

What is the "cost-optimum" for building renovation? Some Considerations

Nils Borg

Executive Director

European Council for an Energy Efficient Economy

Wels 3 March 2011, EEW Building Renovation

Main points to be covered

- Why cost optimality?
- Strengths of Methodology; Some questions that need to be answered first
- Challenges & considerations for practical implementation in the EU



Cost optimality is an EU-level benchmarking system

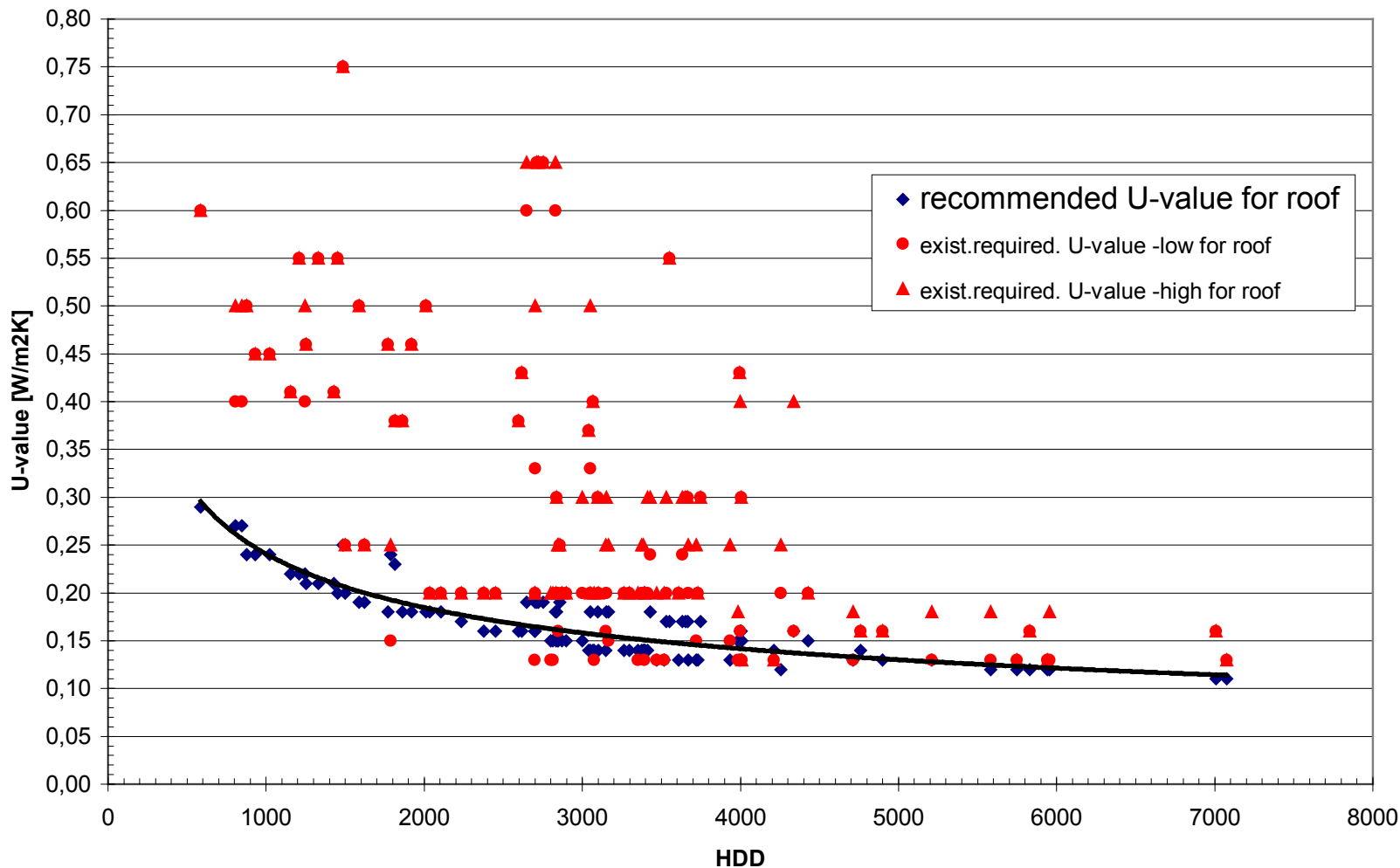
- Most Member States have building codes that are much weaker than can be justified by cost of energy consumed and the investment cost needed to save much of this energy.
- Deemed impossible to set EU-wide performance requirements (e.g. kWh/M², U-values, etc.)
- Possible and politically acceptable to establish a benchmarking system at EU level & ask M.S. to compare their codes to codes calculated to be cost optimal.

.... But rather difficult in practice!



Cost-optimal & current required U-values (H & L) roofing insulation, prevailing energy prices, heating d.d

Peak price - roof



Examples of energy efficiency packages

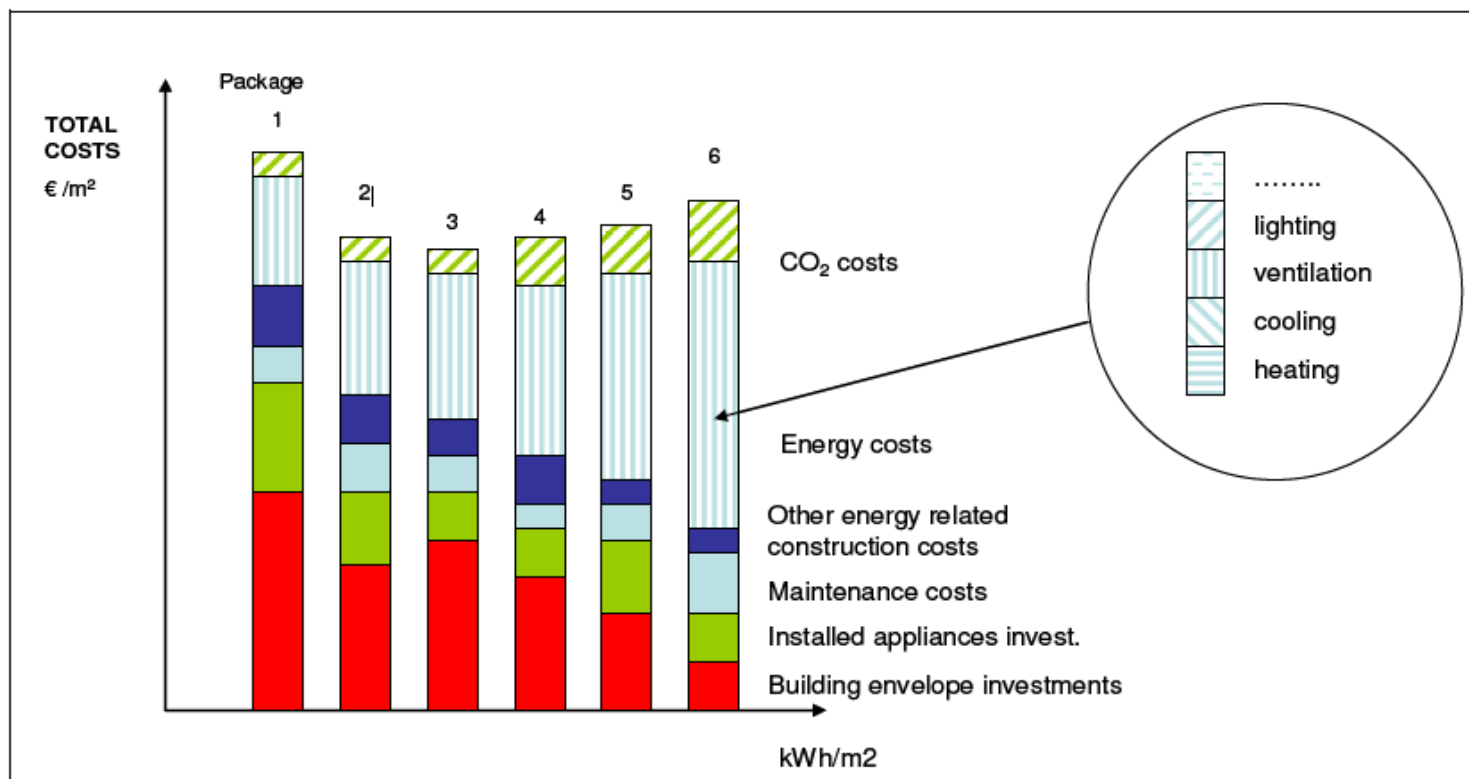
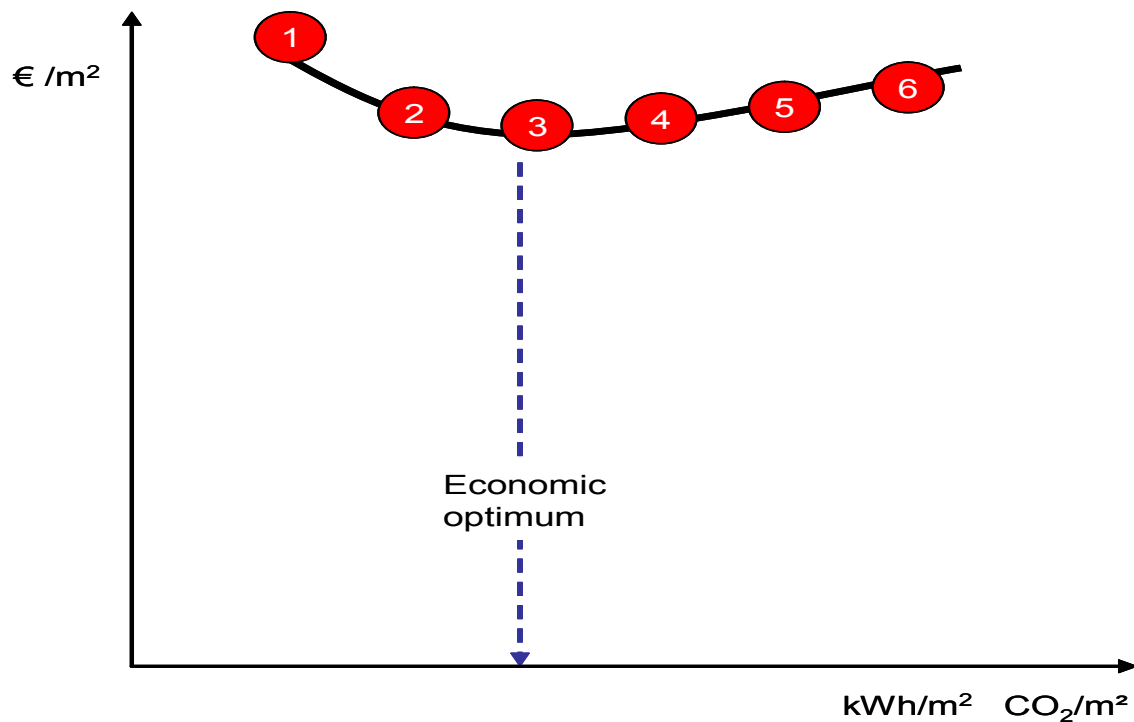


Figure 1: Cost calculations of different packages (example only)

Finding the economic optimum of packages



Net present value approach (global cost approach)

$$C_g(\tau) = C_I + \sum_j \left[\sum_{i=1}^{\tau} (C_{a,i}(j) \times R_d(i)) - V_{f,\tau}(j) \right]$$

$C_g(\tau)$ global cost (referred to starting year τ_0)

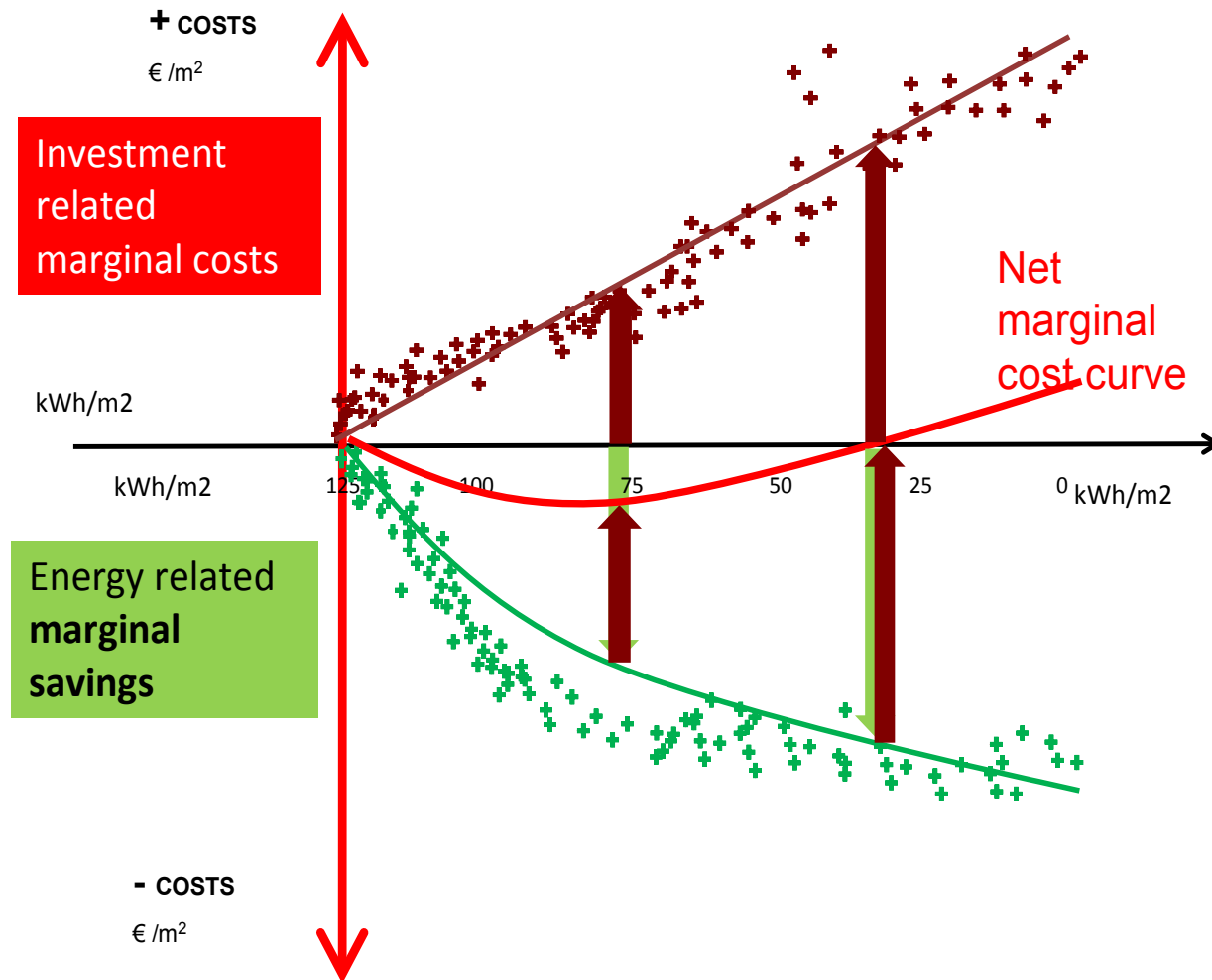
C_I initial investment costs

$C_{a,i}(j)$ cost during year i for energy-related component j (energy costs, operational costs, periodic or replacement costs, maintenance costs and added costs)

$R_d(i)$ discount rate for year i

$V_{f,\tau}(j)$ final value of component j at the end of the calculation period (referred to the starting year τ_0)

Merged marginal costs: another way of viewing costs & savings

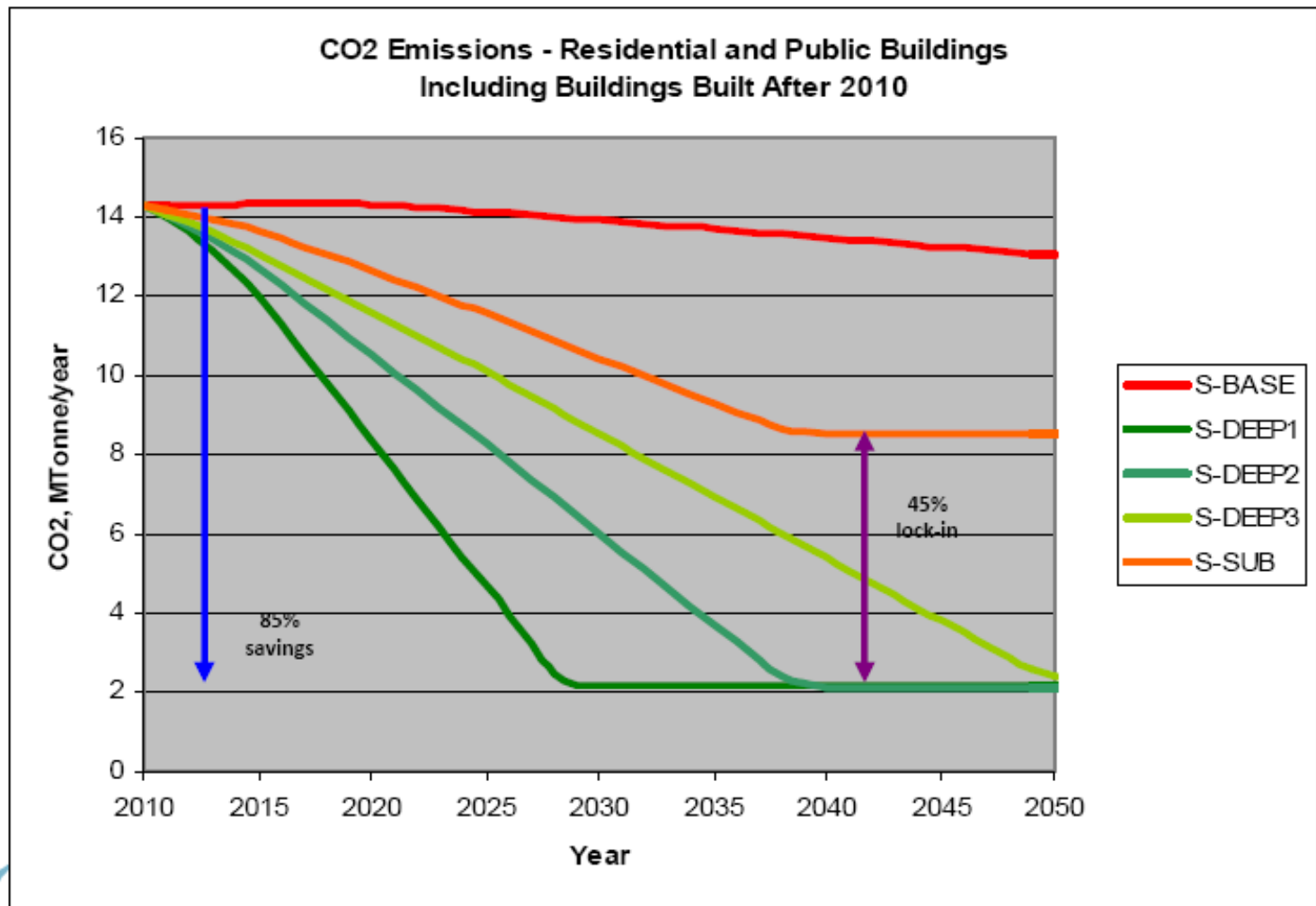




Accepted arguments for cost optimality benchmarking framework

- Can ensure similar and comparable levels of energy performance in MS
- Can save large amounts of energy, CO₂ and unnecessary costs
- Still allows for subsidiarity & consideration for national conditions, climate differences, different building cultures, local costs & local energy prices
- Life cycle costing allows inclusion of full service life of long-term investments (e.g. deep renovations & insulation)

Lock in effects – Avoided by use of cost optimality and LCC



Source: Central European University Study on Hungary

Challenges & considerations

- Future energy prices? By EC & IEA!
- Societal (extern.) or private calculation? Both!
- Shall MS decide on how many different reference bldgs (function, size, age) to use? Need guidance!
- In principle, the greater the number of packages of measures, the better. But how about new Member States?
 - Need best practices & technology transfer!
- Integrate future innovation? Yes!

More challenges & considerations

- Renovate or demolish? Can cost optimal calculation decide? → No, but codes can!
- Are deep renovations to NZEB level cost optimal? Yes, if allow for learning curve & productivity of labour improvements! → Dynamics!
- Is it possible to use NPV and LCC to find cost optimal levels for components (building elements)?
→ Yes, if place them in building (software model) where building as a whole is cost optimal!
- Should energy price include peak load costs (kW), as well as kWh costs? → Yes!

Some final challenges & considerations

- Is it necessary to do a “dry run” of the cost optimal methodology (i.e., a test case) in every Member State?
→ Not necessarily, but advisable to cover as many “building cultures”, climate zones, & energy mixes as possible! To find answers. New questions will always arise in future!
- Will “Disposal costs” in Annex III open door to sustainability calculations?
→ Not yet, but be prepared!

Can it work?

Can the cost optimality Methodology someday work satisfactorily and as foreseen?

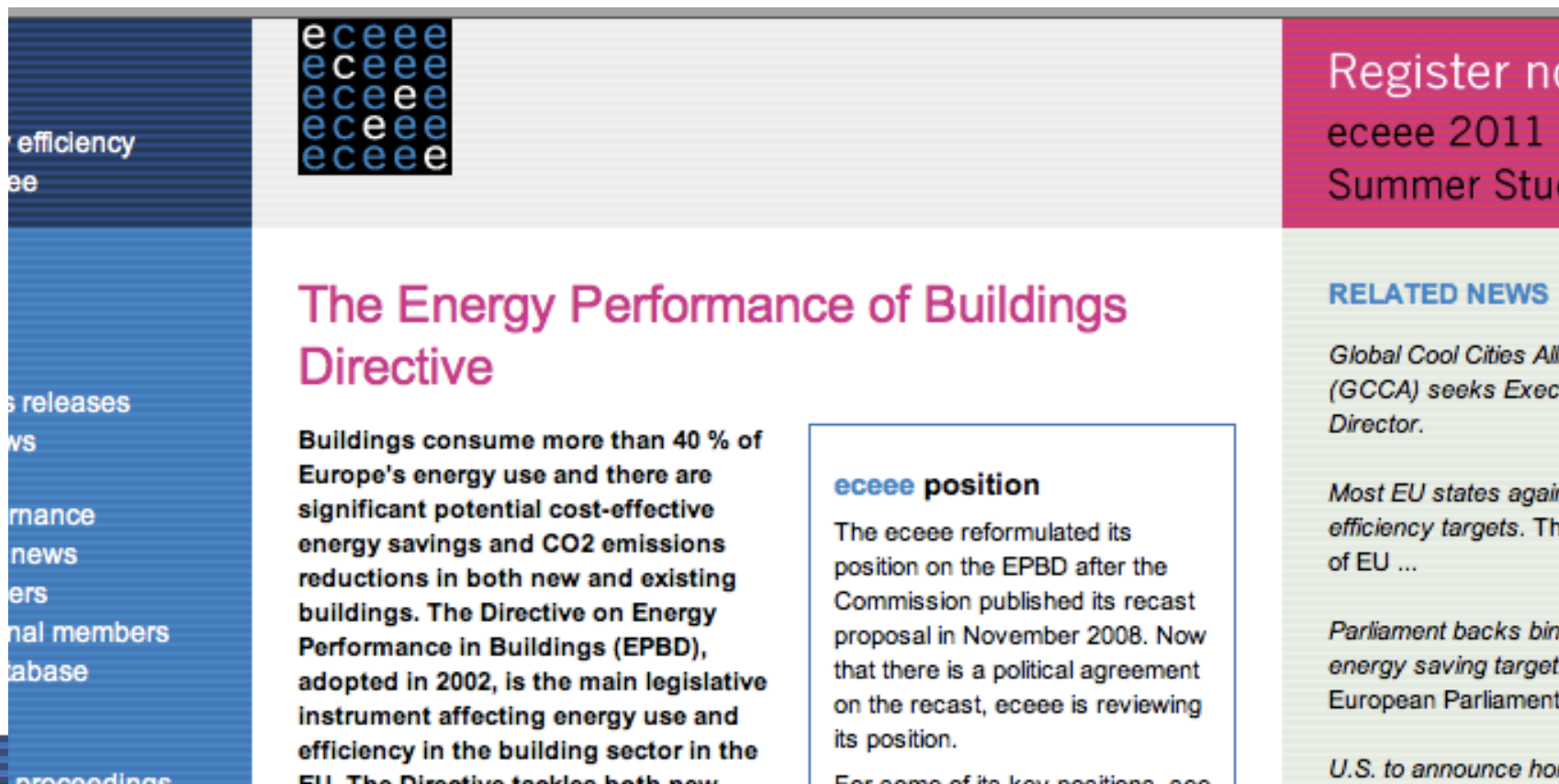
→ Yes, but be prepared to use all the experience, case studies, experts, stakeholders and communications tools available.

→ The June 2011 proposal for a methodology should allow adequate room and flexibility for improvement. It will be an iterative process.

Be prepared for revisions!

What is eceeee's contribution?

- An in-depth cost optimality study to be published
- A wealth of buildings-related materials on our web site
 → www.eceeee.org/buildings



The screenshot shows a website layout with a blue sidebar on the left containing navigation links like 'efficiency', 'releases', 'performance', 'news', 'members', 'database', and 'proceedings'. The main content area features the eceeee logo at the top left, followed by a headline 'The Energy Performance of Buildings Directive' in pink. Below the headline is a text block stating that buildings consume more than 40% of Europe's energy and that the EPBD Directive, adopted in 2002, is the main legislative instrument affecting energy use and efficiency in the building sector. To the right of this text is a box titled 'eceeee position' which explains that the organization reformulated its position on the EPBD after the Commission published its recast proposal in November 2008. On the far right, there is a pink banner for 'Register now eceeee 2011 Summer Study' and a 'RELATED NEWS' section with several news snippets.

The Energy Performance of Buildings Directive

Buildings consume more than 40 % of Europe's energy use and there are significant potential cost-effective energy savings and CO2 emissions reductions in both new and existing buildings. The Directive on Energy Performance in Buildings (EPBD), adopted in 2002, is the main legislative instrument affecting energy use and efficiency in the building sector in the EU. The Directive tackles both new

eceeee position

The eceeee reformulated its position on the EPBD after the Commission published its recast proposal in November 2008. Now that there is a political agreement on the recast, eceeee is reviewing its position.

For some of its key positions see

Register now
 eceeee 2011
 Summer Study

RELATED NEWS

Global Cool Cities Alliance (GCCA) seeks Executive Director.

Most EU states agree on efficiency targets. The Commission has proposed a set of EU ...

Parliament backs binding energy saving target. The European Parliament has approved a ...

U.S. to announce how it will ...

Visit our summer study to discuss with experts and practitioners!

6-11 June, Toulon/Hyères, South of France

Members
 Meetings
 Study
 Venue
 Authors
 Models
 Contributors
 Sessions
 (EPBD)
 Planning
 Directive
 2022

Energy efficiency first: The foundation of a low-carbon society

Register now. The conference is filling up quickly!



Climate and energy security is top of the agenda of policymakers around the world