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COST Action TU1104

# Smart Energy Regions

## Manifesto for a zero carbon built environment



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## Smart Energy Regions:

### Manifesto for a zero carbon future built environment

Our generation has the singular chance and opportunity to keep the world's climate stable. The COP21 has committed countries to a zero carbon future. The COST Action TU1104, Smart Energy Regions (Smart-ER) is concerned with the transition of this international agreement to a low carbon built environment, and identifying ways to achieve this within a time scale that can meet policy-related carbon emission reduction targets.

Smart-ER's 28 member countries have reviewed the drivers and barriers that may impact on the long-term creation of zero carbon regions in Europe. The term 'smart' applies to energy supply and energy demand, from smart grids to smart living, with an emphasis on a 'bottom-up' people based approach, and not necessarily ICT-based. Greenhouse gas emissions from energy consumption are looked at from a built environment 'systems' approach, linking reduced energy demand, renewable supply and storage. This has all been considered at a regional scale, relating government policy and aspirations, to industry capacity and needs, whilst encouraging people and organisations to be as resource efficient as possible. The Action has identified case studies relating to the drivers and barriers associated with smart energy regions, illustrating good and best practice. The focus has been on innovative technologies and processes associated with resource efficiency and demand reduction, with reference to cost and value, skills and training, and supply chains, and the current trend towards a circular economy. This Manifesto presents a set of actions that are essential in order to speed up the transition to a zero carbon society.

**Speed up the transition of zero carbon design and technology into practice in the built environment. The evidence relating to global warming, polluted air and security of supply is overwhelming. There is no excuse to wait. Technology is available. Every project should strive to be zero carbon.**

There are impacts from burning fossil fuel at global, local and building scale, in relation to climate change, air pollution, and security and affordability of energy supply. The need for a transition to a zero carbon built environment is an essential part of the future zero carbon economy, which will be based on energy efficiency, and 100% use of renewable and clean energy supply. The problem is how, and over what period, this transition takes place, how government and industry will rise to the challenge, and how research can inform the process. Currently it is becoming apparent that things are taking too long and the transition of zero carbon goals from policy through to practice needs to speed up dramatically. Zero carbon targets, both medium and long term, are strategically needed, but there is a danger that they introduce complacency and 'carbon fatigue', and place the emphasis on decision-making into the future. Real action is needed now, and from now on, every built environment project should strive to be zero carbon.

Challenge the status quo to remove the obstacles that inhibit the transition to a zero carbon built environment, and redesign our procurement methods such that they can help push forward the zero carbon agenda and facilitate the changes needed.

Depending on location, the built environment can account for around 40 to 50% of carbon emissions, more if urban transportation is included. For some 40 years, since the 1970's oil crisis, our understanding has developed considerably, on how to design and construct a more energy efficient built environment, and technologies to generate renewable energy have significantly moved forward, and yet available and viable low carbon technologies are still not widely applied in practice, nor fully appreciated by policy makers. Often, current procurement practices and vested interests are protected by standards, regulations, framework agreements, and hidden subsidies. We are locked into current practices, resulting in barriers to innovation and change. The delays in progressing towards a zero carbon built environment are therefore more related to the culture and processes of the construction industry rather than to a lack of technology.

All sectors of the construction industry need to engage with zero carbon goals. Government needs to differentiate between industries that support positive change with regards to environmental issues and those that do not. Government needs to provide greater support to those who want change, rather than propping up those that do not want change.

The low carbon industry is a major future growth area and will contribute to a vibrant clean future economy, with products that benefit both people and the environment. However, some industries seem to want to control change to their financial benefit, leading to a 'disconnect' between environmental policy and economic growth, and between business interests and ethical values. Although this will vary from county to country, industries that resist change generally have greater lobbying powers with Governments. They often receive subsidies and preferential taxation. On the other hand, some industries welcome change as a means to produce new innovative high value products that support the transition to zero carbon. These industries need to greater support from Government, including a fairer distribution of subsidies and tax incentives.

The culture of the construction industry needs to change and, where necessary, governments should attract and support new innovative industries into the market, driven from 'bottom-up' solutions, and identify exemplar projects that can be easily replicated, highlighting their local benefits in terms of jobs and wealth creation.

Most initiatives to reduce greenhouse gas emissions are central, top-down, and supply-driven, through existing industries, which may resist change, which in some counties might include the energy supply industries and mass house builders. Some governments seem to prefer big industry solutions for achieving reductions in greenhouse gas emissions. However, to date, the focus on top-down solutions to reduce emissions has failed to deliver a viable sustainable future energy scenario. Many top-down solutions are not sufficiently developed, such as large-scale energy storage, carbon capture and storage, smart grids, and carbon credits. These will take huge investment, and by the time they are developed they may as well be obsolete. Bottom-up solutions are more demand-driven, dealing with specific projects, often at community scale level. The old energy-related industries have a culture

and interests that seemingly cannot adapt to the changes that are needed quickly enough. New industries and new business models that focus on bottom-up activities may more readily bring about change, whilst also supporting local economies through jobs and wealth creation.

**Rebalance top-down and bottom-up approaches to maximize the impact and speed of transition of zero carbon technologies, with an emphasis on creating and increasing bottom-up demand-led activities, leading to tangible added value multiple benefits.**

The potential way forward may be to focus more on a bottom-up 'systems' approach, applying existing solutions, linking reduced energy demand, renewable energy supply and energy storage, at a building and community scale. Smart-ER has identified a range of technology ready solutions that, with the appropriate training and skills development, can produce affordable and replicable solutions. The implementation of low energy technologies often comes with added value 'multiple benefits', such as improved quality of life, reduced fuel poverty, improved health, and local economic spin-offs. These benefits will be regionally driven, providing stakeholder action, jobs, investment and profits, all at a local scale. This approach relates more to people's day-to-day decision-making, compared to the more abstract concept of reducing greenhouse gas emissions, which people may not fully understand, or be able to relate to their daily actions. We will still need central top-down solutions and strategic thinking, for large-scale renewables, smart grids and clean energy, but these will need to be combined with bottom-up solutions in a complementary, and not an opposing way.

**Activate 'middle-out agents' that are able to effect change, who can make informed decisions, and who are properly equipped to implement systematic change, through best practice and operational excellence, and through a cycle of continuous improvement.**

An opportunity to rebalance these bottom-up and top-down approaches, and enhance community ownership, may lie in recognizing the potential attributes of a 'middle-out' approach. Middle-out 'actors', such as community and professional organizations can be the agents of change. They can provide a link between top-down and bottom-up, having capabilities, the structure and power, to negotiate with top-down decision makers, and can offer leadership and empowerment to bottom-up initiatives. The people involved will usually have a personal/professional (and maybe vested) interest in effecting this change at a community/regional level, and have the knowledge and skills to mediate, develop supply chains, and add value to existing tools and techniques by adopting lean and integrated approaches.

**Use the knowledge triangle of Government, Industry and Research to spin out innovative solutions, to provide a more effective transition of zero carbon policy into practice, across the built environment. There should be clear transition routes and government forward planning from policy to practice, to which industry and the public can respond.**

There is currently a 'disconnection' between elements of the 'knowledge triangle' comprising government, industry and research, and their links to society. Communication is often weak, both within the sectors, for example, between different government departments, and across the sectors, for example between government and industry. Government policy sometimes changes too slowly,

for example, in response to climate change. Sometime changes are not fast enough, or they are erratic, in relation to industry time-scales for developing new products, and the skills required to apply them effectively. We need to recognize the tensions within the knowledge triangle, with industry split between those supporting, and those not supporting change, that government has both top-down and bottom-up interests, and that research may be perceived as too theoretical with poor dissemination into practice. Government decisions must be unbiased and research-based evidence led, with clear transition paths identified to enable industry to forward plan, and develop new skills, finance models and stable supply chains.

The research sector must provide a greater knowledge and understanding to government policy-makers, industry and the public at large on visioning a future zero carbon built environment, in a language that all can relate to, in their everyday decision-making situations, and ultimately everyday life, and highlighting the role of all people. We need to create a bottom-up demand for zero carbon solutions.

There are good examples of the application of zero carbon technologies at a regional scale, such as those illustrated through the Smart-ER case studies. However, the rate of replication of exemplar demonstration projects into standard practice is too slow. Reasons may include, the lack of understanding of what is possible and the fear of taking a risk, at both policy level, and from an end-user perspective. The research sector has a crucial role in dissemination and demonstration of zero carbon solutions, to tangibly influence decision makers in both government and industry. There is evidence that when this understanding is demonstrated effectively to both government policy-makers and end-users, there is a high level of interest, which stimulates a demand for change. Top-down international policy agreements, such as the COP21, are essential, but not enough on their own. A zero carbon built environment will only be achieved in the short timescale left, through a wide-scale bottom-up demand from organisations, communities and the public. The challenge now is to create this demand!

*This Manifesto is the result of the collaborative efforts of all members of the COST Action TU1104. Stand-alone PDF versions of this Manifesto in English and several other European languages can be downloaded from the Smart Energy Regions website: [www.smart-er.eu](http://www.smart-er.eu)*

*The COST Action TU1104 'Smart Energy Regions' started in March 2012 and ended in March 2016. During its four years of activity, the Action established a network of more than 70 researchers from 27 European countries and Israel, allowing the exchange of experience and engagement with local policy-makers and stakeholders. The main outputs of the Action are three publications collecting contributions from Action members on the topics of low carbon policy, technology, skills training and supply chains. These and the other outputs of the Action can be found on the Action website: [www.smart-er.eu](http://www.smart-er.eu)*



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