

Planning and Climate Change Conference

The Relationship of Planning to Climate Change

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1. Introduction

The translation of an international obligation of a climate change treaty such as the Kyoto Protocol into national legislation such as an emissions trading scheme is referred to as a “top down” approach; that is, the legal structures of domestic legislation takes its shape from the higher order obligation under the treaty. This ‘top down’ approach was favoured by the UK Stern Report of 2005 and the Garnaut Report of 2008 in making an emissions trading system the preferred legislative solution in order to address an equitable solution among developed countries, thus fulfilling an international obligation¹.

There are many who have paused and doubted this headlong rush into the acceptance of a national scheme based on emissions trading or a carbon tax to solve the global warming crises². The doubt is because these instruments, to be effective in terms of their theoretical goals of economic efficiency and distributive justice, must apply equally to all countries. As the United States is a major source of greenhouse gas emissions (“GHGE”) but has not signed Kyoto, developing countries such as India and China are not subject to binding

¹ L.A. Stein “The Legal and Economic Bases for an Emissions Trading Scheme” (2009) *Monash Law Review* (in publication).

² See: W. Pizer “Economics versus Climate Change” Discussion Paper, *Resources for the Future*, February 2006 as one example.

emissions reductions under Kyoto, and the technologies to reduce GHGE are not on stream, the theoretical bases are not met.

An individual country need not rely entirely on the mechanisms in Kyoto and in fact developed countries are meant by that accord to supplement the international regime with domestic solutions. Using domestic action in addition to international mechanisms has been referred to as a “bottom up” approach. However, there is no agreement on the form that these bottom up mechanisms should take. A “strawman” assessment³ to come up with ideas from scientists and lawmakers created dozens of possible solutions, for example, a tax to be used for research and development on abatement technologies and automobile emission restrictions. That assessment also suggested a “pledge and review” system where countries and industries would try out new ideas and report about them to a central registry.

The difficulty with most solutions for climate change, be they top down or bottom up approaches, is that they cannot rely upon existing legislative models for implementation and require new legal structures. For instance, an emissions trading scheme or setting GHGE abatement targets for individual industry sectors, all require new frameworks and conceptual thinking.

There is a possible bottom up solution that does not need new structures and contains the theoretical grounding that could fortify their strength as abatement subjects. The combination or synthesis of land use planning and GHGE abatement offers a solution that may be equally or more effective than the use of an emissions trading scheme or a carbon tax.

2. The Relationship of Planning to GHGE Abatement

Land use planning is a system for the spatial allocation of uses of land to accord, ideally, with community aspirations. It is concerned with regulating activities that take place on land in order to separate discordant uses. It is not concerned with activities that take place in the atmosphere or, more importantly, are not

³ Set out in D. Bodansky, E. Diringer, X. Wang “Strawman Elements An Assessment: Possible Approaches To Advancing International Climate Change Efforts” Pew Center on Global Climate Change, February 2005.

local in nature. There is, accordingly, no natural fit between GHGE abatement and land use planning.

Yet vehicle emissions, inefficient energy use, obvious industrial pollution all can be viewed as a local problem that could perhaps be assisted by local control of land use through planning. The UK Stern Report⁴ stated as to land use plans and GHGE:

However, their design and implementation can have important implications for mitigating climate change and also has the potential to influence the resilience to the impacts of climate change, for example, in the management of flood risks or water scarcity.

This statement viewed planning as a participant in GHGE abatement but not as the major driver of abatement; that was left to an emissions trading scheme. This is due to the fact that the Stern Report was specifically an economic analysis of global warming and therefore economic instruments (emissions trading, carbon tax) were the prime methods of abatement and the comments on planning were contained in a section of “other” mitigating possibilities to support his thesis.

There are two questions that Stern left unanswered about planning assisting in abatement. Are the issues relating to GHGE abatement consistent with land use planning? Can land use planning be of equal importance to economic instruments in abating GHGE?

GHGE have a relationship to land use planning in four ways:

1. as a planning externality the amelioration of which is in the public interest;
2. as an aspect of “sustainability” and its key relationship to planning;
3. as an extension of pollution controls;
4. by explicit recognition in policy documents related to planning.

⁴ *Stern Review on the Economics of Climate Change*, HM Treasury, 2006, Part IV, page 384.

Planning Externality

The first manner of incorporation of GHGE issues in planning is that they are an “externality” or consequence of land use; emissions result from the manner in which an activity on an individual parcel of land is conducted.

In all land use issues, the manner in which land is used can result in proximate and remote externalities. The use of the term “externality” here is not a reference to economic externalities but rather, as the term is used in planning, to the effect of the proposed use of land on adjoining parcels of land and on the community more generally. For example, a new high-rise dwelling has a direct, proximate effect on adjoining land in terms of overlooking or shadowing, but also it has a more remote effect such as increased traffic on regional routes from more residents and ensuing car trips.

A proximate or remote externality in planning is conceived of as imposing a cost burden on the developer because it arises from the consequence of the approval or carrying out of the development. If a cost burden by way of a levy or charge were placed on a developer that did not arise from the development itself, it would be considered a form of taxation that requires separate legislative authorisation outside planning legislation. If it is an aspect of the development or, as the term is used, there is a “nexus” with the development, it is considered as a price that the developer must pay for the privilege of receiving permission to develop.

The cost imposed on a developer is that of removing or moderating the externality. The usual forms of imposing a cost are either by requiring a payment of a contribution towards services or alternatively requiring the developer, at its expense, to ameliorate the impact of the proposed use. That amelioration of impact may be achieved by limiting the operation of the use (and thereby requiring a reduction in the intensity of the use) or by expending money to protect the impact from adjoining uses. The attempt in both of these forms is to normalise the externality by private contribution so it does not fall to the public purse.

The externality effect of a development on private land is also extended to public land, such as a wetland or conservation area, and it is here that the link with GHGE may be most relevant. A natural asset such as public or conservation land in planning terms is a “public good” to be enjoyed by the public actively or passively. The public good that is to be protected in planning terms is the enjoyment of the natural asset in a manner that leaves it undisturbed such as, using wetlands as an example, preservation of a functioning habitat corridor or protection of a pristine RAMSAR listed wetland. The amelioration of impact on a public good is accomplished by limiting the operation of the use or by requiring the developer to take steps to preserve the public good such as providing land for a buffer between the development and the natural asset.

In all these instances of ameliorating the impact of a public good by imposing a cost on the developer, it is usually one that is adjoining or suffering an observable and direct impact from the development; a wetland, for example, may be contiguous to a development and its maintenance obvious. The public good of clean air is in one sense contiguous but in another is far removed, as the effect of the pollution is not necessarily localised. In order to embrace the remote consequence of a development where the proximate effect is not germane, it is necessary to take a conceptual step that the preservation of the public good is in the public interest.

The “public interest” in planning is an acknowledgement that private rights must give way to a larger framework, such as a scenic view or the overriding need for a public use such as a hospital that outweighs local amenity issues. It is the very essence of planning⁵ and encompasses all manner of criteria that serve a greater community interest. As a consequence, GHGE or the reduction of impacts from those gases are a matter of public interest and as such appear as an aspect of planning considerations.

⁵ The origins of the concept are discussed in E.R. Alexander, “The Public Interest in Planning: From Legitimation to Substantive Plan Evaluation” *Planning Theory*, 1 (3), 226-249 (2002).

Sustainability

The second link between GHGE and planning is contained within the notion of 'sustainability' that is the contemporary expression of the public interest. A UK Planning Policy Statement⁶ has stated:

Sustainable development is the core principle underpinning planning. At the heart of sustainable development is the simple idea of ensuring a better quality of life for everyone, now and for future generations

The incorporation of sustainable development in a Policy Statement in the UK makes it a "material consideration" in deciding an application for development permission⁷. In Australia, under our system of development control, the New South Wales Land and Environment Court⁸ has found that the sustainability includes the precautionary principle where scientific uncertainty is resolved against the proposal and that this is applicable to GHGE. The Court referred to Principle 4 of the *Rio Declaration* that states:

In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

The Rio Declaration arose from the 1992 United Nations Conference on Environment and Development, also known as the Earth Summit. At this conference, the United Nations Framework Convention for Climate Change was also signed. However, the two are often assumed to be related but are not directly connected as the negotiations for the UNFCCC did not take place at the Earth Summit and followed a different path⁹. Nevertheless, sustainability and abatement of GHGE are now considered to be aspects of the same phenomenon and, as planning is to be carried out sustainably, the inclusion of abatement of GHGE is a necessary consequence.

⁶ Planning Policy Statement 1: Delivering Sustainable Development, Office of the Deputy Prime Minister, London, HMSO, 2005.

⁷ In the UK, see that point made explicitly in: *EC Gransden & Co & Falkbridge Ltd v SoSE and Gillingham BC* (1986) JPL 519.

⁸ The cases are discussed in: *Walker v Minister for Planning* [2007] NSWLEC 741.

⁹ See: E.A. Parson, P.M. Haas, R.M. Levy, "A Summary Of The Major Documents Signed At The Earth Summit And The Global Forum" *Environment*, 34 (4), 12-15, 34-36.

The applicability of the precautionary principle means that the unresolved science of global warming is relevant in planning decisions. This is because there is a natural connection between the principle and the uncertain quality of climate change science. The principle was expressed in the *Rio Declaration* as (Principle 15):

Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

The principle developed historically¹⁰ to deal with the difficulty of detection of pollution where it was not visible yet possibly a significant health risk. The main problem with the principle is that it allows for consideration of speculative, unclear risks because it does not offer a risk-management approach but rather requires precautions arising specifically from uncertainty. There is however a direct fit with climate change where, as the Stern Report illustrated, the gaps in the data are secondary to the evidentiary link between GHGE and global warming. The precautionary principle is thus an overriding framework for all activities that bear on the environment with its origins in the prevention of pollution, and consequently it must take into account issues relating to GHGE. As it is an overriding framework¹¹, it includes an assessment of planning issues and in this way GHGE issues and planning issues dovetail.

GHGE as Pollutant

GHGE emissions are, in terms of an externality, also within the definition of an “air pollutant” and therefore are subject to the historical recognition that matters of pollution are recognised subjects of abatement in planning. The recognition perhaps first occurred in the United Kingdom in the 1970’s¹² in

¹⁰ A full analysis of the history and nature of the principle is in: K.H. Whiteside, *Precautionary Politics: Principle and Practice in Confronting Environmental Risk*, Cambridge, MA, MIT Press, 2006.

¹¹ Chapter 1 of the San Francisco *Environment Code*, 2008, provides for the precautionary principle to be the framework for the operation of the rest of the Municipal Code.

¹² Set out in C. Wood, “Environmental Planning” in B. Cullingworth (ed.) *British Planning: 50 Years of Urban and Regional Planning*, London, Athlone Press, 1996, p.258.

relation to smoke and obvious emissions and since then there has been no question that control of pollution is within the planning agenda. This is because pollution in visible form is an obvious externality of land use and its inclusion is an aspect of passing the cost burden to the developer as a condition of approval.

The issue of whether GHGE are a form of pollution arose in the United States Supreme Court in *Massachusetts v Environmental Protection Agency*¹³ in respect of a statute that referred to “any” air pollutant. It was held that GHGE are within the import of “any.” The reach of planning considerations to include pollution and the inclusion of GHGE within the concept of pollution means that there is little doubt that GHGE are an aspect of consideration in planning decisions.

Explicit Recognition

The fourth connection between GHGE and planning is in respect of explicit connections that have been made. There are two instances that illustrate this connection. A 2007 White Paper in the UK: *Planning for a Sustainable Future*¹⁴, mentioned that the planning process could aid GHGE abatement in this single sentence:

Crucially, planning can help speed up the shift to renewable and low carbon forms of energy

At the same time as the White Paper was being prepared, a draft supplement to Planning Policy Statement 1 on Sustainable Development called “Planning Policy Statement: Planning and Climate Change”¹⁵ was issued. That Statement suggested that that planning could be responsible for abatement of GHGE in terms of assessing the carbon impact of regional strategies; it is a direct acceptance that the elements contained within planning strategies are important in mitigating GHGE. The key to regional spatial strategies was said to be for the local government to:

consider how the region’s activities contribute to climate change and provide a framework for integrating policies for the development and use of land with

¹³ 127 S.Ct. 1438 (2007).

¹⁴ HMSO, CM 7120, May 2007.

¹⁵ HMSO, December 2006.

other policies and programmes that influence the nature of places and how they function

Another example of this direct link is an initiative by the *ICLEI: Local Governments for Sustainability*, an organisation of local governments in the United States taken up most prominently in Massachusetts, mandating local governments to create climate change programs. These programs¹⁶ contain land use recommendations that meld the climate change initiative with zoning issues.

California has created a GHGE statute¹⁷ that requires a state cap on emissions and a plan of action that began in 2009. Most significantly for this discussion, a concomitant Bill¹⁸ seeks to require all transport planning to take into account methods to reduce vehicle emissions, including:

The relationship between land use density and household vehicle ownership and vehicle miles traveled in a way that is consistent with statistical research.

The Bill places emphasis on transportation modelling:

Current planning models and analytical techniques used for making transportation infrastructure decisions and for air quality planning should be able to assess the effects of policy choices, such as residential development patterns, expanded transit service and accessibility, the walkability of communities, and the use of economic incentives and disincentives.

The Bill also provides that each local government shall prepare a “sustainable communities strategy” including the mitigation of GHGE resulting from new development, although it specifically excludes that the strategy would interfere with the zoning ordinances. Finally, it provides that environmental impact statements for significant projects include GHGE information.; an indirect relationship between planning and GHGE thus arises by the inclusion of GHGE

¹⁶ For example, Cambridge Massachusetts, *Climate Protection Plan*, 2002.

¹⁷ California Global Warming Solutions Act of 2006

¹⁸ Senate Bill No. 375. It became law on 30 September 2008.

issues in environmental legislation,¹⁹ which is taken into account in the planning process in respect of reviewable projects.

In all cases, except where the consideration is in respect of obvious emitters, the manner in which planning should encompass GHGE is not clear. Where there is an attempt as in the Planning Policy in the UK and the California Bill, the burden is shifted to other agencies to come up with plans as to how to reduce GHGE in the context of planning. This is because planning is looked at as offering limited possibilities for GHGE compared with economic instruments, such as cap and trade.

2. Abatement as Planning Policy

The most comprehensive attempt to use planning as a means to reduce GHGE is the supplement to the UK *Planning Policy Statement 1* “Planning and Climate Change” and it useful to understand the efficacy of its policies to understand how planning policy might add to the abatement of GHGE.

There is much rhetoric in the Statement about making new development carbon friendly. However, the keys to implementation are not clear. The first statement is that a regional planning strategy employing a spatial plan should:

pay particular attention to the location of major generators of travel, the effect of differing patterns of urban growth on the movement of goods and supply chains and the potential to build into new and existing development more efficient means of energy supply and increasing contributions from renewable and low-carbon energy sources

The inclusion of “location of major generators of travel” is difficult to understand as these uses must be located somewhere and will cause travel no matter where they are placed. Placing them near existing residential areas may in fact cause more problems of traffic congestion on busy roads.

There is no way to understand the effect of “patterns of urban growth on the movement of goods and supply chains.” Freight routes and planning are to do with efficiency lines between rail and supply depots and retail outlets. It is not

¹⁹ As in Washington: State Environmental Policy Act, Chapter 43-21C RCW; in Massachusetts: Massachusetts Environmental Policy Act, MGL Chapter 30.

something that can have as its guiding principles the reduction of GHGE because it would impact on economic issues relating to the cost of goods.

The second strategy is stated to be:

focus substantial new development on locations with good accessibility by means other than the private car and where it can readily and viably draw its energy supply from decentralised energy supply systems based on renewable and low-carbon forms of energy supply, or where there is clear potential for this to be realised;

The desire to focus new development on public transport is consistent with Transport Oriented Design, and will be discussed. Decentralised or distributed energy is a concept that encourages local energy supply through the use of individual solar panels, small scale wind turbines, micro hydro where there is a capture of a source of flowing water, and other technologies to generate heating²⁰. Putting them in the policy has no effect as such.

The only example perhaps of connecting planning policy and distributed energy is in the Ontario *Green Energy Act 2009* that provides that renewable energy projects will be exempt from planning laws.

The next two statements in the policy, without setting out their contents, provide for increased renewable energy, a factor not really part of the planning process and then:

- recognise the potential of, and encourage, those land uses and land management practices that help secure carbon sinks;
- consider the potential for carbon capture and storage, and the need for supporting infrastructure, and help realise this potential;

The location of a particular carbon sink, such as a forest or patches of open space cannot be analysed in terms of effectiveness²¹. To what extent, for instance, does

²⁰ A summary can be found in: K. McCormick, et al, "An Overview of Development in Distributed Energy with Country, State and City Examples in the EU and USA" *Victorian Eco-Innovation Lab (VEIL) Distributed Systems Briefing paper No. 1*, Melbourne, 2008.

²¹ J. G. van Mitten, et al, "Quantifying the effectiveness of climate change mitigation through forest plantations and carbon sequestration with an integrated land-use model" *Carbon Balance and Management* 2008, 3:3.

a public park reduce GHGE?²² The potential for carbon capture and storage is again not a factor of allocation of uses through the planning process but of finding suitable areas for sequestration when that technology is proved effective.

The problems faced with the Statement and the use of planning policy in respect of abatement of GHGE are that planning theory is primarily concerned with spatial design, the separation of land uses and efficiencies that can be achieved in that process. When GHGE are added to this theory, it is possible that the tool of spatial design by means of transport planning or manipulation of the uses of land to aid GHGE abatement can be seen as the benefits that can be delivered, as will be discussed. However, introducing the entire GHGE agenda in planning policy may have no practical benefit and could be confusing to an applicant for development permission.

3. Planning Solutions for GHG Abatement

Historical Setting

When planning is examined for content that can yield GHGE abatement, it is generally thought to have effect in three areas. First, there is the increased efficiency of dwellings in terms of reduced energy consumption. Secondly, by a planning process that reduces the number of vehicle trips by, as one example, “transport oriented design” where density is clustered around public transport nodes. Thirdly, by control of specific development such as factories that will emit GHGE.

Historically, planning is not oriented towards the use of any of these methods. The origin of planning controls is, in part, founded on the need to separate incompatible uses by establishing zones for the aggregation of related uses and prohibiting uses that are incompatible. Accordingly, by its very nature, zoning separated out commercial and industrial uses from residential uses and created the need to increase vehicle trips to work. As a result planning, in its historical contact, did not tend naturally to reduce vehicle trips. As well, building efficiency

²² M.U.F. Kirschbaum, “Can Trees Buy Time? An Assessment of the Role of Vegetation Sinks as Part of the Global Carbon Cycle” *Climate Change*, Volume 58, Numbers 1-2 / May, 2003.

was never seen as an aspect of land use planning but was the subject matter of another regime of building controls; in Australia, that regime is related to the *Building Code of Australia*.

The idea of diverse communities with mixed commercial and residential uses is a concept dating back to the work of Jane Jacobs in “The Death and Life of Great American Cities” that postulated that vibrancy in a community depends on interactions between residents that is achieved when commercial and residential uses are mixed. Jacobs was not concerned with vehicle emissions but her theory was one of those that appealed naturally to the experience of vibrant cities such as New York and Paris. It has never ignited as a concept in Australia as it was in opposition to the different values of a quarter acre block and centralised shopping; it has received only lip service in expressions of “smart growth” or “liveable neighbourhoods” but is not a fundamental aspect of planning in this country.

Building Efficiency

The concept behind building efficiency as a form of abatement is that buildings emit GHG because of design imperfections that can be improved to prevent energy wastage and that will require less output from power stations. Building efficiency is proffered as a means of GHGE abatement even though there are only speculative projections about the degree of savings.

The degree of GHGE abatement arising from building efficiency is not known for several reasons²³. The main reason is that efficiency measures only apply to new buildings or those that are subject to extensive renovation and not existing stock, meaning the overall effect cannot be clearly evaluated. Another reason is that attempts to alleviate demand for electricity by “demand management” programs have not proven successful because consumer behaviour is independent of these programs. The most significant reason could be that the efficiency of buildings will not necessarily lead to lower demand for electricity because if the cost of

²³ This is analysed in: J. Taylor, “Energy Efficiency: No Silver Bullet for Global Warming” *Policy Analysis*, 356, 1999, pp. 10-12.

using electricity is reduced by efficient technology, it may prompt increased usage.

The possible effect of efficiency is seen, however, as beneficial even though the precise effect is not known²⁴. This is because modelling of efficiency measures is possible so that it can be concluded that energy consumption can be reduced theoretically by efficiency and therefore it can, again theoretically, be calculated how the demand for energy can be reduced.

An example of the modelling of building efficiency is the “DOE-2,” a computer program for building energy analysis, which can break down and analyse the efficiency of every building component such as, for instance, the effect of the thickness, order and type of materials, and orientation of exterior walls and roofs. Ten thousand runs of the program created the “ASHRAE-90.2” standard that is used in the US²⁵ for efficiency measures for low rise residential buildings. The US Green Building Council developed the “Leadership in Energy and Environmental Design” that provides a rating system based on this standard for the evaluation of energy performance. The efficiency modelled by the program is also analysed according to “time-dependent valuation” that examines the cost effectiveness of measures having regard to different times of day, different seasons, and resultant energy usage.

The essence of residential efficiency is the ability to retain warmth and cooling to be able to reduce the use of heating and air conditioning that draws power. Ideally, the building will be air tight, insulated, and all electrical equipment will have efficient operation and run for less time. Voluntary reductions beyond that may not take place for a variety of reasons: consumer confusion about GHGE, mortgage lending practices that treat energy savings as just another cost, income levels that make reductions less attractive to some, and a doubt as the relative worth of energy efficiency in relation to its costs. Attempts at using

²⁴ As stated in the California EPA, Climate Action Team, *Proposed Early Actions to Mitigate Climate Change, Draft for Public Review*, 2008, p.4.

²⁵ For other jurisdictions, see: Australian Building Codes Board, *International Survey of Building Energy Codes*, 2000. See more recently in Australia “Draft 2010 Building Code of Australia.”

“programmable communicating thermostats” that provide wireless signals and can be controlled centrally have been less than popular.

Commercial activities require a wide variety of building types, making a single code of building efficiency difficult. As well, the energy “load” varies according to the specific use made of buildings elements such as lighting, heating, refrigeration, air conditioning, as well as hours of operation, and work efficiency. The industrial sector, the most obvious emitters, can make improvements in building use such as, to take one example, downsizing the motors used to match the load. Individual solutions by industry can be offered, such as improved water removing techniques in a pulp mill.

These building efficiency concepts are not really planning solutions in that they are concerned with building and use efficiency and not the nature of the use or the creation of a spatial plan or a plan shaping a community that somehow, by its sophistication, reduces GHGE. They are mechanical solutions that are directed to reducing energy consumption and are thus useful in the desire to reduce GHGE. However, they can be included in the planning regime as shown by the UK Planning and Energy Act 2008 that provides:²⁶

- A local planning authority in England may in their development plan documents... include policies imposing reasonable requirements for:
- a) a proportion of energy used in development in their area to be energy from renewable sources in the locality of the development;
 - b) a proportion of energy used in development in their area to be low carbon energy from sources in the locality of the development;
 - (c) development in their area to comply with energy efficiency standards that exceed the energy requirements of building regulations.

Transportation Planning

Planning is the means of control of the use of land in order to effectuate a plan that is the summation and the essence of community goals for a better life.

Planning laws carry out the plan by aggregating uses in a defined area or zone, by indicating which particular uses can be carried out in that zone, and in countries outside the United States and Canada, requiring the developer to obtain permission to develop the land or change the use.

²⁶ Section 1(1).

If one of the goals of the plan is the reduction of GHGE, planning appears to offer little by the usual devices of segregating uses through zoning and separating out discordant uses. However, with GHGE in mind, planning can address abatement by allocating uses in a manner that reduces vehicle trips and therefore results in a decrease in vehicle emissions. This is the essential way that planning can aid GHGE abatement.

Vehicle emissions are a significant source of GHGE; for instance, in 2005 in the EU they accounted for 21% of all GHGE²⁷ and in Australia they account for 13.5%²⁸. Planning might assist in a reduction of vehicle emissions if it could, somehow, by the placement of uses reduce the number of trips to work, the distance travelled for work, non-work related excursions, and freight journeys.

A recent study by the US National Research Council²⁹ found that one clear consequence of planning on GHGE would be more compact development that reduces the number of trips by 5% to 12% and cuts fuel use and thus GHGE. It was postulated that if 75% of new development were made more compact, there would be a 7% to 8% decline in GHGE by 2050.

Reduction of vehicle trips can occur in four ways in the planning process that may serve to ameliorate GHGE. The first is "Transport Oriented Design," (TOD) a concept that suggests increasing density of housing near public transportation nodes, thus reducing the use of cars that constitute a substantial portion of vehicle emissions³⁰. The second, often working with TOD, is the planning for mixed-use areas that include local services and commercial uses joined with residential uses, shortening the need for shopping trips. The third is, in the absence of or in conjunction with TOD, to use transport demand modelling to optimise the transportation options for new communities, and the fourth is

²⁷ European Environment Agency, *Greenhouse Gas Emissions Trends 2007*, Report No. 5/2007, p.78.

²⁸<http://www.environment.gov.au/settlements/transport/fuelguide/environment.html>

²⁹ Transportation Research Board, *Special Report 298: Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO₂ Emissions*, Washington DC, 2009.

³⁰ The Garnaut Climate Change Review found that cars and motorcycles accounted for 53% of vehicle emissions.

designing new communities to provide for desired destinations within walking distance.

These GHGE abatement goals run counter to the underlying themes that underlie the planning process. The traditional concept behind zoning is to maintain property values by high-worth residential areas that do not have commercial intrusions or high density. As a consequence, the separation of commercial uses from low-density residential uses is a precept of zoning. If an area is zoned for a use more intense than single family residential use, it is said there is a “down zoning.”

It is partially for this reason but also for economy of scale for developers that retail shopping policy concentrates commercial uses, such as big box shopping centres, in a single area that requires access by road. The economic justification for centrality of shopping is that concentration of compatible uses will be beneficial overall for all shops and that there is a single destination that provides convenience and recognition for consumers. Concentration of uses is also consistent with the provision of services as an aspect of “central place theory” that postulates that a central location for services can best serve regions and shopping centre size can be adjusted to population.

Mixed-use development is not consistent with the Australian planning ethos. The theoretical underpinning for mixed uses has always been that boring, homogeneous areas are anathema to the social life of a community. However, the desire for mixed uses is rarely found in suburban areas because the purpose of zoning to maintain property values and the rateable base are reasons that are difficult to expunge. Where there have been changes, it is usually as part of the cultural life of an existing urban area where compatible uses are seen as adding vibrancy to the metropolitan fabric. However, as a means to change existing suburbs by reducing the number of trips, mixing uses it is not likely to be a prime tool of GHGE abatement.

The main method suggested for reducing trips to work is the adoption of TOD: concentrating residential density at public transport routes, thus theoretically drawing commuters from the use of private vehicles. Although the exact

contribution of TOD to reduction of GHGE cannot be calculated for an individual site, it is clear that increasing density without access to public transportation would result in a greater number of trips than providing public transport convenience.

Transit oriented design can take many shapes³¹ from increasing densities around existing public transit nodes, creating a specific project in respect of a new area, using light rail or bus extensions for distribution of density, providing permissive zonings in areas near transit but with no specific projects, and other attempts to move development closer to nodes. A variant of TOD is to take advantage of density along travel routes rather than concentrate major density at transport nodes. For example, in Marin County, California, the “Marin Plan” that is highly cognisant in its contents of GHGE provides specifically that the area along US Highway 101, already developed, be the focus for future development by this mandate³²:

Concentrate urban development in the City-Centered Corridor, where infrastructure and facilities can be made available most efficiently.

Setting aside an area for increased density near a transportation route or node does not assure it will necessarily be used in that way as development opportunity is primarily a business decision. If an area is zoned for increased density the land values rise immediately and for a developer to locate a new project in that area means that profits will be diminished because the cost of land acquisition is higher. It is only when development options are restricted elsewhere that developers are forced into one location because large development companies must continue to make investments and must take up any decent opportunity even if there is a low return.

³¹ A comprehensive survey is to be found in Transit Cooperative Research Program, Report 102 “Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects,” Transportation Research Board, Washington DC, 2004.

³² *Marin Countywide Plan* Policy CD-1.1, November 2007.

In one of the few studies³³ analysing developer and community reactions to higher densities in Vancouver, British Columbia, it was found that as local authorities required the developer to obtain a permit to increase density this discouraged development as it required developers to make a large initial expenditure to prove the project. The community, when faced with increased density, became concerned with design issues and the perceived loss of lifestyle and sense of cohesion and therefore provided opposition, discouraging small developers from taking up the options. The consequence is that there is not necessarily an immediate take up of higher density opportunities because of these barriers.

TOD has the effect of reducing vehicle trips and is a clear, positive step to reduce emissions. In the case of existing communities, the increase in density near transport nodes is obvious. However, the most important connection between planning and emissions is in respect of new suburban communities on the urban fringe in which Transport Oriented Design may not be appropriate. A submission³⁴ by the Land Use Subgroup of the California Climate Action Team, a multi agency group set up to provide recommendations to the California Air Resources Board, analysed “urban sprawl” as the land use factor that has most led to vehicle emissions forming, in California’s case, 30% of GHG in 2004. The underlying reason was that population increase drove the distribution of that population into new communities away from urban centres with link roads back to urban amenities and other new communities, as well as separation from employment opportunities. All of these lead directly to increased vehicle trips and emissions.

It would seem that there should be public transport options built into the planning in the establishment of new communities. How to accomplish this is another issue that is not easily resolved. The planning process and the provision of new infrastructure, such as new rail lines, are not directly linked. “Super”

³³ Coriolis Consulting Group, *Increased Housing Density in Single Detached Neighbourhoods*, December 2007 prepared for Metro Vancouver and Ministry of Community Services, British Columbia.

³⁴ LUSCAT Submission to CARB Scoping Plan on Local Government, Land Use and Transportation, May 5, 2008 (draft).

ministries such as the Victorian Department of Planning and Infrastructure, where the two are joined administratively, have appeared to be the answer. However, the infrastructure spending is a *response* to a regional plan as the planning is done according to land that is available for new housing in the hope that infrastructure will follow. The link is made after the plan as with “Connect SEQ 2031: An Integrated Regional Transport Plan for South East Queensland” that amended the previous transport plan to accord with the completion of the South East Queensland Regional Plan 2009-2031. The problem is that the regional plan or metropolitan strategy only dictates areas that may be developed after a master plan is completed by a developer so the actual location of new communities is not fixed but only suggested. As well, budgets for large infrastructure agencies, such as for roads and hospitals, get fixed in the interim and the money to complete transportation nodes for new development is not always there when the time comes, shifting the burden to developer contributions. A good example of this is the New South Wales *State Infrastructure Plan* of 2002 that no longer has any bearing on the planning process but is still used to orient agencies on expenditures.³⁵

When an analysis is made of transport requirements for new Greenfield areas that are not concentrated on public transport nodes. The method by which transportation solutions are optimised is through “transport demand models” that calculate the manner in which people travel and therefore the infrastructure necessary to meet that demand. The fundamentals of all models are the same: the origin of trips is stated and then the distribution of possible trips is determined, the available modes of transport are analysed and the number of trips is calculated. These transport demand models do not address GHGE but are based on economic efficiency of infrastructure expenditure thus theoretically sharpening the transportation options to reduce trips. However, they cannot be worked too hard as the fact of distance to work and facilities are a consequence of establishing new communities. Accordingly, a California legislative Bill to link

³⁵ See the analysis in R. Bunker, “A Plenitude, Plethora or Plague of Plans? State Strategic Plans, Metropolitan Strategies and Infrastructure Plans” (2008) 34(3) *Built Environment* 319-332.

planning to GHGE, stated that what is required is more of a sentiment: “alternative development patterns or additional transportation measures³⁶.”

It is the case that some degree of GHGE abatement can occur by optimising the transport options available to new communities and in the building of infrastructure with a substantial focus on the GHGE agenda. This is accomplished theoretically by the use of transportation models that can calculate the GHGE scenarios presented by different options. More general models³⁷ for the calculation of transport options existed before GHGE issues and were made relevant to GHGE effects because they allow in their formulation for pollutants. These general models are necessary because the issue in transport modelling is not just vehicle emissions but also the potential for future fuel efficiency, impacts of increased use of diesel and other variables.

The combination of these factors: decreasing distance between services and residential development, refining transportation options having regard to GHGE and also employing New Urbanism tools of walkable neighbourhoods and integrated services in new communities is given the name of “smart growth.” This strong belief that vehicle trips can be reduced by effective planning will slowly begin to be part of the planning process so that projects that accord with smart growth will be given precedence over those that ignore such issues.

4. Specific GHG emitters

Planning has another role to play in GHGE abatement that can have a more immediate effect. Planning is also a regulatory system that requires permission to undertake development. In all parts of the world, except the United States and

³⁶ Senate Bill No. 375, page 12.

³⁷ Some of the main models are summarized in: D. Chien, “US Transportation Models Forecasting Greenhouse Gas Emissions: An Evaluation from a User’s Perspective” *Journal of Transportation and Statistics*, 8(2), 2005.

Canada, a system of development control is used where all development must obtain approval prior to its commencement. In the United States, a zoning system is used that provides for development commencing if it is consistent with the plan but yet that system has introduced as system of “special permits” that can accomplish the same result.

This discretionary allocation of land use is the primary means by which planning can take into account GHGE abatement because at the time of making an application to commence a development, the GHGE implications of a specific use may be analysed.

To analyse GHG consequences for all uses would be impossible. Stern was content to go after “obvious” emitters and in the same way, planning can identify the targets that are important. A starting point is that such uses are most clearly identified in legislation required as a participant in the Kyoto Protocol to compel reporting of GHG levels that is accomplished by domestic legislation requiring industries to report their GHG if they are over a certain level of emissions³⁸.

Having identified the possible targets, the question is how to gauge the abatement that is possible. Signatories of Kyoto have accepted GHG abatement targets on the basis of a national total. It is not possible to say to an industry that is seeking a development permit that it must accord with this total as its contribution is unclear. As well, it is not possible to merely say that there must be a reduction when the effect cannot be measured. It is possible to require a wholesale abatement but the requirement is meaningless without some idea, even if not precise, of the contributory effect of the industry at a particular location.

The UK Planning Policy No. 1 speaks of each region establishing GHG trajectories having regard to the emission carbon rate for new dwellings and commercial buildings, the expected energy reduction from building efficiency measures, the possible use of renewable energy technology and the transport energy demand

³⁸ For example, see threshold levels that require reporting in the Australian legislation: Section 13 *National Greenhouse and Energy Reporting Act 2007* (Cwth).

of new developments. This leads to planning documents that in turn are relevant for determining planning applications. It is not suggested that developments be conditioned to cut a certain percentage of GHG but rather the consistency of the proposal with a policy based on regional assessment of GHG abatement will be relevant.

The system of development control is in place in most countries of the world, meaning that no new mechanism need be established, such as an emission trading system requires. Most buildings at one time or another, because of renovations or changes of use require permission, bringing the housing and commercial stock into consideration. The UK Statement is defective in terms of proposing goals that are easily expressed but difficult to deliver. However, the combination of regional assessment of GHG trajectories with planning goals brings the two closer together and makes for a useful filter for development applications to abate GHG.