

The poor, climate change and energy options

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The major development charities are united in their judgement that climate change, which to date has been mainly due to fossil fuel use for energy production in the affluent countries of Europe and North America, is disproportionately affecting the poor in developing countries. The most axiomatic impacts identified to date relate to low-lying countries such as Bangladesh, where long-standing vulnerability to flooding has already been exacerbated by global sea level rise (totalling nearly 20 cm since 1880), which increases the tidal 'throttle' on river outflows, resulting in deeper and longer-lasting inundation. (Similar problems affect low-lying areas of rich countries too, but the irony is that it is more the bijou river view residences that are threatened here, rather than the high-rises of the poor).

Flooding is not the only impact. Although the statistical patterns are less clear than for sea level rise, it does appear that the extremes of weather are becoming rather more marked in many parts of the world: wetter rainy seasons and longer, more intense droughts. We certainly seen the former effect in Scotland, where the north and west of the country have experienced a fifty per-cent increase in rainfall since the 1960s. This does, of course, affect the livelihoods of the less well-heeled here, as the productivity of crofts declines and maintenance requirements for shelters increase. It's not difficult to imagine that sleeping rough is even less pleasant in the wetter Scotland of today than it was a few decades ago.

Inter-annual variability in weather seems to be increasing in many parts of the world, and this has again been experienced in Scotland, in the widely-varying severity of Scottish winters and ever less predictable summers. While this might have a long-term negative effect on tourism, the impacts here are largely a nuisance. In developing countries, though, such inter-annual variability can have severe consequences for the poor, especially those reliant on subsistence agriculture, who live largely outside the money economy. Sometimes romanticised for living close to nature, these people are extremely vulnerable to climatic changes that upset the delicate balance of rainfall and evaporation in their semi-arid homelands. It was precisely with such communities that I worked as a water engineer in the Altiplano of Bolivia in the early 1990s. The local NGO I worked with had been founded in the emergency response to the 1983 drought, which saw 75% of livestock in the region die of thirst, prompting mass migration to the cities, especially to the vast 'El Alto' slum above the capital city, La Paz.

For a couple of decades La Paz seemed like a safe haven from the dramatic variability of rural water resources. Yet trouble was brewing for urban dwellers, as climate change gradually stripped the remaining glaciers from the nearby Andes, removing the principal source of water storage on which the city relies for water in the dry season. The only reservoir of any size is Lago Milluni, but this is pervasively contaminated by acidic drainage from abandoned tin mines, and its water has to be heavily treated before it is even amenable to blending with the much purer glacial melt water in the dry months. As the availability of the latter has declined, not least with the complete disappearance of the Chacaltaya Glacier, ever more brackish water is being delivered, in decreasing total quantities, to the poor urban population of La Paz. Now the urban population is almost as vulnerable to inter-annual variations in precipitation as their rural cousins.

So it seems clear enough that efforts to drastically cut fossil fuel use must be accelerated and intensified. Yet there are some serious complications. Everyone knows about the

Chinese economic boom, which has seen 750m people lifted out of severe poverty over the last fifteen years – but only on the back of a massive increase in coal use. This has led to some of the worst air quality in the world, which disproportionately affects those still in poverty and poor housing. China is now awake to these issues, and is beginning to make impressive progress in reducing carbon emissions and air pollution - albeit with a mountain still to climb. Progress is understandably hindered by the desire to avoid a simple return of so many people to poverty – if not from compassion, then at least for fear of civil strife.

The world's second most populous country, India, is similarly hooked on coal as a means of delivering on the policy of successive governments to finally get at least a basic electrical supply to every home within the next decade or so (the target year has repeatedly slipped, despite a massive expansion of opencast coal mining). With very little gas (which has only half the carbon emissions of coal, so would be preferable), little in the way of nuclear resources, and insufficient scope for renewables to meet the challenge with current technology, there seems little prospect of India abandoning coal use any time soon. As in China, once people have experienced the liberation of electrification, denying them it again is not a wise move politically.

But what about us? Surely we can do much more, much faster? Within the city of Glasgow another drama of poverty and fossil fuels is currently playing out. Many of the poorest families in the city stay in the 1960s high-rises, which were never fitted with gas mains because of the unimaginable horrors a gas explosion would bring in such buildings. So they were fitted with electrical heating – the most expensive and wasteful form of heating. Yet given that Scotland's electricity is about two-thirds low-carbon (at least until 2023, when the demise of the last two nuclear power stations will make us reliant on fossil-fuelled power imports) electric heating is lower carbon than gas anyway. Yet the cost of electric heating is such that it virtually guarantees fuel poverty for those reliant on it. So to combat fuel poverty, wet radiator systems are being fitted in clusters of tower blocks with centralised heat engines provide the warmth. Where these are fuelled with biomass (i.e. wood chips, as at West Whitlawburn) they are at least notionally renewable. However, urban air quality and traffic constraints (biomass needs lots of lorry movements) the best environmental solution currently available is actually natural gas (e.g. at the Wyndford). The result is alleviation of fuel poverty, but little or no net decarbonisation. As Scotland's offshore natural gas production has been in steep decline for a decade now, and there seems little prospect of onshore gas extraction commencing to replace it, this is probably a short-term compromise anyway.

My own research concerns one of the most promising renewable heat technologies: geothermal. It's still early days, but it appears that substantial geothermal heat is to be found beneath the most needy eastern and north-eastern parts of the conurbation. To harness it would require drilling to depths of 2 – 3 km (though using heat pumps, water in flooded mines only a few hundred metres down could also be harnessed) and the construction of district heating networks. This would inevitably entail some disruption, though nothing beyond the usual experience of urban redevelopment. I am also active in Kenya and Ethiopia, where far hotter resources can actually produce abundant electricity. The science is exciting, the engineering tractable; the main barrier is socio-economic. Although geothermal is competitive with gas already when you levelise total costs across the lifestyle, most costs are incurred up-front. The challenge is thus how to access the capital needed to install such systems, even though they are low-cost and low-carbon in operation.

This is by no means the only such issue where poverty, energy and climate change meet: try telling a Glasgow landlord to invest in far greater insulation and cleaner, greener heating technology. As the financial outlay would fall on their books, but their tenants would reap the benefits of lower energy bills, they tend to respond with a blank stare. I am no one to judge them for that either; but we are going to need to get far more politically savvy very quickly if we are to prevent the over-indulgence of our consumer society from devouring the livelihoods of the poor, both here in Scotland and more severely in Africa, Asia and Latin America. We do have options – but we largely lack the political will and the control over the purse-strings needed to deliver them. Can we change that?

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