

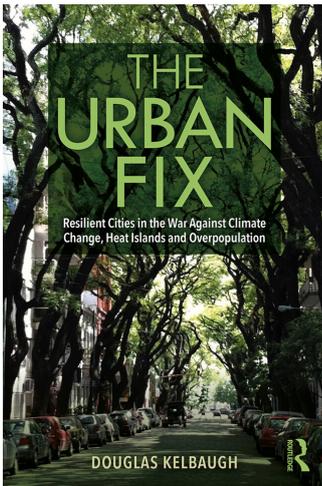
ROUTLEDGE ■ TAYLOR & FRANCIS

Green and Sustainable Planning

Discover how the thoughtful planning and design of spaces can prioritize sustainability and help tackle climate change



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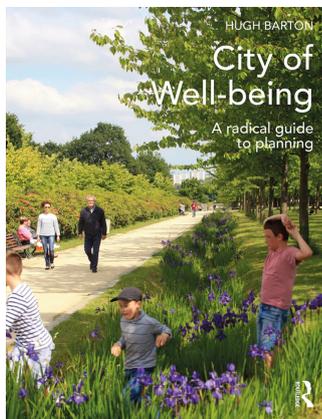
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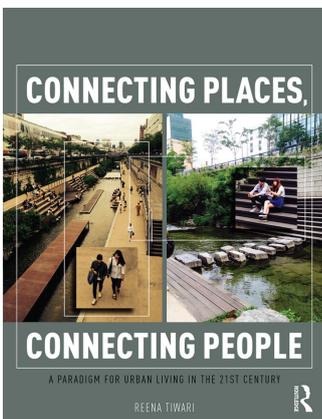
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Time to Act

We are compelled to act on CC for many reasons. Our own survival certainly compels us, but there is also the moral imperative to protect fellow humans and other species. In the words of Danish architect Bjarke Ingels, “Sustainability can’t be like some sort of moral sacrifice or political dilemma or a philanthropical cause. It has to be a design challenge.” CC is also moral movement that demands activism.¹ Ironically, the most effective way to act often is to change our fixations. “So many aspects of life depend on fossil fuels, except for music and love and education and happiness. These things, which hardly use fossil fuels, are what we must focus on.”² It’s true that these and other such positive foci and activities will tend to diminish our febrile consumption of energy and resources. Often an indirect angle is more effective and enabling than mounting an outright, frontal assault. A middle way that balances both active and passive action is often superior, as Buddhists and other spiritual traditions seek to embody and promote. We need to keep it powerfully simple and straightforward.

After a century of urban confusion, of wrongly placed energy, of seduction by over complicated technology, it’s time to clean up. To return to a spirit of *mater atrium necessitas* – necessity is the mother of invention. We need to act in order to save our cities – and us – from ourselves. To fix a century of broken with a tool that fixes.³

And because there’s

no crowned, vengeful Nature frowning in judgment. We have an awesome responsibility that we have to approach with humility and caution. We should preserve whatever we can, but we also have to grow up . . . Basically, it’s a you-break-it-you-own-it situation, and we broke it.⁴

Before advocating specific ways forward, here’s a short review of what typically motivates people to change their behavior and ultimately the status quo. A case could be made that the best, most effective and non-manipulative way to promote sustained behavior change is to provide

information about the problem and how it can be addressed. An understandable menu of reasonable steps to taking meaningful action is plainly helpful. It needs to resonate with people on an emotional level and in a practical way, mobilizing a *desire* to do something about it, rather than mandating a plan. Bertrand Russell pointed out in his 1950 Nobel Prize acceptance speech that all human activity is prompted by desire, and points to four of them – acquisitiveness, rivalry, vanity and love of power. The last one, power, he claims to be infinite, although the other three also seem quite unquenchable.

There are other axes in what seems to be a limited number of basic human drivers of behavior and its modification. Pleasure and love, fear and anxiety, and guilt and remorse certainly figure among the leading ones. Sometimes called carrots, sticks and hot potatoes, these three pairs need to be briefly parsed. Pleasure includes an especially wide range of feelings, from enjoyment and satisfaction, delight, amusement to comfort, beauty, fun, novelty and love. Fear focuses on worry about the dire consequences of our thoughts and actions, from angst, anxiety and awe to distress, nightmare and panic. And guilt is a complex emotion that includes remorse, self-blame and disgrace that sometimes begets repentance and reform. It has arguably been a central motivating factor in the social construction of modern Western civilization. The Catholic, Protestant and Jewish religions have flourished for 2,000 years or longer by promising redemption from the guilt of sin, which they believe is an unavoidable aspect of the human condition. In Alan Lightman's words "being connected to something larger than ourselves, to feeling some unseen order or truth in the world" may be the most powerful evidence of a spiritual realm.⁵

Last, as noted in the first chapter, love is arguably the greatest human motivator. It includes love of self, or self-interest, which most often induces behavioral change, as opposed to self-sacrifice. We have an altruistic and a selfish gene, with a wide spectrum in between. It is important to underscore that emotions and feelings lead to actions; facts and figures can startle and open eyes and minds, but gut instincts more often drive action. There are other, less dramatic emotions and feelings that also move us to act: freedom, safety, comfort, health and both physical and psychological security. These tend to form the wide base of Maslow's hierarchy of needs pyramid, with the issues of social conformity, respect and self-actualization higher on the pyramid.

And there are the perennial pocketbook issues. They seem important to rich and poor consumers alike when it comes to their own money – regardless of whether they are for fiscal restraint or heavy spending in government. For a relative instance, one of the first domestic financial issues is rising insurance rates in areas threatened by sea level rise, such as Miami Beach. For better or worse and whether premature or timely, sudden and steep rate increases could bring on real estate panic that could

precipitate a mass sell-off.⁶ The right economic policies and incentives can push and pull individuals and organizations to allow self-interest to be in the best collective interest of society and the earth.

There is no doubt in this capitalistic age of *homo economicus* that maximizing economic gain – both savings for consumers and profits for producers – is a commonplace if not universal driver. CC and UHIs will have an increasingly major economic impact, which will vary from climate to climate. In the U.S. the most grievous cost

will come from a projected increase in heat wave deaths . . . Higher temperatures could also lead to steep increases in energy costs in parts of the country, as utilities may need to overbuild their grids to compensate for heavier air-conditioning use in hot months. Labor productivity in many regions is projected to suffer, especially for outdoor workers in sweltering summer heat. And higher sea levels along the coasts would make flooding from future hurricanes far more destructive.⁷

It will not be pretty as these changes unfold.

It's painfully obvious how great the economic impacts of CC will grow to be at the global scale over the next decades. What's harder to gauge is how the hotter temperatures will affect people on the ground.

“No one lives at the national level – people live at the local level,” says Bob Kopp, a climate scientist at Rutgers University-New Brunswick . . . “If you look at the impacts at too aggregated a scale, you miss a lot of the story” . . . In a paper published in *Science* (July, 2017), they . . . found a huge discrepancy in the effects of climate change on economic activity depending on where people live.⁸

The ten authors examined impacts in the U.S., such as heat- and cold-related deaths, the ability of people to work in the heat, crop yields, energy demand, coastal storms and crime. While some areas in the far north and parts of the Rockies, may be spared net harm – or may even benefit from modestly higher temperatures – areas in the south are especially likely to experience economic harm.

There will be a net transfer of wealth from the south to the north, and from poorer to wealthier people, which has multiple political repercussions. The Southeast U.S. could see economic losses of 25 percent or more. The losses are almost entirely driven by increases in temperature, the researchers found. Areas like northern Michigan and Maine could benefit from GDP bumps of 10 percent or more, due to fewer cold-weather deaths, lower energy costs and longer growing seasons. Despite fallout from high-profile weather events such as Hurricanes Harvey and Irma, those hardships pale in comparison to the effects of excess heat

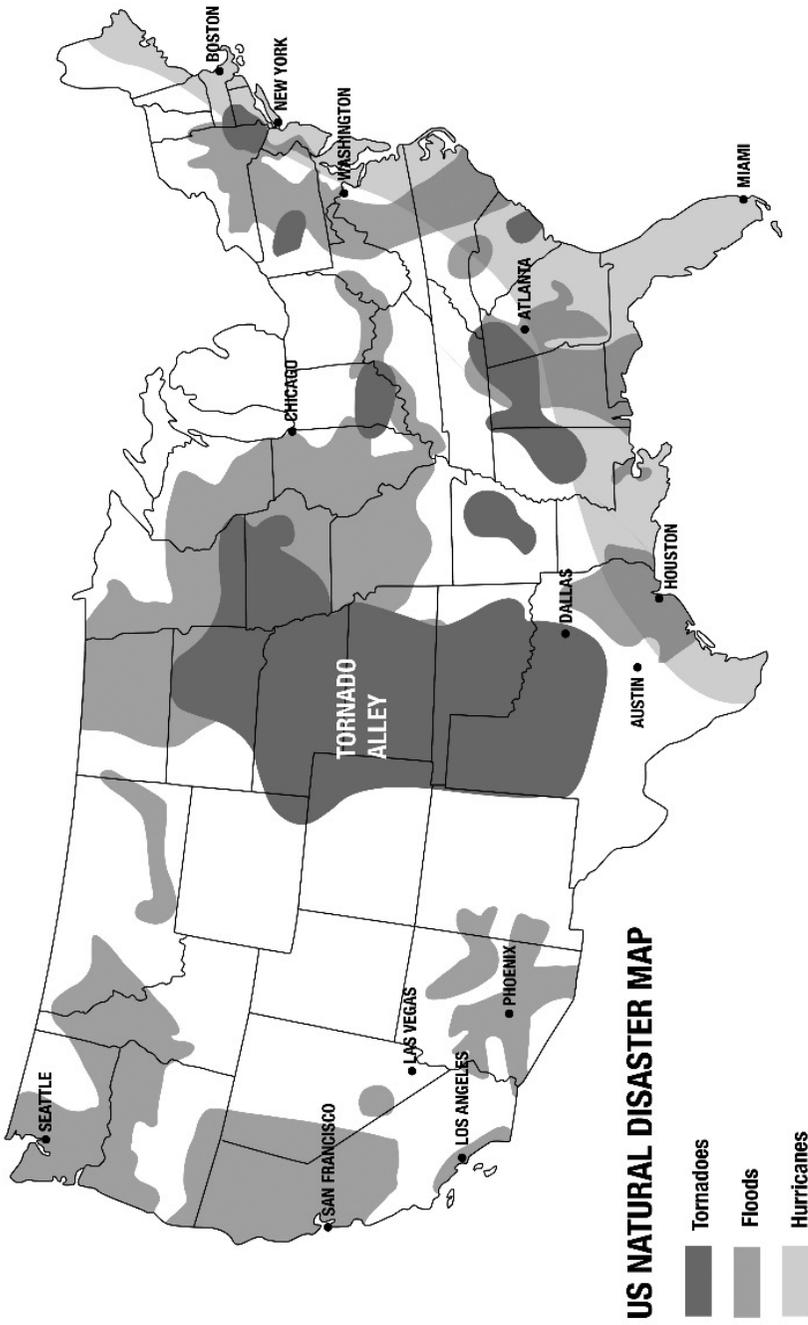


Figure 9.1 Nearly the entire U.S. – rich and poor, prepared and not prepared – is subject to one or more risks, which are increasing in frequency and intensity. Increasing scientific evidence corroborates that floods, hurricanes and tornadoes are amplified by CC (Red Cross.org, NOAA.gov; image redrawn by author)

at a national scale. One of the study's authors states "The silent killer is the increase in temperature,' explaining that hotter temperatures will cause crops to wither, violent crime to increase, and people to die from heat exposure."⁹ This dire prognosis is a vivid reminder of how game-changing extreme heat is, especially in cities.

People can feel conflicted by the push and the pull of contradictory emotional and personal economic issues. Conflicting impulses in the face of menacing information can render people indecisive or irrational, like those who ignore evacuation orders in extreme weather events. Upton Sinclair once insightfully penned "It is difficult to get a man to understand something when his salary depends on his not understanding it."¹⁰ People can be illogical and inconsistent about pocketbook issues. The U.S. federal government estimates the combined social cost of carbon pollution from a typical household's electricity consumption is about \$20 per month. A national poll found that over 40 percent of Americans were unwilling to pay an additional \$1 per month in their electricity bill to combat CC, and almost 30 percent of respondents said they'd be willing to pay that much or more.¹¹ That response is despite the fact that 77 percent said they think CC is happening. On the other hand, in China

an innovative analysis . . . examined how much consumers were willing to pay for cleaner air through their buying habits of air purifiers. The study's analysis suggests that residents of northern China would be willing to pay about \$491 over five years to bring their air quality in line with national standards.¹²

On the personal axis, *patience*—something the fast-pace of city-dwelling can deplete—will be needed more than ever. Interpersonal conflict—resulting in mental breakdown, injury and even death—is likely to increase exponentially with CC. High urban temperatures, jacked higher by UHIs, are exacerbating the link between heat and physical strife. Terms like "hot-tempered," "hotheaded," "hot under the collar" and "hot-blooded" illustrate the general perception that there is a link between temperature and violence. Common sense tells us that the increase in temperatures will lead to more violence—interpersonal and intergroup, and even intrapersonal, with more suicides. There's evidence that even people used to living in very hot climates will not necessarily have more patience with each other and themselves as ambient temperatures and/or humidity rise. Writers like Charles Mann and Steven Pinker have made a compelling case that human-on-human physical violence has fallen very dramatically. Up to 25 percent of males in hunter-gatherer and tribal societies died violently, or roughly 500 times Europe's current rate.¹³ Is this long-term positive trend now jeopardized by more stifling and irritating islands and waves of extreme heat in cities?

Such change will require vast reserves of *both patience and compassion*. As Jonathan Rose also points out, compassion is a necessary ingredient in dealing with these human challenges. Even the most egalitarian, generous and democratic societies have underlying social, racial and economic injustices and unrest, most of which seem to be a constant in the human condition. And there's the sheer poverty of countless people on the planet, including an increasing global cohort of urban dwellers. We can't forget the mental and physical pain and suffering that accompanies the raw lack of decent housing, infrastructure, health care and services that is endemic for over a billion residents of informal settlements throughout the Global South. Indeed, "the huge scale of premature death, illness, injury and impoverishment . . . (is) much more serious . . . in most informal settlements."¹⁴ The migrants' economic and education prospects may be better than in the rural villages they left behind, but it's an arduous life in slums. Rising temperatures make it all the more punishing, which begs more compassion, which like discord, fortunately can also be contagious.¹⁵

We also know there are different social and political persuasions with different reasons and modes for dealing with the threats of CC. New Urbanism co-founder Andrés Duany has classified Americans, dividing them into a half dozen CC cohorts.¹⁶ There are the *Ethicists*, who are moralists and activists who want to proactively save the environment; the *Trendsetters*, including urban hipsters tuned into the "urban cool" factor, who will conspicuously live greener lives if it isn't too onerous; the *Opportunists*, who are pragmatic and entrepreneurial about the business investment opportunities with good paybacks; the *Survivalists*, who are "anarcho-libertarians" pessimistic enough to circle the wagons for family and friends, and even retreat to armed, survivalist compounds or floating "sea-steads" in international waters; the *Apathetics*, who are ignorant, skeptical or indifferent, but will come along if and when their climate changes too much; last, there are the *Denialists*, who simply refuse to admit there's a problem and who believe CC is bad science, a conspiracy or fabrication of scientists, even a hoax.

Nowhere is humankind's simultaneous mix of grand vision and tunnel vision more apparent than in how the U.S. is planning for a warmer world. Politically conservative skeptics and denialists have issued messages that try to perpetuate a black-and-white political debate, which doesn't exist in the scientific community. Contrary to the belief of most scientists that denial of CC is a product of scientific illiteracy, it's almost perfectly aligned with left-wing versus right-wing ideology and politics. The denialists' arguments have become so strained that even oil and coal companies have distanced themselves publicly, though some still help to finance the campaigns of politicians who espouse skepticism and denial.¹⁷ The U.S. debate on CC is unusual in international terms. The conservative position has been anchored in denial, the liberal position has been associated with policy response, with a more radical emergent position

calling for the abolition of fossil fuel usage as soon as possible. That is not the typical ideological landscape of CC debate in most countries.

The U.S. Republican Party is the only major political party in the developed world that denies CC – and rejects all attempts at solutions – as a matter of party orthodoxy. The “do something, anything” attitude is coded as “liberal.” “Keep it in the ground” is radical anywhere, but it appears unusually radical in the US.¹⁸

This denial flies in the face of the fact that 17 of the 18 warmest years since modern record-keeping began have occurred since 2001.¹⁹

It might be said that the denialists have taken the case from the Greenhouse Effect to Madhouse Effect

“Too often, we allow contrarians in the CC debate to frame themselves as modern day Galileos railing at the scientific establishment,” said Michael Mann, Professor of Atmospheric Science at Penn State University. “The indiscriminate rejection of overwhelmingly established scientific findings is not skepticism . . . It’s a denial of basic science.”²⁰

One of Mann’s pet peeves is the way the connection between climate change and extreme weather events is publicly discussed.

“The question whether we can prove that CC caused some particular storm is the wrong question . . . The relevant question is, are the impacts of these storms being made worse by CC, are they becoming more common?” . . . He disagrees with the notion that it’s a coincidence the planet’s waters have become warmer at the same time we’ve witnessed some of the worst natural disasters on record . . . [a] “massive misinformation campaign intended to confuse both the public and policymakers about climate science . . . denial has several stages, including claiming it does not exist, that it’s natural or self-correcting, or that it’s possibly ‘a good thing.’”²¹

This denial flies in the face of the fact that the six warmest years on record have all occurred since 2010.

Personal wealth plays an abashed role in CC beliefs and behaviors. An article published in the journal *Environment and Behaviour* finds that

those who identify themselves as conscious consumers use more energy and carbon than those who do not. Why? Because, environmental awareness tends to be higher among wealthy people. It is not attitudes that govern our impacts on the planet, but income. The richer we are, the bigger the footprint, regardless of our good

intentions. Research by Oxfam suggests that the world's richest 1% (households with an income of \$100,000 or more) produce around 175 times as much carbon as the poorest 10%.²²

This unconscionable inequity begs radical reform.

It is true that technological advances and unprecedented wealth have raised living standards and enabled

a new global elite to enjoy lifestyles more lavish in energy consumption and environmental impact than those enjoyed by any aristocracy in the past . . . if our current tax systems don't penalize damage to the planet and can be side-stepped by the nomadic, hybrid lifestyles unlocked by technology, one solution could be to shift from disconnected national taxation systems to a collaborative global regime, whereby individuals are charged on the basis of their personal energy footprint.²³

Those who eat and live locally, who rarely travel on airplanes, and use recycled or multi-purpose materials would be taxed less than the high-living jetsetters lavishing their lifestyle with imported products. Equally, those whose work requires frequent travel would pass the tax bill on to their employers, compelling companies to more responsibly weigh ecological impacts on their ledger and bottom line.

Major aspects of the U.S. economic and political systems need to change, and to change soon. It will take a loud wakeup call, a "Pearl Harbor" or "911." All six of Duany's CC groups, with the possible exception of the proactive Ethicists, will otherwise be proverbial frogs in slow-to-boil water. As popularized by Al Gore's groundbreaking 2007 movie *An Inconvenient Truth*, it is a vivid metaphor for the numbness of humans to dangers that arise too slowly. Gore's *An Inconvenient Sequel* a decade later takes on the political quagmire that has since developed around CC. It's taken the growing toll of climate disruptions and extreme weather to wake up many people. Fortunately, many Apathetics are becoming less skeptical, and more Denialists are rethinking their position, increasingly persuaded by the unfolding reality of CC.

Signatories to the "We Are Still In" campaign to signal the international world that America's state and local governments are still committed to the Paris Agreement, bear this out. Among the signers are Dallas, TX; Atlanta, GA; Charlotte, NC; Houston, TX; Little Rock, AR; Anchorage, AK; Salt Lake City, UT; and Phoenix, AZ – all red states, but with major cities standing in opposition on the issue of climate change.²⁴

Some of these cities are less than 250,000 population, where most Americans live and where CC denial tends to live.

All the cohorts are subject to universal human instincts and genetic hard-wiring. They will be motivated by similar emotions to change their values and lifestyles, if in different ways and at different times. It's helpful to distinguish between experiential learning and analytically learning. Seeing daffodils bloom early because of warmer temperatures is a type of experience that is likely to have a lasting impact on a person's mindset. In contrast, the analytical learning people experience of a talking-head scientist on TV is less likely to leave an impact, because it takes more thinking and faith.²⁵ Skeptics and denialists that are hard to convince with facts, would no doubt respond better if their religious leaders were outspoken about addressing CC. A case in point is that people are not persuaded to embrace urbanism simply because it will lower GHG emissions. For most people that's a fringe benefit. They become convinced because it's nice to walk, to live in a neighborhood with lots of things to do, friends to see, ability to get to resources and work without being stuck in traffic. *Fostering change will take clever, effective public education, strong leadership and rapid adoption of new practices, regulations, policies, norms and values.*

As Amory Lovins and others have noted, we don't need a consensus of motives; we don't have to agree *why* we need to address this cauldron of challenges. At least for the time being, it doesn't matter whether one is mobilized by concerns about environment, health, flood insurance, national security, or by simply saving or making money, even by being cool, fashionable or opportunistic. In the global picture, the *impacts* of one's lifestyle, intentions and actions are more important than the underlying beliefs or motives, which are elusive in any case. The principle that impacts are more important than beliefs and motives applies to government policies as well. According to *The Economist*, the single biggest reduction in global GHG emissions has resulted from the Montreal Protocol, which was adopted to address the ozone problem, not CC. It has had roughly twice the impact as #2 hydropower worldwide and almost three times the impact of nuclear power. Even more ironically, the magazine's research – which they state is approximate – indicates that China's One Child Policy ranks #4, right behind nuclear power worldwide and ahead of all worldwide renewable energy use other than hydro. The positive unintended consequences of policies such as these examples are often greater than the intended ones. On the other hand, policies to manage population growth can have decisive, intended impacts:

[I]f the world's population reached only 7.5B people by mid-century, rather than more than 9B, in 2050 we would be spewing 5B to 9B fewer tons of carbon dioxide into the air. This alone . . . would keep the global temperature from rising more than 2°C above that of the late 19th century.²⁶

These policies should encourage migration to cities, as well as access to education and modern birth control, as an effective, non-coercive ways to lower birth rates.

Many potential motivators are triggered by urban challenges around the world – from air pollution, congestion and housing shortages to health problems, gentrification and infrastructure failure, not to mention the equally global phenomenon of sea level rise, extreme weather, flooding, drought, famine, etc. The particular concerns will vary from climate to climate, culture to culture and economy to economy. In metro-Detroit, a dominant environmental issue is storm water flooding, accompanied by sanitary sewer overflow, or CSOs, which are due to combined sanitary and storm water systems. But summer heatwaves may soon overtake flooding as the preeminent issue here and elsewhere. Arguably, extreme heat is a more pervasive problem than sea level rise, or hurricanes, tornadoes and the other climate extremes that threaten more limited areas more episodically. Heat waves can also persist longer than more intense extreme storms, even if they are more sporadic and less predictable.

For most urbanized places, especially those in hot and in temperate climates, rising local temperatures from UHIs are making trouble sooner than CC. Deadly heat waves kill more and more people, not just in poor and marginal areas, but in all areas of the metropolis. Indeed, the loss of air-conditioning in a Middle Eastern city during a horrendous heat wave in the summer of 2015 is reputed to have triggered civil unrest at least as intense as the geopolitical violence in this war-torn area. Generally natural disasters and climate disruptions are more devastating in the poorer Global South than in the richer Global North, because the lack of physical and institutional infrastructure makes it more vulnerable.²⁷ And the lack of financial resources makes recovery slower and less complete.

To briefly review some of the fundamentals that have been presented: because the cooling of our cities emphasizes quicker-term adaptation more than longer-term mitigation, it appeals to the universal human tendency for short-term thinking and prompt action in times of crisis. Concrete UHI initiatives provide a proactive sense of progress during the vagaries and uncertain unfurling of the bigger challenge of CC. Adaptation is also more local in its execution, reducing requests for permissions from higher levels of government. Much to our good fortune, the four UHI antidotes – albedo enhancement, reduction in waste heat, urban ventilation and cool microclimates – also frontally address global CC, even though the benefits take longer to manifest. Urban cooling is essential for cities to continue to thrive, retain residents and attract and accommodate new residents. It must be remembered that as metropolises in developing countries mushroom with suburbs, the result is higher consumption and carbon footprints. These outcomes aggravate CC and make *both* cities and suburbs even hotter and less healthy. Lower birthrates help offset larger per capita urban consumption in cities of the *developing* world,

much as lower per capita energy consumption in cities reduces urban carbon footprints in the *developed* world.

Joe Walston of the Wildlife Conservation Society summarizes the current situation succinctly with “the four pillars” of conservation in the modern era – a stabilized human population, increasingly concentrated in urban areas, able to escape extreme poverty, and with a shared understanding of nature and the environment. He singles out the trend *toward urbanization as the biggest driver of environmental progress, bigger perhaps than all the conservation efforts undertaken by governments and environmental groups alike*. New arrivals from the countryside have better access to medical care, with decreased child mortality that in time leads to fewer children, who go on to better schooling and potentially more rewarding work lives. And physically contained urbanization retains habitat for wildlife in abandoned rural areas, as is already happening in Europe, where wolves, bears, lynx, bison and other species are re-wilding a densely populated, highly urban continent.²⁸

Moving Forward

CC begs the cultivation of a sense of common cause to deal with its costly and varied impacts. Climatologists tell us we have no time to waste. Leaders of the international business sector agree: a 2016 report from the World Economic Forum stated the #1 global risk in the next ten years is the water crisis, with failing to adapt to CC and extreme weather ranked as the two next greatest risks.²⁹ While water does pose an immediate threat, other groups would rank CC as the top risk, in some cases by a wide margin. Cities, as should now be more evident, can play a bigger-than-expected role in addressing these problems. Two sobering quotes, the first from noted journalist Thomas Friedman and the second from Lord Nicholas Stern of the London School of Economics, underscore the global magnitude of the problem:

[T]he chief economist of the International Energy Agency has declared that “about two-thirds of all proven reserves of oil, gas and coal will have to be left undeveloped if the world is to achieve the goal of limiting global warming at two degrees Celsius.”³⁰ If we burn all current reserves of fossil fuels, we will emit enough CO₂ to create a prehistoric climate, with Earth’s temperature elevated to levels not experienced for millions of years.³¹

As for the magnitude of the American challenge, the U.S. continues to lead major Western powers in per capita carbon emissions, emitting more than twice as much GHGs per person as France or the European Union as a whole.³² It has cumulatively pumped more GHGs into the atmosphere than any other country, as much as China, Russia, Germany and the UK

combined. Accordingly, Americans should be taking the global lead, with new, muscular public policies, taxes, incentives and codes to deal with this emergency, as well as effective national leadership. Many salutary policies already in place throughout the world need to be embraced by the U.S. government.

Although China has stepped up to a “leadership” role in implementing the Paris Agreement and has cancelled or postponed many coal-fired power plants, it is still building them at home and especially abroad.

Chinese corporations are building or planning to build more than 700 new coal plants at home and around the world, some in countries that today burn little or no coal . . . Overall, 1,600 coal plants are planned or under construction in 62 countries . . . The new plants would expand the world’s coal-fired power capacity by 43% . . . [and would] make it virtually impossible to meet the goals set in the Paris climate accord.³³

In many countries, including the two biggest GHG emitters China and the U.S., environmental and energy regulations are often seen as contrary to economic growth.

Because coal emissions contribute so heavily to both air pollution and CC, it’s worth elaborating on what’s happening to curtail the use of coal globally. China has the most coal-fired power plants, with some 4,000 in operation, but it has shelved or cancelled over 2,500 new ones. India is #3 in both global GHG emissions and coal-fired plants, with roughly a quarter as many as China. It has shelved and cancelled more than twice as many as the number currently operating there. The U.S. has the second most coal plants, about 600, but had only four new plants in the pipeline as of July, 2017.³⁴ In my region of Michigan, two-thirds of our electricity is generated with coal, barely higher than the Chinese average. Ohio and Kentucky depend even more heavily on dirty electricity. Clearly the U.S. needs to cancel coal plants, while the fast-growing Global South needs to shelve them. The Paris COP Climate Agreement of 2015, a.k.a. Paris Accord, has little if any chance of achieving its limit of a 2°C global temperature rise if coal-fired plants aren’t dramatically removed from the equation.

Also, existing coal plants can be radically improved with technically feasible but very expensive technology that captures their emissions. In late 2017, only 17 such capture projects existed around the world, according to the Carbon Capture and Sequestration Institute, which was founded in 2009 and funded by fossil fuel companies and others to more widely deploy the technology. Just *two* of those projects are capturing carbon from coal-fired plants, despite all the recent American hoopla about safely reviving coal’s use. By 2017 over 15 nations announced plans to phase out coal by 2030, and that number is growing. But as long as

the world's biggest coal-consuming nations – China, the U.S. and India – are not part of the initiative, its impact will be limited.³⁵

It comes as no surprise that in the realm of politics, short-term thinking tends to override long-term thinking and distant needs. Roger Pielke, Jr., the University of Colorado professor who has sometimes been described as a CC skeptic, has taken some caustic jabs at decarbonizing. He calls this his ironclad law of carbon policy:

When there's a conflict between policies promoting economic growth and policies restricting CO₂, growth wins every time . . . Burning fewer fossil fuels is the most obvious way to counteract GHG and CC, and the notion has a universally virtuous appeal . . . as long as it's being done by someone else!³⁶

These sentiments pungently portray the human tendency to avoid difficult decisions and to push responsibility and blame onto others, making policy and laws that have real teeth all the less likely. Roy Scranton echoes these sentiments when he writes “No population on the planet today is going to willingly trade economic growth for lower carbon emissions, especially since economic power remains the key index of global status.”³⁷

A surprising historical footnote on CC public policy: neither UHIs nor albedo enhancement were mentioned in the Kyoto Protocol, which focused entirely on GHG mitigation. Also, there has been no international mandate or enforceable framework that builds a multi-lateral incentive to fight global CC, including the otherwise monumental Paris Accord. The U.N.'s New Urban Agenda briefly mentions UHIs but gives them no specific attention. With no UHI standards, or even common metrics, there has been no multi-lateral policy or incentive to invest in *local* urban heat management. International agreements need to include UHIs as well as CC in their calculus and their mandates if a healthy local as well as global thermal commons is to be saved.

Although it lacks mandatory targets, the Paris Accord is nonetheless a long stride forward on CC. Since then, the U.N.'s follow-up statement Mission 2020 describes its goals “to fully decarbonize buildings and infrastructure by 2050.’ As for transport, the campaign calls for zero-emissions vehicles to be ‘the preferred form of all mobility in the world’s major cities and transport routes.”³⁸ Think how much and how fast cities and their metro areas changed to accommodate the automobile, radically altering land-use patterns and infrastructure during the twentieth century. Can humanity rally to make equally large and rapid changes in the opposite direction?

City mayors and their municipal administrations have been more attuned to action than national governments. Cities better know how to de-carbonize, and if they act collectively, they can do it on a scale that

makes a difference in the global climate. We shouldn't forget that they are our most enduring civic and political bodies. In the late Benjamin Barber's words,

Rome is much older than Italy, Istanbul older than Turkey, Boston older than the United States, Damascus older than Syria . . . Concrete and palpable, they draw their existence from their concrete, organic growth, rather than from boundaries drawn on a map; from the art of communal life rather than the science of public administration. Cities define our essential communitarian habitat in a way nation-states cannot . . . Cities are closer to us, more human in scale, more trusted by citizens.³⁹

Cities often are aggressively proactive and responsive to CC and UHI issues. As former Mayor of New York City Bloomberg states, "We're the level of government closest to the majority of the world's people. While nations talk, but too often drag their heels – cities act."⁴⁰ Many American cities now have chief resilience officers, and have formally committed to 100 percent renewable energy. Six American cities run on 100 percent renewable energy as of 2017.⁴¹ In 2016, a coterie of mayors announced the Global Covenant of Mayors for Climate and Energy. Within a year, a remarkable number of cities had signed on – about 7,500 cities representing some 675 million people – nearly 10 percent of the world's population.⁴² Two years after the signing of the 2015 Paris Accord, Mayor Bloomberg and California Governor Jerry Brown upped the ante with America's Pledge, a 127-page statement that enthusiastically supports the original American pledge on climate action. As of the Bonn meeting in 2017, this network of non-federal U.S. leaders had swelled and included more than 2,300 states, tribal nations, counties, cities, businesses, non-profits, universities, and colleges. These efforts constitute a new era of American climate action.⁴³

In the institutional and NGO sector, there are far too many organizations to mention. In America alone, there are numerous green codes and standards, from ASHRAE, LEED and Architecture2030 to Vision California and the Living Building Challenge. The Charter of the Congress for the New Urbanism and its 1,500 members should be credited with changing the national discourse on suburbia, specifically densifying and mixing land uses in real estate development on urban peripheries. As noted, recently its members and adherents have been focusing much more on urban infill and suburban retrofit. They have spawned parallel initiatives like Tactical Urbanism and Lean Urbanism, which focus on very modest, local problems and opportunities, while New Urbanism continues to focus on larger developments and state, national and international public policy. CNU has also begun a direct focus on CC and UHIs, working with collateral organizations in North America and internationally.

There are scores of other organizations, initiatives and programs that promote the ideas presented throughout the book. The Project for Public Spaces, an effective group similar in purpose to CNU, has promoted place making in the public realm and has an initiative similar to LeanU called Lighter, Quicker, Cheaper. Another organization is Friends of the Earth, whose Big Ideas Project was led by Mike Child, who has eloquently summarized the softer advantages of cities, especially the sharing revolution:

A revolution that builds on the digital world of the 21st century that utilizes the ingenuity and imagination that springs from the cross-fertilization of ideas from the diversity of people living in cities; that builds empathy and understanding between people rather than fear and loathing; that leads to much greater levels of sharing of stuff and much greater resource efficiency; that takes naturally evolved cultural traditions of sharing within families and local communities, and re-invents them to enable sharing between citizens and strangers; and that fundamentally transforms the dominant world view that individualism and material possessions are central to what it is to be human.⁴⁴

When coupled with addressing CC and overpopulation, there could hardly be a more humane and inspiring agenda for the balance of this century.

The number of organizations, institutions and NGOs dealing with CC and/or social justice is overwhelming. Paul Hawken, the author of several popular books on sustainability, set out to count the total number of organizations in the world dedicated to sustainability and social justice for his best-selling book *Blessed Unrest*. He gave up, estimating that it was between one and two million, making it what he claims to be the largest organized social movement ever! In a memorable quote, he writes

If you look at the science that describes what is happening on the earth today and are not pessimistic, you don't have the correct data. If you meet the people in this unnamed movement and aren't optimistic, you haven't got a heart.⁴⁵

His later book, *Drawdown*, shows the most consequential paths forward, as covered in the next section.

What Next?

Paul Hawken's *Drawdown* offers the most complete menu of how not only to address and stop climate change but also to reverse it. Reversal will require a total reduction of over one billion tons of GHGs by 2050, but even that mind-numbing number is a moving goalpost. His team

developed three scenarios – Plausible, Drawdown and Optimum. The Plausible scenario is described as reasonable yet optimistic in its assumptions about a 30-year solution that would avoid and sequester enough carbon to stop its further build-up. But it would take the more stringent scenario to fully stop and reverse CC by 2050, achieving a net decrease in GHGs by 2050. The Optimum scenario might achieve reversal and a significant net reduction by 2045. Although the modeled solutions are costly – \$440 per capita per year – the *net* cost is much lower. By subtracting the cost of business-as-usual, it drops the price tag to about 20 percent of the estimated \$139 trillion total cost. And overall savings over the lifetimes of the investments is close to \$74 billion. It's a price we can't afford *not* to pay.⁴⁶

The 80 strategies outlined in the book are divided into the following categories: Buildings and Cites, Energy, Food, Land Use, Materials, Transport, and Women and Girls. If fully implemented, the *urban* and *architectural* strategies within Buildings and Cites, Materials, Transport and Energy can get over one-third of the way to reversing CC. In short, the built environment can play a major role in getting to zero carbon. The balance can be made up by systemic changes in the production of energy and food, which together account for over half the total GHG reductions. Family planning and educating girls account for over a tenth, much of which is associated with the migration to cities previously highlighted.⁴⁷ Indeed, the education and empowerment of females is a socio-cultural virtue of cities, and their role in reducing birth rates is an environmental benefit.

There are some unexpected findings reported in the book. Within the top ten solutions of the Plausible scenario, it might surprise you that preserving and expanding “Tropical Forests” would reduce total carbon more than all solar electric and solar thermal systems that can be reasonably deployed on the planet. If Educating Girls and Family Planning were combined, they would be at the top of the list, well ahead of the combined renewable energy sources of Wind Turbines, Solar Farms and Rooftop Solar. And if you combined Food Waste and Plant-Rich Diet, which are arguably connected, the pair would top the list. “[T]he World Bank projects, by mid-century Europeans and North Americans will produce a quarter more waste than they do today. In the same period, volumes will grow by half in East Asia, double in South Asia and triple in sub-Saharan Africa.”⁴⁸ A 2017 study by NRDC found that residents in three American cities tossed away 2.5 pounds of edible food per day, and that 68 million potential meals from the cities' grocery stores, restaurants and institutions go uneaten each year.⁴⁹

What you eat is more important than where it comes from. Eating only locally grown food for one year would save the greenhouse gas equivalent of driving 1,000 miles, but eating just one vegetarian meal a week for a year saves 160 miles more than that.⁵⁰ So, it's important to reiterate in

this final chapter that addressing such diverse issues as overpopulation, food waste and diet are among the most effective things that can be done to combat CC, including all the architectural and urban strategies to cool the city. Most importantly, it will require *all* 80 strategies to sufficiently negate and reverse all the impacts of CC.⁵¹

In general, the Plausible Scenario opts for cautious assumptions about costs and emissions savings. The economic modeling of costs is conservative and barely bakes in historic trends of falling prices for many items, some of which will surely get cheaper in the future, some radically so. For instance, the 50 percent drop in battery costs between 2015 and 2017 suggests an ongoing trend.⁵² Other promising techniques were not included, such as converting ambient CO₂ into nano-fibers at a lower than current cost in medical and other technological applications. The important “rebound effect” of cost reductions proved too hard to predict to be factored in, although the book’s website (www.drawdown.org) addresses this elusive economic aspect of human behavior. No carbon cap-and-trade policies were assumed, nor any radical new technologies, some of which are sure to come. And the future capacity of oceans, trees and soils as carbon sinks are treated as an unknown, despite recent evidence that suggests that these giant natural sponges may be depleting faster than expected. Even with stabilizing and likely peaking global carbon emissions, the ppm of carbon in the atmosphere continues to climb to new historic highs.⁵³

There are also surprise findings on economic payback, or return on investment. These savings are important to know in advance to prevent going bankrupt before the many solutions are exhausted. The solution with the highest economic payback, as opposed to total GHG drawdown potential, is Solar Farms, at \$80 billion per year with lifetime savings of \$5 trillion. Nuclear is also cost effective, with lifetime savings of about \$1.7 trillion, which represents almost a 2,000-fold return by 2050! And it has a total drawdown potential of 16 gigatons of CO₂E, which squeaks it into the top 20 solutions. LED domestic and commercial lighting are very cost effective, with extremely high savings. Solar water heaters could return their capital investment over 250-fold by 2050. Other solutions with good paybacks are Geothermal, Bike Infrastructure, Conservation Agriculture (no-till or low-till) and Smart Thermostats. Many of these solutions fall within the topics covered in this book.

As perfunctory as “Refrigerant Management” sounds, it’s ranked #1, with the drawdown potential of almost 90 gigatons. Although the 1987 Montreal Protocol successfully banned chlorofluorocarbons (CFCs) to close the ozone holes, their replacement was hydrofluorocarbons (HFCs), which represent only a small part of GHG emissions but have 1,000 times as much greenhouse effect as CO₂. Impressively, 170 nations adopted the Kigali amendment, which has specific timetables and targets to replace HFCs with cleaner alternatives. The 2016 agreement also has

trade penalties to punish non-compliers, and an arrangement for rich countries to help poor countries fulfill their commitments. This is precisely the binding type of international agreement that is needed on CC.

One category that Hawken does not utilize is urban albedo, which the IPCC estimates would offset 44 gigatons of CO₂ emissions,⁵⁴ earning 8th place in the rankings. In fact, if there is one fault in the team's exhaustive study, it would be that their categories underplay the role of urbanism in drawing down carbon from the atmosphere. As pointed out in the last chapter, sprawling urbanism may account for about 30 percent of all GHGs. In Hawken's home state of California, Governor Brown championed the passage of the strictest emission laws of any state. But expensive urban housing is forcing more residents to sprawl further out in search of affordable housing. Transportation accounts for more GHG emissions than any other sector in California, almost 40 percent, compared with 27 percent nationwide.⁵⁵ Add in the emissions from heating, cooling and lighting suburban homes, as well as their embodied, construction and maintenance energy, and the percentage goes even higher. Other metro regions in heavily suburbanized states are not far behind, underscoring that detached single family houses should no longer be indirectly and directly subsidized by government programs and policies.

Political and environmental leaders have long backed renewable energy, often too quick to ignore or dismiss technologies that economic modeling shows will be necessary to combat CC. This oversight includes carbon capture – or better yet carbon reuse – from power plants and industrial facilities, and nuclear power. Nuclear energy is essentially carbon-free, if fraught with more immediately lethal substances. But it is essential, as most experts agree that renewables can't answer all our electricity needs in the foreseeable future. Because it would take building 12,000 new nuclear power plants over the next 35 years – one coming on line just about every day – to keep CO₂ below 450 ppm,⁵⁶ it obviously needs to be part of a more comprehensive strategy. But to remove nuclear from the table, as has more or less happened since the Three Mile Island, Chernobyl and Fukushima disasters, is short-sighted if not irresponsible, especially with recent safety improvements.

What Next, More Literally?

Two major thrusts – convincingly framed and vigorously promoted around the world – are urgently needed to act on the issues that have been raised in this book.

- 1 More research is required to fill significant gaps in knowledge about cooling cities. For instance, the spatial extent and morphology of urban areas remain relatively simplistic in contemporary modeling approaches. Waste heat resulting from energy use in building heating,

ventilation and air-conditioning systems is also crudely accounted for in current data. These examples highlight the importance of cooperation between planners, urban designers, architects, engineers and climatologists. Another important research topic is how to deal with the potential doubling of global cities' physical footprints within the next 15 years. This expansion shouldn't be ignored because it offers a very significant opportunity for mitigating future CC at the global scale. Another need is refining urban climate modeling to improve its ability to examine the adaptive capacity of "what-if" growth scenarios and strategies to inform the planning and design process prior to development and construction.

There are examples of progress in current abilities to predict the performance of new development or redevelopment in a timely manner. Hong Kong's Planning Department has an Urban Climatic Map System, including advice on building density, site coverage, building height, building permeability, and greening. It allows policy advisors and physical designers and planners to balance various needs and requirements before making their final decisions. Proper urban design and planning are critical, because once built, a city's overall layout and morphology are relatively fixed and difficult to change. With existing urban fabric, the immediate emphasis should focus on lightening surface colors and using appropriate construction materials. Where change is possible, design goals should seek to ensure access to the sun for solar electric and solar thermal, and provide shade, wind protection and ventilation by breezes. Urban areas not yet built, such as the many new cities in developing countries, have the advantage of being able to incorporate these strategies in advance of their construction.

- 2 The major sectors of society – government, commerce, religion, the academy, the military, charitable/not-for-profit/NGOs and the media – need to cooperate to develop more vigorous and better integrated CC and UHI strategies, policies and practices. This mandate should take front-row priority at all levels of government. What most cities need is a coherent climate plan, which addresses interrelated environmental issues including flooding and air quality, as well as surface and air temperatures. It should permeate the culture and practice of the architecture, urban design, urban planning and engineering professions. While the public sector incentivizes and codifies this kind of urbanism, the not-for-profit sector and the private sector must also aggressively pursue sustainable, resilient design and development. It will take concerted action by these three parties, as well as bottom-up citizen participation and initiative. It may be easier to galvanize all the parties if the emphasis is on adaptation, as it is less about the cause of or blame for CC, and more about concrete steps that address its impacts and yield a satisfying sense of progress and

accomplishment. And new terminology can help: “climate-proofing” implies that CC, flooding and other environmental risks are primarily technical problems, with straightforward solutions that avoid political controversy.

The urban planning, architecture, landscape architecture and civil engineering professions must also redouble their efforts, reforming their university and continuing education, as well as growing their numbers. This group, along with real estate developers, is critically important because decisions on urban form have long-term consequences – more than 50 years. We need more urban designers and planners, because “although cities are developing at a rapid pace, the number of people that are involved in city planning is very small.”⁵⁷ This is especially true in the fast-growing cities of the developing world, which are too often unplanned, under-planned or poorly planned. In 2013, there were only 194 registered urban planners in Nairobi, which is less than half a planner per 100,000 people.⁵⁸ In the UK, there were almost 38 planners per 100,000 people. Guest professionals hired by developing countries are not always sufficiently knowledgeable about the local culture to understand the multiple, contested concepts of local adaptation and resilience. For instance, these professions have come to recognize the errors of mid-century freeway construction, urban renewal and suburban sprawl, and have accepted that they were to a large extent responsible. Now they need to avoid similar shortcomings in climate mitigation and adaptation, especially in the rapidly developing Global South.

Mitigation strategies that simultaneously yield adaptive benefits should be prioritized.

Consideration needs to be given to how regional decisions may affect neighborhoods or individual parcels and vice versa, and tools are needed that assess conditions in the urban environment at city block or neighborhood scale. There is a growing consensus around integrating urban planning and urban design, climate science, and policy to bring about desirable microclimates within compact, pedestrian-friendly built environments that address both mitigation and adaptation . . . [and] reach across physical scales, jurisdictions, and electoral timeframes. These activities need to deliver a higher quality of life for urban citizens as the key performance outcome, as well as climate change benefits.⁵⁹

Fortunately, powerful new tools are emerging for planning and design professionals. Calthorpe Analytics’ “Urban Footprint” is the most advanced computer software that makes clear to officials and citizens the future implications of urban planning and design decisions. It is fast, accessible and precise in presenting and comparing the impacts for a

menu of various scenarios for future development. It draws on immense data at all scales, from individual land parcel and household census data for the entire U.S. to multiple metrics for all its regions. Other game-changing applications include similar analysis of proposed changes in agricultural and wilderness areas. The program's analytics and graphics can help local communities and their officials – as well as not-for-profits, foundations and community organizations – build consensus.⁶⁰

Jeffrey Raven and his co-authors succinctly conclude their chapter in *Climate Change and Cities* with a cogent summary of the strategies and paradoxes presented in previous chapters:

Cities shaped by integrated mitigation and adaptation principles can reduce energy consumption in the built environment, strengthen community adaptability to CC, and enhance the quality of the public realm. Through energy-efficient planning and urban design, compact morphology can work synergistically with high-performance construction and landscape configuration to create interconnected, protective, and attractive microclimates. The long-term benefits are also significant, ranging from economic savings and risk reduction through reduced energy consumption to the improved ability of communities to thrive despite climate-related impacts. And a community's capacity to cope with adversity, adapt to future challenges, and transform in anticipation of future crises yields wider social resilience with particularly positive benefits for poor and marginalized.⁶¹

Reducing the global birth rate is a positive trend, because the 2018 total world population required over 1.7 earths to support the consumption of resources and to absorb the waste of some 7.6 billion human beings. As individual carbon, resource and pollution footprints are reduced, global population needs to also diminish. And it's becoming more obvious that the enlarging footprints of people in the fast-growing developing world, on top of the already large footprints in the developed world, are seriously and irreversibly disrupting our global climate. This threat means that extreme population is as serious as extreme heat, and that urbanization is, ironically, a way to reduce it.

The other non-climatic virtue of cities is their sponsorship of multiple economic, social, cultural and other benefits. They are the incubators of ingenuity, the purveyors of productivity, the engines of efficiency, the arena of the arts, communities of culture, and the social condensers and blenders of our many personal and collective differences. To the extent its citizens want it, the city provides public stimulation, exchange and excitement, as well as private shelter, sanctuary and retreat. The full transect of work, retail, recreation, institution and religion is expressed and somehow sorted out. The rich mashup is sometimes seamlessly pleasurable and other times painfully awkward. In any case, the city is continuously

trying to resolve its facts and fictions – the miraculous urban ballet that Jane Jacobs championed and the complex physical artifact that she loved. It is human culture made manifest and its history made live.

A city is a face-to-face cauldron, which used to be called a “melting pot” in America. “Salad bowl” seems to better describe the diverse cultures that cities now tend to accommodate rather than merge or integrate with earlier immigrants. Cities have lifted billions of people out of poverty over the centuries. They offer opportunity and freedom. However, they *do* tend to encourage commercial consumption, even as they increase transportation and heating efficiencies. It’s ironic that one of our greatest successes – bringing so many people out of poverty – now presents an equally big challenge: how to keep these people satisfied as their consumption appetites inevitably rise along with their incomes. Along with achieving prosperity without growth, it’s perhaps society’s greatest socio-economic-political conundrum.

Scientists tend to agree that we will reach dangerous tipping points in the planet’s climate sometime between 2050 and 2100, unless there’s a *quick* and *dramatic* decrease in GHG emissions. CC has not a single tipping point but multiple ones – such as the melting of the Greenland ice sheet, the thawing of the tundra or the collapse of a major ecosystem or a biome. The accumulation of tipping points could be totally devastating to homo sapiens. As Hawken’s 80 strategies indicate, it will take very muscular efforts to get to zero carbon emissions and to take carbon out of the atmosphere. More experts are beginning to feel their climate models are under-estimating the speed of CC. A temperature bump of 2°C (3.6°F) will be reached much sooner than predicted according to a report authored by seven leading climate scientists, including Sir Robert Watson, the former chair of the Intergovernmental Panel on Climate Change. *The Truth about Climate Change* report states, “The 1.5°C target could be reached by the early 2030s and the 2°C target by 2050.”⁶² These estimates and predictions are sure to change over time, for better or worse, but it’s clear that big changes are in store sooner than once expected. Indeed, a Fall 2018 report from the Intergovernmental Panel on Climate Change, compiled by hundreds of scientists from around the world, warns that

dangers are no longer remote or hypothetical. Nations have delayed curbing their greenhouse gas emissions for so long that warming of 1.5°C (2.7°F) is now all but inevitable. At current rates of warming, the world will likely cross the 1.5°C threshold between 2030 and 2052, well within the lifetime of most adults and children alive today.⁶³

Pope Francis’s encyclical *Laudato Si’: On Care for Our Common Home* on climate justice is beautifully crafted: “climate change and justice go

hand in hand and . . . the stewards of God’s bounty have misread a bounteous earth as an invitation to excess.”⁶⁴ He gets more concrete and exacting:

The warming caused by huge consumption on the part of some rich countries has repercussions on the poorest areas of the world, especially Africa, where a rise in temperature, together with drought, has proved devastating for farming . . . By itself, the market cannot guarantee integral human development and social inclusion.⁶⁵

The pope’s questioning of the ability of market capitalism to fully address CC raises a timely and profound issue. Avoiding the pervasive damage, a 2018 report by the IPCC asserts, “requires transforming the world economy at a speed and scale that has ‘no documented historic precedent.’”⁶⁶

The Mother of All Challenges

Could the case for CC be false or overstated? Are its magnitude and speed being exaggerated? The short answer is No. If anyone studies the science, they will find that it is exceedingly unlikely that CC’s basic physical explanation, recent trends and grave impacts are false. The evidence clearly supports that humans *are* powerful enough to cause CC, or at the very least speed up and amplify it. Because it’s intangible and complicated, CC is an easy target for our era of fake news. But no political movement, no army or navy can back up fictional narratives about CC. There are deeper, more essential questions to ask: Are we too successful for our own good? Humanity has sufficient science to predict our potential end, but do we have the imagination, willpower and means to avoid it? No species has ever had to predict and plan its existential future so far in advance. It’s both a privilege and an anxiety-ridden burden. Are we up to it?

In a high-rise in Malaysia’s capital in 1999, a group of scientists “convened to designate ‘100 of the World’s Worst Invasive Alien Species’ . . . Every single person in the room agreed, humans are the worst invasive species.”⁶⁷ Do humans need to accelerate their evolution – for their sake and the sake of the earth? Arguably, it is already happening: Alan Lightman writes that the *homo sapiens* species is already transitioning to *homo techno*: “We are modifying our evolution by our own hand. We are remaking ourselves . . . part animate, part inanimate, hybrid of living animal and machine.”⁶⁸ He goes on to point out that life expectancy for Americans has increased from 47 to 79 years since 1900, primarily because of improved medicine to fight deadly diseases. Perhaps this remarkable progress suggests that refocusing and redoubling efforts to achieve comparable success is possible in the war against CC.

Nothing in the last 800,000 years compares to what we are confronting today. It is a shattering of an eon-measured rhythm, accelerating into an unprecedented challenge. Our species has never faced a crisis as pervasively disastrous as CC, and with so little time to address it. This is a challenge that is possible to overcome, but it isn't going to be easy. Humans have bet the bank on endless resources and new ones to replace the ones that become exhausted; perpetual economic growth; extreme urban growth in the developing world; and faith in seemingly inevitable technological solutions. All sails have been set for a following wind. But the downwind course is getting turbulent, as the weather shifts into a strong headwind. Global CC is caused by a tiny change in the chemistry of the planet's upper atmosphere. It is more fundamental and lasting than the changing weather patterns in the lower atmospheric layer, as violent as they can be.

Any way you massage or slice the current challenges and opportunities, major changes in our civilization are needed. And they are needed *as soon as possible*. As Michael Oppenheimer, a climate scientist at Princeton University, who testified with James Hansen in 1988, warns: "The clock has run out in terms of avoiding damaging changes – they have already begun. At this point, we are into damage control."⁶⁹ Even though the International Energy Agency estimates that global energy needs will increase more slowly than in the past, they will still grow by 30 percent between 2017 and 2040. It argues for a very aggressive agenda as

low-carbon sources double their share in the energy mix to 40% in 2040, all avenues to improve efficiency are pursued, coal demand goes into an immediate decline and oil consumption peaks soon thereafter. Power generation is all but decarbonised, relying by 2040 on generation from renewables (over 60%), nuclear power (15%) as well as a contribution from carbon capture and storage (6%) – a technology that plays an equally significant role in cutting emissions from the industry sector. Electric cars move into the mainstream quickly, but decarbonising the transport sector also requires much more stringent efficiency measures across the board, notably for road freight . . . Renewables and efficiency are the key mechanisms to drive forward the low-carbon transition.⁷⁰

The planet no longer affords the luxury of making mega-mistakes. Humans, pressed together as they are by globalization and the traditional search for security and opportunity, have no choice but to better learn how to live with increasing diversity and density. The arithmetic of the growth and mixing of our species is obvious. The stakes have never been higher. So, a critical question is whether an economic, social and political shift of this type and of this magnitude ever happened before in human history? In her provocative book *This Changes Everything: Capitalism vs. The Climate*,

Naomi Klein directly takes on this urgent question. She relates how several historians and commentators have suggested that the abolition of slavery was of a similar magnitude. The economic dependence in the U.S. on slave labor was comparable to the modern global economy's reliance on fossil fuels. Moreover, the loss to slave owners was "a stunning \$10 trillion . . . roughly similar to the value of the carbon reserves that must be left in the ground worldwide if we are to have a good chance of keeping warming below two degrees Celsius."⁷¹

Klein explains that the analogy is not perfect, or morally equivalent. There were unjust economic extortions and reverse reparations to slave owners, plus the profitability of the rising industrial economy to cushion the financial blow to slave owners. There is much less of a consolation prize for the oil, gas and coal industries, as decentralized solar and wind will supply neither the concentrated energy nor the high profits to which the fossil fuel corporations are all too accustomed.

In other words, the economic costs to our elites will be real – not only because of the carbon left in the ground, but also because of the regulations, taxes and social programs needed to make the required transformation. Indeed, these new demands on the ultra-rich could effectively bring the era of the footloose Davos oligarchs to a close.⁷²

Accordingly, Klein goes on to assert with Jane Jacobs directness that

any attempt to rise to the challenge will be fruitless unless it is understood as part of a much broader battle of world views, a process of rebuilding and reinventing the very idea of the collective, the commons, the civil and the civic after so many decades of attack and neglect . . . Because the hot and stormy future we have already made inevitable through our past emissions, an unshakeable belief in the equal rights of all people and a capacity for deep compassion will be the only thing standing between civilization and barbarism.⁷³

What is needed, she concludes, is nothing less than an alternative world view and set of policies to replace the one that underlies the very heartbeat of the current ecological and climate crisis – one that replaces hyper-individualism and hyper-competition with interdependence and cooperation.

In *Learning to Die in the Anthropocene*, Roy Scranton hurls much harsher criticism at our existing "carbon-fueled capitalism and its promises of infinite economic growth,"⁷⁴ and its voracious commodification and assimilation of everything that has quantifiable value. He unabashedly points out that capitalism needs to produce profit in order to attract investors, and that profit requires growth. Others might argue that increases in efficiency play the same role as growth. In any case,

economic stability requires some kind of cheap, efficient energy that fossil fuels have amply provided civilization since the Industrial Revolution fired up its first furnaces. He points out five reasons that switching from oil and gas to non-fossil fuels will be

much more difficult than is commonly realized: the scale of the shift; lower energy-intensity of replacement fuels; substantially lower power density of the renewable energy extractions; intermittence of renewable flows; and uneven distribution of renewable energy sources. It would take decades to develop and implement new systems of carbon-free or carbon-minimal infrastructure, if it's even possible, and we don't have decades.⁷⁵

His sobering but inspirational little book goes on to suggest ways to calmly deal with the inevitability of CC. It's sanguine about geoengineering, because it sets up the planet for sudden runaway global warming if it were to be discontinued. He describes global warming as a "wicked problem," that is, one that doesn't offer clear answers, only better and less bad responses. It can't be solved by one country or by a single continent, which means the whole world has to work together, which is entirely unprecedented. It could be argued that an extra-terrestrial threat might provoke such planetary unity, and in fact CC *is* such a threat – from a sun 93 million miles away. The irony that Scranton painfully points out is that carbon powers the world's political and economic systems, and indirectly but assuredly, configures the collective consciousness of human civilization.

It's coal and oil we have to thank for connecting the many nations of the world into one tight, integrated economy. Without the information, energy and transportation infrastructures built and sustained with carbon, there wouldn't be any global civilization to try to save.⁷⁶

Stewart Brand and his cohorts take a more middling position in the *EcoModernist Manifesto*. This statement emphasizes the decoupling of human production and consumption from nature, i.e., satisfying our needs with as little imposition as possible on and interference with natural systems and ecologies. With increased efficiency in all aspects of civilization and with energy systems that rely on solar, wind, geothermal, nuclear fission and fusion, humans can separate and withdraw into a more self-contained world. It's less about Klein's and Scranton's social and economic transformation, even scuttling, of capitalism, and more about technological salvation. It is more sanguine about reforming rather than rejecting the current economic system. The ending quote of the manifesto is an inspiring way to sum up much of this book: "We value the liberal principles of democracy, tolerance, and pluralism

in themselves, even as we affirm them as keys to achieving a great Anthropocene.”⁷⁷

Some random, excruciating observations about humanity’s current state of affairs: Something is basically afoul in a civilization where every 90 seconds a young child dies from lack of access to drinkable water and sanitation. It’s even more painful when you realize that Americans use about 50 billion plastic water bottles and that all humans collectively spend \$60 billion each year on bottled water – over \$100,000 per minute!⁷⁸ That expenditure is estimated to be over 25 times greater than the annual sum needed to bring clean water to the planet’s population that currently lacks it. Another distressing observation: Worldwide nearly 13 million tons of plastic are dumped into the ocean each year, and at the current pace there could be more plastic than fish in the oceans by 2050.⁷⁹ While fertilizer run-off can cause 16–60 times more damage than plastic litter, up to US\$800 per year.⁸⁰ Even more odious is our world economy: The two men at the top of an inhumanly steep economic pyramid had a 2017 annual income equal to the entire bottom half of humanity. In the U.S. the bottom half has captured only 3 percent of total economic growth since 1980.⁸¹ Since then the average income before taxes of the top 1 percent of Americans has increased more than threefold, while the top hundredth of the top 1 percent has risen more than sevenfold.⁸²

If any government charged a blue-ribbon task force to design a permanent colony on another planet, they would not in their wildest imagination, much less in any scenario planning, consider setting up such an obscenely unequal society. It’s also unthinkable they would plan a society unable to provide clean, potable water to everyone. Water, it is worth remembering, is more than a natural *resource* – it’s a *source* of nature and of life itself. Nor would islands of plastic be gathering in the oceans. And CEO salaries wouldn’t be hundreds if not thousands of times higher than the corporation’s lowest-paid worker, especially when that differential was a fifth or even a tenth of that just a generation ago.⁸³ It’s not hard to list other examples of the world’s staggering socio-economic dislocations and inequities that would be unspeakable, even unthinkable, in any such plan for a new colony or society. The task force would be condemned for its heartless, mindless thinking and short horizon.

We are stuck with an inequitable global civilization that is facing a challenge that is far more threatening to our survival than widespread poverty. CC is a global problem that individual countries cannot arrest and reverse by themselves. Only by everyone working together can the international community address it. The historian-cum-futurist Harari raises the stakes: he questions whether the nation-state can rise above the fundamental purpose of coalescing and defending its territory to collaborate on a global challenge of this magnitude. He goes on to say that

allegiance to one's country is fine, but only if citizens realize their country is unique but not supreme, as is loyalty to family, profession and community.⁸⁴ *There must be allegiance to the planet.* A better system of worldwide loyalty, cooperation and problem-solving is needed, one that has yet to emerge.

While Naomi Klein's argument, Roy Scranton's critique and Stewart Brand's manifesto may seem hyperbolic, in the longer run their positions do not over-dramatize the situation. Our challenge is every bit that colossal. The good news is that the means are both mutually reinforcing and at hand – extremely daunting yes, but not impossible. We are fortunate that so many issues align. As Gwynne Dwyer has wisely written,

[H]ere is the little miracle that shows we still have more than our share of good luck: at exactly the same time when it became clear that we have to stop burning fossil fuels, a wide variety of other technologies for generating energy became available. We are truly blessed.⁸⁵

Resource depletion, ecological destruction, toxic emissions, habitat-loss, sprawl, etc. are more or less tackled the same way as CC and UHIs – by building good urbanism, producing clean energy, stewarding the environment and minding the community. We will not be excused by future generations for not taking advantage of this confluence of good luck at the moment of our greatest challenge. If we come up short, we will not be blameless, as future generations will curse and lament.

Our children and their children have reason to be worried, even depressed and angry. There's a new field – eco-psychology – that has emerged to deal with this understandable condition. Recent developments in the international geopolitics of addressing CC are not encouraging. Although the Paris Accord was a giant step forward, it no longer appears to be the long stride that is so needed. Even if we think countries will live up to their Paris pledges, many, if not most scientists think it will fall short of its goal. There's mounting evidence that we are headed for a 3°C rise, both because countries are likely to be lax on follow-through and the commitments may not have been sufficient in the first place. And, as Al Gore pointed out in his second movie, there's little chance of holding warming to 2°C unless we come up with “negative emissions” technologies and policies that allow us to actively and widely withdraw CO₂ from the atmosphere. A colleague Bruce Donnelly thinks that we need get a handle on two things: new energy technology, including fusion, and sequestering and extracting massive amounts of CO₂.

If a 3°C rise is in store for the earth, the repercussions from sea level rise alone are very daunting. Recent predictions are for roughly 3 feet of sea level rise this century, but

new assessments of the disintegration of glaciers, and more data from deep in the Earth's past, have convinced many scientists that we could be looking at double or triple that . . . Which may take what would have been a major problem and turn it into a largely insoluble new reality.⁸⁶

To belabor this one impact of CC:

Many experts believe that even if emissions stopped tomorrow, 15 or 20 feet of sea level rise is already inevitable, enough to flood many cities unless trillions of dollars are spent protecting them. How long it will take is unclear. But if emissions continue apace, the ultimate rise could be 80 or 100 feet.⁸⁷

Other devastating impacts – on everything from agriculture in Alabama to zoology in Zanzibar – are easy to imagine. We're in a war that nature, as always, will win. More literally, we are now at war with the sun, as atmospheric gases trap too much of its otherwise beneficent gift to the planet, reminding us that there is no room for complacency. And yet, after a three-year plateau, global emissions were up 2 percent in 2017.

It should not be forgotten that meeting the Paris Accord goal of “zero emissions by 2050” doesn't result in quick drawdown of the current high ppm of GHGs. The atmospheric pool stops *filling* if and when we turn the hose off, but then we need to *drain* the pool. We should also remember the global 2°C temperature target masks a lot of regional variation: land warms faster than oceans, high-latitude areas faster than the tropics, and inland areas faster than coastal regions. And the global population is concentrated in specific regions of the planet, increasingly in cities. In the worst-case scenario of continued growth in emissions, about 44 percent of the population will experience warming over 9°F (5°C), and 7 percent to about 11°F (6°C) – in 2100. These temperature increases pose grave health risks, on top of very widespread discomfort.

To untangle the climatic hairball, there is a stark choice: either act now, right-size our economy and lives, and manage the transition in a carefully aggressive way – or CC will do it for us. If we slouch into the latter option it will be unimaginably destructive and chaotic. We can't afford to be the least bit naive or sluggish even for a decade; climate has more momentum and a longer tail than most other societal problems. We can't recover from several years of inaction and lapsed policy on CC mitigation as easily as we can from ignoring crime, corruption, waste and other social problems.

What definitely won't suffice is a climate strategy built out of wishful thinking, the proposition that countries can be cajoled and prodded into increasing their ambition to cut emissions further, and that

laggards can be named and shamed into falling into line . . . There is no momentum for investing in carbon capture and storage, since it could be seen as condoning the continued use of fossil fuels. Nuclear energy, the only source of low-carbon power ever deployed at the needed scale, is also anathema. Geoengineering, like pumping aerosols into the atmosphere to reflect the sun's heat back into space, is another taboo. But eventually, these options will most likely be on the table, as the consequences of CC come more sharply into focus.⁸⁸

To end on more positive notes: There are sure to be unexpected breakthroughs, as there always have been and always will be. In fact, the science and technology is accelerating. Many of the favorable facts and promising predictions presented in the previous pages can be placed into seven promising trends that offer hope. One of them, surprisingly, concerns food. Because of the methane production associated with the belching and manure of cattle, new plant-based products, mimicking meat and dairy items, are coming out monthly. Major investors like Bill Gates, Tyson, Danone and Nestlé, are putting forward major funds. The most advanced megatrend is renewable energy. The prices of solar panels and wind turbines have plunged by 90 percent in the last decade, and are still falling, triggering exponential growth in renewables. The third bright spot has to do with the filthiest of the fossil fuels: coal. It appears to have peaked in 2013, with many cancelled power plants and many fewer planned. In parts of the country, wind and solar now offer the cheapest power available, even counting coal, which was long seen as unbeatable.⁸⁹ And as these renewable systems become cheaper, there's another tipping point: electric vehicles, with China leading the way and virtually every major carmaker in the world following suit. If current trends continue, it's estimated that most new cars will be electric by 2030. Batteries – the fifth big trend – crushed prices by 60 percent between 2011 and 2017, and promise to drop markedly by 2030. A smaller but interesting positive note is that between 2009 and 2015 “the number of biogas plants in the EU grew from 6,000 to 17,700 – heating houses with old banana skins and uneaten porridge.”⁹⁰

As pointed out in the 7 Principles of Energy Efficient Buildings in Chapter 3, defensive strategies are the sixth of the seven CC and UHI antidotes. These include unsexy things like better building insulation and more efficient heating and cooling equipment, with higher standards for household appliances particularly helpful. The seventh and last major trend addresses what might be the biggest negative megatrend – literally failing to see the forest for the trees. The destruction of forests around the world for ranching and farming accounts for 10 percent of global carbon emissions, and annual tree losses have roughly doubled since 2000. Urban areas lose an estimated 36 million trees annually, according to a study from the U.S. Forest Service. Tree cover in urban areas has declined

at a rate of around 175,000 acres per year, while impervious cover – such as roads and buildings – has grown by an estimated 40 percent, often in areas where trees used to grow.⁹¹

Slowing deforestation and restoring damaged forests could deliver a quarter or more of the carbon reductions needed by 2030 to avert dangerous CC.⁹² Offering carbon offsets can prevent the vast deforestation of tropical rainforests such as in the Amazon basin. As inexpensive as it is to plant trees, reforestation can be one of the least costly and fastest ways to cut emissions. Yet according to experts, funding to replant trees is less than 1 percent of the money spent on the commodities that drive deforestation – palm oil, soy, beef and timber. The good news, they say, is that proper land management could deliver up to a third of the carbon cuts the planet needs. In the past two decades, tree-planting in China, India and South Korea has removed three times the annual emissions of the entire European Union. Although the reforestation is often driven by fears of flooding, CC is increasingly seen as the crucial factor.⁹³

Will these trends be in the “too-little-too-late” category, or will they accelerate to keep us from the more worrisome tipping points that lay in our current trajectory? Some say we need not only to aggressively pursue renewable energy and more sustainable cities and towns, but also must close down the fossil fuel industry. As Lord Stern opines, “the two key words are ‘start’ and ‘might’ . . . There is no long-run high-carbon growth story, because it creates an environment so hostile that it turns development backwards.”⁹⁴ The stakes no longer allow incrementalism. Transformation is needed, as in change that is *radical*, in the true sense of the word – going to the roots.

No one wants a hotter, more stressed planet, but everyone wants the modern lifestyle that cheap energy has enabled. To switch to carbon neutrality, much less to carbon capture, is expensive, very expensive. Progress is complicated by the extreme social diversity and inequality, which means there is no one-size-fits-all strategy or single optimal solution. Scientific input is essential, but there are always disagreements about which scientists to trust. We need to come together over

opportunities for collective betterment . . . In the end, it is people, and their institutions – not science – that will decide our future . . . we must focus on strategies for working more effectively across all of our diverse and unequal social worlds . . . Collectively, we have the potential to create a much better planet than the one we are creating now.⁹⁵

Somehow we need to balance limits and hope, while providing a realistic but diligent sense of progress without technological hubris and false optimism. We must be industrious and dogged in the specific ways outlined in this book and others of similar message.

Let us close with two powerful quotations, the first from a favorite book, *A Short History of Progress*, by the Canadian historian Ronald Wright:

The vessel we are now aboard is not merely the biggest of all time; it is the only one left. The future of everything we have accomplished . . . will depend on the wisdom of our actions over the next few years. Like all creatures, humans have made their way in the world so far by *trial and error*; unlike other creatures, we have a presence so colossal that error is a luxury we can no longer afford. The world has grown too small to forgive us any big mistakes.⁹⁶

The second quote is from Bill McKibben, a strong and articulate international voice on CC:

We're used to metaphors: the war on drugs, the war on poverty. But in the case of carbon and methane -- without malice but also without mercy -- we are waging a war on the civilization that emitted them . . . we've lost huge swaths of the world's coral; vast sheets of ice disappear daily. Our adversary is taking territory. It's high time we stop these killers, even take back lost ground.⁹⁷

We must humbly acknowledge, as mentioned in Chapter 2, that more carbon has been released since Dr. Hansen's congressional hearing in 1988 than had been released in the entire history of civilization prior to his astonishing but unheeded testimony. As unintentional and perhaps overstated as this acceleration may have been, we have no choice but to arrest and reverse it as soon as possible.

Whether it's Klein's post-capitalist society, Brand's *EcoModernist Manifesto*, Rifkin's 3rd Industrial Revolution, Glaeser's triumphant city, Brown's Buddhist economy, Mann's moral progress, Barber's cool cities, Hawken's drawdown, or Scranton's Anthropocene, a sustainable economy must be something more than the sum of its carbon-neutral parts. Its goal is to provide a peaceful prosperity, without blind growth and escalating competition, as well as to outgrow novelty and consumption for their own sake. It strives to replace inequality with equity, attachment and greed with compassion and wisdom. It believes that ultimately synergy and optimization can supplant maximization; balance can beat bloat; mindfulness can instill moderation and modesty; cooperation can beget community; and economic and social justice can improve -- all of which mean that common cause can prevail over self-centered gain.

Within this mighty, idealistic context, addressing urban CC and UHIs sits on the right side of multiple ledgers. It nests deeply in the "no regrets" category, as it brings environmental and ecological co-benefits and helps

sustain and improve civilization. It also benefits other plant and animal species, ones that we depend on, as well as delight in. As a persistent and pervasive incentive to address our warming cities and planet, UHIs and CC can positively shape and motivate society. We are fighting our biggest battles against the increasingly dystopian disruptions of changing local and global climates, as well as overpopulation and over-consumption. Cooler, greener cities can render our civilization more sustainable, while enhancing the quality of human lives now and for generations to come. And as we deal with heat, health and habitat in the Anthropocene, maintaining our cool – literally and figuratively – will help us to navigate the coming storm, as we embrace resilient cities. “The Urban Fix,” in all of its many dimensions, makes us more efficient, effective and collaborative, while enhancing and saving countless current and future lives. It’s our last, best hope.

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PUTTING PRINCIPLE INTO PRACTICE

If you don't decide which way to go, you'll end up going the way you were already heading.

Lao tsu

It is only the first bottle that is expensive.

French proverb

Introduction

Chapter 16 has given us a hard task: to marry the logical, systematic preparation of a plan with the active involvement of all the stakeholders, and achieve a plan that promotes the well-being of all. How can planners develop sound policies, work collaboratively, get things done?

The substance of a plan is in principle established by dispassionate analysis of problems, trends, options, impacts, feasibility, drawing on the views and information from stakeholders – an assessment of what the plan is trying to do, and how best to achieve it. The professional planner, though, is rarely in a position to finalize decisions. Most aspects of the plan are likely to be dependent on politicians, private investors and public departments (transport, housing, education, health, etc.) over which there is limited leverage. The politics of the situation may be complex, with local parishes or residents at loggerheads with the local authority, and neighbouring authorities competing rather than co-operating. Eventually the planner in the middle of all this is recommending courses of action to development interests or elected representatives who have their own preferences and prejudices. The whole plan is likely to be both Political (with a big P) and political in the much broader sense – about power and influence, who gains and who loses.

This chapter presents a coherent approach to policy-making. It starts by briefly outlining good practice in relation to inclusive and co-operative decision-making and the cyclic process of plan preparation. These principles are then illustrated with a case study of a relatively simple, small-area plan, leading to a review of the way in which health and sustainability goals can be effectively incorporated in the plan, especially through plan and project appraisal. The

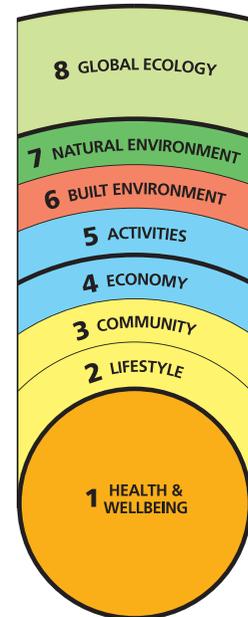


Fig 17.1 Focus on the whole agenda

chapter is only of course a short introduction to the issues, and any process has to be adapted to legal requirements. The principles are relevant whatever the official rules.

Community engagement: making decisions in a pluralist society

There are different levels of involvement in any planning process:

- *Partners* – who share the decision-making and accept responsibility for making things happen. They may be linked by formal contractual agreements. In a regeneration area, for example, key partners may be the regeneration agency, a housing provider and a major developer.
- *Participants* – who actively participate in the plan-making process (through a stakeholder forum, for example), but are not prime movers or final arbiters. Examples might be the chamber of commerce and the civic society. See Figure 17.2.
- *Consultees* – who are formally asked for their views about issues and solutions, but do not necessarily engage in collaborative forums. Normally this includes statutory consultees and all local residents, businesses and organizations.

While all need to have the opportunity to be involved at an appropriate level, *leadership* and clear decision-making are critical. The lead partner (such as a local authority, parish council, regeneration agency or developer consortium) has to instigate and co-ordinate in

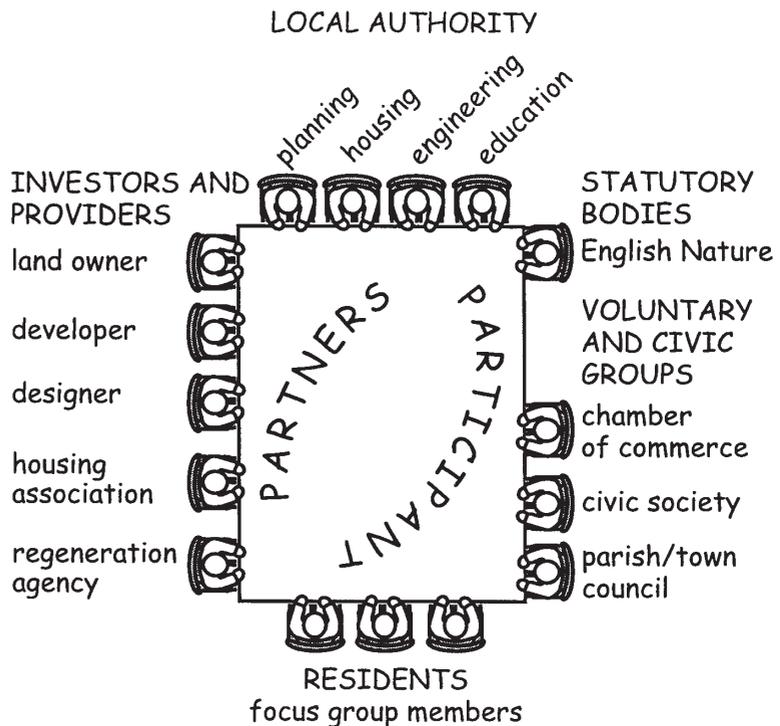


Fig 17.2 A stakeholder forum: illustrative membership

Source: Barton et al. 2010 (further reading), figure 2.5.

a timely, open and effective manner. The positive attitude, support and leadership qualities of the mayor or managing director (whether deeply involved or not) help determine the outcome. Planners and designers working for the lead partner(s) have the responsibility of providing information, concepts, policy options, and design inspiration to match the aspirations of the partners and the forum.

The WHO Healthy Cities (HC) network has very clear and helpful guidelines for municipalities that want to join, insisting on both *top down* and *bottom up* approaches.¹ The Mayor (or Chair) of the council has to sign the HC charter and be actively committed to the project. Political support at the outset, and throughout the process, is considered critically important. At the same time the authority needs to ensure that local communities have been consulted and are actively engaged, involved in a transparent process. Collaboration also has to occur between departments, breaking down traditional silos. This is critical when considering whether cities have built the capacity to achieve 'healthy urban planning'. Senior professionals in transport, housing, economic development, public health, recreation and greenspace have to be involved as well as in planning.

The involvement of stakeholders is part of a democratic approach, and assists the three dimensions of planning discussed in Chapter 16. Politically, it can help build constituencies of support for the plan; technically, it can provide vital information and evidence to improve the logic of the plan; from the executive perspective, it can be fundamental to implementation: the various departments and agencies feel part of the plan and are more liable to commit the funds to realize it. The benefits of collaboration are expressed by Figure 17.3.

Community engagement

Achieving community acceptance and 'buy in' to proposals for change is often problematic. So it is important to have a systematic strategy for community engagement that goes right through the planning and development process. Paternalistic attitudes are counterproductive. It can be tempting for investors and even local authorities to treat participatory obligations in tokenistic fashion (see Figure 17.4).² Instead residents and businesses need to be seen as equals, providing vital information (local knowledge, ideas, values) that can help shape the plan and increase its chance of improving health and well-being. The 'ladder of participation' illustrates the range of approaches possible, several of which may apply at the same time, depending on the stakeholders involved.

The question arises: who represents 'the community'? Given the diversity of interests there is no simple answer. Voluntary sector groups are important participants in the forum. However, they cannot necessarily be taken to represent everyone. Typically only 10 per cent of adults are 'joiners', and voluntary groups often have small, self-perpetuating committees. They can gain greater credibility by reaching out to a large membership. Elected representatives have a broader remit, but often quite idiosyncratic views. The partners in settlement planning – policy-makers and investors – may be tempted to accept the views of the active associations and councillors as

'Political support at the outset, and throughout the process, is critically important. At the same time the authority needs to ensure that local communities are actively engaged in a transparent process.'

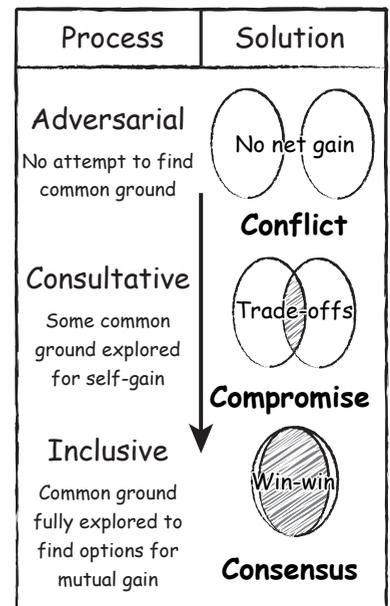


Fig 17.3 The benefits of working together

Source: Barton et al. 2010 (further reading), figure 2.2.

Rungs of the ladder

	Neighbourhood-level characteristics	Attitude of the local authority	Comments
7. Autonomous powers	An elected neighbourhood council with substantial powers, legally and financially independent of local authorities.	Confrontational	The ideal of social anarchism, requiring new legislation. Reality might fall short of the ideal, and be prone to NIMBYism.
6. Delegated powers	Community Development Trust or parish/town council with substantial responsibilities delegated by the local authority.	Collaborative	Achievable without legislation; gives some sense of local control; can be innovative and radical.
5. Partnership	Neighbourhood Forum or regeneration agency with power-sharing between local authority, business and citizens' groups.	Collaborative	Widely practiced; relies on shared ownership, effective leadership, co-operative skills and capacity building in the community.
4. Genuine consultation	Public meetings, stakeholder groups, web votes, focus groups, planning for real, etc. A real attempt to encourage local debate and respond to it.	Enabling	Widely practiced. Positive attitudes, openness and community engagement skills on the part of the authority are vital.
3. Two-way information	Good quality information from authority to citizens and from citizens to authority via community newspapers, social surveys, etc.	Technical	Not adequate in itself, but a vital part of an inclusive strategy, reaching the non-joiners.
2. Tokenism	Consultation too little, too late, going through the motions.	Manipulative	All too common, after all the major decisions have been taken – especially by development companies.
1. Spin	Decisions made and publicized, but no consultation considered necessary.	Autocratic	Quite normal in major urban investment areas such as energy, water, education, health, even local authority housing.

Fig 17.4 A revised ladder of citizen participation

Source: Detailed in note 2.

proxies for the wider population. This makes for a good and easy start. But many community interests may be inadequately represented. The professionals should therefore, where possible, reach out to the wider resident and business population, for example by undertaking social surveys.

Communication across political, professional and community divides is not straightforward (Figure 17.5). Words can get in the way of shared understanding. Every profession devises its own language, its distinctive jargon and logic, which may alienate or confuse other people. Finding the common touch, the common word, to express often complex ideas, needs careful cultivation.



Fig 17.5 Communication, or not!

Source: Courtesy of Rob Cowan – www.plandemonium.org.uk

A cyclical planning process

The process of producing and realizing a plan falls into a well-established cycle, based on the idea of the rational process discussed in the last chapter. Stakeholders are involved at every stage. So too is the collection of evidence. Figure 17.6 is a summary of each stage.

Taking the initiative

Many plans are produced because there is legislative obligation to do so. Other plans may be responding to particular development opportunities or political concerns. The decision by a local authority, agency

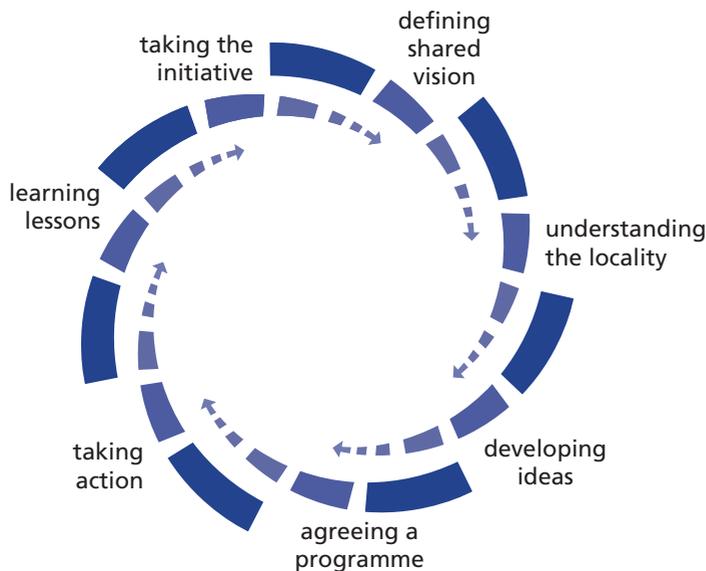


Fig 17.6 The seven-stage cyclical process of plan-making

Source: Barton et al. (2010), Figure 2.1.

or master-developer to make/review a plan requires consideration of the context and informal soundings with key interests. Early and open consultation can result in greater awareness of the issues and opportunities, leading to the plan being better angled to the situation. This initial scoping exercise should aim to answer the questions:

- What is the purpose and scope of the plan?
- What area should it cover?
- Is it potentially in line with broader goals and strategies?
- What stakeholders should be invited as partners or participants?
- Has the initiating agency the capacity to carry it through?

Defining a shared vision

Once partners and participants are on board, the 'vision' gives a sense of direction to the plan, and helps motivate partners, politicians and public to 'buy into' the plan. A vision presupposes a clear view of what the current situation is, what issues need addressing, and what the potential of the plan could be. Figure 17.7 gives an insight into defining scope. The vision should be informed by analysis of available sources of data (e.g. population census, traffic surveys, flood risk data) and public/stakeholder views. The lead organization has the responsibility to ensure that the vision is both realistic and inspiring, and puts health and well-being centre-stage. It might consist of broad aspirations (aims or goals) and more specific criteria of achievement (or objectives). The resulting *project brief* should set out:

- the scope of the exercise;
- the area, its characteristics and the policy context;
- the broad vision for the area;
- more specific objectives or criteria for the plan (to be refined later);
- the partners, and other stakeholders involved;
- the process of community engagement, policy-making and appraisal;
- the way the project will be managed (by whom? what oversight?).

Understanding the locality

This is something that continues throughout plan-making. But the biggest effort needs to come early, and is used to define the *base-line* situation against which progress can be measured, gaining a proper understanding of the nature of *problems and opportunities* that exist before fixing on policy choices. The temptation is to study just those aspects that directly impinge on the subject of the plan or project. But in line with the mixed scanning approach (Chapter 16), it is important to open eyes to all that is relevant. The Settlement Health Map gives a full possible agenda of study:

- people, their diversity of needs and concerns, health and well-being;

'A vision presupposes a clear view of what the current situation is, what issues need addressing, and what the potential of the plan could be.'

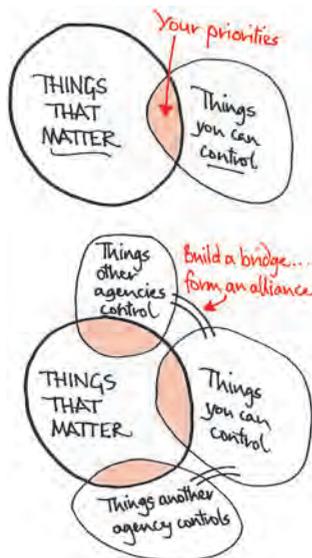


Fig 17.7 Defining the scope of a plan

- behaviour, levels of physical activity and inhibiting factors, lifestyles;
- community activity, cohesion, levels of social support and capital;
- economic activity, market conditions, growth problems and potentials;
- activities and movement, current use of space, traffic volumes, services, footfall, issues arising;
- the built environment, the quality of buildings, renewal processes, route networks use and adequacy for different modes, quality/use of urban and greenspaces;
- the local natural environment, landscape, air quality, water systems, wildlife habitats;
- global impacts, climate emissions, settlement resilience.

It is not possible to know it all, nor is it appropriate. The judgement is about what is helpful, and where extra, in-depth information is necessary to formulate or assess the proposals. The vision and objectives, together with public and political concern, help to focus attention where it matters. The professionals involved then have the responsibility to investigate specific problems and opportunities further – the ‘known unknowns’ that will affect policy or design.

Developing ideas

Plan-making is not a linear process. Before the decision to make a new plan, there were no doubt established policies, inherited proposals and expectations, and specific ideas from influential bodies, which required to be followed up. ‘Developing ideas’ means exploring these and other possible courses of action. Increasing knowledge, derived from context analysis, physical and social surveys, and stakeholders, allows more precision in the development of options. Simple tools can assist analysis. Let us assume there is a specific problem (say, of poor bus services). Figure 17.8 suggests questions that should be asked. Figure 17.9 is a *decision graph* showing how the issue of bus policy is related to other transport decisions. Figure 17.10 then takes

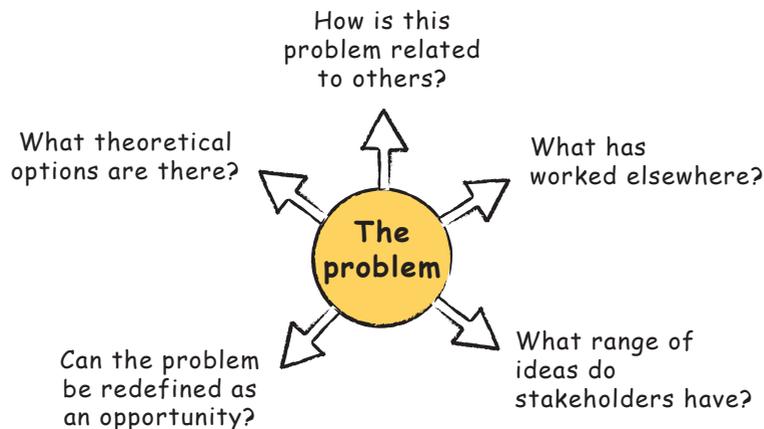


Fig 17.8 Searching for a solution

Source: Barton et al. 2010
(further reading), figure 2.10.

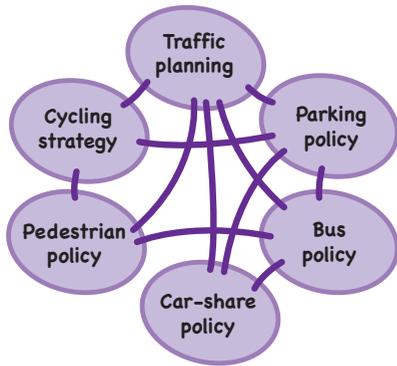


Fig 17.9 The interdependence of decision areas

two related decision areas and uses a *compatibility chart* to evaluate how options in each are likely to impact on each other – relying on evidence from studies elsewhere. It becomes apparent that some parking policies undermine good bus services while others reinforce them. While the whole issue is of course much more complex, this sequence illustrates an approach to analysis. It is useful when a number of different agencies are involved – each can relate to a particular decision area and see the relationship with others.³

There are systematic ways of working through spatial plan-making in order to ensure that environmental and health aims are central. The *twin-track* model of urban form (see Chapter 12) highlights the two tracks of the greenspace/water system and the public transport network. One enables the ecology of the settlement to work effectively. The other provides the focus for diurnal human activity. The morphology of the settlement is defined by the pedestrian accessibility to local high streets and the bus/tram spine on the one hand, and access to greenspace on the other. This process illustrated in Figure 17.11 is relevant for both regeneration areas and new urban extensions.

Simple tools and processes are useful in the political domain. Often there will be potential conflict between political, commercial and community interests. It is vital to grapple with these, and to express them in open debate between stakeholders so that all parties can recognize the issues. The planners and designers have the opportunity to be creative, learning from experience elsewhere, searching for solutions to intractable problems. Health and well-being are at stake. It is a matter of finding good answers and persuasive arguments.

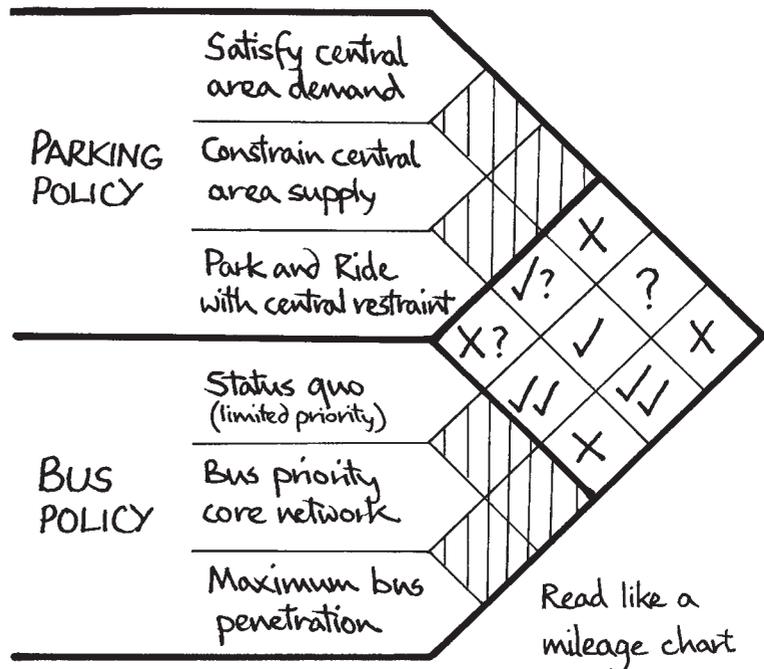
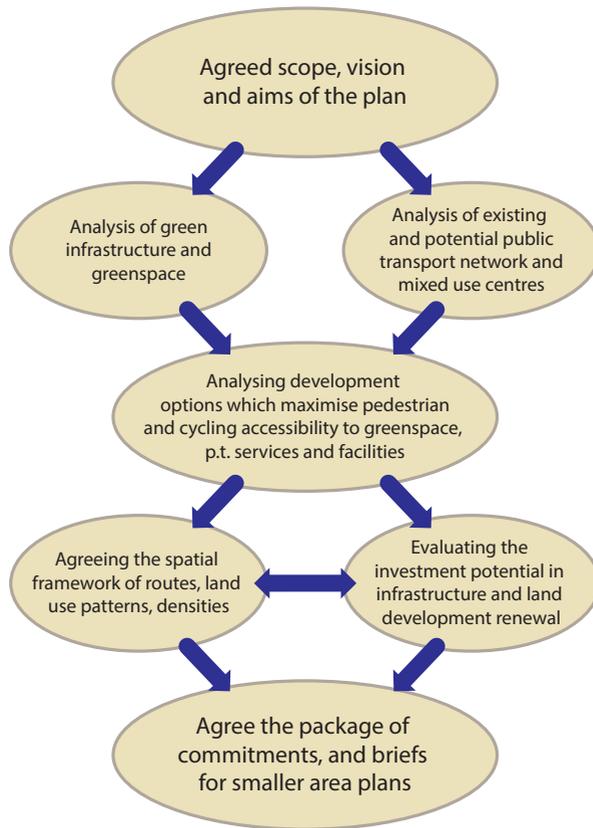


Fig 17.10 A compatibility chart of policy options

Fig 17.11 The twin-track approach to spatial strategy



Agreeing a plan or proposal

Official plans come in a variety of forms, according to context. The degree to which they consist of policies, spatially specific allocations or urban design schemes depends on their scale and purpose. Below are different types of policy intervention:

- Policies: normally intended to guide development management decisions; can apply to the whole of a plan area or a part.
- Commitments: tasks or projects which the planning agency or other body undertakes to fulfil or promote.
- Quotas: amounts of population, housing, employment or other variables allocated to particular sub-regions, settlements or zones.
- Zoning map: areas defined for specific land uses: residential, commercial, mixed use, greenspace, education, main routes, etc.
- Spatial framework: guidelines for development in an area of change identifying route networks, special zones, projects.
- Design code: set of principles for the design and layout of streets, buildings and spaces, often linked to a spatial framework.



Fig 17.12 The trefoil test of healthy development. All three criteria need to be fulfilled.

Source: Barton et al. 2010 (further reading), figure 2.11.

'Given the incremental nature of implementation, it is important to identify some "early wins", where action can be taken and help to boost the credibility of the plan.'

- Masterplan: a schematic layout for a development area, often with a three-dimensional element, providing the context for detailed design.
- Development or design brief: specification for what should happen on a particular site – may be very simple or very detailed.
- Detailed layout: precise measured plan of streets, buildings and spaces on a site, required for a full planning application.

The plan or project planners need to choose the best combination of forms for a given situation. At a point when the options have been honed sufficiently they need formal evaluation. Large-scale projects, such as tram systems, power stations, major renewal schemes or urban extensions, normally require *Environmental Impact Assessments* (EIA). Other projects sometimes require simpler forms of environmental or sustainability assessment. In Europe, most plans, policies and programmes need to have a *Strategic Environmental Assessment* (SEA); in the UK, SEA has been incorporated in a wider *Sustainability Appraisal*, which includes social and economic as well as environmental criteria. *Health Impact Analysis* is occasionally used, but is not a statutory form. The trefoil sustainability model shown in Figure 17.12 offers a 'quick and dirty' test for specific proposals.

As discussed later, appraisal is not intended as end-point evaluation, but a means of improving the plan or project. Public and political engagement at this stage can also trigger changes. The comparison between options will require extra information and further refinement of the favoured plan or scheme. Eventually a clear recommendation can be put to the politicians or investors who make the decision.

Taking action

A plan has been called a *commitment package*. It is a mechanism for gaining the commitment of all the partners, and the support of participants. The roles and tasks of different agencies should be specific, with each agency agreeing its own programme as part of the overall scheme. A conventional land use plan relies primarily on investors (public and private sector, large and small) coming forward with projects, applying for planning permission and subject to development management decisions.

Given the incremental nature of implementation, it is important to identify some 'early wins', where action can be taken and help to boost the credibility of the plan. Gaining early momentum can help protect the plan against derailment by events. The planning authority can try to trigger development proposals by preparing development briefs for particular sites. Public ownership of land can be put to good use, with exemplary projects that demonstrate confidence and give a sense of direction. Effectiveness depends on:

- long-term consistency of vision, strategy and tactics;
- a proactive and joined-up approach from the planning authority and other public agencies;

- the ability to seize opportunities, such as transport investments or land ownership changes, and to solve problems as they arise;
- a continuing open and collaborative approach, contributing to a sense of shared ownership of the plan, including among councilors and major investors.

Learning lessons

Planning policies are often pursued for decades without checking on their effectiveness and continued relevance. As the plan is implemented, it is vital to keep tabs on its progress: what has actually happened on the ground, and is it in line with the plan's intentions? Monitoring the plan and its context is more active than the word implies. There are several monitoring pathways, all of them useful: the observation and thoughts of actors (elected representatives, officials, investors, professional advisors); public, civil society and business representations; media debate; data collection and analysis. We will concentrate on the last of these.

The essential questions that monitoring should seek to answer are threefold:

- Is the policy or design being implemented? If not, why not?
- Is it resulting in the changes that were hoped for, or are there unintended consequences?
- Are the objectives of the policy or design still valid, or has the situation changed?

At the scale of a town or city trends in health, social inclusion, perceived well-being, environmental conditions, economic development, employment, population and housing, the availability of services and transport facilities are all critical. They can be monitored and recorded annually in a 'State of the city', 'Quality of life' or 'Health and Sustainability' report, which can then act as a stimulus to further action. Primary indicators are direct measures of health and well-being, for example 'years of healthy life'. Secondary indicators are measures of environmental conditions, such as air pollution levels, and of behaviour, for example the amount of active recreation. Tertiary indicators are measures of the urban environment, such as the extent of cycleways. Ideally there are a few 'headline indicators' that have intuitive public and political significance. Seattle, in Washington, is famous for introducing an intuitive measure of air pollution: 'can you see the mountain?' The Kuopio technique (Chapter 5) of identifying the three urban fabrics – pedestrian, transit and car – is a tertiary indicator, and a graphic way of integrating a number of key variables: the quality of the pedestrian environment and of public transport services, the level of accessibility afforded, the inclusiveness of the transport system, and by implication (not directly) potential levels of active travel and carbon emissions (see later discussion and Figure 17.19).

At some point (five years is typical) the plan or major aspects of it will need review and up-dating. But meanwhile the emerging issues can be anticipated by careful, collaborative alertness.

Case study: Stroud town centre Neighbourhood Plan⁴

‘Stroud is a market town set in the Cotswold Hills, in Gloucestershire, England. Its economy was originally based on woollen mills and water power; now on engineering and services, with growing IT and cultural activities.’

The purpose of this case study is to tell a story which conveys something of the complexity of the planning process: the way technical, legal, community and political aspects interplay in practice. Having said that, this is no more than a sketch of a small-area plan. Stroud is a market town set in the Cotswold Hills, in Gloucestershire, England. Its economy was originally based on woollen mills and water power, supported by canal and rail access; now it is based on engineering and services, with growing IT and cultural activities. Its population is around 30,000, and it sits in the much wider Stroud District. The parish of Stroud – which has its own ‘town council’ – is less than half of the town.

Neighbourhood Development Plans (NDP) have been established by the UK government as a means of giving local communities greater say in the future of their area. They are undertaken by parish councils, town councils or community fora, nesting within the strategic policy context set by District authorities in the ‘Local Plan’. If approved (by the District, an inspector and a community referendum) they have legal force, and can be used in development management.

Stroud town centre NDP was initiated by Stroud Town Council (STC), after a voluntary sector study and a public meeting, which highlighted some urgent questions about the future of the area (Figure 17.13). There were four main justifications for a plan:

- the re-opening of the canal, giving a new dimension to the town centre;
- vacant and underused sites in key locations;
- the desire to reverse the decline of retailing in the centre;
- poor pedestrian connectivity inhibiting active travel to the centre.

Two retired professional planners took the lead in advising STC. A ‘steering group’ was formed including the STC Clerk, elected representatives from the District and Town councils, Stroud Preservation Trust and Civic Society. It was agreed that the plan should include

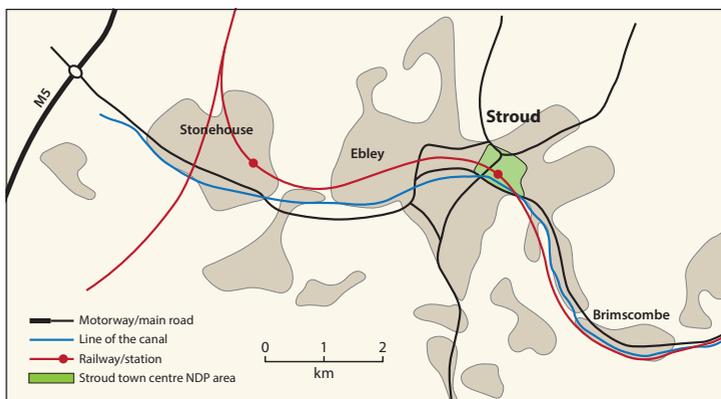


Fig 17.13 Stroud area, and the town centre Neighbourhood Plan

not just the centre but areas immediately around it that could influence its future. A proposal was put to the District Council and approved. Following the formal launch of the project in July 2014 many residents and a few business people volunteered to help. Those who agreed to co-ordinate working groups for the plan (movement, trading, housing, environment, etc.) were co-opted onto the steering group. Considerable enthusiasm and mutual commitment were established, and the momentum carried the plan preparation through subsequent trials.

Vision and understanding

These two stages – defining the vision and understanding the locality – were elided in the Stroud process. The main focus was two periods of public engagement in September and November 2014. The aim in September was to discover what people using the town centre felt about its strengths and weaknesses, and therefore the issues that should be addressed. The aim in November was to decide on the vision and priorities. In preparation for public exhibitions and seminars, the working groups on different topics produced survey reports, highlighting the facts and their implications. For example, the analysis of the population living in the plan area (from the 2011 census) showed only 500+ people lived there, mainly in rented flats, with young single men over-represented, and higher levels of unemployment and disability than average. This information impressed people in general and the steering group in particular with the need to increase the population and diversity of housing options, in order to support social inclusion and bulwark the viability of shops in the centre. Another survey showed the extent of problems facing pedestrians – such as awkward routes and potentially intimidating road crossings – helping to explain very high car dependence and low levels of active travel. Analytical maps were produced showing the land use pattern (Figure 17.14), greenspaces, conservation policies and the pedestrian network.

Most people using the town centre had a lot of positive things to say about its character, its social and cultural dynamism, but also had concerns. They highlighted issues such as the various difficulties of getting into the centre by foot, bike, car and bus; poor street quality; and the decline of retailing. So a cluster of objectives began to emerge which shaped the plan. The planners on the steering group ensured that issues were seen through the lens of healthy, sustainable development, and in line with government policy. The agreed vision was for the town centre to be ‘welcoming, healthy and thriving’.

‘Most people using the town centre had a lot of positive things to say about its character, but also had concerns. The agreed vision was for the town centre to be “welcoming, healthy and thriving”.’

Developing ideas

The period from the November consultation on the vision, to the March 2015 exhibition on policy options, was intensive. The options often took the simple form of doing something or doing nothing. Many of the volunteers found it difficult to move from issues and aims to policies. There were also conflicts between different

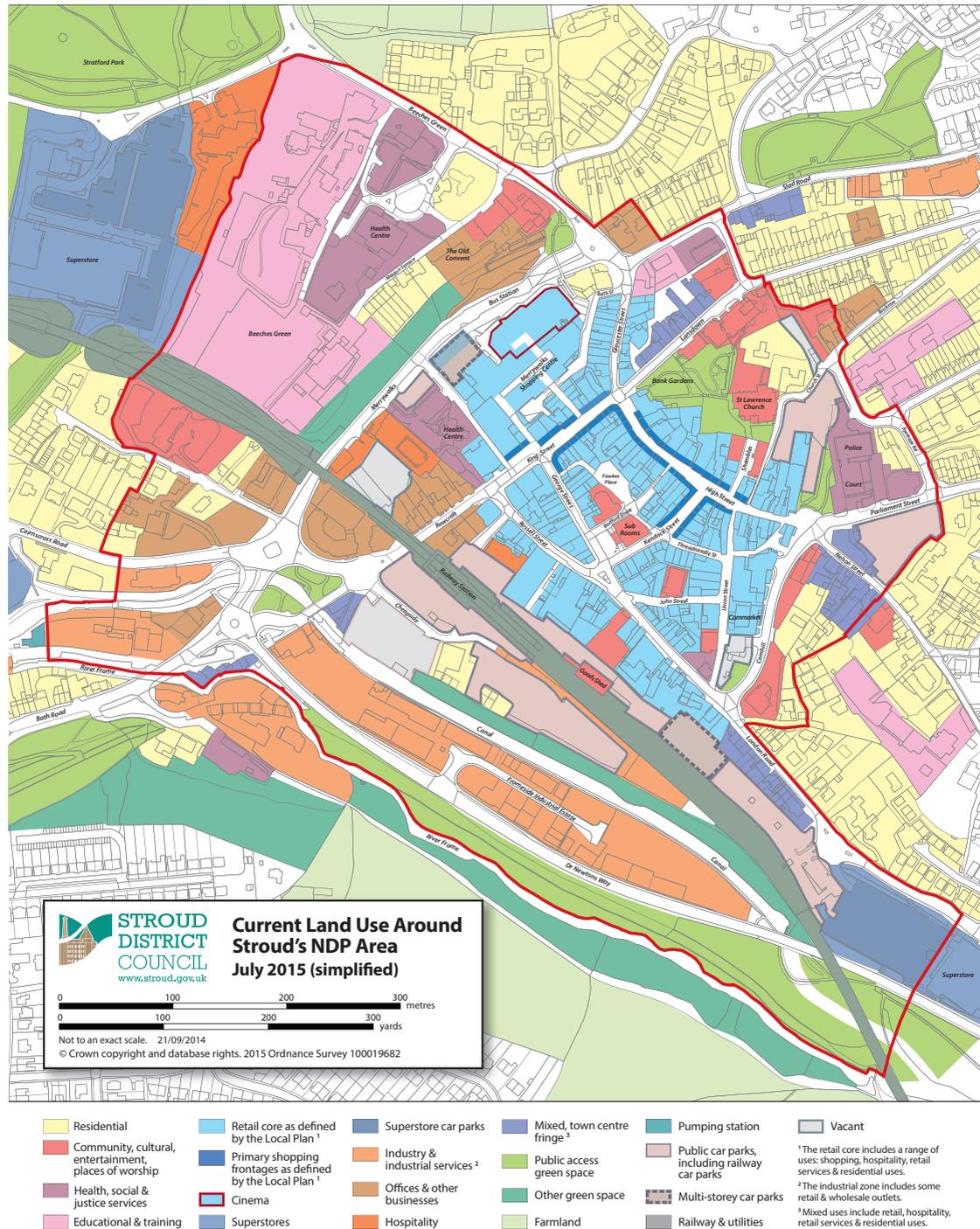


Fig 17.14 Stroud Neighbourhood Plan: land use pattern

Source: Stroud Town Council 2016 (note 9), p.17.

priorities and beliefs. For example, traders were very suspicious of extending pedestrianization, and wanted as much on-street parking as possible to allow 'pop and shop' visits; by contrast the environmentalists were in favour of greatly extending the pedestrian areas. The draft plan was somewhere in-between, trying to keep both parties on board: a set of modest proposals which improved safety at awkward junctions and enhanced the quality of some key spaces – each justified in its own right. This was a *softly, softly* approach. If people liked these improvements, once implemented, then that would establish a precedent for more ambitious schemes.

The outcome of public engagement and political consultations was positive. Indeed, some of the most ambitious proposals – for new pedestrian and bike routes and bridges to connect parts of the town currently separate – won strong support. The emerging strategy included policies for the following:

- encouraging investment in good quality retail, office, service and social facilities;
- providing opportunities for more and varied housing, increasing the number of people within easy walking distance of the centre;
- progressively up-grading the quality of streets and spaces to improve the pedestrian experience and enhance the setting of historic buildings;
- transforming the convenience, safety and attractiveness of access to the town centre for pedestrians and cyclists, thereby encouraging more physical activity and less car dependence;
- reducing the exposure of people to traffic danger and air pollution;
- promoting better directions and charging systems for car parking, more welcoming 'gateways' into the centre, especially in relation to train and bus stations;
- creating an attractive canal frontage, much better linked into the town, and a canal basin for narrow boats;
- greening the town centre and its environs, protecting green-spaces in perpetuity, preserving tree belts and encouraging biodiversity;
- promoting Stroud as a canal-based market town, capitalizing on rail and waterway improvements.

Agreeing the plan

The journey from the options to the submitted plan was long and arduous. Most of the volunteers fell away. Tasks were left to a core group of two planners, the STC Clerk and one councillor, the chair of the Preservation Trust, and the part-time administrative assistant. The staging posts were: approval by the Town Council, formal public consultation in October 2015, and submission to the District Council in December 2015. On the way it was essential to establish that the plan was based on sound evidence, satisfied criteria of sustainable development, and was 'deliverable'. Several special

'It was essential to establish that the plan was based on sound evidence, satisfied criteria of sustainable development, and was "deliverable".'

studies by consultants were commissioned to assist. Despite the earlier surveys by the working groups, extra evidence was needed to demonstrate, for example, the poor quality of the pedestrian experience. Consultation with official bodies and independent testing of policies in a Sustainability Appraisal were needed, partly to ensure that government guidance was being adhered to.

The form of the plan was a critical consideration. The town centre 'neighbourhood' is not like a village with greenfields around it. Most parts have well-established urban uses. However, incremental renewal occurs unpredictably and there are certain sites that are vacant or underused. So the plan took the form of a range of measures:

- *General policies* that apply to any situation in the plan area, guiding development without being prescriptive, covering topics such as retailing, employment, housing, greenspace, movement and design.
- *Zonal policies* which apply to parts of the centre or specific sites – with some flexibility of use because of market imponderables.
- *Spatial Framework* – which shows the specific sites, locations where particular policies apply (e.g. gateways), the pedestrian routes and crossings that must be planned for when change occurs, and the civic spaces which require improvement (see Figure 17.15).
- *Design code* – to which any new development or public realm improvements must adhere.
- *How it will happen* – spelling out the mechanisms, in particular through private investors and development management; also the partners and the funding sources which will, it is hoped, realize the pedestrian and public realm improvements.
- *Advocacy policies* – such as road improvements and parking controls – which are outside the remit of the plan, but where the STC has a clear view and will seek to influence events.

Showing how things could realistically happen is essential for the approval and credibility of the plan. This required several things: the creation of more specific proposals for development sites, which could then be assessed for viability; contact with all landowners and building users who would be potentially affected by proposals; meetings with specific sets of interests (e.g. housing, culture and environment) to refine the plan, and with major land owners, hoping to interest them in the proposals. All this had to happen before the town council could give the go-ahead for the legally required six-week public participation process. Then after comments and representations from the public, businesses, charities and official bodies (including different parts of Stroud District Council [SDC]), the plan was either further modified, or explanation given as to why that was not necessary. The plan was then approved by the Town Council and submitted to SDC. SDC accepted the plan as consistent with its recently approved Local Plan, and initiated the final part of the process.

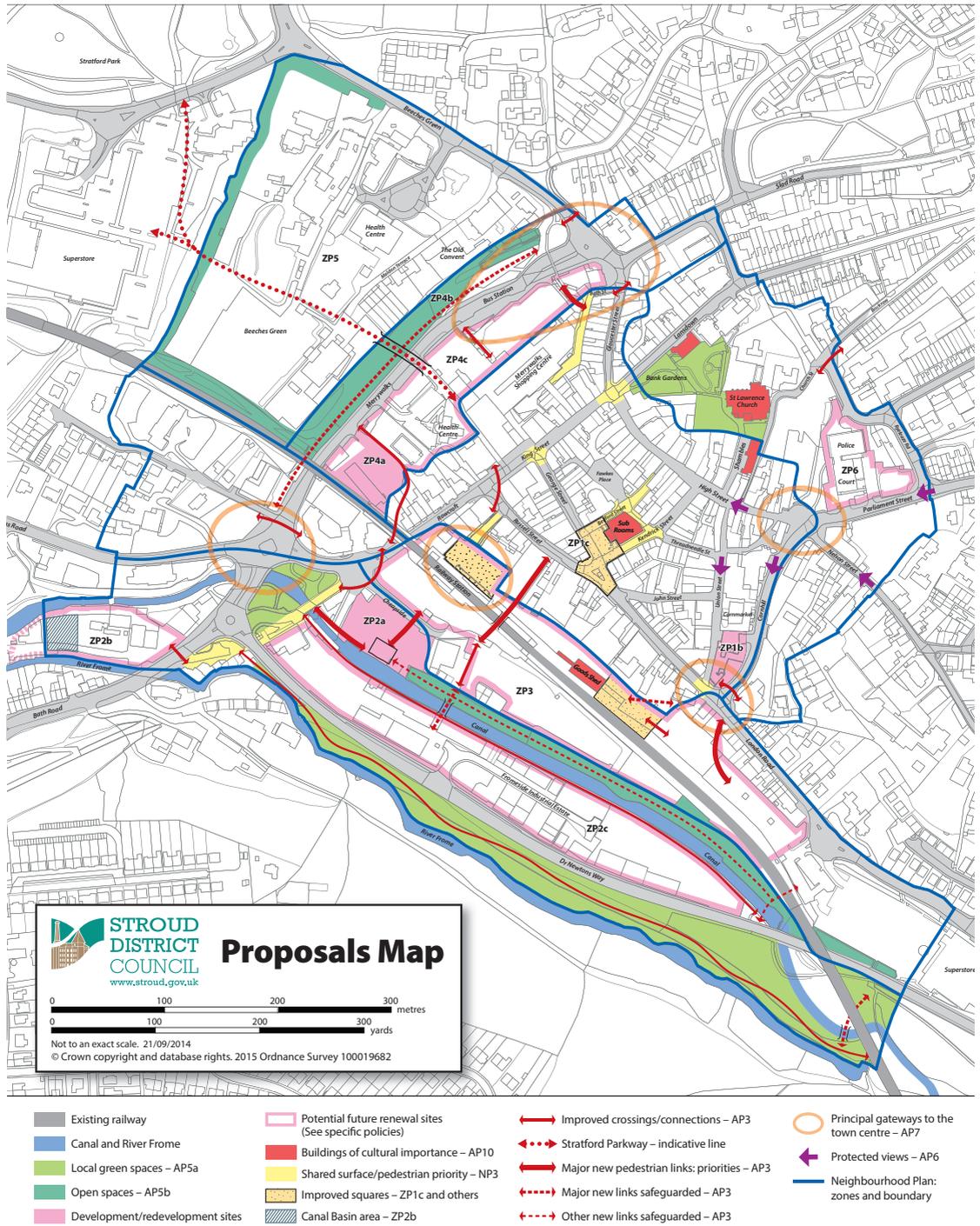


Fig 17.15 Stroud Neighbourhood Plan: spatial framework

Source: Stroud Town Council 2016 (note 9), p.103.

Taking action

At the time of writing (January 2016), the final stages of plan approval still have to be completed: examination by an independent inspector, and public referendum. It could still fall at one of these final hurdles, but the signs from NDPs elsewhere in the country are promising. None have yet been thrown out by the community. The referendum is expected in August 2016. That means that the plan will have taken something over two years from conception to final validation. Yet this is a small-area plan, with limited remit. Most other neighbourhood plans in the District are taking longer. The complexity of the community-oriented process, together with legal requirements, mean that quick plan-making is not an option.

Even before it becomes legally valid, however, the plan begins to have influence. It starts changing the assumptions and mindset of landowners and councillors. Some new initiatives have been launched. For example, STC has embarked on negotiations for improvement and up-grading of the station forecourt, as one of the 'gateways' to Stroud. And the future of several vacant sites is under discussion. The NDP core group has been involved in detailed discussions with the prospective developers of a critically important site by the canal: Cheapside waterfront. The plan incorporates a simple *development brief*. The investors have in principle accepted the recommendations, and the main elements have been incorporated in the plan: access along the canal frontage, a public square with retail space adjacent, a direct route from the canal to the station and the car parks (Figure 17.16).

'The NDP core group has been involved in detailed discussions with the prospective developers of a critically important site by the canal.'

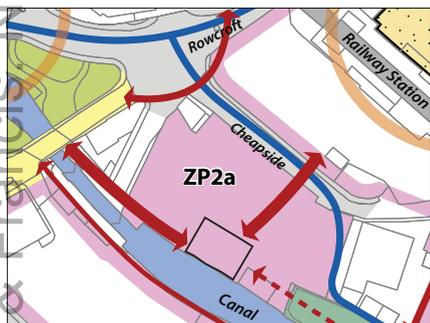


Fig 17.16 Cheapside waterfront spatial requirements

Source: Stroud Town Council 2016 (note 9), p.56 – an extract from the Proposals Map.

Learning lessons

Monitoring change in the plan area, and assessing the impact of policies, needs to be an on-going process. There are several simple indicators – such as the amount of new housing, the extent of public realm improvements and the footfall in the main shopping streets. The plan will come up for review in 2020, in parallel with the Local Plan for the whole District.

Figure 17.17 illustrates the overall process for the Stroud town centre plan. It shows how the 'technical' process of developing the plan is integrated with stakeholder and public engagement and with the legal obligations, i.e. the political and administrative processes. It is clear that the process is complex. Even for this small plan, a high degree of expertise is needed, plus volunteer commitment, political nous, and consistent clarity of purpose.

Converting healthy rhetoric into healthy decisions

There is many a slip between intention and realization. The case study above illustrates the difficulties of making even a relatively simple plan consistent, when many different interests are at stake, and decision-making is not centralized. So how can we ensure that

Appendix 8

Plan process diagram

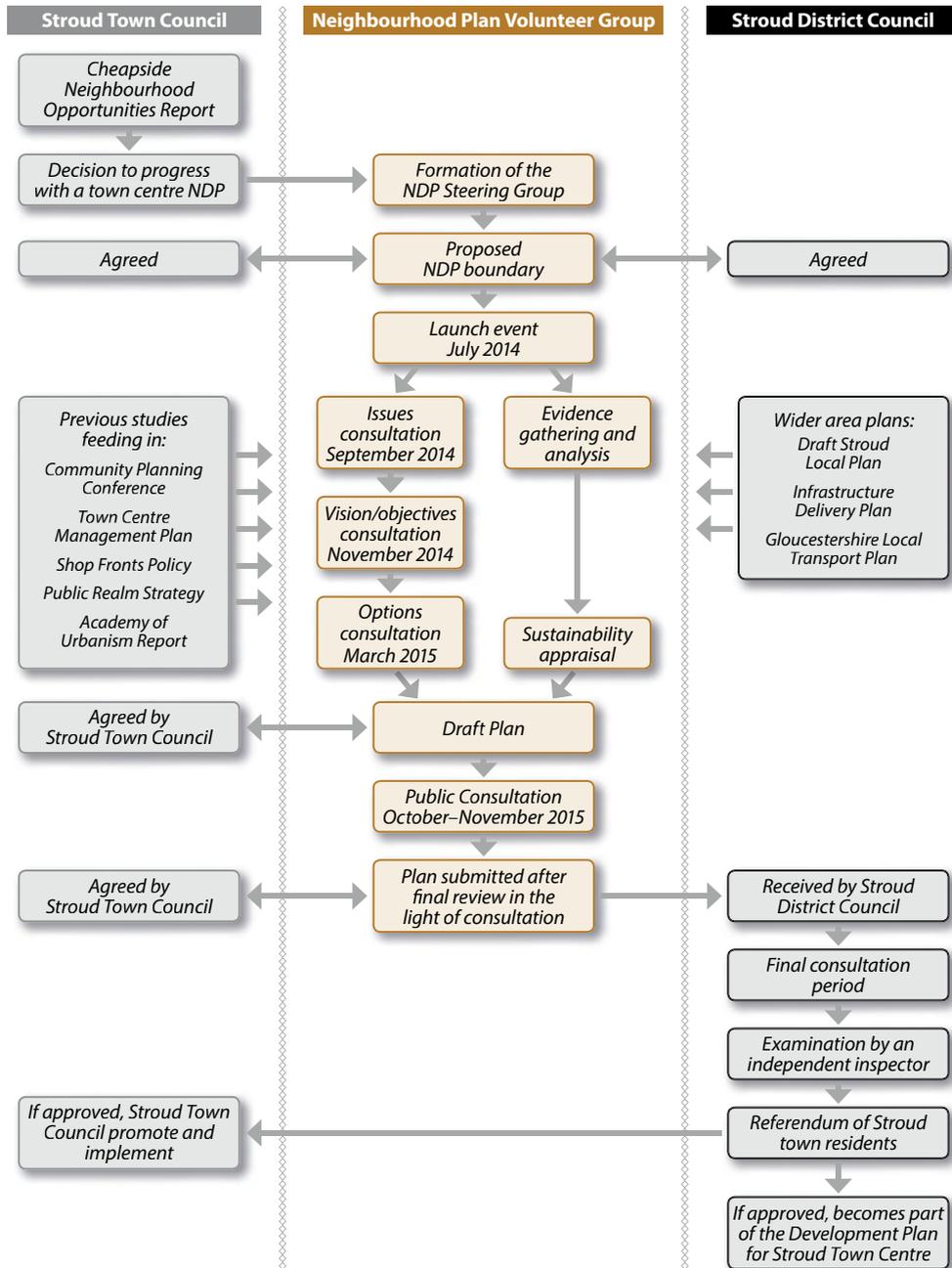


Fig 17.17 The Stroud Neighbourhood Plan process

Source: Prepared by the author for the NDP team.

the rhetoric of health, well-being and sustainable development is converted eventually into appropriate decisions on the ground? There is no magic bullet. There can be no guarantee. But at each stage of the process the professionals and decision-makers require unambiguous honesty.

Many health agencies, trying to influence development decisions, have turned to plan and project appraisal – particularly *health impact assessment* (HIA).

In Britain, the Department for Health, Health England and NICE (the National Institute for Health and Care Excellence) have all become concerned about the degree to which health and well-being are effectively incorporated in appraisal, and in spatial plans. A comprehensive study for NICE in 2010–2011 reviewed all the available evidence in Britain and worldwide. The study concluded that appraisal does not generally consider health impacts in any depth, if at all. Even HIAs tended to be partial in their approach, good on physical activity and environmental pollution but inadequate on mental well-being and health equity. Key barriers to full health-integration were lack of knowledge of those involved, the segmentation of knowledge and the absence of strong health goals in the plans.⁵

Some authorities manage to make it work. In England, the Plymouth Plan is held up as an exemplar, winning the RTPI Award for excellence in plan-making in 2015. It is a single strategic plan for the city acting not only as the spatial development plan, but also as the Council's strategy for health, housing, children and young people, culture, transport and the economy. Land allocation is a key function of the plan relevant to all departments. The legal and professional processes of plan-making shaped the integrated process.⁶ The RTPI judges were impressed by the evident cross-discipline and cross-political support for the integration of policies and the extensive engagement of the public in the process. They concluded that the Plymouth Plan is a ground-breaking example of 'joined-up' government.⁷

The Settlement Health Map can act as an effective trigger to joined-up thinking. Take for example the proposed construction of a new town bypass. The map can be used dynamically to identify effects, which could then be estimated before the decision to proceed is taken. Figure 17.18 shows by arrows the primary and secondary impacts then the effects from all spheres on personal health.

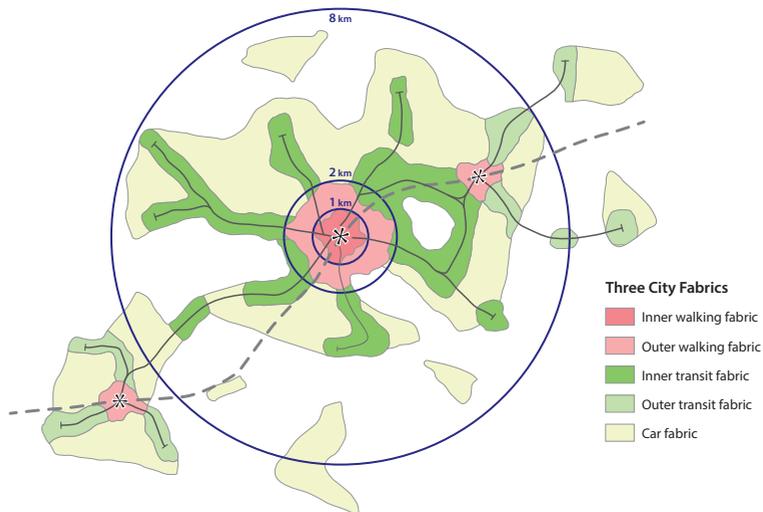
The primary (or direct) impacts are on the landscape, wildlife habitats and farmland, on the one hand, and on travel patterns, on the other. Travel by vehicle increases because of the new facility; new connections are possible, changing the pattern of accessibility. Increased vehicle mileage leads to more air pollution along the bypass route. Whether pollution and carbon emissions are increased or reduced overall depends on the degree to which the transfer of some trips from the centre of town does not simply release suppressed demand. That will depend on parallel action to deter traffic in the centre and positive support for alternative modes. Failing that, the bypass will reinforce the trend towards increased car use.

The new road profoundly alters vehicle accessibility. Land values along the bypass would be transformed, and both commercial and

'Appraisal does not generally consider health impacts in any depth, if at all. Even HIAs tended to be partial in their approach, good on physical activity and environmental pollution but inadequate on mental well-being and health equity.'

Fig 17.19 The three city fabrics test of healthy progress provides urban indicators that capture fundamentals of spatial structure, network quality and transit services

Source: Author's illustration based on Leo Kosonen's ideas. See Chapter 5.



people will choose healthy lifestyles, and health inequalities will be reduced.

Conclusion

Earlier chapters in the book are mostly about building up a holistic understanding of the urban environment in relation to people's health and global health, then reflecting on the nature of planning. This chapter provides a brief insight into what happens in practice. Somehow, through the varied pressures – institutional, political, commercial – planners need to maintain a clear professional and ethical perspective. The planning process needs to do the following:

- Be explicit and holistic in relation to objectives, encompassing all the relevant aspects of health and well-being, social inclusion, environmental sustainability, and economic vitality, ensuring that these are incorporated in the plan at an early stage.
- Be inclusive of stakeholders, valuing the involvement of varied public, private and community interests in a shared learning programme that enables the progressive, mutual development of understanding and ideas.
- Focus attention on critical issues through effective scoping, recognizing the interaction of policies and behaviours, so that resources are used wisely and expertise of all kinds – local, cultural, specialist, generalist, political, market – is tapped appropriately.
- Be both rational and creative through the plan process, uncovering the truth of problems, providing a positive incentive for the team to devise innovative solutions, testing options systematically and honestly.

- Build towards legitimized and well-supported, logical decisions, with the pathways to implementation clear and practical, and with commitment from partners.⁸

Further reading

- Addison, L. (2010) 'Building collaborative partnerships', in H. Barton, M. Grant, and R. Guise *Shaping neighbourhoods: for local health and global sustainability*. London: Routledge.
- Barton, H., Grant, M. and Guise, R. (2010) *Shaping neighbourhoods: for local health and global sustainability*. London: Routledge. This provides much greater detail on the practical processes and techniques needed to make healthy spatial policies.
- Cave, B. (2010) 'Assessing the potential health effects of policies, plans, programmes and projects', in H. Barton, M. Grant, and R. Guise *Shaping neighbourhoods: for local health and global sustainability*. London: Routledge.
- Corburn, J. (2009) *Towards the healthy city: people, places and the politics of urban planning*. Cambridge, MA: MIT Press. A book from a Californian perspective, including stories and analysis of attempts at healthy planning.
- Kurth, J., Iqbal, Z., Southon, P., Weston, C. and Robinson, C. (2015) 'Health-integrated planning and appraisal in the English Midlands', in H. Barton, S. Thompson, S. Burgess, and M. Grant (eds) *The Routledge handbook of planning for health and well-being*. London: Routledge.

Notes

- 1 In the UK, www.healthycities.org.uk/membership/howtojoin
- 2 Figure 17.4 is from Barton *et al.* (2010), freely adapted from Burns, D., Hambleton, R. and Hoggett, P. (1994) *The politics of decentralization* (London: Macmillan), itself adapted from Arnstein, S. (1969) 'A ladder of citizen participation', *AJJP*, XXX4, pp. 216–224.
- 3 These tools are derived from AIDA (the Analysis of Interconnected Decision Areas) – part of the *strategic choice* approach. See Barton, H. and Bruder, N. (1995) *A guide to local environmental auditing* (London: Earthscan), Chapters 2 and 8. For a more in-depth description of AIDA, see Hickling, A. (1974) *Managing decisions: the strategic choice approach* (Rugby: Mantech Publications); reprint digitized (2010).
- 4 The following section is my own summary of the process and the plan (having been involved in it) simplified for a general readership. The *Stroud Town Centre Neighbourhood Development Plan 2015–2035* documentation is available on www.shapingtheheartstroud.org
- 5 Gray, S., Barton, H., Carmichael, L., Mytton, J., Lease, H. and Joynt, J. (2011) 'The effectiveness of health appraisal processes currently in addressing health and well-being during spatial plan appraisal: a systematic review', *BMC Public Health*, 11: 889. And Carmichael, L., Barton, H., Gray, S., Lease, H. and Pilkington, P. (2012) 'Integration of health into urban spatial planning through impact assessment: identifying governance and policy barriers and facilitators', *Environmental Impact Assessment Review*, 32: 187–194.
- 6 Plymouth is a city of 200,000 people in SW England. See www.plymouth.gov.uk/plymouthplan
- 7 RTPI South West magazine *Branchout*, Autumn 2015. See www.rtpi.org.uk/southwest
- 8 Barton, H. and Grant, M. (2008) 'Testing time for sustainability: striving for inclusive rationality in project appraisal', *JRSPB*, 128(3): 130–139.
- 9 Stroud Town Council (2016) *Shaping the heart of Stroud – Stroud town centre Neighbourhood Development Plan 2015–2035: Submission draft*. Stroud, Stroud District Council and Stroud Town Council. Maps reproduced with permission of Ordnance Survey.

EMERGING CHALLENGES

Connected Places in the Global South

Is the concept of connecting places, connecting people relevant to the cities of the Global South? By the 'Global South', I mean countries of the developing world, mostly in the Southern Hemisphere. These countries share many common characteristics, including a low human development index and low gross national income per capita compared with developed countries, termed the 'Global North'.¹

Most future global population growth is projected to occur in developing cities, where the number of residents is growing more rapidly than in advanced economies, alongside more rapid motorization, modernization, and industrialization. With some 70 million new residents added to these cities each year, the challenges of creating livable, sustainable communities while providing basic but critically important services such as shelter, education, and affordable transport are immense. Given that poverty-linked problems are most pronounced in parts of the world where there is vast urban growth—that is, the Global South—special attention must be given to the social, environmental, and physical challenges of connecting places in these very different environments.

Most of the cities of the Global South are characterized by high densities and organically evolved land use mixes. Compared to developed cities, this tends to produce short trip distances and a high proportion of walking, cycling, and informal carriers. Public transport is also prevalent in these cities. Often lacking, however, are rationally designed and well-connected road networks, safe walking and cycling corridors, civic gathering places, and safe zones for kids.

According to the World Health Organization's global status report on road safety (WHO, 2009), more than 1.2 million people die in road accidents each year. An alarming 90 percent of these fatalities occur in the low- and middle-income countries of the Global South, while 75 percent of the deaths involve pedestrians, cyclists, and other vulnerable road users (WHO, 2009). This is a consequence of an environment that does not promote walkability and is not adapted for cyclists and other users of non-motorized transport (NMT).

Although there are no basic street amenities for an NMT user in many mega-cities of the Global South, the infrastructure for motor

vehicles is doubling every seven years. The result is more accidents and congestion, escalating air pollution, and constraints on economic development. These negative externalities cost about 6–7 percent of GDP per year (Cervero et al., 1998). Giving higher priority to road infrastructure than to public transport exacerbates the situation. Being able to access services and public spaces is a major challenge for most urban residents, who cannot afford to drive or own a personal vehicle. A lack of access is a particular issue for the urban poor, the physically challenged, and women and children (Cohen, 2006).

With the creation of hubs at scattered locations in the populous cities, the problem of locating people near their work or services is yet to be resolved. Rising incomes in the Global South mean more trips with more goods to be transported. When the residents of the Global South reach the income levels of Europe or the US, only one-third of travel will be to or from work, which means the number of trips in the future will be multiplied and associated problems exacerbated. Hence, planning for accessible, interactive places is critically important for the social and economic well-being of these populations.

Despite all these issues in the cities of the Global South, a strong sense of identity is visible in their streets and squares, which have retained their role as social hubs. What, then, are the issues that constrain but also provide opportunities for the cities of the Global South to create viable urban places, as well as safer, greener transport connectivity between them? The following section addresses this core question.

Formal and Informal Peri-urban Developments in the Cities of the Global South

Responding to ever-increasing population numbers, many new cities are being planned in the Global South. Even though the transport characteristics of these cities are different from those of cities in Global North, many are still reliant on conventional auto-centric, Western city planning (Dimitriou, 2010; Feng et al., 2010).

An example of applying Western-style planning in developing countries is the edge city concept emerging in China, India, and the United Arab Emirates. City outskirts brim with gated and boxed mid-rise glass office towers surrounded by gardens and parking lots. Shopping malls, wholesale supermarkets, and high-tech industry hubs have located to city peripheries and add to congestion. A study of the travel impacts of 900 households that shifted from organically evolved, mixed-use areas in Shanghai's urban core to isolated superblocks on the peripheries revealed a 50 percent increase in vehicle kilometers traveled by the households and an alarming shift from non-motorized to motorized travel (UN-Habitat, 2013).

These developments not only relinquish the advantages of traditional place-based, pedestrian-oriented morphology and pattern of the old city cores, but also hinder future economic growth based on knowledge and innovation. Human-to-human interaction increases knowledge, innovation, and economic opportunity. This happens

only when cities are more connected and provide the time and places for human interactions.

Although outward city expansion to cope with population growth is unavoidable, is this the only solution? The assumption that the dense inner-city areas cannot support further infill is not necessarily true. In most cases, applying a uniform floor area ratio (FAR) fails to capitalize on premium locations. Cities such as Singapore, Seoul, Tokyo, and Hong Kong have developed living environments with efficient, high-quality services by adopting different density ranges for different areas and taking into consideration the varied socio-economic features (Suzuki et al., 2013). A responsive urban form achieved through articulated densities instead of average density opens up the possibility of vertical expansion in place of peri-urban sprawl.

While some residents choose to live in planned peri-urban developments, others are forced to live in unplanned, informal peri-urban locations. The cities of the Global South are characterized by increasing numbers of people forcibly evicted from city centers, and living in informal settlements on the urban periphery. The urban poor who occupy the city sub-urban rail/road rights of way must be resettled to accommodate major roadworks. Squatters on land in the city core that was previously considered undevelopable have also been forcibly shifted. This has an adverse effect on the urban poor in several ways. First, the relocation decreases the average income of the relocated families by 30–50 percent, which must now be spent on transport. Second, a resettlement 10–15 kilometers away from job locations results in a shift from walking to motorized transport (Suzuki et al., 2013; Tiwari, 2007). Inadequate access to public transport compounds the transport issues. Flexible transportation and a housing model that is well connected to public transport are essential to respond to the woes of the peri-urban slum dwellers.

A good example of connectivity for peri-urban lower-income communities and slum settlements can be found in Cape Town. Here, the objective of the arterial road design was to link the pockets of disadvantaged communities to the city centre (Watson, 2002). Responding to the fractured internal spatial structure after the collapse of Apartheid, the vision for Cape Town was to achieve a higher density and a spatially integrated city. The resulting plan identified arterial roads, with a concentration of middle-class residents, and the roads that connected the city core with the south-east section of Cape Town, where there was an over-representation of disadvantaged people. These were the Tygerberg Arm, the Southern Arm, and the Klipfontein Road (Curtis & Tiwari, 2008; Figure 7.1).

A square grid with nodes and corridors aimed to promote equity, access, and integration (Watson, 2002) by linking the CBD to three centers on the three corners of the square with the three identified arterial arms. The diagonal arm known as the Klipfontein Corridor was begun in 2003 and provided connectivity to the relatively undeveloped land in close proximity to poor residential areas identified as industrial (Figure 7.2).

The corridor design principles integrate people, space, activity, and movement through interrelated spatial layers. In this example,

Figure 7.1 The corridor system in Cape Town

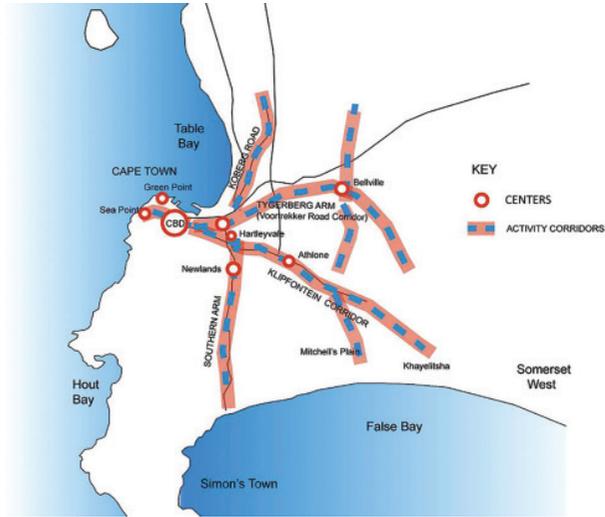
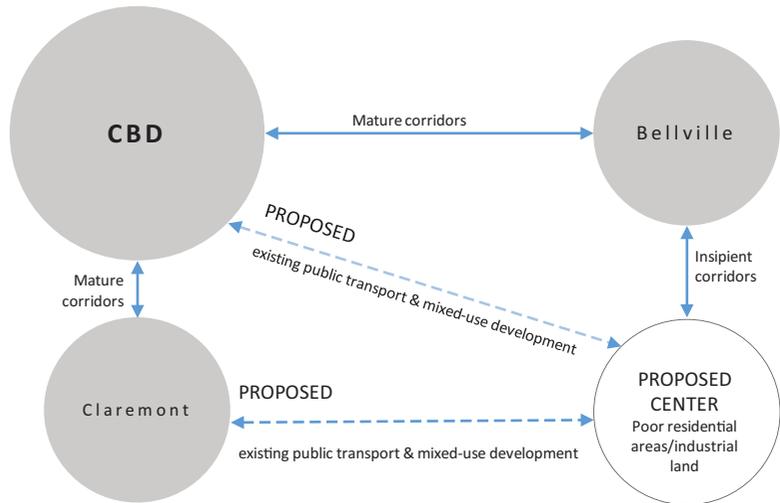


Figure 7.2 The conceptual diagram for the corridor system

Source: Based on Watson, 2002, and adapted from Transitioning activity corridors: Place making and traffic management, by R. Tiwari, 2008, Working Paper for Department of Planning and Infrastructure, Western Australia. (Unpublished report).



Conceptual Diagram for Nodes & Corridors

the NMT layer provided local area access and integration; a layer of socio-spatial generators encouraged economic activity and investment; and a public transport layer with a new BRT system connected the impoverished township of Khayelitsha and the middle-class suburbs of Rondebosch and Mowbray to the city center. The plan was completed with a strategic land use distribution layer (NM Associates, 2005). The calculation of the width of the corridor was based on a maximum of 10–15 minutes' walking distance (Figure 7.3). A high-density strip of 100 dwelling units per hectare (or more mixed use) was planned adjacent to the activity spine. Further out, densities of 40 dwelling units per hectare or more were allowed up to 1 kilometer on either side of the corridor (Watson, 2002).

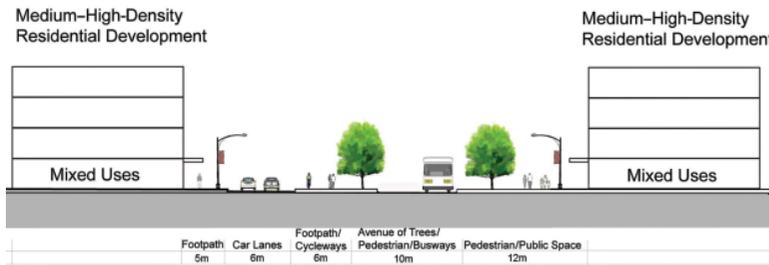


Figure 7.3 Cross-section of the Klipfontein Corridor

Source: Based on Klipfontein-Capetown Brochure available on NM & Associates. Adapted from Transitioning activity corridors: Place making and traffic management, by R. Tiwari, 2008. Working Paper for Department of Planning and Infrastructure, Western Australia. (Unpublished report).

Economic, social, and demographic concerns were pivotal for the corridor design, which aimed to maximize proximity and connectivity while improving the quality of transport and providing a safe urban space (Curtis & Tiwari, 2008).

Another consideration for projects providing connectivity is the affordability of the public transport system. A study of the use of transit in Delhi's slums revealed that only 2 percent of the respondents used the metro to go to work occasionally, while 87 percent had never used the metro because of the high fares (Arora & Tiwari, 2007). Providing affordable housing next to unaffordable public transport does not necessarily improve accessibility or promote equity (Chava et al., forthcoming). Through promoting connectivity, the city of Bogotá in Colombia has successfully reduced the cost of both housing and transportation (Cervero, 2011). The Metrovivienda initiative, an innovative land-banking program introduced in 1999, integrated TransMilenio (BRT) with affordable housing projects (Suzuki et al., 2013). TransMilenio operates 200 kilometers of feeder systems in low-income neighborhoods and peripheral areas. After acquisition, open agricultural land in these areas was sold to developers. The government provided the infrastructure on condition that the average unit price was capped at US\$8,500. This ensured the availability of affordable housing. A uniform ticket price avoided penalizing the poorer peri-urban communities with higher transport costs (Chava et al., forthcoming).

While connectivity to peri-urban communities through improved public transport and affordable housing strategies is critical, another unique feature of the cities of the Global South is their reliance on informal public transport and two-wheelers to achieve this connectivity.

Role of Informal Collective Transport and Private Two-Wheelers

While car ownership may be on the rise in the cities of the Global South, informal collective modes, sometimes referred to as 'para-transit' or low-cost transport (for example, jitneys and tempos), and private two-wheelers are leading the way in mass motorization (Feng et al., 2010; Johnston, 2004; Khisty & Arslan, 2005; Samberg et al., 2011; Zheng et al., 2011).

Informal transit coexists with formal public transport, such as buses, metro systems, and trams, and survives by filling service gaps.

In Nairobi, Kenya, 33 percent of total public transport trips are provided by *matututs*, consisting of a range of vehicles from minibuses and vans to pickups (Cervero & Golub, 2007). Mini- and micro-buses provide 5–10 percent of trips in India and Thailand, and about half of all trips in the Philippines (Cervero, 2000). Thirty percent of all trips in Mexico City are in 30,000 *collectivos* (minibuses and vans; Sperling & Kurani, 2003). Although tolerated by the authorities, these *collectivos* are uninsured and unsafe, but serve as a popular form of transit for low-income earners and have strong political backing (Cervero, 2000). Informal transport vehicles can respond quickly and cheaply to changing markets and passenger demands. They can also ferry goods in and around neighborhoods. They do, however, contribute significantly to air and noise pollution, traffic congestion, and accidents. There is little incentive to introduce clean and efficient vehicles. Estimates suggest that the *collectivos* in Mexico City consume more gasoline than the entire bus fleet operated by the two major bus companies (PCFV, 2010). A lack of regulations and enforcement leads to competition and conflict for customers among unlicensed operators. In South Africa, rival cartels fight over the most profitable routes, resulting in paratransit-related violence (Cervero & Golub, 2007). Public health and safety are threatened.

The positives and negatives of informal transport pose difficult questions for future planning. In Jamaica, the longstanding regulations for informal transport have merely served to increase illicit operations. What is needed is monitoring and enforcement. Each city and circumstance needs careful assessment. A balanced response would lie somewhere between the extremes of acceptance and outright banning of informal transport (Cervero & Golub, 2007). In Rio de Janeiro, Brazil, for example, the circumstances require regulation of informal transport, and investment in and concessions for formal modes of transport.

There is fierce competition between collective informal transit and individual two-wheelers in many cities of the Global South. Currently, 84 percent of all households in Hanoi, Vietnam, own a motorcycle, and 40 percent of households have more than two. The use of the once important *cyclo* (bicycle rickshaw) has declined with the introduction of taxis and the informal *xe om* (motorcycle taxi; Schipper et al., 2008). Similar shifts to two-wheelers have occurred in the cities of China, India, Indonesia, and Thailand. In China, Thailand, and Malaysia, the percentage of two-wheelers exceeds 50 percent of the total motor vehicle fleet (GIZ SUTP, 2010), while in Vietnam the number of two-wheelers is more than six times the country's car population (World Bank, 2011).

Two-wheeler transport is not without risk. Two-wheeler users are more prone to road accidents and deaths than other motorized vehicle users (WHO, 2009), and riders suffer from high levels of air pollution exposure (PCFV, 2010).

In traffic, two- and three-wheelers dominate when measured in terms of vehicle kilometers and emissions. In Hanoi, motor vehicular activity is a major source of emissions, causing both primary and secondary pollution. Ninety percent of the 1.6 million registered private vehicles are motorcycles, making these the major contributor

to emissions (Urban Emissions, 2016). In some cities, 40 percent of particulate matter and carbon dioxide, 50 percent of carbon monoxide, and 70 percent (or more) of volatile organic compounds are due to motorcycles (Manufacturers of Emission Controls Association, 2008). In metropolitan Manila, the Philippines, and Colombo, Sri Lanka, significant pollution is caused by unmaintained two-stroke engines (PCFV, 2010).

While many cities rely on tailpipe policies and regulations based on fiscal benefits to increase e-bike purchases and promote clean engines, non-tailpipe solutions are also being adopted. In Hanoi, for example, formal public transport systems incorporate two-wheelers assigned as feeders to the systems (PCFV, 2010). With the establishment of new bus routes, the expansion of vehicle fleets, the introduction of bus shelters, and passenger information systems, bus ridership in Hanoi reached 350 million trips by 2005 (ALMEC Corporation et al., 2007). Transportation in Hanoi now consists of two systems: formal public transport based on a bus fleet on fixed routes, and an area-oriented system based on smaller vehicles. The individual vehicle system consists of informal motorcycle taxis, traditional bicycle rickshaws, and car taxis (Schipper et al., 2008).

While investing in formal public transport might be a solution in some cases, it can only work when citizens accept the new system and change their behavior. It is therefore critical to make the system attractive and easy to use. In the absence of a clear strategy, the business-as-usual scenario results in an undesirable shift of current public transport users to two-wheelers and old cars (Figure 7.4). The challenge is to effect a shift towards public transport, particularly targeting users of motorized two-wheelers and old cars (Agarwal, 2009). The limitations that public transport presents to these users are:

- unacceptable door-to-door time (owing to inadequate public transport and a lack of network integration);
- marginal costs of informal/two-wheeler modes (which are often lower than bus fares); and
- poor social image of public transport.

Apart from affordability and the quality of public transport, serious consideration needs to be given to the amenities for 'feet and

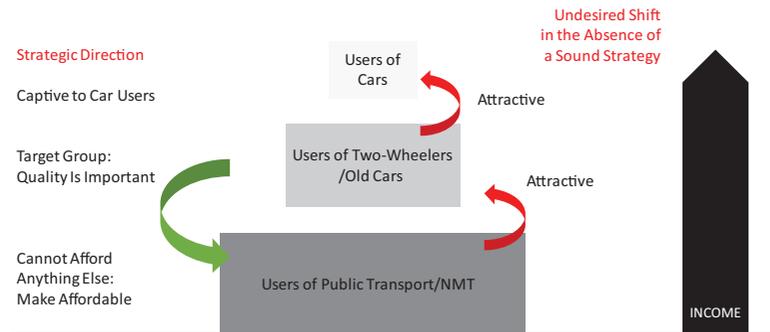


Figure 7.4 Factors affecting mode shift

pedal', as every public transport user is first a pedestrian or an NMT user.

Inadequate Amenities for Pedestrians and Cyclists

Heavy reliance on NMT is a distinguishing feature of Global South nations. In Tianjin, China, for example, 80 percent of all commuter trips are by non-motorized modes, mainly bicycles (UN-Habitat, 2013, p. 110). The bicycle is also an important mode of transportation in Vietnam. In Indian cities, cycling and walking account for 50–75 percent of community trips in the informal sector, while the remainder are dependent on public transport (Tiwari, 2007). Providing adequate facilities for this significant user group is often neglected, making them feel vulnerable and isolated.

Owing to inadequate amenities for the NMT-dependent majority of the Global South, safe travel cannot be assumed. Interviews conducted by Clean Air Asia in 15 cities in nine Asian countries (India, China, Pakistan, Sri Lanka, Indonesia, Vietnam, Mongolia, Nepal, and the Philippines) revealed that 81 percent of respondents would prefer motorized transport to walking, since the walking environments were considered unsuitable (Gota et al., 2010). Better planning and use of a scale more sympathetic to the needs of pedestrians and cyclists would address this issue.

The fundamentals of walkability—high density and mixed use—identified as the key ingredients of TOD for cities in developed countries are already present in the cities of the Global South. But this does not mean that it is easy to walk in these cities. Barriers to walkability include:

- absent or discontinuous pedestrian pathways;
- narrow, uneven, or unmaintained pathways;
- constant obstacles on pathways, such as encroachments by vendors/shops, trees, and temples; and
- a lack of shade, concerns about personal safety, and erratic motorists' behavior.

Even where there are good footpaths with designated pedestrian- and cycle-ways, thoughtless motorists often use these spaces to escape traffic congestion (Figures 7.5a and 7.5b). It is common to see two-wheelers take to the footpaths and cycle paths in Indian cities. Cars and two-wheelers also use footpaths as parking spaces. The weaker NMT user can be pushed out of the pedestrian space, the footpaths deteriorate, and pedestrians feel unsafe.

In some cities, footpaths can support many street activities, including vending, extension of shop frontages, and display places. They may be thronged by kiosks selling food, beverages, clothes, shoes, accessories, and so on (Figure 7.5c). The customers attracted by these activities restrict the space for pedestrians, forcing them to take to the roads. Unplanned built interventions, such as small temples and unadorned shrines, sprout up under shady



Figure 7.5 Appropriation of pedestrians' and cyclists' space
Source: Pictures by R. Tiwari (2012).

trees, along country roads, at bus terminals, and along footpaths on countless streets in Indian cities (Figure 7.5d). These should not be treated as encroachments that need to be removed. In fact, for residents going to work, they are places for everyday rituals. They do, however, disrupt the flow of pedestrians. Footpaths also serve as homes for the homeless, and as places of work (Figure 7.5e). Another consideration is the accumulation of litter on footpaths. The bad odor and unsightly appearance make walking or cycling very difficult (Figure 7.5f). These issues have a strong sociocultural dimension and they are not simply caused by a lack of a pedestrian-friendly infrastructure.

Some footpath activities do create a vibrant environment and promote interaction between different communities. Place-making strategies can enhance these spaces and encourage people to connect, provided the needs of pedestrians are met. A community-centered approach can raise awareness of the problems faced by pedestrians. An example is the Space Reclamation movement, introduced in a number of Indian cities (Bhatt, 2014).

In 2014, a group named Raahgiri started reclaiming the streets and petitioning the public authorities to plan for accessible public spaces for all sections of society. The idea is similar to Ciclovía, an

initiative that began in Bogotá, Colombia, in 1976 and later spread to other countries. Raahgiri is a collaboration between civil society, the media, NGOs, and local government, which aims to create public awareness of sustainable transport, safe streets and inclusive development. Every Sunday, from 7 a.m. to 12 p.m., a section of road is closed to vehicles and opened for people to use. The citizens enjoy recreational and leisure activities, including street dancing, yoga, and live music. The outcomes in the city of Gurgaon, where the movement began, have been overwhelmingly positive.

A survey conducted by Embarq India in Gurgaon found that:

- 350,000 people participated in Raahgiri in its first six months;
- 28 percent of participants bought bicycles post-Raahgiri;
- 87 percent started walking/cycling for short trips;
- there was a 29 percent increase in sales for local businesses;
- noise levels reduced by 18 percent—from 90db to 74 db; and
- exposure particulate matter 2.5 reduced by 49 percent.

(Bhatt, 2014, pp. 32–34, 38–40)

Raahgiri has started contributing indirectly towards equitable access to public places, services, and infrastructure. Local government is now obliged to make infrastructure improvements that are accessible to all, and is planning for sustainable transport infrastructure, such as widening footpaths and cycle tracks instead of widening road carriageways. The movement had spread to at least seven Indian cities within a year, and others have similar plans. People are becoming sensitized to the importance of public spaces and issues of accessibility. This space reclamation movement is gaining acceptability among the citizenry.

There is growing recognition that citizens must be engaged in the planning process to ensure that changes are accepted. This is a major shift for the cities of the Global South, where citizens have not previously been involved in any stage of the project life-cycle, even though the project may influence their lives and livelihoods. However, bringing citizens into the conversation poses significant challenges, especially when there is a history of distrust, inadequate and conflicting knowledge, and lack of agreement over the nature of problems between the authorities themselves (Cox, 1997; Vigar, 2000).

Bogotá: Striving to Become a Connected Place in the Global South

The city of Bogotá is actively working to find the right balance between formal and informal public transport and creating an environment that meets the needs of pedestrians and NMT users. An integrated approach has been used to establish a strong inter-modal network, transit-linked social housing, and public places with innovative finance schemes (Cervero et al., 2009; Suzuki et al., 2013). Home to some 8.7 million people in 2014 (Kraul, 2015), half of Bogotá has grown spontaneously and illegally, often on hard-to-access mountain slopes (David & Peñalosa, 2005). Social inclusivity, the primary aim of the approach, has been addressed by connecting

the geographies of the dispersed social housing sites and promoting equal opportunity for all citizens. The divide between rich and poor in Bogotá had long been embedded and reflected in the city's fabric, resulting in economic and social isolation in many parts of the city. The TransMilenio system has been successful in reducing this isolation. Within the first year of its operation, there was a 32 percent reduction in average bus travel times, a 93 percent drop in bus accidents, and a 98 percent passenger approval rating. Property values along the busway corridor rose owing to improved access and reductions in crime rates and noise levels. Public buses, previously stuck in traffic, now enjoyed dedicated lanes to avoid the jams (Cervero, 2005).

TransMilenio comprises a trunk- and feeder-route grid network. With a fleet of 1,400 buses, the trunk line operates on dedicated bus lanes covering 112 kilometers. There are 12 lines and 144 dedicated, self-contained stations, some with wi-fi (Global Mass Transit, 2011; World Public Library, 2015). An additional 410 feeder buses transport commuters from important stations to many locations not covered by the trunk line. Feeder buses operate without dedicated lanes and charge no additional fare (World Public Library, 2015). The trunk and feeder buses operate using an integrated intelligent transport system (ITS) for operation optimization, fare integration, and smooth interchanges (Bocarejo, 2012). TransMilenio serves up to 2.2 million people daily (World Public Library, 2015). All of the major work centers in the city are within the catchment area of the network (Tufts University, 2005).

When building TransMilenio, the Mayor of Bogotá, Enrique Peñalosa, incorporated some 350 kilometers of bicycle paths into the system (ITDP, 2004). From 1990 to 2002, US\$180 million was invested in bikeways, approximately half the amount spent annually in the US on cycling infrastructure (Hook, 2004). There are huge bicycle facilities at the end of each TransMilenio line to encourage cyclists to use the system (World Public Library, 2015). To promote cycling and walking, 127 kilometers of the city's main streets and roads are closed to automotive traffic every Sunday and on holidays throughout the year. On these days, over a million users take to the streets on their bicycles (Invest in Bogotá, 2015). With 12,000 persons per square kilometer, Bogotá is one of the most densely populated cities in the Western Hemisphere, and the mixed land use patterns make it very attractive for cycling. Three-quarters of daily trips in the city are less than 10 kilometers, and bicycles can often cover journeys through the city's traffic-snarled streets faster than cars (Cervero, 2005).

Using 'green connectors', Bogotá has focused planning on pedestrian and bicycle accessibility. Perpendicular and grade-separated pedways and bikeways connect some of the poorest barrios and informal housing settlements (with highly transit-dependent populations) to the busway. As a result, 45 percent of TransMilenio users travel to stations by foot or bicycle (Cervero, 2006). The TransMilenio busway has encouraged more walking per day, even controlling for socioeconomic factors such as age and car ownership (Cervero et al., 2009).

Place making has been carried out in Bogotá in an interesting manner. The use of symbols and performance art to demonstrate the need for a behavioral shift to achieve safe pedestrian spaces was encouraged by the mayor. The initiative has educated motorists while providing public spaces that stimulate community interaction. Ciclovía (see above) has reactivated public spaces by transforming vacant lots into parks. It has also improved safety, encouraged active living, and created a stronger sense of community. The bike routes traveling through the rich and poor areas of the city have provided connectivity and have attempted to merge the divide between these areas (Project for Public Spaces, 2012).

Bogotá's city-wide model, which is environmentally sustainable, has now been adopted by more than 50 cities worldwide. The success of the model is demonstrated by the fact that public transport is used for 69 percent of all trips within the city (Invest in Bogotá, 2015). However, in spite of its progressive and innovative policies and measures, Bogotá faces significant challenges concerning land use and transport integration, ineffectual density policies and inadequate physical design detailing, institutional inefficiencies, and a lack of coordination.

The increase in building density across the city has been lower for areas closer to the BRT stations than along the surface bus corridors feeding the stations. There was a 7 percent increase in the mean FAR throughout the city between 2004 and 2010 as compared to a 5 percent increase within 1 kilometer of stations along the initial 42-kilometer system (Suzuki et al., 2013). The lack of station area plans encouraging private investment through incentive zoning mechanisms has hampered growth and reduced the ability to capitalize on the added value created by the new transit. The placement of stations at the medians of busy roads has created a poor pedestrian environment, and thus discouraged commercial development around stations.

Bogotá is now developing a new integrated transit project based on the concept of a public transportation integrated system, which will allow the city to work in close collaboration with private developers to sell or lease air rights or underground use rights. The revenue generated could fund a range of social housing, infrastructure provision, and place-making initiatives (Suzuki et al., 2013).

Institutional support is needed to implement these plans, but this can be problematic within the current planning and administrative structure. Bogotá has a decentralized administrative system. Although it is vertically aligned to allow harmonious sectoral planning and development, a weak horizontal relationship across sectors makes it almost impossible to manage both planning and implementation. Barter (2001) argues that the way to overcome this is through dialogue, meetings, workshops, and seminars, which will allow everyone to participate, identify problems, and suggest solutions. A conversation in three dimensions is required: between land use and transit investments, between long-range and short-range planning, and between different levels of government (Suzuki et al., 2013; Walker, 2011). On the other hand, Shanghai and Singapore have demonstrated the benefits of coordinated

decision making, centralized control over land use, and housing and transit investment by local municipal government (Cervero et al., 1998).

Close

Cities of the Global South need improved access to jobs and amenities, increased economic and social development, and efficient movement of goods. Informal transport and two-wheelers make a positive contribution to these goals. Social and environmental sustainability is, however, a major concern if enhanced mobility relies primarily on conventional modes of transport. The result will be worsening air pollution and traffic congestion (Sperling & Salon, 2002). Reducing the use of individual vehicles and promoting the use of environmentally sustainable collective modes of transport are key challenges.

Although large populations present a significant challenge, cities benefit from high population density. Other useful benefits that are rarely found in developed cities, such as 'eyes on the street', are present in most cities of the Global South. However, many socio-cultural issues greatly hamper the use of the available infrastructure. Community engagement movements that empower citizens by bringing them into the conversation are critical. It is important that the cities of the Global South leverage their innate strengths by retaining their sustainable transport modes (walking and biking) and higher densities when planning for future transport and place connectivity.

Reducing negative externalities, such as air pollution and greenhouse gas emissions, while promoting social equity can occur only if automobile-dependent sprawl is avoided. Large increases in urban population add to already compromised transportation systems. The study by Suzuki et al. (2013) reveals that transit in many of the cities of the Global South has so far focused only on relieving congestion. Such a myopic vision may fail to incorporate strategies that would connect places.

The cities of the Global South need to adopt innovative solutions that should be city specific, as even cities within the same country may require a customized approach. Above all, urban professionals need to recognize that applying solutions designed for developed countries will probably prove unworkable and, in some cases, even counterproductive.

Note

- 1 Today, the World Bank classifies countries by their economic performance as derived by world development indicators, such as gross national income per capita. This classification puts developing countries in a category called the 'Global South' and developed nations in a category called the 'Global North'. Also, as per the United Nations Development Program (UNDP), the 'Global North' refers to the 57 countries that have a Human Development Index (HDI) above 0.8 in the UNDP's 2005 report (including Australia and New Zealand), while the 'Global South' refers to the rest of the countries of the world, most of which are located in the Southern Hemisphere (Damerow, 2007). The term 'Global South' does

not imply that all developing countries are similar and can be grouped together in one category. It highlights that although developing countries range across the spectrum in every economic, social, and political attribute, they all share a set of vulnerabilities, challenges, and opportunities (UNDP, 2004). Considering the diverse backgrounds and histories of the nations of the Global South, it may be rather misleading to discuss the increased share of world output of these countries. China, Hong Kong, India, Indonesia, Malaysia, the Republic of Korea, Singapore, Thailand, Argentina, Brazil, Mexico, and South Africa have all demonstrated their overwhelming importance, but it should be noted that the pace and magnitude of their growth have not been uniform. The nature of development in these countries has been associated with structural change in output and employment, not with improved living standards for the majority of the population (Nayyar, 1978).

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EMERGING CHALLENGES

Technology Mega-trends and Demographic Shifts

In this chapter, I ask whether contemporary technological advances can enhance the concept of connecting places, connecting people. Technological innovations such as app-based mobility, driverless cars, collaborative mobility models, and the shifting of activities in cyberspace have facilitated the creation of a 'hypermobile' society (Sager, 2014, p. 52). As we reach for a future where 'distance is dead and there is no longer any general organizational principle governing the distribution of people and activities' (Couclelis, quoted in Sager, 2014, p. 36), what will be the 'glue' that holds society together?

Modern societies are undergoing major shifts in age and household composition. As the global population is aging, young people are drifting towards urban centers and there is a decline in the number of family households (Rérat, 2012). Can the demographic shifts and technological innovations be harnessed to generate economic and environmental benefits? Can we build better communities by connecting places and people in light of the mega-trends that are changing how urbanites live, communicate, travel, consume, and interact?

Mega-trend I: Collaborative Consumption

Collaborative consumption,¹ made possible by connectivity between consumers, is on the rise (Hajkowicz et al., 2012). Examples such as AirBnB (a peer-to-peer rental network), GoGet (Australia's largest car-sharing company in 2016), and Vélib (Paris' most popular bike-sharing scheme;² Citiesnext, 2013) abound. Shared transportation among multiple users is growing in popularity in various cities. What is the impact of these trends?

The growth of car sharing in Australia, especially in Melbourne and Sydney, where 90 percent of the users and vehicles are based (International Car Sharing Association, 2016), has shifted transport strategies from car ownership to car rental to car sharing. The speed of this trend has seen a doubling of GoGet members every year since its launch in 2003 (Frost & Sullivan, 2012). In 2015, GoGet had 1,500 vehicles Australia-wide, estimated to remove 100,000 cars from the

road (University of Wollongong, 2016). The City of Sydney (2014) and other Australian municipalities have reported reductions in car ownership and street congestion. This shift from personal to shared cars is facilitated by a concurrence of factors, including smartphones with access to car-sharing apps, limited and costly parking in Sydney and Melbourne, and the convenience of retaining access to car transport while not using a personal vehicle.

The number of members in car-sharing schemes has also increased in the Americas (Brazil, Canada, Mexico, and the United States)—from 62,348 in 2002 to 1.5 million in January 2015 (Shaheen & Cohen, 2015, p. 2). A study conducted by automotive consulting house AlixPartners suggests that car sharing is a growing threat to car sales. It forecasts that car sharing will replace 1.2 million new vehicles in the US by 2021. Moreover, a single car-sharing fleet vehicle will displace 32 vehicles that otherwise would have been purchased (LeBeau, 2014), leading to less congested roads.

Yet another benefit of car sharing would be reduced parking requirements, as shared vehicles tend to present much fewer parking demands than owned vehicles, as they are on the move for most of the day. Earnings for driver-led services such as Uber depend on the number of rides, to maximize which the cars tend to be in motion all day, and hence demand less parking in comparison to commuters' cars that are parked in the lot (Fulton, 2015).

In acknowledging and responding to shared mobility, the automotive industry is promoting the option of electric vehicles (EV). The Car2go program, launched by Mercedes-Benz, allows users to share the Smart Fortwo EV (LeBeau, 2014). The Bolloré Group, based in France, has plans to send 3,000 EVs to London for sharing, with a tentative investment of £100 million. Such heavy backing of funds and brands demonstrates confidence in the prediction that competition will become more intense as more drivers start to opt for sharing rather than owning (Prakash & Kar-gupta, 2014).

This trend towards car sharing is replicated in other transport modes, such as bike sharing, which has grown exponentially in the last decade. The number of cities globally with bike-sharing schemes increased from just four in 2001 to 1,000 in 2016 (DeMaio, 2016; Richter, 2015). Cities such as Amsterdam would be significantly worse off without bicycles. Cycling constitutes 32 percent of all journeys in Amsterdam and 48 percent in the city centre (Cathcart-Keays, 2016; iamsterdam, 2016). Currently, the city boasts 800,000 bikes (both shared and owned) and more than 250,000 public bike-parking spots (iamsterdam, 2016). With an increasing commitment to cycling, the city will invest in 40,000 new bike-parking spaces by 2030. A sub-aquatic 7,000-bike parking garage is planned under the artificial waterfront, near the Central Station. Another two new islands, each with a capacity for 2,000 bikes, will be constructed by 2030 (Payne, 2015). The imperative for the city is not the scale of the undertaking, but the recognition that space in Amsterdam is at a premium. It may be an exceptional case; however, it does present a promising scenario of the benefits of investment in cycling infrastructure to be considered by other cities where bike-sharing schemes are already growing in popularity and usage (Cripps, 2013).

According to data compiled by Russell Meddin, the global bike-share fleet comprises almost a million bicycles (Richter, 2015). Innovative technological advancements in smart cards and tracking of cycle fleets have made it increasingly feasible for more cities to adopt bike sharing. Information communications technology (ICT) has enabled efficient management of fleets and reduced theft. If bike sharing, with its exposure to the elements, is to compete with climate-controlled cars, it must become more convenient and accessible. Innovation is essential to make the bike-sharing industry a strong mobility contender. Companies such as JCDecaux, operator of Paris' Vélib, are leading the way. It is testing a pedelec (pedal electric) system and automatic gear-change mechanism in Vélib bikes to increase comfort and convenience and attract new users (DeMaio, 2016).

The increase in bike sharing has made a substantial contribution towards making cities more connected. Operating at a human scale (Aldred, 2014), bikes open up opportunities for city managers to encourage interactive places and place making.

Mega-trend 2: Changing Vehicle Technology

As we have seen, the advent of collaborative consumption is reshaping the automotive industry and mobility practices (Hajkowicz et al., 2012). The future will also include autonomous or driverless cars (Corwin et al., 2015). Self-driving vehicles have been widely anticipated and their commercial introduction is becoming a reality (Barr & Ramsey, 2015). Google's driverless cars have already driven more than a million miles in autonomous mode. Ford, BMW, Daimler, and Cadillac are developing plans for vehicles quite distinct from those of the present (Corwin et al., 2015). Toyota expects to introduce its first self-driving car by 2020 (Caddy, 2015). As he stated at the 2015 Frankfurt Auto Show, US Secretary of Transportation Anthony Fox expects self-driving cars to be in use all over the world by 2025 (Hauser, 2015).

Yet another innovation in vehicle technology has been in the area of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications that can potentially avoid road hazards and accidents (Corwin et al., 2015). A V2V communication warns the driver of an impending collision, provides traffic in view, suggests rerouting, and so on. Data like the car's position, speed, steering-wheel position, and brake status are broadcast to other vehicles within a few hundred meters in order to make them aware of what is unfolding around them (Knight, 2015). BMW's app, called Real Time Traffic Information, uses the same technology to provide precise information on the traffic situation. Movement profiles downloaded from the network, GPS data available from vehicle fleets, smartphone apps, and police reports alert users to a threat and suggest potential alternative routes (BMW Insights, 2013). According to Forbes, automatic emergency braking (AEB) is another safety feature that about ten of the top automakers, representing 57 percent of global vehicle sales in 2014, are developing (Yvkoff, 2015). The Insurance Institute for Highway Safety's dedicated Vehicle Research Center will

be incorporating the AEB feature across its vehicle lineup (Yvkoff, 2015). The same institute revealed the technology has been shown to reduce insurance injury claims by as much as 35 percent (Insurance Institute for Highway Safety, 2015).

According to the US Department of Transportation (Sheehan, 2015), which is conducting research on V2I communications, this technology can enable application designs for the avoidance and alleviation of vehicle crashes, particularly for those that are not addressed by V2V communications alone. The technology communicates with vehicles through infrastructure such as traffic signals, dedicated installations, and state vehicles, to convey information to drivers and pedestrians about crosswalk warnings, stop sign gaps, curver speed warnings, and so on. Impacts projected by the Federal Highway Administration include a 20 percent reduction in vehicle emissions, a 50 percent decrease in pedestrian conflicts, and a significant reduction in collisions, injuries, and fatalities at intersections (Arnold & Walker, 2014).

Mega-trend 3: Increased Use of Virtual Spaces

A third global mega-trend is increased use of virtual spaces (Hajkowicz et al., 2012). The use of ICT has altered lifestyles in many ways. An example is e-commerce, which is growing globally at close to 20 percent annually as consumers no longer rely on stores as their sole means of access to products (Stephens, 2014). E-commerce is providing convenience, variety, and personalized shopping experiences that are changing the retail stores' business models (Securepay, 2014). Global online retail sales are projected to reach US \$4.3 trillion by 2025, an increase from just US \$0.55 trillion in 2011 (Frost & Sullivan, 2014). In the US, the increased trend in e-commerce slowed retail foot traffic from 35 billion visits in 2009 to 17 billion in 2013 (PWC, 2015). The increase in 'clicks' (online modes) has meant a reduced footprint of 'bricks' (offline or physical infrastructure), and an evolution of 'concept' (appealing to specific lifestyles) and 'express' (fast and convenient fill-in and stock-up shopping) stores (Frost & Sullivan, 2014, p. 15). Companies like IKEA that rely on big showrooms (the largest being 59,000 square meters) are planning to launch small urban stores and pick-up points (Mitchell, 2015). Big-box retailers like Best Buy and Staples in the US are moving to smaller spaces to better serve the digitally savvy consumer (Pomerantz, 2014). The average retail store size by 2020 is expected to be reduced by 15–20 percent from the 2013 figures (Singh & Saini, 2013, p. 8).

The growth in internet commerce has been accompanied by a growth in background logistic operations and supporting industries (Productivity Commission, 2011).³ Online transactions combined with the triggered background operations further enable domestic and international freelancing models and offshoring to grow rapidly. A report from Deloitte describes the emergence of a fluid ecosystem with rapid blurring and dissolving of fundamental boundaries that have historically determined the relationships, interactions, and potential of most businesses (Corwin et al., 2015).

Increased teleworking—where people can work from ‘third spaces’, including the home, parks, cafés, libraries, or other public spaces—is enabling a life of zero commuting. There is increased interest in these spaces as well as investment from knowledge workers and the office property sector (REGUS, 2011). Such spaces challenge the notion of the traditional office and the associated commute. Hence, the designs of both working spaces and transportation services have been affected (Hajkowicz et al., 2012).

Online retail and teleworking together still represent a relatively minor share of turnover and labour markets. However, the heft of activities taking place in the virtual space is fast paced and so impacts the real world. Cyberspace has accommodated social and recreational activities to an enormous extent. An example is the recent Pokémon Go game, which took over the world soon after its launch in July 2016. The cellphone-based game had about 25 million active players in the US within a week of its launch, setting a new record in the world of smartphone games (Allan, 2016). It creates ‘augmented reality’ through GPS and cameras, overlaying physical space with digital images (Keogh, 2016). The original 1996 franchise concept of a nomadic hunt for virtual creatures has been retained. Players interact with virtual elements of the game, like Poké-stops and -gyms, while navigating real, physical spaces. The virtual creatures are hidden around landmarks and other well-known public spaces. Hence, the game compels users to walk and reactivates the public spaces and landmarks, popular or unpopular. The key point to be noted is that Pokémon Go has forced people into the public realm and especially to rarely visited areas, such as memorials and local parks (Buffa, 2016). Survey findings note that the game captures a diverse demography (MFour, 2016; Zhao, 2016) by attracting people of different ages, genders, races, and incomes to explore the local environment.

The gaming interactions are redefining activities in the forgotten public realm and make a case for capturing the potential of urban spaces through augmented experience. Dan LaTorre, of the Project for Public Spaces, acknowledges the interweaving of technology and public realm. According to him, ‘Gamifying gives people a feeling of new permissions to explore the city’ (Project for Public Spaces, 2016).

The appropriation of cyberspace for the everyday activities of shopping, working, recreating, and socializing has led to the development of new relationships and institutions. Increased digital connectivity then has the potential to change (positively or negatively) societal behaviors, labor markets, retail models, city design, and transportation systems (Hajkowicz et al., 2012).

How Do Some of the Technological Mega-trends Align with the Predicted Change in Global Demographic Patterns?

An examination of demographic trends clearly demonstrates an increase in life expectancy and a proportional reduction in the young population (European Environmental Agency, 2011). According to

the United Nations (2015), between 2015 and 2050, the proportion of persons aged 80 years or over is projected to rise from 1.7 percent to 4.5 percent. The percentage aged 60 years or over will increase from 12.3 percent in 2015 to 21.5 percent in 2050.

The growth in the aged population presents the vast societal challenge of ensuring that infrastructures can support and enable them to live healthy, independent, and productive lives (Czaja & Sharit, 2009). As technology is being used commonly, and is likely to become more important over the next few decades (Horgas & Abowd, 2004), it becomes critical to determine its potential to cater for the lives of the aging population. Technology has the capacity to improve the quality of life of senior and older adults, but they tend to be reluctant users of technology (Charness & Boot, 2009).

Research by the RAND Corporation (2004) suggests that pension plans and reforms to social security may allow later retirement for older workers, and they would benefit from the existing growth in alternative work arrangements, like distance working, working from home, and flexible work hours. Safety, security, and technological devices to assist cognition may be able to delay or avoid the relocation of seniors from their homes as they age (Horgas & Abowd, 2004). Communication technologies can support connection and frequent interaction with their distant relatives and friends.

The challenge will be in adapting to rapid technological changes. These will require education and training. Home retrofitting to accommodate technological improvements will be required for homecare provision, which further raises concerns around affordability, need-responsiveness, suitability, and availability for all (Maddox, 2001).

Automatic driving would provide greater mobility to older people and those with disabilities. These social groups would appreciate automatic driving because of greater comfort and door-to-door service (Alessandrini et al., 2015).

While the number of aged people is on the rise, there has been another demographic shift of young people moving to city centers to pursue studies, and for jobs and apprenticeships (Hillman, 2007). Markus Moos (2015) suggests that our cities are experiencing not only gentrification but 'youthification'. Driven towards the city by ambition and curiosity, young people tend towards smaller families and shared households. In fact, there has been a growing demographic shift to solo living in the city over the past few decades. In Australia, one-person households have increased from 8 percent in 1946 to 24 percent in 2011 (Vasus & Qu, 2015). Renting studio apartments and refurbished lofts in the US is increasingly favored by a younger age group (Florida, 2016). This trend is most evident in cities and areas with populations with a range and depth of knowledge and well-developed technical economies, such as Boston, Seattle, and Silicon Valley. The surge in the number of residential rents in these cities has been even greater than in superstar cities such as New York and Los Angeles. Florida (2016) terms this 'the Great Reset' of housing from owning to flexible renting, which is taking place in dense urban areas in sync with the knowledge economy.

The expanding influence of electronic communication and social media and the rise in the number of daily activities occurring in

cyberspace—including those related to work, shopping, and leisure—make possible new lifestyles and habits for all, but particularly for the young (OPTIMISM, 2013). A survey of 15 countries found that while many young people were internet users, fewer than average had driving licenses. Another survey highlighted that young interviewees felt that the world accessible to them by car could now be accessed through social media (*Economist*, 2012). There was a rise in the share of young households without cars from 20 to 28 percent between 1998 and 2008 in Germany, where cars were increasingly considered as appliances rather than aspirational products (Sessa et al., 2013).

These transformations rely on sophisticated technology embedded in integrated (mostly) smartphone-based urban solutions. As a new breed of city dwellers emerges, the dissolution of traditional boundaries will cause a reassessment of daily practices, ranging from the need to travel to the nature of space required at home.

How Do Digitally Enabled Places of the Future Measure Up against the Connecting Places, Connecting People Attributes Outlined in Chapter 6?

Frost & Sullivan's conclusion is that the cities of the future will have multiple downtowns and TODs (Frost & Sullivan, & Hitachi Ltd, 2014, p. 6). New York, where around 70 percent of the population lives within half a mile of mass transit and 80 percent of the unit housing capacity created since 2000 is transit accessible, sets a pattern for future cities. Developing infrastructure around transit will retain the role of connecting places while being responsive to the shifting paradigm.

The capacity to work from anywhere generates new networks and mobility patterns. If not content with a conventionally fitted workplace, the urban inhabitant could rent an electric car to move to a space offering a productive environment. This productive environment would be a socially and culturally vibrant place with appropriate equipment suited to the new patterns of living and mobility. Possible negative consequences of such a scenario include atypical power consumption, congestion, and an increase in unproductive parking spaces. Breakthrough technology in electricity generation and storage, vehicle and fuel technology, and collaborative consumption models, along with open data⁴ and big data,⁵ would provide ways of alleviating such negative effects, and new opportunities for sustainable and resilient planning, urban design, and development (Connected Cities, 2015).

Box 8.1 outlines key characteristics of future places, such as the new cities of Masdar in Abu Dhabi and Songdo in South Korea. Masdar was originally planned as a zero-carbon city for 45,000 to 50,000 residents, 1,500 businesses, and 60,000 commuters. Currently, it houses 300 students and employs around 2,000 people (Lau, 2012, p. 77). With the downgrading of Masdar's sustainability goals, it is now branded as 'carbon-neutral' rather than 'zero-carbon' (Bsat, 2010, p. 243). Songdo is being built from scratch on 1,500 acres

of reclaimed land on the Yellow Sea coast. With a current population of 22,000, the plan is to have around 65,000 residents and 300,000 daily commuters by 2017 (Frommer, 2012). The city is trying to implement policies at a city level that previously have been tested only at the neighborhood scale. Both of these cities have been dogged by controversy and are not presented here as best-practice models for connecting places, connecting people. They do, however, demonstrate strong innovative strategies that align with key attributes of the paradigm, as summarized in Box 8.1.

Box 8.1 Attributes of Connecting Places, Connecting People Corresponding with Those of Digitally Enabled Future Places

First Attribute of Connecting Places, Connecting People: City and Neighborhood Structure

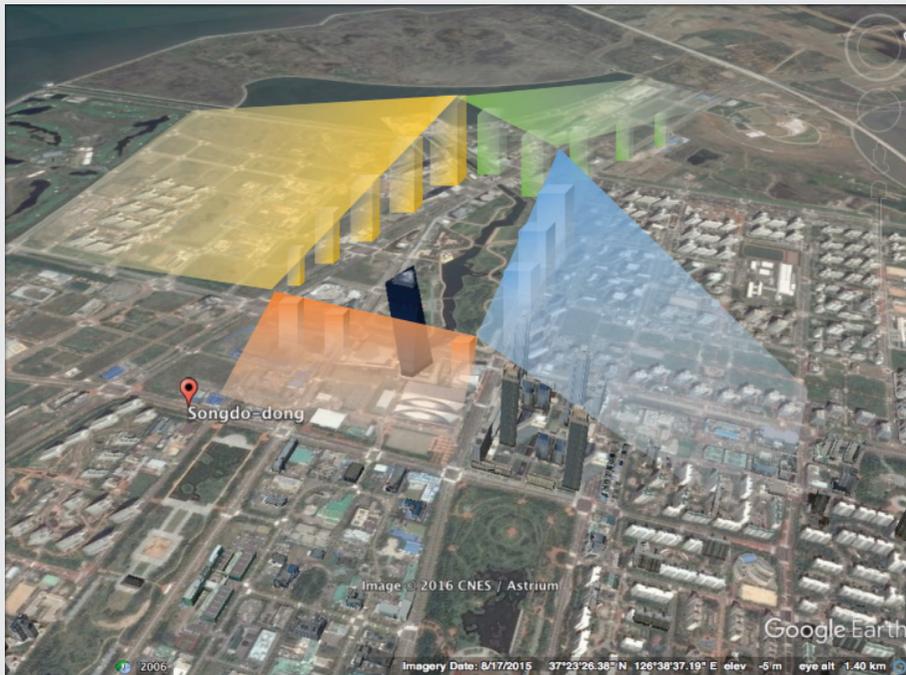


Figure 8.1 A graduated density gradient proposed at Songdo

Source: Image adapted from Google Map by Google, 2016.

Attributes of Digitally Enabled Future Places

Driverless cars require a gridded structure. Arterials will need to house EV-supportive infrastructure. With more retail going online (5 percent of retail sales online in 2011 to 19 percent online in 2025; Frost & Sullivan & Hitachi Ltd, 2014), buildings will be reduced in size. Small block sizes that cater for pop-up commercial/business and concept stores will be in demand.

Examples from Songdo

Songdo's small-sized pedestrian grid of 66x32 meters is aimed towards encouraging active mobility and 15-minute destination accessibility. A graduated density strategy has been proposed, aided by diversity of block sizes with mixed-use neighborhoods surrounding a central hub (Lee, 2012; Whitman et al., 2008; Figure 8.1).

The city and neighborhood structure provides a flexible blueprint for accommodating smart infrastructure in the future. A parallel information technology network linking all services and all residential, business, and government systems with shared data (Halegoua, 2012) has been proposed.

Second Attribute of Connecting Places, Connecting People: Diversity

Attributes of Digitally Enabled Future Places

Most recreation/entertainment/work will be pushed into the digital world on movable/transparent screens requiring zero to minimal space. This will reduce the space requirements within the house and allow more area to be devoted to communal spaces outside individual shelter units. Communal uses—cafés, football fields, community interaction spaces, hospitals, and local stores—will be accommodated within walking distance, ensuring diversity of land use.

Examples from Songdo

Communal spaces have been provided in Songdo by accommodating parking underground. The total green and public spaces constitute about 40 percent of the total area (Lee, 2012). A city-scale public park covering 100 acres is located within the city center and serves as an outdoor community center, hosting flea markets and art exhibits in dedicated exhibition spaces (Kunwon, 2008; Lee, 2012). Smaller pocket parks are scattered throughout the commercial, business, and residential sections.

Hospital units from multinational groups are proposed to be included in the near future and a university district anticipates satellite campuses of US- and Seoul-based universities (Lee, 2012).

Demographic diversity has yet to be achieved (Lichá, 2015).

Third Attribute of Connecting Places, Connecting People: Walkability and Cyclability

Attributes of Digitally Enabled Future Places

With more activities shifting online and freight shifting underground, the environment for active transport will be excellent and will connect people to the places they live in with attendant health benefits.

More people walking and cycling on the streets will result in safer streets. Pop-up infrastructure that is responsive to users (benches, lighting, information screens, bins, kiosks) will make the environment user friendly. User-interactive sensory devices will guide everyday life.

Examples from Songdo and Masdar

With parking shifting underground, Songdo has more space for public greens.

The land uses are well connected through sidewalks and bicycle lanes, ensuring accessibility. The city has defined sidewalks and 25 kilometers of segregated bike lanes supported by bike racks and free bike-rental stations. Active mobility has been encouraged in Songdo (Lee, 2012).

However, on the ground, things are rather different. The citizens have reported that distances are too large for them to walk around the city. It has to be kept in mind that Songdo is a work in progress and, with time and an increase in population services, might be available to people at walkable distances (Lichá, 2015).

Masdar's master plan provides green, shaded spaces for residents, workers, and visitors that include walking, jogging, and cycle trails, recreational and other pedestrian amenities. The linear parks connect recreation areas located throughout the city, and their orientation facilitates the movement of cool breezes (Walsh, 2011).

Fourth Attribute of Connecting Places, Connecting People: Place Making (Quality of Architecture and Urban Design)

Attributes of Digitally Enabled Future Places

The experience of the living environment will be mediated through augmented locative media applications (Bilandzic & Foth, 2012), augmented reality (Nischelwitzer et al., 2007), and wearable computing and ambient displays (Veerasawmy & Ludvigsen, 2010). The opportunities for enhancing a global sense of place through technology will be immense (Bilandzic, 2013).

SMART buildings with zero-carbon footprints will create a green environment. 3D and 4D printing will allow users to be architects of their living environments. This will increase a sense of attachment to the living environment and enhance the local sense of place.

Examples from Masdar and Songdo

Masdar has a number of projects that minutely specify everything from the type of electricity meters to the façades, with a view to optimizing and focusing on efficiency (Lau, 2012; Masdar City, 2011). Being built on high ground, tall wind towers and narrow streets signify pre-modern Arabian architecture (Lau, 2012). The buildings have to adhere strictly to efficiency regulations concerning cooling, lighting, water consumption, and even landscaping (Masdar City, 2011). The regulations direct users with the use of sensors, materials, and design to reduce energy consumption and wastage (Lau, 2012). The residential buildings at the Masdar Institute portray traditional alignment with their wavy façades, which shield the interior from direct sunlight and prevent inhabitants from seeing into the windows of buildings across the street.

Lau (2012) notes that Masdar uses the financial potential of new technologies to combat social concerns. The Abu Dhabi government intends to encourage scientific research in renewable energy through Masdar entrepreneurship and shift from an oil-based economy (Lau, 2012).

Songdo aims to incorporate technology in the built form. Besides a SMART built form, the city is trying to emphasize a link with the natural landscape. A canal system highlights the water theme, which is utilized by the waterfront shopping districts, green, and recreational spaces (Lee, 2012).

Songdo has unfortunately not responded to the regional geographic or cultural context (Lee, 2012). The landscape lacks the vibrant streets bustling with activities that are typical of Korean culture. Instead, the city announces itself as a global blend of cities, with its building blocks replicating icons from around the world (Hou, 2012).

Fifth Attribute of Connecting Places, Connecting People: Transport

Attributes of Digitally Enabled Future Places

Transport modes will include EVs, driverless cars, pods, and high-speed rail. Walking and cycling should be adequate for access to local needs.

Freight will increase in response to increased online retailing. Measures for improving the last-mile logistics will be critical. Cross-company collaboration will be essential to improve vehicle utilization and avoid empty trips. Online traffic-routing systems reliant on modular, environmentally friendly vehicles and delivery-on-demand systems that enable coordination with recipients will aid in time optimization, while also contributing positively to the environment. Measures at the macro scale will involve co-modality and alternative delivery modes (metro utilization for freight transport) and high-speed strategic transport corridors (Merten, 2015). Freight could be shifted to underground fast-movement corridors, leaving on-ground corridors for people movement.

Examples from Masdar and Songdo

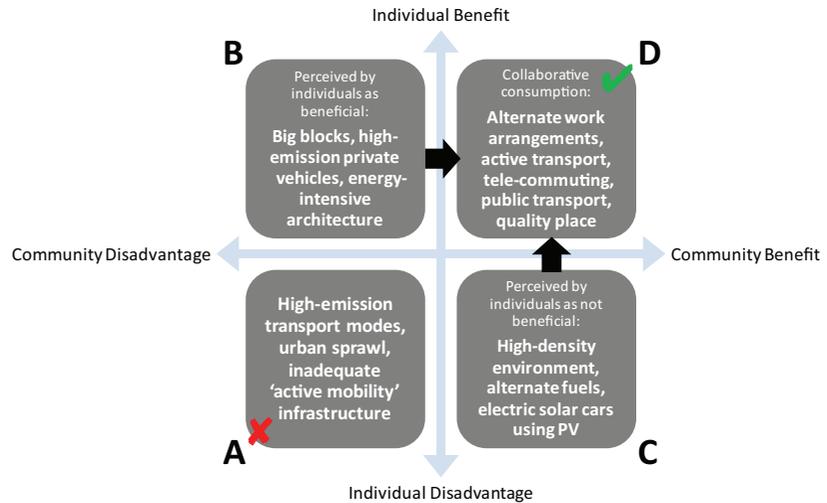
In Masdar, the initial design banned automobiles and provided mass transit through personal rapid transit (PRT) systems. Under the revised design, PRT was dropped (Walsh, 2011) and the use of electric and other clean-energy vehicles for mass transit inside the city was recommended. A majority of private vehicles will be restricted to parking lots along the city's perimeter. Abu Dhabi's existing light rail and metro lines will connect Masdar's center with the greater metropolitan area (Aktan, 2012; PRT Consulting, 2010).

In Songdo, alternative modes of transportation, bike rentals, and water taxis have been restricted to the central park area. The express bus terminal has been built but has never been used. In summary, insufficient public transport and the slow development of infrastructure services have resulted in spatial stratification (Lichá, 2015).

One important lesson from the Masdar and Songdo case studies is that whatever the nature of the future place might be, it will be successful as long as it emerges from the ground up. For Masdar, place making has not emerged from community values and preferences (Jensen, 2016). Further, Masdar's sustainability standards do not correspond to the values held by the regional and local community. A waning political will has prevented the regime from attempting to curb demands from the local population for an unrestrained lifestyle (Crot, 2013).

If we are to advance the paradigm of connecting places, connecting people, the important challenge is to confront those aspects that do not allow an alignment in benefits for the individuals and for the community. Individuals make choices in ways that return them pleasure or pain. Their preferences are shaped in time depending on these outcomes and do not consider equitable distribution of resources and services. Therefore, an increase in one individual's utility may reduce another individual's utility or utility for the community, considering resources are scarce (Bentham, 1987). In that sense, what works for an individual may not work for the community, and what works for the community may not work for certain individuals. The paradigms of today address issues of sustainability as of utmost importance. It has been established that private vehicles, low-density residential developments, consumerism, sedentary lifestyles, and so on carry costs for humanity and the planet. While 'Individuals are continually sensitized and encouraged towards a sustainable lifestyle, and urban paradigms are simultaneously striving to achieve sustainability goals. However, there are still miles to go.

Figure 8.2 Benefits and disadvantages for individuals and communities



Some examples of design aspects where a mismatch between community and individual benefits is evident are demonstrated in Figure 8.2. Scenario A shows how high-emission transport modes, inadequate infrastructure for active transport modes, and insensitive urban planning and design can have harmful effects for both individuals and community. These practices should be avoided and stopped. Scenario B highlights that big block subdivisions and high-emission private vehicles are perceived by individuals as beneficial, perhaps due to a lack of awareness and lifestyle choices. These individual perceptions need to be changed through information and education programs to effect a cultural and lifestyle shift towards sustainable practices. Individuals also perceive high-density environments as causing traffic jams and leading to poor living environments (Nematollahi et al., 2016). There is hesitation about using electric vehicles due to concerns and reservations about the particular technology, its supporting infrastructure, and a fear of obsolescence caused by rapid changes in technology. These are, on the other hand, beneficial to the community, as shown in Scenario C. By resolving individual concerns, a way forward is possible where these aspects, along with those enabled by mega-trends and technological transformations (Scenario D), become the determining factors for a connected place that unites individual needs and choices with those of the community.

For a successful accommodation of community values towards sustainability and individual preferences for lifestyle in future cities, an approach that is simultaneously top down and bottom up will be required (Figure 8.3). Cities can and should intelligently harness the potential released by ICT and instil positive transformation in manufacturing, infrastructure, services, and the digital economy. Given the scarcity of resources and pressure on competitive economies across the world, it is imperative to adopt sustainable models for production and consumption. ICT applications can be conditioned as sensors to be placed amidst civic life to understand demands, and as enablers

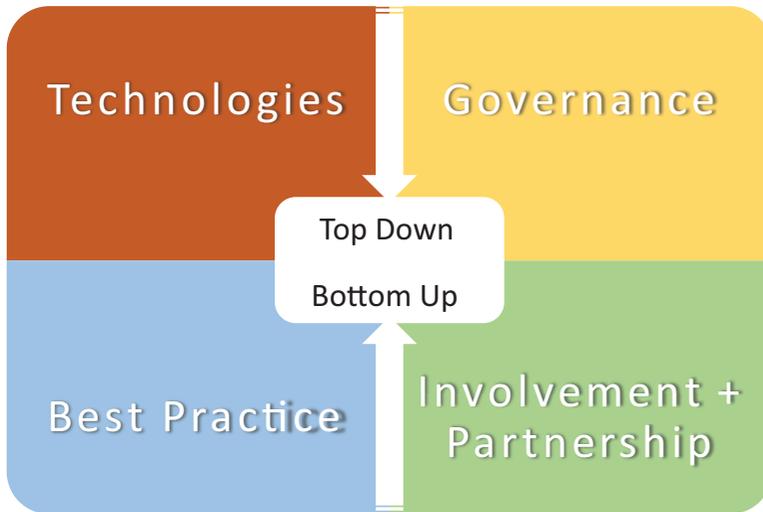


Figure 8.3 Using a top-down and a bottom-up approach

to support efficiency on the supply side. This leads to the creation of bottom-up and top-down models that use ICT to reap benefits from what is present in civil society. While a greater top-down approach could enable more investment in and regulation of infrastructure, as well as innovate business models and applications (Mega, 2013), the bottom-up approach could increase convenience, health, safety, and informed choices in daily life, thereby leading to a sustainable future.

Close

Working patterns and enterprises mobilized through social networks, and cities with e-governance, smart cards for multi-modal transport, connected vehicles, e-learning, and mobile banking are all projected to have a captive market of around US\$730 billion by 2020 (Jawad, 2014). ICT applications will have their place in fully automated homes and workplaces with unified communications. Many such ICT applications are already in operation today, and governments are investing heavily to create smart cities, digital cities, future cities, and/or intelligent cities (Hollands, 2008). This mega-trend has the potential to generate connected living in the world and will be evidenced in our home, work, and city environments.

Parallel to virtual connectivity will be connectivity in the real realm. The increasing investment in transit and growing numbers of TODs and place-making projects will create future cities that are connected and active urban places accessible by sustainable and integrated transport. ICT-enabled e-governance will provide avenues for e-citizens to participate in decisions about their living environments. A key measure of the attractiveness of a place is the degree to which people feel connected with each other through formal and informal networks. Through ICT-enabled connections, residents can leverage each other's skills. Residents, local organizations, and local businesses can connect to find jobs, services, or products that build

individual and community capacity. Care will be needed to bridge the gap between digitally rich and poor residents.

Will machine-to-machine communication, cloud computing, networks of data, virtual connections—the Internet of Things⁶—be the movers and shakers for the connecting place, connecting people paradigm? Will the resultant improved efficiency, optimizations, convenience, safety, and predictability lead to a place that is valued by its citizens (Haque, 2014)? Will the connected virtual place overshadow the connected ‘real’ place? Will becoming a digital citizen become more important than being a ‘real’ citizen?

The answers to these questions can be glimpsed in the work done at Medellín in Colombia, which was nominated as one of the ‘smartest’ cities at the Future Cities Summit of 2013. Medellín, a city that was struggling a few decades ago with its problem *favelas* and high crime rates, was able to reconnect its *favelas* not through smartphones but with publicly funded cable cars. A record drop in homicide rates from more than 200 deaths for every 100,000 inhabitants to around 62 was achieved by linking slum areas to the public transport network. Increased accessibility to new public place infrastructure, including libraries, schools, and sports facilities, allowed the ‘communities [to interact] in a way they had never done before’ (Poole, 2014, p. 1).

The success of Medellín demonstrates that real connected places will continue to matter and people will continue to value the in-person experiences that proximity affords. There is no doubt that the infusion of ICT makes life easier by making one informed and connected. What is crucial for transformative technologies is to have the sensors in the right places in the city. As society becomes more intelligent by making its citizenry more mindful of the facts, people will do the right thing and strive to avert any predicted disasters.

The plurality of actors involved or associated with the ‘digital skin of the cities’, including technologists, engineers, civic activists, urban planners, designers, and policy makers, results in plural narratives (Rabari & Storper, 2015, p. 27). These actors work together pragmatically or normatively for the agendas in the real space consisting of real people. Thus, while the internet has taken over our lives, face-to-face communication remains and will remain vital for humans.

Notes

- 1 ‘Collaborative consumption’ is a phenomenon born of the internet age and driven by information communications technology (ICT). It is defined as ‘the peer-to-peer-based activity of obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services’ (Hamari et al., 2015, p. 2047).
- 2 Vélib has the highest market penetration, with one bike for every 97 inhabitants, as of July 2013.
- 3 The number of inbound parcels in Australia increased by 56 percent in 2010–2011, almost twice the growth rate in 2009–2010 (Productivity Commission, 2011). The logistics industry, including road, rail, and shipping freight, experienced revenue growth of 6.5 percent between 2006 and 2011 (IBISWorld, 2012).
- 4 ‘Open data’ are data that are available freely without issues of patent and copyright (Open Knowledge International, n.d.).

- 5 'Big Data is characterized by volume, velocity and variety of data types' (Deloitte, 2015, p. 2).
- 6 The 'Internet of Things' is visualized as a hyper-connected urban environment—a super-smart city. Sensors provide connectivity to everything from cars to road infrastructure to rubbish bins (Perera et al., 2015).

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