

Markets, migration and a return to the back garden economy?

England in 2025 and 2050 under a business as usual emissions scenario.

A New Economics Foundation report for *Tomorrow's England*
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When push comes to shove...

Climate change will alter how we live our lives, whether we decide to do anything about it or not. One thing's for sure, the future won't look anything like the present.

Whether the status quo continues, or should we embrace a low carbon and low energy future will influence significantly if the outcomes are to be positive or not. If people are forced to change because of climate impacts and resource scarcity - from food and water to energy – the negative impacts on wellbeing could be large. They will also worsen the longer positive action is left.

When we look into the future and try and predict what it might look like, we base our visions on two limiting factors: a limited carbon sink in the biosphere, and the availability of cheap energy in the form of oil, coal and gas.

The problem of peaking oil and gas production...

'We've all been living in a fool's paradise of cheap gasoline, cheap oil for the last several decades, and that's coming to an end.' Richard Heinberg¹

There is a problem on the horizon in supplying the world with crude oil and natural gas. When demand exceeds production rates, the rivalry for what remains will result in dramatic economic and geopolitical events beyond what we can currently imagine. In the end it may be impossible for even a single nation to sustain industrialism as we have known it during the twentieth century².

'...if we could spend the oil age in an Irish pub...the glass was more or less full in 1900, just about half full in 2000 and there are a few little dregs left at the end of this century.' Dr Colin Campbell³

There is considerable uncertainty surrounding future oil reserves, and the field is surrounded by intense debate. But, the current view appears to be reaching a consensus that the phenomenon of Peak Oil is a real and impending problem that could have catastrophic implications for the global economy. The speed of idea's journey to the mainstream of political concerns is such that the Secretary of State for Environment, David Miliband, addressed an audience at the University of Cambridge in March 2007 stating: *"The time is right to look at what it would mean for the UK over the period of 15 to 20 years to create a post-oil economy – a declaration less of 'oil independence' and more the end of oil dependence."*⁴

While Peak Gas is *"...an entirely unheard of and unwelcome spectre,"*⁵ it is projected to occur only slightly later than the moment of Peak Oil. The UK's own gas fields have already peaked and begun the journey toward decline. DEFRA reported earlier this year⁶ that emissions from Industry in the UK increased during 2006 as power stations had to switch from gas to coal due to

high gas prices (coal has the highest amount of carbon per unit of energy of all fossil fuels). Is the shape of things to come...?

Wilting in the heat and wading in the wet...

Climate modellers suggest that by 2025, climate in England will be milder and wetter in the winter and warmer and drier in the summer. Superimposed over the long term trends will be increases in extreme weather events, making our lives more and more uncomfortable. Things will only get more extreme by 2050. These changes in the climate will have adverse impacts on health both physically and mentally.

Extreme rainfall events will cause flooding in urban areas as the drainage systems, designed for more moderate weather, prove unable to cope with intense inundations. Rivers of a toxic soup made up of raw sewage and other pollutants, pushed by flood waters chemically contaminated from other storm driven spills will flow past makeshift sandbag flood barriers outside thousands of front doors all over the country.

As these extreme events become more frequent, it will be increasingly difficult to recover from each blow. Losing everything in a flood, places considerable strain on the personal lives of victims.

People and the economy suffer as the nation becomes less healthy and happy...

Currently, sickness absence costs the economy around £13 billion. The negative health effects of climate change could result in a significant increase in this figure.

Heat waves will result in a dramatic increase in premature deaths. The total daily mortality rates in European cities rise as summer temperatures increase. Heatwaves in 1976 and 1995 were accompanied by a 15 per cent increase in mortality in Greater London, with cardiovascular and respiratory deaths among older age-groups rising particularly sharply^{7,8}.

Cases of food poisoning will significantly increase, getting worse as temperatures rise over the next half century. There will be an increase in respiratory illness due to the deterioration of air quality; the main culprit being ozone - a pollutant that is temperature dependent. As temperatures rise, more ozone is produced from both natural sources (i.e. plants) and the chemical reactions of nitrogen oxide gases (produced from the burning of fossil and bio fuels).

The health impacts of medium to high CO₂ emissions scenario in the UK by 2050 include:⁹

The risk of major disasters caused by severe winter gales and coastal flooding is likely to increase significantly

Water borne illness from the disruption caused by flooding. Drinking water supplies will be affected by increased rainfall (over shorter periods), which lead to increased numbers of bacteria in surface water, increased water temperature leading in an increase in algal blooms in reservoirs and a decrease in the efficiency of chemical coagulation: a major method of removal of microbes in drinking water.

Cases of skin cancer are likely to increase by perhaps 5,000 cases per year and cataracts by 2,000 cases per year.

Milder, more humid winters will lead to more mould growth in housing - already a major cause of respiratory allergies.

Some positive effects of a warmer climate on health (cold-related deaths, for example, are likely to decline), will be outweighed by the negative health impacts of rising temperatures in the UK and worldwide.

There is strong evidence that serious flooding (both inland and coastal) results in an increase in disorders such as anxiety and depressive illness, especially in the elderly. For example, those whose homes were flooded in Lewes (East Sussex) in 2000 experienced a four-fold increase in psychological distress compared to those whose homes were not affected¹⁰. While there are often immediate stress-responses, such as sleep disorders, irritability, anger and anxiety, there can also be longer-lasting mental health disorders which may affect the physical health of the victim. Depression and anxiety disorders are known to be associated with increased risk of hypertension, heart diseases and diabetes, as well as with increased mortality rates from these illnesses¹¹.

The increased prevalence of mental health problems will place a significant strain on an already stretched health service. Will the NHS be able to survive as a public service? Mental health problems are not only the most expensive illnesses to treat; they also have negative effects on the economy. A healthy happy nation is far more productive.

We can either expect significant increases in tax to cope with the huge pressures placed on the NHS, or other public sectors will suffer. At the same time, decreased productivity of the economy due to depleted levels of wellbeing could push towards a recession. Recession is defined as an economic growth rate of less than 2 per cent a year.

A population under stress, whether directly related to climate or indirectly through loss or damage to property is also likely to be more susceptible to illness, both acute and chronic. This relationship will worsen in a warmer England, and the relationship could be linear or non-linear with increasing frequency of climate events or long-term temperature trends.

The rising tide washes away secure futures...

The impacts of climate change will result in more uncertain futures. The financial security that many households have enjoyed during the past

decades will progressively wash away. The self-employed and single-income households will be at greatest risk.

Over-engineering of buildings, to adapt to the changing climate will increase the cost of new buildings...

Due to increases in wind speed and the variability of rainfall, the cost of building will increase. Rising costs of transport fuel will mean it becomes more costly to import construction materials, driving the use of more local materials. New buildings will require over-engineering (deeper foundations, stronger structures etc.) to safeguard against changing climate conditions. By 2025, building regulations are likely to become more stringent to safeguard the population from the structural failure of buildings, which will be more likely with increased wind speeds and heavy rainfall.

Over the following 25 years towards 2050, the increase in cost of new buildings and more stringent building regulations will slow the development of new homes. According to leading house builder *Cala Homes*, England is already condemned to housing shortages over the next 20 years. And currently, there is an estimated shortfall of 50,000 homes per year. The slow down of construction could have a knock on effect for those employed in construction.

The failure to meet the demand for new homes will act to push the price of homes upwards. Some regions, however, will suffer from a dramatic drop in house prices.

House prices rocket in the north and slump to rock bottom in the south...

Warming oceans and melting polar ice will leave a legacy of sea-level rise lasting thousands of years. By 2050, increases in sea level rise will lead to increases in coastal erosion and flood risk, from gradual sea level rise and storm surges. Worryingly, the impacts of climate change are already spiralling out of control faster than expected. The rapid melting of the Greenland ice sheet is one example. Earlier estimates suggested that it would be gone in 50 years, updated estimates released earlier this year suggest it is likely to happen as soon as in 20 years time.

As a result of the more rapid collapse of the Greenland ice sheet and therefore, more rapid increases in sea level rise, by 2050, large areas of England could be under water. Areas that will be particularly high risk include East Anglia, southern England and Yorkshire and Humber. Within 50 years the majority of these regions will have to be heavily defended against rising seas. Some land could be returned to the sea in more managed retreats – this has already happened in an area in Humberside.

The loss of land to rising sea levels could leave millions of people displaced without homes. The nation would have less land to build new homes and grow food.

Taxpayers will have to foot the bill for the necessary increase in flood defences – and based on current government strategies and observations of the unfolding climate crises means that we could be paying through our noses to keep the water out.

The majority of nuclear power stations are located in coastal areas. The price of gas will reach a critical price in the 2010s. As a result the government will launch an aggressive nuclear rebuilding programme. Initially the programme will be popular both in Westminster and with some at the household level due to the promised stabilisation of electricity prices. This promise, however, will be broken. Hidden costs, deliberate underestimates, continuing problems with security and nuclear waste disposal, plus higher than anticipated rates of sea level rise and coastal erosion, all significantly raise the cost of the building programme. In response, people vote with their own electricity sockets and install a range of small scale, domestic renewable energy technologies.

Increased variability of rainfall, particularly during the winter will result in an increase in flood risks, particularly to developments on flood plains and built up urban areas, which do not have the drainage capacity to cope with extreme rainfall events.

Investment will be needed to protect London and other key places from flooding. Flood modelling of the River Thames and River Severn suggest that flooding will become more severe and frequent. Again, it will be the tax-payer who bears the brunt.

Insurance companies reject policies and mortgage availability plummets in high climate risk areas...

Over the next 25 years, homes located on the coast or along a river will cease to be accompanied by a financial premium due to their desirable location, as everyone heads for high ground. Lenders will reject mortgage applications in areas of high climate risk, driving those house prices down. This will also have a significant impact on the local economy. Large businesses will move out of high climate risk areas and small businesses will be refused financial support.

According to the Association for British Insurers, the number of buildings at risk from flooding is already worse than predicted. At least 10 per cent of homes in England are at risk from flooding, this will increase significantly by the middle of the century.

Government spending on flood defences has permitted England to continue to benefit from flooding insurance as standard in private insurance and is a necessity for mortgage agreements. As risk increases, unless government spending on flood defence increases, this may come to an end. Already, many insurance companies in developed countries like the US do not offer flooding insurance.

Trapped by negative equity...

Between 2025 and 2050 it will become increasingly difficult for people to acquire a mortgage in a high risk area, property prices will crash and many will be bound to their environmentally vulnerable properties because of negative equity.

Those who bought their homes when house prices were high will be trapped by negative equity of their houses. Crashing house prices, particularly in high climate risk areas such as East Anglia, means that households will be tied to their properties for long periods with high mortgage repayments.

The nation is on the move...

Between 2025 and 2050 rising sea levels, more frequent river flooding and water shortages, declining urban conditions and an over-stressed infrastructure due to hot dry summers in southern England will result in large-scale migration to the north.

As the North-South movement progresses between 2025 and 2050, initially, there will be a shift in relative house prices, as surplus housing in the North is used up, whilst the pressure on the southern market eases. The rise in house prices in the North will result in an increase in construction here. As there is more land available for construction, however, it is likely that this may place an upper limit on house prices.

The North-South movement will result in an increase in demand for jobs. The surge in the development of new homes will, however, provide many jobs in construction. The North-East will become a popular place to live as its already thriving renewable industry takes off in the 2020s, driven by the demand for alternatives to oil and gas. The renewable energy industry will become the dominant employer in the North East, particularly around Teesside and Newcastle.

For businesses, the timing and scale of relocation will be difficult to predict. The cost of relocation will be high. Even if the impacts of climate change result in higher insurance premiums and disruption to business, companies will stay in the south as long as suppliers and customers stay put. This implies there will be a tipping point to a mass relocation. This will most likely occur between 2025 and 2050. Leading up to this tipping point, however, in general, businesses will see their profits progressively drop off.

Three generations under one roof...

Toward the end of the 20th century and beginning of the 21st, the size of the household began to decline as more and more individuals began to live on their own. The demand for single occupancy accommodation grew. More recently, however, rising property prices has resulted in an increase in young adults staying with their parents for much longer. Between now and 2025, it is likely this trend will continue, accelerated by the high cost of living

This may have a positive effect on the wellbeing of the population, however, as people relearn the lost skills once embedded in extended families. For example, multiple generations may live together, with the older generations

providing childcare, while younger generations will provide support to the aging population.

Bills, bills, bills...

With an increase in unemployment caused by an economic slow down due to year-on-year increases in the costs of climate change impacts, collapse of the insurance industry and perpetual rise in the price of oil and gas, many families find that they are no longer able to cope with household bills. These households fall behind with mortgage repayments, rent or utility bills. Some are unable to pay home insurance at a time when they most need it. Single-income families and the self-employed will be particularly vulnerable.

Business debts will also rise. Small businesses are already feeling the pressure of rising energy prices, this will only get worse. Many products will become redundant. Goods and services superfluous to meeting basic needs will be eliminated, for example, luxury goods.

What will be in your wallet?

As the years go by between now and 2025, the cost of living will gradually creep upwards. Although incomes may rise to offset the impact of this, by the middle of the century, there will be a significant decrease in disposable incomes. The cost of living will reach a critical point where the majority of incomes will be just sufficient to meet basic needs. High taxes and lower and less secure incomes means that but it will be the end of consumerism as we know it. What little income remains will be saved due the volatility of pension payouts, as increased costs and lower profits reduce stock market returns.

People will spend much of their income on energy and food. Energy will be affected by the continually rising costs of fossil fuels. Food prices will be affected by declining yields, and increases in the costs of agricultural inputs (pesticides and fertilisers) and of transport due to cost of fuel. Insurance premiums will rise, credit will be hard to acquire and taxation will inexorably rise to cope with the impacts of climate change from flooding to health.

There will be an overall decrease in wellbeing, and increase in stress due to insecure financial futures.

Economic growth measured by GDP will slow, and may even come to a standstill. Locally, however economies will thrive.

We will see a long-term trend towards population reduction

As disposable income decreases, job insecurity many people decide against having a family or more than one child. This will be coupled with increases in mortality from health impacts of climate change.

And increases in job competition ...

As a long-term recession sets in, there will be an increase in the competition for jobs as businesses have to downsize. The most heavily hit will be the

finance sector. There will, though, be an increase in the jobs to do with green technology and, ironically, insurance.

The hardest hit will be recent graduates. Many graduates will leave University with large debts and face huge competition for a limited number of jobs. Over time, the knock on effect of this will be a decline in the number of school leavers going to university. By 2050, this may eventually balance out the surplus of graduates. However, there could be an increase in the proportion of students leaving school or university who will have to go straight to claiming unemployment benefits. The increase in unemployed will result in a large increase in taxes.

But, less time at work could mean better and stronger personal relationships...

Initially, businesses will try desperately to cut down on their overheads and may encourage more distance working. This could increase links to the home community and improve wellbeing. But to the extent that we have become dependent on workplaces for social interaction it could conversely lead to greater social fragmentation.

The long-term decline in availability of professional jobs may result in emerging policies to encourage job-sharing, such as the lowering of the maximum number of working hours or a shift to first a 4-day week, and then a 3 day week. Compared to the 1970s, however, this could have positive impacts on personal wellbeing. For example, increase in recreation time could result in physically and mentally healthier family units. Additionally, divorce rates may decline.

The back garden economy returns after a 50-year break...

Although climate change is forecast to increase the yield of some crops in England, declining self-sufficiency over the years means that England's agricultural industry is not able to provide the diverse diet we have become accustomed to.

By 2025, Peruvian asparagus in January and New Zealand apples in June will be a distant memory. The high cost of transport caused by high fuel prices will push the price of imported food upwards. This means that England will have to reverse the trend of increasing co-dependence.

The dependence of agriculture on fossil fuels for the running of machinery and fertilisers means that intensive farming practices will make way to more traditional organic farming practices, on smaller scales. This will also act to push the price of food upwards.

Currently 1 per cent of the population provides food for the other 99 per cent. The balance of this will shift; with more people becoming employed in agriculture. The high cost of running machinery will result in an increase in demand for manual labour.

Suddenly everyone wants to learn from Cuba...

Following the collapse of the Soviet Union, Russia was no longer able to subsidize Cuban sugar and send the country cheap oil or agricultural support. Cuba also had to weather the comprehensive economic embargo implemented by the US. In response, the Castro regime supported extensive organic truck farming and urban horticulture in the city of Havana and other urban areas.

During this period, Cubans got more exercise, ate fresher food and lost an average of 20 pounds in weight each¹². Considering the externally imposed hardships and, to an international audience, the relatively unpopular government, people begin to marvel at how Cuba was able to maintain high levels and a good quality of health service – world class in some respects - and the provision of education.

After the disaster in New Orleans following Hurricane Katrina, people also wake up to Cuba's very impressive record of preparedness, response and ability to minimise the damage from extreme weather events. Cuba then becomes the most popular country of destination for government delegations wishing to learn how to adapt to the new world economic and environmental conditions.

Peak oil and peak gas drive up food prices, the supermarket becomes obsolete...

In 2025, supermarkets will progressively have to substitute long-distance suppliers with more local providers, and by 2050, the days of supermarkets with displays of salad, fruit and vegetables from the other side of the world will be distant memory. But shelves will instead be full of a rich, resurgent variety of locally adapted and grown varieties. The Tayberry replaces the Goji berry.

The high price of transport and increase in price of food production means that diversity of food decreases. People will tend to shop locally at street/farmers markets and local shops.

The high price of food means that food will have to be produced locally. Many households will transform their landscaped gardens into vegetable patches. In the England during World War II, a law was passed that meant any idle land could be used for growing food. By 2025, this law will return.

The back garden economy could provide over and above 40 per cent of food. For example, during World War II, 40 per cent of produce eaten in the U.S. was grown in back gardens, vacant lots and parks.

Local economies will begin to grow, as communities become more independent from the regional, national and international markets. Communities will have to work towards self-reliance on food, energy and essential trades and services.

Positive outcomes include increases in social cohesion, the population will get more exercise and fresh air from working outside, diets will improve due to fresh produce and the decline in processed foods, and the proportion of the population that is overweight will decline.

Due to high energy prices, households will move away from dependence on white goods such as refrigerators and freezers. People will spend more time shopping, perhaps making visits to local markets three to four times a week.

While the current development pathway has resulted in the loss of community structure fuelling anonymity and in extreme cases anti-social behaviour, the back garden economy will bring communities together. Local and regional political structures will become stronger. Strong cohesion will result in a decline in anti-social behaviour as people begin to patrol their own communities.

We'll be holidaying in Cornwall...

There will be a decline in flights as the price of aviation fuel significantly increases. Overseas holidays will return to a luxury only enjoyed by the wealthiest of the population. The majority of England's population will holiday in the south of England, and this will become the dominant industry in this region, particularly in the south west.

For example, Cornwall will see an increase in the tourist industry as warmer and drier climate gives it a Mediterranean feel. While there will be a positive impact on the local economy, environmental impacts are likely to be negative. Increased demand for tourist accommodation will put additional pressures on the natural environment, coupled with increases in waste and possibly an aggressive road building or transport infrastructure programme to meet the new demand.

The countryside is torn up to get access to coal resources as we struggle to meet the demand for energy...

While there will be a decline in financial and administrative jobs, as England struggles to meet the demand for electricity as the era of cheap gas ends, we will need to turn existing resource of coal. As coal is energy intensive to mine, and the era of cheap energy comes to an end, there will be an increase in manual labour jobs in mines to help recover England's remaining coal resources. Former coalfield communities which suffered significant economic hardship during the last two decades of the twentieth century will begin to re-establish themselves, as pits begin to open again.

We get on our bikes...

Without addressing planning legislation, by 2025 England's economy will have become so dependent on road transport that any wobble in fuel prices will

have a huge impact on the economy, from the functioning of businesses to the stocking of supermarket shelves. Welcome back to the bicycle.

Good bye to out-of-town shopping centres...

Large out of town shopping malls will become obsolete. Not only will it become increasingly difficult for people to get there due to the cost of fuel, but there will be a decline in disposable income. There will be a decline in the demand for luxury goods. The co-dependent growth of retail parks and bland, sprawling suburbia will come to an end as their lifeline, the supply of cheap fuel, dries up.

But there is a rebirth of local production for local consumption. Small local businesses providing handmade goods, using local produce will increase.

The end of cheap imported clothes...

Companies that thrive on cheap clothes made in developing countries on the other side of the world and made from fossil fuel derived materials will disappear. Increases in the cost of transport and materials will end the mass production of cheap clothes.

Locked in to a car dependent society...

At a personal level, a large number of families who have been affected by unemployment find that they are unable to afford to run their vehicles due to the high cost of fuel, and will also have less disposable income to repair their vehicles. While the use of public transport will increase, the high price of fuels will be translated into expensive public transport. The government may choose to provide subsidies, but this will be paid for by an increase in taxes, specifically road users. Overall, the large majority of people are unable to move around as much. By 2050 as people begin to travel less, a positive impact will be that new local and regional cultures will develop as long-distance travel ends.

Environmental refugees will be demanding justice at the borders...

Environmental refugees from regions significantly affected by climate change will be demanding justice and somewhere to live. The majority of these refugees will be from developing nations, who had little or no responsibility for the problem of climate change.

There will be an influx of environmental refugees on a scale never before seen – as rich country governments prove unwilling to pay for the costs of adaptation in poor countries like Bangladesh who are most affected by rising seas and extreme weather. Forced to flee from their homelands due to resource scarcity or environmental disasters, environmental refugees become another unaccounted-for cost of climate change.

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- ² R. Heinberg (2003) 'The party's over' p. 81
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- ⁴ David Milliband speaking at Cambridge University, March 5th, 2007.
- ⁵ <http://www.energybulletin.net/23462.html>
- ⁶ <http://www.defra.gov.uk/environment/climatechange/trading/eu/results/index.htm> (accessed May 29th, 2007)
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