Let’s Construct Europe’s Future
With Innovative Buildings and Infrastructures
Construction and Societal Challenges

Long term E2BA Roadmap, targeting 2020 and beyond

Stefano Carosio
EeB PPP AIAG co-ordinator
stefano.carosio@dappolonia.it
The EeB PPP Multiannual Roadmap

SRAs Analysis
• SRAs and Implementation Plans from 37 ETPs have been analyzed

Common targets and multi-disciplinary links have been identified

Cross-check and harmonization

List of Research Priorities

Inputs from Stakeholders (channeled through E2BA) more than 200 contributions

Clustering of inputs

Public Consultations

www.e2b-ei.eu
Moving forward

The new long term E2BA roadmap should answer key questions:

1. What is our destination? -> Updated Vision
2. What are the trends and drivers for the future? -> Scenarios
3. Where are we now? -> Detailed assessment of the SoA
4. What barriers and challenges do we foresee on our road(s) to the destination?
5. What do we need to overcome the barriers and to take up the challenges?

We should be measurable with clear milestones to check progress and redirect priorities -> Reviewing and monitoring

www.e2b-ei.eu
Overall proposed approach for the new E2BA Roadmap

Destination vision
2050/2020

review and monitor
routes and needs for breakthroughs
barriers and challenges

feedback and integration
Priorities
Milestones
Time lines
Resources
Follow-up
Scenario analysis

Present position

www.e2b-ei.eu
Possible Layers of Analyses

We could have layers describing:

1. Trends and drivers leading to scenarios and challenges
   - Priority areas

2. (Market) needs and product/service opportunities with quantified targets/functional requirements
   - Technology Roadmaps

3. Research and technology areas where gaps and promising alternatives are identified to address the needs above
   - Cross cutting- integrating aspects

4. Other enablers and cross cutting non technological aspects:
   - Regulation, Standards, Training, Financial, Sharing knowledge across supply chain, Research Infrastructures, etc

5. Anticipated Outcomes: e.g. Revenue, enable large scale deployment, input to other EU initiatives, etc.

www.e2b-ei.eu
Benchmarks

Product or Service Area

Specific Product or Service Roadmap

Product/Service Performance

GAP
Product or service performance gap needing addressed

GOAL
Targeted Performance for the product or service identified above
ST=Short Term (0.5 yrs); MT=Mid-Term (6-10 yrs); LT=Long Term (11+ yrs)

Technology

EXISTING TECHNOLOGIES
Technologies fulfilling the gaps above

TECHNOLOGY GAPS
Technologies needed to fulfill the gaps above

R&D Program

EXISTING R&D PROGRAMS
R&D Programs in progress

R&D PROGRAM GAPS
R&D Programs required to develop the technologies needed

Priority Score of R&D Gap (Max=100)
Benchmarks

High Priority R&D Programs

Product & Service Area

- RETROFIT BUILDING DESIGN/ENVELOPE
- NEW CONSTRUCTION BUILDING DESIGN/ENVELOPE
- LIGHTING
- HVAC
- SENSORS, METERS, & EMS

Drivers

- Market Drivers
  - Increasing cost of electricity and gas
  - Innovation and redefinition of the building envelope
  - Increase in energy efficiency and sustainability
  - Changing demographics impacting purchasing choices
  - Consumer desire to "green" and reduce energy usage
  - Consumer desire for comfort and aesthetics
  - New technologies
  - Increase in demand

- Technology KPIs
  - Data of energy efficiency and sustainability
  - Integration of IoT and smart technology

Technology Innovation Drivers

- Integration of IoT and smart technology
- Integration of energy efficiency and sustainability
- Consumer desire to "green" and reduce energy usage
- Market drivers
- Technology KPIs

Product/Service Performance GAP

- Product/Service Performance GOAL

Product/Service Performance)

- Product/Service Performance Goal

R&D Program

- Technology KPIs
- Data of energy efficiency and sustainability
- Integration of IoT and smart technology
- Consumer desire to "green" and reduce energy usage
- Market drivers

www.e2b-ei.eu
3-dimensionality of analyses

We should cover 3 time dimensions:

- Long term: beyond 2020

Wave 1 OD & B

Wave 2 OD & B

Wave 3 OD & B

Years 01 02 03 04 05 06 07 08 09 10

EeB PPP 2010-13

i.e. Retrofitting and reduction of energy use

i.e. Energy neutral buildings/districts

i.e. Energy positive buildings/districts

Continuous Research

www.e2b-ei.eu
Preliminary review of the current roadmap

<table>
<thead>
<tr>
<th>REFURBISHMENT TO TRANSFORM EXISTING BUILDINGS INTO ENERGY-EFFICIENT BUILDINGS</th>
<th>CROSS-CUTTING CHALLENGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems and Equipment for energy use for existing buildings</td>
<td>Systems and Equipment for energy use (horizontal)</td>
</tr>
<tr>
<td>Envelope (for existing buildings)</td>
<td>Storage of energy</td>
</tr>
<tr>
<td>Solutions for Cultural Heritage (including diagnostics)</td>
<td>Quality indoor environment</td>
</tr>
<tr>
<td>Systemic Approach for existing buildings</td>
<td>Design - Integration of new solutions</td>
</tr>
</tbody>
</table>

**Close relationship with VALUE CHAIN AND SMEs FOCUS**
- Business models, organisational and financial models (including ESCOs)
- Knowledge transfer
- Value Chain and SMEs focus
- Geoclustering

**HORIZONTAL ORGANISATIONAL ASPECTS**
- Automation and control
- Life cycle analysis (LCA)
- Energy Management Systems
- Labelling and standardization
- Materials: embodied energy and multi-functionality
- Diagnosis and predictive maintenance (continuous commissioning)
- Systems and Equipment for energy production (horizontal)
- Diagnosis

**HORIZONTAL TECHNOLOGICAL ASPECTS**
- Interaction (integration) between building, grid, heat network ...
- Systems and Equipment for energy production (district)
- District and urban design
- Systems and Equipment for energy use (district)
- Retrofitting (district)

**ENERGY EFFICIENT DISTRICT/ COMMUNITIES**
- Interaction (integration) between building, grid, heat network ...
- Systems and Equipment for energy production (district)
- District and urban design
- Systems and Equipment for energy use (district)
- Retrofitting (district)

**NEUTRAL ENERGY POSITIVE NEW BUILDINGS**
- Systems and equipment for energy use for new buildings
- Systemic approach for new buildings

*Should be integrated in all other relevant areas*

*These are 2 different topics*

Website: [www.e2b-ei.eu](http://www.e2b-ei.eu)
Proposed Roadmap Content

1. The destination
Contains:
   • A revised vision of energy efficiency in the built environment in 2050
   • A consensus-based and unambiguous definition of the desired situation in 2020, including measurable targets (SMART).

www.e2b-ei.eu
Proposed Roadmap Content

2. The present situation

- Overview of the directions set out in the first E2B roadmap, and progress against it
- Describing the state-of-the-art in technological and non-technological issues (= the progress made over the last years)
- Overview of the portfolio of running EeB projects: present focus and activities (= what we might achieve in the short run when the running projects are successful)

www.e2b-ei.eu
Proposed Roadmap Content

3. Trends and drivers for the future

• Identification of drivers and trends, implications for the built environment, market threats and opportunities
  • This will include reviewing existing scenarios for the future, national and international roadmaps, major position papers, relevant forthcoming EU legislation, …
  • It may include development of a new set of scenarios, to help develop clear implications for the built environment

www.e2b-ei.eu
4. Identifying the enablers, gaps, barriers and challenges

In addition to technical research needs, this will include a review of the need for regulation, standards, training, financial instruments, knowledge sharing etc, taking account of:

- The changing world: trends, policies, business and market opportunities
- Identification of the development stage in relevant technology (from embryonic to mature), and expected time-to-market
- Non-technological issues (e.g. consumer acceptance, financial and economic issues)
- Availability of resources
- Lesson learned from the portfolio of running EeB projects

www.e2b-ei.eu
Proposed Roadmap Content

4. Identifying the enablers, gaps, barriers and challenges (cont.)

The technical requirements for research and demonstration will be highlighted in more detail, including:

- Defining priorities and main areas to address in details
- Developing technology roadmaps and identify more promising research areas, including timelines, resources and milestones
- Description and analyses of value and innovation chains: who should be mobilised, who is needed?
- Covering research, development, demonstration and market validation, and capturing interdependencies to foster systemic approaches, interoperability etc.
- And considering review, monitoring and follow up actions to steer the process and realise real market implementation at EU scale
Proposed roadmap in summary

• Responds to the updated E2BA Vision
• Has a time horizon to 2050 with focused priorities and implementation plan till 2020
• Takes account of the key areas and directions set out in the first roadmap
• Covers research, development and market validation (including business models) and captures the dependencies between areas to foster systemic approaches, interoperable solutions, etc
• Feeds into deployment plans for subsequent work by e.g. DG R&I, DG Energy, DG Enterprise, EIB, ...

www.e2b-ei.eu
Who will give input to the roadmap?

- Active and committed involvement of AIAG members and all E2BA members, exploiting the National Liaison Points multiplying effect and national/local reach
- Facilitated by an expert organisation in roadmaps (which does not need to be an expert, or even particularly knowledgeable, in the area of energy efficient buildings and construction)
- Open and wide consultation is key:
  - At the various stages, consultation will be required beyond the E2BA and NLPs reach
  - Close relationship with ETPs, running initiatives and roadmaps as SET Plan (PV, Renewable Heat and Cooling, …), Green Cars, FoF, KETs, EIT KICs, IEA, Research Infrastructures…

www.e2b-ei.eu
Project plan/milestones

EeB PPP
Impact workshop

January

April

May

2012

September

December

EeB PPP
Info Day
Preliminary draft

www.e2b-ei.eu
Your comments and opinions are key!

Let’s open the discussion

www.e2b-ei.eu