Meacham, B. (2016). Sustainability and resiliency issues and objectives in performance building regulations. *Building Research & Information*. DOI: 10.1080/09613218.2016.1142330

Supplementary data

NB: The author is interested in extending this survey to other countries and adding further countries to the database. Those who may be interested should contact the author.

Appendix A:

IRCC Survey – Information for *Building Research & Information* papers

The purpose of this survey is to gather input for two papers to be submitted to the journal *Building Research & Information*. The first will be an international comparative survey of regulatory provisions and market instruments aimed at increasing sustainability and resiliency in existing buildings, and the second will be on challenges with existing (performance) building regulatory systems and desired attributes for 'next generation' systems. Part A of this questionnaire relates to gaining an understanding of government policies for sustainability and resiliency, in general. Part B relates to sustainability and resiliency policies and instruments for new and existing buildings. Part C focuses on issues with current regulatory systems and desires for next generation systems. Thank you for answering these questions as best you can. Please feel free to provide links to documents which provide additional information pertinent to the issue(s) in your country. Note that while names and contact information are requested, information provided by you will not be attributed to you or any other person without your approval. If you have questions regarding the survey, please contact (____). **Please respond by July 15, 2015.**

Name:	
Organization:	
Address:	
Email:	

Part A

To understand the relative importance / priority of sustainability and resiliency principles and policies to the government in your country – in general and with respect to the built environment – a few benchmarking questions are posed. It is understood that these questions may be difficult to answer (or that you may not be able to answer them). However, any information which helps illustrate the situation will be beneficial.

<p>1. From a top-level (over-arching) national government policy perspective, is <i>sustainability</i> a guiding principle for legislative / regulatory development? If so, how is it defined and what does it encompass? (E.g., in the USA, presidential initiatives on sustainability can be found at https://www.whitehouse.gov/blog/2015/03/19/leading-example-climate-change-our-new-federal-sustainability-plan.)</p>
<p>2. Which national government departments / agencies have a role in promulgating regulation related to <i>sustainability</i>, and which aspects are addressed by those departments / agencies? (E.g., in the USA, US Environmental Protection Agency (USEPA) efforts in the area of sustainability practices and approaches include labeling green products and promoting green chemistry and engineering, managing materials rather than creating waste, using green infrastructure to manage storm water runoff, and supporting the sustainable design of communities (http://www.epa.gov/sustainability/). The US Department of Energy sustainability activities relate to reducing greenhouse gas emissions associated with energy production and use (http://energy.gov/eere/spo/goals-and-requirements). Etc.)</p>
<p>3. Do you also have state / province / territory government departments / agencies with a role in promulgating regulations related to <i>sustainability</i>, and, if so, which aspects are addressed by those departments / agencies? (E.g., in the USA, each state has environmental, planning and related legislative and regulatory responsibility for the built environment. In Massachusetts, for example, the Executive Office of Energy and Environmental Affairs (EEA), among other activities, enforces pollution laws to protect public health and natural resources; reviews the environmental impact of major real estate and infrastructure developments; and enhances the state's role in energy conservation and production (http://www.mass.gov/eea/), and the Executive Office for Administration and Finance focuses on energy efficiency and sustainable practices for state-owned facilities (http://www.mass.gov/anf/property-mgmt-and-construction/facilities-mgmt-and-maintenance/energy-and-sustainability/).</p>
<p>4. Is there a hierarchy at either the national or state / provincial / territorial level with respect to <i>sustainability</i> policy? (E.g., does one particular ministry / department /</p>

<p>agency have actual power to direct other groups' efforts in sustainability, or have <i>de facto</i> power to direct or influence others significantly, or does each group work independently, or...) If there is a hierarchy, how is it structured? (E.g., in the USA, states are required to follow federal environmental and energy regulations, but depending on state, can also promulgate their own (varies by state).)</p>
<p>5. From a top-level (over-arching) national government policy perspective, is <i>resiliency</i> a guiding principle for legislative / regulatory development? If so, how is it defined and what does it encompass? (E.g., In the USA, presidential initiatives on climate change resiliency can be found at https://www.whitehouse.gov/administration/eop/ceq/initiatives/resilience, and presidential policy on infrastructure and security resiliency can be found at https://www.whitehouse.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-and-resil).</p>
<p>6. Which national government departments / agencies have a role in promulgating regulations / policies related to <i>resiliency</i>, and which aspects are addressed by those departments / agencies? (E.g., in the USA, several entities have 'resiliency' portfolios, including Department of Homeland Security (DHS) for flooding, earthquake, terrorism (http://www.dhs.gov/topic/resilience) and the National Oceanic and Atmospheric Administration for hurricanes, tornados, and large storms (http://www.noaanews.noaa.gov/stories2014/20141117_climateresiliencetoolkit.html) , with the Department of Housing and Urban Development addressing related impacts (http://www.huduser.org/portal/periodicals/em/winter15/highlight1.html).</p>
<p>7. Do you also have state / province / territory government departments / agencies with a role in promulgating regulations related to <i>resiliency</i>, and, if so, which aspects are addressed by those departments / agencies? (E.g., in the USA, there are state Emergency Management Agencies, which operate much like the Federal Emergency Management Agency (FEMA), a part of DHS.)</p>
<p>8. Is there a hierarchy at either the national or state / provincial / territorial level with respect to <i>resiliency</i> policy?</p>

Part B

This series of questions aims to identify how concepts of sustainability and resiliency are addressed within building regulations, and within the built environment, for new and existing buildings.

1. Are building regulations developed and promulgated at a national level? If so, which ministry / department / agency is responsible? <u>Note: no need to update if information in the 2010 IRCC Guidelines document is still accurate.</u>
2. If building regulations <u>are not</u> developed and promulgated at a national level, how does your system work? <u>Note: no need to update if information in the 2010 IRCC Guidelines document is still accurate.</u>
3. From a building regulatory policy perspective, is <i>sustainability</i> , as reflected in general government policy (see A1 above), addressed within the building regulations? If so, how? (E.g., stated in the Building Act (or similar), stated goal or objective of the regulations (Code), through specific provisions (such as energy usage / efficiency, insulation requirements, glazing requirements, embodied carbon limits, etc.)) <u>Note: As stated above, please feel free to provide documents / links to documents which may have details.</u>
4. From a building regulatory policy perspective, is <i>resiliency</i> , as reflected in general government policy (see A5 above), addressed within the building regulations? If so, how? (E.g., stated in the Building Act (or similar), stated goal or objective of the regulations (Code), through specific provisions (such as specific mitigation for earthquake, high winds, high snow loads, flooding (riverine / coastal), wild land fire, etc.)) <u>Note: As stated above, please feel free to provide documents / links to documents which may have details.</u>
5. Are building regulations in your country applicable to existing buildings? If so, when are the regulations applicable, and to what extent? (E.g., in the USA, existing buildings are not required to meet current building codes unless there is an imminent hazard to occupants, or if the building is undergoing a change in use, major renovation or expansion.)

6. In your country, have any sustainability measures been mandated for existing buildings through regulation? If so, what precipitated the action, how were the measures implemented, and to what extent (e.g., as a result of the Kyoto Agreement and IPCC reports and associated pressures on government, through Ministerial Order (or equivalent), addressing energy efficiency targets, etc.).
7. If there are no mandatory regulatory requirements to enhance sustainability in existing buildings, are there voluntary regulatory measures? If so, what are they and how are they used? (E.g., creating an energy use label when a building is sold.)
8. If there are no voluntary regulatory requirements to enhance sustainability in existing buildings, are there voluntary market based approaches? If so, what are they and how are they used? (E.g., LEED is a voluntary approach to rating sustainability performance of buildings, where points are assigned to various building features.)
9. In your country, have any resiliency measures been mandated for existing buildings through regulation? If so, what precipitated the action, how were the measures implemented, and to what extent (e.g., following an earthquake / hurricane / cyclone / wildland fire / flood, by decree / Ministerial Order / stakeholder input, addressing earthquake rehabilitation of XXX type buildings, addressing YYY type buildings in flood zones, by changing hazard maps (peak/sustained winds, snow loads, rainfall, flood levels, ground motion, etc.)).
10. If there are no mandatory regulatory requirements to enhance resiliency in existing buildings, are there voluntary regulatory measures (voluntary standards, other regulatory instruments)? If so, what are they and how are they used? (E.g., ASCE/SEI 41-06 is available in the USA for seismic rehabilitation of existing buildings.)
11. If there are no voluntary regulatory requirements to enhance resiliency in existing buildings, are there voluntary market based approaches? If so, what are they and how are they used? (E.g., FEMA 547 is available in the USA for techniques for seismic rehabilitation of existing buildings.)

Part C

This section is aimed at understanding how well the performance- (objective-, function-) based building regulatory system has been working in your country, with a particular emphasis on aspects which have been identified as somehow lacking (or failed, or could be significantly improved), why you think the challenges exist, whether actions are underway to change the system going forward, and what 'the next generation' of the regulatory system might include (or that you would like to see it include). Again, please feel free to send documents / links if there is material on this already available for the situation in your country.

1. What is working well with respect to your performance- (objective-, function-) based building regulatory system?
2. What <u>is not</u> working so well with respect to your performance- (objective-, function-) based building regulatory system?
3. Have there been any 'significant' failures of / gaps in / challenges to your system? If so, what are / were they, how did they come about? (See also 4 below.)
4. Can any of these failures / gaps / challenges be related to <i>sustainability</i> or <i>resiliency</i> policies or issues ? (E.g., a focus on insulation for energy led to moisture failures, or inattention to wind (snow, ...) loads, which are potentially related to climate, change led to building failures, or...)
5. If there have been failures of / gaps in / challenges to the system, what have been the major implications for government, your agency, the industry and other stakeholders? (See also 6.)
6. If there have been failures of / gaps in / challenges to the system that can be related to <i>sustainability</i> or <i>resiliency</i> policies / activities / issues, what have been the major implications for government, your agency, the industry and other stakeholders? (E.g., failure to address increased wind speeds in cyclones resulted in \$XXXX in property damage, leading to changes to the building regulation and increased insurance costs.)

7. If the implications have affected the building regulatory system, what action has the government / your agency undertaken to address them and to prevent / mitigate similar challenges in the future?
8. Are the building regulatory system stakeholders generally accepting of the current system, or would they like to see changes? If they want changes, what would they like to see?
9. Are there any activities underway to modify, reduce or enhance any aspect(s) of the building regulatory systems (regulation, education, certification, ...) to address failures / gaps / challenges, either resulting from an event, or resulting from stakeholder feedback, or from new 'high level' policy objectives? If so, what are they?
10. Even if there are no changes to the system underway, what types of changes would your country be interested in with respect to delivering a 'next generation' building regulatory system?

Part D

If you have information, data, comments, ideas or suggestions relative to the two papers which are being prepared, which are not addressed in the above questions, please provide your comments below. Thank you for your participation in this survey.

--