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Showcasing Green Urbanism on Waterfronts: A Comparative Study of Porto Alegre and Auckland

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***Abstract:** Porto Alegre and Auckland - being port cities on river estuaries, comparable in size and age, and sharing a number of morphological analogies - are similar enough to enable and justify a comparative analysis and evaluation of the physical opportunities for redevelopment. We are particularly interested in possibilities for a faster transition to environmentally sustainable and technologically resilient models of urban development.*

The context to this investigation is the imminent global environmental crisis and the growing political and scientific consensus that cities are at the centre of this crisis. They are the main culprit, and they will be the main victim if nothing is done. Cities must undergo a radical technological overhaul – which means replacing their obsolete infrastructure and architecture with cleaner and smarter solutions. This is a colossal task, which must be accomplished in the next 10 to 20 years, worldwide.

Demonstrating what sustainable urban development looks like and how it works will be critical in mobilising governments, industries and populations. Such demonstration will be more effective if done on particularly prominent locations. In port and coastal cities, these spaces and locations are typically found on their waterfronts. Both Auckland and Porto Alegre have excellent opportunities to redevelop the unused, or poorly used, segments of their waterfronts. Both cities have started the redevelopment process and have aspirations and plans for even more transformation and investment.

The areas compared in the study are the Auckland ‘CBD waterfront’ and Porto Alegre’s ‘Cais Mauá’. Both zones are about 2 km long and between 60 and 150 metres deep. The existing planning documents and declarations, as well as already executed projects, have been assessed in terms of their expected environmental performance and in terms of their perceived significance in promoting advanced forms of ecologically sound urbanism. Accomplished international examples of ‘green urban waterfronts’ have been used as benchmarks (Toronto; Vancouver; Melbourne; Hamburg; Malmo; and others).

Keywords: Waterfront; Urban development; Sustainable design; Resilient cities.

1. INTRODUCTION

Responding to the Congress theme “Building Communities for the Cities of the Future”, we might first ask - what are the “cities of the future”? It seems that the ‘triple bottom line’ approach to this question is the least controversial one: cities of the future are economically prosperous, socially inclusive, and ecologically responsible. Most interpretations of this formula insist that the three objectives are equal in importance. But, on an overpopulated planet, now 50% urbanised (probably 60% by 2020 and 70% by 2030), with a disturbed climate - and predicted to get nastier – it could be argued that the environment has emerging as the No. 1 issue (McKibben, 2006; Sample, 2009). The issue is further complicated by the mitigation vs adaptation debate. The most recent take on the global environmental agenda, is that this is not only about sustainability but also about resilience (Newman et al, 2009; Bogunovich, 2009). Based on these considerations, we suggest that the theme of the congress is actually meant to be: “How we can build communities, so that while they promote inclusiveness and nurture a sense of belonging, they are also in harmony with the natural ecosystem (‘sustainability’), as well as secure in the face of whatever disturbances might happen in the wider environment in the coming decades (‘resilience’).”

Thus the aim of this paper is to highlight the combined issues of sustainability and resilience as the hallmarks of the early 21st century and to entice a debate about whether we need a new Modernism – an ‘Eco-Modernism’ this time – if we really want to generate the same level of vigour and thirst for radical technological and cultural change that we saw 100 years ago with the rise of the original Modernism. Whether that level of revolutionary fervour is necessary, of course, depends on how severe we believe the global environmental crisis is and to what degree cities and their design and technology have anything to do with it. For those of us who believe that the ‘collective global urban Titanic’ – which by 2020 will have about 4 billion ‘citizen-passengers’ - will hit the ‘environmental iceberg’ some time between 2020 and 2030 (Dyer, 2010), unless we radically change the way cities are planned and operated, the need for urgent action is obvious.

To stimulate this type of debate, we shall investigate the potential of two urban waterfronts – Auckland, in New Zealand, and Porto Alegre, in Brazil – to be used as the sites of testing and demonstrating new models of infrastructure, architecture, urban design, urban planning. In other words, what a ‘sustainable and resilient city of the future’ should look like and how it might work.

This paper will first review some of the evidence that the global environmental outlook is grim and that, in biophysical terms, the runaway metabolism of cities is the main reason for this. Based on the premise that ‘if cities are the problem, then they must be the solution too’ (Jaime Lerner), we will then address the proposition that ‘showcasing’ what a sustainable and resilient city looks like is crucial if we want to effect fast and massive change in the property, construction and design industries, and in the culture of the general public and local government. Lastly, a comparative assessment of two cities’ waterfronts will be presented in order to establish that the potential for effecting change is huge, but that at this stage it is still waiting to be fully utilised.

2. THE PROPOSITION: MANAGING CLIMATE ON AN URBAN PLANET

There is growing evidence and consensus among natural and social scientists, policy analysts and commentators that the world is facing a serious shortage of key resources (energy; water; soil; forests; fisheries) as well as filling up of the key sinks (atmosphere – with consequences for the global weather system; hydrosphere – with consequences for the water cycle and the thermal regime). This of course is happening at a time of the fastest growth of human population ever, accompanied by an unprecedented rise in aspirations and expectations for a better life. It is not hard to see that both the ‘sources-sinks crunch’ we are heading towards, and the spectacular rise in population and standards of living exacerbating that crunch, have to do with cities and the urban way of life (Girardet, 2009).

Different professions do state somewhat different diagnoses about what is wrong with the world. Typically, economists talk about the ‘wrong price signals’ and ‘massive market failure’. Lawyers talk about the failure of regulation and enforcement. Political scientists talk about the failure of the governance structures. While all of the above is true, it is of little use to planners, architects and engineers. Our concern is the physical structure and form of the places where people live, consume and pollute. We have to stick to the idea that it is our plans and designs - including the technologies that support these plans and designs and enable particular attitudes and behaviours of the occupants – that are the problem.

The most economic way of telling what is wrong with cities is by adopting the concept of urban metabolism (Girardet, 2009). The term encompasses all consumption and all emissions. The fact is that cities, while today accommodating about 50% of all human population, actually consume 75% of all resources and generate about 75% of most emissions (‘waste’). Clearly, if we find a way to tame the global urban metabolism – both by reducing its overall volume and restructuring its flows so that there are more loops, i.e. ‘recycling’ of resources – then we stand a chance of seeing the end of this century in the condition we like to describe as ‘civilisation’.

From a biophysical, and design and engineering, point of view, this means radically changing the way we plan urban form and urban infrastructure and the way we design buildings and open spaces, and choose associated technologies. Massive and urgent change cannot happen without demonstration. Demonstration must happen on prominent urban locations and sites – to enable easy and frequent access, attract developers and tenants, and have a lasting landmark effect. In most coastal and port cities, such places are the waterfronts. They tend to be on well connected, central metropolitan locations, carry significant cultural capital and in many cases are in need of renewal and new users after the main port activity has moved to other, bigger and less congested locations.

Over the late 20th century, many redevelopment projects took place on urban waterfronts and brought new shine to cities like Baltimore, San Francisco, Vancouver, Shanghai, Singapore, Brisbane, Sydney, London, Rotterdam, Barcelona, and so on. More recently, some urban waterfront developments have addressed environmental sustainability and resilience. Worldwide, examples of urban waterfronts used for demonstration of ecologically responsible development are found in Melbourne (Docklands); Incheon (Eco-City); San Francisco (Treasure Island Plan); Victoria, BC (Dockside Green); Toronto (Central Waterfront Revitalisation); Hamburg (HafenCity); Copenhagen (plan for Nordhavn); Malmö (Vastra Hamnen) (1); Stockholm (Hammarby Sjöstad) (2); Barcelona (the Forum Waterfront); and so on.

Most recently, the announcement was made that in Rio de Janeiro, on the very prominent Pier Mauá, the Museo do Amanhã – Museum of Tomorrow – will be built according to the design by one of world star-architects Santiago Calatrava. Significantly, the Museum ‘will showcase science and sustainability – suggesting a path for future, greener development [...] exemplifying ecology for young people [...] to see how things work with their own eyes’ (3). The project will feature sun-tracking PV panels, rainwater harvesting and seawater heat pumps and will seek LEED certification

3. COMPARATIVE ASSESSMENT OF TWO WATERFRONTS

Both Auckland and Porto Alegre have excellent opportunities to develop poorly used segments of their waterfronts. Both cities have started the redevelopment process and have aspirations and plans for even more transformation and investment. But will their plans deliver environmentally conscious and future-proof cities?

While the above mentioned international examples are the world ‘leaders’, we are here trying to shed light on two cities which clearly are the ‘followers’. Presumably, they could benefit from both the good and the bad experiences of the leaders, while they are in the middle of the process of replanning and redeveloping of their respective urban waterfronts. Also, the comparative analysis and assessment methodology is likely to shed better light on where exactly – ‘forward’ or ‘behind’ – they are at the moment.

Auckland and Porto Alegre are of comparable size (Auckland 1.3 million; Porto Alegre 1.4 million) and age (Auckland about 150 years, Porto Alegre about 270 years old; both European colonial settlements in the New World). Both are port cities on a river estuary (though the nature and the size of the two respective bodies of water differ).

With respect to the urban fabric - particularly the built form grain, the street/road pattern, and the axial alignment - Porto Alegre and Auckland exhibit many morphological similarities and analogies. While the similarities are not too obvious at first sight, they are sufficient to enable a comparative analysis and evaluation of the physical opportunities for a future urban development and redevelopment.



FIGURE 1 – Aerial view of Porto Alegre (left) and Auckland (right) waterfronts at approximately same scales.
Source: Google Earth (GeoEye 2010).

3.1 The Case of Auckland

Auckland's city waterfront is generally understood to be the 4 km long stretch of land from the Harbour Bridge (over Pt Erin) in the west, to Teal Park (near Pt Resolution) in the east. While this is quite a long swathe of land, the actual, publicly accessible waterfront is squeezed between a large marina at the western end, and the port at the eastern end, and measures about 1.8 km in a straight line.

The public waterfront segment has been under a process of redevelopment for about 20 years. The first stage of the redevelopment affected the area known as Viaduct Basin and near the National Maritime Museum. The redevelopment was partly triggered by the preparations for the America's Cup and Louis Vuitton Cup world yachting championship in 1999-2000. This area is now almost completely redeveloped and is known as Viaduct Harbour.

Current and future efforts are focused on both areas east of Viaduct Harbour – the 'old' or 'historic' or 'CBD' waterfront – and west of Viaduct Harbour – the area traditionally know as Tank Farm, which was recently re-branded as 'Wynyard Quarter'.

In the 20-odd years of planning for the city waterfront, the two levels of local government – the City Council (the development planning authority) and the Regional Council (the environmental authority and legal owner of the coastal land) have produced a long series of vision and strategy documents. The better known ones were:

- Viaduct Basin – Towards 2000 (1996)
- Western Reclamation Area (1998)
- Harbour Edge/Waterfront - 2000 (1998)
- The Harbour Edge Report (1992)
- Auckland Waterfront Advisory Group – AWAG (2003)
- Auckland Waterfront Vision 2040
- CBD Waterfront Master Plan
- Wynyard Quarter Urban Design Framework

Only the last three have made direct references to environmental sustainability. The Vision 2040 document starts with five 'principles' and one of them is named "Environment". This principle is briefly developed into three statements, one of which suggests that 'leading edge environmental technologies and sustainable design' will be incorporated into the design.

The CBD document states that the Master Plan will have five major ‘themes’ and the fifth of these is labeled “Sustainable Design Showcase”. This is explained to mean that ‘sustainable infrastructure, such as energy generation or stormwater treatment’, will be located on the waterfront and ‘best practice in resource efficiency and sustainable design’ will be showcased in buildings and public art. Lastly, the Wynyard Quarter urban design guidelines include a chapter on “Environmental Principles”. Here the document declares that:

“The goal of the Sea+City’s Environmentally Sustainable Design (ESD) initiative is to demonstrate sustainable and environmental excellence and leadership. The Sea+City Project will use current best practice as the baseline to develop an ESD strategy that will evolve over the life of the project and encompass emerging ESD trends relevant to New Zealand” (4).

In addition to all these documents, three actual projects – two under construction and one about to commence in 2011 - can also be taken to represent the current design philosophy on Auckland’s waterfront:

- Viaduct Events Centre/Halsey Street Wharf
- North Wharf/Jellicoe Street/Jellicoe Plaza
- ASB Bank Headquarters (to commence next year)

Lastly, the recent controversy over the redevelopment of Queens Wharf has exposed an unusually wide range of views from the general public, the design professions, the public media and all three levels of government. This controversy just ended with the recent announcement by the local and central government that a pavilion called “The Cloud’ will be built on the wharf, so this episode can be taken as yet another piece of evidence where the current urban design and building technology agenda stands.

Based on a review of the planning documents mentioned above; observation and/or participation of/in the public debates and consultation processes; and, on the recently executed, or presently being executed, projects, it is possible to say that the key players on the Auckland Waterfront have demonstrated certain positions and trends. They:

- have recently shown significant progress in understanding and appreciation of the of the issue of sustainability;
- have as yet little or no interest or understanding in/of the issue of urban resilience;
- have started implementing some sustainability attributes and features into the physical projects in the last five years; however, these are relatively moderate, both in appearance and in performance (with one exception the ASB Bank);
- are not quite clear about whether in any future redevelopment sustainability will receive more attention and whether the issue of resilience and adaptation will be introduced any time soon (with the partial exception of the Wynyard Quarter UDF document, which, speaks wisely of ‘evolving’ its approach as new trends emerge).



FIGURE 2 – Tank Farm, Auckland. Now (left) and the proposed ‘Wynyard Quarter’ project by Sea+City (right).
Source: <http://www.aucklandcity.govt.nz/council/documents/urbanframework/introduction.asp> (5)

3.2. The Case of Porto Alegre

Porto Alegre's Cais Mauá, 18 hectares of land, about 2.5 km long, situated at the northern edge of the city centre, is a non-operational port site typical of many that have been targeted for redevelopment world wide since the 1980s (Dovey, 2005).

The first governmental incursion to redevelop the area dated from 1991, with the adapt-reuse of five from the sixteen early 20th century warehouses to accommodate restaurants, a museum, an educational centre and a touristic ferry terminal. Other punctual initiatives follow in 1992 and 1995 but with the economy in recession and the changes in the local government, little happened until the newly elected Liberal government announced, in 1996, the "Porto dos Casais" competition. This competition, and its future plan of implementation of 1998, represented the first integrated urban planning design for the entire Cais Mauá area, under conditions of reasonably democratic process and transparent decision-making. Proposed projects included a public marina, two hotels, offices, theatres, and a leisure and retail precinct. Many and varied glossy images of the future "docklands" were published with great effect in the media. However, lacking in political decision, disagreements between local and state government, and changes on the local political scene led to the project being completely abandoned in 1999.

After a hiatus of almost 10 years, the neo-liberal local government of 2007 launched a new "business plan" competition for the redevelopment of the Cais Mauá area (6). Tenders were called, under conditions of strict confidentiality, without public consultation, and in 2008 a Hispano-Brazilian consortium led by architects Fermin Vazquez (B720 Arquitectos, Barcelona) and Jaime Lerner (Jaime Lerner Arquitectos Associados, Curitiba) were selected as the winning entry (7). Their proposal states:

"The transformation of the Cais Mauá includes interventions in 2,5 km of coastal highway and 258.000m² of built area. Additionally, the transformation of the old fish market into a thematic recreational and commercial zone eliminates the existing barrier between the city and the waterfront. The large new buildings are situated at the ends of the site: two office towers at one end, and a hotel, exhibition hall, and commercial center at the other. The rehabilitation of the Cais Mauá makes possible the introduction of large singular buildings which exist in harmony with the existing city, strengthening the image of a centralized urban area. Special efforts were made to connect the city center with the docks, thus mending the new torn urban fabric in the surrounding neighbourhood of lake Guaíba. Thus, the organic and fluid plazas of the docks are allowed to enter into the existing rigid city grid. The open areas are reserved for pedestrian traffic, with careful landscaping treatment that includes protected green areas, building access routes, and parking zones." (8)

A close inspection of the proposed "business plan" shows the complex relationship between public and private roles, telling the story of a market-driven development that intend to be free of both planning interference and public investment. It also raises perplexing questions about where the public interest lies when city or state governments seek to use the reconstruction of urban environments as a catalyst for economical regeneration. The "plan" consists primarily of a division of the site into three precincts, tall buildings at both ends and the reuse of exiting structures in the middle of the site, and the proclamation of a series of principles (9).

The role of government is to be that of co-ordinating the integration of different precincts. In the sense that property development is largely a competitive quest for locational amenity played on the game board of urban space, here developers were invited to bid for design and control of large portions of the game board. Nether the document calling the competition nor the selected proposal mention a sustainability or resilience strategy for the Cais Mauá redevelopment (CONCORRÊNCIA N° 001/2010).



FIGURE 3 – Cais Mauá, Porto Alegre. Now (left) and proposed “business plan” (right).
 Source: <http://urbanascidadespoa.blogspot.com/2010/04/revitalizacao-do-cais-do-porto.html> (10)

4. MISSED OPPORTUNITIES?

Worldwide, the recognition that *sustainability and resilience* are critical issues in urban development is growing. This trend is accompanied by an increasing number of instances of demonstration projects. *Demonstration* comes in the wake of awareness that if a significant shift in norms is desired simultaneously across so many areas of practice - planning, design, construction and occupation – then showing literally, in 1:1 scale, what the new norm looks like is of great importance (The Worldwatch Institute, 2010). Lastly, for the *demonstration* strategy to be truly effective, it must occupy particularly prominent and attractive sites. Such sites, in coastal, riverside and port cities, tend to be on urban *waterfronts*.

The examples we have cited above show that ‘waterfront demonstration’ is becoming a dominant practice. When a city wants to attract attention, improve its reputation and accelerate the local property industry’s shift in a greener direction – it facilitates a long term, large scale redevelopment scheme somewhere near, or right on its waterfront (harbourfront; riverfront; seafront...).

It is too early for a proper assessment of how effective these redevelopment projects really have been in reducing the consumption of resources and generation of emissions (except in a few examples where monitoring has been in action from the first day and positive results are being already recorded – such as in Hammarby Sjostad in Stockholm and Vastra Hamnen in Malmoe). But it is safe to say that the resources/emissions performance is - at least to some degree - better than in conventional development. However, it may well be that it is more important that these projects have attracted great attention in professional and financial circles, as well as in the general media. Their objective of influencing positive change in the way we build and use cities, is clearly working.

More than anything, the examples of green waterfronts in the listed cities - San Francisco, Vancouver, Toronto, Hamburg, Rio de Janeiro - show that these days well governed and economically ambitious cities almost without exception are also environmentally conscious cities. They are paying attention to the global discourse on resources and sinks, are aware of the role of cities in the global environmental drama and are deeply concerned about how all this might in the end affect them. Particularly so if they are on, or near, the low-lying coastal areas – which indeed many of them are!

Could we then add Porto Alegre and Auckland to the list of concerned and appropriately acting cities?

In the case of Auckland, there are some encouraging signals that the environmental agenda is now seen as equal to the economic/commercial and the social/cultural agendas. This is evident in recent planning documents, as well as in recent public debates and consultation exercises. However, in actual execution the environmental agenda is still acknowledged in a very limited manner. Most recent building projects in the area have some green features but, overall, are master planned and infrastructure-supported the same way as they have been throughout the 20th century. There are no examples of radically green projects in current production, nor are any evident in current plans for the future. The idea that buildings might be off-the-grid - or perhaps on-the-grid, but a two-way grid (smart or not) - is off the agenda. Resilience is still an exotic word in the mainstream discourse about Wynyard Quarter and Queens Wharf. And the notions of 'regenerative buildings' and 'restorative design' are unknown to most of the players.

If things stay the same, Auckland is on the way to achieve what we would describe as a 'moderately green' waterfront. Such a waterfront may score some modest results in terms of eco-efficiency (mostly energy efficiency in buildings and reduced demand for automobility outside of them), but little or no results with respect to resilience and self-sufficiency.

In the case of Porto Alegre, the situation is even more troubling. The planning agenda for the waterfront redevelopment in this city, now about 20 years old, never addressed environmental sustainability at all. Even the most recent planning documents are silent on the issue of the environment and appear to completely ignore the global imperative of sustainable development. From a more optimistic angle, we could say though that the environmental agenda in the present business plan for Cais Mauá is 'implicit'. We could acknowledge the intention to recycle the unused prime urban land and to re-use, or restore, some of the old buildings. These decisions could be proven to save a great deal of construction material and embodied energy, and, through bringing density and mixed use to the edge of the CBD, prevent significant quantities of GHG emissions (although this is unlikely given that the plan has proposed 3,500 car parking places!). But even such easily achievable sustainability objectives are not stated anywhere.

If the situation does not change and the 'business plan' goes ahead, we conclude that Porto Alegre will not get a 'green waterfront' at all. On the contrary, this will be a typically market-driven property development project of the kind we had in North America in the 1980s; focused on short term commercial profit and human comfort.

5. CONCLUSION

We live in a volatile world. The human population keeps growing. Cities are growing in number, in physical size, and in resource consumption and waste generation. The climate is changing towards a warmer world, leading to more frequent and more intense 'extreme weather events'. Human exposure to such events is greater than ever (even if they remained of the same frequency and intensity), simply because there are more people than ever, they are more concentrated than ever, and they are increasingly settling down in areas which are historically recognised as hazardous and traditionally have been avoided for permanent settlement. The competition for key natural resources such as water, food and fuel is growing. The resulting pressures lead to depletion and 'peak' situations (oil; fresh water; fisheries; timber). Tensions are growing between villages, regions and nations, over energy sources, water from lakes and rivers, and fertile soil. The recent financial crisis has demonstrated the fragility of human systems, resulting not only in plunging half the world into a super-recession, but exposing the illusion of 'regulation' and 'control' even in developed, well organized countries. Above all, the repeated inability of the global community to reach an agreement on the scientifically proven case for human-induced global climate change – most recently in Copenhagen – shows that things will get worse before they get better. The role of cities and their runaway urban metabolism in all this is well documented. The idea that cities – more than any other human creation – must become environmentally sustainable or climate neutral, is gaining traction as one of the key general solutions for the accumulated problems of this planet. *Urban sustainability* is becoming a global imperative (UNEP, 2005).

Furthermore, in the wake of the realization that some degree of disturbance will affect cities sooner or later (because the mitigation measures were not taken when they were needed), the ‘sustainability’ idea is now joined by the ‘resilience’ idea. Mitigation, now combined with adaptation, is supposed to reduce vulnerability, i.e. increase *urban resilience*. Whether hit by high prices of energy, water and food, or by occasional shortages, or by complete disruption of supply – cities should be prepared to deal with such challenges and avoid either hardship, or disaster (Droege, 2006).

It is in this context that some of the measures undertaken in the last 10 to 20 years in the cities and town of Germany, Switzerland, Scandinavia, Netherlands, UK, Canada, US, Japan, South America, Australia and so on, seem to make a lot of sense. Not all of these measures have been undertaken or demonstrated on urban waterfronts, but many were, for reasons explained earlier.

Amidst such clear signals of what might happen and evidence of what well-organized societies and communities are doing to be prepared in case it does happen – it is strange that Auckland is taking a rather slow paced approach to these issues and concerns. It is even stranger that Porto Alegre is taking no approach at all!

‘Green urbanism’ – here understood to be a mix of design and technology strategies aimed at increasing both the sustainability and resilience of a community – is neither a fad, nor a niche interest. It is a fundamental strategy for maintaining a degree of security in an over-populated and over-exploited world, as well as a contribution to the global efforts to prevent a full catastrophe. Every town and city pursuing a form of sustainable urban planning and urban design appears to be the only wise and only ethical choice in this world. Auckland’s recognition of the issue is worthy of praise; but its relaxed implementation is not. Porto Alegre’s complete silence on the issue is at best – puzzling and at worst - irresponsible.

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