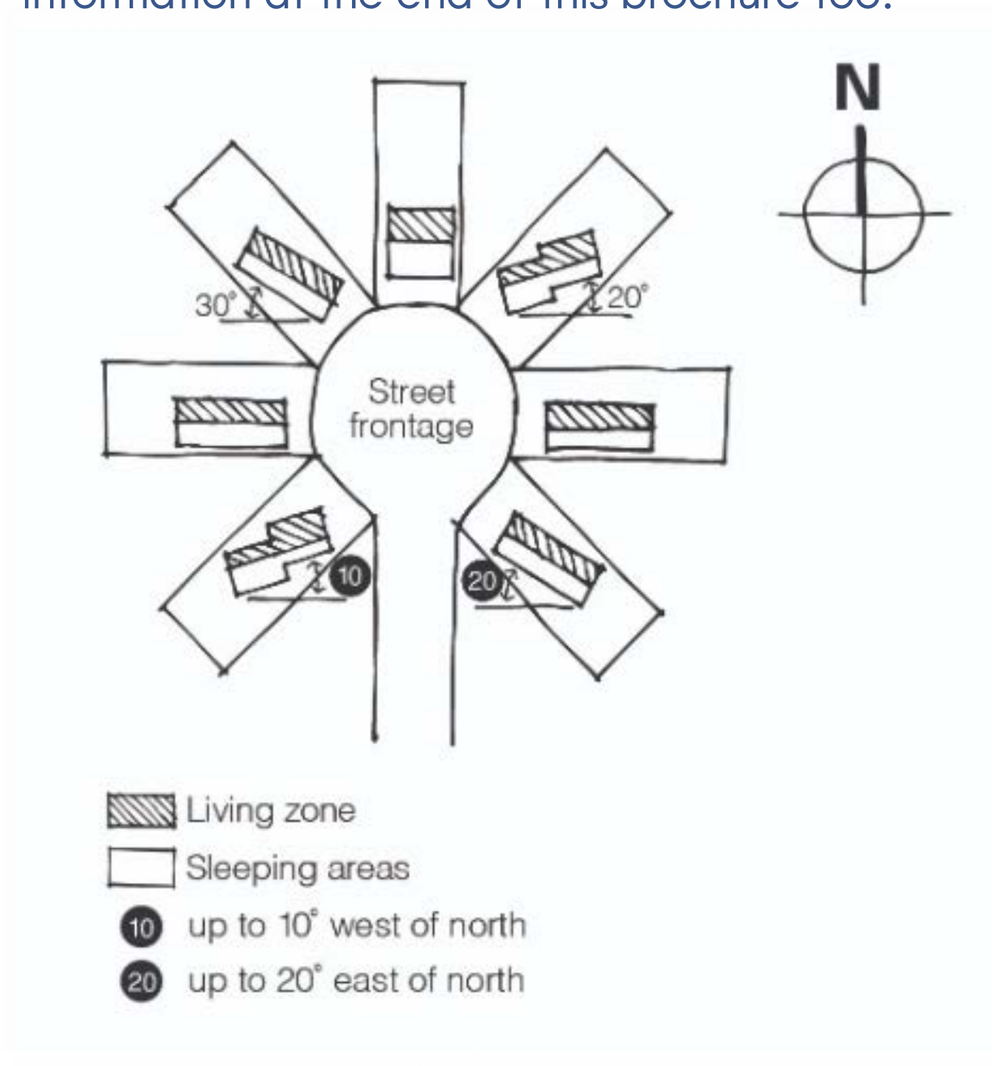
Sustainable Homes

A guide to designing, building or retrofitting your home to be more sustainable, livable and healthy

The Shire of Denmark's commitment to sustainability is reflected in our Sustainability Strategy and Sustainability Action Plan. One way we can contribute to achieving the aims of the strategy and action plan is through the promotion of well designed and constructed sustainable homes which are great for the environment whilst saving energy, water and money and being a comfortable place to live all year round.

There are so many ways sustainability can be considered in building design and in the way we live including designing homes to be adaptable; using sustainable building materials; considering renewable energy systems; and selecting products and materials that are good for the environment and good for our health. The following information is designed to give you an overview of the things to consider for your next building or renovation project. There's a handy checklist and links to further information at the end of this brochure too!



Orientation possibilities on different blocks

Do your homework

Considering what type of home you need to be sustainable and comfortable is a great start, but it is also important to choose a builder that can demonstrate best practice when it comes to construction methods, and one who will facilitate sustainability aims in to your budget. Sustainable design features might have some upfront costs but will save you money in the long run.

Size matters

Deciding how big your home needs to be can make a significant long term difference to your environmental impact. Will a smaller design allow you to create and afford a more comfortable and energy efficient home?

House Orientation

Good house orientation combined with well considered layout and design can substantially reduce household energy consumption and costs, while improving the comfort of your home. If your home has longer northside orientation, greater opportunity exists to take advantage of winter sun for warmth and natural light. Good orientation to take advantage of solar passive energy is possible on different block configurations by considering the design and location of living and sleeping zones.

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Renewable Energy

Sources of energy are regarded as renewable if their use does not cause them to be depleted. The most common renewable energy systems used in Australian homes are solar photovoltaic (PV) systems to produce electricity, air source heat pumps and solar hot water systems. Renewable systems offer economic, health and environmental benefits and can produce electricity, heating or cooling with very low to zero greenhouse gas emissions. Renewable energy systems are a significant investment for most people, but equipment costs have been falling considerably in recent years, especially for solar photovoltaic (PV) systems. Don't forget to consider provisions for electric vehicle (EV) charging at home too.

Material Selection

Carefully analysing and selecting environmentally friendly materials in the construction phase can significantly improve the health, comfort, cost effectiveness and energy efficiency of your home. Also consider the lifecycle of materials and the processes adopted to extract, process and transport them to the site. Informed decisions about materials and construction systems can reduce the environmental impact of a home without adding to the cost. The following guiding principals should be considered:

- Where possible, use fully recycled materials or materials with recycled content such as timber, glass or cork.
- Understand how chemicals used in the manufacture of some materials might affect your health. Look for products with low Volatile Organic Compounds (VOC's) i.e., when choosing paint and carpet.
- Consider how and where the materials are sourced and the impact this causes.
- Consider rapidly renewable materials such as bamboo, cork and linoleum.
- Design and build for de-construction, re-use, adaptation, modification and recycling.

Waste Minimisation

Construction and demolition waste is a significant contributor to Australia's total waste and much of that waste can be recycled. Key considerations to minimise waste are to:

- **reduce**, by building a smaller home and designing to reduce wastage.
- **reuse**, by looking for sources of materials that have been salvaged for reuse, such as brick, timber and plasterboard.
- **recycle**, by finding local recycling operators, and buying materials with high proportions of recycled content which in turn helps build the market for recycled building materials.

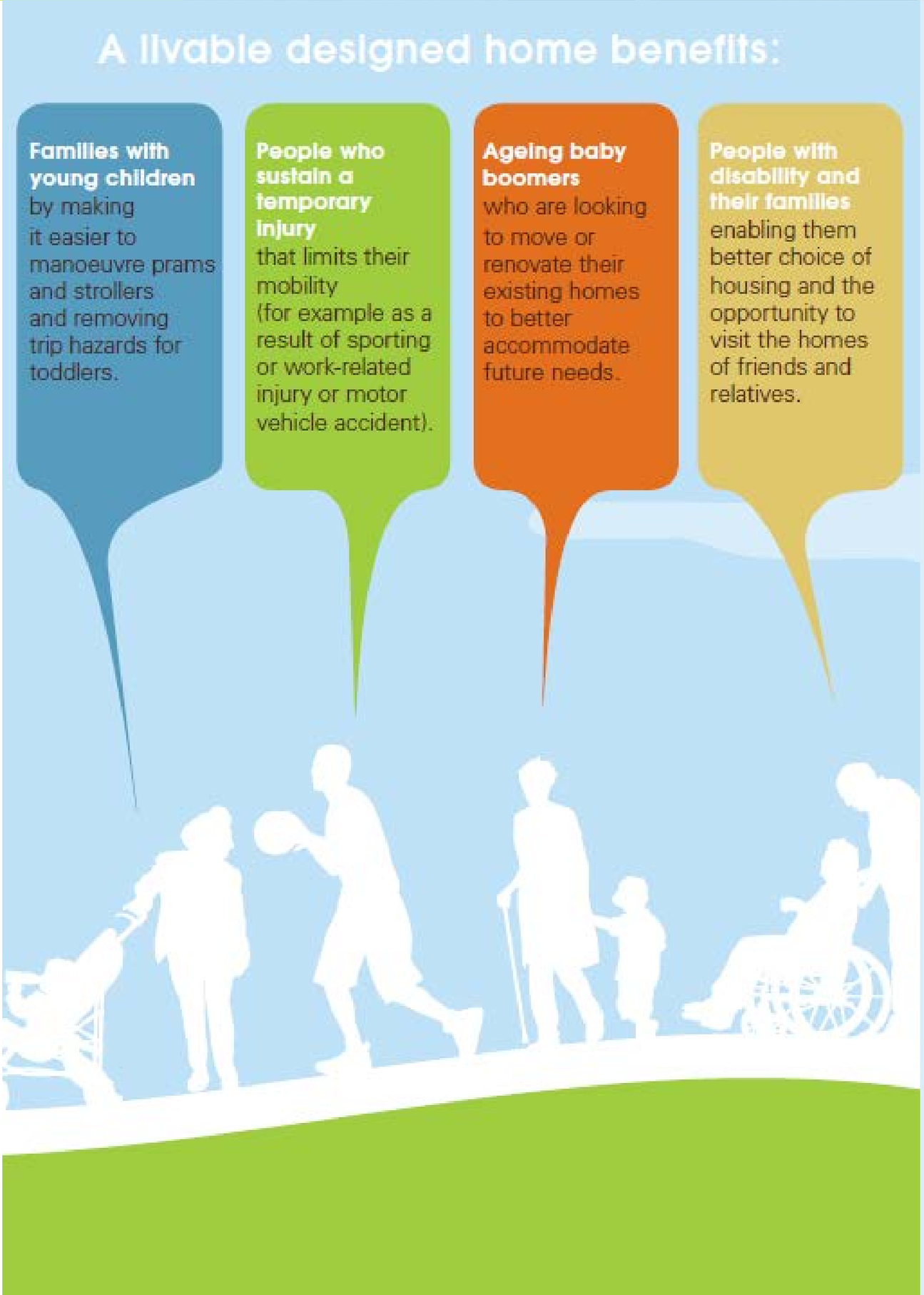
Water

Reducing water use in the home is a simple and easy way to decrease water and energy bills and reduce your household's environmental impact. Water-efficient showerheads, taps, appliances and toilets can significantly reduce water use. Look for the Water Efficiency Labelling and Standards (WELS) label for water-efficient products.

You should also consider the distance from your hot water unit to where hot water is needed to reduce the running of taps or showers until the water gets up to the right temperature.

Wastewater Reuse

Many Australian homes use potable (drinkable) water for practically everything in the house and garden. You can reduce potable water use in the home by treating and reusing greywater (from showers, basins and taps) for irrigating gardens or for flushing toilets.



Universal Design

When designing a new home or renovating your existing home it is important to consider your future needs. Many homes don't cater for an ageing demographic and aren't designed to meet the changing needs of occupants.

Designing a home with comfort, safety and ease of access in mind are features that make the home more liveable, whether that's for parents with prams, getting the shopping in the house or allowing people with disability or temporary injury to move around more freely and easily.

Windows and Glazing

Up to 40% of a homes heating energy can be lost and 87% of its heat gained through windows. Minimise windows in east and west elevations to avoid excessive heat gain in summer as these windows are exposed to morning and afternoon sun for longer periods of time. North facing windows are great for letting winter sun in.

Improving the thermal performance of windows and glass doors can improve comfort and reduce energy costs. Glazing choices are generally made when building a new home but improving glazing through renovation is an easy way to significantly improve thermal performance of your existing home without rebuilding or moving. Window furnishings such as carefully selected blinds or curtains can also improve heat loss or gain.

Ventilation and Sealing

When planning door and window locations for your house, consider which direction breezes come from and place openings in these areas. Locating windows opposite each other will allow air to flow more readily through your house. If possible, windows on the prevailing breeze side of the house should be lower than those on the opposite side to assist natural air flow.

Sealing your home is one of the simplest ways to increase your comfort and reduce energy use. Unintended air movement can contribute up to 25% of winter heat loss in buildings.

Insulation

Insulation is a material that resists or blocks the flow of heat energy. Insulation is used to stop heat inside the home from escaping in winter, and to stop heat outside the home from entering in summer.

For insulation to be effective, it should work in conjunction with good passive design. For example, if insulation is installed but the house is not properly shaded in summer, built-up heat can be kept inside by the insulation, creating an ‘oven’ effect.

CHECKLIST

- [ ] Have you thought about what size home you really need?
- [ ] Does the layout and siting of your home allow for the best solar passive outcomes?
- [ ] Have you integrated a renewable energy system or allowed for this down the track?
- [ ] What percentage of construction materials to be used are recycled?
- [ ] Do materials and fixtures contain harmful chemicals or are they better for your health?
- [ ] Are your appliances the best choices you can make for water and energy efficiency?
- [ ] Can you put wastewater to good use, including in the garden and for flushing toilets?
- [ ] Will your home be comfortable and accessible as you get older or sustain an injury?
- [ ] Can your home be easily adapted to suit disability access?
- [ ] Have you considered how upgrading your choice of glazing can reduce energy costs?
- [ ] Insulation is a must, but have you used the best performing product?
- [ ] Does your home have adequate ventilation for passive cooling and can be well sealed to limit heat loss in winter ?

FURTHER RESOURCES

Australia's Guide to Environmentally Sustainable Homes
https://www.yourhome.gov.au/

Liveable Housing
https://livablehousingaustralia.org.au/

Water Efficiency Labelling Standards Scheme
https://www.waterrating.gov.au/

Energy Ratings for Electrical Appliances
https://www.energyrating.gov.au

Insulation Facts Sheet
https://www.commerce.wa.gov.au/homeinsulationfactsheet.pdf

Green Building Council Australia
https://new.gbca.org.au/green-star/rating-system/

Vinyl Council of Australia
https://www.vinyl.org.au

Green Painters
https://www.greenpainters.com.au

NOTE:

- The websites and/or products listed on this publication are for general information only and are not endorsed by the Shire of Denmark.
- Designing buildings for energy efficiency as required under the National Construction Code (NCC) may require detailed advice. It is important to seek appropriate professional advice in the implementation of the principles outlined in this document.