

Green Technology's Effect on Sustainable Office Property Development in Sydney

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Abstract. The promotion of green technologies in office property developments has triggered a series of changes in the existing market. Firstly, this paper examines the existing office property market based on the Office Market Report 2014 by Property Council of Australia which illustrates the demand for sustainable offices being solid. Then through utilizing DiPasquale and Wheaton model, the effects of green technologies for present market are analyzed from different aspects which are rating scheme, government policies, green technologies cost and economy. It is believed that sustainable office properties will enjoy high popularity in the future and the application of green technology in office properties will contribute to a more sustainable Sydney.

Introduction

It is recognized that we can no longer use natural resources unlimitedly without concerning environmental issues such as climate change, energy shortage and carbon emission. Concerns about building-related energy uses and carbon emission have triggered green building initiative. Green technologies including recycling, water purification, sewage treatment, environmental remediation, solid waste management, renewable energy and so on could be implemented in buildings to achieve the objectives of reducing adverse impacts on the natural environment.

Wide use of Green technologies in office property could cause a series of changes in the existing property market. In this paper, we will analyze how green technology affects the future office property market in Sydney CBD, Australia through the application of the DiPasquale and Wheaton Model developed by Denise DiPasquale and William Wheaton in 1992. And this model shows the relationship of four markets including market for space (rental income), asset valuation (prices of buildings), construction (cost of new building work) and stock (existing buildings), as four linked graphs. DiPasquale and Wheaton model is an elegant model of long-run equilibrium in the aggregate real estate market.

Existing Office Property Market Analysis

According to the Property Council of Australia's latest Office Market Report 2014, the national office market vacancy rate had increased during the past six months (January to July 2014), but Sydney CBD had experienced decreasing vacancy rates. To be more specific, an increase of demand had helped bring down the vacancy rate of Sydney CBD from 9 percent in January to 8.4 percent in July 2014. In the same period, Australian CBD vacancy rates increased from 10.4 percent to 10.7 percent.¹ (Property Week 2014). Meanwhile, the DEXUS released the Office Demand Barometer which indicated that office demand in Sydney CBD had entered into a growth phase² (Property Week 2014). Therefore, it could be predicted that the demand for office property in Sydney CBD is solid. Moreover, as can be seen from figure 1, major vacancy reduction is concentrated in the grade Premium, A and B. Grade A and B are buildings that rated as 4 Stars and above under Green Star Rating Scheme, and 4.5 Star and

above under NABERS Office Energy Rating scheme. Premium Grade properties are those rated as 5 Star under Green Star Rating Scheme and NABERS Office Energy Rating, and properties in this grade reduced the most. There is a point of view that raising the quality of sustainable buildings will induce a higher rent, higher occupancy rates, increase tenant's retention, reduce the risk of obsolescence, resulting in greater capital value of the properties (Heerwagen 2000). Herein, we can predict that the demand for office property market in Sydney CBD will be in a growth phase, particularly for those sustainable offices with advanced green technologies.

Grade	Vacancy, Jul 14 (%)	Vacancy, Jan 14 (%)	Net absorption, 6 months to Jul 14 (sqm)	Net absorption, 12 months to Jul 14 (sqm)
Premium	8.2	9.9	7,698	16,549
A	9.5	9.8	4,696	13,484
B	7.6	8.3	22,431	25,776
C	7.1	7.8	-6,991	3,882
D	7.9	6.7	-3,851	-2,419
Total	8.4	9.0	23,983	57,272

Figure1 Vacancy rate of office properties with different grades in Sydney CBD ³(Property Council of Australia 2014)

Impacts and Opportunity

Rating schemes and policies

In Australia, Government has already begun to intervene in the property market to encourage and promote green or sustainable development practices. In order to stimulate sustainable development, Australia's State and Federal Governments have set a series of rating schemes to assess environmental impact and energy consumption of commercial space. There are two better-known rating tools: Green Star and National Australian Built Environment Rating System (NABERS). They both initially focused on commercial office property. Green Star ratings scheme is administered by the Green Building Council of Australia, and it focuses on design or physical aspects of buildings and could be rated before construction. NABERS rating scheme managed by the NSW Government is applied to existing buildings to measure and benchmark sustainable performance. A lot of commercial office properties have been rated by these two rating systems.

When it comes to Sydney, Sydney 2030 envisions a green city, setting sustainable development, renewal and design as one of the ten strategic directions. Apart from that, City of Sydney, in cooperation with its partners such as AMP Capital Investors, DEXUS Property Group, Lend Lease, Mirvac, University of Sydney and University of Technology Sydney, has proposed a series of programs including: the Smart Green Business Program, Sydney Better Buildings Partnership, City Switch Green Office Program as well as the Environmental Upgrade Finance Scheme to help businesses become more sustainable. We can see from these facts that the national and local government have greatly endeavored to encourage sustainable and green buildings. Government's attitude and policies are major forces in pushing forward the sustainable development.

According to the DiPasquale and Wheaton model, with a fixed supply of the green office space, if the demand rises, the rent will increase consequently. The rising rent then leads to a higher asset price, which in turn, contributes to more new constructions. Finally, the new constructions will generate a higher level of office space stock, thus the demand is equal to the supply, where it reaches a new equilibrium status, as shown in figure 2. With all indicators growing, the market will move towards a "virtuous circle", (shown in figure 3). The users, designers, constructors, developers and investors will all benefit from the value of the sustainable buildings.

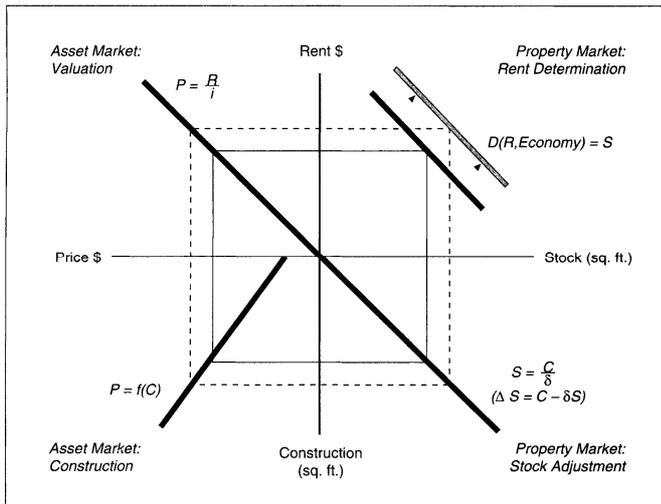


Figure 2 Property demand increase (DiPasquale and Wheaton 1996: 12)

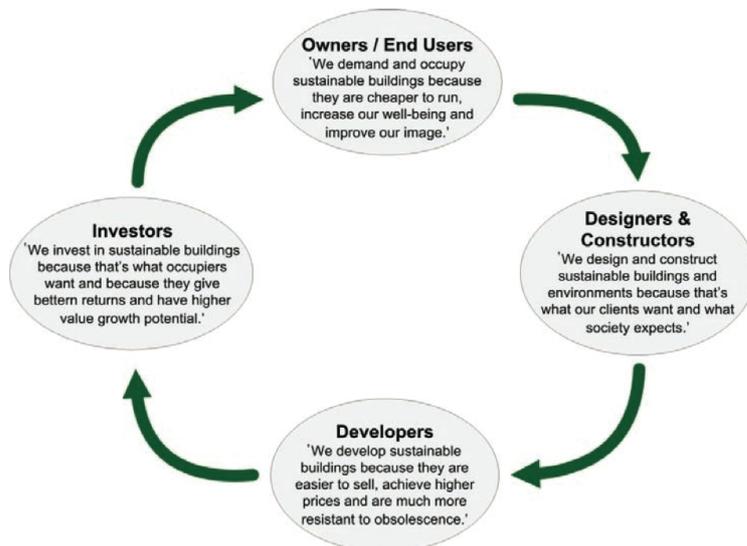


Figure 3 The virtuous circle (Royal Institution of Chartered Surveyors 2008)

Green Technology Cost

With green technologies becoming more and more popular, their price will decrease, which will reduce the expenditure of providing a fixed amount of new space and increase profitability of construction companies for given asset prices. These kinds of positive supply changes could expand new constructions, and cause an easterly shift in the construction cost quadrant. For the same asset price, an easterly shift will lead to more constructions and increase the level of space stock. With more space in the northeast quadrant, the rent will lower, which will cause the price of asset drop. In order to reach an equilibrium status, the new solution box will shift to southeast, with rent decreasing and construction and stock increasing, as shown in figure 4 below. The lower rent and lower property value could make sustainable buildings with advanced green technologies more acceptable for the public, allowing more people to afford them. The increasing construction and stock levels reflect the fact that the sustainable offices are taking up more proportion in the existing office market.

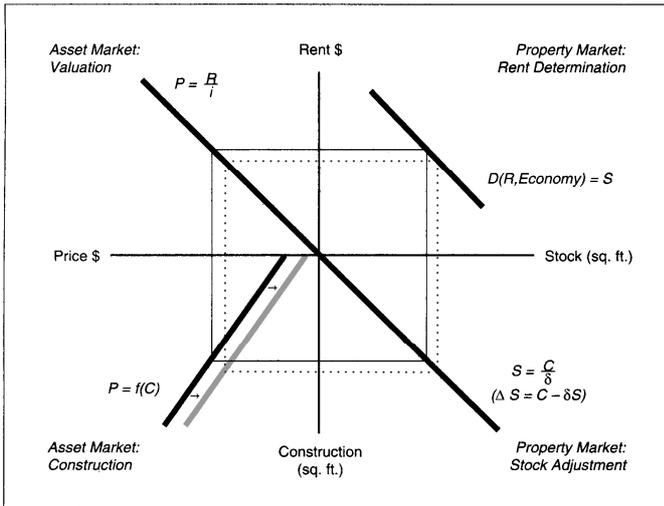


Figure 4 Asset cost shifts

Economy

Economy will certainly influence the sustainable property market. Ang and Wilkinson (2008: 337) pointed out “*the sustainable property development is not being driven by economic incentives and benefits*”, according to their research, pressure from the stakeholders is recognized as the main driver of sustainable development. Regarding the barrier of adopting sustainable property development, it is perceived that it mainly came from economy (Ang and Wilkinson 2008: 339). In other words, economic prosperity may not trigger the boom of sustainable development, but economic recession will directly affect the sustainable property market. To be more specific, when there is an economy recession, such as the 2008 financial crisis, the sustainable office market will face a situation where demand will decrease, followed by falling rent rates. The lower rent will affect asset market, where asset price will descend and the number of new constructions will reduce. Finally, reductions in new construction will lead to less stock, as shown in figure 5 below.

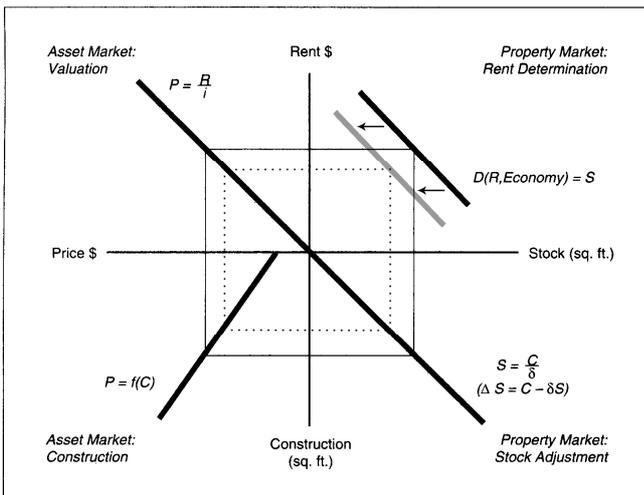


Figure 5 Property demand decrease

Conclusion

The single-minded pursuit of short-term profit without consideration of environmental issues in the property development industry could no longer be a sustainable way (Dunphy et al. 2007: 5). A good

sustainable design can bring long-term profitability due to the significant reduction of operating cost over a longer period of time. (Green Building Council of Australia 2006: 48). There are a large proportion of new buildings that are seeking to gain a Green Star rating and NABERS rating now. We believe that the office property market is moving towards the trend of sustainable development as green technologies are becoming popular, their prices are affordable and the government is advocating green technologies as well. In my opinion, if economy does not encounter significant recessions, the demand for sustainable office buildings in Sydney CBD will expand. Especially, the state-of-the-art green technologies will surely challenge the public's view of the premium grade offices and induce more sustainable buildings of a premium grade in Sydney CBD. Developers, investors and owners' sustainable incentives are increasing, and as a result, sustainable technology can be more readily applied on both new buildings and existing buildings lacking in energy savings and other sustainable attributes.

In conclusion, we believe that the adoption and incorporation of green technology in buildings will advance Sydney CBD's existing office market toward a more sustainable and environmentally-friendly future.

References

1. Ang, S.L.&Wilkinson, S.J. 2008, 'Is the social agenda driving sustainable property development in Melbourne, Australia?', *Property Management*, vol. 26, no. 5, pp. 331-43.
2. DiPasquale, D. & Wheaton, W.C. 1996, *Urban Economics and real estate markets*, Prentice Hall, Englewood Cliffs, NJ, pp.1-21.
3. Dunphy, D., Griffiths, A. & Benn, S. 2007, *Organizational Change for Corporate Sustainability – A Guide for Leaders and Change Agents of the Future*, 2nd ed., Routledge, Abingdon.
4. Heerwagen, J. 2000, 'Green buildings, organizational success and occupant productivity', *Building Research and Information*, vol. 28, no. 5/6, pp. 353-67.
5. Green Building Council of Australia 2006, *The Dollars and Sense of Green Buildings 2006*, Green Building Council of Australia, Sydney.
6. Green Technology 2010, *Green Technology- What is it*, viewed 6 November 2014, <<http://www.green-technology.org/what.htm>>.
7. Matthiessen, L.F. & Morris, P. 2004, *Costing green: comprehensive cost database and budgeting methodology*, viewed 6 November 2014, <<http://www.axiomsustainable.com/library/financial/Davis-Langdon-CostofGreen-Full.pdf>>.
8. Property Council of Australia 2014, *Returning demand drives down Sydney office market vacancies*, viewed 6 November 2014, <<http://www.propertyoz.com.au/Article/NewsDetail.aspx?p=16&id=9797>>.
9. Property Week 2014, *Demand for Sydney office space increases*, viewed 6 November 2014, <<http://www.propertyoz.com.au/Article/NewsDetail.aspx?p=16&id=9681>>.
10. Property Week 2014, *Sydney and Melbourne buck office vacancy trend*, viewed 6 November 2014, <<http://www.propertyoz.com.au/Article/NewsDetail.aspx?p=16&id=9827>>.
11. Ratcliffe, J., Stubbs, M., & Keeping, M. 2009, *Urban Planning and Real Estate Development*, 3rd edn, London, Spon Press.
12. RICS 2008, *Breaking the Vicious Circle of Blame – Making the Business Case for Sustainable Buildings*, viewed 6 November 2014, <www.rics.org>.
13. Warren, C. 2009, 'Measures of environmentally sustainable development and their effect on property asset value: An Australian perspective', *Property Management*, vol. 28, no. 2, pp. 68-79.
14. World Green Building Council 2013, *The Business Case For Green Building*, viewed 6 November 2014,

<http://www.worldgbc.org/files/1513/6608/0674/Business_Case_For_Green_Building_Report_WEB_2013-04-11.pdf>.