Regulatory and policy barriers to effective climate change adaptation

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Introduction

SIBA believes that there are many more challenges to address in the review than the terms of reference appear to allow. Noting that narrow perspectives can compromise coherent responses, SIBA has attempted to interpret the terms of reference from a broader perspective and thus consider some wider implications. The time constraints are equally inhibiting.

Reliability

No one, especially governments, can accurately assess climate problems unless they draw their information from sound spatial data in the first instance. If they are to address issues effectively, policy changes must be predicated on **accurate, current, accessible and interoperable** spatial data.

About the APS 200

The APS200, comprising the Secretaries Board, SES Band 3 and selected agency heads (equivalent to SES Band 3), is the new senior leadership forum for the Australian Public Service. The APS200 plays a leading role in communicating the vision of the future APS and building the understanding, engagement and commitment of staff to the reform agenda.

Spatial data is a fundamental infrastructure for policy, not only for addressing climate change *per se* but for many other policy and economic domains affected by or related to climate change. These include environmental management, water, communications, transport, infrastructure, planning and development, health, defence, resources and energy, agriculture, finance and insurance, among many others. Further, the APS200 Location Project also recognises location as an important infrastructure.

Developing a reliable data resource must therefore be the first priority: a **National Spatial Data Infrastructure (NSDI)**, one that comprises all the necessary elements to give impetus to a policy framework, is essential. An NSDI will deliver '*the building blocks of a better regulatory system, such as national environmental accounts, skills development, policy guidance, and acquisition of critical spatial information*'[1]. The EPBC Review Report made many recommendations recognising how important spatial information is to effective environmental management.

However, state and local governments have thus far proved reluctant to either share their spatial data or contribute to a NSDI. As a result, a plethora of state or industry-based mini-SDIs prevail, none of which provide consistent, uniform or standardised information.

Without a standards-based interoperability policy or a mechanism for sharing spatial data, nobody can be certain that *their* spatial data is *current, correct or entire*. This is a shortcoming akin to the legendary problem with the railway gauges; and just as problematic.

Uncertainties

[1] *Report of the Independent Review of the Environment Protection and Biodiversity Conservation Act 1999, October 2009*

Climate change and its potential effects on coastal and estuarine inundation, combined with conflicting inter-and intra-state laws, policies and planning regulations (not to mention Crown protections) will undoubtedly give the construction sector more cause for concern than it already suffers. Current uncertainties make businesses cautious anyway and any need to adapt to the added effects of climate change may well compromise business confidence even further.

Currently, councils and state agencies restrict developments according to arbitrary opinions about potential rises in sea levels. Developers can also acquire independent assessments but if the opinions and policies conflict – and they often do – then the ensuing uncertainties can escalate borrowing costs, increase insurance premiums or even render proposals entirely unviable.

It's not feasible to provide absolute information on rising sea or estuarine levels but it is possible to provide more certainty via highly accurate and freely available digital elevation data. The floods in Queensland in 2010-11 demonstrated that high-resolution spatial data for accurate flood risk assessment is crucial to effective mapping and modelling.

Given Australian communities have always tended to build on river and coastal lands, it's essential to base planning, zoning and development assessment on a single authoritative source of current, accurate, standards-based spatial data that can assist governments, developers, buyers and insurers to *accurately* determine flood-related risk. Using single-source high-resolution spatial data for risk assessment will enhance understanding across all stakeholders, from councils to developers and from the buyers to funders. Open and free access to this data would also help emergency management groups.

Advantages

Constructing a virtual Australia based on digital elevation data at appropriate scales will deliver significant advantages and enable planning using key inputs such as:

Topography - land information as the platform for all other inputs such as road, rail and infrastructure corridors. The private sector would also find this useful for developing location-based products and services, some of which will lead to intelligent transport systems and thus reduce carbon emissions from vehicles.

Risk assessment - factors associated with climate change such as inundation, fire, cyclone and other natural disasters. Insurers would also find this useful for determining risk, based on a trusted data source at the relevant scale. Open access to spatial data will also obviate the need for multiple company-based datasets and is likely to deliver reduced insurance costs.

Land-use - balancing food security, ecological and heritage control, housing, water and catchment protection, biofuels, resources and energy. Clear guidelines and open access methodologies will reduce development costs, ensure more rapid approvals, reduce public appeals and minimize duplication.

Principally:

- a National Virtual Model would operate from nationally consistent standards-based interoperability rules
- open access would reduce the data acquisition and maintenance costs to local, state and commonwealth governments through a 'collect once, use many times' approach
- data would be retained and maintained at the agreed 'point of truth' so that consistency is ensured and duplication reduced
- funding would be directed to the 'point of truth' body to maintain and verify data
- all data would be added to the NSDI to ensure discoverability and that standards-based metadata is maintained.

Conflicts

Coal-seam gas, carbon sequestration sinks, biofuels, food production – all these interests and many others compete for, potentially, the same land tracts. Land management policies must address how the arable land is used. Currently, that land is diminishing because of over-exploitation, shrinking water supplies and the negative impact climate change has on land possessing the potential for agriculture.

Sustainable population planning policy conflicts with the competing demands of an ever-expanding urban sprawl and an ever-decreasing productive agricultural land mass. The pressure for housing, transport and other infrastructure will increase. Further competition for land will emerge from the rapid development of biofuels and the disturbing trend, even within Australia, of foreign countries buying large tracts of arable land for food production to supply foreign domestic needs in the future.

If global population does expand to 8.3 billion by 2030, as some predict, the world will need an extra billion tonnes of cereals. In 2011, world production stood at 2.3 billion tonnes. Water systems are currently under stress from numerous factors and urbanization is depleting the presence of the most productive lands suitable for agriculture.

Geospatial technologies have a multi-disciplinary and global role to play in helping to increase in the level of food production.

Mapping and documentation form the foundation for many agricultural producers worldwide. Since efficient land administration systems tend to be privately owned, there are great incentives for producers who deploy the latest available technologies that assist to conserve landscape resources while improving average yields.

Geospatial tools and technologies tend to have higher rates of return on investment because they include consideration of growth factors into the workflows and decision-making, leading toward higher production. Knowing available soil moisture, levels of weed infestation, seed rates, fertilizer requirements and other production factors across varying terrain means improved management.

Just as there is conflict between our short-term energy needs through coal-seam gas and our future needs for arable land for food production, policy has been too narrow and not based on a *holistic* assessment of short, medium and long-term needs of the national economy. The

Murray-Darling Basin debate is indicative of future conflict and highlights the increasing radicalism of community groups.

Policy must be developed in a spatial framework that is open to public scrutiny so that a government policy position can be either verified or challenged by citizens. The objectivity of spatial analysis will enhance policy-making and provide us with the confidence to undertake investment in construction, energy, communications, housing, transport, agriculture and the many other inputs to a comprehensive and defensible land-based regulatory platform.

The Policy Void

Some agencies develop policies in a void. Despite the obvious and necessary linkages and exchanges that should occur, some agencies choose to develop policy without regard to a greater spatial plan. Complementary services aren't brought together - roads and railways are developed in isolation, as are houses, towns and community assets. As a result of this isolationist approach, properties and people are placed in harm's way.

Roads are built and then administered in ways that don't embrace innovation. For example, some authorities are considering regulations to support using GPS to track heavy vehicles for the express purpose of applying speeding fines: the National Transport Commission is developing policy that appears to ignore SIBA's warnings about the problems around GPS-occluded or denied environments.

In a submission on Performance-based Specification for Electronic Work Diary and Heavy Vehicle Speed Monitoring,[2] SIBA pointed out a number of **policy flaws**:

'It is well understood that GPS user equipment computes and fixes position in relation to a constellation of satellites. Over the past few years the US military has indicated a growing concern with interruption of ranging signals, which results in the degradation of reliability of GPS navigation systems ...

A study by the Electronic Navigation Research Institute (Sakai Takeyasu and Koremura Kazunobu) found that there are frequent short-term cracking of ranging signals that 'may cause serious impacts on reliability of GPS navigation systems'....

In addition to the aforementioned technical assessment of the reliability of GPS it should also be noted that there are a number of additional constraining factors on the reliability of GPS including tall buildings, geometrical condition and big trees might also block the GPS signal and reduce the data quality.

… We note with interest the proposition that this technology could be used for other purposes in the future such as speed checking or even for toll roads and usage charges … low-cost 'spoofing' devices [provide] an incentive to interfere with charging mechanisms ...

The most significant warning comes from US Air Force Chief of Staff Gen. Norton Schwartz who said 'the Global Positioning System is vulnerable to threats such as jamming and anti-satellite weapons and the United States should reduce its dependence on the system while developing alternatives for precise positioning, navigation, and timing'.'

This is a good example of policy developed in a vacuum and one that is part of the environmental actions that government can take. Yet developing proper policy around using spatial information and technologies, including GPS and more recent advancements such as

[2] Performance-based Specification for Electronic Work Diary and Heavy Vehicle Speed Monitoring, SIBA, Canberra, 10 December 2010

the Locata Terrestrial system (recently adopted by the US Department of Defence), will increase uptake of transport solutions that will **reduce carbon emissions significantly**. In a submission titled *In-Vehicle Telematics: Informing a National Strategy*, SIBA stated that:

'The concept of green driving systems is already being trialed in Europe, where a number of leading companies have identified fuel savings ranging from 5% to 15% for drivers who choose to follow Green driving recommendations. Predictive Cruise Control, while not a new concept, is being used to better manage automated systems in vehicles such as cruise control. This too is showing better fuel economy even on hybrid cars.

Another method for enhancing fuel economy and reducing emissions is a complicated but important integration of digital maps, green driving systems which "look forward" for the driver and the hybrid engine controller in a hybrid vehicle. In the simplest terms, a hybrid attempts to use the electronic motor whenever possible, as long as the battery lasts, and to minimize the use of the internal combustion engine that uses fossil fuel. The hybrid controller must carefully monitor battery charge to make sure that the battery does not run completely out. For this reason, the hybrid controller is conservative to make sure the battery charge is not drained.

It is possible for the system to operate more intelligently when digital map data is brought into the picture. For example, if the system knew that there was a recharging opportunity on the downhill side, it could drain the battery lower while climbing uphill. Similarly, knowing that there are stop signs or other deceleration opportunities ahead, the system could plan on regenerative braking to add charge to the battery, and thereby regulate battery drain more effectively.

The most accurate way of creating a transportation network is by using a GIS (Geographic Information System) together with a spatial (or geospatial) database, which contains the actual coordinates of streets and other features that are fundamental to telematics systems.

Spatial systems provide information to assist planners to define both the starting and end points that reflect where flows start, end, or branch and links carry the flow from one point to another. [3]

If we are to develop policy in order to reduce barriers to adaptation, we must evaluate Australia's spatial infrastructure in conjunction with current and emerging technologies *and* cross-jurisdictional co-operation.

Policy boundaries

Policies and the jurisdictions that create them have boundaries but floods, cyclones, fires and all manner of natural disasters don't respect these artificial barriers. Business operates across boundaries yet we continue to erect barriers (specifically policies and regulations) that inhibit efficient and effective trade.

Carbon pollution mitigation strategies and policies must consider not only the technical aspects of the legislation but also its capacity to interfere further with cross border trade and how it will add to the cost of doing business. If the rules vary from one local council to the next it's essential for a business to know exactly what the difference is and what it will cost them. Consistency across the borders must be a priority – that is, there must be **one agreed cost tied to a specific mitigation strategy** not a multiplicity according to the jurisdictions across which the mitigation is effected. We need also to be careful that the costs of mitigation are not seen as a mechanism for government 'gouging'.

[3] The Role of Digital Map Data in Enabling Green Driving, Green Routing and Eco-Routing, NAVTEQ White Paper, 2010

How complex and costly the policies and regulations are will determine how willing companies are to invest.

Where authorities support participation with cash – such as new forest growth and on-farm carbon sinks – the risks may be overlooked in the policy detail without examining the wider inputs. For example, what is the legal framework for managing carbon sequestration? How does this legislation marry with existing property law? Is the risk profile defensible and sufficiently robust to satisfy lenders? Is there nationally agreed spatial framework to support policy on carbon sinks?

The lack of legal clarity will result in either a disincentive to invest or legal challenges that will ultimately lead to an undermining of the carbon sequestration policy.

Emergency Management

The term 'emergency management' covers a range of challenges, some of which are arguably the result of climate change. Rising sea levels and estuarine inundation have received significant press in recent times. Clearly, we need to respond to these challenges in the longer term but we also need regulations for the short to medium term.

Under the Constitution, policies related to land and water are the states' responsibility. Planning and zoning policies and regulation are clearly not working and, with further severe weather conditions predicted in the future, it is clear that existing policies will create an unwillingness to invest in property in some coastal and estuarine areas. Similarly, if local and state governments continue to ignore the need for and use of high resolution spatial data then it is reasonable to assume that insurance companies will react to the risk profile with higher premiums. By extension, banks may eventually refuse to lend for 'at risk properties'.

Combining a strike of capital with adverse insurance risk profiles could significantly damage the capacity of communities to expand. Retreat in some instances may be the only option and some coastal communities have recognised this.

Failure to respond to the planning, zoning and development assessment problems will increase risk for citizens and business. It will also increase the costs of mitigation and recovery from natural disasters. Therefore, current policies and regulations serve to undermine climate change strategies and cloud the debate on population and sustainability.

Motivated monitoring

Building owners and businesses don't visually monitor their use of energy. We have readily adopted visual clues in our motor vehicles to monitor fuel usage but haven't provided similar visual incentives in the built environment.

Regulation may not be the most efficient tool for delivering results. However, some legislative incentive mechanism may provide an opportunity for private bodies to develop appropriate visual tools. Such tools could be used to monitor energy usage on a tenant-by-tenant basis as well as whole of building. This would enable the investment and tenant communities to evaluate rental costs for a specific building, based on green credentials. It would also indicate to investors the true value of a building over time, taking into account a

given building's energy efficiency. Such tools could be made available through closed systems for investors and financiers or for use in auditing.

Research and development

Current R&D policies do not adequately recognise the part that the private sector plays in developing technologies that can improve climate adaptation. Academic and scientific solutions and technologies tend to be favoured, without due consideration being given to the innovative technologies and solutions developed in a commercial context but which also have relevance to climate change mitigation.

Technologies developed for one purpose may also be valuable for others. Without an open and inclusive R&D system we will fail to deliver on policy initiatives on climate change mitigation; or, at best, we will under-deliver.

To determine the model for inclusion we must first understand the interconnectedness of technologies. For example, we know that GPS technologies have significant limitations yet we fail to seek out alternative solutions that might provide a better outcome not only for current users but also to advance new and innovative solutions to climate change issues.

Conclusion

It is difficult to fully explore all policy implications on climate change in the limited time available and with limited resources available to the Association.

However, SIBA believes that the real challenge for the Productivity Commission is to explore through its considerable resources the full breadth of issues across the economy. We believe that a thorough examination will reveal the considerable value that spatial data and technologies can play in delivering climate mitigation results.

Listed below are our recommendations, which, in recognition of the short time-frame, are not as expansive as we would like but do address the key challenges. We have also listed a series of links to specific examples that are relevant to your work. This series of videos are an excellent example of the extent of spatial innovation across the economy.

Further Information

The following short video series is important to get a perspective on the use of spatial information and technologies in the real world. These videos examine all aspects of the application of spatial information and technology and represent where we are today. The economic value is indisputable.

http://geospatialrevolution.psu.edu/episode1
http://geospatialrevolution.psu.edu/episode2
http://geospatialrevolution.psu.edu/episode3
http://geospatialrevolution.psu.edu/episode4
http://geospatialrevolution.psu.edu/trailer.php

Recommendations

Secure agreement from COAG to:

1. Fund a standards-based, interoperable National High Resolution Spatial Data Infrastructure;
2. Fund a standards-based, interoperable National Digital Elevation Framework;
3. Fund a standards-based National Spatial Data Interoperability Framework;
4. Facilitate open access to Public Sector Spatial Information;
5. A national framework for land-use (including but not limited to agriculture, housing, commercial, environment, water catchment, all-hazards, infrastructure corridors, resources, carbon sinks, biofuels);
6. A national framework for cross-jurisdiction infrastructure planning.

Implementation of the above recommendations will ensure a more efficient economy, greater flexibility to absorb the impacts of climate change and encourage the private sector to develop appropriate tools, products and services to enhance the climate adaptation.