



Unlocking Energy Efficiency post 2020 Policy background & R&I challenges

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Energy efficiency legislation

ACHIEVING THE BINDING 30% ENERGY EFFICIENCY TARGET BY 2030



Energy Efficiency Directive

- Binding 30% energy efficiency target for 2030
- Continue & clarify Art. 7 beyond 2020 + consider energy poverty
- Empower consumers by granting access to information on their energy consumption
- >
- Create 400,000 new jobs
- Reduce gas imports by 12%
- Save € 70 billion in fossil fuel imports



Energy Performance of Buildings Directive

- Clear vision for a decarbonised building stock by 2050
- Smart & Efficient buildings through use of Information and Communication Technologies and Smart Technologies; EV-charging
- Smart Finance for Smart Buildings initiative:
 - More effective use of public funding
 - Aggregation of funds
 - De-risking
- Protect vulnerable groups & address energy poverty



Ecodesign Working Plan 2016-2019

- List of new product groups
- Outline on how ecodesign will contribute to circular economy objectives
- Specific measures for verification tolerances and air heating and cooling products
- Guidelines on voluntary agreements

Energy Efficiency legislation revision - conclusions for 2030

1. Building renovation has to do more

2. Financing has a more important role to play

3. Digital/ICT has a big potential to:

- Capture behavioral change potentials

- Improve energy performance assessment and measurement accuracy for new business models (guaranteed energy savings)

- Activate demand-side resources to optimise energy use within the building and across the system

R&I challenges to unlock energy efficiency post 2020

Upgrading buildings' energy performance and smartness

- *buildings renovation: innovative technologies, skills, and business models (EE1; EE2; EE3);*
- *buildings energy performance assessment: innovation for quality and convergence (EE5);*

Energy efficiency is an investment

- *investments standardisation based on reliable data (EE10),*
- *innovative financing schemes with non-energy benefits valuation (EE9),*
- *aggregation of projects (EE11)*
- *mobilisation of cities' investments (EE17)*
- *socio-economic research conceptualising energy efficiency as "first fuel" (EE14)*

Digital technologies enable energy transition

(ICT for more efficiency and flexibility of energy consumption)

- *smarter (existing) buildings (EE4)*
- *smart energy services valorising energy efficiency and consumption flexibility (EE13)*
- *energy communities, collective actions of energy consumers (EC1)*
- *digitalisation of energy (IoT, big data, cybersecurity)*



#InvestEUresearch

Horizon 2020 Work Programme for Research & Innovation 2018-2020

Activities of Societal Challenge 3: "Secure, clean and efficient energy"

XXX

Research and
Innovation

Energy Efficiency



Buildings



Consumers
& Services



Industry



Financing
Energy
Efficiency



Public
Authorities
& Policy Support



Digitisation

**Innovation
Actions**
EU Support: 70%
3 to 30 M€ / project

EE1/*EE1*
EE4
EE5

EE6

DT-ICT-10

**Coordination
& Support
Actions**
EU support: 100%
0.5 to 2 M€ / project

EE2/*EE2*
EE3
EE5

EC1/*EC1*
EC2/*EC2*
EE13/*EE13*

EE6
EE8/*EE8*

EE2/*EE2**
EE9/*EE9*
EE10/*EE10*
EE11/*EE11*
EE13/*EE13**
EE17

EE16/*EE16*
EE15
*EE17**

**Research &
Innovation
Actions**
EU Support: 100%
1 to 2 M€ / project

EE14/*EE14*

Standard text: 2018 topics
Italic text: 2019 topics



* The topic also addresses this thematic area where indicated

Energy Efficiency



Buildings
21 M€ (2018)
26 M€ (2019)



Consumers
& Services



Industry



Financing
Energy
Efficiency



Public
Authorities
& Policy Support



Digitisation

Innovation Actions



- EE1** – Innovative approaches for building renovation (2018, 2019)
- EE4** – Upgrading smartness of existing buildings through innovations for legacy equipment (2019)
- EE5** – Next generation of energy performance certification (2019)

Coordination & Support Actions

- EE2** – Integrated home renovation services (2018, 2019)
- EE3** – Stimulating demand for sustainable energy skills in the construction sector (2019)
- EE5** – Next generation of energy performance certification (2018)

Energy Efficiency

EE-1-2018-2019: Decarbonisation of the EU building stock: innovative approaches and affordable solutions changing the market for buildings renovation (IA)

Specific Challenge

- **Deep renovations** need to become **more attractive**, more reliable in terms of performance, less disruptive for occupants, less time-consuming, less energy-intensive from a life cycle perspective, more environmentally friendly and more cost-effective

Scope

- Demonstrate solutions addressing **building fabric and/or technical systems** that ensure faster and more cost-effective deep renovations that result in high energy performance
- Include innovations in **technology** and in **design** and **construction methods**, but also in **business models** and the **holistic integration of disciplines** across the value chain

Expected impact

- Primary energy savings; investments in sustainable energy; Higher energy performance in the renovated buildings; cost reduction; reduction of time needed on site for renovation works (-20% compared to current national standard practice); increased rate of renovation

Energy Efficiency

EE-2-2018-2019: Integrated home renovation services (CSA)

Specific Challenge

- Many project promoters **lack the skills and capacity** to set up, implement and finance ambitious low-energy and clean energy building projects

Scope

- Create or replicate innovative local or regional "**integrated home renovation services**" covering the whole "customer journey" from technical and social diagnosis, technical offer, contracting of works, structuring and provision of finance, to the monitoring of works and quality assurance
- Services should be **operational at the end of the project** and create more demand for holistic approaches

Expected impact

- Implementation and upscaling of economically viable business models, ultimately running without the need for public subsidies
- Availability of adequate financing offer for integrated renovation services
- Strong and trustworthy partnerships with local actors and quality of the proposed services recognized by market actors
- Development of large, locally-developed investment pipelines for home renovation, connecting the supply of finance with demand for it
- Uptake of home energy renovation at local level

Energy Efficiency

EE-3-2019: Stimulating demand for sustainable energy skills in the construction sector (CSA)

Specific Challenge

- Increase the number of **skilled building professionals and/or blue collar workers** across the building design, operation and maintenance value chain

Scope

- Stimulation of demand for **energy skills in construction** - development, up-scaling and combination of a range of tools and initiatives:
 - Tools facilitating the **mutual recognition** of energy skills and qualifications in the construction sector
 - National, regional or local initiatives **raising awareness**
 - Support to public authorities for the development of **new legislative frameworks**
 - **Partnerships** with producers and retailers of construction products
 - Initiatives **reinforcing the link** between skills/education and energy performance/quality of construction

Expected impact

- Primary Energy savings; increased renewables production resulting from improved skills; investments in sustainable energy; increased number of certification schemes for energy efficiency skills; improved mutual recognition of sustainable energy skills; improved collaboration and understanding across different trades and professional groups; legislative changes; reduction in the gap between designed and actual energy performance through improved quality of construction.

Energy Efficiency

EE-4-2019: Upgrading smartness of existing buildings through innovations for legacy equipment (IA)

Specific Challenge

- Innovative technologies for **enabling smart buildings to interact** with their occupants and the grid in real time and managing themselves efficiently (becoming an active element of the energy system.)

Scope

- Develop and demonstrate cost-effective **technological solutions to manage energy** within existing buildings and **interact with the grid** providing energy efficiency, flexibility, generation and storage, based on user preferences and requests (using automation and IT)
- Demonstrate how the smart systems, smart controls and smart appliances can be integrated seamlessly in **existing buildings** to interface and/or to control the major energy consuming domestic appliances that are already installed
- Include clear **business model development** and a clear path to finance and deployment

Expected impact

- Primary Energy savings; Investments in sustainable energy; Upgrade of existing buildings to higher smartness levels, including a significantly enlarged base of existing building equipment and appliances monitored by energy management systems and activated through demand response actions; Reduction in energy consumption and costs

Energy Efficiency

EE-5-2018-2019: Next-generation of Energy Performance Assessment and Certification (CSA, IA)

Specific Challenge

- **Assessment processes and certificates** have to become more reliable, user-friendly, cost-effective, have comparable good quality and be compliant with EU legislation in order to instil trust in the market and incite investments in energy efficient buildings

Scope

- **2018 (CSA):** Stimulate and enable the **roll-out of next-generation of energy performance assessment and certification**, with a view to achieve enhanced reliability, cost-effectiveness and compliance with relevant EU standards and the EPBD
- **2019 (IA):** Definition and demonstration of **innovative approaches for the assessment of building energy performance**, focusing on the reliable assessment of building intrinsic performances but working also towards output-based assessments using available building energy related data

Expected impact

- **2018 (CSA):** Primary energy savings; investments in sustainable energy; increased convergence of good quality and reliable energy performance assessment and certification and uptake and compliance with EU Directives and related standards; increased rate of application and compliance of EPCs and independent control systems; increase of EPCs databases for compliance checking and verification
- **2019 (IA):** Improved user-friendliness of EPCs; enhanced user awareness of building energy efficiency; primary energy savings; investments in sustainable energy

Energy Efficiency



Buildings



Consumers
& Services
14 M€ (2018)
18 M€ (2019)



Industry



Financing
Energy
Efficiency



Public
Authorities
& Policy Support



Digitisation

Coordination
& Support
Actions

EC1 – Role of consumers in changing the market (2018, 2019)*

EC2 – Mitigating household energy poverty (2018, 2019)*

EE13 – Next generation of smart energy services (2018, 2019)

*For EC1 & EC2 consult the slides under Smart and Clean Energy for Consumers

Energy Efficiency

EE-13-2018-2019: Enabling next-generation of smart energy services valorising energy efficiency and flexibility at demand-side as energy resource (CSA, IA)

Specific Challenge

- Big **untapped potential** in sectors and with actors not yet engaged in services triggering energy, CO2 and cost savings

Scope

- **2018 (CSA)**: Actions should allow different market actors to get together and develop **concepts and business models** for new types of energy services integrating energy efficiency with other energy services (flexibility, distributed generation etc.) and non-energy services (comfort, safety, health); moreover actions to support the use of 'big data' for verification and monitoring and to improve the accessibility of demand side service providers.
- **2019 (IA)**: Demonstrating and testing **innovative energy services in a real environment**, across several market segments and different actors in the value chain; tested business models and services should consider innovative monitoring and verification solutions, legal aspects and be self-sustainable after the end of the project

Expected impact

- Primary Energy savings; investments in sustainable energy; improved viability of innovative energy services; growing offer and up-take of new types of integrated energy services; growing up-take of innovative data gathering and processing methods in the monitoring and verification of energy savings and flexibility; application of methods and concepts to ensure that: (i) innovative energy services are reliable and verifiable, (ii) service providers are trustworthy and accessible.

Energy Efficiency



Buildings



Consumers
& Services



Industry
19 M€ (2018)
15 M€ (2019)



Financing
Energy
Efficiency



Public
Authorities
& Policy Support



Digitisation

Innovation
Actions

EE6 – Industrial waste heat/cold recovery (2018, 2019)

Coordination
& Support
Actions

EE8 – Capacity building to support energy audits (2018, 2019)

Energy Efficiency

EE-6-2018-2019: Business case for industrial waste heat/cold recovery (IA, CSA)

Specific Challenge

- Sources of **heat/cold losses** can be a **valuable resource** for other industries and buildings/ District Heating and Cooling operators and could be of commercial interest for the waste heat/cold producer.

Scope

- **2018 (IA): Cost-benefit models** for industrial waste heat/cold recovery - develop and demonstrate integrated cost-benefit simulation tools that can determine the best utilisation options of recovered waste heat/cold and/ or surplus renewable energy from industrial and eventual other sources
- **2019 (CSA): Symbiosis in industrial parks and clusters- non-technological barriers** - improving the energy efficiency of industrial parks, districts, and clusters by developing and testing instruments facilitating the actual implementation of energy cooperation or/and of replicable business models and service concepts for joint energy services

Expected impact

- Accurate prediction and holistic modelling of industrial waste heat/cold and/or surplus renewable energy from industrial or other sources; valorisation in assessments of cost-benefit of industrial waste heat/cold and/or surplus renewable energy; primary energy savings; investments in sustainable energy; number of stakeholders/businesses concretely engaged; change in policy framework to facilitate energy cooperation

Energy Efficiency

EE-8-2018-2019: Capacity building programmes to support implementation of energy audits (CSA)

Specific Challenge

- **Lack of expertise, time and capital** often prevents SMEs from implementing energy conservation measures or from getting access to the energy services market. The effectiveness of energy audit results relies also on behavioural changes enabling large enterprises to concretely achieve energy savings. Moreover, Member States shall improve the surrounding conditions of SMEs boosting their confidence on investing in energy efficiency measures through the development of national supporting schemes.

Scope

- Proposals should focus on one, or more, of the following issues:
 - Develop staff trainings and capacity building programmes, facilitating **SMEs to undergo energy audits** and to implement the recommended energy-saving measures
 - Capacity building to support the **take-up of audits recommendations for Large companies**
 - Initiatives **supporting Member States** in empowering or establishing national supporting schemes for SMEs

Expected impact

- Primary energy savings; investments in sustainable energy; market stakeholders with increased skills/capability/competencies and long-lasting training schemes; enhanced energy culture; Creation and adaption of policies and strategies supporting SMEs to undergo energy audits

Energy Efficiency



Buildings



Consumers
& Services



Industry



Financing
Energy
Efficiency
19 M€ (2018)
27 M€ (2019)



Public
Authorities
& Policy Support



Digitisation

EE9 – Innovative financing for EE investment (2018, 2019)

EE10 – Mainstreaming EE finance (2018, 2019)

EE11 – Project Development Assistance (2018, 2019)

EE17 – European City facility - European Cities as key innovation hubs to unlock finance for energy efficiency (2019)

EE2 – *Integrated home renovation services (2018, 2019)**

EE13 – *Next generation of smart energy services (2018, 2019)**

Coordination
& Support
Actions

Energy Efficiency

EE-9-2018-2019: Innovative financing for energy efficiency investments (CSA)

Specific Challenge

- Need to set up **innovative regional/national financing schemes** to create the conditions for adequate supply of private finance for energy efficiency investments and maximise leverage ratio of private finance to public funds

Scope

- **Development or replication** and implementation of innovative financing schemes for energy efficiency investments
- Establishment of **new** innovative, operational financing schemes; **replication** of previously successful solutions (e.g. developed under PDA/ELENA); establishment of regional/national **aggregators** which are able to develop large (standardized) project pipelines; creation of EU or regional/national energy efficiency **investment roundtables/platforms** to organise dialogue with and between the relevant stakeholders and develop roadmaps, design and validate (template) documents and contracts etc.

Expected impact

- Delivery of innovative financing schemes that are operational and ready to finance energy efficiency investments; regional/national aggregators with capacity to set up large-scale pipeline of (standardized) sustainable energy investments; EU or regional/national energy efficiency investment roundtables/platforms providing comprehensive range of support and/or services to facilitate access to energy efficiency finance; primary energy savings; investments in sustainable energy

Energy Efficiency

EE-10-2018-2019: Mainstreaming energy efficiency finance (CSA)

Specific Challenge

- **High transaction costs for rather small investments, high perceived risks, lack of standardisation and track record** for energy efficiency investments reduce attractiveness for financial institutions
- **Non-energy benefits** need to be quantified and monetised

Scope

- Proposals should address at least one of the following issues:
 - Development, demonstration and promotion of **frameworks for the standardisation and benchmarking** of sustainable energy investments
 - **Capacity building for banks and investors**, in particular on underwriting sustainable energy investments;
 - Gathering, processing and disclosing **large-scale data on actual financial performance** of energy efficiency investments
 - Further integration of **non-energy benefits** in project valuation
 - Targeting **institutional investors**
 - Exploring the impact of **revised risk ratings and requirements**

Expected impact

- Frameworks, standardisation, benchmarking, standardised descriptions and data evidence of financial returns of energy efficiency investments; higher allocation of institutional investments to energy efficiency; standardisation of assets enabling securitisation; development of a secondary market for energy efficiency assets; primary energy savings; investments in sustainable energy

Energy Efficiency

EE-11-2018-2019: Aggregation - Project Development Assistance (CSA)

Specific Challenge

- Energy efficiency projects are fragmented and still considered risky by investors and lenders. EU support can help **build confidence of market actors** towards such investments and **mobilize private finance**. In particular, support to the introduction of financial and organisational innovations, facilitation of project aggregation minimising transaction costs, and removal of legal, administrative and other market barriers would be needed

Scope

- **Project Development Assistance (PDA)** to build technical, economic and legal expertise of public and private project promoters, with the **final aim of launching concrete investments**
- Exemplary/showcase dimension in the **ambition to reduce energy consumption** and/or in the **size of the expected investments**
- Delivery of **organisational innovations** and **high degree of replicability**, building on previous PDA experience

Expected impact

- Primary Energy savings; investments in sustainable energy; sustainable energy investment projects and innovative financing solutions and/or schemes; every million Euro of Horizon 2020 support should trigger investments worth at least EUR 15 million; innovative and replicable investment financing solutions

Energy Efficiency

EE-17-2019: European City facility - European Cities as key innovation hubs to unlock finance for energy efficiency (CSA)

Specific Challenge

- Despite a tremendous potential, too few cities and communities in Europe succeed in developing and scaling up investment packages due to **lack of capacity and resources** of public authorities, especially of small and medium-sized municipalities, to transform their overall long-term strategies (e.g. Sustainable Action Plan or similar) into **credible investment concepts**

Scope

- Set up/operation of a **'European City Facility' as an intermediary** offering financial support and services to large number of cities and municipalities (or groupings) to:
 - Develop innovative investment concepts (identification of the potential project pipeline, financing strategy, governance analysis, design of the process for launching investments, etc.)
 - Within a limited period of time
 - Via "cascade funding" (i.e. "lump sums")

Expected impact

- Investment concepts; tangible sustainable energy investments; increased leveraging of finance into energy efficiency investments by public authorities; for every million Euro of Horizon 2020 support trigger energy efficiency investments worth at least EUR 20 million; increased capacity of public authority staff for developing investible energy efficiency projects; innovation uptake by potential replicators; primary energy savings; renewable energy production

Energy Efficiency



Buildings



Consumers
& Services



Industry



Financing
Energy
Efficiency



Public
Authorities
& Policy Support
17 M€ (2018)
14 M€ (2019)



Digitisation

Coordination
& Support
Actions



EE16 – Supporting public authorities (2018, 2019)

EE15 – New energy label (2018)

EE17 – *European City facility - European Cities as key innovation hubs to unlock finance for energy efficiency (2019)**

Research
& Innovation
Actions



EE14 – Socio-economic research (2018, 2019)



* The thematic area Public Authorities & Policy Support is also addressed by this topic

Energy Efficiency

EE-14-2018-2019: Socio-economic research conceptualising and modelling energy efficiency and energy demand (RIA)

Specific Challenge

- Energy efficiency is not sufficiently taken into account in financial and political decision making, and planning, because the structure of energy demand, as well as the **real value** and impacts of energy efficiency, are still not well understood

Scope

- **2018: Conceptualise** the energy efficiency first principle, **assess and quantify its impacts**, in particular as regards: its role and value in the energy system and energy market; its role and value in financing decisions; its economic and social impacts; its correlation and interaction with other policy objectives; existing best practices worldwide.
- **2019:** Deepen the **demand side-related parameters in existing models** and to include new aspects and data sources; complement the existing demand side energy models by developing multiple-agent energy models and/or modelling segments and/or developing methodologies on how to improve and enhance the demand side aspects in modelling.

Expected impact

- **2018:** Support policies aiming to promote and implement the "energy efficiency first-principle" based on a sound assessment of the concept and its impacts
- **2019:** More accurate and holistic mapping and modelling of the demand side; better assessment of energy consumption trends for different categories of economic agents; more accurate follow-up of energy efficiency measures implemented at the demand side; better assessment of demand-side policy needs at European level

Energy Efficiency

EE-15-2018: New energy label driving and boosting innovation in products energy efficiency (CSA)

Specific Challenge

- **Rescaling of current energy labels** will be a challenging operation in terms of organisation and provision of information to the concerned market actors, requiring technical guidance, communication and training campaigns, including during the transitional periods in order that the new scale is applied correctly

Scope

- The proposed action should cover one or more of the following:
 - Raise the **capacity of manufacturers and retailers** to fulfil their obligations
 - Develop and roll out tailored and effective actions focusing on **awareness-raising and information campaigns** to alert market actors of label rescaling
 - Exchange of **best practices** in relation to these campaigns
 - **Involve all relevant stakeholders** necessary for the successful implementation of the action

Expected impact

- Primary energy savings; investments in sustainable energy; improving the understanding of rescaled labels by informing stakeholders and engaging manufacturers, suppliers and retailers, thus minimising any risk of confusion; reduced compliance costs, minimise errors during the transition periods

Energy Efficiency

EE-16-2018-2019: Supporting public authorities to implement the Energy Union (CSA)

Specific Challenge

- **Local and regional public authorities** have a crucial role in setting ambitious energy efficiency strategies and become energy transition leaders
- The focus should turn to **implementation and effective monitoring** of concrete energy efficiency solutions and actions, to modernise and decarbonise the European economy

Scope

- **Support to local and regional public authorities:** Deliver higher quality and consistency of energy efficiency measures implemented through enhanced coordination of different administrative levels; Support public authorities in the development of transition roadmaps that clearly outline the path to the 2050 targets; Innovative ways to enable public engagement in the energy transition; Deliver large-scale and action-oriented peer-to-peer learning programmes targeting cities and/or regions
- **Supporting the delivery of the Energy Efficiency Directive:** Assisting Member States to fulfil their obligations under the Energy Efficiency Directive and supporting its efficient implementation taking into account existing effective practices and experiences

Expected impact

- Primary energy savings, renewable energy production and investments in sustainable energy; Public officers with improved capacity/skills; Policies influenced; Improved implementation of Art 7. (Energy Efficiency Obligation schemes or alternative measures); improved and consistent monitoring and verification systems for energy savings across governance levels

Energy Efficiency



Buildings



Consumers
& Services



Industry



Financing
Energy
Efficiency



Public
Authorities
& Policy Support



Digitisation
15 M€ (2018)
15 M€ (2019)

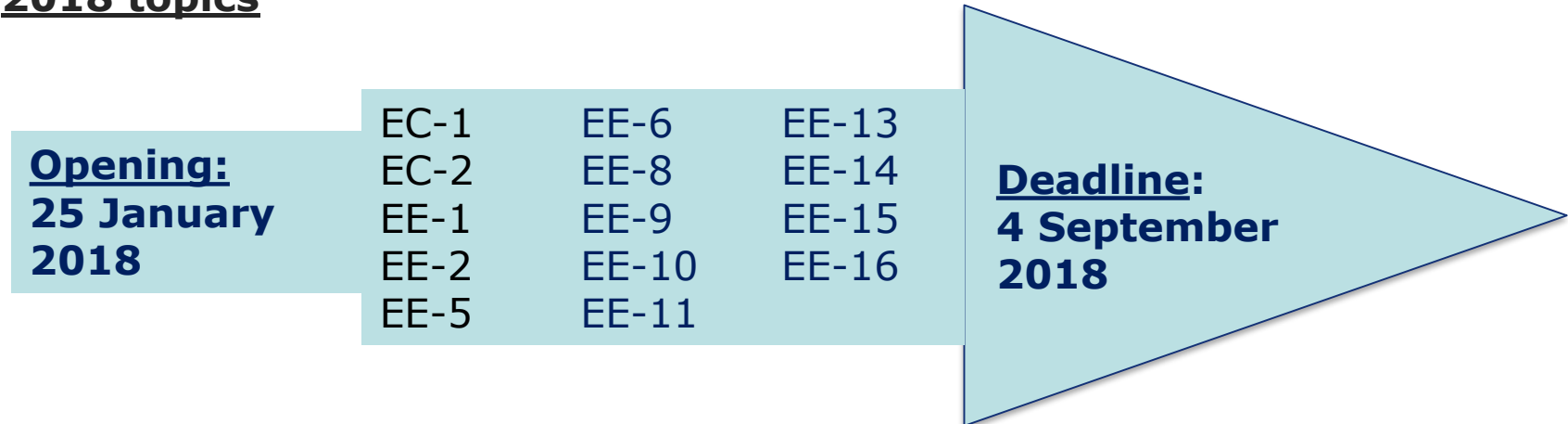
Innovation
Action

DT-ICT-10 – Interoperable and smart homes and grids (2018, 2019)

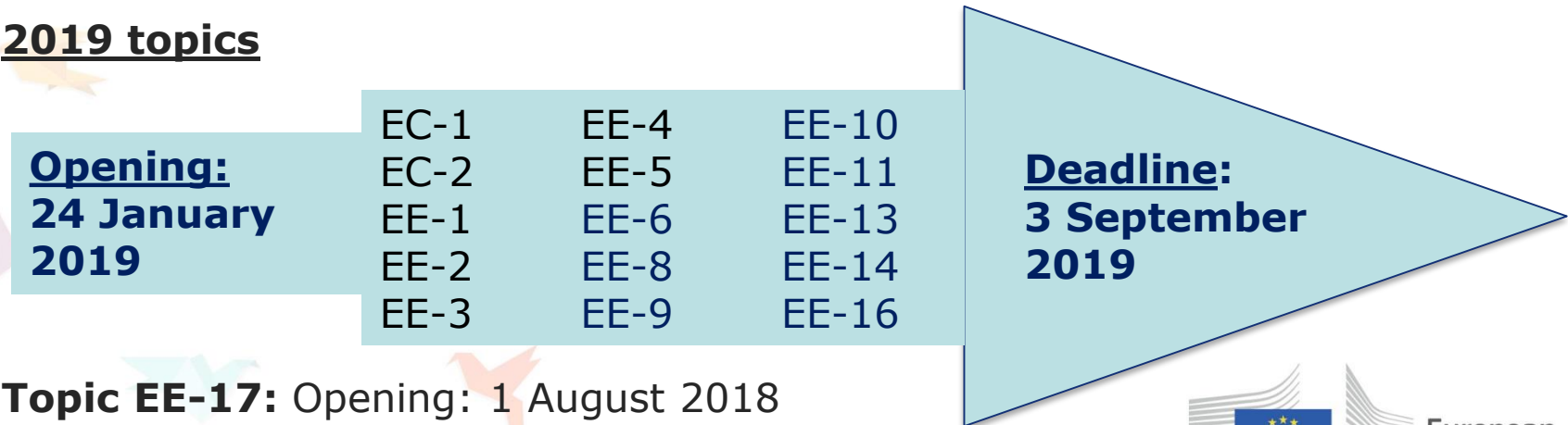
Energy Efficiency

Deadlines

2018 topics



2019 topics



Topic EE-17: Opening: 1 August 2018
Deadline: 5 February 2019