

The Design and Implementation of Effective and Efficient Policies

Phill Harrington and Hirohisa Awano

Planning for sustainability

Planning and development policies may have the greatest long term impact on the sustainability of the built environment, as it is they which will determine – in large degree – the nature of the development process and its long-term impacts at that site and the surrounding area. Induced (or avoided) travel demand is a key consideration for the planning process. The same development may have a radically greater environmental impact over the long term if it is located at a new, or ‘greenfields’, site when compared to an existing, or brownfields, site, particularly if the development does not allow mixed uses. Second, planning policies have a significant impact on the choice of travel modes within the development and to and from the surrounding area, with ease of access to efficient public transport a key requirement, while restrictions on parking or vehicle use may be considered in some circumstances. Zoning or other development controls play a critical role, as they will influence the overall character of the development; the extent to which it is self-contained (or at least well-integrated) in terms of social and commercial services and provision of resources such as energy and water, as well as the possibilities for local employment, work from home, etc. An exciting development in this area is performance-based zoning, where limits are set for the impacts of a development (eg, noise, waste, perhaps hours-of-use limits), rather than for the nature of the development in functional terms. This approach, or else greater flexibility in the planning process, could also be important to facilitate changes in the usage of buildings over time, and hence in reducing demand for building demolition and rebuild. Finally, planning requirements may determine the allowed emissions from the site, re-use of existing materials or preservation of existing features, the physical form of the development and the balance of green and developed space.

Promoting best practice as the industry standard

After the planning process, there is an important opportunity to influence the design and long-term environmental performance of the building via codes, regulations or standards surrounding the construction process, but also similar instruments that may affect the performance of individual end-use equipment or systems, such as lighting, motors, glazing, etc. Such requirements, which are generally mandatory but may also be voluntary or indicative, have the key feature of being able to influence key design and technology choices at the beginning of the project, allowing for overall system optimization and, importantly, cost savings. Performance-based policy approaches are important in order to preserve flexibility and to minimize costs for building designers, while performance requirements need to be objectively benchmarked to ensure optimal building performance. Many of the fundamental choices made at this time will determine the life-time environmental impacts of the building, notably its energy consumption, and it may not be cost-effective, at any future point in the building’s lifecycle, to retrofit more resource efficient solutions, for example for the building fabric and glazing. This suggests that policy should be used to create an investment climate which encourages best practices, but not restricted only to demonstration buildings, but rather for all new buildings. Such practices, and the transition towards them, may need to be facilitated – see *Reinforcing Market Drivers*, below. Building performance requirements interact in complex ways with wider resource efficiency in the building sector: while lifecycle energy savings may result from more appropriate designs and choices of materials, attention must be paid to the lifecycle characteristics of materials

employed, quality and productivity factors such as indoor air quality, and to ensure that incentives are not inadvertently created that may shorten the effective service life of a building (eg, excessive performance requirements for refurbished buildings).

Integrating building systems

While performance-based building codes go some way towards encouraging integrated, whole-building solutions, steps in this direction may need to be re-inforced, or facilitated, via strategies such as facilitating (or requiring) building performance simulations, to optimize the building design but also the integration of the various building systems. Major advances in modeling techniques, sensors and controls enable new strategies, such as 'continuous commissioning' and remote building optimization, which can have economic as well as environmental performance benefits. Such developments can be encouraged via building performance rating and accreditation schemes, training and accreditation of professionals to undertake such work and wider facilitation of the energy services market. At the same time, many of these tools rely on objective data that must be created through performance testing of building components and whole buildings, and this work is often carried out by government-funded or accredited agencies. Providing sufficient resources for such work is an essential step in enabling such market solutions.

Reinforcing market drivers

Stepping back from the building itself, the wider commercial environment within which the building industry operates is an important determinant of market outcomes. Here, important strategies begin with basic, but critical, steps, such as raising the awareness of both building clients and the building industry of the range of impacts and options associated with the economic and environmental performance of buildings. Formal information provision, research resources and advisory services, build upon such a base. But beyond this, governments can play a key role in reinforcing market drivers towards higher eco-efficiency, for example by encouraging (or requiring) labeling or disclosure of building performance. Such strategies make visible in the market-place the environmental credentials of buildings, allowing clients to discriminate and developers to perceive a return on investment in improving environmental performance. Finally, governments can influence the broader economic and commercial climate within which the building sector operates – key factors will include the presence (or absence) of carbon pricing strategies, the nature of tax and depreciation incentives, and the wider legal environment affecting lease structures – each of which may influence behaviours of both clients, building developers and owner/managers.

Expanding the performance envelope

The strategies considered above may be used to optimize the sustainability and environmental performance of buildings, drawing on the set of existing technologies and design philosophies. However, a key requirement is that the frontiers of the performance envelope must be pushed out, in order to offer to the building sector a wider range of solutions, and at lower costs, over time. Given the fragmented structure of the building sector in most countries, the industry itself commits relatively few resources to research, development and demonstration. Yet the spillover benefits for society that are created by such activities can be very high, opening up a clear role for government to fund, or otherwise stimulate, such activities. Beyond direct funding are strategies such as public/private partnerships, tax incentives, voluntary agreements, reward and recognition programmes, and competitions. Each of these can help to create an environment in which the private sector is encouraged to invest in innovation,

and to link up to advances in science and public-good research, to improve the environmental credentials of the building sector.

Informing policy design

A final consideration is that, with buildings directly consuming around 40% of all energy produced in OECD countries, and also being a major user of primary materials in the construction process, it is remarkable how little objective information is publicly available on the resource use and efficiency of buildings, at least in many countries. An important effort to improve the quality, timeliness and transparency of key data associated with building performance is needed in order to facilitate well-targeted, effective and least-cost policy. A related need is to better understand, through careful evaluations, the actual impact of existing policy measures. Typically this type of activity represents an important role for government, although here again innovative strategies, involving collaborations between government, industry and other stakeholders, can also be effective in improving information flow.