Council Policy Options for Sustainable Homes

Poune Asset Management

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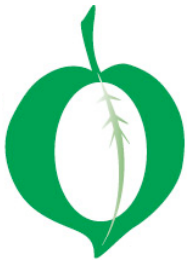

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About Us:
Poune Asset Management

Poune Asset Management is a boutique consultancy firm, a Socially Responsible Company (SRI) focusing on how to make property investment and management a better deal for investors and stakeholders whilst addressing people- and environment-friendly issues.
As such, we are a strong supporter of the United Nations Principles for Responsible Investments (UNPRI) and should become a sponsor soon.

Poune AM caters to two different categories of clients:

- Local governments and housing associations,
- Investment Management companies.

We have a proactive agenda to bring the environmental movement into mainstream property development and management, and as such we aim to reach the new frontier for green and healthy buildings as a profitable investment.

We could summarise our philosophy with a few select words:

Investing in People and Property

Poune Asset Management wants to put itself into the position of blazing a trail that others may follow, as sometimes the road to success is not a road yet, and in the process become a reference in its trading industry.

> *"Blazing a new trail: we need to create growth, not just follow it. Bold visions are essential to fuel hope, energise capacity and extend reach to what might be. Before something becomes conventional, one has to think unconventionally as it takes foresight and global perspective to stay ahead of the game.*
>
> *Adversity is commonplace, but things worthwhile don't come easy; one needs the vision to see what is possible and the resolve to drive it through. It is when you are successful in what you are doing that people start paying attention, and that's the way things begin to change."*

Finally, our Company develops a holistic and integrated approach that contains a clear mission with a strategy and governance structure to achieve that mission. In that respect, we put excellent governance and a willingness to invest in talented individuals at the core of our investment strategy.

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INTRODUCTION

For *Poune AM*, a sustainable home is warm, healthy, cheap to run, and kind to the environment. It will also be affordable both to construct and to operate, durable and, for larger developments, within a sociable and beautiful built environment. Finally, it will be designed to flexibly meet changing needs into the future.

It is commonly agreed that there is considerable scope to improve the sustainability of UK's new and existing homes; UK homes are generally cold, damp, unhealthy and inefficient in energy and water use. We can noticeably point out that:

- Fuel poverty[1] is widespread in the UK, reaching millions of already vulnerable people.
- There is a growing part of UK's population afflicted with asthma[2] which is directly connected to poor indoor air quality .
- The air inside homes can be more polluted than outdoor air.
- Cold damp homes pose serious health risks, particularly for the most vulnerable groups in the community who spend the most time at home.

Even new homes do not perform as well as they could: although insulation standards are much higher than they used to be, new building techniques can bring their own problems, particularly for homes' ventilation and indoor environment quality.
New homes in the UK are also the smallest ones in room size in Europe with the added negative feature of scarse natural light. Occupants are left struggling with often cramped homes and undersized rooms.

In short, the challenge for the UK is to improve the millions of homes that we already have, and to ensure that we don't continue to make the same design mistakes when we build new ones. *Poune AM*'s research is helping to understand the steps we need to take to meet this challenge.

A central concern is to ensure that today's sustainable homes are flexible enough to meet tomorrow's changing needs and challenges. We already know what some of these needs will be,

[1] Households that need to spend more than 10 per cent of their income on fuel to maintain a satisfactory heating regime, as well as meeting their other fuel needs (lighting and appliances, cooking and water heating). UK National Statistics definition: www.statistics.gov.uk

[2] Children living in damp, moldy homes are 1.5 to 3 times more likely to experience coughing and wheezing. The UK has among the highest prevalence rates of asthma symptoms in children worldwide. "Key facts and statistics" from Asthma UK charity: www.asthma.org.uk

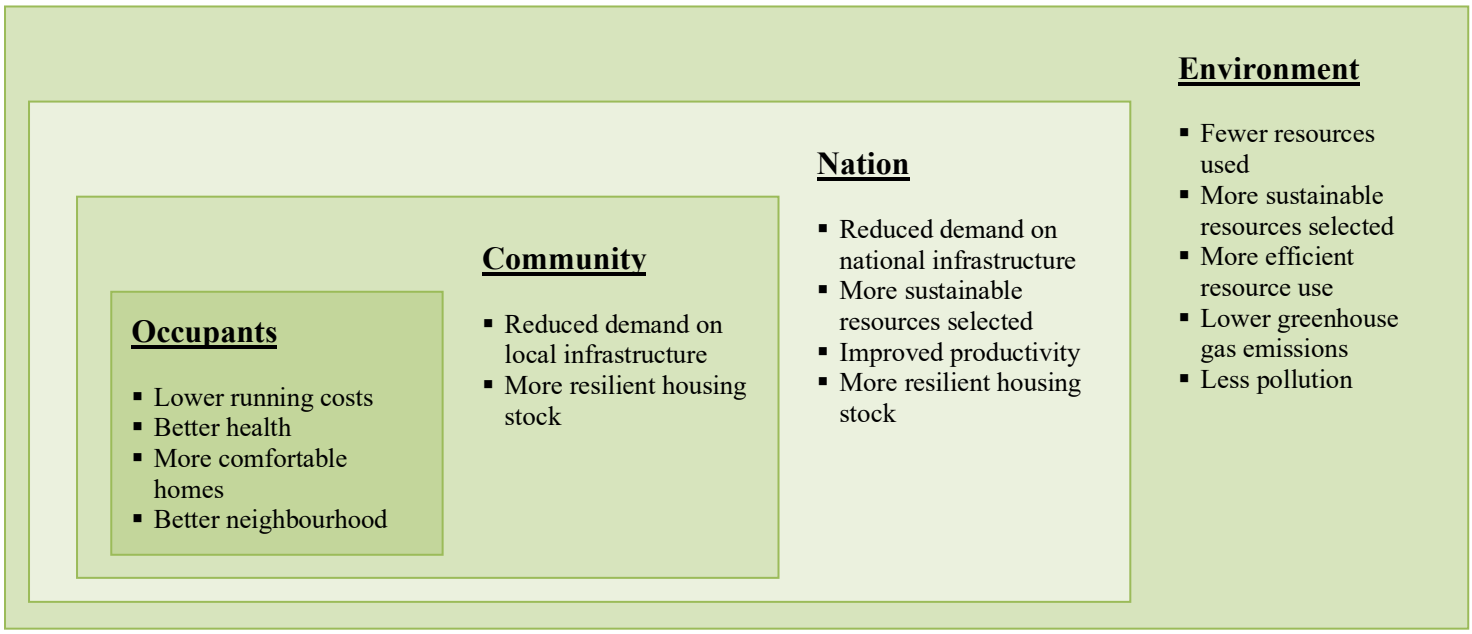
such as preparing for the housing requirements of an ageing and diversifying population, anticipating changing activities and technologies within homes, and ensuring our homes can withstand the consequences of climate change. Other as yet unforeseen challenges are also likely to emerge.

Future challenge	Possible housing consequences
Ageing population	■ Increasing difficulty with accessibility and functionality around the home (e.g. entryways, toilet, shower, stairs). ■ Smaller household size, less discretionary income to spend on maintenance, heating etc., different time-use patterns in the home (e.g. more daytime energy use). ■ Changing demand for different housing typologies.
Diversifying demographic profile	■ More diverse housing needs for small and large households, provision for different uses of spaces.
Changing lifestyles, technologies and activities within houses	■ Diverse demands on space: conversion of spare bedroom into office. ■ Increased services and/or infrastructure needs (energy and telecommunications). ■ Installation of new services. ■ Reorganisation of spaces and structural changes (e.g. move to open-plan living and kitchen areas with more glazing).
Changing urban form (increasing density)	■ Smaller units. ■ Proximity issues (noise, odour, privacy). ■ More expectation of meeting leisure needs outside the home.
Greater proportion of rental occupancy	■ Landlords less likely to undertake major structural change to homes to meet tenants' changing needs. ■ Greater need to be able to make changes to space without structural change.
Impacts of climate change	■ Summer overheating leading to thermal discomfort, heat stress and health problems. ■ Flooding leading to damage of building contents, possible contamination from sewage, structure collapse. Subsidence risk for concrete slab foundations.
Increasing cost of resources and infrastructure	■ Services such as electricity, water supply and waste collection become more expensive.

There are direct design responses for many of these issues, including:

- Using lifetime design principles to ensure homes are functional for people at different stages of life.
- Improving house design to work effectively with the sun (to assist heating and prevent overheating).
- Building in flexibility and adaptability for future unspecified changes.

Making our homes more sustainable will deliver benefits to the homes' occupants (be they owners or tenants), the wider community, and also the nation and the environment. The benefits extend well beyond the homeowners, but the costs usually fall directly to them, with some small-scale support from subsidy programmes.



More sustainable housing stock could help to deliver improved health and productivity, greater resource efficiency, reduced demand on infrastructure services, and a housing stock that is more resilient to change (e.g. changes in climate, demographics, and resource availability). Most of the energy savings are in electricity use, implying a reduction in CO_2 emissions.

Furthermore the residential sector is a large source of employment. In addition to the social- and economy-wide benefits, there are significant employment gains in redirecting this resource to improving the current housing stock in recessionary times.

Poune AM estimate that a standard post-WWII home renovated for improved performance could require around 260 hours of labour split between a variety of sub-trades. Statisticaly, for every **1,000 houses retrofitted,** around **150 full time equivalent jobs** would be required for delivery solely of on-site retrofitting services, and a total of nearly **400 full time equivalent jobs** would be required to provide the products and services involved in the renovation activity.

To cut a long story short, by encouraging sustainable renovation councils can provide a substantive economic stimulus to their local economies.

Some benefits of sustainable homes are more directly relevant to local government than others. Because local government has an important role in managing water-related infrastructure, efficiencies that can be gained at the household level will be beneficial at the community scale. The benefits from improving energy efficiency may be less immediately obvious, but are in line with the UK's green agenda.

At the household level, some of the sustainable housing choices are sometimes dismissed as too expensive, with the prospect of additional upfront capital expenditure overshadowing the longer-term operational savings. Yet, operational costs can be significant over the life of the house, and will increase if resource and service costs continue to rise.

This research paper provides advice on how local government can play a part in the change.

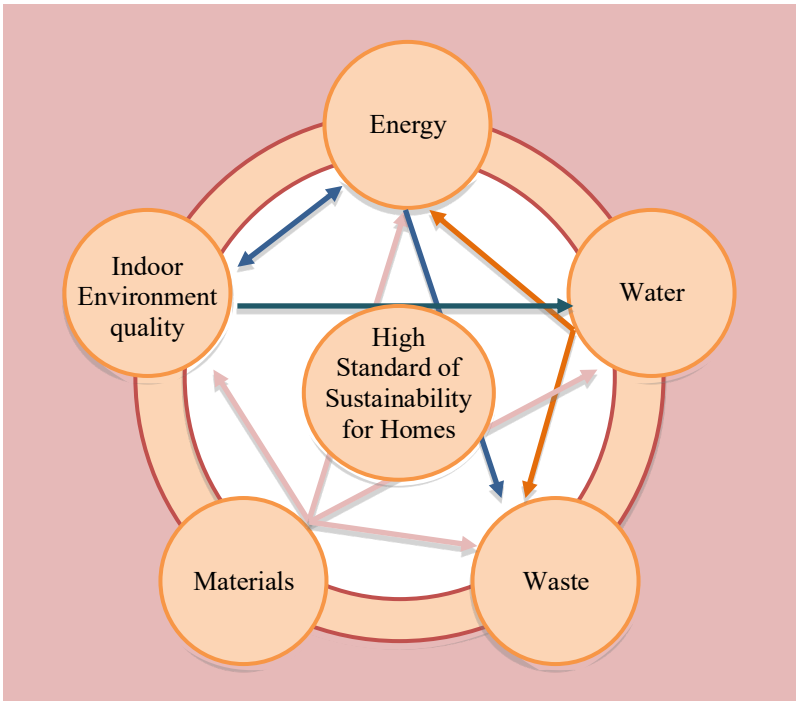
Part I. Outcomes: What makes a sustainable home?

Part I. Outcomes: what makes a sustainable home

Section 1. High standard of sustainability

Poune AM is working towards the development of a high standard of sustainability index, a set of benchmarks to support homeowners to understand how their home performs in terms of energy, water, indoor environment quality (IEQ), and materials and waste.

As far as possible, the benchmarks should be established as measurable units. Occupants can regularly measure their home's performance against the benchmarks, and better understand where they can make improvements. For some performance areas, such as reticulated energy, the measurement can be easily obtained from power bills. The same applies to reticulated water in places where it is metered. Indoor environment quality is a more complicated set of measurements.



This benchmark identifies five key performance areas, and does not prioritise one area over the others. This is because focusing on a single issue can lead to compromises and under-performance in other aspects of the home.

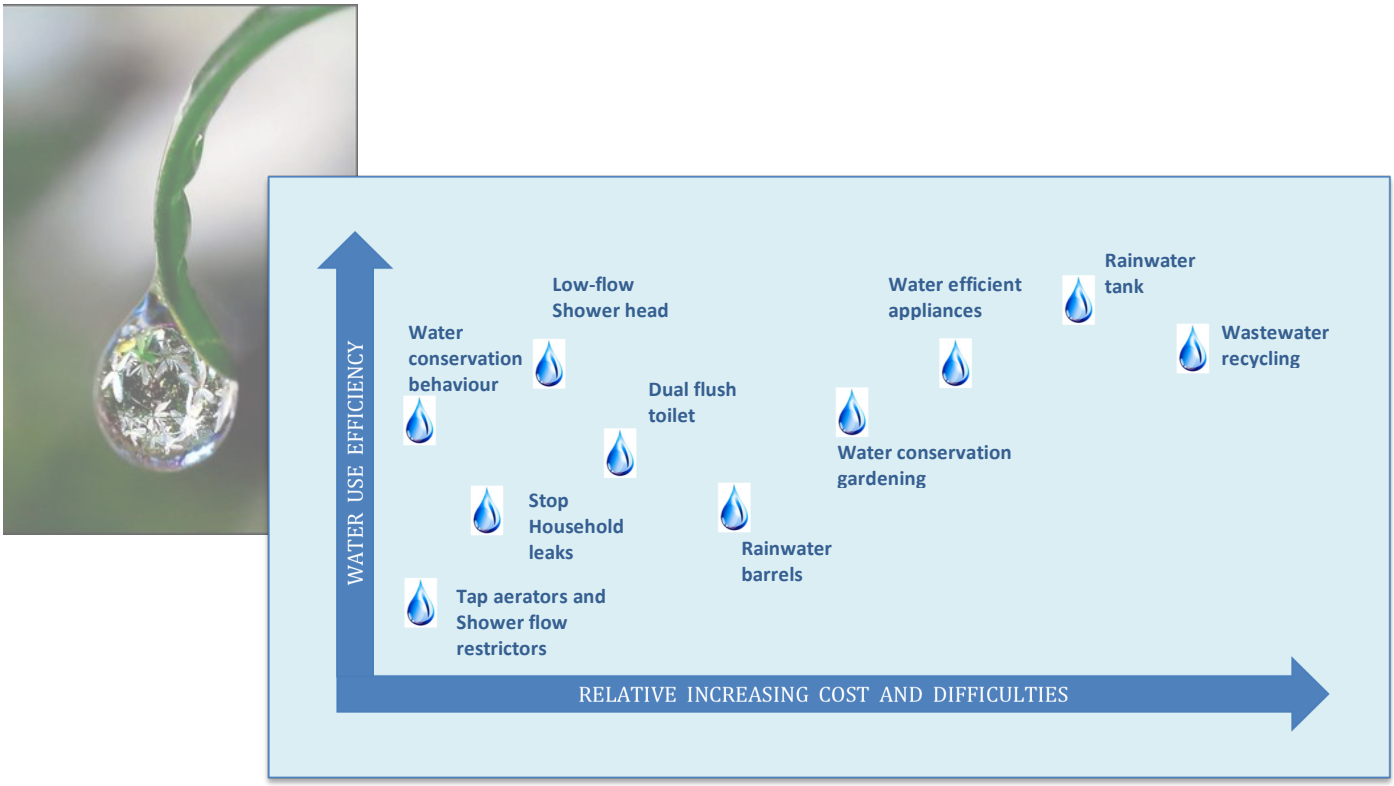
Energy efficiency can be achieved through under-heating the home, but this compromises indoor environment quality. Conversely, heating the home to improve the indoor environment (without also improving the dwelling's thermal performance) can lead to high energy demand. High water use also has energy implications as approximately 30% of a typical UK household energy consumption is spent heating water. In addition, there are energy and infrastructure costs for collection, storage, transport, treatment, use and disposal of water.

Part I. Outcomes: what makes a sustainable home

Section 2. Benchmarks for high standard of sustainability and examples of methods

Examples of methods to achieve outcomes
■ Passive solar design: orient daytime living areas to south. Shading that allows protection from summer sun and allows winter sun to heat house. Limited glazing on eastern and northern facades. ■ Efficient thermal envelope: high R-value insulation in ceiling, walls and floor; double glazing; insulated slab on ground. ■ Hot water from solar, solar-gas, solar-electric or heat pump, or ground source hot water heat pump system. ■ Use efficient heating devices, e.g. heat pump, wood or pellet burners, under-floor heating utilising solar hot water system, or ground sourced heat pump system. ■ Use natural lighting where possible. ■ Efficient lighting: ensure all light fittings are suitable for CFLs or LEDs, separate switching circuits for different zones, movement detectors on external lighting. ■ A rated or higher appliances: fridges, freezers, dishwashers, washing machines...
Rationale and benefits
More energy efficient homes will provide better comfort, reduce energy use, reduce greenhouse gas emissions, and improve health year round. The energy benchmarks focus on reticulated energy because making efficiencies here can reduce national costs of energy supply, reduce climate changing emissions, and have resilience benefits for the environment and community. Given that 1/3 of total energy use goes on heating the home, and another 1/3 goes to hot water systems, cost savings in energy use are potentially huge.

Benchmarks for Water Use
125 litres/person/day
Examples of methods to achieve outcomes
■ Efficient shower heads, taps, toilet, and appliances. ■ Water meter for each dwelling. ■ Use of "free" water sources (e.g. rainwater collection, greywater systems) to supply toilets, washing machine and garden use.
Rationale and benefits
The benchmark focuses on metered water use. Reduced demand for potable water lessens pressure on infrastructure and therefore on overall local authority charges. Also, treating and pumping water is energy intensive, and one of the local government sector's biggest single energy uses (and sources of greenhouse gas emissions). 100% of water supplied in metered systems is treated to the highest drinking standards — but a very tiny portion of it is actually used for drinking or cooking. The rest is used for washing, bathing, flushing the toilet, and watering the garden. The benchmark for water use is the same for all kinds of houses, because the same kinds of water saving devices can be installed regardless of house type.



Benchmarks for Indoor Environment Quality	
Temperature	Checklist
■ Living room evening in winter >18°C ■ Bedroom overnight in winter >16°C	■ Mechanical extract ventilation of kitchen, bathroom and laundry ■ Means to passively vent dwelling ■ No unflued gas heaters ■ No indoor clothes drying ■ Under-floor vapour barrier

Examples of methods to achieve outcomes

- Windows that can open in all rooms.
- Extraction fans in bathrooms and ensuites, and rangehoods in kitchens.
- Passive vents in bedrooms and living spaces.
- Low toxicity products and materials used, especially considering volatile organic compound (VOC) content.
- Vapour barrier on ground under floor.
- No unflued gas heaters.
- No indoor clothes drying and all dryers vented to outside.

Rationale and benefits

Improvements in insulation help bring the consistent temperatures of homes above the World Health Organization minimum standards of 16°C in bedrooms and 18°C in living rooms. This has positive health impacts e.g. in reducing respiratory problems such as asthma. Improved health reduces health-related expenditure, days off work and school.

Adequate ventilation and removal of moisture generated in the home is critical to preventing mould growth and resultant health impacts and deterioration of building fabric.

Using building materials which contain low levels of volatile organic compounds (VOC) is expected to impact positively on health by reducing exposure to polluted indoor air.

Unflued gas heaters, indoor clothes drying and moisture rising from the ground are very significant sources of moisture in the home. Removing these moisture sources will make the house healthier, as well as easier to heat.

Benchmarks for Waste
■ For new building, a maximum of 2.6 tonnes per house or 16kg/m^2 of construction waste. ■ Separate construction wastes for collection, recycling and reuse. ■ Waste management plan produced for site in accordance with local guidelines. ■ Provide space in kitchen for organic collection — 5 litres minimum capacity. ■ Provide space for non-organic recycling bins in or near kitchen — 20 litres minimum capacity. ■ For detached dwellings on suburban lot sizes, provide space in garden of at least 1m^3 for composting of organics.
Examples of methods to achieve outcomes
■ Incorporate waste reduction provisions in contract documents. ■ Ensure someone on site (foreman, supervisor, etc.) has undertaken training in waste minimisation and has authority to require adherence to waste management plan. ■ Use prefabricated and modular design of core elements where possible. ■ Require contractors to order and pay for materials as a method to encourage waste minimisation. ■ Recycle all construction wastes that can be recycled. ■ Reuse all offcuts where possible. ■ Provide on-site sorting facilities and require workers' personal waste to be included.
Rationale and benefits
The negative effects of waste can include the emission of greenhouse gases and toxic leachate escaping into or over the ground from waste decomposing in poorly managed landfills. Landfills require the allocation of valuable open space, creating a nuisance for neighbours and limiting future land use. Reducing waste to landfill has environmental, health and economic benefits.

Benchmarks for Materials
New Homes Materials which: ■ promote good indoor air quality through use of environmentaly friendly paints and finishes. ■ have minimal health risks during construction or retrofitting. ■ are durable and have low maintenance requirements. ■ re-use existing or demolished building materials or can readily be reused. ■ are made from renewable or sustainably managed resources. ■ have low embodied energy including minimal impacts due to transport. ■ minimal impact on the environment (air, water, land, habitats and wildlife). ■ have third-party certification. **Existing Homes** Retrofit or renovation applies principles from materials checklist where appropriate.
Examples of methods to achieve outcomes
■ Materials use up raw resources, require manufacturing or processing, and must be stored, transported and disposed of. ■ Choose materials which are suitable for the task and which are durable. Constantly replacing poor quality or inappropriate materials is a waste of resources. ■ Minimise the use of materials. Make sure you have sufficient material for the task, but try to avoid over-ordering materials and excessive wastage. Try to reuse or recycle materials where you can. ■ Choose materials carefully. Find out about the source of the material, where and how it was made. Product descriptions often include information about VOC levels and supply chain. Look for environmental or energy labels. ■ Use materials which suit the local climate and heritage of the neighbourhood/site, and which support local industry employment.
Rationale and benefits
Materials produced at a rate that allows regeneration of the resource do not exhaust the resource and are still available for future generations. Materials with low environmental impacts over their life cycle: avoid emitting pollutants into the water, air and land; using up valuable resources such as water and old-growth timber; and changing land use such as forest clearance which can lead to loss of biodiversity. Materials which minimise embodied energy, i.e. the energy used throughout their life cycles, use resources efficiently, delaying new energy generation infrastructure and emitting fewer greenhouse gases.

Part I. Outcomes: what makes a sustainable home

Section 3. Comparing new and retrofitted homes

To demonstrate that more sustainable homes can be built today, using technology that is already available, at an affordable price, we have compared a new built with existing retrofitted properties. All these homes were monitored to verify their performance, and the results are very encouraging.

New Built

Passive solar design, resource efficiency, minimisation of hazardous materials and future flexibility were all key considerations in designing and building the home.

Features	Benefits
■ Southern orientation ■ Passive ventilation (opening windows which can be locked, window position in rooms) ■ High performance insulation ■ Double glazing ■ Thermal mass in floors ■ Efficient water heating ■ Efficient space heating ■ Energy and water efficient appliances ■ House size matched to occupants needs ■ Sunny external washing line and vented/condensing dryer ■ Externally vented rangehood and bathroom extractor fan ■ Low/no toxicity products and materials ■ Rainwater collection ■ Space for composting and recycling ■ Located within walking distance of community facilities	■ Even, comfortable temperatures all year round ■ Unpolluted air indoors ■ Smaller environmental impacts ■ No condensation or mould ■ Lower utilities and transport costs ■ Reduced maintenance and modification costs ■ Privacy and connection to neighbourhood ■ Healthy families and reduced healthcare costs ■ Increased resale value ■ Potentially improved family relationships due to better standards of living

Retrofitted

Take back effect, where the residents effectively take back some of the savings they have made, (for example by heating more rooms in the house, or taking longer showers) shall be considered over an extended period of at least two years.

The home experienced some improvements in temperature, humidity or energy use. The homeowners enjoyed significant energy savings, but what they valued most was the improvement in comfort and well-being they experienced in their renovated homes.

The results have helped us to establish some core principles for effective retrofitting:

Features	Benefits
■ Insulate the full thermal envelope	■ To maintain healthy temperatures in winter time, walls must be insulated along with the floor and ceiling. Partial thermal envelope upgrades are insufficient.
■ Efficient heating must accompany thermal retrofit	■ It is not enough to insulate the home; a heat source is still necessary to reach healthy mean temperatures in winter.
■ Hot water cylinder wraps are a great energy efficiency measure and should be widely applied	■ With efficiency increases of 11–30 % of hot water energy demand, wraps proved worthwhile even on the newer, A grade cylinders. Being a very affordable intervention and great value for money supports their wide use.
■ Solar hot water systems can perform really well even in winter	■ When properly installed, solar hot water systems can provide for the majority of hot water needs.
■ Low flow shower heads should accompany hot water conversions	■ Electric hot water cylinders tend to limit people's hot water use (when the tank runs empty, the shower runs cold). With more abundant hot water available from solar or instant gas heating, there is a discernable increase in hot water use. Low flow showerheads can help to reduce this water wastage.

Part II. Basis for action: Local government's role in sustainable homes

This section explores the broad number of ways in which local government can influence the sustainability of UK's homes. It sets out the legislative basis for action and presents relevant findings from our research into local government barriers to sustainable building.

Section 1. What council officers have told us

In developing this Resource Manual, the interviews revealed that:

- There is strong interest in sustainable building within the councils interviewed.
- The main drivers for council officers carrying out activity on sustainable building are the social, environmental and long-term financial benefits, as well as political drivers where councils are committed to sustainability.
- Almost all the officers interviewed saw their councils as being at the beginning of a transition pathway to improved residential sustainability.
- Currently, there are limited resources, knowledge gaps, and a generally piecemeal approach to policy initiatives.
- There is some uncertainty as to the parameters of possible interventions and the scope of application of financial incentives.

Section 2. Local government: a door or a wall?

Local government's role in promoting sustainable home building is broadly grounded in the purposes of:

- Playing a broad role in promoting the social, economic, environmental, and cultural well-being of their communities, taking a sustainable development approach.
- To ensure that buildings are designed, constructed, and able to be used in ways that promote sustainable development; and
- To promote the sustainable management of natural and physical resources.

But local councils also have a significant role in the provision of infrastructure and services to houses, including:

- Potable water supply,
- Stormwater and wastewater infrastructure,
- Transport infrastructure, and
- Household waste collection.

The level of household demand can affect the efficiency and effectiveness of these services for the whole borough or city. In recognition of this, many councils now offer incentives to promote aspects of sustainable building and information and guidelines on aspects of sustainable building.
There is a great deal of enthusiasm for sustainable building within many councils. From our interviews, we know that officers have developed a range of initiatives to encourage people to make more sustainable choices in their homes, and are seeing some good results.

However, at the same time, *Poune AM* has found that a number of people building sustainable homes perceive local government policies and processes to be a significant barrier to their objectives. Often, the barriers are unintentional, barely the result of trying to achieve something new or different in an already-time-consuming and costly bureaucratic process.

We have undertaken several research projects to understand local government policy and regulatory frameworks, to review potential barriers to sustainable building within those frameworks, and to consider in greater depth the policy and regulatory frameworks for market transformation, water conservation and water use efficiency through demand management.

Of particular note for this research, barriers to sustainable building are generally more at the generic (e.g. lack of information) level than as a result of specific policies, plans or practices of the individual council. In other words, process issues were found to be a major barrier to sustainable building choices. Additional costs, uncertainty and delays of getting planning consent can have the effect of deterring people from incorporating sustainable features.

Interestingly, the two situations can be happening simultaneously in the same council — at the more general level of education and advocacy there is a great deal of support and encouragement for people to make sustainable choices, only for people to then hit a “brick wall” within the more exacting requirements of obtaining planning consent.

Part II. Basis for action: local government's role in sustainable homes

Section 3. How local government interacts with homes

Life cycle of a house

Local government is involved at each stage of a house's life cycle, as a regulator and a provider of services. Each of the points of interaction between council and a home could represent an opportunity to promote more sustainable choices: in construction, operation and eventually demolition.

Life cycle stage	Council's interaction with the house
Planning	Local plans rule set site sizes, orientation etc. Council Codes of Practice set development standards (e.g. infrastructure specifications) and establish the infrastructure that the home will connect to.
Design and Construction	Local plans set building envelope for the house. Building Code sets minimum performance standards for the house — Council is the administrator and carries out compliance checks. Construction waste may go to council cleanfill or landfill.
Day-to-day operations	Council infrastructure provides essential services (water, wastewater, transport, waste collection). Rates are levied. By-laws are enforced (e.g. environmental health officers). The neighbourhood is generally maintained — affects quality of life and property values.
Significant renovations	Requirement for planning consent.
Demolition	Building consent required. Demolition waste may go to council cleanfill.

Part III. Options for action: What councils can do

Section 1. Introduction and key findings

The information within this section should be seen as a set of ideas and potential methods for councils to promote greater sustainability within the residential built environment.

What councils can do to promote more sustainable homes

Our assessment of existing council policies and programmes suggests that councils who want to successfully promote more sustainable homes in their districts *can* make it easier for homeowners to build and retrofit more sustainable homes. The following sections set out the detail of different options – their scope, the pro's and con's of different approaches.

Key findings: making it easier to build and retrofit more sustainable homes

Council requirements and processes can be a disincentive for people who want to build more sustainably. Making sustainable choices can be perceived as adding time, cost, and complexity to consenting processes. We have identified the following key findings as to how councils can most effectively support more sustainable homes in their regions, districts and cities:

Secure a mandate for change

There is a clearer mandate for council action on issues where the community expects council leadership. This expectation can be developed where:

1) There is **an identifiable community-wide issue** to be managed (e.g. water shortages, poor air quality, energy security of supply, health). Communities might not necessarily be aware of the situation, or the potential long-term costs. By clearly and consistently communicating issues through their publications and their engagement with communities, councils can help to build a groundswell of understanding and desire for change.
2) There is **a regulatory requirement to act**. Increasingly clear national-level direction provides a stronger basis for councils to develop policies and programmes that promote more sustainable homes.
3) **Council manages assets and provides services** such as water supply and waste collection. Regular reviews of levels of service and future demand are opportunities to introduce

demand management tools as part of providing efficient and cost-effective infrastructure and services.

4) **Council owns housing stock** and can undertake upgrades as part of being a good landlord. This is also a way of demonstrating to the community exactly what is possible, and stimulating local economic development in the sustainable building sector.
5) Council can develop **partnerships with other agencies** to meet shared goals and leverage greater benefits from their investment.

Develop a package of tools

By capitalising on the numerous small opportunities that exist across all aspects of council operations, councils can develop a comprehensive and effective approach to encouraging more sustainable homes. Packages can be staged over time; pilot programmes, economic tools and community education are important steps to prepare the ground for any regulatory changes.

Some initiatives within the package of tools will be needed to remove barriers such as regulatory constraints within council plans. Other initiatives will be focused on promoting more sustainable choices through supportive policy signals and consent assessment criteria, economic incentives, education and advice.

Support whole-of-house solutions

A whole-of-house approach to creating sustainable homes seems to be the most effective way. It allows for positive interdependencies between the different features of homes, particularly between energy efficiency, water consumption and indoor environment quality, where improvements in one area can lead to compromises and under-performance in other areas.

Councils can support this finding by broadening their approach to promoting more sustainable homes to consider the full range of key performance areas (energy, water, indoor environment quality, materials, and waste). They can also help by connecting various initiatives that may already be in place across different units of council, so that prospective developers and renovators receive a comprehensive response to their proposals.

Recognise indirect opportunities

Often, the opportunities to promote sustainable homes will emerge as a result of other council priorities and actions. For example, improving indoor environment quality can be achieved as a consequence of wider air quality programmes. The rainwater harvested through stormwater attenuation measures can contribute to efficiencies in domestic potable water use. Programmes to stimulate local economic development could be targeted to improving homes.

Bridge the implementation gap

Policies are an important signal of a council's priorities and intentions. However, policies that "promote", "support", or "encourage" sustainable home building choices can be viewed as soft and generally inconsequential. The challenge for councils lies in specifying and delivering effective methods to achieve those policies.

Build officer capabilities

Council officers need to understand and be receptive to sustainable building options. Without this, any new policies and methods risk languishing on paper, and prospective sustainable home developers and renovators will be frustrated by the lack of a consistent council position.

Making this change requires work across council units and professions, and skills in translating between the different professions' "languages" and priorities. Offering in-house training, continuing professional development, practice notes and using collaborative processes for reviewing consent applications are all opportunities to improve officers' expertise as it relates to sustainable building.

Extend the available tools

Looking at the various council initiatives that are currently being used, it is clear that there is scope to extend the available tools:

1) Some initiatives, such as more sustainable **codes of practice and design guidelines, could be standardised** for application throughout the UK. Particularly for smaller councils with fewer resources, it is useful to be able to 'cut and paste' provisions.
2) **Proven initiatives could be adopted by other councils**. This includes water metering, healthy housing retrofit programmes, and one-to-one advisory services.
3) **Regulation should always be a choice of last resort**. There are legislative constraints as to how much can be achieved through regulatory methods such as rules in regional and district plans and bylaws. A lack of national standards and guidance has most likely contributed to the low level of promotion of sustainable building through regulatory mechanisms. Councils can continue to advocate to government for **greater national guidance and support**.
4) **The body of knowledge needs to be extended.** Examples of council initiatives already in practice are thinly spread across the country, although this appears to be changing with the latest round of policy reviews. Opportunities to share experiences across councils would be valuable.

A consumer perspective

A survey of 200 homeowners asked "What is the best way for local government to encourage sustainable renovations?"

Out of six possible incentives, most homeowners selected financial incentives and discounts on products and services. Regulation was the least-selected incentive.

Respondents also identified that the biggest barrier between residents and sustainable renovation is the cost of the product and installation.

Preferred Council Incentives	Percentage
Financial incentives	29%
Discount on products and services	26%
In-house advice	16%
Education	12%
Demonstration	10%
Regulation	7%
TOTAL	**100%**

Part III. Options for action: What councils can do

Section 2. Strategic policy signals

Strategic policy signals

Councils prepare a number of strategies and plans, some required by legislation, and some prepared to meet their own particular needs. Combined, they communicate a council's priorities and intentions. Including sustainable housing issues in council strategies and plans introduces the issues to the public and secures a mandate (and funding) for any planned council activities.

Key strategies and plans include:

- Long Term Council Community Plan
- Water and Sanitary Services Assessment
- Waste Management and Minimisation Plan
- Other issue-specific regional and local strategies addressing issues such as energy, water, and economic and urban development.

Scope

There is scope to address any sustainable housing issue within this bundle of strategies. It is easier to address the issues where there is an identifiable local issue and a clear council mandate; for example, when there is national regulatory direction, or where council provides services and has control over infrastructure assets (including council-owned housing stock).

> **Pros:** Communicates council's priorities and intentions, and secures a mandate for activities around sustainable housing. Relatively straightforward processes to develop, consult on, and adopt policies.
>
> **Cons:** Challenge to move from strategy to implementation — can be difficult to develop and fund appropriate methods, at the necessary scale. Inclusion in a strategy does not automatically equate to community awareness and buy-in.

Waste management and minimisation plans

Territorial authorities must prepare waste management and minimisation plans. These must set out objectives and policies, and methods for achieving effective and efficient waste management and minimisation within the districts.

The following methods of waste management and minimisation must be considered:

- Reduction
- Re-use
- Recycling
- Recovery
- Treatment
- Disposal

Other issue-based strategies

Councils may also prepare strategies to assist them in responding to locally significant issues and carrying out their functions. These strategies can be developed to inform other strategies and plans and to communicate council priorities to the community.

> **Pros:** Able to focus on a specific issue across the range of council activities (and potentially other stakeholders too). Consultative processes can lay the groundwork for change in the community. Strategies can provide a clear statement of council's position.
>
> **Cons:** Can take a lot of effort to develop, and then fall down on implementation. To be effective, they need to be well-linked to financial planning processes.

Part III. Options for action: What councils can do.

Section 3. Resource Management policies and plans

Resource Management is concerned with the sustainable management of natural and physical resources.

> **Pros:** requiring consent for relatively minor works such as installing a rainwater tank can be a disincentive to homeowners. This removes such barriers, and signals council support for such initiatives. Removing the requirement for consent may also help address the significant issue that such work often proceeds anyway (without consent).
>
> **Cons:** Any exemption needs to be balanced with the original purpose of development controls — namely protecting neighbours' sunlight, privacy and outlook. Such provisions will only affect a small number of homes. Plan changes can be time consuming and costly processes.

Requiring sustainable features

In areas where there is a clearly identifiable resource management issue, it may be possible to introduce specific rules for sustainable housing into council plan. However, there is sparse evidence of district plans being used to require sustainability in areas of energy, water, indoor environment quality and materials and waste.

> **Pros:** A directive approach provides certainty in addressing a pressing local sustainability issue. A choice of methods to achieve targets can smooth the regulatory method.
>
> **Cons:** Need to be able to demonstrate the resource management issue justifies the scale of prescription. Requiring some of the newer, relatively untried technologies can raise concerns (e.g. with risk-averse public health agencies). Methods can also involve more short-term costs for the development community.

Sites oriented to optimise passive solar gain to subsequent dwellings

In greenfields areas, orienting streets south-north and west-east ensures that sites and houses are better able to benefit from solar gain. We suggest the optimal orientation of streets is to align streets west-east and south-north wherever possible

Among other reasons, this orientation maximises solar gain on the long side of buildings. L-shaped living areas can ensure all homes get a sunny living area and outdoor living court regardless of what side of the street they live on. Sites on west-east streets need to be wider to allow for adequate solar gain.

Furthermore, on skewed roads (i.e. not running south-north or west-east) side boundaries could be oriented south-north or west-east (rather than running at right angles to the road boundary).

Part III. Options for action: What councils can do.

Section 4. Development standards and guidelines

Codes of practice

These manuals have several names and define councils' engineering design and compliance requirements for *their* infrastructure assets such as: Geotechnical, Transportation, Storm water, Water Supply, Wastewater, and Parks and Reserves.

In some instances, adherence to codes of practice can result in less sustainable and efficient outcomes, for example requiring highly finished driveways, then requiring stormwater offsets to mitigate the increased runoff from the driveways. Codes of practice have not traditionally included alternative (more sustainable) options for infrastructure, although this is beginning to change.

Pros: A straightforward process to change the content of development standards. Can help drive councils' own practices in infrastructure renewal and extension as well as new development.

Cons: Mostly applied to new development. Prescriptive nature requires detailed assessment before introducing new provisions (or it may generate unintended consequences).

Design guidelines

Guidelines have a broader focus than codes of practice, setting out outcomes and methods that are considered desirable by council, for developers to draw from, but not requiring strict compliance.

Part III. Options for action: What councils can do

Section 5. Building Code administration

The Building Code has a significant influence on the sustainability of housing. Councils can't decide what's in the Building Code, but they can ensure that, as Building Consent Authorities, their consent and inspection processes are streamlined, based on sound information and consistent practices.

There are two primary means for homebuilders and renovators to demonstrate compliance with the Code. These are:

- either through demonstrating that their home meets the prescribed Acceptable Solutions within the Code,
- or by obtaining consent using an alternative solution.

Alternative solutions must still meet the Code's minimum performance standard to achieve compliance, and it is the onus of the homebuilder to demonstrate satisfactorily to the borough that the solution will indeed do that.

Barriers to sustainability

There are three principal barriers for councils looking to promote higher levels of residential sustainability in their jurisdiction as building consent authorities.

- The first of these is a regulatory barrier and relates to the limit on councils preventing them from requiring performance standards more stringent than those stipulated in the Building Code. As the Building Code prescribes only minimum standards, the overall building performance of a compliant house is still well short of what might be defined as a "more sustainable" house.

- The second barrier relates to the use of alternative solutions; as they provide a less certain road to compliance they can lead to higher cost and risk for the homebuilder. Whilst providing an avenue for sustainable building innovation, proposals may be outside the experience of either the building consent authority, or a particular building consent officer, and are therefore likely to come under far greater scrutiny as well as requiring additional proofs supporting whatever is the proposed design solution. From a sustainability point of view this makes it an option that is always going to be more likely to be used only by those homebuilders who are committed to employing sustainability within the household design.

Examples of sustainable technologies and approaches which can fall outside of the current Acceptable Solution framework:

- Dual metering with rainwater tanks providing for non-potable uses
- Greywater reuse systems
- Composting toilets and off-grid solutions
- Green roofs

- The third potentially significant barrier relates to council process and particularly the tension that is often found between the consenting and strategic teams within councils. What may be required here is a reconsideration of council processes and how to best incorporate strategic direction into the functions and tasks of the consenting team within council. It may also require a facilitated process to work through the sometimes conflicting objectives of different parts of council.

Demonstrating compliance

Compliance Documents provide the easiest route through the Building Consent process.

Under the Building Code, councils must issue a building consent where a building employs methods that are part of it or deemed to be acceptable. These solutions and methods are sometimes referred to as "cookbook" solutions because they prescribe a recipe for ensuring compliance. Because designs based on compliance documents must be approved, they provide the cheapest and most hassle-free way for a building to achieve consent.

Alternative solutions differ but must still demonstrate compliance with the Building Code. They provide an important avenue for testing new building technologies and methods. The greater the level of guidance that can be given to the homebuilder by both central and in turn local government regarding alternative solutions the better, as it is a potentially critical method for achieving greater understanding and uptake of more sustainable building techniques, systems and products.

Part III. Options for action: What councils can do

Section 6. Economic tools

Economic tools could be employed to encourage sustainable housing choices in a variety of different council operations. The options identified here are:

- Development contributions remissions
- Fee reductions and waivers
- One-off grants and subsidies
- Loans
- Raising funds and co-funding

Incentives have to be able to demonstrate public benefit, such as reduced load on infrastructure. A transparent assessment of the distribution of benefits is important to ensure any economic provisions are robust and defensible.

To be effective, economic tools also need to be:

- Well publicised
- Easy to access
- Substantial
- Worth the effort for the developer/builder

Pros: The range of economic tools offers different solutions for councils' different needs. They can be applied for new construction and for retrofits of existing homes, and have been identified by homeowners as a preferred mechanism of council support. Publicly funded programmes can stimulate demand for new technologies, generate a flow of business activity, and also raise awareness in other households through associated programme promotions and word of mouth. As sustainable homes become more of a priority for communities, (for example, due to increased public awareness and new regulatory requirements) it may become possible to introduce economic tools to address a wider range of issues.

Cons: To date, most economic incentives have had a low uptake rate. Many of the one-off grants and subsidies are available only to certain sectors (e.g. low income households), and are constrained in their focus (e.g. energy retrofits). Limited forms of incentive can't cater for a wide range of needs, and may increase public costs. The cost of sustainable building can be high, and the level of funding available to incentivise sustainable choices may not be sufficient to act as a real incentive (as opposed to a reward for people who would have made the sustainable choice anyway).

Scope

Based on the range of initiatives already in effect, the greatest scope for economic tools to promote sustainable housing would appear to be in the areas of water, energy and indoor environment quality.

Water

Councils have a direct role in providing water, though directly or indirectly, and a responsibility to ensure services are efficient and sustainable. Reducing household demand could generate significant financial savings for councils through a reduction in spend, and savings from deferring the need to invest in significant new capital projects.

Energy and indoor environment quality

Regional councils' responsibility for meeting the national environmental standards for air quality provides a strong basis for using economic tools to fund initiatives to upgrade home heating. This has consequential benefits for both energy use and indoor environment quality.

Basis for action

The reasons for offering an economic incentive must be clearly stated and the justification must take into account the impact on individuals, council, and the community. While councils have a level of discretion when weighing up the public good of a sustainable initiative against the sectors of the community that are required to pay for it, it is important to link the initiative to the benefits it distributes.

The distribution of benefits between the community as a whole, any identifiable part of the community, and individuals is a particularly important test when it comes to sustainable housing programmes. This is because many of the measurable benefits of sustainability initiatives often accrue to the individual as opposed to the community.

For example, in the case of solar hot water heating it is relatively simple to measure the individual benefits of reduced water heating costs. Other benefits experienced by the wider community, such as reduced energy consumption and greenhouse gas emissions, conservation in energy production, transmission and consumption, are considerably more difficult to measure.

Barriers

There are three key impediments to implementing economic tools:

- **Legislative barriers:** particularly in being able to adequately demonstrate the community-scale benefits of house-level activity or, in the case of development contributions, how the initiative mitigates the infrastructure requirements that councils must meet as a result of growth.
- **Acceptance barriers:** accepting that promoting sustainable housing is council business and should be funded by ratepayers, particularly where the initiatives are different from traditional council activities, and where some of the benefits go directly to the occupants of individual homes.
- **Lack of uptake:** Uptake has been low for some of the incentive schemes already in place. We might suggest that two main factors are in play:
    - The threshold of the financial incentive is not high enough in monetary terms to be a real incentive
    - And/or potential recipients are not aware of the incentive.

Responses

Councils can ensure greater uptake of economic tools by:

1) Promoting them in ways that are meaningful to prospective applicants

Without promotion, potential consumers may be unaware of the existence and benefits of an economic incentive. Communicating in terms that are meaningful to homeowners is important.

For example, a programme focused on the message that people would get warmer, more comfortable homes (and solve the air quality problem at the same time) could increase public awareness and acceptance and lead to a higher than anticipated level of uptake. Community leadership and enthusiasm could also be a factor in encouraging global uptake.

2) Increasing the threshold of the incentive in monetary terms

Is the amount of money sufficient to act as an incentive, particularly in relation to the cost of the sustainability measure? For example, waiving consent fees for installation of solar hot water can be an important signal of a council's support for that choice, but is relatively minor compared to the actual cost of purchasing and installing such a system.

3) Making them easy for applicants to access

The time it takes to apply for an economic incentive is another form of cost on the applicant. Eligibility criteria need to be clear and quickly understood, and paperwork kept to a minimum.

4) Targeting the right market

Is the tool targeted at those households where it will really make a difference? Are the thresholds for eligibility set at the right level? Some programmes have lifted their eligibility criteria to include middle income households, who — with a little support — are more able to make the desired kinds of home improvements. There may be other examples where eligibility is better determined by location, or by house typology.

Pricing and charging regimes

Councils can recover the costs of providing services to households through fees and charges. These fees and charges can be set in ways that encourage more sustainable homes, particularly as it relates to waste collection and water supply.

Pricing of waste collection (e.g. charging for refuse bags) can encourage greater sorting of waste and recycling. Volumetric charging for water (via metering) raises awareness of water use and the value of water with customers. Poune Asset Management has identified metering as a top priority for implementing demand management programmes within councils. Whether or not a pricing regime is introduced, metering enables the total domestic supply to be measured and unaccounted for water (i.e., leaks in the system) to be identified.

Any pricing regime needs to be developed so as to ensure equitable supply, ensuring everyone's essential water needs can be met. Similarly, charging for waste collection needs to be partnered with other initiatives, such as recycling collections and community education, to minimise the risks of illegal dumping.

Fee reductions and waivers

For relatively low cost, councils can waive or reduce the consenting fees associated with building and retrofitting more sustainable homes.

Fee waivers are not a sufficient incentive to generate sustainable technology choices. After all, the cost of consent is low compared to the overall cost of purchasing and installing a solar water heater or rainwater tank.

There may, however, be a secondary benefit of communicating the message to potential applicants that council is supportive of such efforts, and that obtaining consent will not be a significant hurdle.

One-off grants and subsidies

Councils can offer one-off grants and subsidies to support specific actions, such as installing insulation or rainwater tanks.

These can be limited by some eligibility criteria, or by a maximum number per year. As noted above, the value of the grant is an important factor in uptake, as is the level of community awareness and the ease of applying.

Loans

It is possible that time payments and loans are an underdeveloped method for promoting change. Complimentary to one-off financial incentives such as grants, they offer the potential:

- To provide greater coverage in the market and cater for households where the current system of grants may not be suitable.
- To go beyond the basic package of energy-efficient heating initiatives being offered at present to include higher-priced options such as double glazing (which would be effective and attractive to many households)
- To reduce the overall call on public money (or increase the total number of households benefiting from the same level of public expenditure).

Raising funds

Supporting sustainable home initiatives can cost a lot of money, and the benefits of programmes are not always evenly shared across the ratepayer base.

Two options to source funding are targeted rates and co-funding with other organisations, public or private.

Targeted rates

The money is being raised through a targeted rate on ratepayers (rates may vary by area). The targeted rate is being raised during a 10-year period to make it more affordable for ratepayers, but the programme itself will run for longer.

Some concerns were identified at the outset of the programme, around inequities of all ratepayers subsidising a small number of households to improve their heating technologies. It might be argued that a targeted rate is the price the community must pay to achieve a healthy air quality and, as the whole community benefits, every household must make a contribution.

Pros: Establishes a clear link between council policy, funding mechanism and implementation. Rate can be targeted by area within the district or by services provided. Targeted rates set on individual properties can also be used as a form of loan repayment scheme (see Loans above).

Cons: Difficult to impose further rating burden on ratepayers.

Co-funding

There is potential for councils to co-fund initiatives with other relevant parties, at local and national levels. This can be a good way of piloting programmes, encouraging uptake across sectors, and spreading risk. As with any partnership, however, the scope of such programmes can be limited by other organisations' priorities and constraints.

Part III. Options for action: What councils can do

Section 7. Community education

An increasing number of community education programmes are operating around the country, focused on providing sustainability education to households. The effectiveness of such programmes is varied, depending on the depth and breadth of their reach.

A survey of homeowners and designers concluded that a person who is made aware is more likely to include environmental technologies than those who don't.

Pros: One-on-one point of contact, with the added ripple effect of "spreading the word" and a source of independent information for home-owners, designers, council staff and developers. It generates goodwill for the council as at public meetings the free service might be mentioned as an example of something positive the council is doing for the community.

Cons: Cost of employing the program (note that there is the possibility to share it between councils to offset costs).

Community Based Social Marketing: 5 Key Points to Designing an Effective Programme

1) Target behaviour
2) Uncover barriers and benefits
3) Design programme to overcome steps
4) Pilot programme
5) Implement and evaluate

Publications

Information can be shared as brochures, in council communications to ratepayers, and online. Some council websites now include guidance for sustainable building. Other websites can also offer comprehensive information and provide users with an easy way of accessing information on environmentally friendly living such as profiles of eco houses, a listing of businesses providing eco living products and services, a range of information articles on eco living and an online community for people to share ideas and connect on eco living topics.

Pros: A simple, low-cost method for disseminating information. If produced by councils, they can tailor information to local issues and provide links to relevant council activities and regulations. Information produced by other agencies can also be useful — drawing on other sectors' expertise and resources.

Cons: A passive form of communication, relying on people to seek the information out. Needs to be linked into other initiatives if the information is going to be accessed and used.

Special events

Special events can lend profile to sustainability efforts showcasing products and services and providing practical advice to the public.

Workshops and training

Councils with in-house capacity can run workshops and training programmes for the community. Another option is to partner with community organisations running household sustainability programmes and workshops.

Depending on the community's main ethnic origins, programmes can be translated or delivered in other languages to favor access to information.

Leading by example and better communication

Councils can play a key role in driving the construction industry towards more sustainable building practices. Where the public sector leads by example, a new standard of construction is set, upskilling of tradespeople and designers occurs at every level, and the community is able to experience first-hand that sustainable buildings are both pleasant to be in and functional, as well as being resource efficient. This also enables the council to engage with the community on issues to do with sustainability with a great deal of first-hand knowledge and provides confidence that the organisation is practicing what it preaches.

Councils could easily prop up their communication at no extra cost, simply by presenting what they already do but in a way communities can easily grasp. Examples could be:

- Social housing upgrade programme: what is happening, what is the impact on communities,…
  Practical points shall be addressed: improvements to insulation, ventilation and so on.
- Possible incentives for home owners and developers to build/retrofit/refurbish according to better standards than those mentioned in the building code.

Part III. Options for action: What councils can do

Section 8. Council administrative practices

This section focuses on how policies are expressed in everyday operations, and highlights a need for consistency across units and disciplines. The following possibilities are already used by councils to improve their handling of other issues, and they could potentially be adapted for sustainable building:

- **Reducing consent costs.**
- **Simplifying building consent processes.**
- **Fast-tracking consenting process** for homeowners that are willing to install sustainable building innovations.

Ensuring that the initiative will not place additional workload pressures on already stretched consenting staff is important as is being certain that the council can deliver on its promise of a sped up process.

- **One-stop shop/case managers.** During the course of its research we have heard frustrations from developers about the lack of a "one-stop shop" when dealing with the consenting process — particularly for larger projects. Different sections of councils have provided different advice when it came to sustainable features, and consent processes have become drawn out and costlier as a result.
  Because of the perception that sustainability in residential buildings already comes at a premium over and above a standard building, any additional costs for developers can be the make or break point for investing in additional measures, especially if these are not perceived to be providing a significant additional payback for the developer. In this case avoiding duplication and contradictory advice during the consenting process can be vital in saving both time and money. It is important to also remember that councils also benefit from developers that have an inclination to do more than the very minimum.

- **Appointing a case manager** offers an opportunity to discuss sustainable design options with developers early and ensure that the consenting process is made as smooth (and consistent) as possible.
  Having a representative from various areas of council such as the building consents team, the landscape team, and water team brought into a meeting at the outset can be a way of ensuring that everybody who will be involved on the project has an opportunity to input into the development process, suggest sustainable building options or alternative approaches, and hear what the developer's needs, wishes and concerns may be.

- **Officer training** can help to ensure that officers on the building consent frontline are familiar with existing, new and emerging building technologies, and with how to apply council policy.
  This is particularly important where the technology may be different from mainstream building approaches. Running regular materials workshops, inviting various industry professionals to come and give seminars, and maintaining a commitment to upskilling officers can be an effective way of encouraging more sustainable building practices.
  It might also be the opportunity for some developers to offer free seminars to council staff, better liaise with them and smoothen out further applications.
  Of course councils should be wary of too much proximity between their staffs and developers, and maintain a healthy relationship.