BABLE

A methodological approach for developing smart grids

- determining main drivers and match appropriate projects to meet local needs

A spin-off from

Fraunhofer IAO

MorgenStadt City of the Future

EnerDAY

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BABLE Smartcities

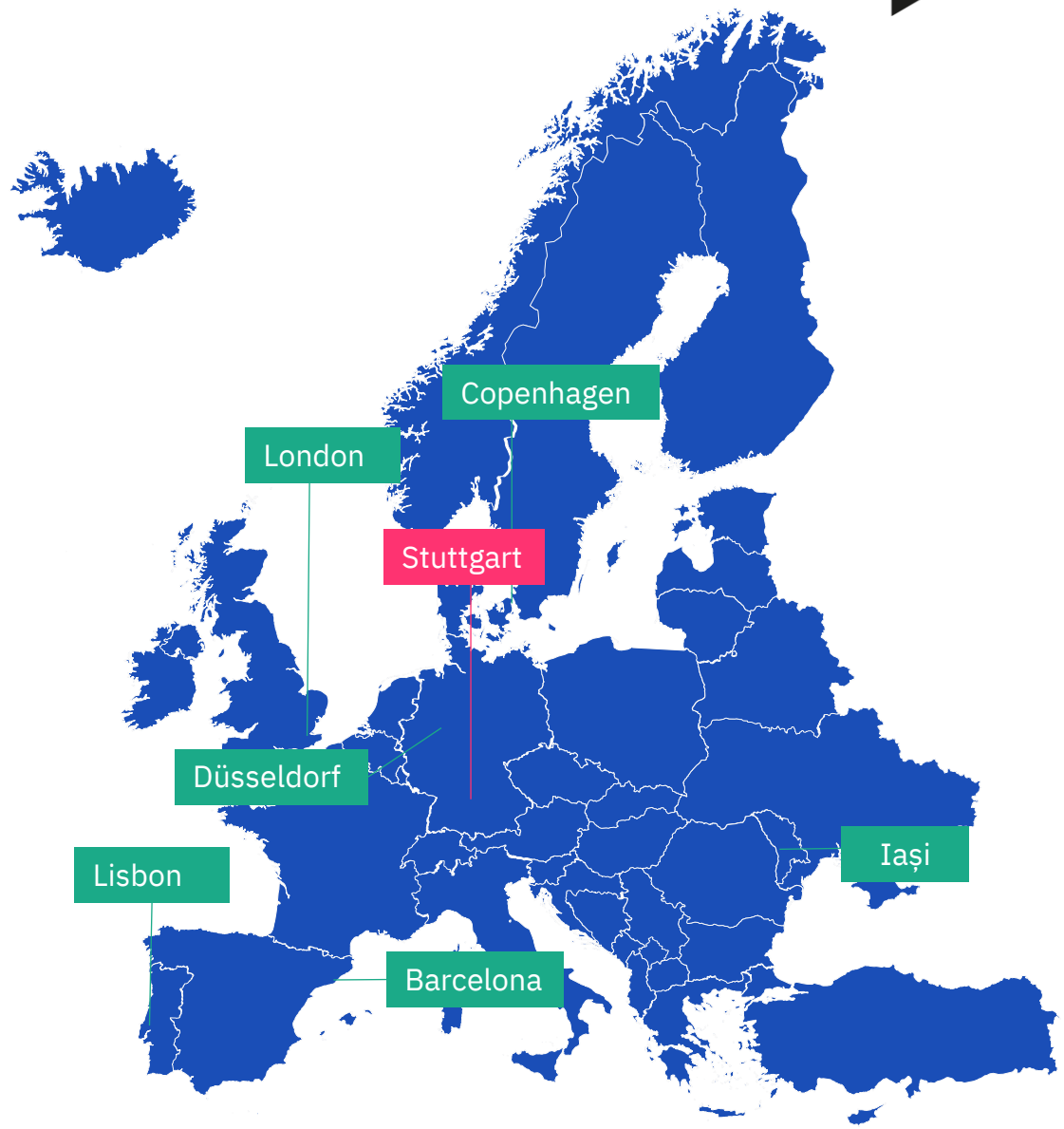
What we do

We accelerate the change for a better urban life with knowledge and market access for public and private sector

#1 Smart City **Knowledge Hub** with Acceleration Tools

Impactful and Engaging **Capacity Building**

Access to Experts and Insights for your Smart City Project

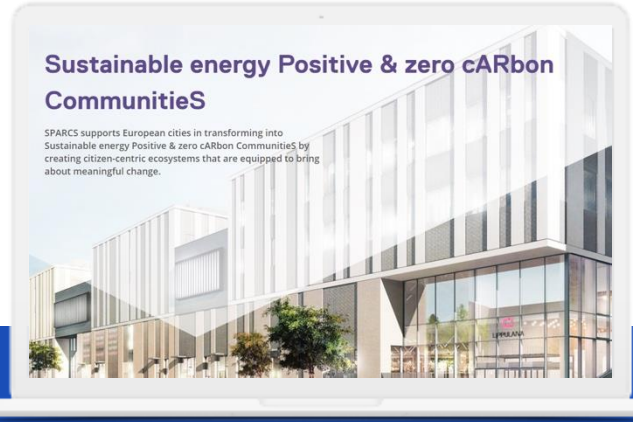


We are Collaborating with European Partners in H2020

Some examples of our EU-Funded projects:

Triangulum

Triangulum created a model to replicate projects throughout Europe, for the integration of existing technologies in the field of energy, transport and ICT



SPARCS

SPARCS supports cities in transforming into sustainable energy positive & zero carbon communities by creating citizen-centric ecosystems for action

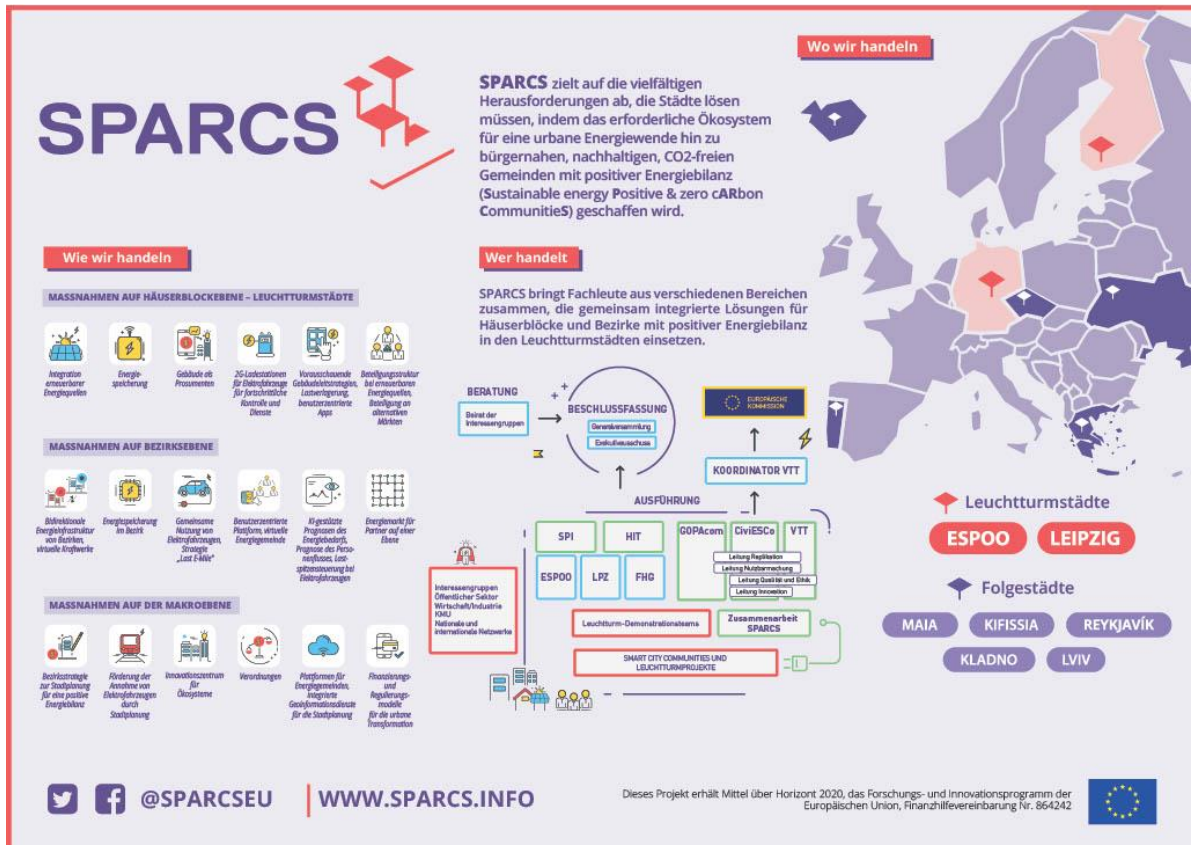
ENTRANCE

ENTRANCE aims to create a European matchmaking platform to accelerate the uptake of innovative zero- or near-zero transport and mobility solutions

Smart Grid Roadmapping

SPARCS project scope

SPARCS is working to create a network of Sustainable energy Positive & zero cARbon CommunitieS



SPARCS

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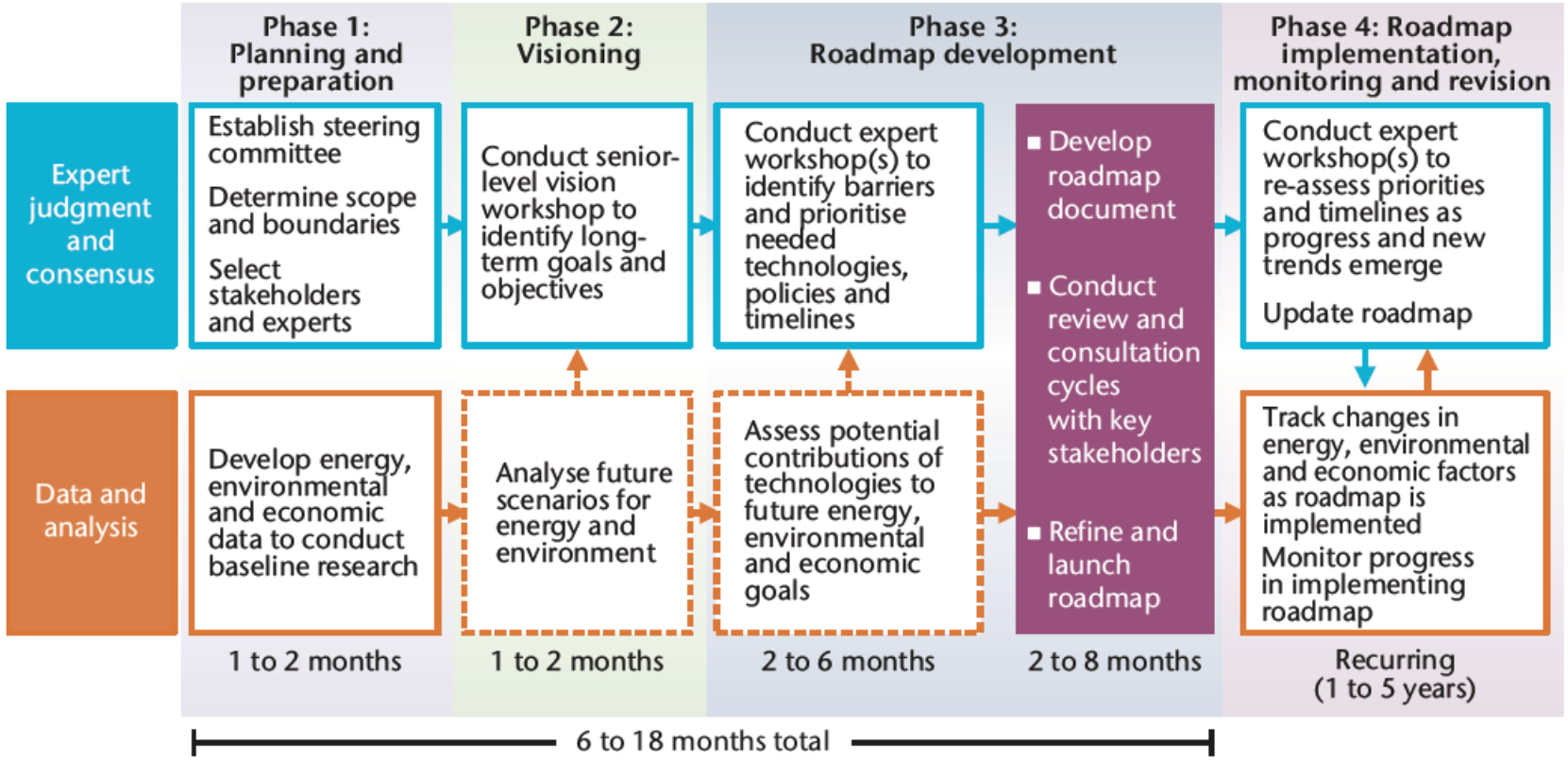
Topic: LC-SC3-SCC-1-2018-2019-2020: Smart Cities and Communities

Smart Grid Roadmapping

A technology roadmap for smart grids

IEA's roadmap development methodological approach



Five key actions:

1. Identifying smart grid stakeholders
2. Conducting baseline research to assess smart grid potential
3. Determining main drivers and appropriate projects to meet such needs
4. Pre-empting barriers and defining response actions for successful deployment
5. Setting timelines and milestones for monitoring roadmap implementation

Adapted from: (IEA, 2015).

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Smart Grid Roadmapping

Main drivers for Smart Grids at the Local Level

Transformation of cities into sustainable, zero carbon ecosystems with improved quality of life for citizens

Adapted from: IEA (2015) - How2Guide for Smart Grids in Distribution Networks

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Smart Grid Roadmapping

Challenges for Smart Grids at the Local Level

Multifaceted challenges in Smart Grid policy implementations

Need for smart consumers

- Lack of **awareness**, interest and policy co-development with consumers
- Need for **consumer participation models** supporting energy efficiency and demand response

Stakeholder engagement

- Lack of multi-way **communication** between key stakeholders
- Rigid, pyramid approach within the SG stakeholder network

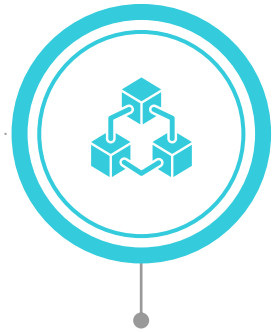
Funding and incentives

- Concentrated risks in particular stakeholders
- Lack of incentives provided via stable and **long-term policy framework**
- Expand policy framework beyond supporting SG infrastructure

Market development

- Need for a more **open market** (competition and innovation)
- Need to **lower entry barriers** to distributed energy resources aggregators and platforms

Standards and frameworks



- Need for policies that directly and indirectly support **interoperability** and integration of both technologies and market actors

Adapted from: Nair (2017) - Smart Grid Policy Implementation Barriers

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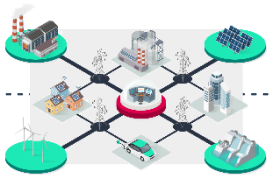
Smart Grid Roadmapping

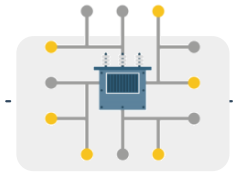
Match appropriate projects to meet local needs

Project Types



Distribution/ Substation automation

Control-centre systems



Asset management

System infrastructure-focused

Advanced Metering Infrastructure (AMI)

Distributed Energy Resources (DER)

Customer-side systems

Customer-oriented

ICT infrastructure

Data integration

Data governance

Cross-cutting

Adapted from: IEA (2015) - How2Guide for Smart Grids in Distribution Networks; ©Slidesgo, ©Flaticon, ©Shutterstock, ©IBM

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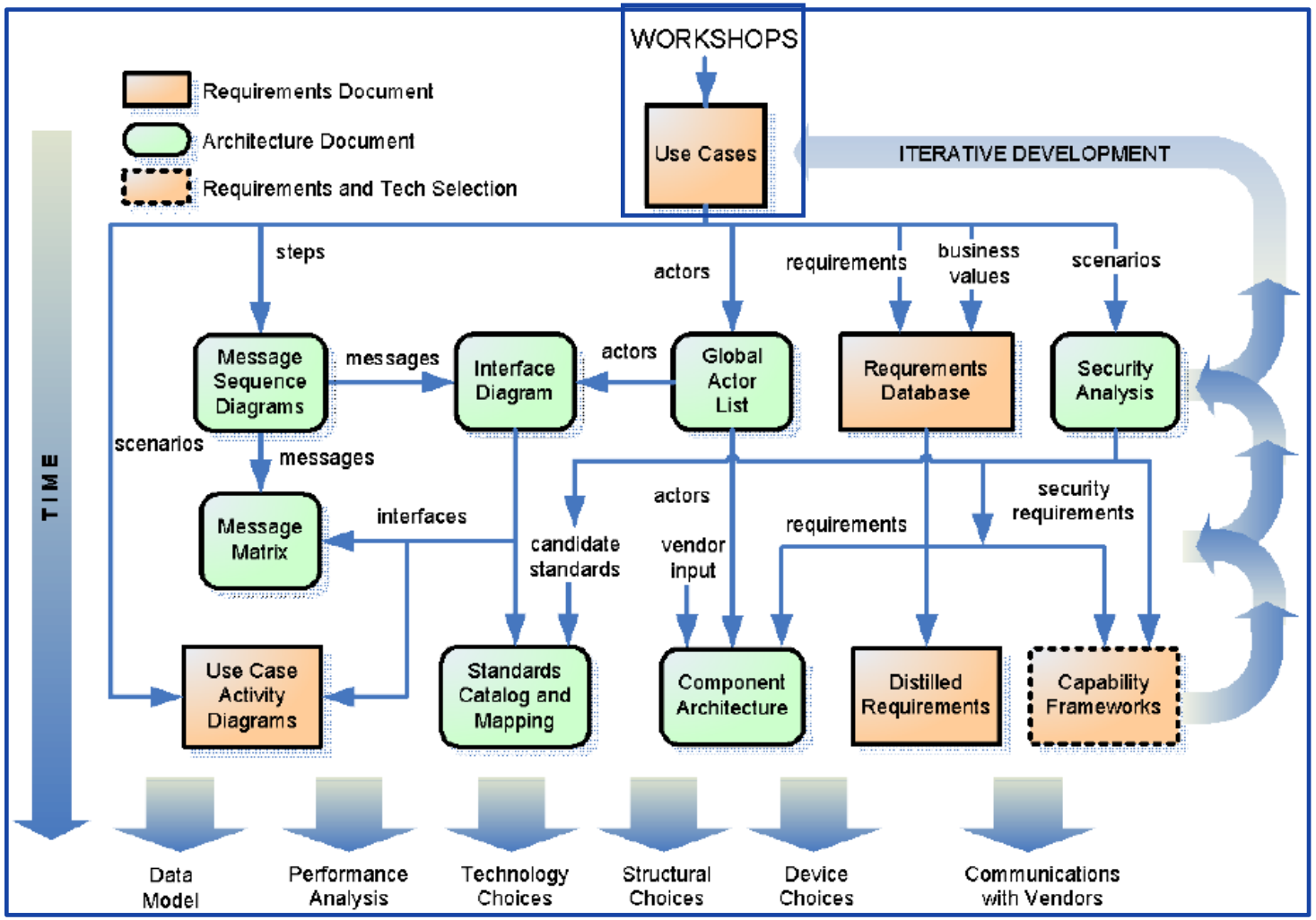
Smart Grid Roadmapping

Match appropriate projects to meet local needs



- The amount of technology involved in a roadmap is big - +200 technology categories
- Getting too technical and too specific too early would lead to compromises in other areas which the team is not even aware they are making.
- Don't just add new technology – consider legacy systems and integration with broader systems

Source: Smart Grid Roadmap Guidebook (EPRI, 2012)

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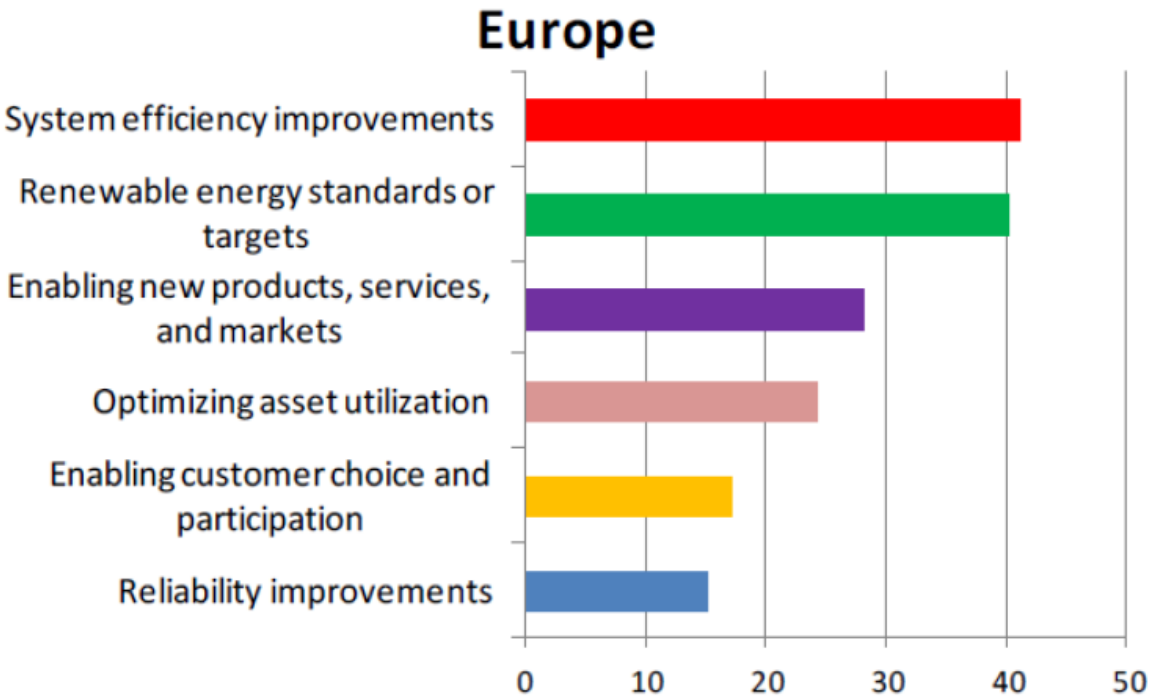
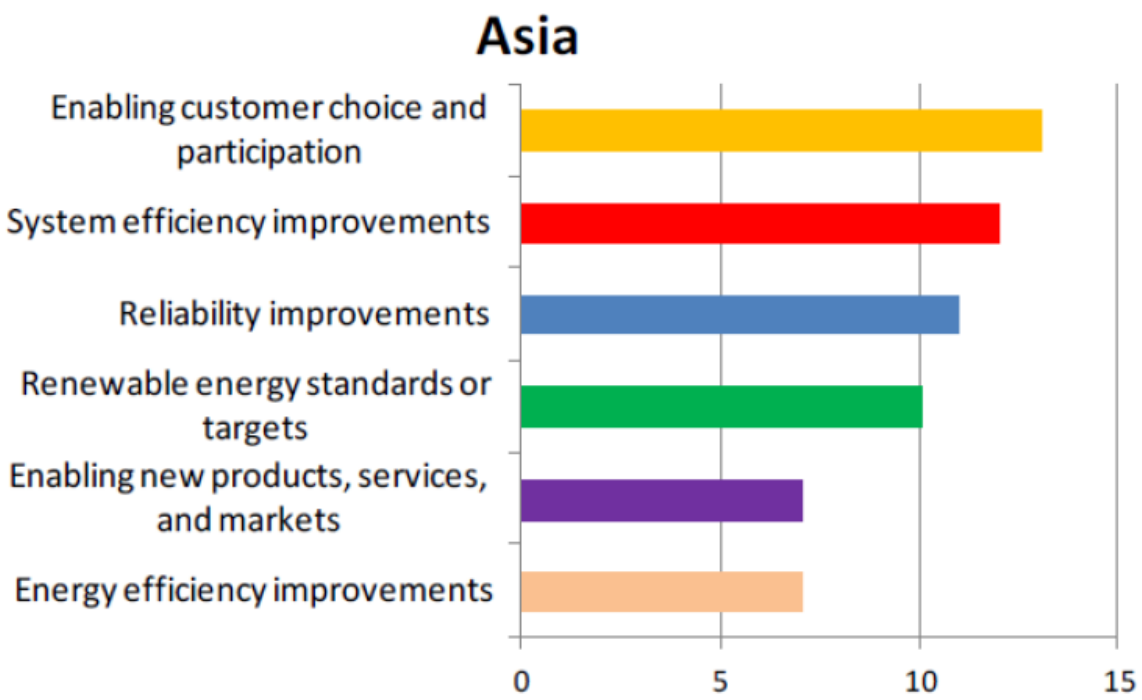
Smart Grid Roadmapping

What do you think are the top drivers of smart grids?





Adapted from: (ISGAN, 2014)

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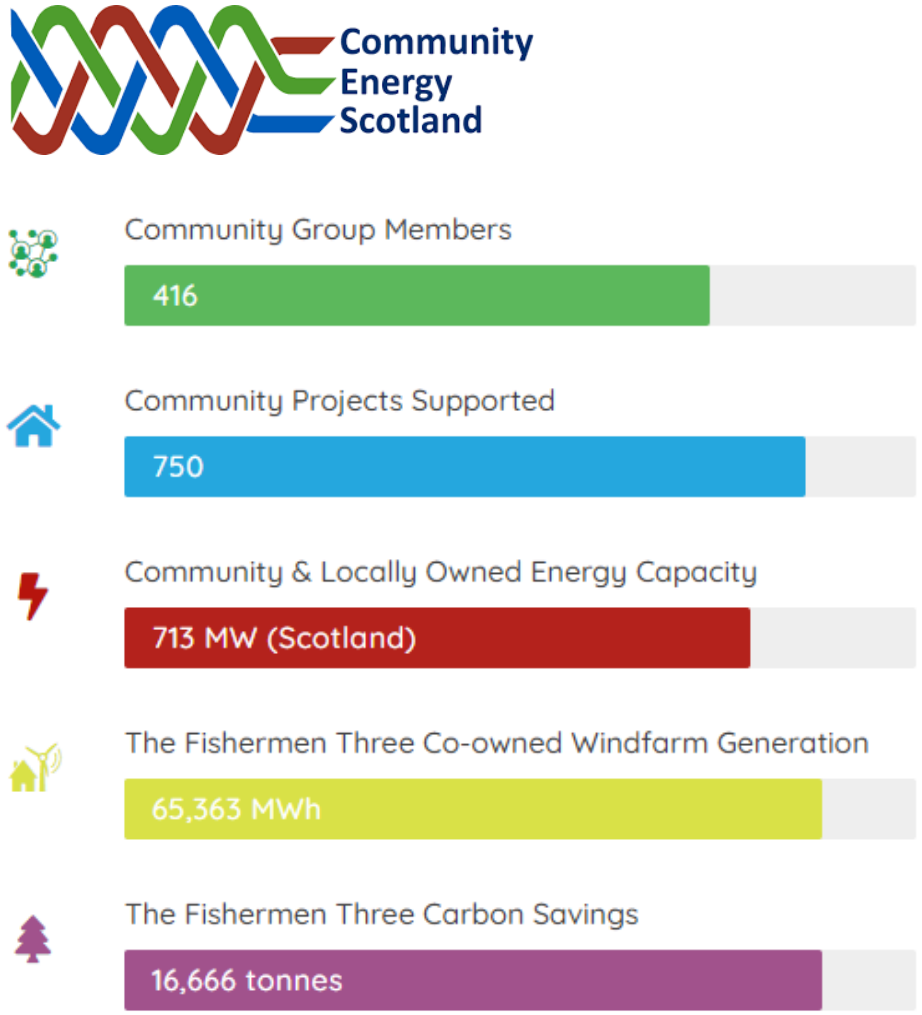
Economics & financing

Barriers & response actions

Example I: Community Energy Scotland

Community Energy Scotland provides independent and ongoing practical and technical support for community project development

- Co-ordinated efforts from developers, government, and civil society, led by Scottish targets, to increase community and locally-owned renewable energy
- Encouraging communities to engage in the energy sector for their own financial, social, and environmental benefit
- Using a mix of: Feed-in-Tariffs (FiTs), Renewable Obligation Certificates (ROCs), and "risk-free" grants and loans from the Energy Saving Trust (EST) and the Community and Renewable Energy Scheme (CARES)
- Outcome: Community-owned and led projects capturing secure revenues from energy generation close to source



Source: Community Energy Scotland

Economics & financing

Barriers & response actions

Example II: Municipal ESCos in the UK

Municipally-owned Energy Service Companies (ESCos)

- Energy services suppliers at the city scale, which enable Local Energy Schemes through Purchase Power Agreements (PPAs)
- Facilitate civic generation by becoming the main purchaser of electricity generated by the local energy schemes.
- Not necessarily a grid owner but plays an aggregator role balancing local embedded generation with wholesale purchases (e.g., local supply shortfalls)
- They also lead the development of DER and energy efficiency measures, and have a statutory duty to address fuel poverty and equity.

ThamesWey
1999 – 2019 20 years of building sustainable communities

Founded in 1999 by Woking Borough Council. It supplies energy to 800 domestic customers and 30 retail units

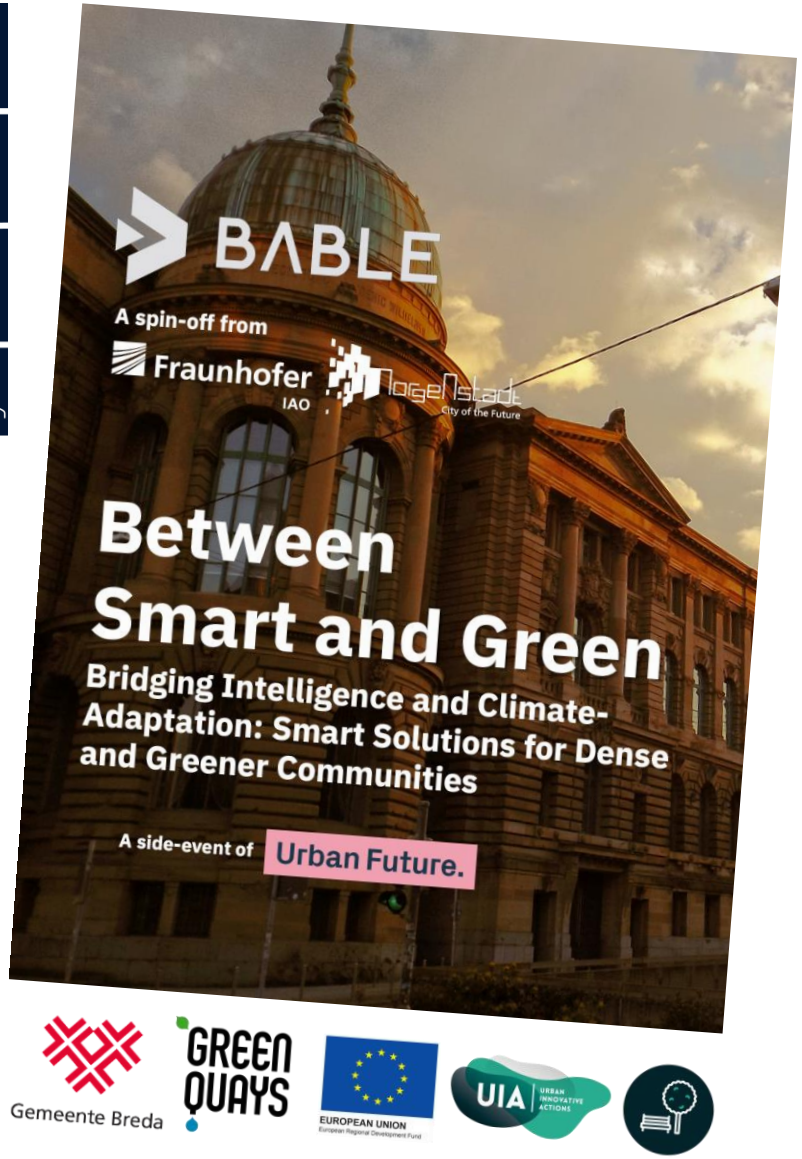
Based on: Hall (2015) – Distributing Power: A transition to a civic energy future

Smart Grid Roadmapping
Final remarks

Key recommendations:

- Multilevel governance is critical. National and local energy system policy, strategy and system regulation cannot be treated in isolation.
- Get the demand side right. Demand and supply should be integrated at the city scale, so energy policy needs to treat distributed generation and (aggregated) demand response equally and in the same framework.
- New stakeholders mean new business models. New ways of valuing energy systems are needed that require new decision support tools.

WILL YOU JOIN US FOR THIS DYNAMIC ENGAGING AND PASSIONATE EVENT?



BABLE

Feel free to contact us.
Whenever you like.

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Breaking down Smart Grids Innovation

Smart Grids Architecture Model (SGAM)

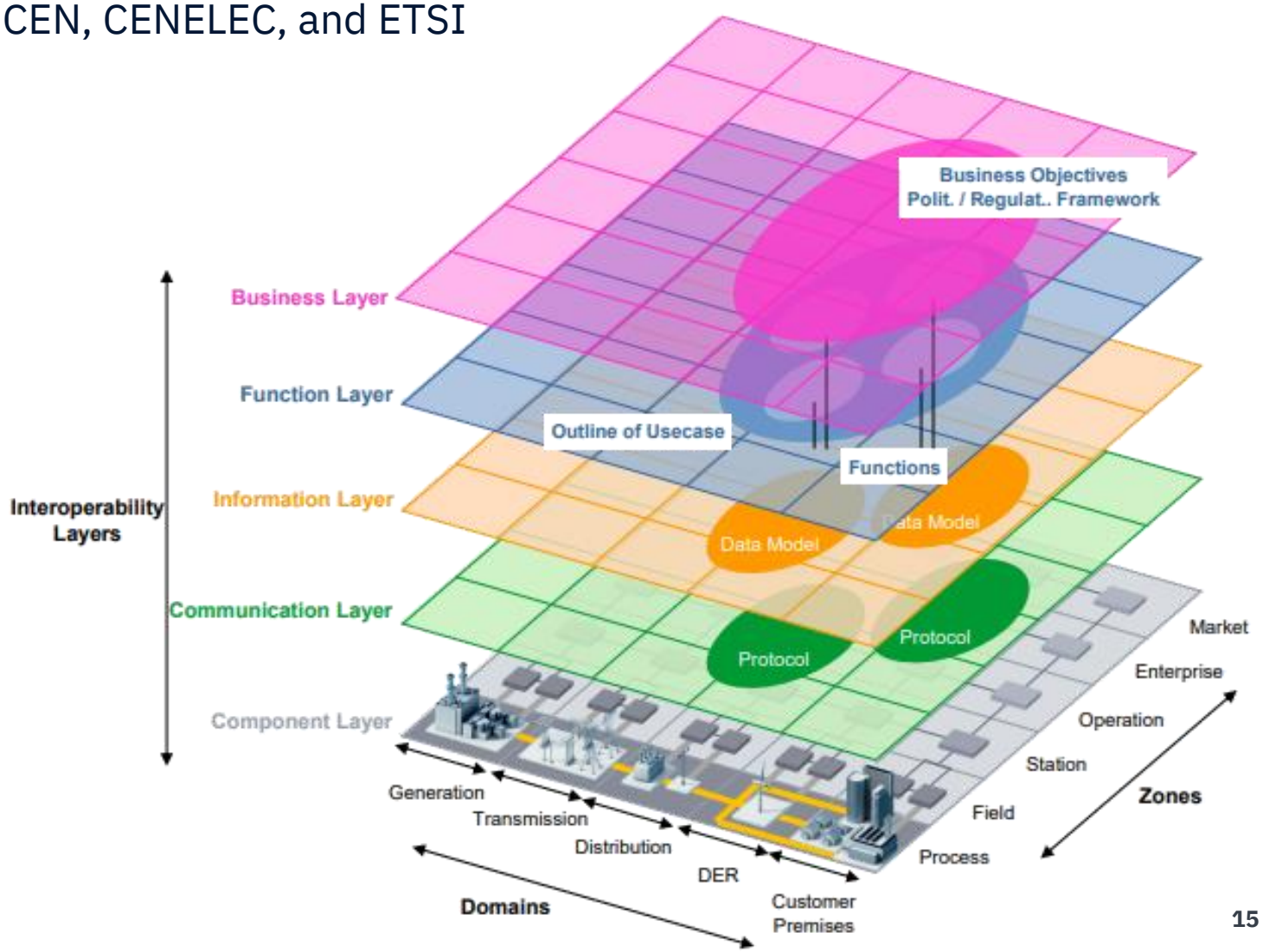
The European Model co-developed by CEN, CENELEC, and ETSI

Based on NIST model but with some changes to include specific requirements to the EU context that were not addressed.

Two main elements were added:

- A separate Distributed Energy Resource (DER) domain
- “Flexibility” entity grouping consumption, production and storage.

The model focuses on interoperability: Provides a holistic framework on the most important existing standards and architectures



Source: CEN, CENELEC, ETSI (2012): Smart Grid Reference Architecture

Smart Grid Roadmapping

What are the top 3 drivers of smart grids in your city?

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