



Smart  
Energy  
Systems  
ERA-Net

Spotlight

## WG SAIM 2021

**EPC4SES**  
Digital Building Twins

**SONDER**

**EPC4SES**  
**SONDER**

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ERA-Net SES has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements no. 646039, 775970 and 883973.

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## ERA-Net SES Projects' Perspectives on



- From business layer to systems and architectures
- Are the EU approaches to harmonizing over-engineered?

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## Building on „System Reference Deliverable“ by IEC



IEC SRD 63200

Edition 1.0 2021-08

**SYSTEMS  
REFERENCE DELIVERABLE**



Definition of extended SGAM smart energy grid reference architecture model

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

100 28 020

ISBN 978-3-0322-1812-6



# From business layer to systems and architectures

The IEC SGAM definition describes business and system use cases, roles, and actors (A.1.2). At the same time there is an effort to develop a new Harmonized Electricity Market Role Model on EU-level (HEMRM). Both are relevant for all future system architectures and the ERA-Net SES community should discuss their relevance. Projects should use the proposed terminology and ontologies to describe their findings and solutions.

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## EPC4SES



At the state of the art, EPC4SES slightly fits into the model, as SGAM is thought for representative scopes. But EPC4SES' consortium agreed that SGAM is not exactly representing us and our platform scale. The EPC4SES could further develop the model to adapt it to its ecosystem of actors, re-conducting it to the macro frame of the SES. We would have to adapt and compromise the existing role model. Our micro model is focusing on how the power demand could be submitted to the DSO. Also, how prosumer communicate the future demand or generation of energy is not well depicted in the SGAM model.

We agreed that it was much easier to collocate ourselves into the Harmonised Role rather than SGAM.

Further resources: [www.smartenergy.nu](http://www.smartenergy.nu)

## SONDER



The SGAM is good to position solutions on the different layers into domains and zones. Solutions may span a little across the boundaries, however, the 3-D positioning shows what are the neighbouring systems the solution may require interfaces to. Basically, we see no need to extend the 3D-SGAM model per se. It offers all what's needed to integrate new roles and sub-systems. However, the market model needs to be modernised: alike modern software it could be a structure where roles and sub-systems can be modularly defined and integrated without interfering with the existing, though potentially obsoleting outdated roles and sub-systems.

Further resources: [www.project-sonder.eu](http://www.project-sonder.eu)

## Joint Conclusions

Models such as SGAM and HEMRM have been developed by true experts and adequately describe all elements and interfaces. The more interested parties get involved and the more market players need to explain the system in practical terms, the more it will become necessary to describe (parts of) the system in an easy to grasp manner. While both documents (extended SGAM and the HEMRM) constitute a major step forward to a common view and terminology, they should be carefully reviewed to cover all the latest findings in the scientific, regulatory and political fields. That does not require an extension of the models per se. It rather requires opening them beyond the electricity sector and a clear positioning of technical elements (such as distributed inertia) and organisational and market structures (such as Local Energy Communities). As WG SAIM points out, integrating electricity grids with heat and gas grids are key to exploit the full flexibility potential of demand response and energy storages. Chapter 5.7 of the SGAM extend model document is a first step to include the heat and gas domains, but further steps are needed to allow for fully describing sector coupling with multiple energy carriers and smart grids.





# Are the EU approaches to harmonizing over-engineered?



The architectures and approaches are developed by true experts and overwhelming complex. Can industry not having integrated their solutions into these proposals make use of the results published? Would not a simple, less complete, more adaptive approach fit the needs of many better than a solution composed by few?

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## Perspective

Slightly agrees – there should be a more flexible approach based on an overview defining the big (business) blocks before going into details (functionality aka roles) and the involved actors (components) that jointly realise the required functionality cooperatively via executing required data transactions and the correct responses thereto.

## SONDER

### About

In SONDER we intend to do Integration Profiles for important interfaces required to integrate industry partners in an Energy Community. These profiles will be embedded in an IES Technical Framework which reflects the SGAM layering. Based on the Layers we derived top-down a generic outline what Local Energy Communities might require. The resultant introductory Vol.1 of the [Technical Framework on Local Energy Communities](#) is now publicly available as of version 0.5, entitled first trial release.

## Further resources

[Technical Framework on LEC](#)  
[www.project-sonder.eu](http://www.project-sonder.eu)



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CrossChargePoint  
EMBS  
EPC4SES  
SONDER

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## ERA-Net SES Projects' Perspectives on



- The HEMRM should be the reference point for all ERA-Net SES projects
- Energy Communities (CECs, RECs) in HEMRM are not a new role but new actors in the roles of energy suppliers, aggregators, active customers, etc.

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## Building on „Harmonized Electricity Market Role Model” A Differential Analysis With Respect to the ENTSO-E Model” by EU BRIDGE Projects



EU Bridge Projects'  
"Harmonized Electricity Market Role Model"  
(HEMRM)  
A Differential Analysis  
With Respect to the ENTSO-E Model

September 2020: Draft for Sharing Between EU BRIDGE Projects



# The HEMRM should be the reference point for all ERA-Net SES projects

The HEMRM as developed by the EU Bridge working Groups should be the reference point for all ERA-Net SES projects. They should use the proposed terminology and especially the notion of roles and actors in the energy system.

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## EMBS & CrossChargePoint



On a first view, the results of HEMRM seem to be comprehensive and well-defined. Believe that it is of extraordinary importance to use common terminologies, definitions and possibly even ontologies. These would even increase in importance together with a stronger coupling between the energy sector and other sectors, where the electricity market may have impact on the behaviour of other sectors such as the traffic or production sector.

**Further resources**  
[www.srfg.at/embs](http://www.srfg.at/embs)

## SONDER



- Does see the intention but does not believe that harmonization is ever possible in the long term. Every new development will obsolete any specific terminology ever defined. Language, and in particular technical terms, evolve and sometimes even change their meaning within few years.
- A too strict believe in terms-definitions results in narrow-mindedness. To exchange information with other disciplines it is better to forget any definitions and accept other meanings than one is used to.

**Further resources**  
[Technical Framework on LEC](http://www.project-sonder.eu)  
[www.project-sonder.eu](http://www.project-sonder.eu)

## EPC4SES



Agrees that it is important to try to create a common technical language and an ontological narrative. Referring to HEMRM it was much easier to collocate into it rather than SGAM. For simplicity we could amend this role model collocating EPC4SES project for dissemination purposes.

**Further resources**  
[www.smartenergy.nu](http://www.smartenergy.nu)

## Joint Conclusions



After adoption of the HEMRM (which is planned for 2022) or even earlier efforts should be made to the develop tools that allow for the practical use of HEMRM in the scientific and product development domains. Such tools should follow a levelled and modular approach that allows for the seamless integration of new findings without changing the general model. In addition, tools should comprise interfaces that allow for the description of requirements for the implementation and assessment of interoperability (so called Integration Profiles, see project SONDER). JPP SES follows the path of setting up a network of validation labs that can be used by ERA-Net and other funded projects on national, European and global level.



# Energy Communities (CECs, RECs) in HEMRM

Energy Communities (CECs, RECs) in HEMRM are not a new role but new actors in the roles of energy suppliers, aggregators, active customers, etc.



## Perspective

Having analysed the EU directives and top-down derived a generic concept of local energy communities that care about local resources, we did not yet question the role. The discussion of the statement brings us to the following conclusions:

- Energy Communities are actors very close to the customers and may perform the obligations of one or more roles. Offering access to local energy resources without including established market players is an entirely new role that partly bypasses the market and is therefore difficult to include in a market centric architecture. To clearly identify the location in the entire system we need to position them in the 3D-SGAM.
- How shall we name the actor they represent in the architecture? We would suggest Energy Community.
- How shall we name the new role they introduce? Demand and Supply Coordinator might be fitting, but it might be called Flexibility Broker, likewise.
- Other roles of Energy Communities: Offering access to local/private clean energy sources for the 'poor' that cannot install their own might not be a role along the value chain and thus, cannot be represented by a dedicated actor or role in the system architecture.

## SONDER

### About

In SONDER we look at RECs that include industry partners in close vicinity. The discussion on how participation can be beneficiary is difficult, given that RECs shall not aim on monetary profit but on other benefits. A clear and local benefit we identified is: increasing the utilization of local DER. Another may be sharing the costs (and risks) of investing in local infrastructure, e.g. a community battery.

## Further resources

[Technical Framework on LEC](#)

[www.project-sonder.eu](http://www.project-sonder.eu)



## ERA-Net SES Projects' Perspectives on



## Building on „Reference Architecture for Cross-Domain Digital Transformation V1” by OPENDEI

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More info on [expira](#)

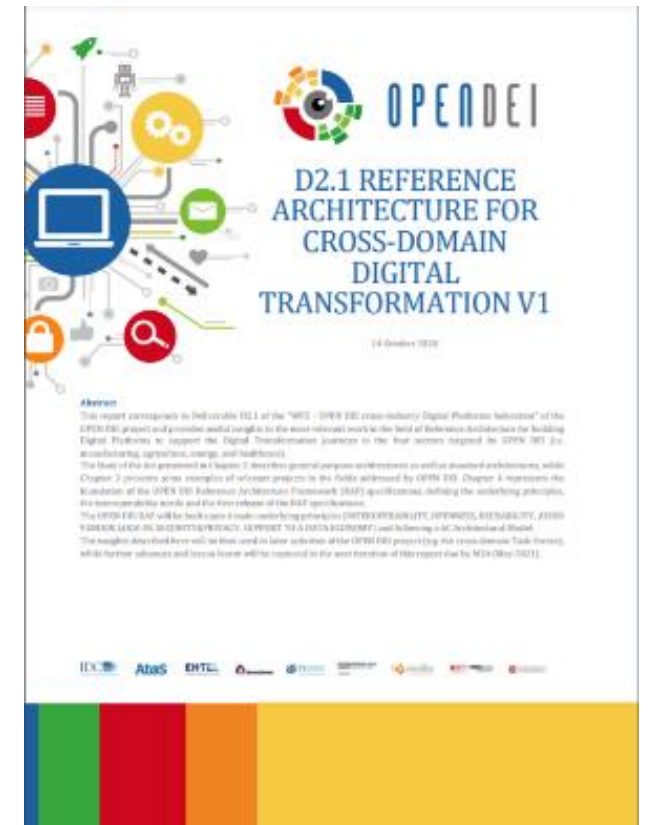


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FIWARE is a perfect architecture to  
build a cross-domain platform

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# FIWARE is a perfect architecture to build a cross-domain platform



“Generic and Domain Specific Enablers, semantic definition of data (NGSI) [...] Components are open source, free for use. FIWARE is the broadest model and the best way to prepare for interoperability of sector platforms.” (*Reference Architecture For Cross-Domain Digital Transformation V1, page 20*)

WG SAIM



## Perspective

Agrees with the appraisal for FIWRAE, but some parts might not be executed centralised for latency reasons:

- Grid development and production capacity planning is done on a decades scale, the bulk energy market trades energy days in, the reserve energy market operates on-demand in few seconds to few hours.
- Grid control is commonly a distributed reactive task, but flavoured with a lot of prediction based preparatory actions taken long in advance to prevent any expectable critical as good as possible.
- FIWARE appears like another platform tool to store and exchange lots of sensible data, from and among distributed devices and parties, with and without integrated analytic processing and made accessible via restrictive individual authorisation.
- For Citizens Energy Communities such an inter-sectoral platform is for sure a benefit. However, the perfectly distributed real-time control required to assure grid safety (stability) may be not integrable due to communication latencies that cause oscillations and consequential instability.

## SONDER

### About

In SONDER we intend to do IES integration profiles that specify all the features required for use-case specific interoperability with the existing energy system across all SGAM layers. For the integration of energy communities in grid related information exchange we assume IEC 61850 to be the default language to define intelligent electronic devices (IEDs); though within the DACH island some stick to 60870-5-104 still. For market interactions CIM (IEC 61968) appears to be the common established industry standard.

## Further resources

[Technical Framework on LEC](#)

[www.project-sonder.eu](http://www.project-sonder.eu)



# Funding Partners



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Agence de l'Environnement  
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ENERGETSKU UČINKOVITOST

