Critical urban Infrastructure in Australia

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Abstract: The provision and location of critical urban infrastructure (i.e. energy, water, transport and communications) are intimately connected with national security ambitions around settlement growth and development. Yet despite a broader 'infrastructure turn' within Australian cities (see Dodson, 2009), a detailed understanding of how and why critical urban infrastructure becomes framed as a key security issue has been little explored within Australian urban research. This paper positions the (national) security focus around critical urban infrastructure in critical tension with growing parallel imperatives for democratic governance processes that are able to reduce social vulnerability and build community resilience. Better understanding the democratic possibilities and dimensions of this agenda include a focus on the important role of non-state actors and empowerment of those most marginalised within the Australian city context.

Introduction

Nearly 70 per cent of the Australian population lives in the five largest cities, which are now recognized as having or nearing world city or global city status (Kubler & Randolph, 2009). These cities act as significant international nodes for economic, political and cultural exchanges within and through which the contemporary configurations of critical urban infrastructure intersect. The provision, location and connectedness of critical urban infrastructure (e.g. energy, water, food, transport and communications) are intimately linked with notions of human security, ambitions around settlement growth and fundamental to the sustainable development of Australia's burgeoning metropolitan regions.

Whilst infrastructure can be understood as "the basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools, post offices, and prisons" (Moteff and Paformak, 2004, p.1). Critical infrastructure embodies a more relational framework of interconnected networks and services:

> …comprising identifiable industries, institutions (including people and procedures), and distribution capabilities that provide a reliable flow of products and services essential to the defense and economic security of the United States, the smooth functioning of government at all levels, and society as a whole (Clinton, 1996, p.1).

Within cities critical infrastructure is recognized as a key transmitter of risk and vulnerability within cities, yet there has been a lack of urban attentiveness to infrastructure within the Australian city context. The politics of addressing these problems involve three fragmented tiers of government (local, state and national), a range of domestic interests, as well as international forces. These problems affect different

parts of the city to different degrees, contributing to broader patterns that shape the spatial distribution of urban poverty, inequality and disadvantage.

Yet despite what has been described as a broader 'infrastructure turn' to planning within cities (see Dodson, 2009), critical and/or detailed understandings of the interlinkages between infrastructure governance, security and socio-political dynamics have been little explored within Australian urban research. The absence of any substantive discussion about the relational role of urban infrastructure – critical or otherwise – is for example a glaring omission in the otherwise excellent and authoritative book on Australian cities by Clive Forster (2004). In many ways this is indicative of a much deeper failing within Australian city and planning literature that largely marginalizes infrastructure systems and networks as the purview of engineers and technicians. For Phillip O'Neill (2009, p.1) the Australian infrastructure crisis is 'as much a crisis of ideas about infrastructure that requires new thinking and new approaches in the 21st century'.

This paper has three aims that guide the structure and content that follows. The first is to highlight the complexity of critical infrastructure as a security and governance agenda and the implications of this for Australian cities. Building on this the second part of the paper asks what is critical about critical infrastructure drawing on a human security approach on critical urban infrastructure that seeks to reduce social vulnerability and build community resilience. The third section of the paper offers the framework of *sovereignty vs. security* as an alternative approach to thinking about critical urban infrastructure as the basis for research. The emphasis on a community-based approach to critical infrastructure (i.e. food sovereignty) challenges the dominant positivist approach to infrastructure as a national security and/or technical or engineering issue. We conclude the paper by highlighting that not all ways of governing critical infrastructure are equal.

Framing critical infrastructure

Infrastructure networks shape and sustain our cities, as well as render them exposed and vulnerable to a wide range of security threats such as natural disasters, terrorism, peak oil and climate change (Graham, 2010). In Australia national ambitions for long-term city resilience are realized through the securitization of critical urban infrastructure. The national position around the importance of securitising critical infrastructure has been made clear in *The Critical Infrastructure Resilience Strategy* (2010, p.8) which states:

> The Australian Government recognizes the importance of critical infrastructure, including those parts that provide essential services for everyday life (such as energy, food, water, transport, communications, health and banking and finance). A disruption to critical infrastructure could have a range of serious implications for business (including other critical infrastructure), governments and the community.

The logic of securitisation differs from a risk management approach which deploys a preventative focus on the potential rather than the concreteness of any given security act or threat. The intent of the risk management rationale is pre-emptive through measurement, evaluation and other actuarial methods of risk surveillance, control or reduction. As Foucault (1978 cited in van Munster, 2005, p.7) observes, risk management "does not have to draw the line that separates the enemies of the sovereign from his obedient subjects; it effects the distributions around the norm". The processes of securitisation are thus a political choice and act. A sense of political community is re-established and the "we-ness" and societal identity powerfully reinforced (Williams, 2003, p.518).

The official position around the importance of critical infrastructure follows the national security imperative developed by the US government as a consequence of the 9/11 terrorist attacks (Moteff, 2004). The policy to protect this infrastructure was framed in the *National Strategy for the Physical Infrastructure Protection of Critical Infrastructure and Key Assets* (U.S Government 2003, p. 6), which includes one of the first definitions on critical infrastructure:

> Systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety.

The US national strategy located these systems and assets in the areas considered vital for the nation's progress, such as energy, water, transportation and food/agriculture (US Government, 2003). These sectors are considered 'lifelines' and, in this sense, critical urban infrastructures become 'the arteries and veins of Western, urbanized societies' (De Bruijne and Van Eeten, 2007, p. 18). The majority of these urban infrastructure 'lifelines' are owned and operated by the private sector, following the neoliberal trend of privatising public assets. Privatisation marked a shift from centralised public monopolies to private and public structures operating in competitive markets, leading to an increased 'splintering' in the governance of urban infrastructure (Graham and Marvin, 2001).

In the Australian urban context given the proportion of the population living in cities, there is a recognised need for better governance frameworks in the management of critical infrastructure (Hodson, 2010). This is problematized by the governance deficit in Australian cities with no clear status or voice within the Australian federal system and little political recognition. This deficit takes three principal forms: 1) an absence of governance frameworks for the nation's extensive urban regions displaces metropolitan political ambition and activity to local and state levels; 2) episodic and piecemeal interest of the Commonwealth in urban affairs; and 3) neo-liberal reform, in concert with technological and institutional change, which has given new status and influence to private interests, especially in the field of infrastructure and urban management systems (Steele & Gleeson, 2010).

In the United States this institutional fragmentation has been dealt mainly through Public-Private Partnerships (PPPs) where the government and the private sector partner to monitor and control infrastructure operations. In Australia the Commonwealth government relies on a PPP approach for national infrastructure provision and supply security. The importance of the PPP is clearly outlined in Australian national policy which states that 'a business-government partnership is the foundation of the Australian Government's approach to critical infrastructure resilience' (Australian Government, 2010, p. 17). The governance of infrastructure is seen at the national level as a shared responsibility between the federal government, the private sector, and State and Territory governments (TISN, 2013).

According to the Australian Government *Critical Infrastructure Resilience Strategy* (2010, p.4), "a significant proportion of Australia's critical infrastructure is privately owned or operated on a commercial basis". The Australian government currently relies predominantly on a non-regulatory approach based on the acceptance that the private sector is in better position of securing the infrastructure assets (Australian Government, 2010). There is a tension however between delegating between business logic and public matters of national security. The benefits can be seen in the recommendations for improving the governance of the food sector as a consequence of the 2011 Queensland floods, which state that regulations should not obstruct business capacity to respond to disasters (Australian Government, 2012). However this can also lead to confusion about the roles assumed by the government, as was identified in the analysis of the Melbourne heat wave of 2009: is the government policymaker, regulator or service provider? (see McEvoy et. al. 2012).

In order to support this coalition of PPP interests the exchange of resources and information is managed via the *Trusted Information Sharing Network* (TISN) for Critical Infrastructure Resilience. The TISN is overseen by the Attorney-General's Department (AGD) and includes the main sectors of infrastructure for Australia: energy, water, food, telecommunications, transport, health and banking (Australian Government, 2013). The main objective of the TISN is to share information about the threats and vulnerabilities of infrastructure. In this context, the government depends on the willingness of private actors to collaborate but must take steps to ensure commercial and public interests are protected. The need to protect both vulnerable public infrastructure and the commercial in-confidence of private sector assets raises a number of democratic tensions.

Similar to the US, the Australian government has adopted restrictive public information policies to foster the co-operation of the private operators in the protection of critical infrastructure assets. In the US, for example, private industries supporting critical infrastructure have since 2002 been made exempt from the Freedom of Information Act (Uhl, 2004). In Australia access to public information about infrastructure is restricted by the Australian Freedom of Information Act which even though it does not mention critical infrastructure explicitly, exempts from disclosure the documents affecting national security or

commercially valuable information (Australian Government, 1982). With respect to restricted access to critical information, knowledge and resources, the approach to critical infrastructure via PPP's reflects a tension between the logic of security and due democratic processes that are able support public accountability, transparency and legitimacy and build community confidence (Dunn-Cavelty and Suter, 2009).

What's critical about critical infrastructure?[1]

Understanding what is critical in urban infrastructure and the potential vulnerabilities frames the urban response. Infrastructure is critical due to the services it provides – food, water, electricity or transport– and the potential negative impact upon a nation and its communities if these services are disrupted. For instance, a disruption in the energy sector or a breakdown in the water system leading to impacts on public health and safety (Moteff et. al. 2003). Another factor that adds criticality is the degree of interdependency and interconnectedness of the networks and systems that comprise urban infrastructure, including the environment where they operate, framed by policies, regulations, markets and resource availability (Rinaldi et al. 2001; De Bruijne and Van Eeten, 2007; Kröger, 2008). This is common in metropolitan areas, where two or more infrastructures are correlated and influence each other in an environment where multiple tiers of government interact. For example, electricity generation systems support the telecommunications and transport sectors while water infrastructure supports food and energy production.

Urban society's vulnerability depends then on 'critical nodes' that comprise the critical infrastructure system (Orwat, Buscher and Raabe, 2010). The interdependent nature makes urban infrastructures more vulnerable to external impacts, leading to what is known as 'cascading effects', where a disturbance propagates rapidly among infrastructures of different sectors (Rinaldi et al. 2001). An example of this is a power crisis where electricity shortages coupled with blackouts can affect oil and gas production as well as water provision. In the last decade, the danger of propagation has increased due to the information technologies that make modern infrastructures operate, making them vulnerable to cyber-attacks. The fear of critical infrastructure collapse or disruption and the impact of this on Australian cities have led to the rendering of infrastructure invisible as part of a national security agenda. As Stephen Graham (2010, p.10) describes infrastructure networks become "the forgotten, the background, the frozen in place" unless crisis/disaster strikes and their importance and vulnerabilities are publicly (and painfully) exposed.

Criticality is thus a function of importance and vulnerability, which is aggravated by the fact that most of the infrastructure in urban areas is geographically concentrated due to settlement growth and development policies that promote scale economies and natural resource exploitation (Parfomak, 2005).

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[1] Thanks to Professor Steve Dovers (Fenner School, ANU) for posing this question in personal communication highlighting the critical role and importance of natural ecosystems –see forthcoming paper 2014 with this title).

Whilst there is no definitive criterion for defining what makes infrastructure critical there are two perceptions that behind criticality: systemic and symbolic. The first is given by the *interdependence of infrastructures* while the latter is defined by the *socio-political role* in society that critical infrastructure holds (Brunner, 2008). Both the systemic and symbolic perceptions highlight that it is impossible to separate out people, place and politics when cataloguing the threats and vulnerabilities of critical infrastructure, as well as the public importance and progressive possibilities.

Infrastructure sovereignty vs. security?

New directions in non-traditional security studies have sought to re-frame security as a positive or constructive agenda that can hold emancipatory goals challenging "the restrictive understanding of national security that has dominated realist theories...for a more comprehensive framework for understanding security that takes human well-being and ecosystem integrity, rather than states, as the fundamental moral and analytical reference point" (Eckersley, 2004, p. 256). This includes a shift away from early militarized preoccupations with securitization in favour of alternative modes expressed through deliberative democracy, education, and the values of compassion and community care (Dobson, 2004).

From a human security perspective, a focus on the complex democratic dimensions of critical urban infrastructure includes consideration of the national role but only as part of the broader human-centred democratic system necessarily underpinned by progressive and deliberative ethical values and criteria. For Barnett and Adger (2007, p.64) human security can be understood as "a function of multiple processes operating across space, over time, and at multiple scales. Whilst Smith & Whelan (2008, p.1) argue a case for the inclusion of human security in strategic guidance as they believe it "presents an opportunity for Australia to embrace a more holistic approach to security that can accommodate the vulnerabilities of both the individual and the state, as well as help achieve the Millennium Development Goals".

Central to the human security approach are calls for more imaginative responses to security threats, the need to learn from previous security decisions embraced, and to include non-state, sub and supra-state levels of security ambition and activity that expand the narrow state centric approach in the face of contemporary challenges. Climate change for example is expected to alter the frequency of extreme weather events such as droughts, bushfires, storm surges, cyclones and hail. This is expected to increase damage to infrastructure, disrupt key services, increase insurance costs, increase risk to human life including respiratory disease, heat stress, post-event disease outbreaks and other health-related impacts.

A human security approach emphasizes protection and empowerment of those most vulnerable. The focus is on "a state that is achieved when individuals and communities have the options necessary to end, mitigate or adapt to threats to their human, environmental and social rights; have the capacity and

freedom to exercise these options; and actively participate in pursuing these options" (GECHS 1999 cited in O'Brien, Sygna and Wolf 2013, p.1). As Ogato and Sen (2003, p.2) highlight in *Human Security – Now, the United Nations Independent Commission on Human Security Report* human security holds a three-fold focus: (i) protecting people from menaces (i.e. climate change); (ii) recognition of the important role of non-state actors; and (iii) an emphasis on empowerment for those who are marginalized. They use the case study of hunger to highlight the importance of a human security approach to food.

> Having access to adequate food affects people's ability to participate in all spheres of economic, political and social life and move out of chronic poverty […] Food insecurity and hunger undermine a person's dignity and well-being. A country's ability to produce and procure enough food for its people to avoid hunger and malnutrition is critical to human security (Ogata & Sen 2003, p.14).

Within the urban context the human security approach to critical infrastructure reorients the focus away from national security protection and private-sector investment towards how individuals and communities best maintain and enhance their short/long term access to adequate supplies of basic needs such as energy, water and food. It also increases the importance of interconnectedness of key areas such as communications, public transport and information availability via a people/earth-centred approach. In this way the larger geo-political/eco-political contexts of energy and water for example intersect with concerns around human security and justice. Within such a framework the role of civil society are understood as more than simply "an artefact of statist ontology" but as both system-reforming and system transforming agencies (Gale, 1998, p.345).

Purcell (2003) identifies few characteristics in regards to the right to the city that resonates with the human security approach to critical infrastructure. He states that the right to the city sets the principles for a different form of citizenship where the principle of inhabitance will define the membership of the citizenship. In regards to the rights, the inhabitants will have "the right to appropriate urban space and the right to participate centrally in the production of urban space" (p 577). They will also hold a say in decisions related to critical infrastructure. The inhabitants will be at the centre and decisions are made as much through deliberation among inhabitants, rather than through PPP-style negotiation between capital and the state.

The right to the city can potentially lead to a more democratic system characterized by debate among inhabitants about the structure and purpose of global political economy leading to action. Lefebvre (1981, p.34) observes that the right to the city is "the right to information, the rights to use of multiple services, the right of users to make known their ideas on the space and time of their activities in urban areas". For critical urban infrastructure this links to the new human security support and calls for:

… new, transformative approaches to research, policy and action. The focus on transformative processes recognizes a compelling need for change … an explicit recognition of the spatial, temporal and social dynamics between threats and responses…responding from a different action logic it becomes possible to identify actionable and effective leverage points for systems transformations towards sustainability (p.2-4).

Thus, just as food sovereignty is 'embedded in larger questions of social justice and the rights of communities to control their own futures and make their own decisions' (Zerbe 2013, p.1) as opposed to traditional questions of national food supply and security, larger questions need to be asked about our approach to critical infrastructure in research, policy and action. Food sovereignty has evolved as a powerful grassroots political concept associated with human and environmental rights and localized action. This is described as "the right to safe, nutritious and culturally appropriate food and food-producing resources and the ability for communities to sustain themselves and their societies" (Forum for Food Sovereignty, 2007, p.1).

How then might our approach to critical urban infrastructure shift if we were to think in terms of energy and water sovereignty for example rather than national PPP energy and water style security? Can we conceive of socio-political conditions that would lead to transport and communications sovereignty that emphasizes the right to the city through a different security logic? What opportunities would unfold if critical urban infrastructure in Australia was framed at heart as a focus on: people; values and ethics; localized systems; principles of subsidiarity; building skills and knowledge; and a commitment to working with, not against, nature?[2] What would our cities be like then?

Conclusion

The provision and location of critical urban infrastructure (i.e. energy, water, transport and communications) are intimately connected with ambitions around settlement growth and development. The problems of critical infrastructure stress, resource availability (especially water) and climate change present a challenge to the resilience of the urban system. Yet not all ways of presenting security threats are appropriate; not all ways of governing the security of critical infrastructure in cities are equal. Given the concentration of the population and its polities in metropolitan areas this is no small consideration, and the significance of urban decision making for welfare and well-being intersects with critical infrastructure at every scale.

Through the security lens the focus of research is on who is promoting security measures and how these policies form part of broader political projects and visions. Australia's concept of critical infrastructure encompasses national security rhetoric by defining it as:

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[2] Guiding principles developed at the Forum for Food Sovereignty, Nyeleni (2007)

Those physical facilities, supply chains, information technologies and communication networks that, if destroyed, degraded or rendered unavailable for an extended period, would significantly impact on the social or economic well-being of the nation or affect Australia's ability to conduct national defence and ensure national security (Australian Government 2010, p. 8)

In this way Australia follows the national security imperative framed by the US for the protection of critical infrastructure in its urban areas which emphasizes the physical security of its assets as the way to achieve urban resilience, largely managed and administered through a PPP constortium. The national security aim and the way infrastructure is governed as a result, concedes a high priority to business interests as they are the owners and operators of most of the infrastructure within the Australian city context. The danger is that this kind of security is a double-edged sword that can undermine the most basic principles of civil rights and democracy (Brown, 2007).

This paper has focused on highlighting the disjuncture between the (national) security imperative for critical urban infrastructure and the growing parallel imperatives for democratic governance processes that are able to reduce social vulnerability and build community resilience. Better understanding the democratic possibilities and dimensions of this agenda within the context of the current Australian metropolitan governance deficit includes a focus on the role of non-state actors and empowerment of those most marginalized. In this sense what is 'critical' is not just recognition of the vulnerability and interconnectedness of critical urban infrastructure systems – although this is important - but greater critical recognition of the deep links between critical infrastructure systems and human and environmental integrity and welfare. Infrastructure research, policy and action must make this agenda public and explicit.

References

Axworthy, L. (2001). "Human security and global governance: putting people first." Global governance **7**: 19.
Australian Government (2010) *Critical Infrastructure Resilience Strategy*, Canberra.
Australian Government AusAID (2013). Human Security. Accessed on 23rd July 2013. Available at http://www.ausaid.gov.au/countries/eastasia/regional/Pages/human-security.aspx
Barnett, J. and W. N. Adger (2007). "Climate change, human security and violent conflict." Political Geography **26**(6): 639-655.
Bellamy, A. J. and M. McDonald (2002). "The Utility of Human Security': Which Humans? What Security? A Reply to Thomas & Tow." Security Dialogue **33**(3): 373-377.
Bielecki, J. (2002). "Energy security: is the wolf at the door?" The Quarterly Review of Economics and Finance **42**(2): 235-250.
Boin, A. and A. McConnell (2007). "Preparing for Critical Infrastructure Breakdowns: The Limits of Crisis Management and the Need for Resilience." Journal of Contingencies and Crisis Management **15**(1): 50-59.
Brown, G., et al. (2006). "Defending Critical Infrastructure." Interfaces **36**(6): 530-544,616,618.
Brown, O. (2007) *Weather of Mass destruction? The rise of climate change as the "new" security issue*. IISD.
Brunner, E. M. a. S., Manuel (2008). International CIIP Handbook 2008/2009. Zurich, Center for Security Studies, ETH Zurich**:** 652.
Chen, N. and P. Graham (2011). Climate Change as a Survival Strategy: Soft Infrastructure for Urban Resilience and Adaptive Capacity in Australia's Coastal Zones. Resilient Cities. K. Otto-Zimmermann, Springer Netherlands. **1:** 379-388.

Christie, R. (2010). "Critical voices and human security: To endure, to engage or to critique?" Security Dialogue **41**(2): 169-190.

Cornall, R. (2005). "New Levels of Government Responsiveness for 'All-Hazards': the Management of Natural Disasters and Emergencies." Australian Journal of Public Administration **64**(2): 27-30.

De Bruijne, M. and M. Van Eeten (2007). "Systems that Should Have Failed: Critical Infrastructure Protection in an Institutionally Fragmented Environment." Journal of Contingencies and Crisis Management **15**(1): 18-29.

Deudney, D. (1990). The Case against Linking Environmental Degradation and National Security. *Millennium* 19, 461–76.

Dobson, A. (2004). *Environmental citizenship*. MIT Press, Cambridge.

Dodson, J. (2009) The "Infrastructure Turn" in Australian Metropolitan Planning*, International Planning Studies*, 14(2): 109-123.

Dunn-Cavelty, M. and M. Suter (2009). "Public–Private Partnerships are no silver bullet: An expanded governance model for Critical Infrastructure Protection." International Journal of Critical Infrastructure Protection **2**(4): 179-187.

Dupont, A. & Pearman, G. (2006) *Heating up the planet: climate change and security*. Lowry Institute, Paper 12.

Eckersley, R. (2004). The Green State: Rethinking democracy and sovereignty*.* MIT Press, Cambridge.

Evans, G. (2013). "Human Security and Australian Foreign Policy." Accessed on 26th April 2013. Available at https://www.google.com.au/interstitial?url=http://www.gevans.org/speeches.html

Forster, C. (2004) Australian Cities: continuity and change, Oxford University Press, Melbourne.

Gale, F. (1998). Constructing global civil society actors: an anatomy of the environmental coalition contesting the tropical timber trade regime. *Global Society,* 12(3):343-61.

Graham, S. (ed.) (2010) *Disrupted Cities: When Infrastructure Fails*, Routledge, London.

Graham, S. and S. Marvin (2001). Splintering urbanism : networked infrastructures, technological mobilities and the urban condition. London ; New York, Routledge.

Government, A. (1982). Freedom of Information Act. A.-G. s. Department. Canberra. **Act No. 3:** 233.

Government, A. (2006). Infrastructure information in the public domain. TISN. Barton, ACT**:** 14.

Government, A. (2011). Organisational Resilience Australian Case Studies. A.-G. s. Department. Canberra**:** 44.

Government, A. (2012). Resilience in the Australian food supply chain. Canberra, DAFF**:** 83.

Government, A. (2013). Strong and Secure: a strategy for Australia's National Security. DPMC. Canberra**:** 58.

Government, U. S. (2003). National Strategy for the Physical Protection of Critical Infrastructures and Key Assets. H. Security. Washington DC**:** 96.

Hodson, M. a. M., Simon (2010). World Cities and Climate Change. Berkshire, McGraw-Hill.

Human Security Network (2013). Accessed on 23rd July 2013. Available at http://www.humansecuritynetwork.net/

James, S. (2010). "Human security: key drivers, antecedents and conceptualization." Centre for Dialogue and Institute for Human Security, La Trobe University, Australia, available at http://www. latrobe. edu. au/humansecurity/assets/downloads/IHS-WP-01-James. pdf (accessed on 23 March 2011).

Khong, Y. F. (2001). "Human security: A shotgun approach to alleviating human misery?" Global governance: 231-236.

King, G. and C. J. L. Murray (2001). "Rethinking Human Security." Political Science Quarterly **116**(4): 585-610.

Kröger, W. (2008). "Critical infrastructures at risk: A need for a new conceptual approach and extended analytical tools." Reliability Engineering & System Safety **93**(12): 1781-1787

Kubler, D & Randolph, B. (2007) Metropolitan governance in Australia – The Sydney experience. In *Governing cities in a global era: Urban innovation, competition and democratic reform. (*eds). Hambleton, R & Gross, J. Palgrave-Macmillan, NY

LaTrobe University (2013). Human Security. Accessed on 28th June 2013. Available at http://www.latrobe.edu.au/humansecurity/

Luiijf, E. A. M. and M. H. A. Klaver (2004). Protecting a nation's critical infrastructure: the first steps. Systems, Man and Cybernetics, 2004 IEEE International Conference on.

Martin, M. and T. Owen (2010). "The second generation of human security: lessons from the UN and EU experience." International Affairs **86**(1): 211-224.

McEvoy, D., et al. (2012). "The impact of the 2009 heat wave on Melbourne's critical infrastructure." Local Environment **17**(8): 783-796.

Michael, S. (2002). "The role of NGOs in human security." Hauser Center for Nonprofit Organizations Working Paper(12).

Moteff, J., Copeland, C., and Fischer, J.W. (2003). Critical Infrastructures: What makes an infrastructure critical? CRS Report for Congress. C. R. Service. Washington DC, The Library of Congress**:** 17.

Moteff, J. a. P., Paul (2004). Critical Infrastructure and Key Assets: Definition and Identification. CRS Report for Congress. C. R. Service. Washington DC, The Library of Congress**:** 16.

Newman, E. (2010). "Critical human security studies." Review of International Studies **36**(1): 77-94.

Ogata, S. and A. Sen (2003). "Human security now, commission of human security." Commission on Human Security, New York.

Ogato, S. & Sen, A (2003) *Human Security- Now, United Nations Commission on Human Security*, New York.

Orwat, C., Büscher, C. and Raabe, O. (2010). Governance of Critical Infrastructures, Systemic Risks, and Dependable Software. Karlsruhe, Karlsruhe Institute of Technology**: 25.

O'Neill, P (2009) O'Neill, P. (2009), 'Infrastructure Financing and Operation in the Contemporary City', *Geographical Research*,

Parfomak, P. W. (2005). Vulnerability of Concentrated Critical Infrastructure: Background and Policy Options. CRS Report for Congress. C. R. Service. Washington DC, The Library of Congress: 21.

Paris, R. (2001). "Human security: paradigm shift or hot air?" International Security **26**(2): 87-102.

Purcell, M. (2003). *Citizenship and the Right to the Global City: Reimagining the Capitalist World Order*. International journal of urban and regional research, 27(3), 564-590.

Rinaldi, S. M., et al. (2001). "Identifying, understanding, and analyzing critical infrastructure interdependencies." Control Systems, IEEE **21**(6): 11-25.

Rübbelke, D. and S. Vögele (2011). "Impacts of climate change on European critical infrastructures: The case of the power sector." Environmental Science & Policy **14**(1): 53-63.

Smith, M. G. and J. Whelan (2008). "Advancing Human Security: New Strategic Thinking for Australia." Security Challenges **4**(2): 1-22.

Steele, W. & Gleeson, B. (2010a) Mind the governance gap: oil vulnerability and urban resilience in Australian cities, in *Australian Planner,* 47 (4), p. 302-310

Trusted Information Sharing Network (TISN). 2013. *Critical Infrastructure.* Accessed 3 August 2013. Available at http://www.tisn.gov.au/Pages/Critical_infrastructure.aspx

Uhl, E. K. (2003-2004). "The Freedom of Information Act Post-9/11: Balancing the Public's Right to Know, Critical Infrastructure Protection, and Homeland Security." Am. U. L. Rev. **53**(261): 261-311.

United Nations (2013). Human Security. Accessed on 23rd June 2013. Available at http://unocha.org/humansecurity/

Yates, A. & Bergin, A. (2009*).Hardening Australia: Climate change and natural disaster resilience,* ASPI, Issue 24.