



Towards 'One Planet' Cities

David Thorpe

Future Cities Symposium, Imperial College London

Introducing me

With Imagination We Can Change the World



The 'One Planet' Life



"Makes the irrefutable case for 'one planet living'"
—Oliver Tickell, editor, *The Ecologist*

"An excellent and immensely practical step by step guide"
—George Marshall

The *'One Planet' Life* demonstrates a path for everyone towards a way of life in which we don't act as if we had more than one planet Earth. The difference between this approach and others is that it uses ecological footprint analysis to help to determine how effective our efforts are. Much of the book is a manual – with examples – on how to live the 'good life' and supply over 65 per cent of your livelihood from your land with mostly positive impacts upon the environment.

It examines the pioneering Welsh policy, One Planet Development, then considers efforts towards one planet living in urban areas. After a foreword by BioRegional/One Planet Living co-founder Pooran Desai and an introduction by former Welsh environment minister Jane Davidson, the book contains:

- An essay arguing that our attitude to planning, land and development needs to change to enable truly sustainable development
- Guidelines on finding land, finance, and creating a personal plan for one planet living
- Detailed guides on: sustainable building, supplying your own food, generating renewable energy, reducing carbon emissions from travel, land management, water supply and waste treatment
- 20 exemplary examples at all scales – from micro-businesses to suburbs – followed by Jane Davidson's Afterword.

The book will interest anyone seeking to find out how a sustainable lifestyle can be achieved. It is also key reading for rural and built environment practitioners and policy makers keen to support low-impact initiatives, and for students studying aspects of planning, geography, governance, sustainability and renewable energy.

David Thorpe is a writer and consultant on sustainability issues. He is a Special Consultant on Sustainable Cities Collective, the primary website for urban leaders globally; a founder and core group member of the One Planet Council; and the author of several books on sustainability, including: *Energy Management in Buildings*, *Energy Management in Industry*, *Solar Technology* and *Sustainable Home Refurbishment*, all in The Earthscan Expert Guide series. Prior to this he was the News Editor and Opinion Writer of the UK's *Energy and Environmental Management* magazine for 13 years. Before that he was director of publications at the Centre for Alternative Technology.

SUSTAINABILITY

Cover images: Front, top: Cassie and Nigel Lishman outside their home at Llammas; © Tao Wimbush; Middle: Dan and Sarah Moody at their home, Nant-y-Owm, Wales' approved first One Planet Development; Hoppi Wimbush; homes at Hockerton, Nottinghamshire; © David Thorpe; Bottom: Vauban, Freiburg, Germany; © Andreas Dellecke. Back cover: Family outside BedZed housing development, south London; © BioRegional

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THE 'ONE PLANET' LIFE
David Thorpe



THE 'ONE PLANET' LIFE



A BLUEPRINT FOR LOW IMPACT DEVELOPMENT

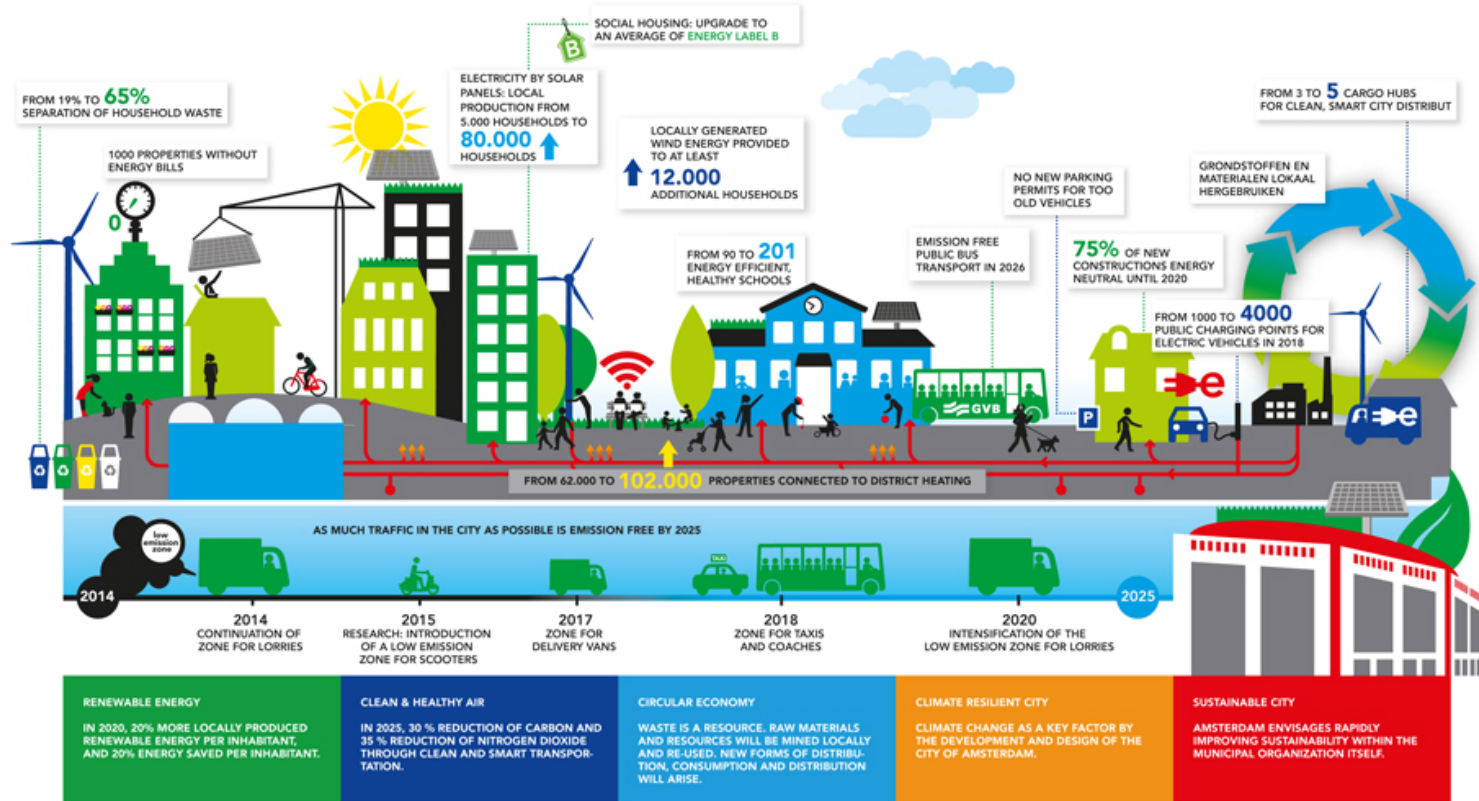
David Thorpe

Foreword by BioRegional's **Pooran Desai**

Introduction and Afterword by former Welsh Environment Minister **Jane Davidson**



Sustainable Cities Collective



Where does the food come from?

Is the city really sustainable?

Let alone regenerative?

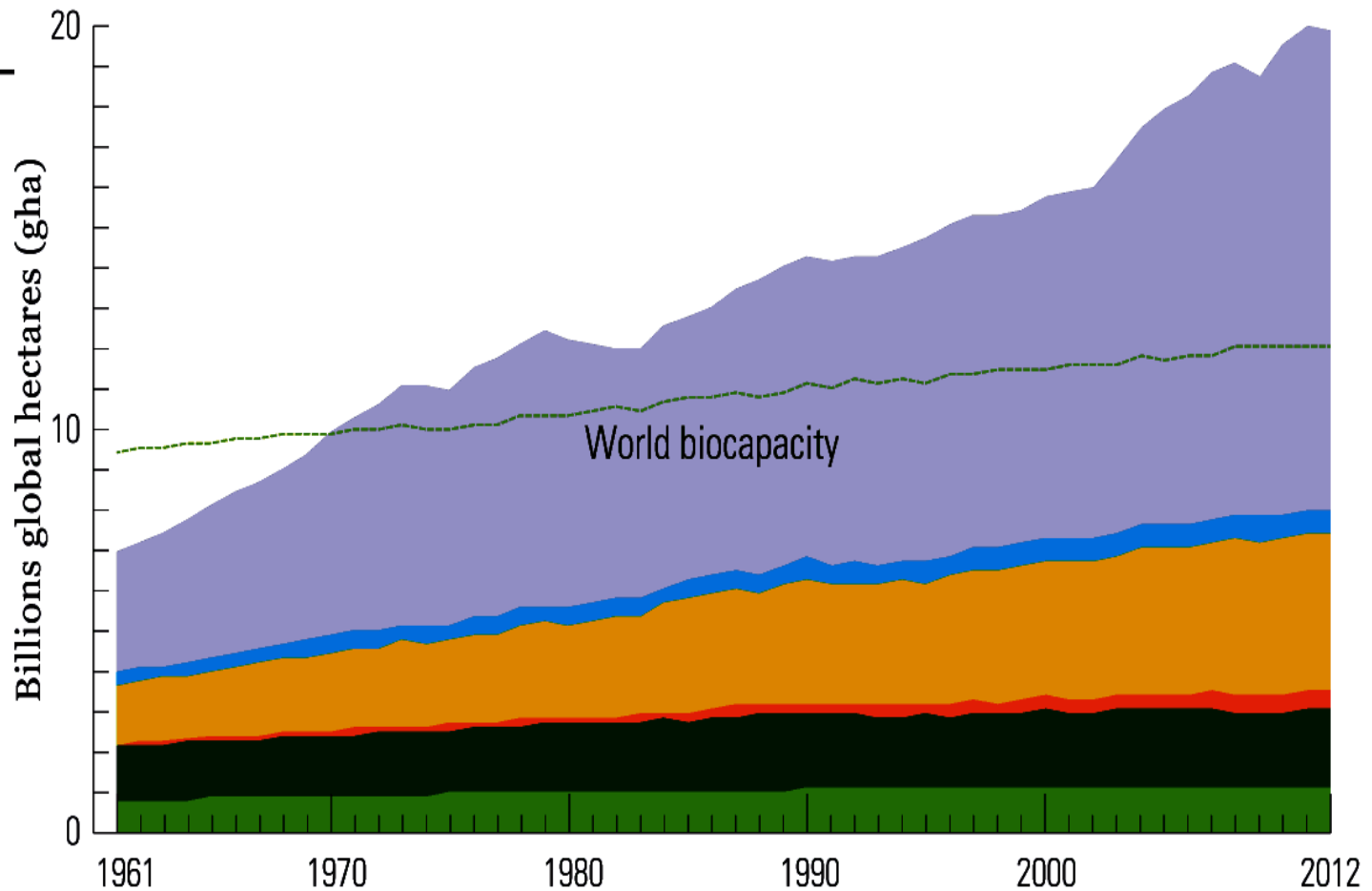
How do we know?

Planetary boundaries

Key

- Carbon
- Fishing grounds
- Cropland
- Built-up land
- Forest products
- Grazing land

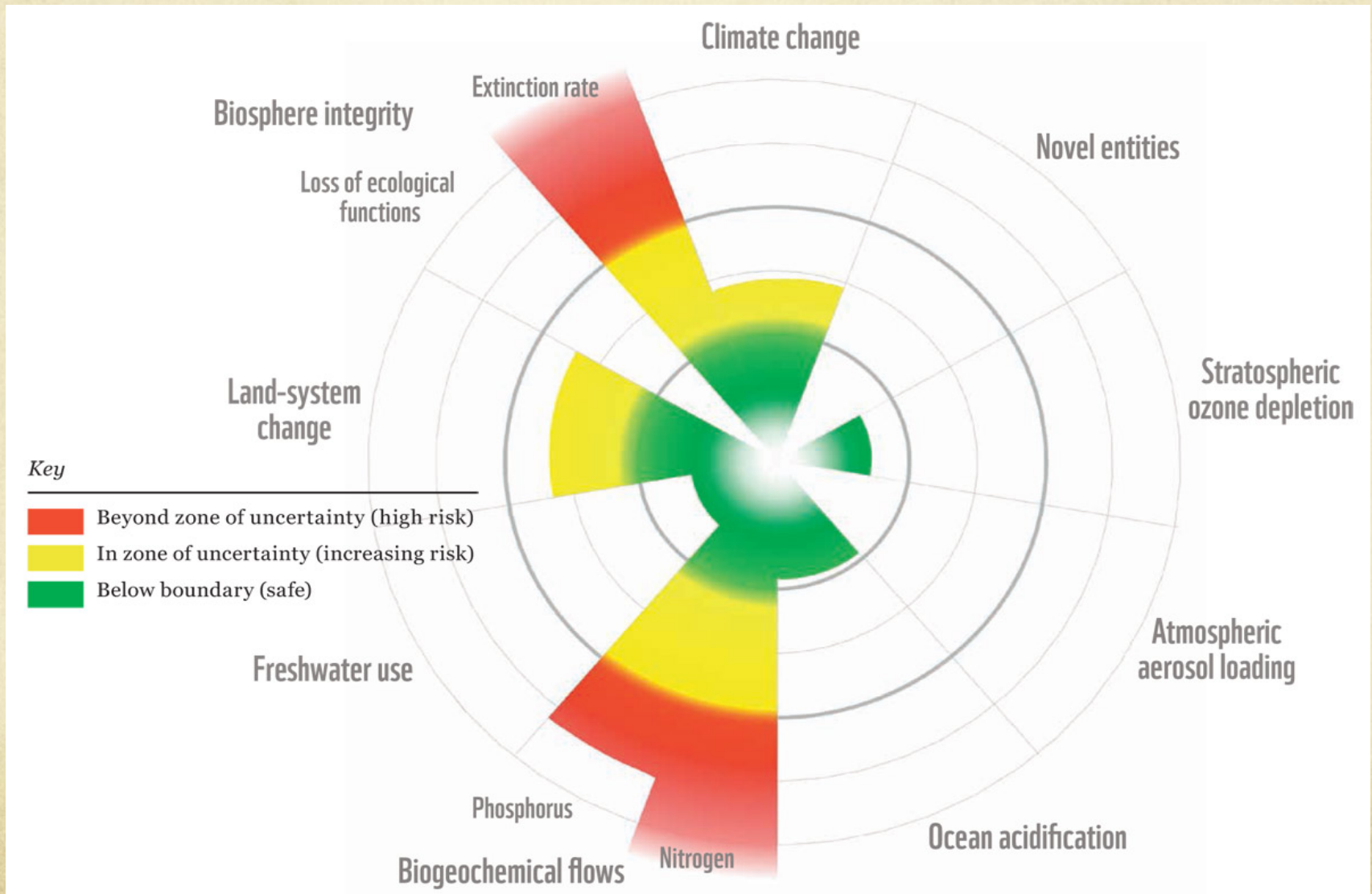
Green line:
Earth's biocapacity



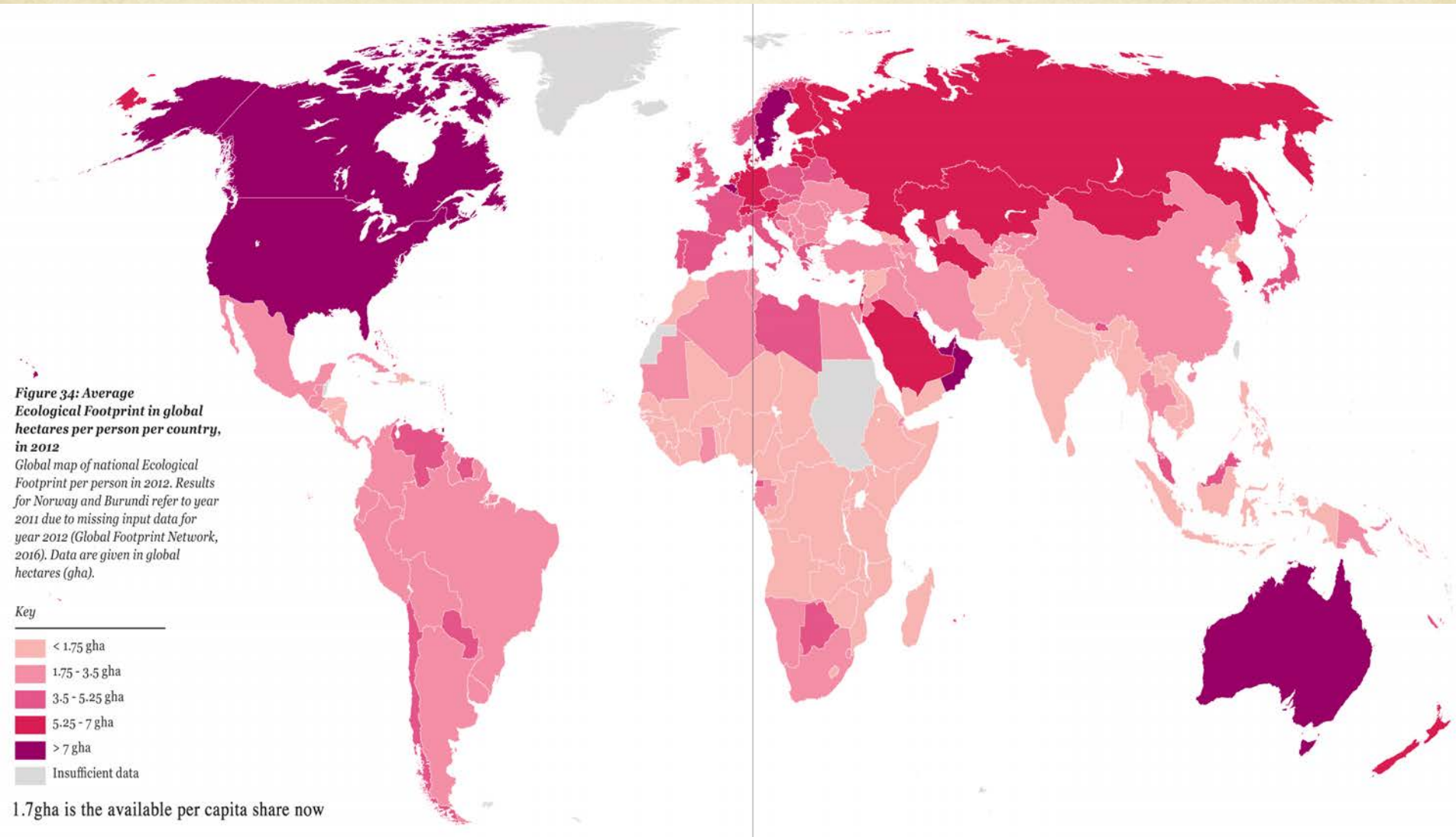
Planetary boundaries

- Of the 9 'planetary boundaries' assessed by WWF, 4 have passed beyond safe (climate change, biosphere integrity, biogeochemical flows and land-system change).
- Humanity currently needs the regenerative capacity of 1.6 Earths to provide the goods and services we use each year.
- The per capita Ecological Footprint of high-income nations dwarfs that of low- and middle-income countries.
- Global population (now 7.5 bn) predicted to peak at 11.2 bn by 2100 (UN).

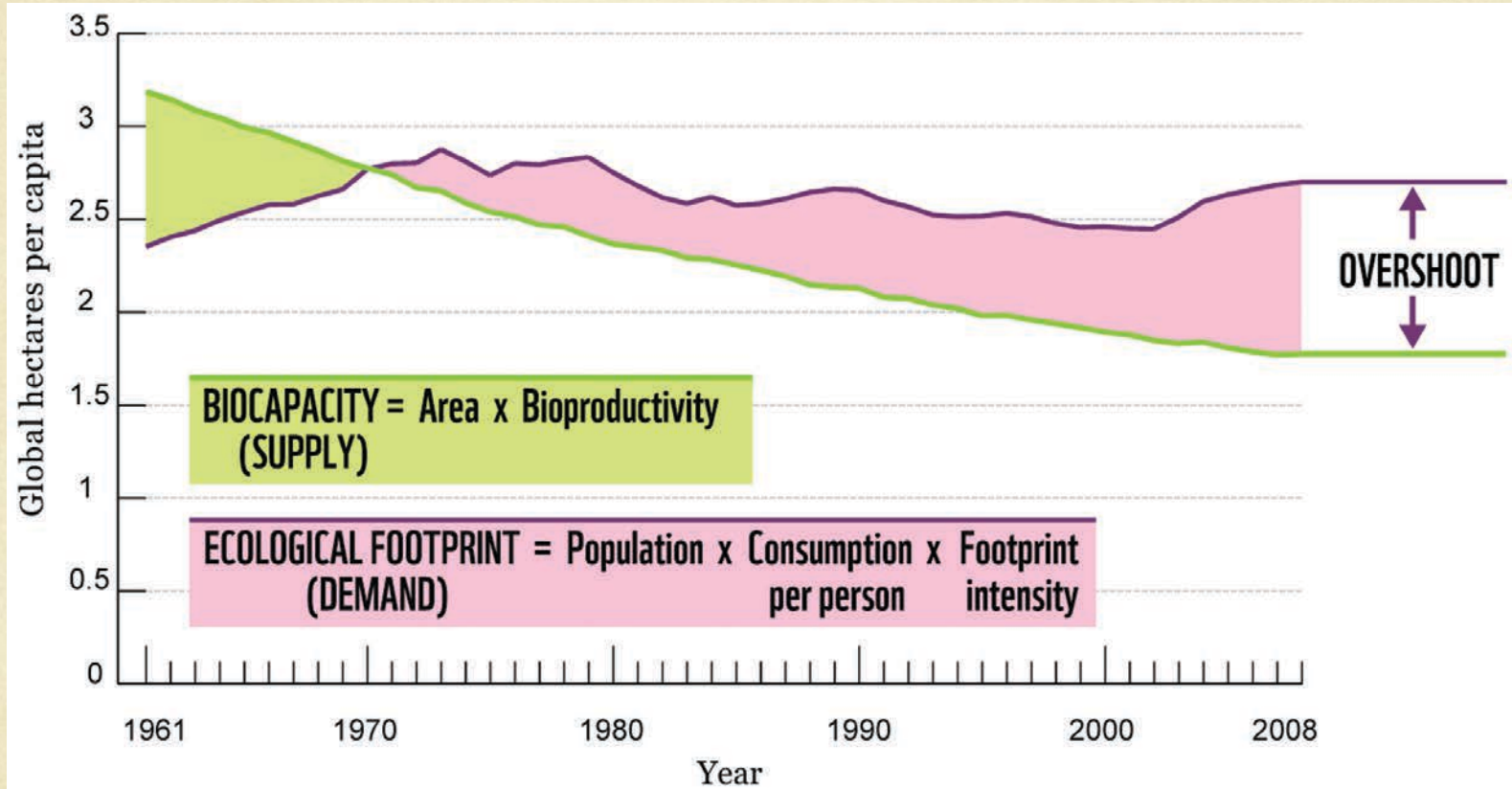
Planetary boundaries



Unequal consumption



Ecological footprint



The challenge

We must reduce our ecological footprint from this:



Home & Energy 27%

Transport 17%

Food 23%

Goods 14%

Services 9%

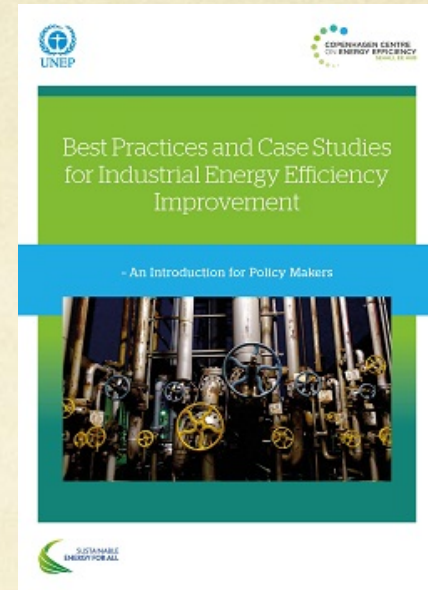
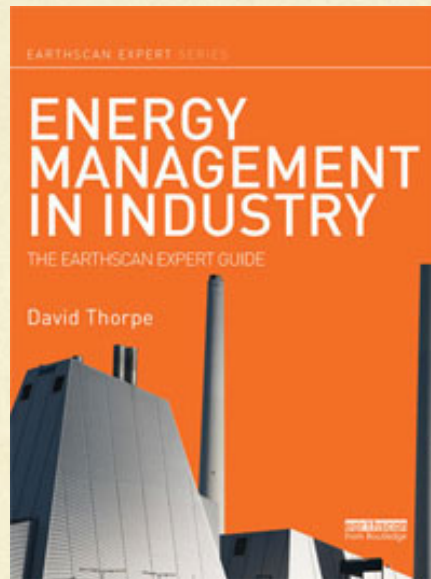
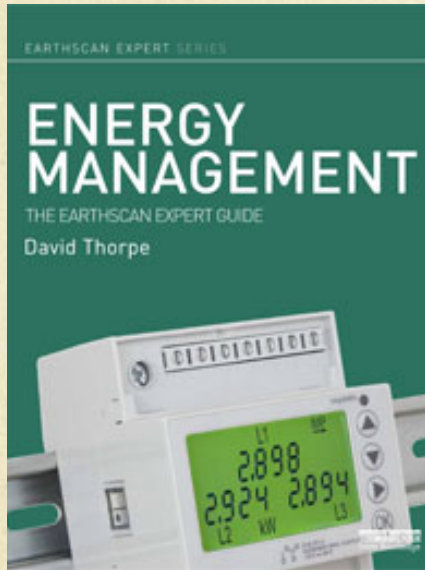
Govt 7%

Capital assets 4%

To this:



As in energy management...



What gets measured gets saved

Measure it

One Planet Development Ecological Footprint Calculator

Current Per Capita Ecological Footprint

2.18 gha

Estimated Per Capita Ecological Footprint on First Habitation

0.38 gha

Year Three & Year Five review Per Capita Ecological Footprint

0.38 gha

Future estimated Per Capita Ecological Footprint

0.38 gha

Output ref. Data entry sheet

* It is recommended you enter current household figures as a baseline to guide your estimates

	Existing Household Actual Figures Pre Application (not required on application)	Estimated Household Figures on First Habitation Required on Application
1 Number of people in Household	4	1
2 Household annual income	15000 £ per year	
ENERGY		
3 On Grid electricity	500 kWh	0 kWh
4 Off grid electricity: solar PV	500 kWh	0 kWh
5 Off grid electricity: wind turbine	0 kWh	0 kWh
6 Gas (includes bottled gas) - 1kg LPG = 12.77 kWh	0 kWh	0 kWh
7 Biomass - logs - 1 tonne (see notes) = 3869 kWh	50 kWh	0 kWh
8 Coal - 1 kg = 8.05 kWh	0 kWh	0 kWh
9 Oil - 1 litre = 10 kWh	0 kWh	0 kWh
HOUSING & INFRASTRUCTURE		
10 Rent or mortgage expenditure	1200 £ per year	0 £ per year
11 Capital Cost - renewable energy equipment /water plant - spread over 15 years	500 £ per year	0 £ per year
12 Capital Cost - Costs of home construction - spread over 30 years	5000 £ per year	0 £ per year
13 Maintenance and repair of the dwelling	500 £ per year	0 £ per year
14 Goods & services for household maintenance	500 £ per year	0 £ per year
15 Water supply and miscellaneous dwelling services	20 £ per year	0 £ per year

One Planet Development in Wales

- Ecological footprint of 1.88gha per person in 5 years
- 65% of essential needs met from land-based activities
- conserve, manage and enhance the environmental quality of the land, including biodiversity, cultural heritage and landscape
- Sustainable water supply
- zero waste (including biological waste - sewage treatment)
- 100% renewable energy
- zero carbon home over its lifetime
- minimise carbon impact of travel



ONE PLANET COUNCIL

Supporting One Planet Developments

- Supports applicants
- Supports local planning departments
- Conducts research
- Liaises with Welsh Government
- Conducts awareness raising
- Runs training courses
- www.oneplanetcouncil.org.uk



Benefits

- Sustainable low impact homes
- Creating sustainable livelihoods
- Affordable housing
- Increased land productivity (c.32x)
- Improving land and wildlife
- Efficient use of natural resources
- Sustainable transport
- Good for the local community
- Good for Wales and the planet
- **Measurable**

Peri-urban OPD



REVIVE THE HEART OF WALES

For the sustainable revival of the rural Welsh economy

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['One Planet' pilot communities](#) ▾

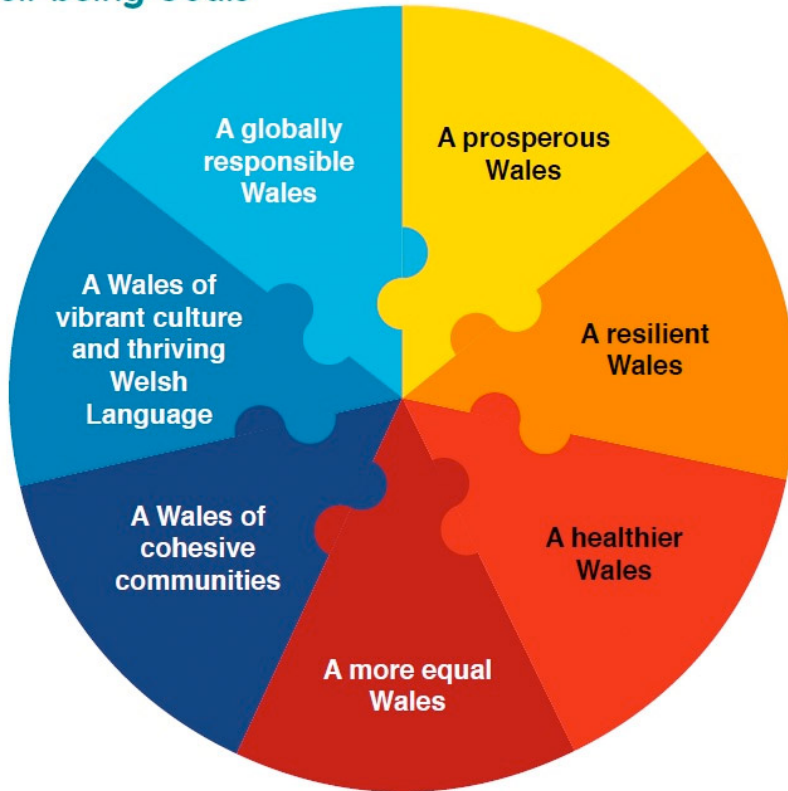
[Contact us and Stay Informed!](#)



LLANDOVERY SUSTAINABLE NEIGHBOURHOOD

Well-Being of Future Generations Act

Well-being Goals



Goal in the WBFG Act	Description of the goal	How One Planet Developments can help	Supported Indicators & SDGs
A prosperous Wales	An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.	One Planet Developments help to create jobs due to the intensive nature of growing, with more jobs provided per hectare, and more productivity, than on a conventional farm. The requirement for land-based activities means that as the number of such developments increases, the more self-sufficient in food and other agro-forestry products Wales will become.	20,21
A resilient Wales	A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).	The requirement for biodiversity and landscape assessments helps to protect and restore habitats. One Planet Developments must use traditional management practices and increase the number of pollinators, natural predators to pests and diseases, and birds; they must form wildlife corridors and conserve and enhance the flora and fauna identified in the Local Biodiversity Action Plan. They should reintroduce lost features such as traditional orchards, woodland, hedgerows, stone walls and wetlands; and create ponds, use traditional woodland and shelterbelts; and enhance carbon storage. They should create new natural habitats through good land use and integration into the built environment, and use water efficiently. Trees are often planted and soil enriched with organic material to reduce run-off and flooding and to increase soil fertility and carbon content. The requirement to be self sufficient in water and sewage treatment reduces nitrate pollution and retains nutrients. The requirement to deal sustainably with waste results in almost zero waste and closed loop resource reuse.	13,15,32,41, 42,43,44 SDG12, SDG15
A healthier Wales	A society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood.	Working on the land and eating fresh local, organic produce helps promote good health and well-being, not just for the practitioners but those in their community who are customers.	5,29 SDG11
A more equal Wales	A society that enables people to fulfill their potential no matter what their background or circumstances (including their socio economic background and circumstances).	Anyone may, in theory, live and work on a One Planet Development. Training courses are being provided to train people in the necessary skills. Models are available which, like Steiner communities, can provide gainful occupation and care for those of limited abilities. So far, One Planet Developments have managed to provide very affordable housing.	SDG11, SDG12
A Wales of cohesive communities	Attractive, viable, safe and well-connected communities.	One Planet Developments are required to integrate with their local community and conduct a community impact assessment. They must record the quantity and value of local food, goods and services sold or exchanged for local consumption and take steps to redress any negative impacts.	26,27
A Wales of vibrant culture & thriving Welsh language	A society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation.	One Planet Developments are required to survey and curate any known sites of cultural importance within their curtilage and help to strengthen local landscapes. Buildings should blend in visually and respect local architecture. Current projects include several Welsh-speaking households and almost all the non-speakers are learners, although this is not explicitly required by policy.	40
A globally responsible Wales	A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.	The requirement to reduce one's ecological footprint to 1.88 global hectares per person is in line with a global equitable spread per head of population of the planet's resources. The requirements 1) to reduce the need to travel and encourage low and zero carbon modes of transport, 2) for 100% renewable energy, and 3) for zero carbon buildings, all help to tackle climate change.	12,14,33,41,42,46 SDG7, SDG11, SDG13

Ambition: Wales waste strategy - Towards Zero Waste: key milestones to the goal of one planet resource use

2025: Towards Zero Waste

Significant waste reduction
(**including reuse**) (27%
reduction)

Recycling rate of at least 70%

AD food waste priority

'Closed loop recycling' systems
(**high quality, separate
collection**)

Residual waste to high
efficiency EfW

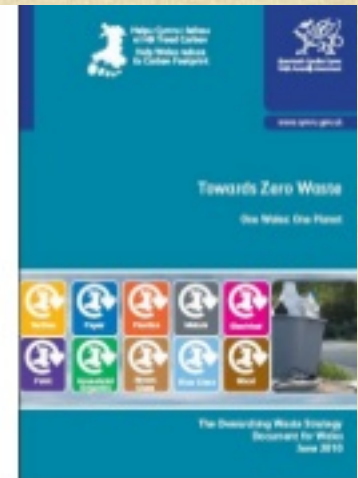
As close to **zero** landfill as
possible



2050: Achieving Zero Waste

Reduce our share of Wales' ecological footprint to 'one Wales: one planet' levels by 2050 (**65%** reduction of waste)

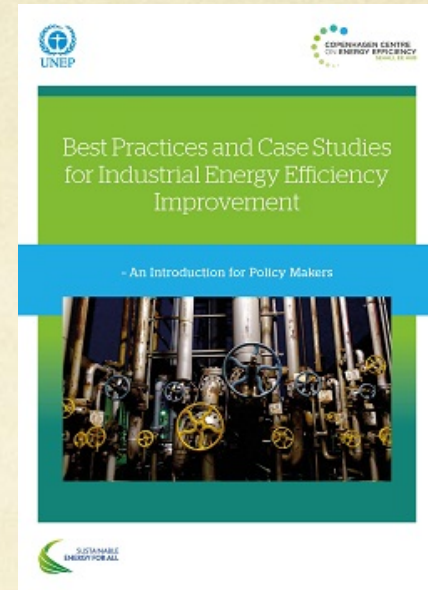
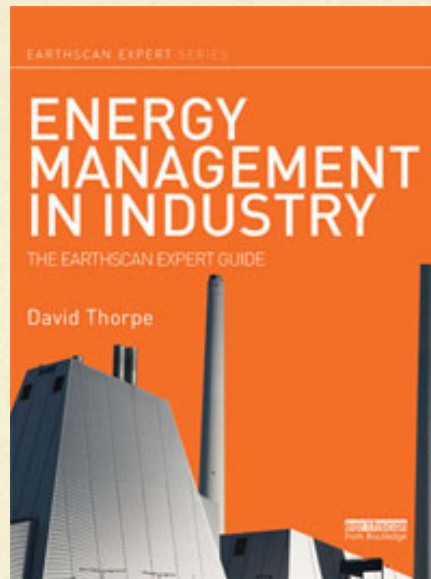
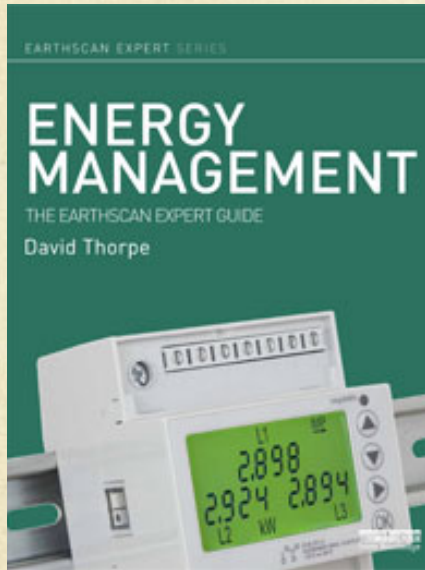
Produce no residual waste through SCP - any waste that is produced is re-used/ recycled (at **100%**).



Other Welsh legislation

- Planning (Wales) Act 2015
- Environment (Wales) Act 2016
- Woodland and Forestry Policy
- Future of Land Management in Wales
- White Paper on Reforming Local Government (2017)
- National Development Framework consultation (2017-18)
- Inquiry into the Future of Agricultural and Rural Development Policies in Wales

As in energy management...

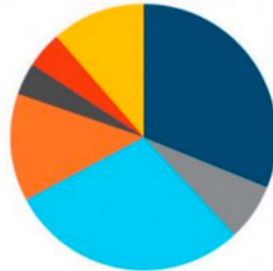
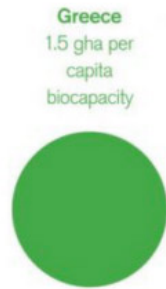


You need management buy-in
You need staff training

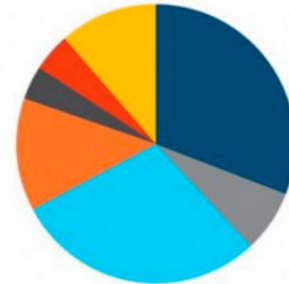
How to apply this to cities?



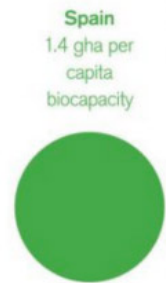
Global Footprint Network



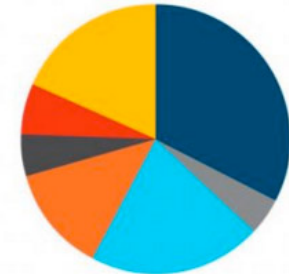
GREECE / 4.41 gha per capita



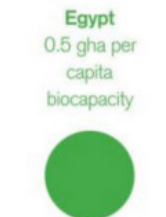
ATHENS / 4.84 gha per capita



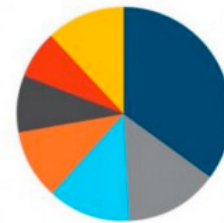
SPAIN / 4.05 gha per capita



BARCELONA / 4.52 gha per capita



EGYPT / 1.79 gha per capita



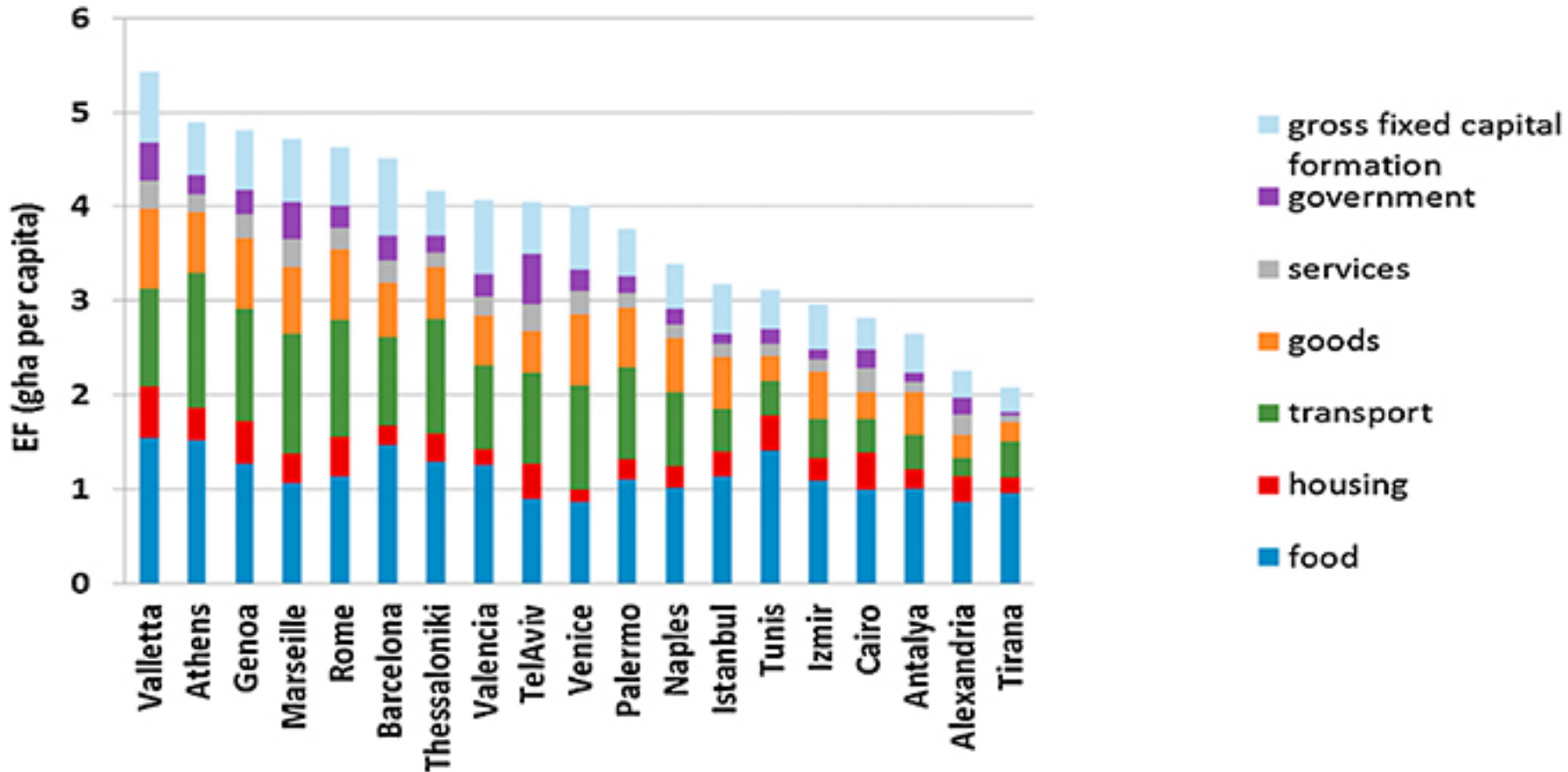
CAIRO / 2.85 gha per capita

Per capita Ecological Footprint (2010)

- Food
- Housing
- Personal transportation
- Goods

- Services
- Government
- Infrastructure Investment (houses, bridges, roads, factories)

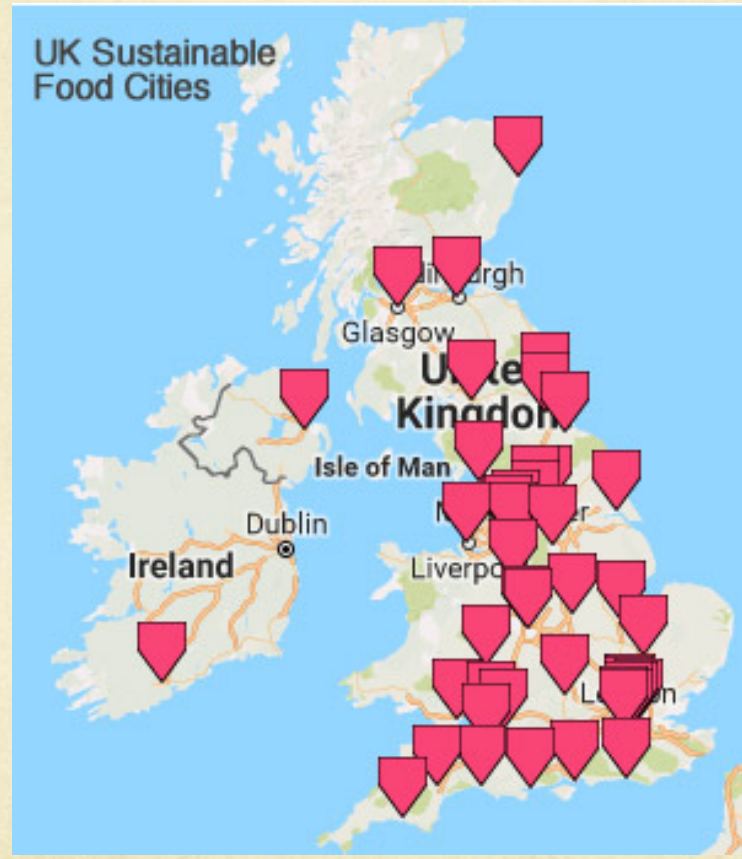
Mediterranean City Footprints



Feeding cities

1. Milan Urban Food Policy Pact: 140 signatory cities (as of April 2017)
2. City Region Food Systems
3. The UN Committee on World Food Security
4. The C40 Food Systems Network
5. EUROCITIES' food working group
6. The UK Sustainable Food Cities Network has 48 member cities
7. The Association des Régions de France: Rennes Declaration for Territorial Food Systems
8. Netherlands, 12 cities, 1 province, 3 ministries signed CityDeal “Food on the Urban Agenda“ 2017.
9. Dame Ellen MacArthur calls cities “great aggregators” of resources and materials – especially nutrients from food: URBAN BIOCYCLES report
10. EAT Forum in Sweden
11. UK Sustainable Food Cities Network

UK sustainable food cities

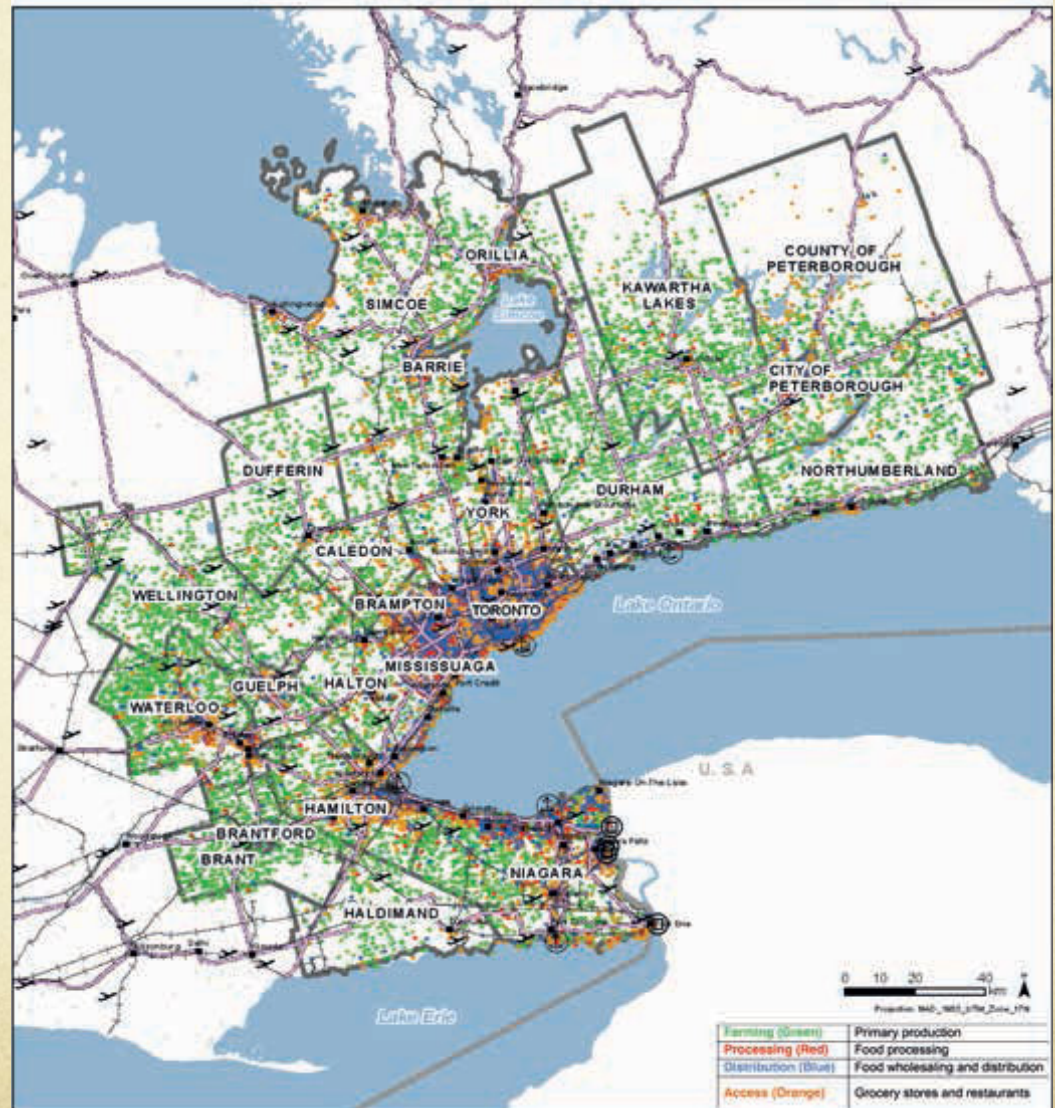


Hinterland approach

Golden Horseshoe, incl. Greater Toronto area. 7 municipalities 10-year Golden Horseshoe Food and Farming Plan 2021:

- to grow the food and farming cluster
- to link food, farming and health through consumer education
- to foster innovation to enhance competitiveness and sustainability
- to enable the cluster to be competitive and profitable by aligning policy tools, and
- to cultivate new approaches to supporting food and farming.

Problem: big agriculture.



Urban Farming in Detroit

- Detroit City Plan updated 2012 to feature urban agriculture, acknowledging environmental, economic and social benefits.
- 2013's Detroit Future City Strategic Framework: priority for all city stakeholders in order to accelerate economic revival, address land use issues, improve city services, and foster civic engagement.
- Urban agriculture gets zoning ordinance, formally permitting, certain types of food production as a viable land use.
- Planning barrier and land cost often a vital issue.



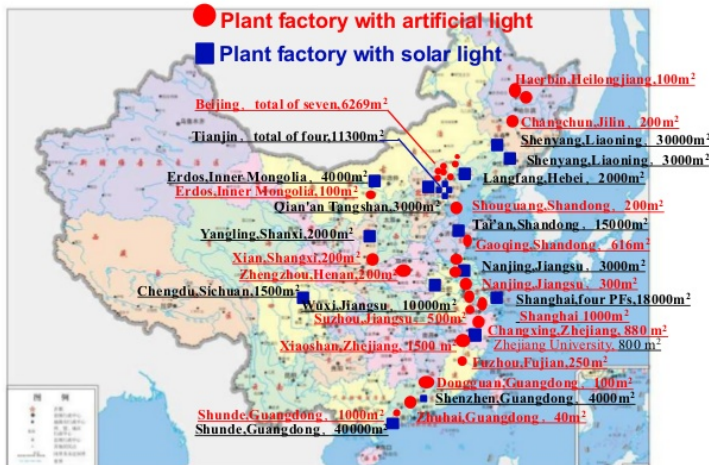
Vertical farming in China

- Cultivated land is only 0.08ha/person – 40% of world average.
- 80% of population will live in cities by 2050
- Partly-automated indoor farming is an essential feature of the future.
- Professor Dr Qichang Yang CPAEE & CCAS in Beijing. 40 research institutes in Ministry of Agriculture: indoor /vertical urban farming, greenhouse engineering, plant factories, hydroponics and energy efficiency.



Vertical farming in China

Regional Distribution of Plant Factory in China (2014)



Inside view of the plant factory



Plant factory with LED light (Zhejiang)

Plant Factory for demonstration in Zhejiang



Bird eye view of the plant factory, 1600 m² (include PF with artificial light 880 m²)

Movable cultivation beds with LED light



Tuberous roots

Soilless sweet potato plant 10 yrs old has produced 500 potatoes.



Ways to measure city sustainability 1

Private schemes:

- Ecological Footprint Standards 2009 (GFN) (fairly transparent)
- BioRegional's 'one planet' programme (obscure)
- Stockholm Environmental Institute (fairly transparent)
- UN System of Environmental and Economic Accounting (SEEA) (not complete)

Ways to measure city sustainability 2

Wales' Well-Being of Future Generations Act:

- Economic output – Gross Value Added
- Social Justice - percentage of the population in relative low-income households
- Biodiversity conservation – status of priority species and habitats
- Ecological footprint – national EF against the UK and global average
- Wellbeing - a standard set of 36 health questions which ask respondents about their own perception of their physical and mental health.
- UN's Sustainable Development Goals
- Carbon footprinting

Ways to measure city sustainability 3

European Union's sustainable towns and cities program, uses:

- The Integrated Urban Monitoring in Europe (IUME)
- Reference Framework for Sustainable Cities (RFSC), a still-active online toolkit
- - uses 28 absolute indicators

Genuine Progress Indicator:

- Applicable to existing settlements, it uses 26 indicators: seven economic, nine environmental and ten social, combined into a single framework.

Garden Cities Criteria (TCPA) – don't mention food.

Ways to measure city sustainability 4

British or International Standards

- Life Cycle Assessment: ISO 14040:2006, 14044:2006, 14047:2012, 14049:2012
- Guidance for community sustainable development: BS 8904:2011
- Sustainable Development of Communities: Indicators for City Services and Quality of Life: ISO 37120 46 indicators, 18 environmental
 - absolute but not related to ecological planetary boundaries.
 - can be used by any city, municipality or local government wishing to measure its performance in a comparable and verifiable manner
 - Under review, Will be replaced by ISO/DIS 37120
- Sustainable cities and communities: ISO 37100:2016. Will contribute to UN Sustainable Development Goals through standardization. Guided by ISO/TC 268
- Sustainable development in communities. Inventory of existing guidelines and approaches: PD ISO/TR 37121:2017
- Specification for the assessment of greenhouse gas emissions of a city – Direct plus supply chain and consumption-based methodologies, free to download: BS PAS 2070

Criteria for standards

- Absolute (fixed units) rather than relative (a 50% reduction) – for comparison and ranking
- Measurable
- Simple to communicate and implement – especially data gathering
- Could be automated and harvested from existing data collection (cf. smart city agenda)
- Must refer to the planetary boundaries.

Towards One Planet Cities 1

The British Standard Institute's John Delaney:

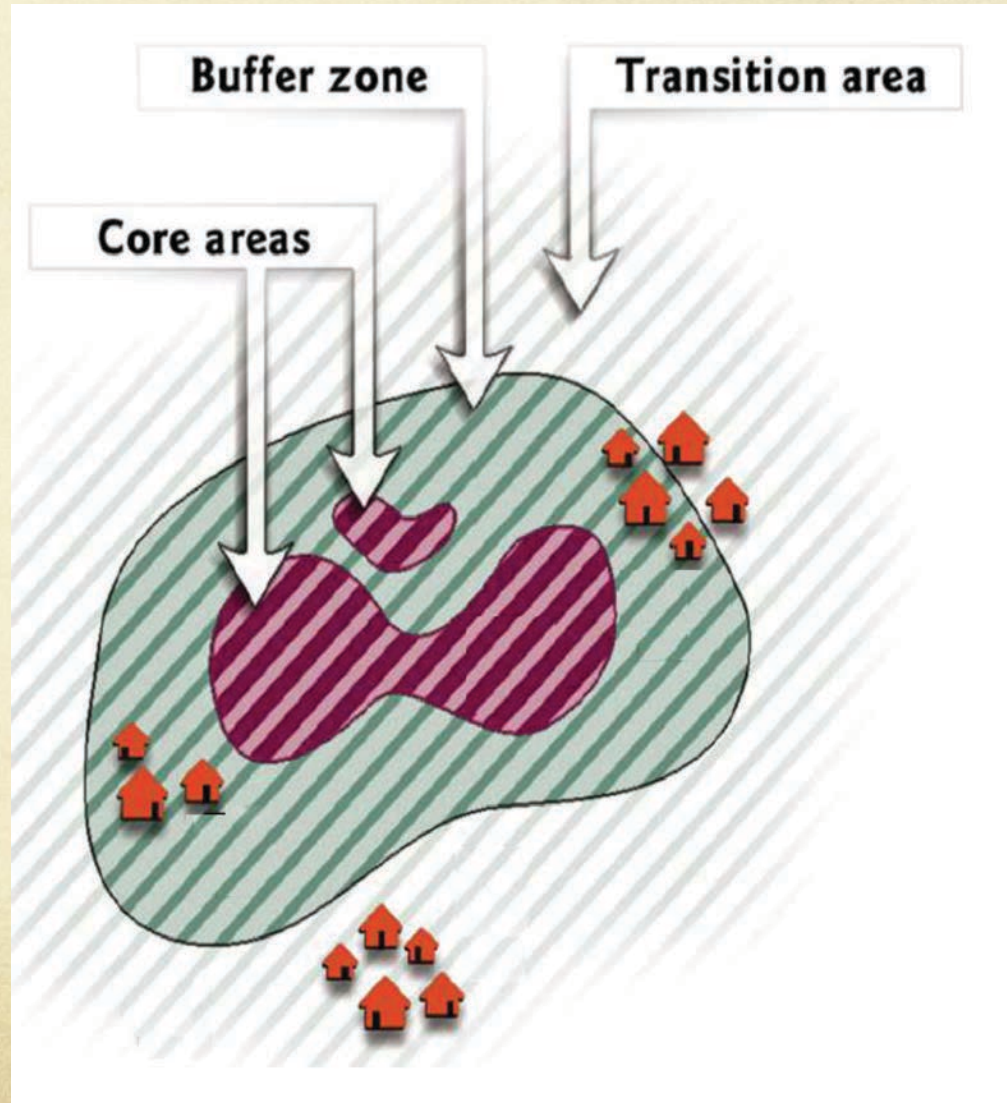
- *"What option is chosen depends on what suits a city and/or what they are most comfortable with.*
- *Process standards - powerful, and help develop strategy, vision, objectives and targets, but take commitment and resources.*
- *Reporting standards give a quick indication of how your city is doing against a raft of issues that are commonly agreed to be important, and allow ranking of city performance.*
- *Different development standards [systems] needed for new communities like One Planet Development, BREEAM Communities, etc. and for existing communities and cities."*

Mathis Wackernagel, president of the Global Footprint Network (GFN):

- *"Perhaps the driving question becomes – what do places need to know in order to operate safely in an ecologically ever more constrained world. It puts us on the city's side, because they need to have the critical information. But what is this? – this opens potentially a productive conversation."*

Towards One Planet Cities 2

Use UNESCO
Biospheres
approach as
prototype?



Towards One Planet Cities 3

1. Decide standards
2. Obtain buy-in and feedback at all levels
3. Decide objectives
4. Set baseline
5. Set targets over realistic timescales and how to measure them
6. Ratchet down ever one or two generations.

'One Planet' Cities
Foundation anyone?

Thank you

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- www.revive-heart-of.wales
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