Chapter 14
Emergent Urbanism as the Transformative Force in Saving the Planet

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The most significant force in saving the planet is when cities begin to grow without using fossil fuels. The great urban revolution of the twentieth century was based around a continuing growth in the total and per capita consumption of fossil fuels leading to the problems of climate change, oil security, air pollution and urban sprawl.

The twenty-first century is beginning to show that this reversal may well be underway and that a new kind of city is emerging where economic growth is decoupling from fossil fuel growth and new greener, more competitive cities are emerging (Glaeser 2010). Some of this evidence will be presented before outlining how we can ensure the trends continue.

Peak Fossil Fuel Power Investment and Use

In 2008 the world began to invest more money in renewable energy than in fossil fuels to generate power (Wills and Newman 2012). Figure 14.1 shows the trend and the dotted lines shows the predicted levels that fossil fuel investment was going to reach through some global agencies. Since then we have been informed by the World Bank and the U.S. Government that they will no longer fund coal-fired power stations.

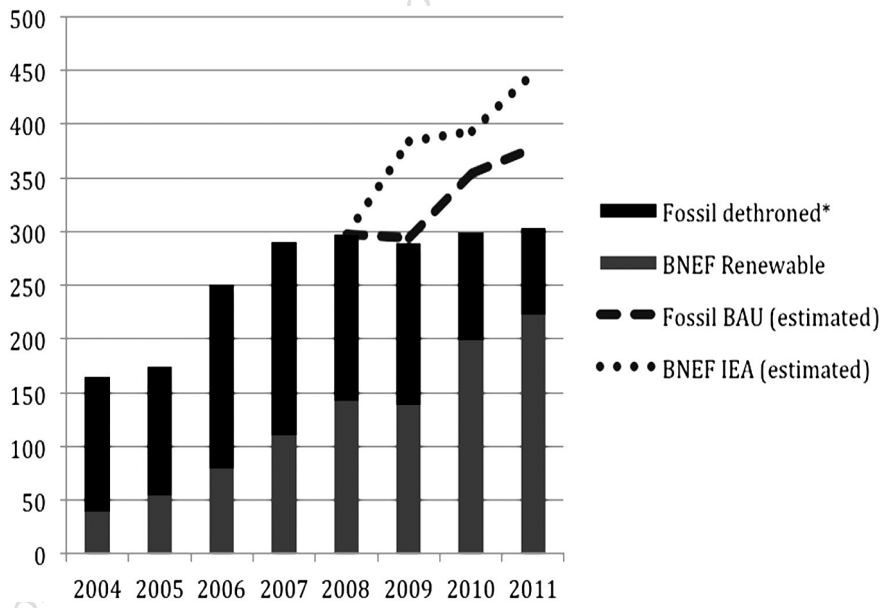

Figure 14.1 The peak of investment in power stations, fossil and renewable energy

1 Unless otherwise specified, all figures in this chapter are the author's own.

At the same time there is another emerging trend—decreased power consumption. In Figure 14.2 the decline in household power used in the UK is shown.

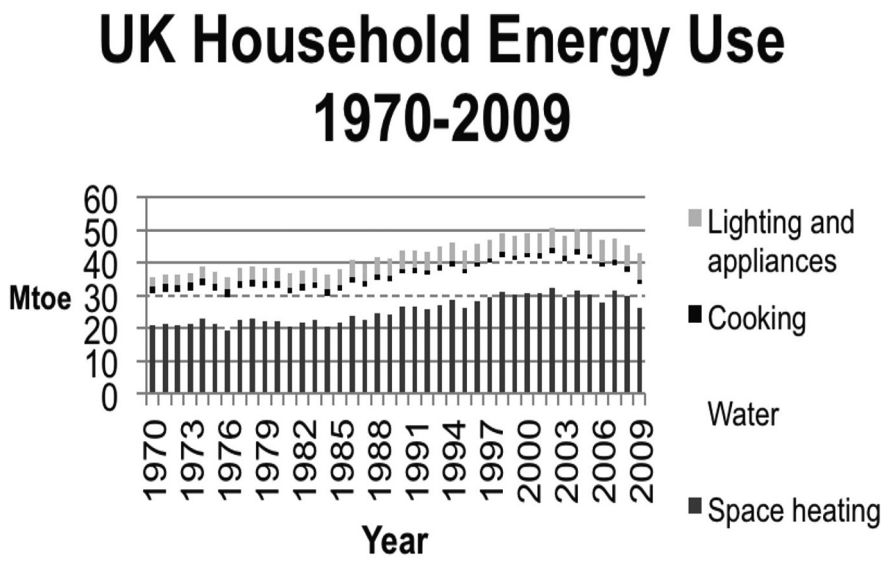

Figure 14.2 The peak in household power consumption, UK

The same has been found across the OECD nations including Australia where a new phenomenon is emerging of photovoltaic electricity as a major power part of urban power. Figure 14.3 shows how Perth has adopted PV on rooftops—mostly in the outer suburbs. The 140,000 homes that have adopted PV in the past three years are producing 310 MW of power—like a whole new centralized power plant.

The lack of space in the inner suburbs and the extra utility bills in large houses in the suburbs suggests an emerging Low Carbon Urban Transition Theory (Newton and Newman 2013). This suggests a model for the low carbon urban transition involving combinations of simple technological changes and harder structural changes, depending upon which parts of the urban fabric are in focus. In outer suburbs the PVs are easy but reducing oil in car use is hard and will require new infrastructure and urban centers (Dodson and Sipe 2008, and see below), whilst the inner suburbs have many more transport options that are relatively easy but power use will need new decentralized trigeneration systems at precinct scale.

In 2009 the Brookings Institution was the first to recognize a new phenomenon in the world's developed cities—declines in car use (Puentes and Tomer 2009). Peak car use suggests that we are witnessing the end of building cities around cars as the primary goal of planning—at least in the developed world—and probably the rediscovering of the compact city. Perhaps we are witnessing the demise of further automobile city building and the beginning of the end of automobility.

Peak Car Use

Puentes and Tomer (2009) first picked up the trend in per capita car use starting in 2004 in U.S. cities. They were able to show that this trend was occurring in most U.S. cities and by 2010 was evident in absolute declines in car use.

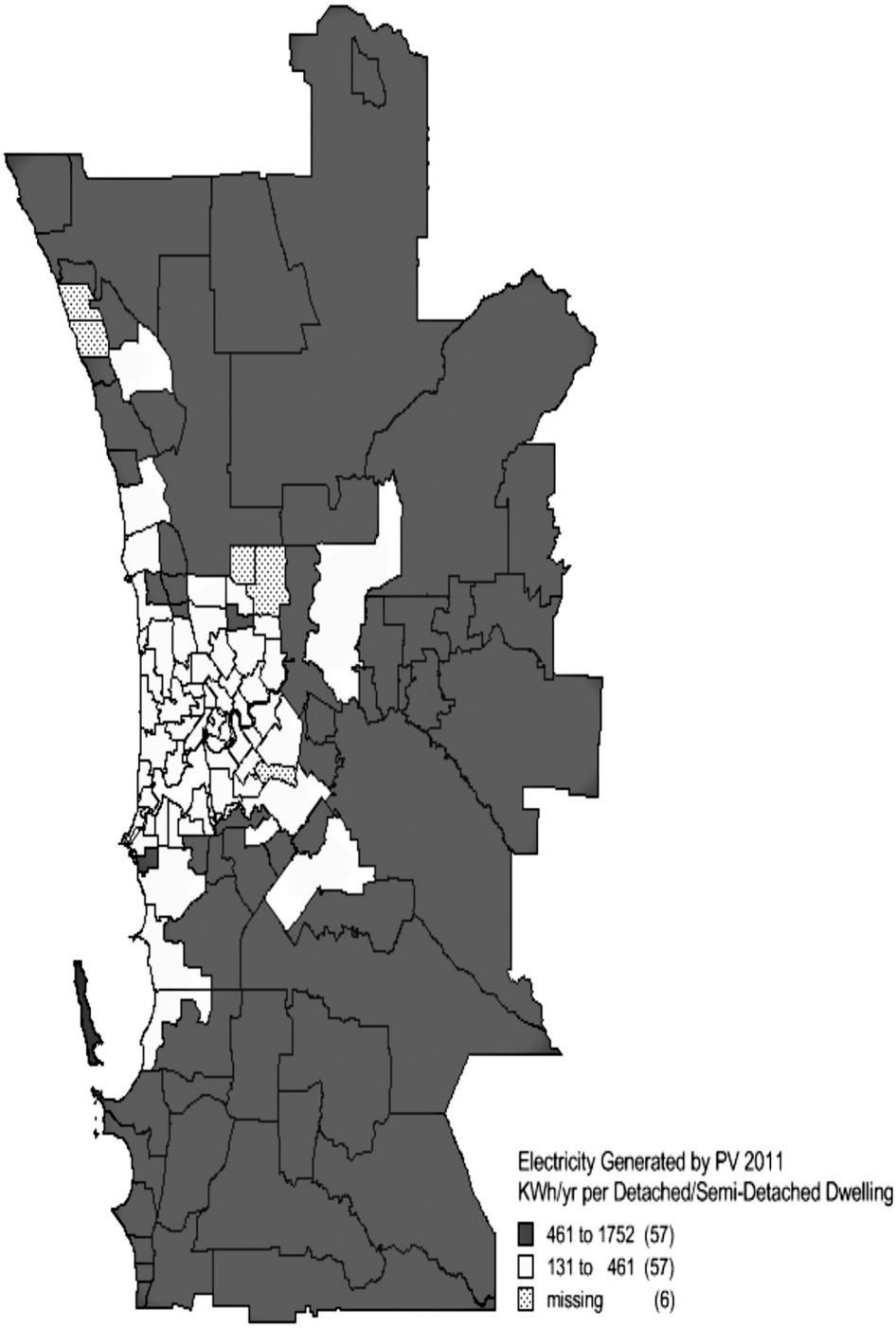

Figure 14.3 Spatial Distribution of PV Systems by Subrban Area in Perth, 2012

Stanley and Barrett (2010) found a similar trend was obvious in Australian cities and that the peak had come at a similar time—2004—and car use per capita at least seemed to be trending down ever since. We have since mapped this in all Australian cities, including small ones where congestion is no issue and relevant graphs and data can be found in Newman and Kenworthy (2011).

Millard-Ball and Schipper (2010) examined the trends in eight industrialized countries that demonstrate what they call "peak travel." They conclude that:

> Despite the substantial cross national differences, one striking commonality emerges: travel activity has reached a plateau in all eight countries in this analysis. The plateau is even more pronounced when considering only private vehicle use, which has declined in recent years in most of the eight countries. . . . Most aggregate energy forecasts and many regional travel demand models are based on the core assumption that travel demand will continue to rise in line with income. As we have shown in the paper, this assumption is one that planners and policy makers should treat with extreme caution. (2010: 16–17)

The Global Cities Database (Kenworthy and Laube 2001, Kenworthy et al. 1999) has been expanding its global reach since the first data were collected in the 1970s. While the 2005/2010 data are yet to be completed the first signs of a decline in car use can be gleaned from previous data and were first recognized by us when it was seen that cities in the developed world grew in car use per capita in the 1960s by 42 percent, in the 1970s by 26 percent, and the 1980s by 23 percent. The new data now show that the period 1995–2005 had a growth in car use per capita of just 5.1 percent, which is consistent with the above data on peak car use (Newman and Kenworthy 2011). The reductions have started after this decade and appear to be continuing (Gargett 2012).

In the 26 cities that comprise the 1995–2005 percentage increase in car VKT per capita, some cities actually declined in this period. Some European cities show this pattern: London has declined 1.2 percent, Stockholm 3.7 percent, Vienna 7.6 percent, Zurich 4.7 percent. In the U.S., Atlanta went down 10.1 percent, Houston 15.2 percent (both from extraordinarily high levels of car use in 1995), Los Angeles declined 2.0 percent and San Francisco 4.8 percent. The acceleration in decline has mostly been since that time.

Peak car use appears to be happening. It is a major historical discontinuity that was largely unpredicted by most urban professionals and academics. So what is causing this to occur?

The Possible Causes of "Peak Car Use"

The following five factors are examined; they all suggest a less automobile-dependent city is emerging.

Hitting the Marchetti wall

As outlined above, the travel time budget matters. Freeways designed to get people quickly around cities have become car parks at peak hours. Travel times have grown to the point where cities based around cars are becoming dysfunctional. As cities have filled with cars the limit to the spread of the city has become more and more apparent with the politics of road rage becoming a bigger part of everyday life and many people just choosing to live closer in.

The trends in relative speeds are shown in Figure 14.4.

The ratio of overall public transit system speed compared to general road traffic has increased from 0.55 to 0.70 between 1960 and 2005, the ratio of rail system speed to general road traffic has gone from rail being slower than cars in 1960 (0.88) to a situation in 2005 where rail was on average faster (1.13). Thus rail has become increasingly more viable as an option in the world's cities. And with it will be a greater emphasis on rail-induced compact land use patterns and a growing move away from freeway-induced land use scatter. The remaining data presented in this chapter supports this.

The automobile city seems to have hit the Marchetti wall.

The growth of public transit

Globally there is a big increase in public transport (Newman et al. 2013). The extraordinary revival of public transit is especially evident in car-dependent Australian and American cities in terms of growth rates (see

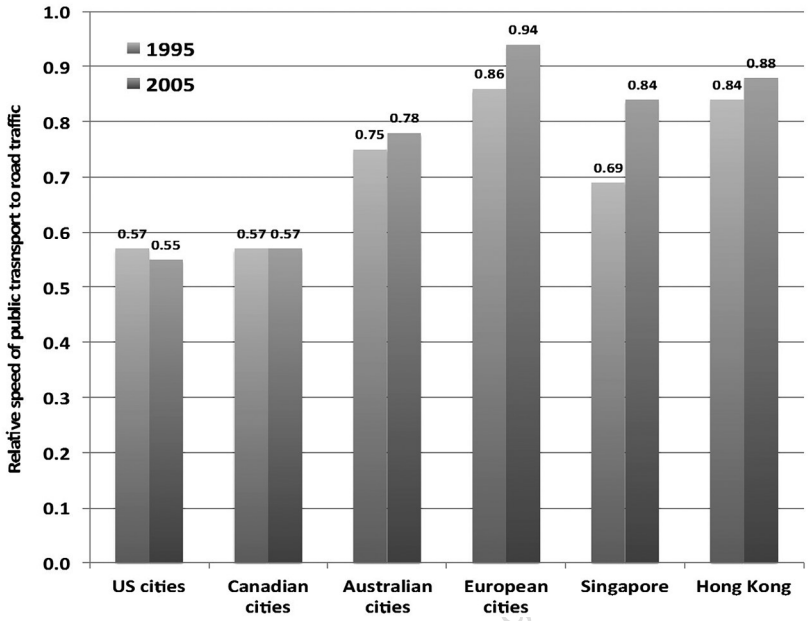

Figure 14.4 Relative speed of public transit to car traffic and rail to car traffic in global cities, 1960 to 2005

Source: Newman, Glazebrook and Kenworthy 2013.

Figure 14.6) but in terms of absolute numbers European and Asian cities continue to lead. This is demonstrated in Figure 14.5.

The growth in public transit was always seen by transport planners as a small part of the transport task and car use growth would continue unabated. However, there is an exponential relationship between car use and public transit use that indicates how significant the impact of public transit can be. By increasing public transit use per capita the use of cars per capita is predicted to go down exponentially. This is the so-called "transit leverage" effect (Neff 1996, Newman et al. 2008). Thus even small increases in public transit can begin to put a large dent in car use growth and eventually will cause it to peak and decline.

The reversal of urban sprawl

The turning back in of cities leads to increases in density rather than the continuing declines that have characterized the growth phase of automobile cities in the past 50 years. The data on density suggest that the peak in decline has occurred and cities are now densifying faster than they are spreading out. Table 14.1 contains data on a sample of cities in Australia, the USA, Canada and Europe showing urban densities from 1960 to 2005 that clearly demonstrate this turning point in the more highly automobile-dependent cities. In the small sample of European cities included in the table, densities are still declining due to *shrinkage* or absolute reductions in population, but the data clearly show the rate of decline in urban density slowing down and almost stabilizing as re-urbanization occurs.

The relationship between density and car use is also exponential as shown previously (Newman and Kenworthy 1989, 1999). If a city begins to slowly increase its density then the impact on car use can be more extensive than expected. The compact city is being rediscovered.

The growth of a culture of urbanism

Commentators are increasingly picking up a renewed interest in living a more urban and less suburban lifestyle (Leinberger 2007, Newman and Newman 2006). Puentes and Tomer (2009) suggest this is not a

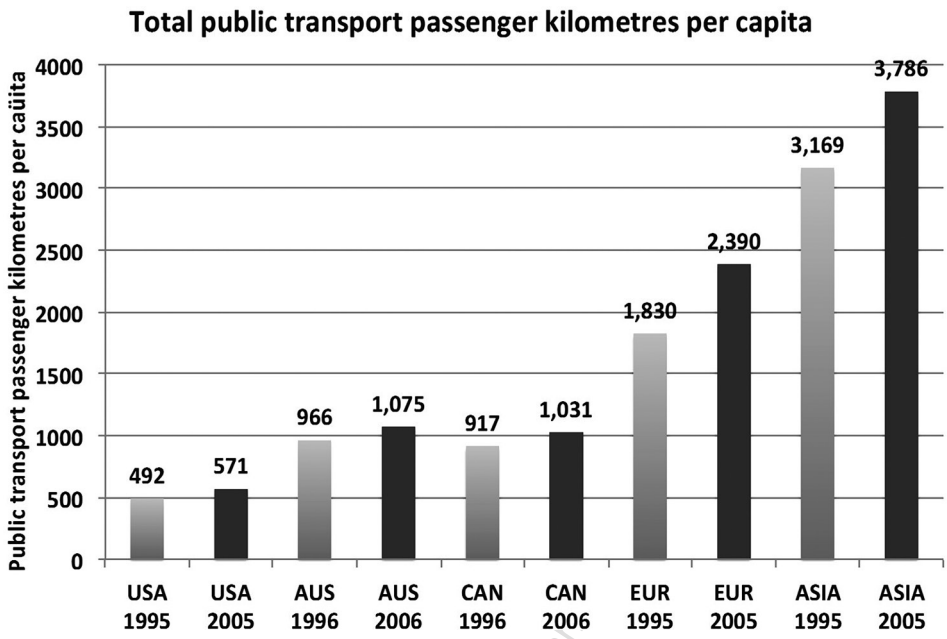

Figure 14.5 Recent strong growth in U.S. public transit use, especially rail
Source: American Public Transportation Association 2013.

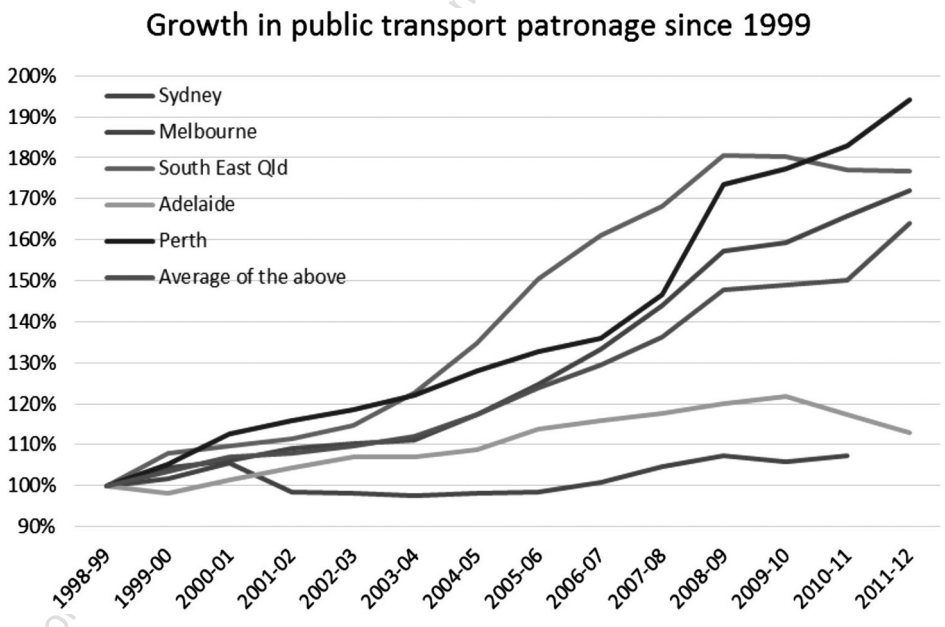

Figure 14.6 Growth in public transit use in Australian cities since 1999
Source: Authors' data compiled from Australian cities' public transit authorities.

Table 14.1 Trends in urban density (persons per ha.) in a sample of U.S., Canadian, Australian and European cities, 1960–2005

	1960	1970	1980	1990	1995	2005
Brisbane	21.0	11.3	10.2	9.8	9.6	9.7
Melbourne	20.3	18.1	16.4	14.9	13.7	15.6
Perth	15.6	12.2	10.8	10.6	10.9	11.3
Sydney	21.3	19.2	17.6	16.8	18.9	19.5
Chicago	24.0	20.3	17.5	16.6	16.8	16.9
Denver	18.6	13.8	11.9	12.8	15.1	14.7
Houston	10.2	12.0	8.9	9.5	8.8	9.6
Los Angeles	22.3	25.0	24.4	23.9	24.1	27.6
New York	22.5	22.6	19.8	19.2	18.0	19.2
Phoenix	8.6	8.6	8.5	10.5	10.4	10.9
San Diego	11.7	12.1	10.8	13.1	14.5	14.6
San Francisco	16.5	16.9	15.5	16.0	20.5	19.8
Vancouver	24.9	21.6	18.4	20.8	21.6	25.2
Frankfurt	87.2	74.6	54.0	47.6	47.6	45.9
Hamburg	68.3	57.5	41.7	39.8	38.4	38.0
Munich	56.6	68.2	56.9	53.6	55.7	55.0
Zürich	60.0	58.3	53.7	47.1	44.3	43.0

Source: Newman and Kenworthy 2011.

fashion but a structural change based on the opportunities that are provided by greater urbanism. The cultural change associated with this urbanism is reflected in many aspects of popular culture, especially the use of mobile digital devices which enables freedom and connection without a car (Florida 2010).

"Footloose jobs," particularly those related to the global economy, can theoretically go anywhere in a city and can make the difference between a viable center or not. However, there is considerable evidence that such jobs are locating in dense centers of activity due to the need for networking and quick "face-to-face" meetings between professionals. High amenity, walking-scale environments are better able to attract such jobs because they offer the kind of environmental quality, livability and diversity that these professionals are seeking.

As Florida (2012) says:

> Economic growth and development, according to several key measures, is higher in metros that are not just dense, but where density is more concentrated. This is true for productivity, measured as economic output per person, as well as both income and wages. (Florida 2012, November 12, 2012)

Other cultural factors seem to now be associating with higher density locations such as social integration, innovation and talent levels. This holds for both the share of college graduates and the share of knowledge, professional, and creative workers (Glaeser 2010). Most citizens who experience car dependence, and have long commutes stuck in traffic, can understand the need for more sustainable options, since they directly feel and bear the economic, social and environmental consequences of car dependence. They want other options provided for them. As cities continue to evolve, the politics of sustainable transport will demand both more livable and less car dependent options for the future.

The rise in fuel prices

The vulnerability of outer suburbs to increasing fuel prices was noted in the first fuel crisis in 1973–74 and in all subsequent fuel crisis periods when fuel price volatility was clearly reflected in real estate values (Fels and Munson 1974, Romanos 1978). The return to "normal" after each crisis led many commentators to believe that the link between fuel and urban form may not be as dramatic as first presented by people like us (Newman and Kenworthy 1989, 1999). However, many commentators now believe that rising oil prices, and the urban forms that compel demand for oil, are the source of financial crises.

Despite the global recession, the twenty-first century has been faced by a consolidation of fuel prices at the upper end of those experienced in the last 50 years of automobile city growth. Most oil commentators including oil companies now admit to the end of the era of cheap oil, even if not fully accepting the peak oil phenomenon (Newman et al. 2009). The compact city is being driven by transport factors outlined above but fuel price volatility and uncertainty will certainly have added to the value in living closer to urban activity.

The Future City

Will these trends continue? The economic drivers can be changed if priorities in infrastructure spending are artificially forced back into funding coal-fired power and freeways. However, this is unlikely as the world is now showing significant economic growth that is decoupling from fossil fuels (ADB 2012). For example Figure 14.7 shows there is now a clear trend emerging to decouple urban GDP from car use.

The future is likely to continue to emerge based around this decoupling process, though some cities are likely to emerge much quicker than others with new green economy systems (Newman et al. 2009, Gehl 2011).

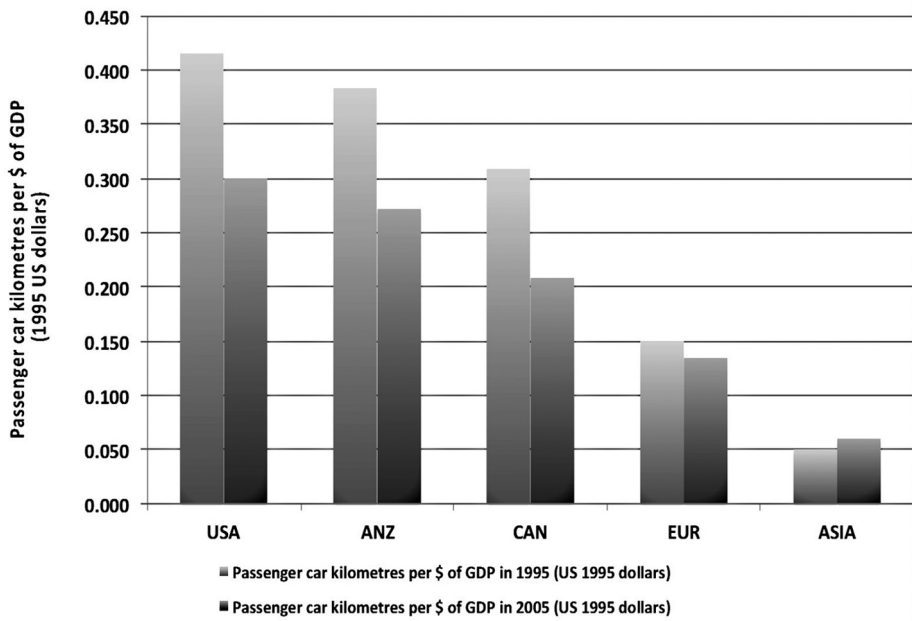

Figure 14.7 The decoupling of urban GDP per capita and car use per capita
Source: Kenworthy 2013.

Mechanisms for Facilitating the Emerging City

Facilitating the emerging renewably based city needs the easing of barriers to the rapid spread of PVs in outer suburbs and to the regulatory barriers preventing distributed power systems in inner areas (Bunning et al. 2013, Rauland and Newman 2011).

Facilitating the more resilient polycentric city with reduced car dependence needs a range of new and old planning tools. Old tools like strategic plans linked to infrastructure plans are essential. Building fast rail out into the automobile city's suburbs has been shown to work very successfully when the speed of public transit is better than the clogged freeways which the trains speed past (McIntosh, Newman and Glazebrook 2013). New tools, such as financing public transit through value capture builds the integration of dense centers into the building of public transit (McIntosh et al. 2013). New digital planning tools for assisting redevelopment, especially in the revitalization of middle suburbs can ensure that automobile city urban fabric is upgraded to provide more resilient outcomes (Glackin et al. 2013, Newton 2012). New forms of governance will be needed that can enable greater regional autonomy and more deliberative, participative processes (Briand and Hartz-Karp 2013, Bunning et al. 2013).

Some new approaches will benefit both the reduction in coal-fired power and the reduction in car dependence. The new techniques of biophilic urbanism with green walls and green roofs, which are appearing in the many compact cities of Asia, are also needed as more compact urban fabric demands new ways of bringing nature into the city (Beatley and Newman 2013, Newman 2013, Newman and Matan 2013). As well, for the car use that does remain, new vehicle technologies such as electric vehicles or plug-in hybrid electrics will provide additional environmental and livability benefits but can be very valuable in assuring a city has adequate storage for its renewable power.

Conclusions

A new kind of city is emerging that represents a combination of old techniques in creating walkable and transit-oriented urban fabric along with new green technologies. The first signs of reduced dependence on coal-fired power are emerging in the patterns of investment in power stations and also in power consumption. The first signs of movement away from car dependence are also now appearing. Only time will tell if these are a truly structural change or a small shift in a longer-term continuation of fossil fuel and automobile dependence over the past century or so. The evidence above suggests it may be a structural change, and that a more sustainable and resilient city may finally be appearing to reduce the impact of fossil fuels and automobile dependence. Tools to help accelerate this phenomenon are also emerging.

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