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International Energy Agency (IEA)
Energy in Buildings and Communities

Annex 70 - Building Energy Epidemiology: Analysis of real building energy use at scale

Ispra Workshop

12-14 September, 2016

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Why change our current research and practice?

Many countries have plans to **significantly reduce energy use** from the built stock.

Much of this reduction needs to come through more **energy efficient built environments**, which are responsible for almost 40% of global emissions.

Globally energy efficiency refurbishment is predicted **Investments of trillions of dollars**.

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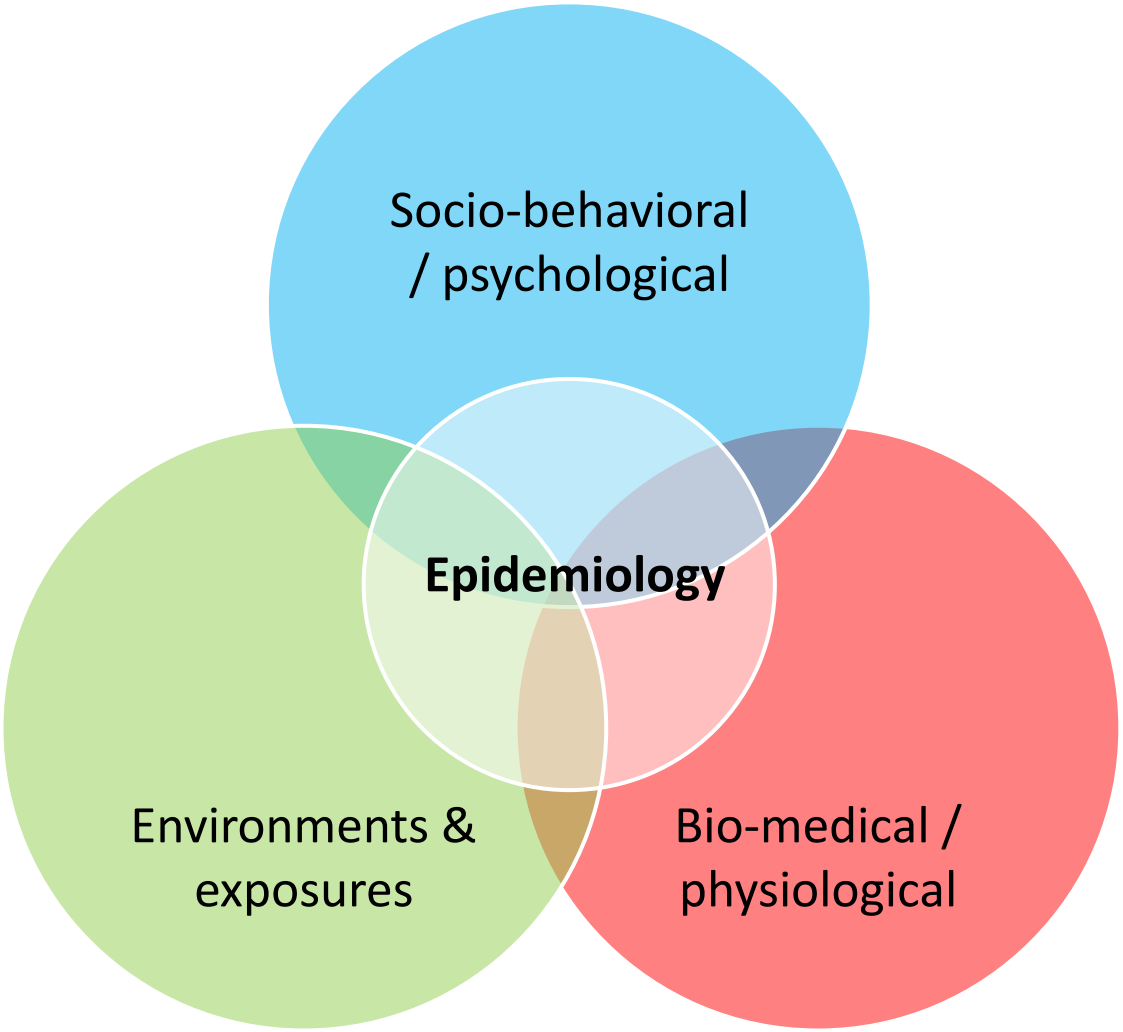
Simplified approaches in health research



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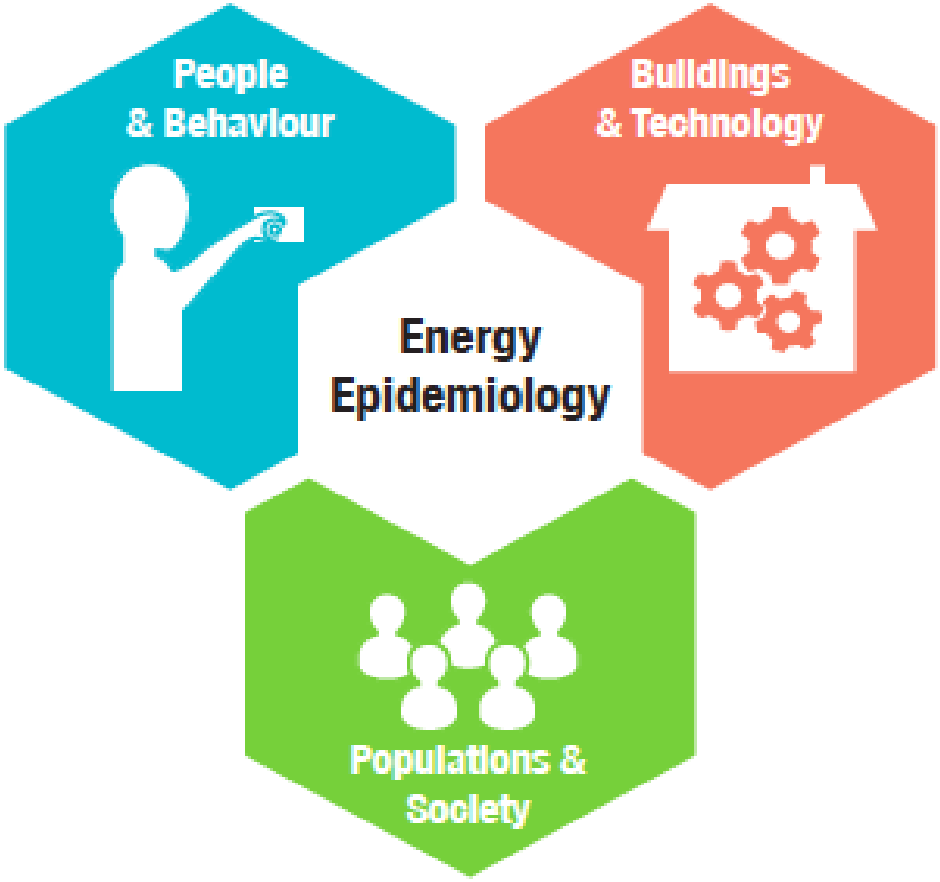
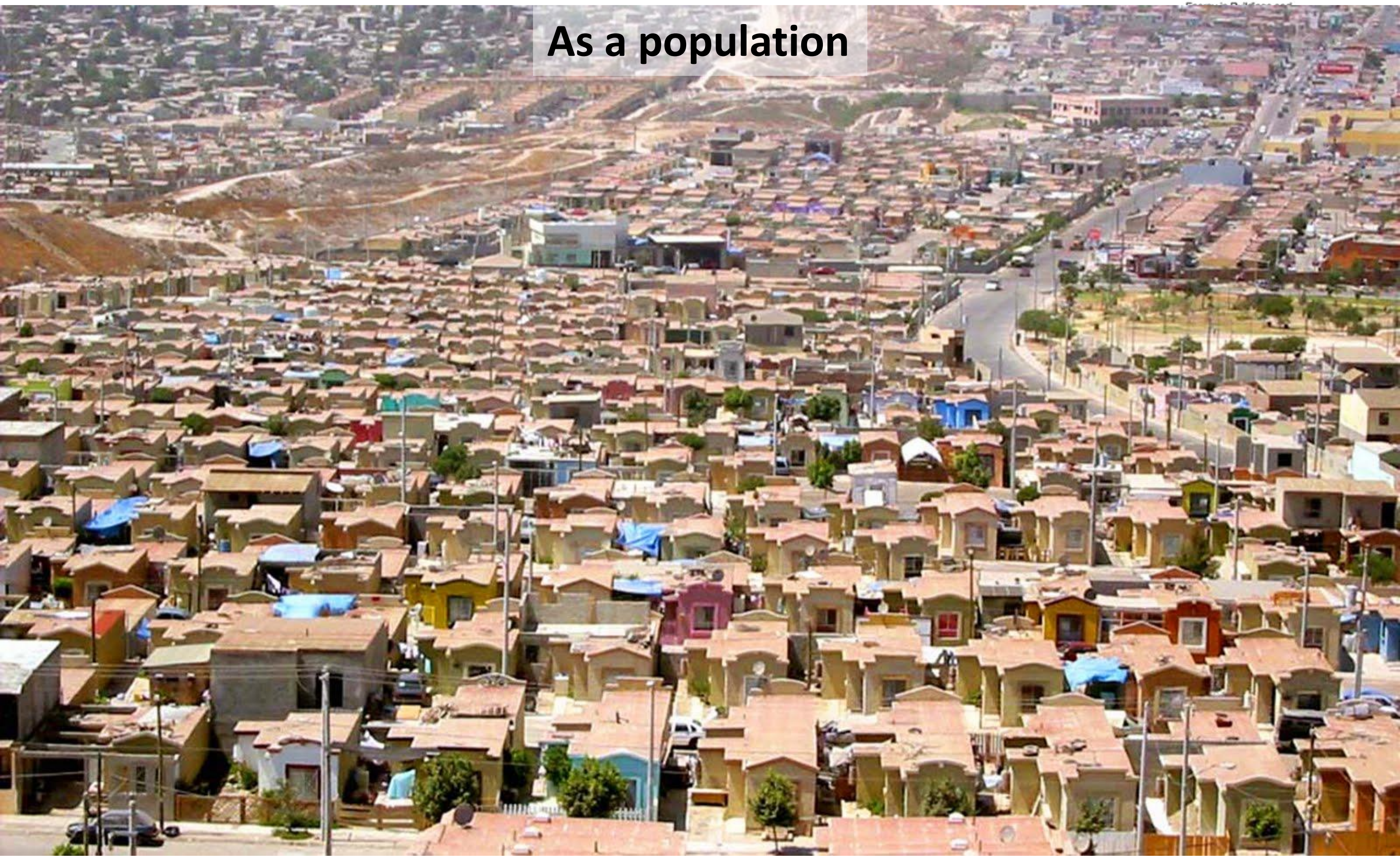
Conceptual framework for energy epidemiology



Studying the house… as a group

As a population



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IEA EBC Annex 70
Building Energy Epidemiology: Analysis of real building energy use at scale

Introduction to Annex 70 – Building Energy Epidemiology

Paris Workshop, 9 May 2016

Annex 70 held a one-day workshop at the IEA Headquarters in Paris on 9 May 2016.

Over 35 participants from 12 countries attended the workshop, many from Europe but also Australia, New Zealand and China. The participating institutions included universities and other organisations carrying out research and dissemination, such as the French CTSB, EDF and C40 Cities.

Introduction to Annex 70 – Building Energy Epidemiology

Vision

To develop an **empirically grounded and robust evidence base on energy and the building stock** through established data collection, study methods and modelling techniques to better inform decision-making and policy to achieve a transition to a low carbon built environment.

Introduction to Annex 70 – Building Energy Epidemiology

What is Annex 70?

Annex 70 is an **international collaboration of researchers, industry and government** from across the globe who are working to **develop methods for improving the empirical evidence** on energy demand in the building stock.

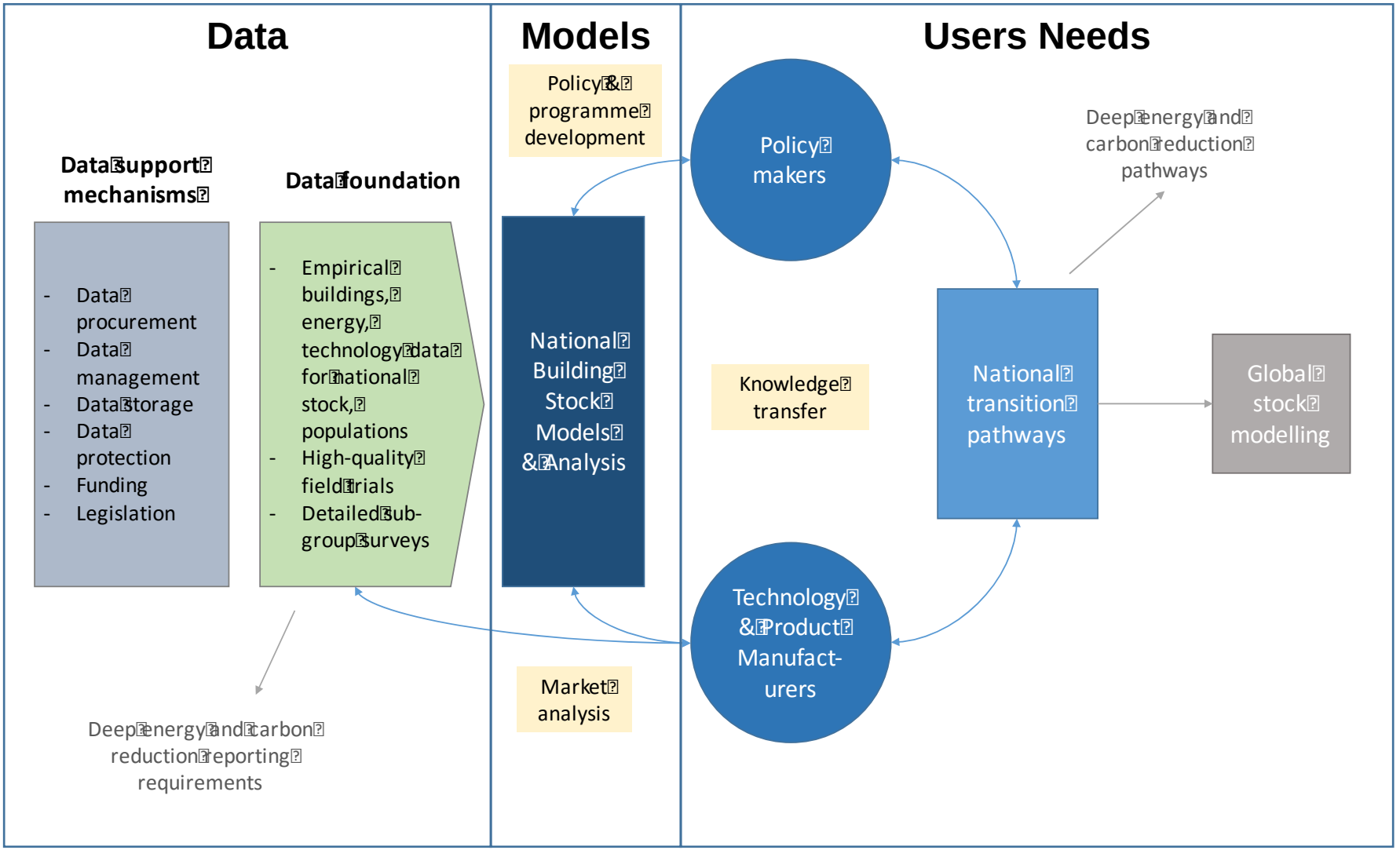
Annex 70 will focus on identifying, reviewing, evaluating and producing **leading edge methods for studying and modelling the building stock** including: data collection techniques on energy use, building features and occupant features, and building morphology; analysis of smart meter energy data, building systems, and user behaviour; and modelling energy demand among sub-national and national building stocks.

Introduction to Annex 70 – Building Energy Epidemiology

Aim

To work in an international collaboration to identify **user needs** around energy demand in buildings and to **establish best practice methods** and **harmonized approaches** for data collection, analysis and modelling.

Conceptual flow of data, models and users



Outline for Annex 70

The Annex will comprise <u>three main subtasks</u> and activities (to operate in parallel):

- **Subtask A: User engagement (needs and provisions)**
- **Subtask B: Data and methods;**
- **Subtask C: Building stock modelling and analysis.**

Outline for Annex 70

Subtask A - Description:

This subtask will focus on stakeholder engagement for existing and prospective data users from government, academia, industry and the IEA itself.

The users/stakeholders that will be focused on include national and state government officials (not politicians), city authorities and industry in energy supply, buildings construction and supply chain and (if appropriate) the investor community.

The focus is to identify and map the key challenges in among users on the lack of knowledge of data (existence, use, linkage, benefits) and the confidence in data quality and their models.

This Subtask will then feed into Subtask B, data framework and collection methods.

The focus of the Sub-task is on operational energy, delivered energy, and contextual data required to understand energy demand in buildings.

Outline for Annex 70

Subtask A: User engagement (needs and provisions)

Activity 1 Survey(s) of data users / producers

Energy suppliers
City government
National government
Building industry consultants
Academic researchers

Surveys

Activity 2 Analysis and review of stakeholder needs

Framework for data collection processes
Framework for evaluation of user needs

Activity 3 Reporting lessons learned

Report on stakeholder needs (reflecting sector, users, and jurisdictions)
Report on recommendation for best practices around data

Outline for Annex 70

Subtask A - Proposed outputs:

- Report on the key issues for different stakeholder groups across participating countries on their needs and uses of energy and buildings stock data;
- Report on the frameworks for energy and building data collection and uses;
- Report on best practice guidance on data uses and data user needs;
- Report on use cases and best practices of energy and buildings data uses and accessibility case studies – demonstrating business case;
- Report on the frameworks for energy and building data collection for energy demand scenario planning and renewable energy deployment;
- Report on the smart meter roll-out status across participating countries.

Outline for Annex 70

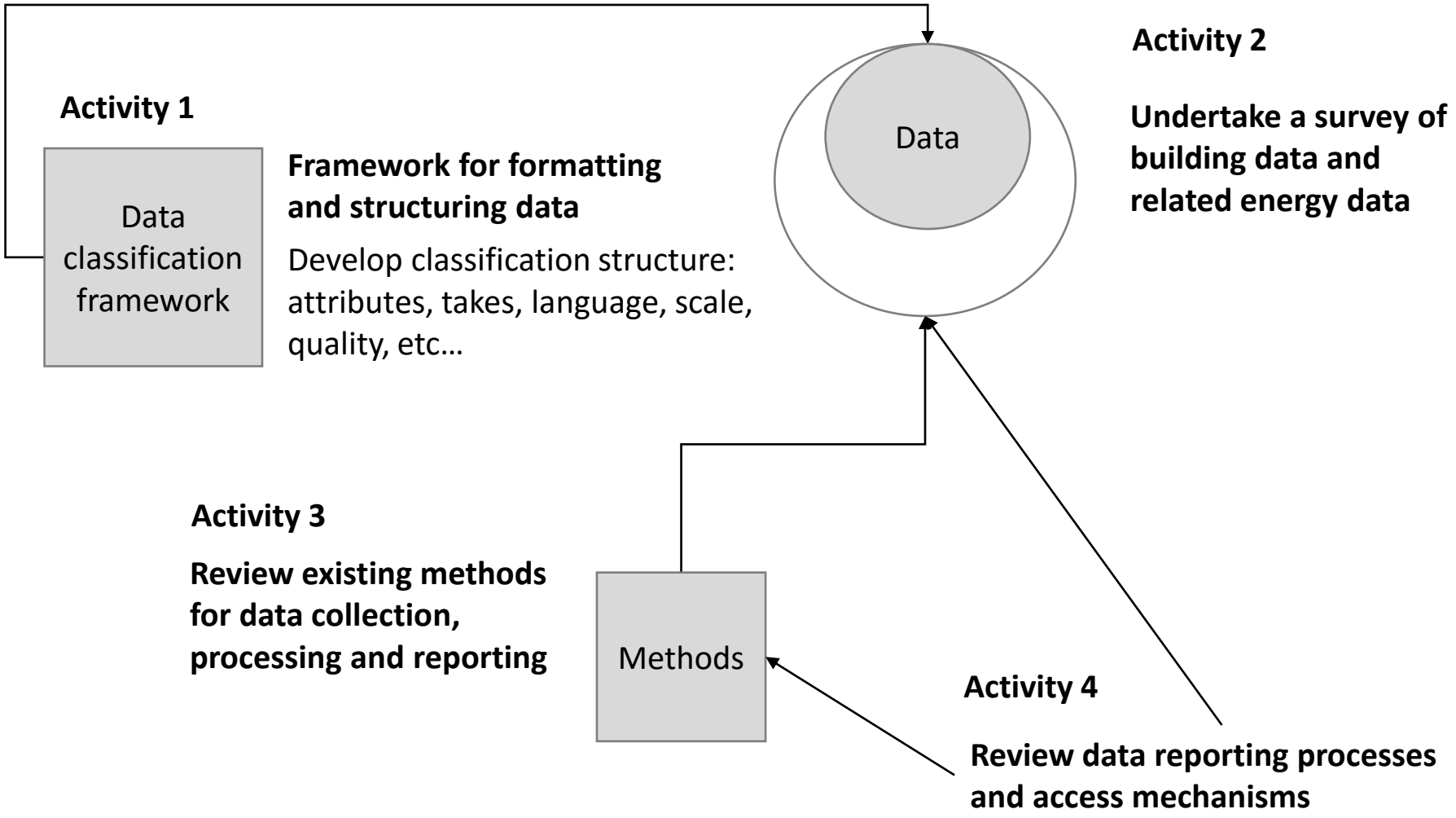
Subtask B - Description:

This subtask will identify and review the data and its development and foundations employed in the participating countries. The subtask will build on the international survey undertaken in the annex development phase (see Appendix 1). A framework will be developed to describe and classify energy and building stock data, including: attributes, types, variables, standards, etc…

The survey of data will also examine issues of: data procurement, management, storage and protection. This will consider how funding and legislation impact on the procurement of, and access to, data. The breadth, depth and quality of data available at the national, sub-national and field trial levels will be reviewed.

Outline for Annex 70

Subtask B: Data and Methods



Outline for Annex 70

Subtask B - Proposed outputs:

- Report on the classification for energy and buildings data;
- Registry of identified energy and building stock data registry;
- Reports on the data evaluation, including:
  - a) method reports for different data outputs / resources;
  - b) best practices for data collection; and
  - c) data uses;
- Special issue on energy and buildings data in emerging economies.

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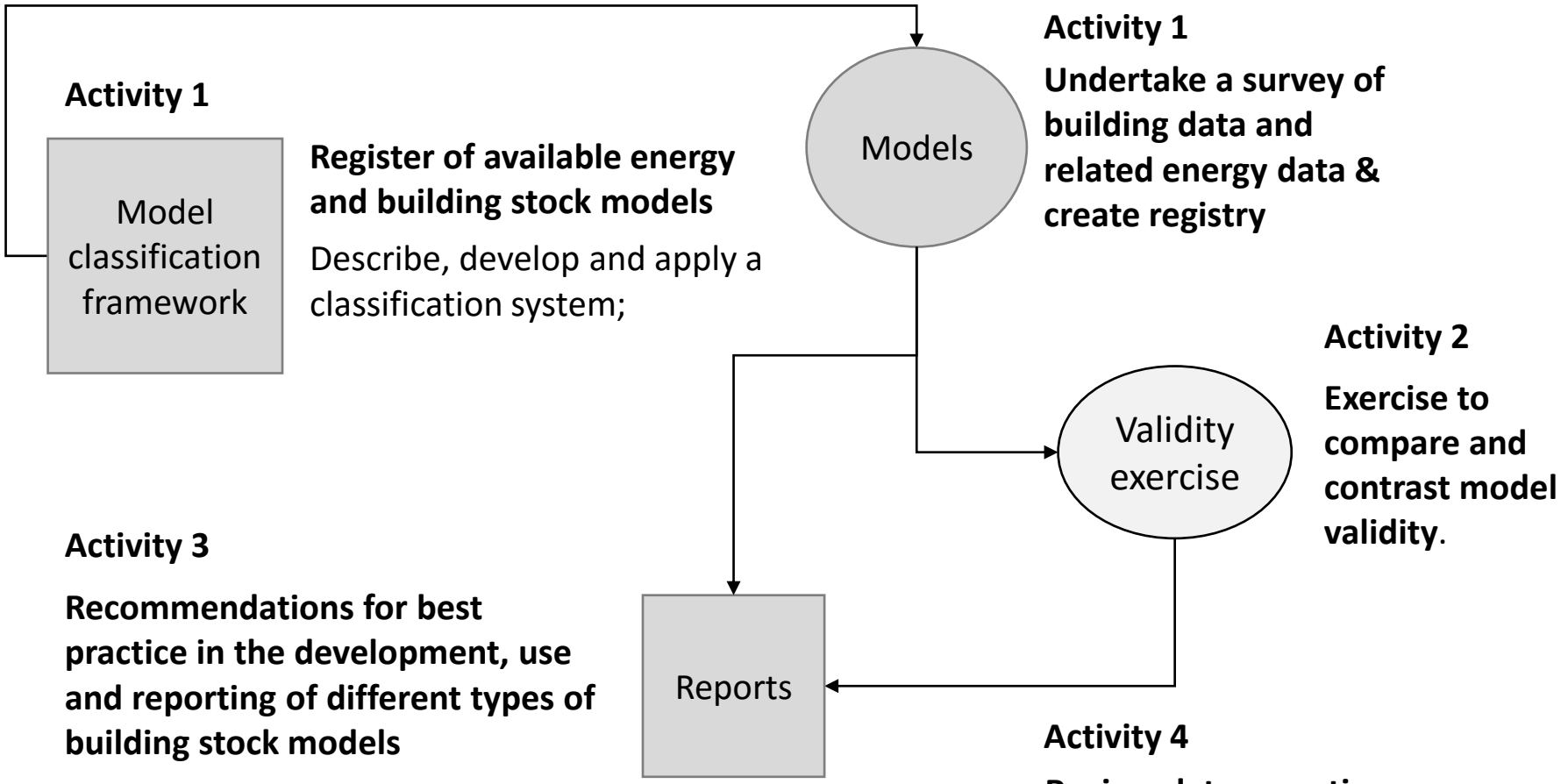
Outline for Annex 70

Subtask C - Description:

This subtask will focus on the development and use of national stock models and the way in which they draw on the datasets examined in Subtask B. This subtask will also draw on the reviews of users' needs undertaken in Subtask A and relate these to the modelling and analysis currently undertaken. The annex focus is on the methods of energy and building stock modelling and analysis and their reliability.

Outline for Annex 70

Subtask C: Building stock modelling and analysis



Outline for Annex 70

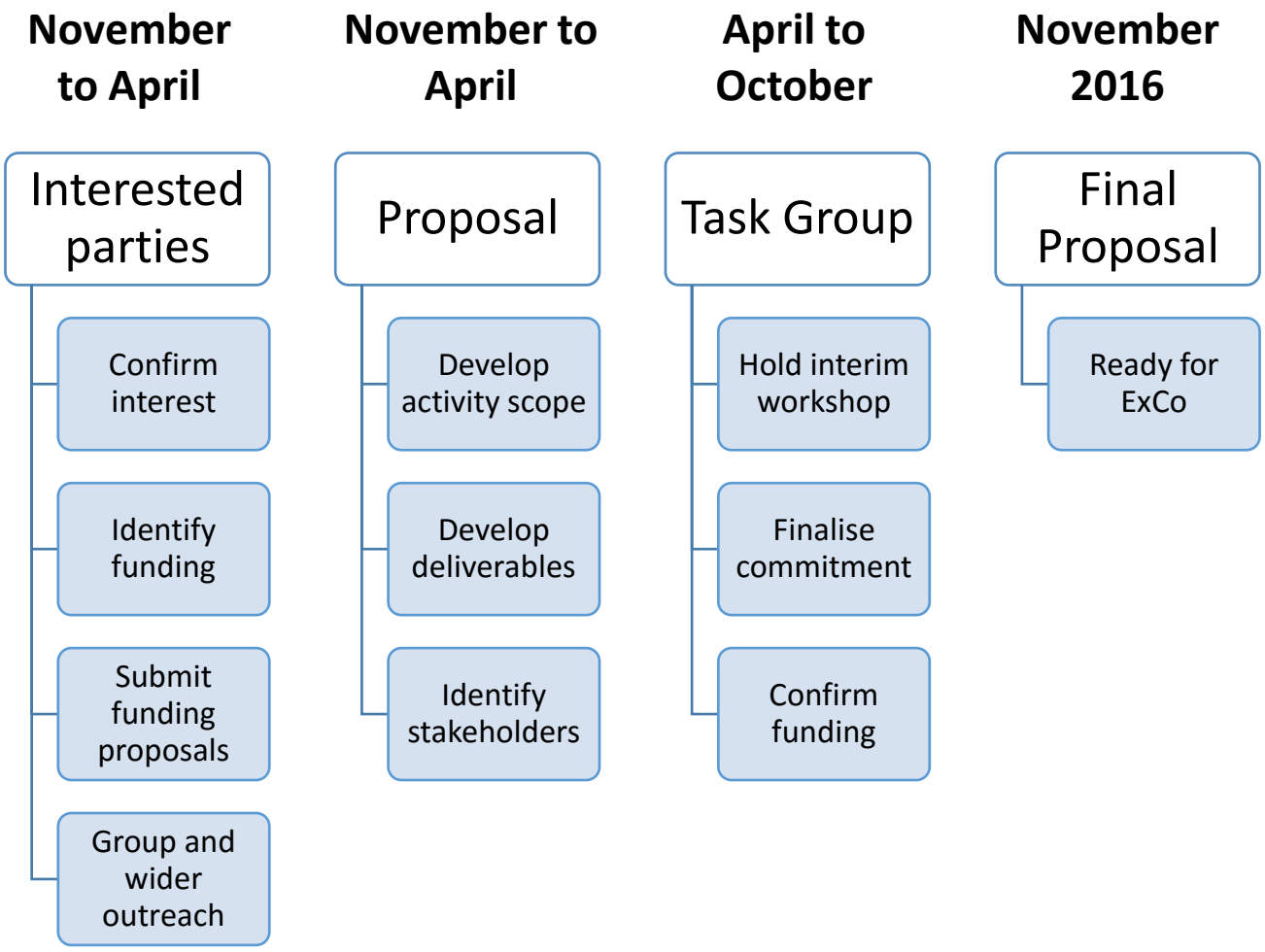
Subtask C - Proposed outputs:

- Classification of building and energy stock models
- Registry of energy and buildings stock models
- Software or plug-ins to analyse building stock energy data
- Best practice (Guidance) on energy and building stock model validation methods
- Best practice (Guidance) on energy and building stock model reporting
- International energy and building stock model validity assessment
- Selected metrics for stock model comparison
- Data book for participating countries building energy use (e.g. China)

Propose Timeline

	2016	2017		2018		2019		2020	
Period	Q4	Q1/Q2	Q3/Q4	Q1/Q2	Q3/Q4	Q1/Q2	Q3/Q4	Q1/Q2	Q3/Q4
Preparation Phase									
Final text agreed	X								
Operation Phase									
ST1		X	X	x					
ST2			X	X	X	x	x		
ST3				X	X	X	x	x	
Reporting									
All ST's				X		X		X	X

Timeline for developing a full proposal



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