

## ‘A Blast from the Past’ - Some lessons from Milton Keynes (1997 - 2021)

A look back at a survey of resident’s views of the green building projects/exhibitions of Solar Court, Homeworld, Energy World and Future World, in Milton Keynes in the 1980s-90s. Tam Dougan’s 1998 NATTA report ‘Sustainable Housing: some lessons from Milton Keynes’, is out of print, but there was a version in Renew 114, rerun below, slightly edited, and as part of an ‘historical’ re-assessment, it might shed some light into a previous era and might also be of use in assessing how well we are doing today, in terms of energy-efficient building design and related sustainability issues. Have the principles, and designs of ‘Eco-housing’ projects, and the attitudes & practices of related industries, improved over time? Hopefully, this article might be of interest to some...



### **Sustainable Housing in Milton Keynes** Tam Dougan (1997)

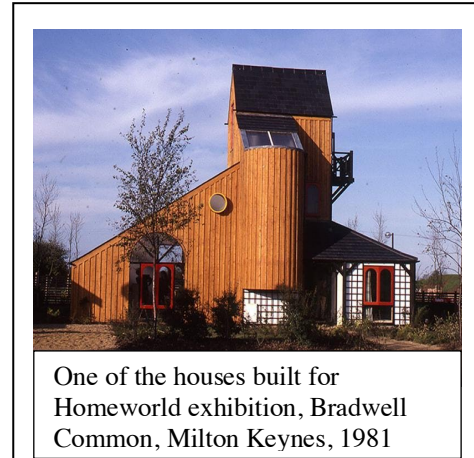
The Milton Keynes low-energy/solar-housing projects have been seen as pioneering attempts to set high standards in terms of energy efficiency. However, judging by the evidence from a detailed survey I carried out of resident’s attitudes and experiences, whatever progress has been made has been rather patchy. You might expect a gradual improvement in energy efficiency, as lessons were learned and technology improved. My survey results certainly indicate that there were some differences in energy-efficiency in the houses on Homeworld (1981) and Energy World (1986). But the improvements that have emerged seemed to be mainly due to the fact that only some of the 36 Homeworld houses were designed on energy saving principles, whereas energy was a central issue for Energy World’s 50 houses. However, these improvements seemed to have been somewhat lost when it came to the most recent housing scheme, the 34 house Future World (1994), where energy was of minor concern to the developers. Nevertheless, there was a general rise in expected minimum standards for some aspects of the houses, such as double-glazing, although whether this was ahead of the national pattern is unclear. After all, double-glazing is now standard in most new housing. The most obvious changes have been in terms of various add on gadgets, reflecting a general shift towards increased consumer interest in style and convenience services. But, as the houses in MK illustrate, these changes have generally been at the expense of more fundamental improvements to the building structure and performance as that is less visible. This conforms to the general idea that the ‘free market’ will provide what the public desires rather than delivering what is more sustainable for the whole community in the long-term.

The survey results highlight the fact that people appreciate modifications they can actually see. Hence the emphasis on design in the survey results. Those technologies that did not appear to deliver, such as the solar-heating systems in Homeworld, were vilified by their owners in the survey report. Seemingly, at least in some cases, that is because the suppliers only gave the occupants very poor explanations of the principles of the technologies, and the owners were not given the means to monitor the solar contribution to water-heating. This gave rise to a general disenchantment with the technology. However, it wasn’t always just a matter of poor understanding or lack of information or control. There do appear to have been some genuinely ‘duff’ elements in the design of some of the systems. For instance, one resident in Solar Court (a nine-house project built in 1980) reported that there were ‘13 pumps for the water system’, so that very little, if any, energy was saved overall. This is surely a bad piece of design, which can give rise, unnecessarily, to a ‘bad press’ for solar power. The houses in Solar Court were monitored for energy use, and delivered about half of their projected energy savings.

**Consumer Responses to the Technology** Heating and ventilation were overwhelmingly the most important factors when analysing consumer responses. Heating systems were often far too complex, and instructions were poor. Most of the houses were heated by gas central heating, and other heating technologies were add-ons to this basic system, including heat-pumps and heat-exchanger units. Not all of these systems worked well, with noise being a particular problem. An occupant of Homeworld who had a heat-exchanger said that *‘it made the house far too hot in summer and very dry’*.

However, there were some bright spots. Another occupant of Homeworld noted that, although the system was noisy, they had found that, if the exhaust from their heat-exchanger was disconnected in hot weather, it would blow large quantities of colder air into the house. Matters seem, however, to have improved somewhat since then, as there were no particular complaints from the few users of such systems in either Energy World (apart from one who said theirs was noisy) and Future World. Many of the houses had powered ventilation - indeed this technique seems to have proliferated. However, its greater use in Future World compared to Solar Court did not seem to have improved the problems of poor seasonal heat-management - it merely added to the power requirement of the household.

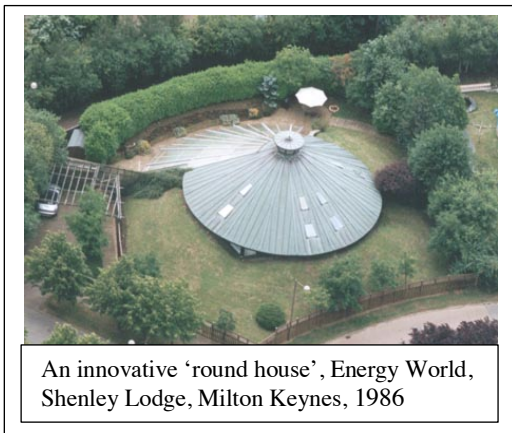
Generally, the use of energy saving light bulbs had increased, but the use of energy-saving washing machines has remained pretty constant throughout. Use of energy saving fridges dropped off on Energy World but picked up again on Future World. Other energy-saving appliances followed the same pattern. The importance of energy-saving appliances to residents on Energy World declined, but the proportion using them (50%) in Solar Court & Future World didn't change. The more advanced 'eco design' features such as passive-solar atriums, turf roofs, Trombe walls etc., as opposed to the more general energy efficiency elements, have proved to be of mixed value. Atriums, where they were well built, have been popular features, because of the light and space created. Generally, except for some respondents on Homeworld, people liked the solar technologies, even when they didn't seem to be notably contributing energy. Consumers were, on the whole, very keen that their house had a noticeable quality that marked it out as being special by design. Some also seemed quite entertained by problems that they had encountered whilst coming to grips with innovative technology. However, the turf-roof was apparently wholly disappointing & has been replaced. The Trombe wall was draughty & was eventually decommissioned.



**Overall Consumer attitudes** More than half of all householders who responded to my questionnaire, on all estates, said that the features that they had thought to be important, when they first rented/bought their houses, have continued to remain so. Many people commented that it was 'design', 'comfort' and to a lesser extent 'eco-design', that mattered in a choosing a home. The proportion of people who would consider energy/eco design as an important factor when buying or renting a new house has increased from 42.8 % in 1984 (Solar Court) to 75% in 1994 (Future World).

The following are the qualities that appeared, consistently, to be what the householders most valued: design, light, space, together with location, appearance, quality, comfort, ease of maintenance, insulation, garden, conservatory, energy costs/features, purchase price, security, and flexibility of use. There was a good deal of interest in energy saving technology, but also an equal amount of confusion about the technology, and, in some cases, disenchantment with and rejection of some of the systems. Quite a few of the energy/eco techs had been completely dispensed with, as being not worth the effort. Nevertheless, the overall impression is that, despite having to grapple with more technological teething problems than in a normal house, people were very attached to their houses on the whole. General energy awareness has improved over time and looks likely to do so into the future. Running costs only played a minor role in shaping people's attitudes to their homes. Although there had been an increase in the level of importance to consumers of energy costs since 1980, this had dropped off, slightly, when it came to those living in Future World. Generally, the high point in energy cost-terms is, as expected, Energy World, although there were some discrepancies in terms of running costs. Three-bed roomed houses on Energy World cost more to heat than 4 bed-roomed houses in Solar Court, but bills were generally on the low side. Homeworld and Future World had the widest discrepancies in the size of house/bill and Future World had the largest range of costs! Energy World had the most consistent bill/size of house and the lowest costs of heating in general.

Finally, there is the issue of whether a 'community spirit' had been engendered on the estates. The evidence is mixed. Solar Court reported that it had the greatest sense of community, but that is probably down to its small size and the fact that they share the same technological innovation, solar power. Future World & Homeworld had roughly one third giving a positive response, whilst Energy World had the least shared sense of community.



An innovative 'round house', Energy World, Shenley Lodge, Milton Keynes, 1986

**Building Industry Failures** One resident of Future World, who had professional experience with building techniques, replied in depth to the survey questions. Although basically happy with living in his house, he had had to grapple with a mountain of teething problems, from the status of his 'freehold', through to the structural specifications, and failure of the materials supplied. What was clear from his comments, and from other observations I gleaned while doing the survey, is that the central problem facing residents in the MK houses was often not the technology as such, but the performance of the various parts of the building industry - the designers, contractors and suppliers. As he noted there seemed to be a *'lack of product knowledge by the professional and monitoring bodies who draw up and pass the plans'* as

well as a failure to implement them properly. For example, he reported that floors sagged in excess of 25 mm over a span of 5 metres (regs. allow for a 10 mm sag), which he concluded was due either to a miscalculation by the structural engineer/designer, or incorrect data used by the designers and suppliers. This was compounded by the fabricator fitting standard joist hangers, and packing them out with softwood pieces so as to mate with metric TJI- joists. He added *'Simpson Strong Ties should have been used; they stop the joist kicking up when loaded'*. In addition, he noted that *'for reasons unknown a 15 mm gap was built in between gable end walls and the roof 'to allow for loft ventilation'*. Seeing as the insulation is in the roof and not in the ceiling, the house quickly chilled when the heating was turned off. Clearly the design was not followed there.

The next set of problems came when contractors were brought in to install services. *'After erection, the contractors promptly hacked and slashed through the roof-breather membrane to install Passivent services. BT followed suit and broke through the floor, which is sealed, in no less than 3 places and did not make good. All these holes diminished the insulation value and caused draughts from the electrical sockets mounted in the internal and external walls.'* When he tried to obtain redress for problems like these, he found that none of the companies involved would admit to being at fault or responsible for the buildings failures - the building fabricators had, in any case, since, gone out of business. The NHBC was the only body to offer some positive support to him, but he was disappointed to find that the building trade did not readily assist them. *'They are clearly obstructed in their role by all and sundry.'*

**Major Problems Encountered**

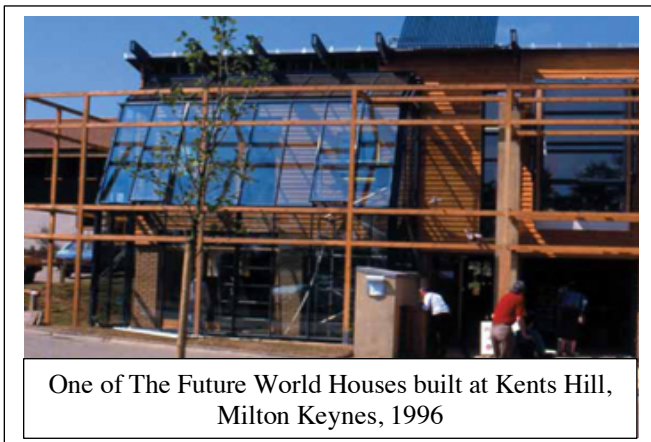
1. Lack of ability to find someone to maintain/understand the system
2. Heating systems and boilers much too complex and controls unfriendly to use, or else inadequate for size of house/rooms or incorrectly installed
3. Poor plumbing
4. Poor ventilation resulting in condensation, noisy fans, vibration,
5. Houses too cold in winter or too hot in summer
6. Heat pumps/heat exchangers breaking and not being repairable
7. Technological innovations being discontinued, or firms going out of business, therefore causing a high need for replacement with tried and tested systems
8. Houses very draughty
9. Lack of understanding by the householder of the principles/reality of how their systems work (or are supposed to!)
10. Leaking roofs
11. NHBC guarantees taking a long time to remedy (in one case 7 years)

**Professional Failings** There sometimes seems to be a mismatch between builder's knowledge of the principles behind a house design and the architects or designer's specifications, especially when it comes to the more advanced techniques. For example, it was reported to me by two residents of Future World that the nickel alloy roof-cladding of the (currently empty) RIBA award-winning house on Future World was initially installed up-side down. (The architect wrote to me and denied that the roof had been installed 'up-side down' and I included, in my report, his critical replies, in full). The RIBA house also provides an example of a more general problem, concerning architect's awareness of, or at least control over, the nature and limitations of the sites on which their buildings are built. When I took a party of conference participants around Future World during its opening exhibition, I talked to one of the architects of the RIBA house at some length. He described some of the problems he had come up against. He said that the site he had been given was too small for the design and that he hadn't been able to put in the reed-bed water purifying system due to lack of space and poor positioning. The house sits in a hollow, and has an under-floor heating system. I can't confirm, but during my survey-work I was told (by a neighbour) that there had been corrosion problems with the underfloor pipework, since it was below the water table. If true, that's bad enough, but if the reed-bed had been installed on that site, it might well have compounded the problem of water ingress into the underfloor heating system.

This house was, of course, a one-off design, but problems like this do illustrate the more general problem with many architects designing remotely, not planning for specific site constraints. This seems, too often, to be one of the contributing factors for material and technology failures. The increasingly common tendency for architects to design estates on a mass-produced basis, without being overly concerned for the vagaries of a particular site, can also throw up other problems. An example was recently in the news in Banbury. Planning permission was granted, after initial objection, for an estate on a flood plain, providing that the architects instituted measures to counteract possible flooding. This was successful in protecting the estates newly built houses, but, houses previously never under threat, further up the river-bed course, were flooded in the heavy rains in April. With increasing threats of unseasonal & unpredictable weather from global warming, these problems will inevitably multiply.

## General Conclusions

As noted earlier, the proportion of people who would consider energy/eco design as an important factor when buying or renting a new house has increased from 42.8% in 1984 to 75% in 1994, so on the whole results are encouraging. Knowledge of the National Home Energy Ratings has improved gradually: 50% knew what they were in Future World, whereas on Energy World only 35% were aware of their houses rating under the previous scheme, the MK Energy Index. There was general appreciation for those houses that managed to achieve low fuel bills. However, energy cost awareness has largely remained constant. The main conclusion seems to be that with these 'feature' houses, the design, quality of construction and the viability of the technological features vary widely. So, consumers face something of a lottery when purchasing a 'showcase' house.



The lesson seems to be that if advanced energy saving techniques are to be successfully implemented on a wide scale, there will be a need for improvements in each phase of the design and building process. Architects and designers need to be more aware of the limits and requirements of the various new systems and techniques, builders and fitters need to have more training in the new skills involved.

It's good to see in this respect that, some new training courses are emerging on solar water-heating installation and design. However, so far, such initiatives are rare. Clearly there is

a need for a lot more training programmes and courses for all concerned in the industry, covering the complete range of new building techniques and principles. In addition, there is a need for improvements in the building regulations, together with improved building control systems and some form of quality control mechanism. Over the years there have often been fudges, with houses being required to achieve higher energy-efficiency standards, but the means to achieve this being left to the designers/builders. This meant that they could elect to simply add on energy saving devices post hoc, rather than design and build the basic building envelop to higher standards. Given the predilection for consumers to be attracted by visible gadgets, the former approach would obviously be the easiest route in commercial terms. The problem however is that, whereas you can always add on gadgets after a house is built, it is much harder to modify the basic building structure once it is built. The other main problem relates to quality control. At present, formal approvals and checks are only required for some specific areas, such as on foundations & on the load-bearing ability of the structures, usually carried out during construction. In addition, here are checks at later dates on such elements as plumbing & electrics. Otherwise, it is just left up to the building company to check on the quality of the construction process & the finished product. With the more complex & sensitive energy saving designs & systems, this may not be sufficient. As the survey suggested, there were limits to the effectiveness of the guarantees provided by the NHBC, which is overstretched & underfunded. Clearly, if the new energy-saving techniques & systems are to be successfully implemented, we need something more comprehensive & effective - proper quality assurance covering the complete building process.

Finally, there's the role that planning could play in helping us to achieve a more sustainable approach to building. We live nearly two thirds of our daily lives in the same home environment, and consume about one third of the UK's energy in our houses. Planning-controls ought to be able to deliver both a more sustainable energy use to the average householder, and a better quality of living. For example, the planning systems could be revised so that developers were required to design new houses with a south-facing roof profile, so that it would be possible to add solar panels at a later date, when PV solar cells become more economically viable. And there are more immediate advantages from solar orientation.

One small development of housing-association flats on Future World had a small yard attached to each - and there was a very different feel to them, according to the orientation. The south-facing yards had a small but fairly pleasant place to sit outside on a sunny day and entertain guests. The north-facing yards were gloomy & depressing, fit only for dustbins, or bike-sheds. If we want to give our home environments a sense of community, we must provide the kind of places where people want to socialise. It would have been possible, without using extra land resources, to design these flats so that everyone had some access to a congenial & sunny place to be outdoors. This is where planning can count, without adding extra burdens of cost.

The survey showed that those that were happy with their houses valued space, light availability, and design as the most appreciated factors in their houses. These are aesthetic values that add to the quality of living and health, rather than, fundamentally, material factors that add to a buildings value.

Surely, rather than being denied a choice, everyone should have access to light, space and good design, not just those who can afford to buy houses which have these features as standard. In addition to paying more attention to these 'social' aspects of building design and location, planning should also acknowledge the wider environmental context of the developments. We saw earlier, in the case of the flood-plain problem in Banbury, what can happen if a broader perspective is not adopted.

Sustainable building is more than just building energy-efficient houses: it has to be part of a wider approach to sustainable development covering all aspects of the housing impact on the environment. The impact of living and working in the area, including, most obviously, the provision of ecologically-

sustainable transport options, which are also crucial to improving national, and indeed global, energy efficiency measures. These Milton Keynes housing projects, as examples of eco/future housing design, have given us some pointers to the future, and much food-for-thought, but there is still a lot to be done, before we can develop a truly sustainable form of good housing for everyone.

**Tam Dougan, 1998**



Inside 'Arcosanti', Paolo Soleri's experimental desert town in Arizona, USA

**Epilogue:** Several years later I attended an energy conference at RIIA and met a woman delegate who said that my report had helped to change the nature of the NHER's away from allowing 'bolt-on' energy technologies on new houses and towards whole building 'envelope' ratings. It was a start of sorts, to improving the whole nature of environmentally-sustainable housing, and related infrastructure. However, it's clear to me, on looking back on the past-measures, and comparing them with what kind of housing is currently being built, that there still is a long way to go... We must do better, but not just for the sake of the quality of our own 'living', for human lives, but also for the quality of all those other creature's, and plants, that we depend upon. The world is heating up, due to our own energy profligacy, and general exploitation of the

environment. Time, perhaps, for us to change our habits, rather than enforcing our change on those other hapless creature's habitats....

**Tam Dougan, 2021**