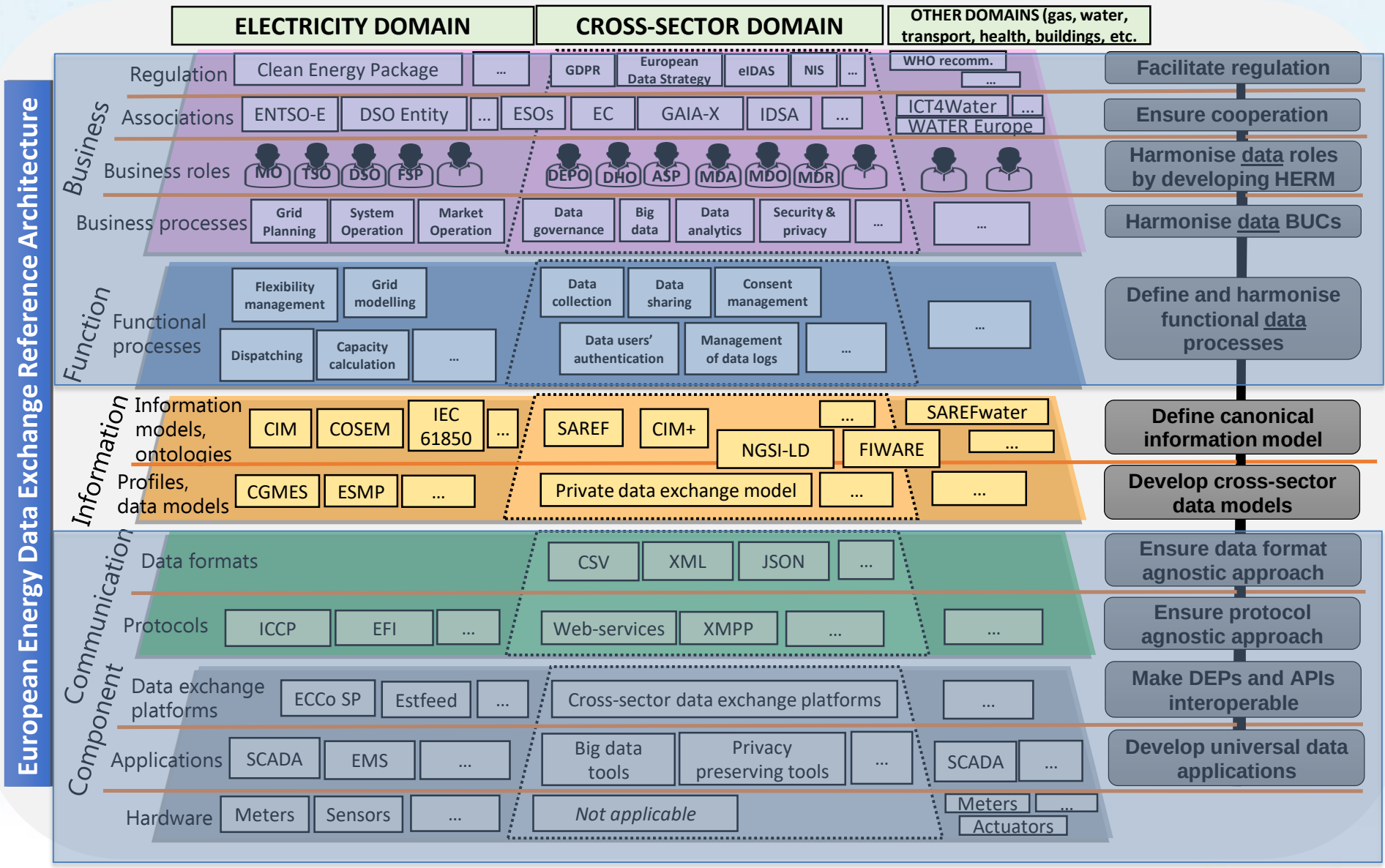

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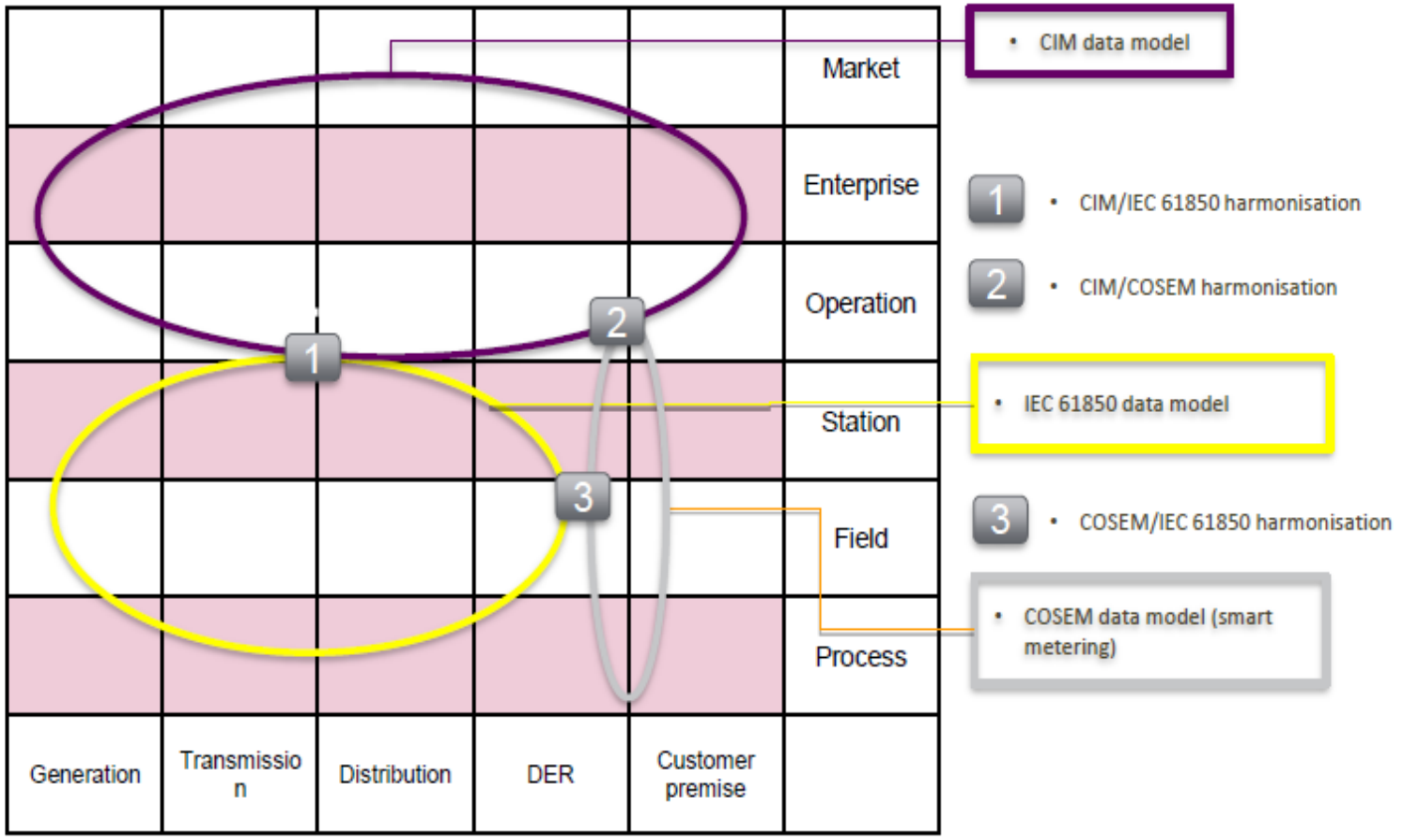
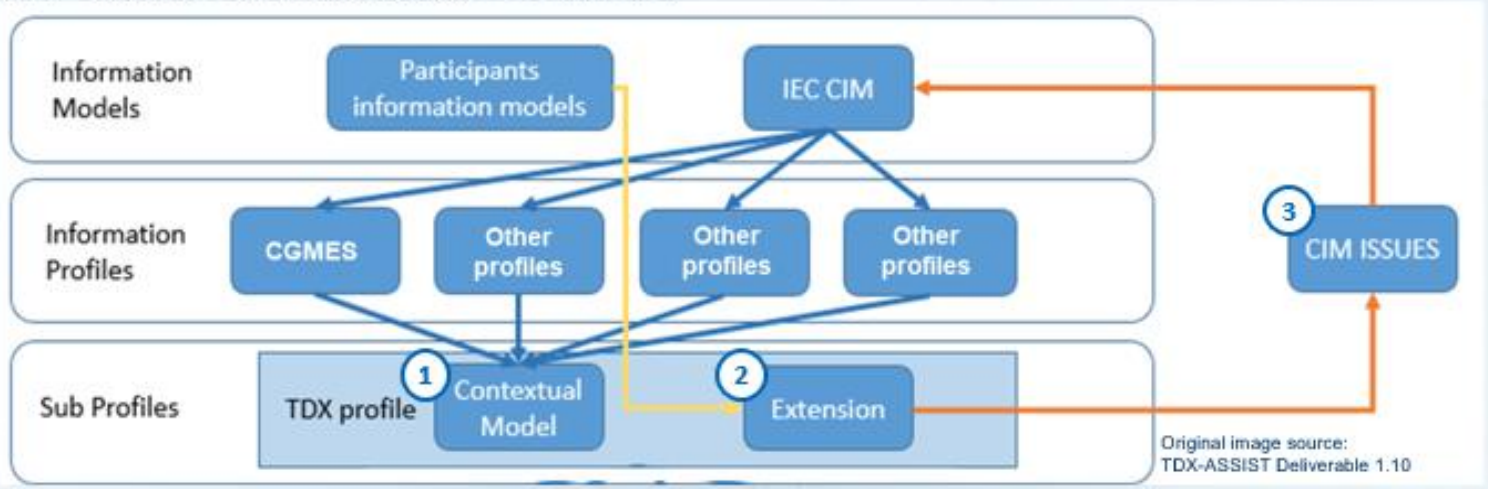
IEC core (canonical) information models



From core CIM to data modelling and profiling

Common Grid Model Exchange Standard



1. For selected **TDX-ASSIST Business Objects (BO),** a CGMES **sub-profile** is derived.
2. If sub-profile cannot contain all Business Object data, a CGMES **extension** is proposed.
3. The proposal is presented to and reviewed by CGMES developers.

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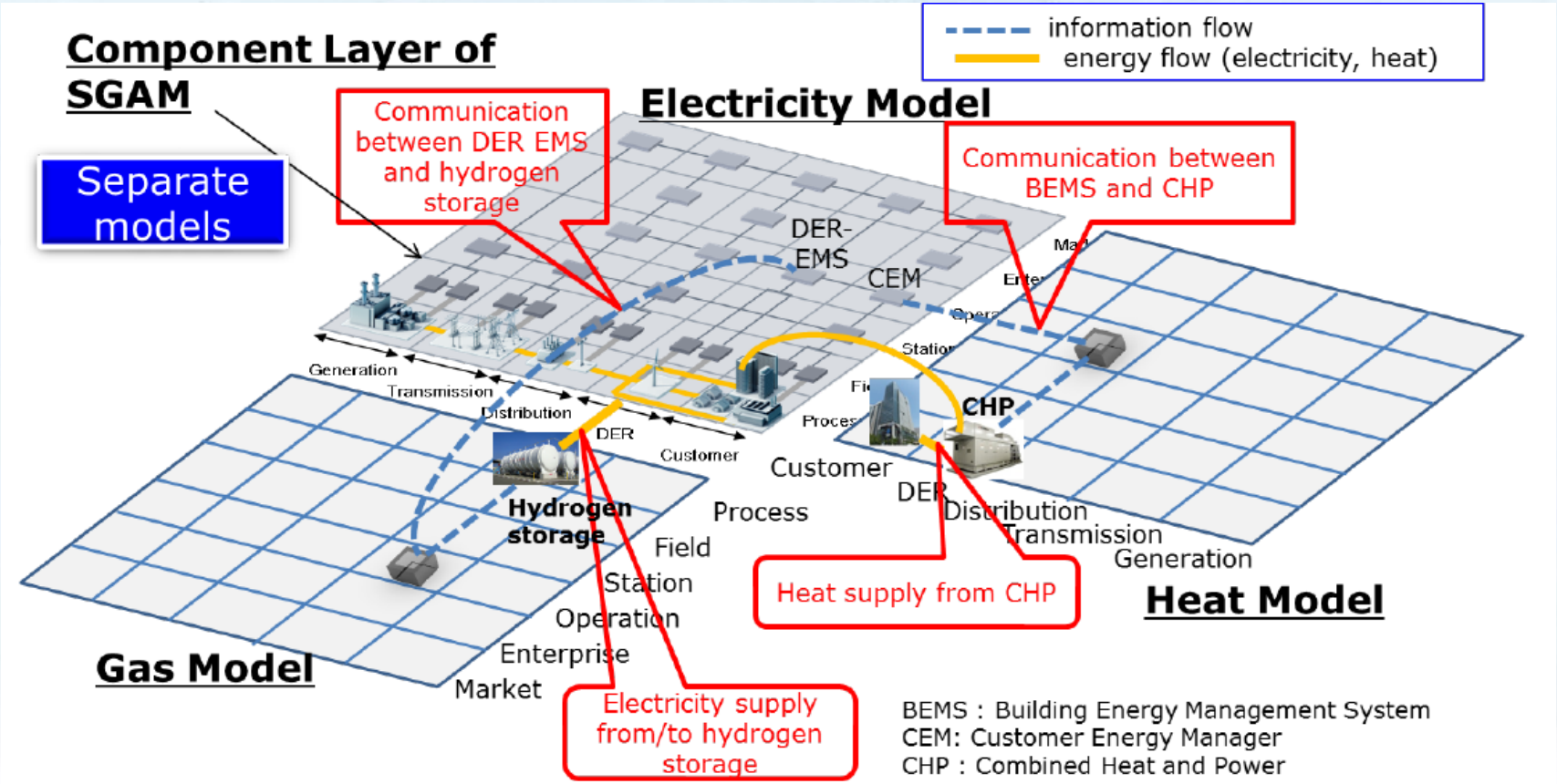
The interaction model of three energies' component layer



Source : IEC 63200

Topic	Information layer – canonical data model
Findings	The development of use cases according to IEC 62913-1 (Generic smart grid requirements) allows to define Business Objects which have to be exchanged between Applications, Systems, Functions providing interfaces. Business Objects define the semantics that has to be exchanged. The Canonical Data Model is used to define the Business Objects (information exchange requirement).
Recommendation	**Define canonical data model facilitating cross-sector data exchange, e.g. by extending Common Information Model (CIM) and/or integrating other sectors' canonical data models with CIM. Study the benefit to use ontologies to support cross-sector interactions.**

Topic	Information layer – data models and profiles
Findings	European electricity sector has put in place a robust methodology based on system approach, which promote interoperability by using standards (Use Case definition, Role Model, Canonical Data Model like CIM, Smart Grid Architecture Model). It would be valuable to extend this approach to other energy vectors and to cross-sector domain. In order to facilitate data exchange between sectors, it would make sense to develop cross-sector data models. Profiles define how the semantics of an interface relate to the Canonical Data Model. Profiling methodology is defined in IEC 62361-103.
Recommendation	**Develop cross-sector data models and profiles.**

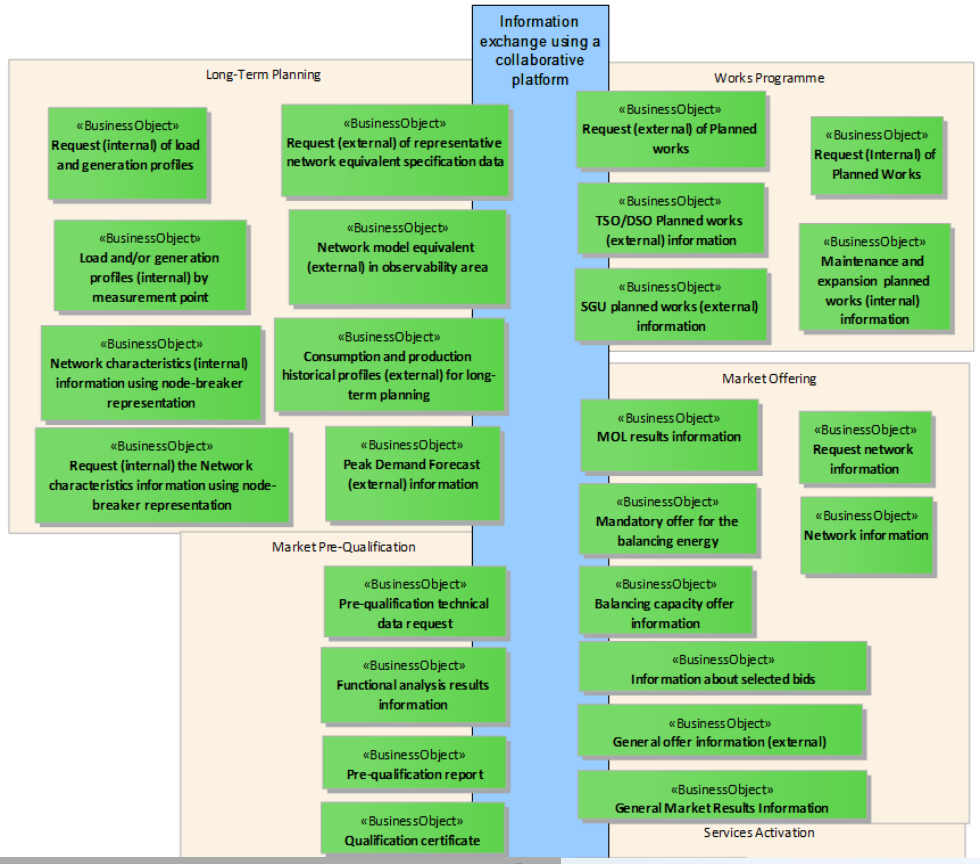
Topic	Information and communication layers – CIM repository
Findings	It is important to promote reusability among European projects. Complementary to set-up a use case repository, it is important to identify which business objects and profiles have been defined by other projects and to share knowledge. It is important to take into account that CIM evolves (versioning), and that profiles are derived from CIM. Different kind of CIM repositories can be managed (repository of Business Objects, repository of CIM profiles). Ideally Unified Modelling Language (UML) repositories will have to be managed, using versioning system. Having UML repositories will also facilitate the generation of CIM profiles.
Recommendation	**Set up and manage a CIM repository for BRIDGE projects and beyond.**

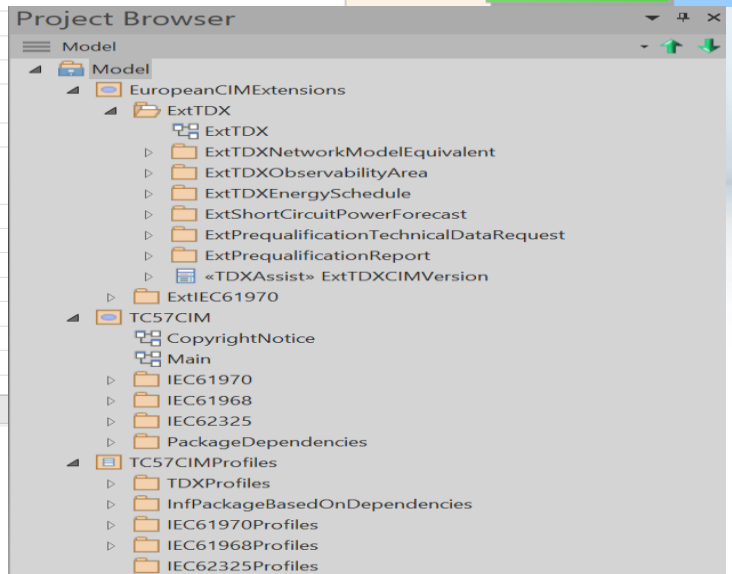
CIM repository

updated CIM profile			Use Case Background		
Profile name	CIM extension (UML package name)	profile is based on	BO (Business Object)	SUC (System Use case)	BUC (Business
TDXFunctionalAnalysisResultsInformationProfile	no extension required	CGMES	Functional Analysis Results information		
TDXPreQualificationReportProfile	ExtPrequalificationReport	CGMES	Pre-qualification report		
TDXPreQualificationTechnicalDataRequestProfile	ExtPrequalificationTechnicalDataRequest	CGMES	Pre-qualification technical data request		
GeneralOffer	no extension required	ESMP	General offer information		
MarketResults	no extension required	ESMP	General market results information	Market offering	BUC 2
ConsumptionAndProductionForecastInformationDependancy	no extension required	ESMP	Consumption and production forecast (internal) information		
ReactivePowerSetpoint	no extension required	ESMP	(Request/Response) Reactive Power Setpoint	Contribution of DSO to voltage regulation / scenario : Mandatory/ ... ...Voluntary reactive power service request nearby real-time	BUC 5/
TDXShortCircuitPowerForecastProfile	ExtShortCircuitPowerForecast	CGMES	Short-Circuit power forecast	Exchange short circuit levels at bay level for the next 24 hours	BUC 7
TDXEnergyScheduleProfile	ExtTDXEnergySchedule	CGMES	Consumption and production forecast for operational planning purposes	Disaggregated consumption and generation forecast for operational planning purposes	BUC 7
			Consumption and production historical profiles (external) for long-term planning	Definition of historical profiles disaggregated by type of consumption and	BUC 9

EU-SysFlex		INTERRFACE	
SUCs	Business Objects	SUCs	Business Objects
Authenticate data users	Authenticate Information		
	Representation Rights		
Calculate flexibility baseline	Baseline		
	Flexibility Bid		
Collect energy data	Authenticate Information		
	Metering Data		
	Market Data (e.g. Flexibility Bid)		
	Request on market data		
	Congestion Matrix (same as Results of Grid Validation or Grid Impact Assessment Result)		
Exchange data between DERs and System Operators	DER Structural Data		
	DER Real Time Data		
	DER Activation		
Manage access permissions	Authorization information		
	Customer Consent		
Manage data logs	Data log request		
	Data log		
	Flexibility Bid		

Mapping objects to use cases | Mapping profiles to objects





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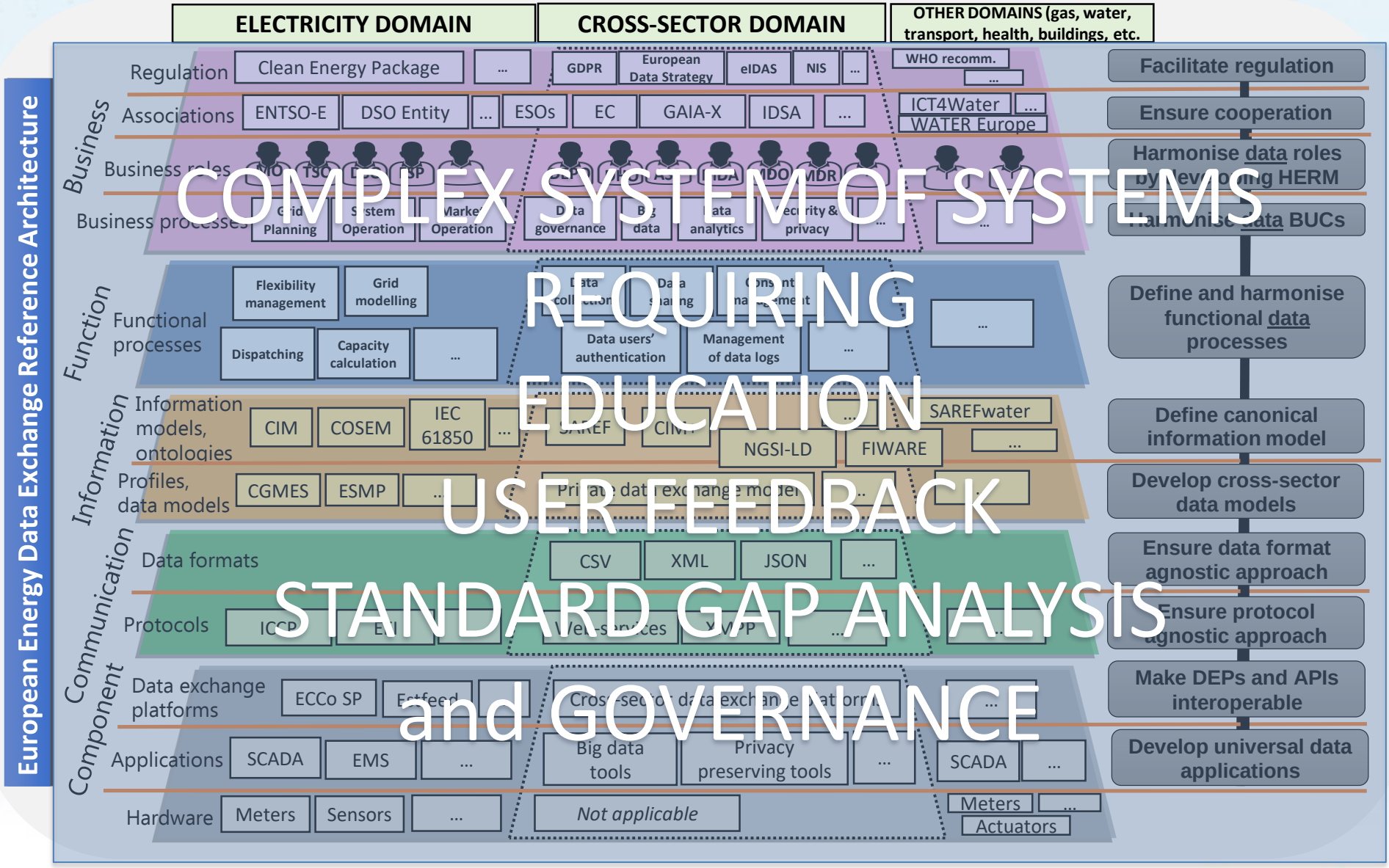

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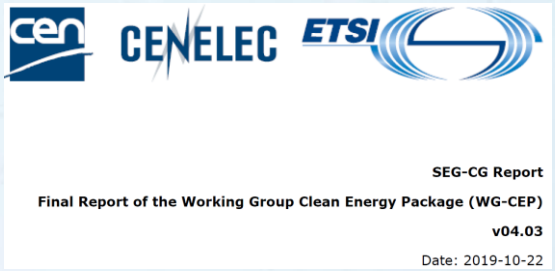
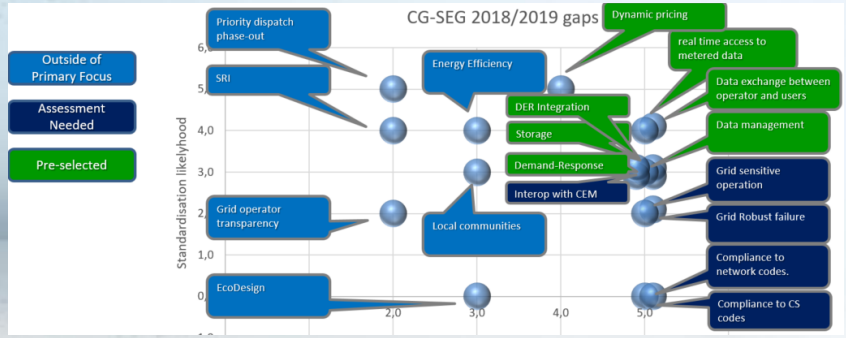
Coordination Group on Smart Energy Grids



Regulatory domains	Regulation	Amending	Status
Electricity market design and security of supply	Proposal for a revised Electricity Market Regulation	714/2009	Published on 2019-06-05 under Directive (EU) 2019/943
	Proposal for a revised Electricity Market Directive	2009/72/EC	Published on 2019-06-05 under Directive (EU) 2019/944
Renewable energy	Proposal for a revised Renewable Energy Directive	2009/28/EC	Published on 2018-12-21 under Directive (EU) 2018/2001
Energy efficiency and performance	Proposal for a revised Energy Efficiency Directive	2012/27/EU	Published on 2018-12-21 under Directive (EU) 2018/2002
	Proposal for a revised Energy Performance of Buildings Directive	2010/31/EU	Published on 2018-06-19 under Directive (EU) 2018/844



IEC SRD 63199 **Top priority standards development status in the domain of smart energy**

IEC TR 63097 **Smart grid standardization roadmap**

CEN/CLC/ETSI CG-SEG

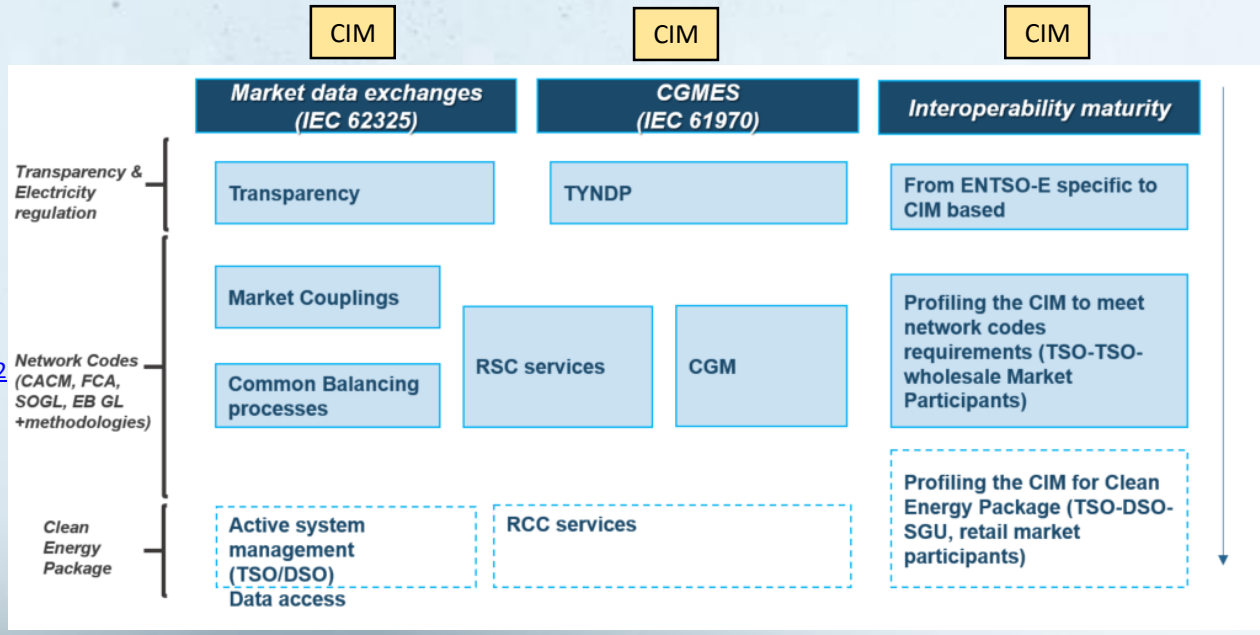
An Interconnected Electricity Market

Development of network codes, guidelines, and standards

Connection Codes
- Demand Connection (EU) 2016/1388
- High-voltage direct current connections (EU) 2016/1447
- Requirements for generators (EU) 2016/631

Market and trading guidelines
- Capacity Allocation and Congestion Management (EU) 2015/1222
- Forward Capacity Allocation Regulation (EU) 2016/1719
- Electricity Balancing (EU) 2017/2195

Operation Codes
- Emergency and restoration (EU) 2017/2196
- System Operation (EU) 2017/1485



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Topic	Information and communication layers – CIM User Group
Findings	Continuous training and knowledge sharing is essential as IEC CIM is a moving target as its scope grows to cover new, emerging data exchange requirements and we are more and more into a cross-sector energy mode. CIM training and knowledge sharing is important in order to help European projects' participants to implement CIM standards in a fast-track mode; to be aware of the standardisation process and how to contribute to it; to involve people with different expertise as contributors; to ensure the areas of benefits are well understood and where new work is planned. In general, the whole process needs resources (human and financial). Building strong community via knowledge sharing would boost opportunities for projects on key topics. A European CIM User group would foster European CIM community needs and will help to liaise with other user groups. European standardisation organisations (CEN, CENELEC, ETSI), European academics, European institutions like JRC could participate in this European CIM user group. Moreover, smart energy grids are complex systems it could be valuable to set-up a European Smart Energy Standard User Group.
Recommendation	**Set up a European CIM User Group and eventually a Smart Energy Standard User Group.**

Standardisation & user groups landscape

General Standardisation

ISO

cen

Electrotechnical Standardisation

IEC

CENELEC

Telecommunication Standardisation

ITU

ETSI

CIM users group

UCA International Users Group

dlms device language message specification

9 INDUSTRY-LED EUROPEAN TECHNOLOGY AND INNOVATION PLATFORMS

SECTOR ORIENTED ETIPS

PhotoVoltaic Technology Platform

European Technology Deep Geothermal & Innovation Platform

Bioenergy

Zep Zero emissions platform

ETIP Wind European Technology & Innovation Platform on Wind Energy

Ocean Energy

SNETP Sustainable Nuclear Energy Technology Platform

RHC Renewable Heating & Cooling European Technology Platform

CROSS-SECTOR ETIP

SYSTEM INTEGRATION ETIP

Smart Networks for Energy Transition

JRC EUROPEAN COMMISSION

EUROPEAN CIM/Smart Energy Standard User Group

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Topic	Information and communication layers – education and promotion
Findings	While CIM represents the common ground enabling semantic and syntactic data interoperability, achieving the final goal requires wide acceptance of CIM by all stakeholders in the electricity domain. Systematic approach will be achieved by a definition of study and training programs divided into the modules with a number of hours defined, including the competences and skills that such programs will provide to the participants. It would be a huge advantage to establish some CIM educational programs at the European level, supported by electricity industry and institutions such as ENTSO-E.
Recommendation	**Define the strategy to disseminate advantages and benefits that CIM usage provides as well as develop a systematic approach in provision of education and consulting to all interested parties across Europe.**

EUROPEAN CIM/Smart Energy Standard User Group

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Topic	Information and communication layers – access to CIM
Findings	IEC sets out the process and rules to be used by IEC groups (TCs, WGs, SyCs, etc.) and experts in charge of editing IEC documents to ensure a proper handling of copyright licensing of code components included in IEC deliverables. It also defines the technical and process requirements to consider to optionally offer a free access to certain code component(s) through the IEC web site. The availability of **code components** opens the possibility for IEC to offer new services to users. It should be sufficient if at least one European project participant can prove that IEC standards and associated Code Components have been bought from IEC and that this gives the right to use IEC CIM standard in the context of the project. At this stage solving this issue is still an open question which has to be solved between European Commission, European Standard Organisations, and **IEC**.
Recommendation	**Make CIM UML model(s) and associated profiles available following a clear procedure.**

Thanks for your attention

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