

Searching for a sustainable Britain

– Vicars, tarts and the rebound effect




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TUESDAY
NEWS EXTRA

**VICAR
FIGHTS
BROTHEL
CLOSURE**

 **Evening Standard**
KNOW WHAT LONDON'S THINKING

The image shows a newspaper page with a red header and a blue footer. The main headline is in large, bold, black letters. The entire page is covered with a metal security cage. There is a small red mark on the right edge of the newspaper.



WEDNESDAY
NEWS EXTRA

**ZERO-CARBON
AGENDA CAN
RESULT IN
PERVERSE
OUTCOMES**

EVENING STANDARD



WEDNESDAY
NEWS EXTRA

**ZERO-CAP
AG
COUNTER-INTUITIVE?
SET IN
PERVERSE
OUTCOMES**

EVENING STANDARD

Time to reflect

- Is the zero-carbon building our highest ambition?
- Is there more to delivering genuinely sustainable buildings than zero-carbon?
- What are the dangers and pitfalls?





The Khazzoom-Brookes Postulate

“Energy efficiency improvements that, on the broadest considerations are economically justified at the micro level, lead on to **higher** levels of energy consumption at the macro level”

Otherwise known as the “**rebound effect**”



The rebound effect

- First proposed by William Jevons in his 1865 book “The Coal Question”
 - known as the Jevons Paradox
- Jevons observed that England’s coal consumption soared after James Watt’s improvements to Newcomen’s earlier design



William Stanley Jevons



Key Question

Will the Government's target to make all new homes **zero-carbon by 2016** and reduce energy consumed from existing buildings by **at least 80% by 2050** simply result in householders and businesses spending what they save, on other energy-consuming goods and services?

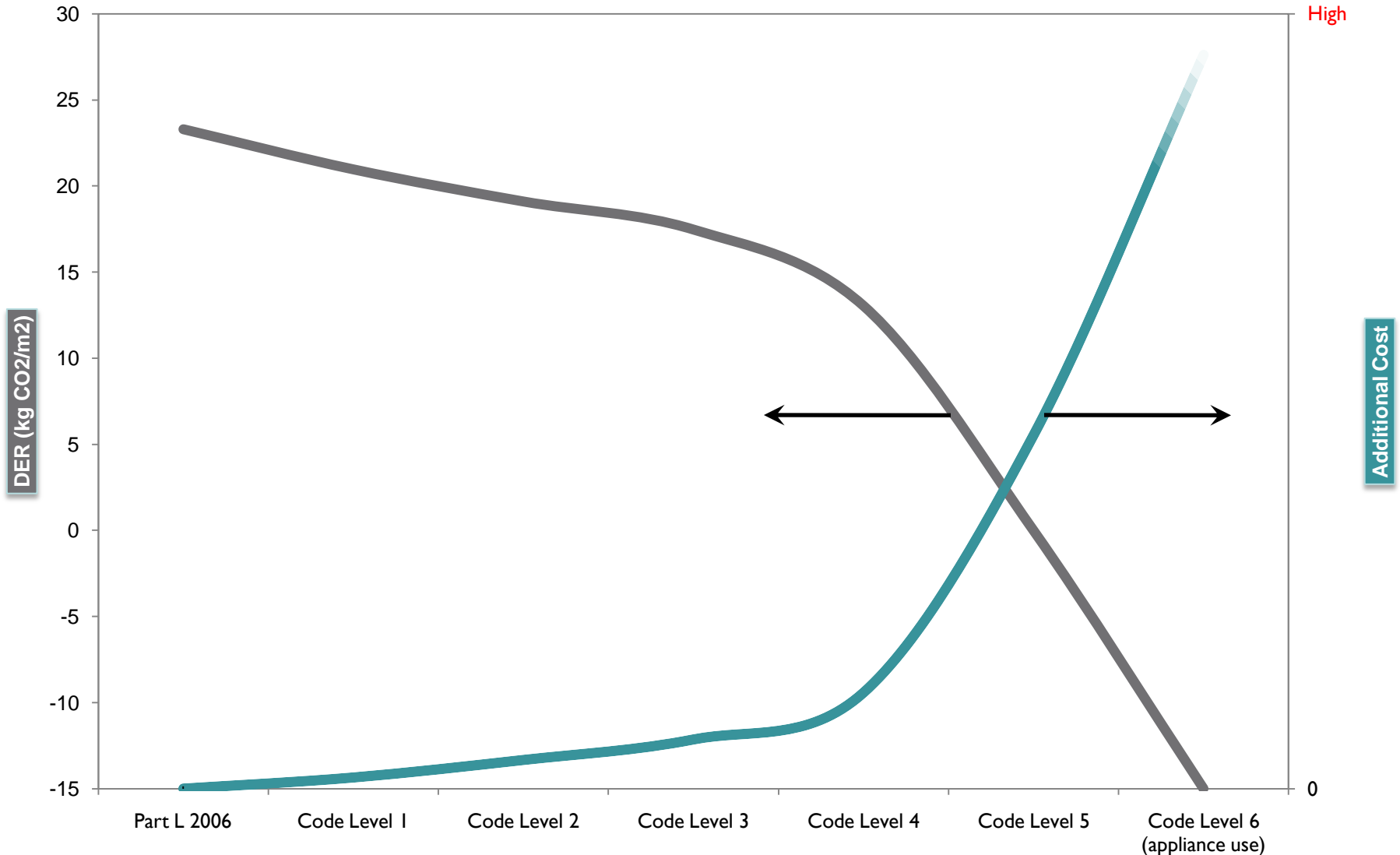
- The answer is almost certainly **“yes”** unless there is a profound change in consumer behaviour.
- Vital that the grid is decarbonised by deploying **large scale renewables where they will be most cost effective** and utilise low/zero-carbon space heating and cooling



Are there other risks from the zero-carbon agenda?

- Law of Diminishing Returns
- Law of Unintended Consequences
- Murphy's Law

Carbon emissions vs. Code Level –the law of diminishing returns!



- Based on an 80m² semi-detached house

Beware the law of unintended consequences



- Summertime overheating
- Flood resilience
- Transport
- Security
- Acoustic performance
- Indoor air quality/Health problems
 - No IAQ regulations
 - c1900 about 50 materials (mostly natural)
 - Now over 50,000 compounds and chemicals



Murphy's Law



Over-reliance on complex / unproven technologies

- As a general rule, simple building technologies work, complex ones can prove problematic!
- Mis-selling/misspecification of technologies could have hugely damaging consequences
 - Micro-wind turbines in the urban environment
 - Air source heat pumps
 - are they appropriate for the UK climate?





Is there a way which avoids these paradoxes and perverse outcomes?

- Genuine sustainability requires a “whole-system” approach
 - Focusing on zero-carbon is not enough!
 - There are no technology ‘magic bullets’
 - Vital that social and economic factors are also considered
- It's **much more** than just ticking the BREEAM / LEED / CSH box!



Our Approach

- Inbuilt has adapted and applied the proven principles of The Natural Step to the built environment
- Enables **Economic** and **Social** sustainability to be considered as well as Environmental
- Technical solutions based on elegant simplicity

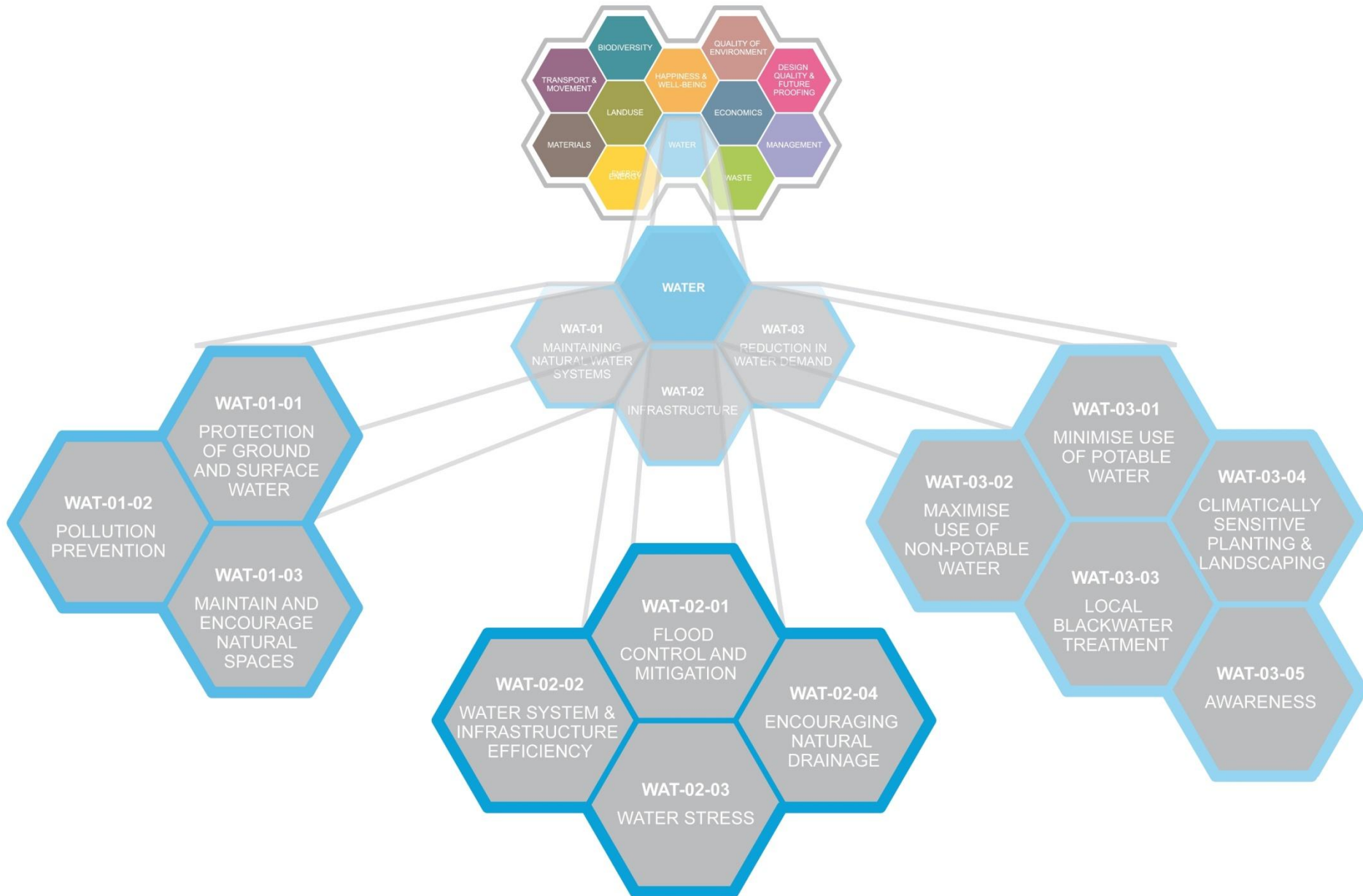
The Inbuilt Framework for Sustainable Development



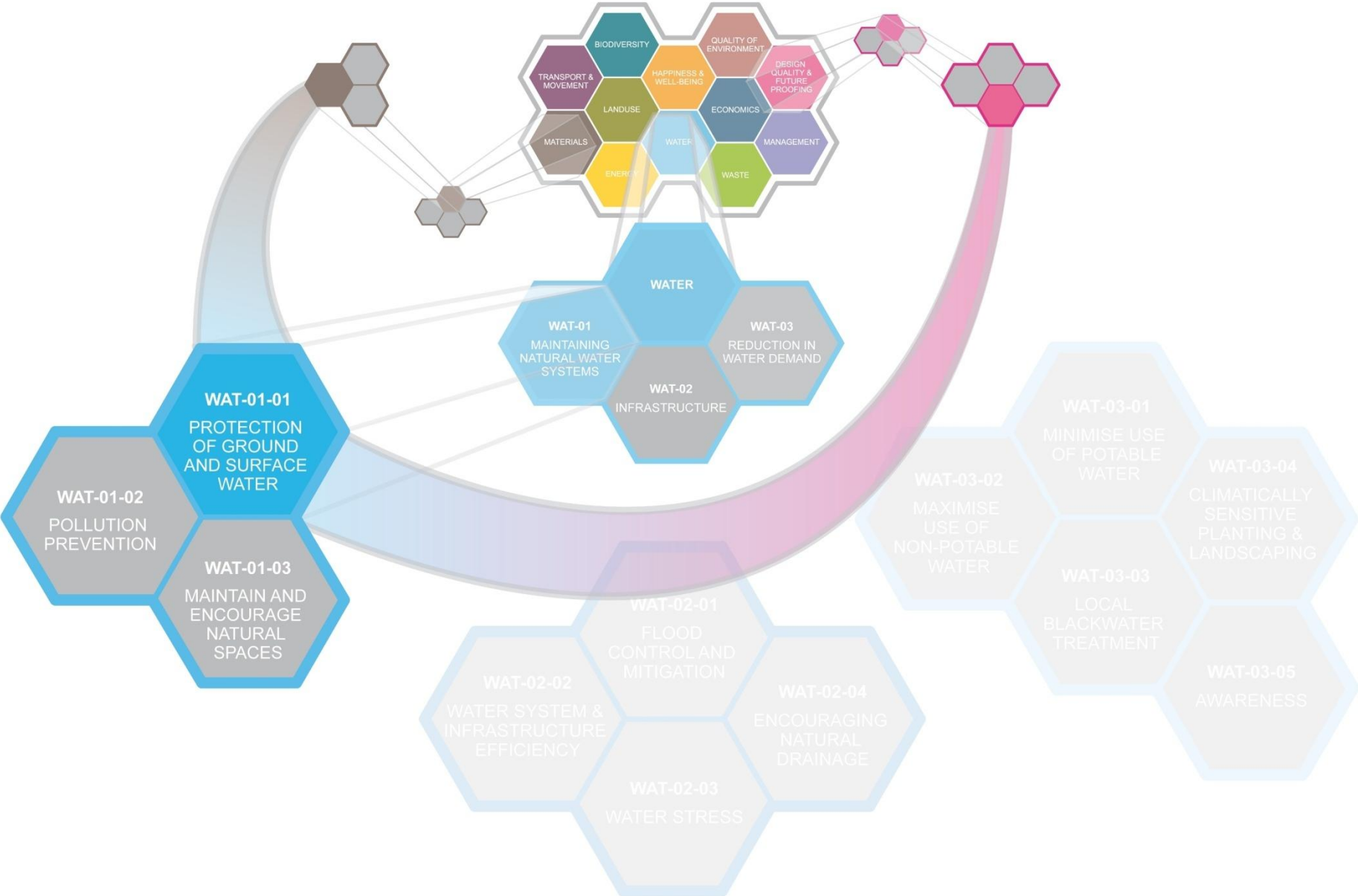
IFSD 12 Dimensions



Within each Dimension there are Aspects



Important to recognise the cross-linkages between Dimensions and Aspects



Summary



- There is no “one size fits all” approach to delivering genuine sustainability
- Success requires a clear (and shared) definition of targets and objectives
 - Our IFSD helps achieve this
- There is much more to achieving genuine sustainability than BREEAM / CSH, or the zero-carbon agenda
 - Vital to decarbonise the electricity grid and utilise low-carbon space heating & cooling
- Beware!
 - The Law of Diminishing Returns
 - The Law of Unintended Consequences
 - Murphy’s Law
- **Unless we also achieve profound behaviour change all our efforts will be wasted!**

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