One thing we have learnt this week – Renewable heat

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Renewable heat is one of the biggest problems facing the environmentally sustainable economy. That's why governments worldwide have concentrated on switching to renewable electricity. There are plenty of options which in this latter area that work well and as we have seen the costs have plummeted. Renewable heat by contrast is as we covered in our book is a highly disruptive technology with less options and common underlying drawback. This week I have learnt of a partial solution to this issue. There is a lot more detail in our book which I would highly recommend for a look at this issue but in brief here is a summary of each technology and its pros and cons. **Air source heat pumps.** Heat pumps work on the same principle as a fridge. Think of the hot air you get out of the back as the inside is chilled. As the name implies these extract heat from the air. There are number of problems with this technology the main ones being they are noisy, use lots of electricity and work less and less effectively when you want the most heat. I have a friend who bought one and said it was rubbish, they are however very much used in Norway. Presumably the Norwegians switch them on in Autumn and leave them on till the spring. The thermal mass of their well insulated buildings would keep them warm and their hydroelectricity is cheap. The advantage is they are easy to retro-fit. **Ground source heat pumps.** Cousin of the above and work on the same principle this time extracting heat from the ground or water. Much more efficient (particularly using water) you could be much more confident your house would be warm. The main problem is they are very disruptive to fit and use a lot of electricity (requiring grid reinforcement). You either bury a tube all over your (very large) garden or sink two very deep boreholes. A form of solar geothermal heat. **Solar collectors.** See below. **Wood.** There is not enough of this to go around, it might have a possible niche use in some district heating systems (see below) or an individual basis **Inter-seasonal heat transfer.** Basically you capture the renewable heat in summer (I'm thinking from conservatories rather than solar panels), store it in some way and use throughout the winter. There are chemical methods but the easiest is to use a large tank of water. This up until now is my personal future favourite (more for a lack of better alternatives). The disadvantages are disruptive retro fit and poor summers (would have to be combined with electric backups). **Gas.** There is possibility of using anaerobic digestion to make about 25% of our (UK) gas needs. This is tantalisingly high but relies on a steady stream of food waste. The gas needs to also have the same calorific value as natural gas (so would fracked or imported gas). There is a little of this gas going onto the grid at the moment. The huge advantage is that there is no retrofit issue hence would be the cheapest of the above. To make it go around we would need to use a lot less each. Perhaps this is a partial solution. All the above have one common drawback. They are all low temperature systems that use low temperature systems either special radiators or underfloor heating and require very well insulated buildings. **District heating.** Very common in Scandinavia and growing slowly here. However what technology is the heat to come from above? A mix? This week I heard of an idea. This is to use heat from abandoned coal mines. There are literally thousands of these scattered over the UK. Many surprisingly near or even under major cities. If you think about it mines are always hot with geothermal heat. They also tend to flood. This renewable heat and we are talking about near Glasgow in this study 12°C can be extracted using very highly efficient heat exchangers and pumped to houses. There is a scheme in Southampton that uses hot rocks but the principle is the same and coal mines are probably easier to access. There are two potential huge drawbacks. The first is would work better as a low energy system the second is that is going to be disruptive and therefore expensive to fit. We would have to build a network of pipes. One reason the Edinburgh tram scheme may have run over price was the problem of lost (orphan) pipes and wires still in use. This could be seen as an advantage though we could sort the whole lot out and make maintenance easier in the long term with out having to dig roads up all the time... Neil

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