BUSINESS DAY SEMINAR

Buildings 2050
Efficient, Decarbonised, Digital

16th May 2018, Brussels
LET’S MEET LUNCH
Welcome, Tour de Table, Structure of Seminar

Adrian JOYCE, Secretary General, EuroACE
Introduction to EuroACE
and current EU policy developments

What will the EPBD & Smart Finance for Smart Buildings bring to business?

Céline CARRE, EuroACE President | Saint-Gobain
EuroACE Members (May 2018)
What is EuroACE?

- Europe’s **leading companies** involved with the manufacture, distribution and installation of a variety of energy saving goods and services in buildings

- **Objective**
  To promote energy efficiency in buildings on the EU political and regulatory agenda, raise awareness, provide research data and communicate on available solutions and policies

- We believe that improving the energy efficiency of buildings is the most **cost-effective** method of
  - Creating employment and securing economic recovery
  - Achieving energy security
  - Meeting carbon reduction targets
  - Providing Europeans with comfortable & healthy homes
Cross-Sector Representation

1. Air Cooled Chiller
2. Heat Pump
3. Automated Roller Blind
4. Glazing
5. Regenerative Drive Elevator
6. Floor Insulation
7. Heating Controls: Room Thermostat
8. Automated Exterior Venetian Blind
9. Insulation
10. Insulated Wall System
11. Heating Controls: Radiator Thermostat
12. Heat Recovery Ventilation
13. Humidity Sensitive Air Inlets
14. Heat Pump
15. Automated Roller Blind
16. Humidity Controlled Extract Unit
17. Lighting
18. Sunspace
19. Automated Awning
20. Insulation
21. Sealants
22. Roof Window
23. Solar-control/ Low E-window Film
24. Air Tightness Membrane
Energy Performance of Buildings Directive (EPBD)

**Process and Timeline**
- ✓ Trilogue Agreement (19th Dec 2017)
- ✓ Plenary Vote (17th April 2018)
- ✓ Council Approval (14th May 2018)

**Next procedural steps**
- • Official Publication (May-June 2018?)
- • Deadline for transposition (20 months, i.e. early 2020)
- • Review (by 1st January 2026 latest)

**What’s next for us in EuroACE?**
- • EuroACE Guidance Notes
- • Crucial importance of transposition & implementation
EPBD (in short)

- 2050 ambition for buildings
- Impactful renovation strategies
  - Milestones 2030/2040, Indicators
  - Trigger Points
  - Building Renovation Passports
- Improved requirements for TBS/BACs
- Smart Readiness Indicator
- Annex 1: Efficiency First & RES
Unlocking private financing for energy efficiency

<table>
<thead>
<tr>
<th>More effective use of public funds</th>
<th>Assistance and aggregation</th>
<th>De-risking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deploying Financial Instruments and innovative business models to attract private finance</td>
<td>Supporting the project pipeline at EU and local level</td>
<td>Understanding the risks and benefits for financiers and investors</td>
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What’s in it for us?
Nice figures (1/3)

Table 8: Comparison of policy options

<table>
<thead>
<tr>
<th></th>
<th>Reference: No-change option</th>
<th>Option I: Enhanced implementation and further guidance</th>
<th>Option II: Enhanced implementation, including targeted amendments for strengthening of current provisions</th>
<th>Option III: Enhanced implementation towards further harmonization and higher ambition</th>
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<tbody>
<tr>
<td>Additional final energy savings in 2030</td>
<td>-</td>
<td>2 Mtoe</td>
<td>28 Mtoe</td>
<td>72 Mtoe</td>
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<tr>
<td>Additional associated construction activity in 2030</td>
<td>-</td>
<td>€2.15bn</td>
<td>€47.6bn (€1 – €4 bn mandated by the Option)</td>
<td>€101bn (€52 – €59 bn mandated by the Option)</td>
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<tr>
<td>Economic growth, incl. SMEs in 2030</td>
<td>-</td>
<td>€2.4bn - €10.1bn</td>
<td>€103.8bn - €143.8bn</td>
<td>€197bn - €280bn</td>
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<tr>
<td>Jobs retained/created</td>
<td>-</td>
<td>9k</td>
<td>220k</td>
<td>500k</td>
</tr>
<tr>
<td>Energy poverty alleviation</td>
<td>-</td>
<td>20k – 120k households</td>
<td>515k - 3.2M households</td>
<td>1.5M to 8.3M households</td>
</tr>
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</table>
What’s in it for us? A good story (2/3)

Buildings sector increasingly seen as key driver of the energy & climate transition, and the boost offered by digitalisation can drive it faster.
What’s in it for us? Huge opportunity (3/3)

EPBD gives us the renewed opportunity to bring the facts and the story at national level. The challenge is huge.
How to ensure desired impact?

• **#1 Challenge ourselves, learn**
  • Nurture, adapt & revamp our story (relevance)
  • Understand impact and other drivers
  • Does EPBD meet consumers expectations?

• **#2 Strengthen our community(ies)**
  • At corporate level
  • At EU level
  • At national level

• **#3 Anticipate**
  • EPBD not in isolation
  • Digitalisation as a key trend among others:
    o Urbanisation
    o Multilayered decision-making / complexity
    o Silver economy
    o Etc...
Conclusion

The Buildings Directive will bring to business what business can give to it!
Keynote ‘TED Talk’ Speech – Looking Beyond

How does digitalisation impact our sector, our economy and society? How does it impact energy performance of buildings, indoor environment, and users?

Nicos PEONIDES, Associate Director, Arup
Digital transformation of the built environment

EuroACE – Seminar
16th May 2018 – Brussels

ARUP
These companies disrupted their respective markets … it is naive to believe that the digital transformation will not affect the buildings industry
Key Technologies

- Internet of Things (IoT)
- Artificial Intelligence/ Machine Learning (AI/ML) and Robotics
- The Cloud & Big Data
- BIM / Digital Twins
- Data Analytics & visualisation
3D scans of existing structures
Drones for inspection of buildings/ infrastructure
Visualisation / data representation

Arup Street

Locates details, sketches, specifications, etc. in a building.

Provides a viewer for clients.
Visualisation / data representation

Impact of flooding
Visualisation
Virtual/Augmented Reality
( VR/AR)
Visualisation + Auralisation
(SoundLab)

“Listening” to spaces before they are built
Fully parametric façade model
Generative/iterative design of own offices
<table>
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<tr>
<th>Levels of BIM Implementation</th>
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<tbody>
<tr>
<td>3D Shape</td>
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<tr>
<td>• Existing Conditions Models</td>
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<tr>
<td>• Laser scanning</td>
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<tr>
<td>• Ground Penetration Radar (GPR) conversions</td>
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<tr>
<td>• Safety &amp; Logistic Models</td>
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<tr>
<td>• Animations, renderings, walkthroughs</td>
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<tr>
<td>• BIM driven prefabrication</td>
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<td>• Laser accurate BIM driven field layout</td>
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<td>4D Time</td>
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<tr>
<td>• Project Phasing Simulations</td>
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<tr>
<td>• Learn Scheduling</td>
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<tr>
<td>• Just in Time (JIT) Equipment Deliveries</td>
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<td>• Detailed Simulation Installations</td>
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<td>• Visual Validation for Payment Approval</td>
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<td>5D Cost</td>
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<tr>
<td>• Real time conceptual modeling and cost planning (DProfiler)</td>
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<tr>
<td>• Quantity extraction to support detailed cost estimates</td>
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<tr>
<td>• Trade Verification from Fabrication Models</td>
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<td>• Structural Steel</td>
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<td>• Rebar</td>
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<tr>
<td>• Mechanical/Plumbing</td>
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<tr>
<td>• Electrical</td>
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<tr>
<td>• Value Engineering</td>
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<tr>
<td>• What-if scenario</td>
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<tr>
<td>• Visualisations</td>
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<tr>
<td>• Quantity Extractions</td>
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<tr>
<td>• Prefabrication Solutions</td>
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<tr>
<td>• Equipment rooms</td>
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<tr>
<td>• MEP systems</td>
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<tr>
<td>• Multi-Trade Prefabrication</td>
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<tr>
<td>• Unique architectural and structural elements</td>
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<tr>
<td>6D Sustainability</td>
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<tr>
<td>• Conceptual energy analysis via DProfiler</td>
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<td>• Detailed energy analysis via Edm Tech</td>
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<td>• Sustainable element tracking</td>
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<td>• LEED tracking</td>
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<tr>
<td>7D Performance</td>
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<tr>
<td>• Life Cycle BIM Strategies</td>
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<td>• BIM As-Builts</td>
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<tr>
<td>• BIM embedded O&amp;M manuals</td>
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<tr>
<td>• COBie data population and extraction</td>
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<tr>
<td>• BIM Maintenance Plans and Technical Support</td>
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<tr>
<td>• BIM file hosting on Land Laser’s Digital Exchange System</td>
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Brick-laying robots
Dynamic column casting via robots
3D-printed bridge
Data analytics, IoT and insight

Bridge monitoring systems

- Installing sensors in critical points of existing bridges
- Remotely read data
- Interpret data
- Evaluate need for repair (or not)
Internet of Things and Data Analytics

Washroom sensors

30% of people would never return to a restaurant with a dirty washroom.

50% of people would tell others about a bad washroom experience.

48% of people don’t wash their hands.

Welcome Screen outside the Washroom with dynamic directions to the nearest available Washroom in each direction.

Users can view the data on our dashboard and download reports.

Digital Transformation of the built environment | © Arup
Artificial Intelligence (AI)  
Machine Learning (ML)  
Capture and predict trends  
Predictive maintenance

DeepMind AI reduces Google data center cooling bill by **40%**
Digital Twin
Level 1:
Building accurate 3D Models
Digital Twin

Level 2: Adding Design Data

For example:

- Signage
- Lighting
- MEP
- Interiors
- Security
Digital Twin

Level 3: Adding Operational Data

For example:

- Transport modelling
- Passenger flow patterns
- Lighting analysis
- Acoustics
- Baggage simulation
- Fire information
- Water and energy flows
A smart building…

- Attract Tenants
- Create a better Experience
- Reduce costs for operators
Health & Wellbeing

Typical business Operating costs

- 90% Staff costs
- 9% Rental costs
- 1% Energy costs
A truly smart building: Airport of the Future

- Seamless travel experience
- Meet or exceed safety, security and immigration regulations
- Reduce unwanted walking distance and time in queues
- Service a large variety of passenger types
- Optimise passenger journey within a reasonable cost model
- Be based on a ‘sustainable strategy’
Challenges

- Loss of jobs
- Cyber-security
- Over-relying on machines
- Data overload
- Data privacy
Reactions & Inputs from Business Colleagues Debate
Break-Out (parallel) Sessions

1. Impact of digitalisation on decarbonising buildings (with Adrian JOYCE)
2. Impact of digitalisation on energy consumers and people (with Hélène SIBILEAU)
3. Impact of digitalisation on construction and renovation works (with Caterina NISSIM)
Reports from the break-outs
Conclusions

Adrian JOYCE, Secretary General, EuroACE
20th Anniversary Celebration

Le Bouche-à-Oreille,
Rue Félix Hap 11