THE ENERGIVIE MANIFESTO

Towards the Paris Climate Change Conference (COP21) & Beyond

BUILDINGS AT THE HEART OF THE ENERGY TRANSITION

ÉNERGIVIE SUMMIT
Building and Climate Change

LE PÔLE ALSACE ÉNERGIVIE® FOR POSITIVE ENERGY BUILDINGS

THE ENERGIVIE MANIFESTO:
Buildings at the heart of the energy transition

Towards the Paris Climate Change Conference (COP21) & Beyond

"We are under pressure from the need to join forces in enabling society to benefit fully and rapidly from the technological revolution now underway."

"Our common priority is to connect innovation in science and industry with social progress and equity".

WHAT IS THE ENERGIVIE MANIFESTO?

The Energivie Manifesto: Buildings at the core of the Energy Transition is a high-level platform supported by the Alsace Energivie Competitiveness Cluster. The manifesto is the brainchild of a 22 international experts from a variety of countries. Over the next 5 years (2014-2018), the platform will gather together some of the world's top experts and competence centers, who will conduct a systematic analysis of how the building and construction sector can effectively boost CO2 and greenhouse gas (GHG) emission reductions.

The Energivie Manifesto covers more than just buildings. It connects planning and urban development with engineering and finance, focusing on accountability and business leadership opportunities for low carbon built environments.

The Energivie Manifesto targets 6 priority areas and contains 40 practical proposals, these latter being listed in appendix. They are to be tweaked and developed in 2015 on the basis of the route map also set out below. They illustrate the building and construction sector's commitment to ensuring the success of COP21.

The Energivie Manifesto is open and forward-thinking and sets out to propose practical recommendations to scale up the investment needed to achieve dramatic change.

The target audience is public and private developers, in particular of eco-districts, bankers and investors, municipalities and municipal finance groups. It is also aimed at built environment professionals, scientists and researchers (universities and public or private laboratories, etc.), trade and international multilateral organizations, philanthropic organizations, think tanks and lobby groups interested in promoting low carbon environments.

By increasing the recognition of the value created by sustainability in urban environments, private sector investment can dramatically increase and significantly contribute to societal and technological change.

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1/ A GENERATION OF CHALLENGES

Buildings, cities and energy

Global energy consumption is expected to grow by 56% between 2010 and 2040.

Worldwide, the building and construction sectors account for 6.5% of direct and 12% of indirect greenhouse gas emissions (GHG) and these figures are expected to rise[1]. Including emissions during the building exploitation phase, the building and construction sector accounts for about 35% of the world's CO2 production and more than 40% in OECD countries.

Buildings use about 60% of the world's electricity. By 2035, increased demand from China alone is predicted to equal today's total electricity demand in the US and Japan[2].

In 2010, the building and construction sector accounted for about 8.8 GtCO2 in direct and indirect emissions, with energy demand expected to approximately double and CO2 emissions to increase by 50% to 150% by mid-century according to the baseline scenarios[3].

The Intergovernmental Panel on Climate Change (IPCC) estimates that urban areas account for 71 –76% of energy-related CO2 emissions, and that the world's cities produce almost half (37-49%) of all global GHG emissions[4].

Buildings, cities and the middle classes

Additionally, population growth is estimated to reach 9.2 billion by 2050, with a projected 2 billion new energy consumers in emerging economies by the same year[5]. From 3.9 billion urban dwellers worldwide in 2014, the figure is expected to rise over 5 billion by 2030[6].

New forms of energy consumption are also likely to emerge with the gradual disappearance of subsistence lifestyles[7].

Population growth, especially urban population growth, is part of the story, but upward mobility towards the middle classes remains one of the real foundations for increased energy demand.

+82 billion square meters by 2030!

In urban and economic contexts such as North America or Europe, most of the buildings that will exist by 2030 have already been built[8]. The situation in BRICS countries is the reverse. In India, most of the buildings likely to exist in 2030 have yet to be built[9]. There are also a large number of emerging countries, such as South Africa, Mexico, Turkey, South Korea, where urban growth, construction and housing needs are huge and the situation is somewhere between these two extremes.

1 International Panel on Climate Change (IPCC) Report 2014, Mitigation of Climate Change, Summary for Policy-Makers
2 S. Muldavin, Rocky Mountain Institute, 2014
3 IPCC report 2014, Mitigation of Climate Change, Summary for Policy Makers
4 Source: *The Cities Climate Finance Leadership Alliance* – Action Statement, UN Climate Summit, NY, Sept. 2014

5 International Partnership for Energy Efficiency Cooperation (IPEEC), 2014
6 United Nations, World Urbanization Prospects, 2014, courtesy of Architecture 2030 – E. Mazria. http://esa.un.org/unpd/wup/Highlights/WUP2014-Highlights.pdf
7 N. Savery, Australian Building Codes Board
8 In Europe, it is expected that, by 2050, about half of the building stock existing in 2012 will be still operational. L. Bourdeau, ECTP-E2BA.
9 The Energy and Resources Institute (TERI) – New Delhi, 2014

By 2030, a total of 82 billion square meters (883 billion square feet), an area roughly equal to 60% of the world's total building stock today, will be built or rebuilt in urban areas worldwide[10]. In short, if a city now counts 100 buildings, it will count over 160 buildings by 2050[11].

70% decrease in GHG emissions by 2050?

The 5th assessment report from IPCC[12] calls for a dramatic short-term reduction of CO2 and GHG emissions (40% to 70%) and total elimination of such emissions by 2100 as the only way to tackle climate change and limit its hazardous consequences[13].

We are at a crossroads. We are summoned to do much less (GHG, etc.) with much more (energy, buildings, people, etc.) in terms of requirements. Since we need to think ahead as far as to 2050 or 2100, we have to act now, and build a generation of building (and city) changers.

As the representatives of private enterprises and as experts subscribing to the Energivie Manifesto, we are firmly committed to working with governments, citizens and communities looking to promote innovation and the large-scale dissemination and implementation of energy efficiency measures and CO2 emission reduction solutions[14].

10 United Nations, World Urbanization Prospects, 2014, courtesy of Architecture 2030 – E.Mazria
11 Source: UIA World Congress, Durban 2014. Declaration 2050 Imperative
12 http://www.ipcc.ch/report/ar5/ issued Nov. 2014
13 A recent World Bank research report observes that "more than 80% of the overall annual global costs of adaptation to climate change are estimated to be borne by urban areas." Economic losses due to floods in 2010 were approximately 170% greater than in 1990. Source: The Cities Climate Finance Leadership Alliance – Action Statement, UN Climate Summit, NY, Sept. 2014
14 PE. Bindschedler, Chairman, Energivie, A. Beretz, President, Université de Strasbourg. « Appel de Strasbourg », Nov. 3rd 2014

2/ ABUNDANT POTENTIAL FOR CHANGE

The building and construction industry, an asset for global energy efficiency

We believe that, beyond their differences, all countries share a common interest in improving their energy efficiency performance and that there is abundant potential for international cooperation among them, starting with the building industry, a factor recently recognized by the G20 countries[15]. But while the potential is enormous, it remains under-exploited.

Reducing energy consumption and improving energy efficiency is one of the quickest and most cost-effective ways of addressing energy security issues, driving down GHG emissions and improving resilience, as well as ensuring sustainable economic growth.

Based on current projections, worldwide implementation of energy efficiency measures could save over 8 GtCO2/year by 2030, with a significant share of this coming from the building sector, without impacting adversely on construction costs.

Retrofits and upgrades form a key part of the mitigation strategy in countries with established building stock (housing, offices, etc.), and reductions of heating/cooling energy use by 50 – 90% in individual buildings have in many cases been achieved.

Most mitigation options for buildings have also considerable and diverse co-benefits in addition to energy cost savings[16].

15 IPEEC: https://www.g20.org/sites/default/files/g20_resources/library/g20_energy_efficiency_action_plan.pdf
16 Innovative design and work space organization concepts, closer links between buildings and their environment, better working conditions, etc.

Building lifecycles, a real source of potential

Despite the variety of local and national situations, particularly with regard to standards, acceptance of the building lifecycle assessment concept is becoming increasingly widespread. It enables detailed analysis of construction materials and energy systems. It enriches foresight models and fosters more in-depth and well-considered research.

Provided that proper account is taken of the synergies between buildings and cities, lifecycle analysis also has the potential to aid in the establishment of built environment transformation scenarios, which will be critical to maintaining productivity, quality of life and social cohesion, not only in general terms across the world but also at regional and local level.

New context for public and private engagement

Unmet demand for investment in low carbon and climate resilient urban infrastructures remains huge. According to the World Economic Forum and the World Bank, more than USD1 trillion/year are needed in low and middle-income countries alone[17].

But the large metropolitan areas of the so-called developed economies also have to face similar or even greater financial challenges.

There is an urgent need to tackle the structural problem of ageing infrastructures inherited from earlier decades or even centuries past.

In the face of social and economic pressures, the advent of digital infrastructures and environmental requirements, we need to turn existing infrastructures into "green" infrastructures and develop new generations of public transportation networks.

While the pressures are huge, there is a lack of public finance and public-private partnerships (PPP) alone cannot resolve all the problems. Value capture (higher tax incomes, for example) from the real estate industry are far from being the much-needed silver bullet.

A number of cities and States around the world have shown farsighted leadership in setting targets and devising and implementing plans to reduce GHG emissions[18]. Global and regional financial institutions are beginning to acknowledge the scale of the changes in the pipeline.

The building and construction industry must now rise to the challenges ahead.

The industry is illustrative of changing local and global urban and social patterns. While governments often lack funding and expertise, local authorities the necessary cutting-edge skills and regional and international organizations the requisite outreach, building and construction professionals should exploit their critical role at the crossroads of public and private initiatives, at the forefront of contemporary urban and economic change.

Worldwide, changing conditions are creating new social and economic behaviors. The changes in how people work with the new information technologies and how they use space make tertiary buildings more efficient per capita in the process. Smart Building technologies together with urban, building and landscape design promoting reduced water, energy consumption and waste production as well as recycling, encourage individual and corporate initiatives and renew corporate social and environmental responsibility[19].

The industry is experiencing a great deal of innovation in new technology, processes and execution. In many countries and regions globally, advanced R&D and research centers

17 *The Cities Climate Finance Leadership Alliance* – Action Statement, UN Climate Summit, NY, Sept. 2014

18 cf. for example California's AB32 and SB375 regulations and the CalGreen Code (B. Anderson). The concept of "post-Kyoto metropolitan systems" underlying integrated projects such as "Grand Paris" in France, that are based on in-depth reality checks, has met with significant success worldwide, both in liberal and in State-controlled economies. London's "Infrastructure Plan" and "PlanNYC 2030" in New York, are further but not exclusive examples of the radical changes now emerging in our approach to major complex urban systems.

19 B. Anderson, American Planning Association

or clusters have been established as tangible outcomes of national and regional innovation plans designed to scale up energy efficiency solutions within the built environment[20].

Public-sector seed funding or tax arrangements in favor of research have attracted talent and private interest. These now need to be made available not only to major civil engineering, building & public works or development groups but also to medium-sized companies and to SME-SMI.

Human resources – a fundamental part of the change process

Public and private thinking and initiatives have tended to converge across the world in recent years. The technologies now exist for large-scale development of positive energy buildings. Numerous demonstration projects have now been mainstreamed and substantial literature attesting to the economic returns on such projects also exists.

But the sheer scale of the challenges still facing us will require greater and more comprehensive action across the board.

It will also require in-depth changes in the way in which information about new discoveries in the various different fields is produced, exchanged and disseminated and improvements in the way in which these fields are linked together: structural engineering, finance, environment and biodiversity, NICT, urbanism, architecture, etc. The challenge will be particularly crucial in regions where the new building construction rate is expected to rise rapidly. The same applies to the necessary transformation of existing building stocks.

The building and construction industry[21] has already experienced major technological, process, and execution innovation enabling it to substantially reduce building emissions. Funding solutions have also evolved significantly[22]. Nevertheless, progress still needs to be made. Research activities have to be developed in the domain of building energy efficiency in order to adapt products, methods (including bringing together the various forms of expertise) and crafts to market expectations[23].

The ability of public and private players to transfer good practices and results of research or experiments internationally is growing constantly. There are a large number of successful examples of multilateral cooperation at regional and cross-border level that bear witness to what can be achieved[24].

To meet the climate change challenge and cater to the need to drive down GHG emissions on a global scale, sweeping top-down plans designed and applied centrally cannot offer the solution. By the same token, civil society cannot go it alone.

To promote further innovation and foster the application of new solutions, our answer is to work through connected excellence clusters and hubs, distributed infrastructure networks and platforms systematically encompassing academics, businesses and practitioners together with public-sector representatives.

We are convinced that a rationale based on speeding up the learning process and the dissemination of knowledge will be far more effective than a marketing or communications

20 For example, the "Instituts pour la Transition Energétique" (Energy Transition Institutes - ITE) in France, the *Energy Efficiency Hubs* set up by the Department of Energy (DOE) in the USA, or the "Centers of Excellence for the 21st century" policies applied in Japan since the turn of the century.

21 Building conception, building materials, building maintenance and servicing, building uses, expertise in sustainable urban design, solar energy, energy efficiency, built environment, decision support software tools, community engagement…

22 Rocky Mountain Institute (RMI) – S. Muldavin

23 High levels of energy efficiency and sustainability are technically possible but unless stakeholders move beyond short termism, investments will remain limited. *See Reinventing Fire*, Amory Lovins & The Rocky Mountain Institute, Sept. 2011

24 Examples of this are the building and construction industry's energy transition Trion interclusters set up at regional economic level in the Upper Rhine area (France).

oriented approach[25]. Driven by a spirit of innovation, a comprehensive approach to social balance and public duty, an unequivocal concern for high quality achievements, we can make a difference in the short and long terms.

Coping with too much information (TMI)

In many cases we are information rich but time poor, overwhelmed by what is being produced to promote renewables and sustainability strategies[26].

There is a need to coordinate the volume of information being developed and the activities of the different organizations involved.

Managing the short-term vision problem

At present, energy cost savings still seem inadequate to convince many building users (office buildings, in particular), of the advantages of a new approach. The investment sources needed to provide large-scale energy-efficient buildings through new construction or deep retrofitting are still in short supply, at least from a market perspective.

The focus is still on supply side alternatives rather than on demand management solutions. Demand for return on investment continues to promote a mainstream culture of employing low-risk business-as-usual technologies.

Unless stakeholders move beyond short-term energy cost savings and recognize the true value created by engaging in new construction technologies and deep retrofits, investment will remain limited; this damages business profitability and the ability of society to use resources more efficiently.

25 To this end and by way of illustration, the Alsace Energivie cluster, working in close cooperation with the other laboratories and centers of excellence that are its partners in its geographical region (Upper Rhine) and in the context of this manifesto, has set out to become a world-scale building and energy efficiency training center capable of sustainably marshaling solid international skills and expertise.

26 N. Savery, Australian Building Codes Board, Canberra

By ignoring all non-energy cost-related values, and requiring short-term payback on capital costs, a large number of major energy efficiency and sustainability measures cannot be implemented, with the result that many measures that could boost energy efficiency and sustainability remain stranded on the back-burner. In practice, this puts GHG and energy reduction targets even further out of reach.

Moreover, the short-term payback mentality encourages consideration of innovative measures on a piecemeal basis which further erodes the potential for performance improvements[27].

Short-term vision, especially in the retrofitting of buildings, leads to lost opportunities. The building stock in many countries was – and unfortunately still is in many cases – more the subject of short term decisions than of sustainable solutions[28]. There is a need to consider not only the building as a whole, but also the issue of the district and the whole city in refurbishment decisions. Downstream log-jams in the real estate industry chain are a major stumbling block for innovation by other building and construction industry players.

Rating and certification systems: an essential feature of the process, heralding new and exciting opportunities

Over the last two decades, systems for rating and certifying the energy and environment performance of buildings have proliferated and progressed by leaps and bounds. Discussions and competition between the different systems have even boosted further research and shed greater light on the difficulties to be addressed.

For buildings, the reference for the certification process is now that of the general urban context. Success in developing energy-efficient buildings faster and more sustainably is a vital part of achieving low carbon and low energy living environments.

27 Green Building Finance Consortium, S. Muldavin

28 I. Ahlke, BBSR

Cities and urban environments - from community scale to metropolitan agglomerations and even mega-regions, are intertwined systems of built environments that must be perceived as closely interdependent, interconnected systems, both technically and financially.

So far, attempts to extend the reach of major energy rating and certification systems to neighborhoods and cities have failed to live up to expectations. The obstacles are legion, not least the complexity of city governance and administration and the various issues to be factored into the equation.

To overcome these obstacles, we are of the opinion that urban planning systems and instruments will need to be thoroughly rethought and redesigned to make proper allowance for current changes in the building and construction sector. Grand central master plans and retrofitting projects must be replaced by sustainable integrated urban development processes able to reflect the interaction between the regions and their building stock. This is a real and practical challenge at both local and global level.

There is no evidence that city development based upon a mix of modernist theories, contemporary technology, and global funding, as currently promoted in many South-East Asian agglomerations, as well as in a wide range of cities in India or China or even in the Middle East, will provide the grounds for sustainable living.

Conversely, the combination of population densities that promote efficient use of infrastructure with new centers of development that are both accessible to high capacity transit and decentralize employment opportunities will significantly contribute to the goal of reducing CO2 emissions from transportation[29].

29 J. Rahaim, San Francisco

Promoting low carbon built environments

Promoting low carbon buildings, low energy buildings and the corresponding technological and financial solutions may be more efficiently accomplished through the promotion of low carbon built environments and low carbon urban landscapes[30]. But this will require champions, leaders, innovators and, in some cases, risk takers. Leading building and construction sector players could play this role.

New approaches to financing, risk sharing, ownership and partnering are all part of the mix, involving a range of complex issues and challenges, such as integrated building systems, low carbon precincts, engaged communities and innovative and efficient urban administration.

We call on the building and construction industry, both professionals and researchers, to upgrade their understanding of spatial and urban metabolisms.

In particular, research needs to be mindful of scale issues (building scale, precinct/urban scale and community scale), in order to arrive at solutions that are relevant to the urgent need to create more energy-efficient urban systems truly conducive to lower GHG emissions[31].

More research needs to be done, for example, to highlight the relationship between land use patterns and GHG emissions, and show how clusters of buildings in the form of Eco-Districts, using distributed infrastructure systems, can effectively share resources and thereby reduce demand for energy and water resources.

30 D. Prasad, CRC for Low Carbon Living, Sydney
31 D. Prasad, CRC for Low Carbon Living, Sydney

Beyond the science of optimizing energy resource management and GHG emission reductions, research needs to focus on the legal and operational requirements of Eco-Districts since they require resources to be shared across ownership boundaries and between public and private properties[32].

Reliable and solid financial and economic assessments are generally in short supply or of poor quality. Yet, they are critical in order to scale up sustainability investments for once and for all.

32 J. Rahaim, San Francisco

3/ OUR COMMITMENT: A 5-YEAR ACTION PLAN

Global awareness, professional leadership

Internationally, global awareness is on the upsurge, while global advocacy and global warning against global warming are widespread, but not yet universally accepted. Through the UN, emphasis is being laid on multilateral and multi-stakeholder initiatives involving not only national governments but also cities, businesses and civil society.

But we have serious doubts as to the wisdom of the communications strategies still adopted by many global institutions and corporations and their image consultants. Scaring the general public and the world community by insisting on current global disorders is a questionable approach. How efficient is playing on people's fears in the long run?

The building and construction sector has, more than ever before, a very strong case to make for showing that it can be a leading industrial and financial sector pushing the boundaries of energy consumption and carbon emissions to meet a challenge that requires both mitigation and adaptation measures to ward off climate change and be on a par with public hopes and expectations.

In times of profound economic uncertainty and instability, business champions are needed to show leadership and commitment to drive the necessary change. The scale of initial rewards needs to be gauged against the long-term benefits

Professional leadership mobilizing trusted professional skills and market proven knowledge should be one of the keys to nurturing, supporting and sustaining official commitments.

This leadership also needs to be on display and duly recognized internationally so that it can give practical shape to some of the initiatives currently in the pipeline such as

the UN Open Working Group, which has just sent its final recommendations to the General Assembly of the United Nations, including Urban Sustainable Development Goals (SDG)[33].

Our six key targets

Building on the first edition of the Energivie Summit, we intend to deliver a clear message to governments in preparation for COP21, promoting the building and construction industry's past and future achievements in favor of carbon neutral and energy efficient built environments.

Our common priority is to connect innovation in science and the building industry with social progress and equity.

We understand the interdependencies of the various contemporary issues involved in the design, construction and occupation of cities and buildings.

It is no longer possible or appropriate to compartmentalize issues, whence the demand for new approaches, new thinking and greater clarity.

We understand that changing views, relieving anxiety and challenging convention is an important complement to building evidence and promoting options as we look to develop the case for the built environment to play a much bigger part in reducing energy consumption and GHG emissions.

We firmly believe in the value of connected expertise, connected networks, connected hubs and platforms and are convinced that significant results can be quickly achieved.

Narrowing the gaps between information flows and widespread concrete action is a matter of urgency. It is a priority we can achieve by working together with governments, enterprises and the civil society.

Starting in 2014 from the inaugural edition of the Energivie Summit, our aim is to build a strong case. We have decided to join forces with the Alsace Energivie cluster and its partners in committing to the following priority targets over the next 5 years:

1. Reinforcing multi-stakeholder perspectives (public and private sectors, NGOs, civil society, etc.)
2. Identifying and supporting industrial innovation, whatever its scale and whatever the size of the companies concerned
3. Reaching our goals and obtaining universally-applicable results through a focus on local solutions
4. Acting now before scaling up to the next level and planning for the future
5. Recognizing the need for result-oriented codes and standards able to develop over time, their application and monitoring
6. Connecting knowledge, skills and professional networks

We will be able to move forward by enhancing the research and findings of the experts and centers of expertise gathered around the Energivie Manifesto and by further linking up with current research programs that match any of the above mentioned priority areas.

33 We are keeping a watchful eye on discussions still in progress at the time of producing this Manifesto over fixing an "urban" target (Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable).

Target 1: Reinforcing multi-stakeholder perspectives (public and private sectors, NGOs, civil society, etc.)

The building and construction sector exemplifies the vital role of multi-stakeholder perspectives and the need for more participatory processes from the early stages of R&D through to decisions on public policies.

We understand that durable and convincing solutions cannot be deployed by the public authorities alone. Markets, whatever their scale, are a critical judging criterion and need to play a part in tailoring, improving and advocating new approaches.

We believe that citizens' participation and involvement is necessary so as to balance decision-making processes and influence local implementation of national or global measures.

Target 2: Identifying and supporting industrial innovation, whatever its scale and whatever the size of the companies concerned

Energy efficiency issues are becoming increasingly relevant to small and medium sized manufacturing firms as they search for ways to drive down their energy costs and sharpen their competitive edge in a challenging business environment.

Since the built environment is strongly shaped by local building traditions, locally adapted solutions will be best for its improvement, in return opening up new opportunities for SMEs[34].

Energy efficiency improvements can also deliver increased productivity for SMEs and a greater understanding of energy management systems and processes.

Industry and professional associations have an important role to play in supporting adoption of energy efficiency by their members. While many associations have developed innovative and practical ways to support and educate their members on energy management, a number of challenges still remain[35].

Mid-size enterprises with between 200 and 5,000 employees working in the building and construction sector are often synonymous with cutting edge technologies, proactive management and a strong ability to cope with changing norms and contexts. Their involvement in CO2 reduction strategies will therefore be critical.

Target 3: Reaching our goals and obtaining universally-applicable results through a focus on local solutions

Performance indicators should be encouraged to enable the industry to innovate and propose alternative solutions for which suitable options and cost efficient outcomes can be found.

Energy issues vary by building type, and recommendations need to be tailored to the diverse building uses.

Owners, occupants, lenders, service providers such as brokers, appraisers, designers, engineers, developers and governments must be motivated and educated with an eye to their specific roles and potential contributions.

Target 4: Acting now before scaling up to the next level and planning for the future

Many practical solutions already exist, building on multidisciplinary expertise, recent innovations, international and national research and benchmarks for identifying the underlying principles of low carbon living and building resilient communities.

34 I. Ahlke, BBSR

35 IPEEC - International Partnership for Energy Efficiency Cooperation

By extensive deployment of current technologies, it is therefore possible to develop strategies, reduce energy consumption, improve grid reliability and cut emissions from fuels already in use[36].

Through comprehensive feedback on these actions, it will be possible to define scientific and technical strategies aimed at the innovative developments needed to enable the gap between reality and market expectations to be narrowed[37].

Tools devoted to buildings need to be better factored into plans for the growth of cities that promote mixed land use, diversity, distributed employment, while ensuring the protection of agricultural assets and environmental capital[38].

Deploying current technologies first is a further critical way of rapidly improving existing buildings and constructions and actively exploiting the value of our architectural heritage.

While current innovative technologies are – nearly automatically – suitable for new buildings, stakeholders should put additional effort into the adaption of these technologies to existing building stock. Existing buildings frequently shape cities and their unique building culture. Concepts have to be developed to achieve proper integration and overcome potential conflicts between innovative technologies and cultural heritage.

Target 5: Recognizing the need for result-oriented codes and standards able to develop over time, their application and monitoring

Not all local contexts are alike and not all markets have reached the same stage of development.

36 Energy efficient major renovation and new construction, commissioning services, certification process management, new construction and retrofits, sustainability consulting, strategic environmental management, energy savings, performance contracting, energy master planning, supply side energy analysis, cogeneration, distributed generation and renewable energy projects, facility improvement and optimization projects, heating and cooling, lighting design and implementation.

37 T. Duforestel

38 cf. in particular, UN-Habitat's *Cities and Climate Change Initiative* (CCCI) seeks to enhance the preparedness and mitigation activities of cities in developing countries

The support of professional groups representing key segments as well as their financial and intellectual capabilities and resources could be helpful in developing an agenda that is as ambitious as it is practical.

Special emphasis should be put on the holistic education of working professionals, especially those in the building trades, architects and engineers. The barriers existing between the different trades and professions need to be removed; the classic approach to vocational training must be enriched by integrative aspects to provide information about overall targets and by multidisciplinary elements to help in understanding the work of other specialist professionals[39].

Detailed market assessments must be completed using flexible tools such as green building design competitions[40], mobilization of private and non-profit institutions, celebrating achievements in architecture, design, construction, urban planning, and engineering, and encouraging excellence in the building arts and sciences.

Transformation of existing built environments as well as crafting future built environments are not only a matter of hard science and evidence-based policies.

Creativity, imagination, design, investment in human science are equally critical. A good dose of creative economics can provide the grounds for widespread acceleration of energy efficient policies within built environments.

More innovation should also come from built environment professionals in a much more connected way. Planners, architects, engineers, surveyors and their organizations need to be far more open to sharing goals and strategies, in order to foster the human resources that will be needed in the near future to promote sustainable large scale urban developments and large scale urban regeneration.

39 http://www.buildupskills.eu/, e. g.: http://www.buildupskills.eu/national-project/germany , http://www.buildupskills.eu/sites/default/files/BUS-Roadmap-EN-GERMANY-FINAL-19-03-2013.pdf

40 BADI, Solar Decathlon…

Combined expertise in real estate finance, investment and valuation experience will be a further key to expanding sustainability/energy investment.

The notion of capturing the value created by a cleaner carbon future, and creating capital funds to finance the necessary investment, with some of the savings made providing a return on capital, is yet another set of solutions to be implemented in real urban life.

Target 6: Connecting knowledge, skills and professional networks

The number of advanced engineering and design projects in the field of energy efficient buildings illustrates the international capacity and capabilities available to promote the development of sustainable buildings and cities.

Post-occupancy assessments, in other words, once buildings are in operation, are critical in order to promote mainstream adoption of new designs and technologies.

There is a need to move away from demonstrators and prototypes that fail to take serious account of the self-interested and, at times, contradictory motivations of builders, users and investors, which should instead be made to converge.

We strongly believe in the role of users in ensuring the long term success of energy efficiency and CO2 reduction targets. User payments aligned on user benefits are a simple but critical key to such success.

The gap between the level of information and the level of practice can indeed be narrowed by constantly supporting and encouraging the interconnection of experts and centers of expertise.

In our experience, world class expertise circulates widely and quickly through dedicated centers of excellence, research labs, university departments on built environment engineering, public and private agencies and foundations, and think tanks.

This type of interaction needs to become everyday practice and to be developed on a much broader basis to obviate the risk of not having adequate human resources to cater to requirements and provide functional solutions. Forging links will enable knowledge to be better connected with skills locally and globally in order to harness the overload of available information (too much information, or badly organized communications channels). The time has come to better combine building, design and urban thinking.

Strasbourg - 5 November 2014

APPENDIX A - OUR 40 PROPOSALS[41]

1. **Enhance the understanding of business sector leadership opportunities:** apart from large global corporations, a wealth of mid-size enterprises, with or without family ownership of capital, are performing extremely well in their domains, tend to cooperate with others and with larger companies, and can be extremely active drivers of change.[42]

2. **Define clear and operational CO2-limitation-oriented targets** applicable to all relevant segments: new construction in developing countries and retrofitting of the most polluting/consuming buildings in developed countries.

3. **Accelerate the uptake of innovative technologies by SMEs** in order to overcome the limits of their economic and knowledge resources.

4. **Recognize that building stock is a key component of CO2 reduction.** By way of consequence, incentives for renovation and information campaigns should be envisaged. A breakthrough could be achieved by a mix of instruments geared towards owners and users.

5. **Understand the true implications of deep refurbishment:**

- Breakthrough technological and economic performance improvements for the building envelope (reducing demand);
- Proper downscaling/management of energy equipment (adjusting to lower demand without diminishing energy use efficiency);
- Durable performance improvements (avoiding user misuse and/or building disorders).

41 These proposals represent a series of avenues that could usefully be explored. They will be considered in greater depth in the course of 2015 in application of the road map set out in this Manifesto.

42 *Rhine Capitalism model,* offering alternative and complementary options to State-run capitalism and Anglo-Saxon capitalism. J.A. Héraud.

6. **Embark on the 3 stages in the green construction improvement process**[43]: Firstly, improve existing green building constructional standards and regulations; secondly, gradually set up valid bidding processes; thirdly, implement reward, penalty and elimination mechanisms in the design and construction process.

7. **Prioritize lifecycle assessment of building materials.**

8. **Harmonize norms and standards** on a large scale (Europe, North America, etc.).

9. **Provide building users and/or owners with personalized information,** especially for retrofit and improvement operations.

10. **Implement intelligent control systems** and train users and specialists so that these are kept under technical and financial control.

11. **Upgrade the quality of the services delivered** in maintaining building and system performance.

12. **Emphasize demand management as well as supply management.**

13. **Train building protagonists,** mainly in developed countries, in order to enhance the relevant retrofitting operations through identification of the most profitable and cost-effective measures.

14. **Use data from public properties** to educate private owners about best practices, payback periods on specific investments; this will ultimately underpin the need for alterations to building code requirements.

15. **Work together:** There are a number of new technologies making great strides in building and construction. Much of their impact depends on their ability to work well together.

43 In China, the awareness of green building standards and regulations in the construction phase is far behind that in the design phase, so that green building design and construction are two separate stages. Thus, in three to five years, the main task should focus on publicizing and developing green building awareness and professional standards.

16. **Target mutual understanding and cooperation** of stakeholder and user efforts.
17. **Strengthen community commitments** and co-creation agendas so there is a bottom up buy-in.
18. **Produce** cheaper and more efficient photovoltaic panels.
19. **Encourage** recourse to low cost materials and low maintenance needs.
20. **Combine various and complementary efforts to reduce CO2 emissions,** as emission factors vary greatly.
21. **Accumulate precise knowledge** and motivate users positively by developing information engineering and marketing engineering.
22. **Develop platforms which enable holistic control or management of construction,** application of well-balanced CO2 reduction technologies to the construction process and encourage users to make proper use of buildings.
23. **Minimize unnecessary new constructions** by prolonging the use of existing buildings.
24. **Encourage on-site emission reductions** in bridge and highway construction, water and sewer projects, etc.
25. **Source technology and products locally** as far as possible (avoid "grey CO2" of buildings, i.e. CO2 linked with transportation of materials, etc.).
26. **Curb the cost of solar** energy technologies.
27. **Use recyclable materials** capable of thermal regulation for energy conservation in various types of weather.
28. **Reduce the cost of smart control systems** both for houses and cities. These are still rather expensive, especially in BRICS countries/emerging economies.
29. **Understand the complementarity** of energy efficiency measures and renewable energy technologies with lifestyle and behavioral changes.
30. **Include values other than just energy cost savings** in the retrofit decision-making process as a means of dramatically increasing the ability to execute deep retrofits (more than 50% in energy savings). A growing body of statistical evidence suggests rent premiums of 3 to 6%, occupancy premiums of up to 10%, and sales price premiums of 10% or more for investor-owned LEED certified or Energy Star office buildings[44]; in addition the health, productivity and recruiting advantages for occupants of sustainable properties are well documented.
31. **Address all risk issues involved with retrofits** through proper deep retrofit value analysis.
32. **Address value and risk integration issues at property level.** A general business case analysis is sufficient for most strategic decisions, but not for portfolio or property specific decisions.
33. **Move away from piecemeal subsidization** to the mainstreaming of suitable alternatives.
34. **Transfer the knowledge of human-environment interaction** accumulated in the architecture and urban development fields to other fields such as building and construction.

44 Over a dozen studies provide evidence suggesting a 3 to 6% rent premium and 10% or more sales price premium (See codes 15.71 and 15.72 of Green Building Finance Consortium Research Library, www.GreenBuildingFC.com).

35. **Locate new developments in places that are accessible** to high capacity transit, and that mix land uses so as to provide a range of jobs, housing and services in close proximity – all with the goal of reducing CO2 emissions from transportation.

36. **Move from a building to a district dimension,** allowing for cross-building energy cooperation and/or smart energy generation and use within districts.

37. **Promote self-sufficient buildings and neighborhoods.**

38. **Link district energy with waste heat recovery:** much of the success depends not only on technology, but on breaking down legal barriers and co-locating buildings with different functions closely together to make heat recovery and conveyance more practical[45].

39. **Ensure that building and construction are not treated solely on the basis of individual projects,** but on a city-wide scale, which takes into consideration the integration of buildings, urban structures, transport, infrastructure and the like with the different forms of energy supply, such as distributed energy systems, industrial ecology networks and tri-generation systems.

40. **Redefine the role of building and construction professionals** and include them in the political landscape as significant contributors in rising to the challenge of reducing GHG emissions.

45 For example, in Seattle, Amazon has just announced that its new campus, currently under construction, will heat all of its 280,000 square meters of office space with waste heat captured from a gigantic data center located across the street

APPENDIX B - OUR "THREE QUESTIONS TO THE EXPERTS"

The following three questions" have been put to each of the experts listed in Appendix C. Their answers have greatly contributed to the content of this Energivie Manifesto.

1. **What would be the most critical breakthroughs in the building and construction sector in order to curb CO2 emissions significantly towards 2030?**

2. **How could research and advocacy networks promoting renewables and sustainability strategies be more efficient?**

3. **What would be the most appropriate way for industry (building and construction, civil engineering, etc.) to contribute towards fostering the COP21 agenda?**

APPENDIX C - LIST OF CONTRIBUTING EXPERTS THE ENERGIVIE MANIFESTO

	Location	Name	Position
1	BBSR - Bundesinstitut für Bau-, Stadt- und Raumforschung (Federal Institute for Research on Building, Urban Affairs and Spatial development) / Bonn, Germany	Dipl- Ing Isabel AHLKE	Referentin im Referat II-2 « Energieeinsparung, Klimaschutz », BBSR (Division II-2, Energy Saving and Climate)
2	APA - American Planning Association Chicago	Bill ANDERSON, FAICP	President, American Planning Association (and Principal, Vice President, Design, Planning and Economics - AECOM)
3	SOPREMA	Pierre-Etienne BINSCHEDLER	Chairman Chairman, Energivie Cluster
4	ECTP - European Construction Technology Platform E2BA – Energy Efficient Buildings Association, Brussels	Dr Luc BOURDEAU	Secretary General, ECTP and E2BA CSTB- Climate R&D European Affairs Manager
5	Renaissance Urbaine Paris	Nicolas BUCHOUD	Scientific Curator, Advisor and Coordinator of the Manifesto
6	EDF R&D Paris	Thierry DUFORESTEL	Ingénieur chercheur senior
7	Dalian University of Technology Dalian (China, Liaoning Province)	Prof. Yue FAN	Dean. School of Architecture and Fine Arts of Dalian University of Technology Vice President, Institute of Architecture, Liaoning
8	District 2030 Seattle, WA	Brian GELLER	CEO, District 2030
9	Université de Strasbourg Facultés des sciences économiques	Prof. Jean-Alain HERAUD	Prof. BETA, Bureau d'économie théorique et appliquée Président, Association de Prospective Rhénane
10	Meiji University Tokyo	Dr. Kozo KADOWAKI	Senior Assistant Professor, School of Science and Technology Director, Architect Associates Ltd

	Location	Name	Position
11	ONU-Habitat Nairobi, Kenya	Robert KEHEW	Head, Climate Change Planning Unit
12	NYU – New York University New York	Hugh KELLY, PhD	Clinical Professor, Shack Institute of Real Estate Immediate past President, CRE (The Counselors of Real Estate)
13	Tomsk State University Tomsk (Russian Federation)	Alexey KOZMIN	Director, Center for Urban Research
14	IPEEC - International Partnership for Energy Efficiency Cooperation / OECD, Paris	Benoît LEBOT	Executive Director
15	TERI New Dehli (India)	Mili MAJUMDAR	Director, Sustainable Habitat Division
16	RMI- Rocky Mountain Institute (Colorado) Green Building Finance Consortium (California)	Scott MULDAVIN	Senior Fellow (RMI) Green Building Finance Consortium, CEO
17	Conseil Scientifique de la Chaire « Économie du Climat » - Université Paris Dauphine	Christian DE PERTHUIS	Président Représenté au Sommet par Jean-René BRUNETIÈRE
18	UNSW - University of New South Wales Sydney	Prof. Deo PRASAD	Program Director, Sustainable Development CEO, CRC for Low Carbon Living
19	Pontifícia Universidade Católica Rio de Janeiro, Brasil	Prof. Antonio ROBERTO	Adjunct Professor, School of Engineering
20	City and County of San Francisco San Francisco	John RAHAIM	Director, General Planning & Development
21	National Building Museum Washington DC	Chase RYND	President
22	Planning Institute of Australia Canberra	Neil SAVERY	General Manager, Australian Building Codes Board Immediate Past President of the Planning Institute of Australia

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