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Urbecon

Building a stronger national economy through sustainable cities

Australia's major cities are vital to the economic health of the nation. Their influence on competitiveness is effected through a multiplicity of functions including:

- maintaining well functioning labour markets;
- maintaining relatively low cost access to training and education opportunities;
- facilitating technology transfer, research and innovation;
- maintaining efficiency in export ports;
- containing demands on the health system;
- managing the production costs of business;
- attracting international tourism; and
- managing the consumption of water and energy.

Investing in key projects and urban management programs to make the metropolitan areas more efficient will not only make the cities better places to live and work, but can be expected to reap a significant GDP boost, including improved taxation flows to the Commonwealth. These projects and programs would target better transport systems, more sustainable development patterns and better labour market integration.

Efficiencies from better cities

Better managed metropolitan areas featuring a more efficient spatial structure can contribute to competitiveness and productivity on two fronts; containing input costs to business; and facilitating human capital development and business innovation.

Arguably, the cities represent the greatest untapped opportunity for micro-economic reform and productivity advantage since the inception of National Competition Policy.

The nexus between urban structure and the propensity for innovation is a complex one. It is particularly challenging from an analytical point of view as most macro-economic models treat technological change as an externally determined or 'given' factor.

Improved economic performance enabled by reduced business costs is more amenable to conventional modelling. The impact on GDP of improvements in urban structure and management can be tested using the Treasury Macroeconomic Model (TRYM).

SGS has used this approach to model the impact on GDP of improvements in urban structure and management which are achievable within a 10 year time frame. The scenario adopted for testing considered only three of the many opportunities for cost savings from better cities; namely, reduced traffic congestion, reduced transport related greenhouse gas emissions and lower housing construction costs.

Also in this issue...

SGS Economics & Planning

A scenario for more productive cities

The input data for this scenario is shown in Table 1. Available data sets did not allow for the inclusion of Canberra, Hobart and Darwin in the estimates of future cost savings.

The commuter travel costs data used in the scenario was sourced from the Bureau of Transport Economics[1]. Another Bureau publication, *Greenhouse Gas Emissions from Transport: Australian Trends to 2020*, was consulted to arrive at the estimates of greenhouse gas costs in the scenario. This source contains projections of transport related greenhouse gas emissions for all metropolitan areas, expressed in tonnes/year. These emissions were valued at €10/tonne, or some A$17/tonne, based on projected prices within the European Union carbon trading system.[2]

The dwelling construction costs were based on the average rates reported for Melbourne in the Rawlinsons Costing Guide.[3] The average per unit construction cost applied in the other cities took into account State loadings (or savings) as reported in Rawlinsons. These average per dwelling costs were applied to metropolitan household projections as published by the ABS. It was assumed that each household equals one dwelling.

Table 1. Selected Cost Savings with Better Managed and Structured Cities, Constant 2006 Dollars

		Commuter travel costs (congestion)	Greenhouse gas emissions	Dwelling construction costs
		$m 2006	$m 2006	$m 2006
Sydney	2006	$9,546	$233	$5,953
	2016 (trend)	$11,352	$272	$5,893
	2016 (alt with better cities)	$9,082	$253	$5,633
Melbourne	2006	$6,848	$212	$5,769
	2016 (trend)	$10,240	$246	$5,792
	2016 (alt with better cities)	$8,192	$229	$5,537
Brisbane	2006	$7,735	$86	$4,171
	2016 (trend)	$12,090	$103	$4,249
	2016 (alt with better cities)	$9,672	$96	$4,062
Perth	2006	$1,284	$81	$2,784
	2016 (trend)	$2,489	$95	$2,708
	2016 (alt with better cities)	$1,991	$89	$2,589
Adelaide	2006	$1,175	$57	$969
	2016 (trend)	$2,340	$64	$693
	2016 (alt with better cities)	$1,872	$59	$663
All capital cities (excluding Canberra, Hobart & Darwin)	2006	$26,588	$669	$19,647
	2016 (trend)	$38,511	$780	$19,335
	2016 (alt with better cities)	$30,809	$726	$18,484

Through these processes, the 'trend projections' in the scenario were established. Thus, by 2016, it is expected that the 5 metropolitan areas under examination would generate some $38.5 billion in congestion costs (compared to $26.65 billion in 2006) on a 'business as usual' basis.

Achievable improvements in these cost factors were postulated by reference to a recent cost benefit analysis of the Melbourne 2030 strategy conducted by SGS. [4] This cost benefit analysis drew on traffic modelling which estimated total travel in the metropolitan area under the 'poly nucleated' structure sought under the strategy versus a trend development pattern. Similarly, it estimated future housing construction costs on the assumption that the latent demand for more compact housing in convenient locations could find expression as per the objectives of the metropolitan strategy .

With the Melbourne example in mind, the '5 cities' scenario shown in Table 1 indicates that in year 2016, congestion costs would be some 20% lower than they might have otherwise been, while transport related greenhouse gas emission costs would be approximately 7% lower and housing construction costs about 4% lower.

Modelling strategy

The cost savings indicated in the above scenario needed to be expressed as standard inputs to TRYM. For this purpose the following logic and assumptions were applied.

Congestion cost savings were translated into an improvement in labour productivity. If workers are able to get to work in less time (or can more readily access options to do so) because of better structured / better managed cities, it follows that they would require less total compensation for a given quantum of output compared to a city structure which locks them into long, slow, or unpredictable journeys to work. Congestion cost savings were translated into 'saved work hours' by reference to average wage and salary costs to arrive at a labour productivity boost for input to TRYM. This improvement was assumed to build up gradually, in straight line fashion, from 2006 to 2016 after which the productivity advantage would plateau. This is a conservative assumption, as one would expect continuing improvements in congestion performance versus trend, as the cities are 'reshaped' more profoundly with advancing years.

The modelling assumed that Australia would ultimately be operating in a carbon emissions trading environment, at the relatively modest prices currently projected within the EU market. Participation in carbon emissions trading would increase the cost of production, thereby impacting on the productivity of Australian firms. Under the tested scenario, Australia would need to buy $54 million fewer emission rights in 2016 with better cities compared to trend. For the purposes of the modelling, the productive efficiency of the enterprise sector in the TRYM model was assumed to deteriorate in line with current trends in greenhouse gas emissions (see table 1) under the base case (i.e. do nothing scenario). Under the better cities scenario, productivity of the enterprise sector was assumed to improve in line with the estimated savings in greenhouse gas emissions. Again, this benefit was scaled to build up gradually and then plateau at year 2016.

Saved housing construction costs would release capital for reinvestment elsewhere in the economy. The modelling assumed that these released funds would be invested in the business sector of the economy. This marginal increase in enterprise sector investment (and decline in dwelling investment) was made subject to a gradual build up pattern as described.

Results

Table 2 shows the results of the TRYM modelling undertaken to estimate the economic benefits expected from better managed and more efficient cities. The analysis shows that by 2020-21 Australia's GDP can be expected to be higher by 1.27% compared to the Base Case Scenario (i.e. do nothing scenario). Similarly, the Federal Government's tax revenue can be expected to be higher by 0.55%.

The analysis further suggests that under the modelled better cities scenario, Australia would be better off by some $80.86 billion over the 15 year period to 2021. This is a substantial dividend, notwithstanding the conservative nature of the scenario tested. As discussed, this scenario allowed for only three categories of efficiency savings from better cities (congestion, greenhouse gas emissions and housing construction costs) and these efficiencies were assumed to stop growing from 2016 onwards.

Table 2. Economic Benefit of Efficient, Better Managed Cities

Source: SGS Economics and Planning based on TRYM Model

	Base Case Scenario (i.e. Do Nothing Scenario)		Better Cities Scenario		Net Economic Benefit of Better Cities			
FY Ending June	Real GDP, $m	Real Taxes on Products and Production, $m	Real GDP, $m	Real Taxes on Products and Production, $m	Real GDP, $m	Real Taxes on Products and Production, $m	Real GDP, %	Real Taxes on Products and Production, %
2005	858,119	99,080	858,119	99,080	0	0	0.00%	0.00%
2006	889,917	100,044	889,944	100,056	27	12	0.00%	0.01%
2007	954,641	108,338	954,647	108,376	6	38	0.00%	0.03%
2008	990,691	113,655	990,737	113,720	47	65	0.00%	0.06%
2009	1,014,411	117,165	1,014,483	117,259	73	94	0.01%	0.08%
2010	1,027,966	119,014	1,028,007	119,162	41	149	0.00%	0.12%
2011	1,043,123	120,755	1,043,462	120,998	340	243	0.03%	0.20%
2012	1,062,911	123,017	1,063,844	123,346	933	329	0.09%	0.27%
2013	1,085,388	125,584	1,087,170	125,978	1,782	395	0.16%	0.31%
2014	1,111,508	128,550	1,114,437	129,000	2,929	450	0.26%	0.35%
2015	1,141,192	131,946	1,145,576	132,447	4,383	502	0.38%	0.38%
2016	1,173,914	135,643	1,180,085	136,202	6,171	559	0.53%	0.41%
2017	1,210,196	139,648	1,218,320	140,233	8,124	585	0.67%	0.42%
2018	1,250,942	144,152	1,261,311	144,795	10,369	643	0.83%	0.45%
2019	1,295,726	149,135	1,308,451	149,839	12,725	704	0.98%	0.47%
2020	1,344,746	154,634	1,359,961	155,416	15,215	782	1.13%	0.51%
2021	1,395,505	160,315	1,413,200	161,201	17,695	886	1.27%	0.55%
			Total Cumulative Benefit		80,859	6,434		

Implications

This scenario-based modelling underscores the significant boost to national economic performance which is achievable by establishing programs and incentives to reshape the cities. Arguably, the cities represent the greatest untapped opportunity for micro-economic reform and productivity advantage since the inception of National Competition Policy.

The econometric modelling has shown that significant national benefits, including improved taxation flows to the Commonwealth, will be generated by investing in key projects and urban management programs to make the metropolitan areas more efficient. These projects and programs would target better transport systems, more sustainable development patterns and better labour market integration.

It is squarely within the Australian Government's economic management mandate to influence how the States and Territories go about urban management, metropolitan planning and investment in urban infrastructure. The Australian Government, as demonstrated above, is expected to be the big fiscal winner from better cities, due to significant growth in Federal tax revenues generated by productivity induced growth in the economy.

Multi-government partnerships are needed to deliver the nation-building infrastructure projects and programs that will support the transformation of Australian cities, which already account for 70% of GDP, into even more powerful economic drivers. They can be developed through the key forums which influence investment in the cities, including Ministerial Advisory Councils and the various Council of Australian Governments (COAG) reform agenda committees.

This approach has been well-accepted in recent Australian policy debate. It gained support from right across the political spectrum in 2005, when the House of Representatives Standing Committee on Environment and Heritage recommended (inter alia) that the Australian government: establish an Australian Sustainability Charter; encourage a COAG agreement to the Charter and key targets; establish an independent Australian Sustainability Commission to monitor the extent to which Commonwealth funds and State and Territory use of them, promote the sustainability targets; and explore the concept of incentive payments to the States and Territories for sustainability outcomes along the lines of the National Competition Policy model. ■

Footnotes

1. Bureau of Transport Economics (1999) *Information Sheet 14: Urban Transport - Looking Ahead. Table 1 (p. 4)*

2. Pew Centre on Global Climate Change, *The European Union Emissions Trading Scheme (EU-ETS) Insights and Opportunities* http://www.pewclimate.org/docUploads/EU-ETS%20White%20Paper.pdf retrieved Dec 11, 2006

3. (Edition 24)

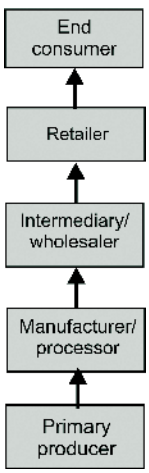
4. SGS Economics & Planning Pty Ltd (2005) *Costs of Urban Form.* Report prepared for the Department of Sustainability and Environment, Victoria

Sustainable shopping and retailing: a supply chain approach

In the planning of urban areas a prime responsibility of Government (with urban planners as appropriate agents) is to ensure that its constituents have access to the goods and services that they need for a satisfying lifestyle. A measure of the quality of a city is in a large part due to how well it goes about this task.

The primary rationale for a 'centres' component in any metropolitan strategy should be to ensure that this demand for goods and services is satisfied by devising an efficient and sustainable distribution system for the delivery of goods and services. The development of a network or hierarchy of activity centres is the favoured model but that satisfies just one component of what is needed for efficiency and sustainability.

The concept of a hierarchy of shopping centres is based on central place theory which had its origins in the 19th century with Von Thunen. It was subsequently developed by Christaller in 1933 based on observations of the distribution of settlements in the southern parts of rural Germany. The assumptions and insights of the model are unlikely foundations for a shopping system to service Australian consumers in the 21st century. The theory focuses almost entirely on the relationship between customers in their place of residence and the shopping centres to which they travel to shop. Whilst this is a very important relationship it is not the only one that needs to be considered.



The complexity of the relationships in the distribution of goods and services to a large metropolis are best illustrated within a supply chain management framework (see Figure 1).

Figure 1: Conventional supply chain

Supply chain management as retail strategy

Retailing (Davies 1993) =
'The management of resources to supply the product and service needs of the end-consumer, encompassing the supply chain of any physical products and the exchange processes involved.'

Supply Chain Management (Simchi et al 2003) =
'set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time in order to minimize system wide costs while satisfying service level requirements.'

These quotations relate to the supply chain for individual shops or retail corporations that inevitably focus on their own self interest of competitiveness and profitability in the market place. Supply chain relationships are ultimately translated into land use patterns with shopping centres and transport infrastructure along which shoppers and delivery trucks travel. Hence, planners should also be concerned with supply chain management, in the interest of the wider consuming public.

In relation to the spatial distribution of activity centres there are two main travel interests: the distance that consumers travel to a retail outlet to get their goods and services; and the distance that products and providers travel to the outlets where they are sold.

End consumer transportation in supply chain

In the conventional supply chain generally shoppers/ consumers are called upon to pay the cost of travel to and from shopping/ retailing destinations. This cost is commonly underestimated by shoppers.

There are considerable economies of scale in retailing and the trend is for both retail corporations and their outlets to become larger to exploit these economies of scale and pass on the saving to customers as cheaper prices. However, in so doing they require and generally create for themselves larger and larger trade areas with concomitant increases in customer travel distances and costs. In this market equation, externality costs are absorbed by the wider public as more expensive personal travel, increased public infrastructure investment, additional air pollution and the likes.

The link between consumers and retail outlets is particularly important in any public interest supply chain. Planning policy at State Government level, such as the activity centre policy in the metropolitan strategy Melbourne 2030, is based on the concern/ observation/ assumption that the aggregate customer travel cost (direct and externality) exceeds the benefits of cheaper prices in the shops out-of-centre. The basis of such policy is that requiring shopping development to locate in-centre with public transport access and subsidising public transport will achieve a more efficient public interest outcome.

Freight transportation in supply chain (retail and wholesale)

Governments and urban planners in Australia have been less concerned about the transportation of goods along the supply chain than they have been about the distance that shoppers travel to shopping. However, the accommodation of freight on the road network is a major cost burden on the public purse and truck movements continue to cause negative externalities in many urban areas. These translate into factors such as: fear and stress on citizens going about their daily lives, car accidents and concomitant trauma, air and noise pollution, and the likes.

In support of balanced metropolitan strategy, consideration should be given to initiatives to reduce the travel distance that goods have to travel to get to various retail outlets. This requires the strategic location of freight hubs and distribution centres in relation to major roads, interchanges, docks, and airports, as well as the location of retail outlets.

Shops owned by people who live in the locality are more likely to source their products locally and are also effective mechanisms for keeping money inside a local economy. On the other hand, large scale national outlets, such as supermarkets, are classic mechanisms for leakage. Few of the products sold in supermarkets are produced or processed locally and many of them have travelled great distances. It has been estimated that in the UK the average supermarket trolley contains goods that have travelled 3000 miles, of which a fifth (600 miles) consists of fruit and vegetables. The food system accounts for up to 40% of all UK road freight and from 1978-1999 the UK transported 16% more food over distances that were 50% longer.

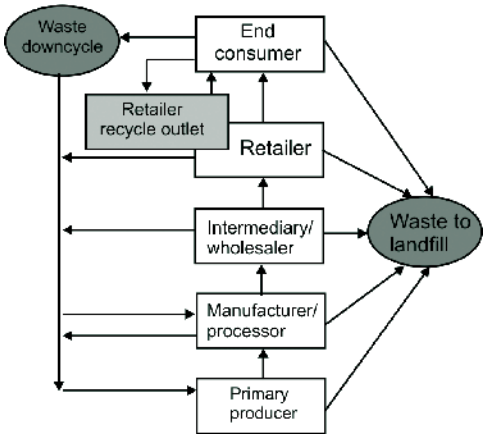
In Victoria, supermarkets source oranges from the USA at the same time as the local crop is being exported to Hong Kong. Melbournians drink water imported from Europe at the same time as it exports water the other way.

Waste production and management in the supply chain

Waste occurs at all stages of the supply chain, the management of which is seldom considered to be the responsibility of urban planning. It is a poor division of responsibilities in city development when any discipline is not made aware of the eventual impacts of its decision making, let alone being held responsible for them.

A credible shopping and retailing policy should have a concomitant waste management component. This in turn should have a 'waste reduction' component, to delay and reduce the magnitude the 'land fill' option. (see Figure 2 overleaf.)

Figure 2: Circular supply chain



William McDonough and Michael Braungart (2002) coined the term and concept of 'cradle to cradle', in a book of the same name. The concept is of a 'circular economy' in which products are managed from their inception (cradle) to their ultimate destiny which should be viewed as the cradle for a subsequent rebirth in another form. This includes the land fill option being turned into food for the soil, as far as possible.

The fundamentals of the concept are for products to be designed and manufactured at the outset to be discarded. Distinction is made by McDonough and Braungart in the general 'discarded' term between recycling and downcycling. Recycling occurs when products no longer needed by one party are passed on (either by donation or re-selling) in their existing form to other consumers, commonly less wealthy, but not necessarily so. This is mainly, but not exclusively, practiced by the not-for-profit sector such as the Brotherhood of St Laurence and the Salvation Army.

Downcycling occurs when products that are beyond use by any other party in their existing form are taken apart and are used as components with or without reformulation into other products. This commonly occurs with a loss of value in the product, so it is not as sustainable as recycling.

In implementation there is a need to find and exploit the inherent economic forces behind supplying goods to people, including the handling of their waste. In all of this a supply chain approach is useful in setting out the various links that should be considered in a comprehensive system for the distribution of goods and services across the city. ■

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Affordable housing - not just a housing issue

The main reason for ensuring access to affordable housing is to prevent housing stress: unacceptably low after-housing-cost household incomes[1] . But there is another downside of not providing affordable housing: the effect on local labour markets and consequently on prospects for growth in local economies. Labour market participants under housing stress have little choice but to relocate elsewhere, leaving employers unable to find appropriate skills to fill the vacancies.

While this problem has been reported anecdotally in the media[2] , recent SGS research focusing on the Bay of Plenty region of New Zealand [3] has examined and quantified the relationship between labour market conditions and the demand for affordable housing. After projecting the future trajectory of the region's economy; the research calculated the number of affordable housing units required over the 25 years to 2031, to attract and retain an optimal level of labour supply in the region. Finally, it estimated the detrimental economic impact of not providing the required number of additional affordable housing units.

Projecting the future trajectory of the economy

In 2001, the Bay of Plenty region offered 94,646 jobs, had an estimated regional output of $11.92 billion and value added estimated at $4.5 billion.

To project the future trajectory of the regional economy, SGS used regional Input-Output modelling, which details the industry linkages and the multiplier or flow-on effects of raising the output in any sector of the regional economy. SGS developed an input-output model customised for the Bay of Plenty Region.[4]

Employment growth by industry in the region was projected using employment multipliers, and assumptions about two stimuli (interregional and international exports growth; and expected growth in household expenditure due to the expected population growth).

Overall, the analysis suggested that the Bay of Plenty region is expected to grow by almost 55,000 jobs between 2001 and 2031. Major growth sectors in the BOP region (together comprising 80% of employment growth) include: Retail Trade; Agriculture, Forestry and Fishing; Property and Business Services; Manufacturing (including Wood products; Machinery & equipment; 'Other food' manufacturing; Furniture and other manufacturing); Health and Community Services; Accommodation, Cafes and Restaurants; Construction; and Education.

Next, the likely future occupational structure of the regional economy was estimated, applying the historical relationship between employment by industry and occupation, and taking into account the changes in occupational structure over time. This predicted significant growth in the numbers of people employed as legislators, administrators and managers, followed by service and sales workers, professionals and plant and machine operators and assemblers.

This was then related to the income profile, to estimate the number of jobs by annual personal income categories.

Projecting demand for affordable housing

Housing occupancy cost is borne by the households and not individuals, so the number of households in each income group had to be estimated. Again, this used historical relationships - between annual personal income of employed residents and household income and the number of employed people in households in each income category.)

This indicated that the total 55,000 jobs growth projected to 2031 would be occupied by approximately 34,000 households. The income distribution of households occupying the projected jobs growth suggested that approximately 15,500 households would be in the bottom two quintiles.

Projected household income was then related to the direct cost of shelter, to estimate the number of households in the bottom two quintiles which may be under housing stress. A household is considered to be under housing stress if the housing occupancy or direct shelter cost exceed 30 percent of the gross household annual income and the households are in the bottom two quintiles of the income distribution.

Two different scenarios were developed (one conservative, based on the mid point of income and housing cost range; the other less conservative, based on upper end of the income and housing cost range.)

The analysis suggested that between 3,000 and 5,100 households with members supplying the projected jobs growth, would be expected to be under housing stress between 2001 and 2031. In other words, approximately 3,000 to 5,100 affordable dwellings would need to be supplied in the Bay Of Plenty region in order to support the economic/ labour market outcomes. This includes both affordable rental and homeownership tenures.

Economic impact of short supply of affordable housing

Finally, the modelling sought to articulate the detrimental effect on regional output, value added (or income) and jobs, if the projected demand for affordable housing was not supplied in the region. In doing this, it assumed that the labour market participants under housing stress (i.e. 3,000 to 5,100 households) would relocate elsewhere in New Zealand and the employers in the Bay of Plenty Region would therefore not be able to find appropriate skills to fill the vacancies.

The economic impact of not supplying the required affordable housing was found by working backwards through each of the modelling steps, to estimate the number of jobs in each industry that would not be occupied due to the lack of sufficient affordable housing and therefore lack of sufficient labour supply.

The analysis suggested that around 5,000 (conservatively) to 8,700 jobs ('base case') in the Bay Of Plenty region would be dependent on the supply of affordable housing between 2001 and 2031. The majority of these jobs would be in the occupations of Service and Sales Workers, Legislators, Administrators and Managers and Agriculture and Fishery Workers; and the industry sectors most impacted by lack of affordable housing would include Retail Trade, Agriculture; Forestry and Fishing, and Accommodation, Cafes and Restaurants.

A shortage of labour due to the lack of affordable housing in the Bay Of Plenty region could be expected to have significant flow on effects on the upward linked industries (or supplier industries). By applying the multipliers derived from the regional Input-Output model for BOP region these flow on effects could be estimated.

Under the conservative scenario, the direct impact of not supplying the required number of affordable dwellings was estimated to lead to decline in jobs growth by 5,000, decline in projected regional output growth by $500 million and value added by $196 million. Taking into account the flow-on effects, total jobs growth in the Bay of Plenty region would be lower by 6,640 , regional output would be lower by $721 million and value added would decline by $280 million between 2001 and 2031. On average, total jobs growth in the Bay of Plenty region would be lower by 227 per annum, regional output would be lower by $24m per annum and value added would be lower by $9.4m per annum. ■

Footnotes

1. Housing stress is defined as households in the bottom two quintiles of the income distribution paying more than 30% of their income on housing.
2. "Forlorn Lorne seeks answers to low-season blues" The Age, November 16, 2007
3. Bay of Plenty region is defined to include the Western Bay of Plenty District, Tauranga City, Rotorua District, Whakatane District, Kawerau District and Opotiki District.
4. This was done using statistical adjustment of the national Input-Output coefficients. The method used was similar to that used by leading statistical agencies.

SGS News

More SGS projects awarded by Planning Institute

SEQ Region 2005 - 2026 Implementation Guideline No 5: Social Infrastructure Planning won the Award for Excellence in Social and Community Based Planning, from Planning Institute of Australia (PIA) Queensland division. SGS collaborated with Briggs & Mortar Pty Ltd, Andrea Young Planning Consultants, and Elliott Whiteing Pty Ltd, to produce the guideline for the Office of Urban Management. The Guideline provides a comprehensive framework for social infrastructure planning in new communities and urban areas undergoing change within South East Queensland.

The *Alternative Housing Systems for Indigenous People in Remote Communities* report received a Commendation for Social and Community Based Planning, from the PIA ACT division. SGS, Paul Pholeros and Merrima Design, were commissioned by Department of Families, Community Services and Indigenous Affairs to study alternative models for housing provision on Indigenous communal title land. The project provided a framework that the Department could use when assessing proposals for alternative housing systems.

Marrickville Urban Strategy won a Commendation for Urban Planning Excellence, from PIA New South Wales. A consultant consortium, led by SGS Economics and Planning, in conjunction with Architectus Sydney Pty Ltd and Community Solutions, collaborated with Marrickville Council officers to produce the strategy. The strategy drew on comprehensive research and extensive community and stakeholder input.

More information on these projects is at SGS's website www.sgsep.com.au/news

Staff news

SGS is pleased to introduce some of our new team members.

Julian Szafraniec (Consultant, Melbourne office). Julian is an econometrician with experience in financial/econometric modelling and analysis, forecast analysis, feasibility study, simulation, spatial analysis and cost-benefit analysis.

Mathew Strain (Senior consultant, Melbourne office). Mathew is an economist with over 10 years' experience in feasibility studies, business strategy, and cost benefit analysis of projects across regional Australia. Mathew previously worked for the National Institute for Economic and Industry Research (NIEIR) and Sinclair Knight Merz.

Princess Ventura (Senior consultant, Melbourne office). Princess is an economist focusing on applying international best practice and economics to public policy and business issues. Her experience encompasses economic impact assessments, delivering training programs, public expenditure and budget formulation, poverty alleviation, labour market regulation, and public administration and staffing.

Anna Tweeddale (Consultant, Melbourne office). Anna is an architect and urban designer with skills in design, research and analysis. She has experience in design of commercial, residential and cultural buildings, sustainable urban design and research into urban culture. As a design architect at LAB architecture studio, she was involved in projects and competitions in Australia, Europe, China and the Middle East.

Terry Rawnsley (Senior consultant, Melbourne office). Terry is an economist with a wide range of experience in economic and statistical analysis including the use of Microsimulation models, Macroeconomic statistics and the TRYM Model. In his former roles with Australian Bureau of Statistics, Terry researched areas including labour market economics, wealth and income statistics, and indigenous disadvantage.

Inna Kiner (Consultant, Sydney office). Inna is qualified in Financial Economics and Human geography. She has experience in sustainable transport planning, survey development and analysis, GIS and travel plan development. Her particular interests are economic development and corporate and business planning.

More information about SGS staff members can be found on the SGS website www.sgsep.com.au

Urbecon

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