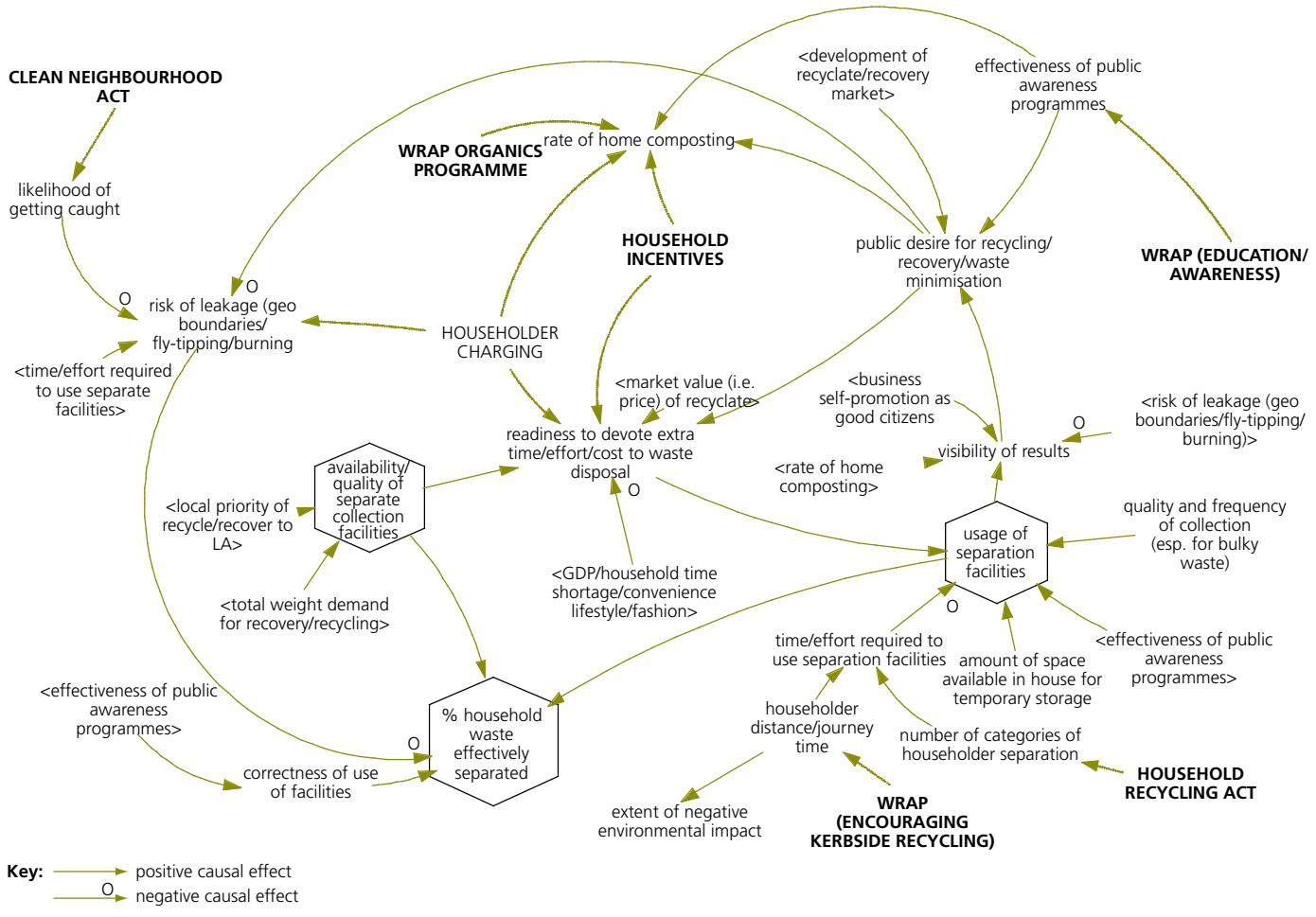
Annex G: Horizon scanning

1. *Waste Strategy 2007* (WS2007) was developed against a background of increasing public and political awareness of the need to consider waste management and resource efficiency within the context of sustainable development and impacts on climate change. WS2007 therefore sets out a broad programme which requires actions at all levels of society – recognising that behaviour change will be key to achieving our objectives. The aim in implementing WS2007 will be to prioritise waste prevention and actions towards the top of the waste hierarchy, i.e. towards waste prevention with the aspiration of driving increasingly to a resource-efficient, zero waste society.

2. In developing WS2007, Defra developed a 'model of causation' (MoC) to better understand the interactions within the complex landscape of waste management. The MoC represents a qualitative assessment, built up through peer group discussion, of causes and effects within the landscape mapped into an analysis web.[1] This facilitates more systematic thinking around the complex problems, generating a more robust view of causes and effects and the complex interactions between various factors within a system. An example map is illustrated in Figure G.1 below. This considers the factors influencing householder behaviour identified within the final model.

Figure G.1: MoC map of factors influencing householder behaviour



Source: Defra.

[1] A series of facilitated workshops was held to consider cause and effect in the cycles of municipal, commercial and industrial, and hazardous waste generation and management. The final model is a single map considering the interactions between all of these.

3. The MoC can be used in a number of ways to provide a framework for the qualitative evaluation of alternative policy instruments. It enables identification and examination of:

- the interaction between policies highlighting any gaps;
- the ways in which policy instruments bring about desired effects;
- side-effects/unintended consequences; and
- priorities for additional research/evidence gathering.

4. The MoC is an important tool for ensuring the overall **coherence** of the collection of waste policies as WS2007 is implemented. At the same time, it is important to ensure the **robustness** of the evolving strategy and policies against possible UK (and wider) changes in social, economic and environmental pressures on the environment over the medium to long term. In developing WS2007, 'horizon-scanning' techniques have therefore been used to develop alternative future scenarios against which to test policies within, and emerging from, WS2007.

5. Future scenarios explore different views of how the future might play out. They are not based on traditional forecasting methods, which often extrapolate existing trends, but instead are derived from a consideration of how drivers, trends and other factors may combine to produce a series of internally consistent but divergent plausible future worlds. They are designed to allow stakeholders to better understand what developments could emerge and allow them to explore and rehearse, rather than predict, the future.

6. Waste-related scenarios were developed with Henley Centre HeadlightVision, building on generic future environmental scenarios for 2030 developed with the Environment Agency.[2] These take alternative views of societal attitudes and behaviour around consumption, juxtaposed with alternative views of UK governance systems. This results in the four future scenarios illustrated in Figure G.1 below. As with the MoC, these scenarios were developed through a series of facilitated workshops and provide a robust framework for 'future-proofing' WS2007. The scenarios and principal waste implications are summarised in Appendix 1.

7. The work on future scenarios has been incorporated with the model of causation to provide a robust future-facing framework for policy analysis. This provides an overall tool for testing that the policy framework efficiently delivers the desired environmental outcomes both now and over the lifetime of WS2007.[3] In particular, it enables both high-level risk and strategic priorities to be identified, and more specifically the relative importance of different policy instruments to be future-proofed under the various scenarios and unforeseen risks and consequences to be identified. As such, this will be an important tool for informing implementation of WS2007.

8. Workshops were held during the development of the Strategy to generate an initial analysis of several key policy areas. These included:

- landfill tax and the landfill allowance trading scheme;
- statutory performance standards for local authorities;

[2] Environment Agency Scenarios 2030, Environment Agency Science Report SC050002/SR1 (July 2006) available from enquiries@environment-agency.gov.uk

[3] Future Proofing Waste Strategy, Henley Centre HeadlightVision (November 2006) web@defra.gov.uk

- producer responsibility and product policy;
- household tools/incentives; and
- market development.

9. Details of the analysis are set out in the research report.[4] This has provided strong evidence within WS2007 to support:

- a significant rise in the landfill tax as a more appropriate policy response than a landfill ban, at least in the short to medium term;
- changes to the distribution of tax revenues, to put more of the revenue towards improving recycling capacity, encouraging innovative production and design, and improving consumer education;
- ensuring full implementation and possible extension/refocusing of LATS to include commercial wastes;
- statutory performance standards for local authorities (although the precise nature of these needs further investigation to make them more outcome-based);
- a greater role for local authorities in relation to commercial waste;
- a deeper dialogue with business in relation to product policy and producer responsibility, shifting the emphasis more towards the production and design end of the spectrum;
- a voluntary approach to industry targets backed with a clear communicated intent to move to statutory measures if there is no increase in performance;
- increased investment in market facilitation, including improvements in infrastructure and capacity building;
- goals and targets for public sector and related agency procurement;
- further communication and other measures to incentivise changes in consumer behaviour, recognising that such change is also required to spur market development and industry action;
- retaining and improving controls on hazardous waste;
- increasing investment and confidence in the necessary skills and technology, to ensure that future demand can be met; and
- greater control, monitoring and enforcement in relation to illegal waste activity, including fly-tipping.

4 Future Proofing Waste Strategy, Henley Centre HeadlightVision (November 2006) web@defra.gov.uk

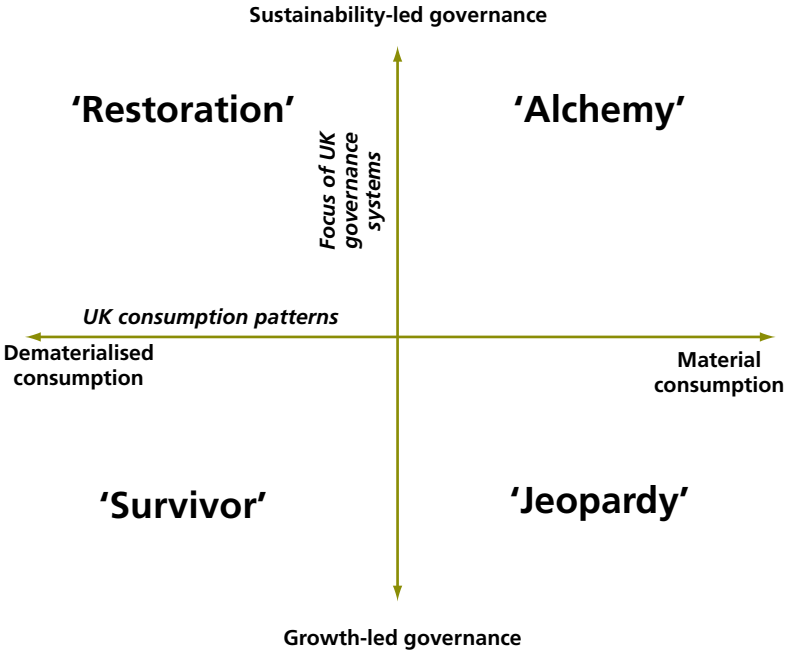
Appendix 1: Summary of future scenarios

10. The scenario space is defined by the juxtaposition of two 'axes of uncertainty' derived by clustering a series of prioritised drivers into key opposing dimensions.

11. One axis focuses on UK societal attitudes and behaviour around consumption. At one extreme of the axis, consumption patterns are constrained with a focus on well-being and sustainability. At the opposite extreme, individuals exist in an intensified materialistic 'desire economy' in which the possession of goods and experiences outweighs any concerns around wider or longer term impact or sustainability concerns.

12. The second axis refers to UK governance systems. At one extreme, governance systems and decision-making focus on longer term sustainability concerns, such as global warming and resource depletion. At the opposite end, governance is directed towards short-term socio-economic concerns, such as short-term international competitiveness and continued economic growth.

Figure G.2: Main parameters of the future scenarios



Source: Environment Agency Scenarios 2030.[5]

13. Importantly, a consistent rate of climate change applies across all of the scenarios. Each of the scenarios expresses different responses to the same set of climate 'events' and the way in which society in that 'world' engages with those kinds of issues. Tables G1 to G2 provide descriptions of each scenario and summarises the associated waste implications and high-level conclusions.

[5] Environment Agency Scenarios 2030, Environment Agency Science Report SC050002/SR1 (July 2006) available from enquiries@environment-agency.gov.uk

Table G.1: Restoration

Scenario and description	Waste implications	High-level conclusions
Scenario **'Restoration' (sustainability-led governance, dematerialised UK consumption)** *Description* A scenario in which there is a heightened concern at a macro-economic and political level about the environment. Societal values and behaviour are oriented more towards sustainable development goals as a result of greater awareness and perception of environmental risk. There is also stronger global political leadership in relation to environmental issues. More investment is made to develop and renew key infrastructure, including renewable sources of energy, and there is a shift towards materials recovery, repair and re-use of goods and some de-centralisation of business	• Greater range of global agreements and standards • Slow decline in amount of municipal waste produced • Bigger appetite for secondary use of some materials • Increased restrictions on hazardous materials • Much more focus on true resource efficiency (e.g. burning waste for energy, other forms of re-use) • Greater desire for goods to be built to last • Shared responsibility between consumer and state for waste issues	• A crucial factor here over which there is a degree of uncertainty is how far the recyclate market will be globalised in this scenario • A more global recyclate market could be a critical success factor in this scenario • This scenario also emphasises the importance of a significant landfill tax • Questions remain in this scenario about the level of building capacity that will be available in the industry and re-emphasise the importance of investing in this area for this scenario to deliver positive outcomes • Equally, the underpinning for this scenario is based around significant incentives to change consumer behaviour, without which there would seem to be little incentive for household behaviour to change, even in a scenario with increases in raw materials and energy prices

Table G.2: Alchemy

Scenario and description	Waste implications	High-level conclusions
Scenario **'Alchemy' (sustainability-led governance, material consumption)** *Description* A scenario in which aggressive technology-update programmes and a new regulatory environment act as a spur to innovation in new technologies and an information and communications technology (ICT) knowledge-intensive UK economy in response to global competition. New clean technologies and efficient production processes, driven by new standards of producer responsibility, drive stable economic growth, despite earlier concerns about the long-term stability of energy supplies. Most individuals are able to enjoy a good standard of living and have few concerns about the global environment, believing that technology can minimise the impact of their increasing consumption of goods and services	• Slight increase in waste – with consumption growing faster than resource efficiency • Emphasis is on cleaning up supply chains and production processes so potentially greater need (and market) for recyclate • Household recycling is a key priority – to deal with the consequences of consumption and manage natural resources more efficiently • Potential desire for more energy to come from waste, to reduce energy imports • Competition for land increases, potentially increasing the costs of landfill • Potential for greater export of hazardous/nuclear waste, etc. • Note – the degree of technological innovation remains highly uncertain, and could fundamentally change the way waste is separated, collected, managed and used in future, essentially impacting on the fundamentals of the waste system and the model of causation. For example, technology might enable more mechanised 'auto-sorting' of waste either in or out of the home	• This scenario highlights the need for government leadership to facilitate the development of a market for recyclate and encourage investment in new plant and technologies (including the production of energy from waste) • It also emphasises the need for supply side measures and household incentives and interventions in a world where current consumption patterns continue and/or intensify • However, it also flags up the importance of making recycling/separation convenient for the household, and the dangers of not doing so (increased leakage/fly-tipping) if there is greater regulation of household waste • The underpinning need to monitor local authority performance outcomes and continue with a landfill tax (or other disincentives for use of landfill) are also highlighted as underpinning success factors, or safety nets or hygiene factors, in this scenario

Table G.3: Survivor

Scenario and description	Waste implications	High-level conclusions
Scenario **'Survivor' (growth-led governance, dematerialised consumption)** *Description* A scenario in which the UK, like many other countries across the globe, is recovering from an earlier economic collapse, partially linked to rises in the price of energy and other key resources, with consumer spending in relative decline as people become more frugal and self-reliant. Manufacturing processes are forced to become less resource intensive by economic pressures, and there is a resurgence in more traditional regional and local cultures and values	• Waste has a real economic value (assumption is that this is high enough to drive behaviour) • Less materials are consumed overall, and there is a slower waste cycle – more re-use and re-manufacture of goods • More energy is created from waste due to energy security concerns and high energy prices • There is more of a closed loop economy within the UK • Overall, there is less waste (partly due to more recycling and recovery and partly through materials that used to be classified as waste now being seen as valuable resources) • Waste is less centrally controlled: Europe's control over the UK is slightly weakened and in the UK there is less central control over local authorities. No massive central government intervention • Waste is more of an economic, rather than environmental, concern	• Landfill tax – or some other incentive – remains critical in this scenario to disincentivise landfill and encourage greater resource efficiency • The need to instil the value of waste/importance of recycling into both local authority performance frameworks and public notions of waste is also critical because local authorities and the public may otherwise remain distant and ignorant of the economics of waste e.g. through some form of household charging • Investment in the skills and technology that underpin the recycling industry are also key in this scenario if true resource efficiency is to be achieved

Table G.4: Jeopardy

Scenario and description	Waste implications	High-level conclusions
Scenario **'Jeopardy' (growth-led governance, material consumption)** *Description* A scenario in which a more intensive and materialist 'consumption culture' pervades across much of the UK (and the world), accompanied by a rise in social fragmentation. A deregulated environment provides added stimulus to innovation and economic growth and there is little societal concern about sustainability. Investment to increase capacity among oil-producing countries results in a continuing reliance on non-renewable forms of energy, with little concern to ensure equitable supply to all, with many people assuming that supplies of key resources will remain plentiful for some time to come	• More waste • Lower level regulatory framework with less stringent penalties and enforcement • No controls on consumption at level of the individual or the household • Construction waste also increased – more building and greater population • No incentives to recycle or divert from landfill (if it is cheapest short-term option), but some incinerators developed in and around major cities (and located in poorer areas), increasing polarisation of local environments • Only niche incentives for greener production and supply chains (for the more affluent who care and can afford them)	• This scenario sees relative uncertainty in many areas of the waste system, for example waste collection and disposal • It re-emphasises the key role that local authorities have to play in these areas, and also the critical need for strong strategic governance over local authority performance in the area of waste through future performance frameworks based on key outcomes • Landfill becomes more attractive in this scenario with a very weak market for recyclate/recovery, thereby reinforcing the importance of – the landfill tax – measures aimed at changing public perception of the issues and incentivising both households and businesses to change behaviour