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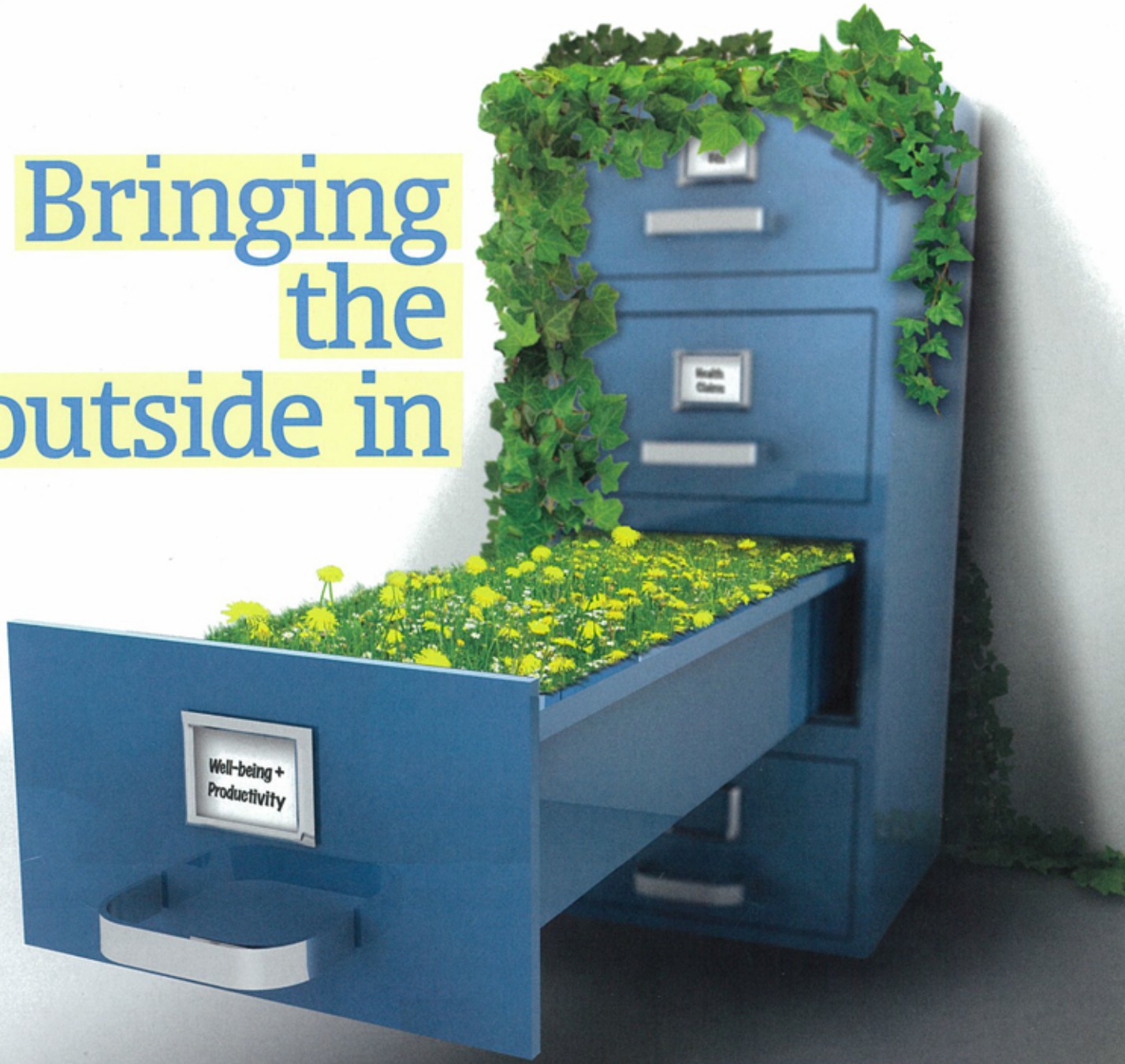
sustain

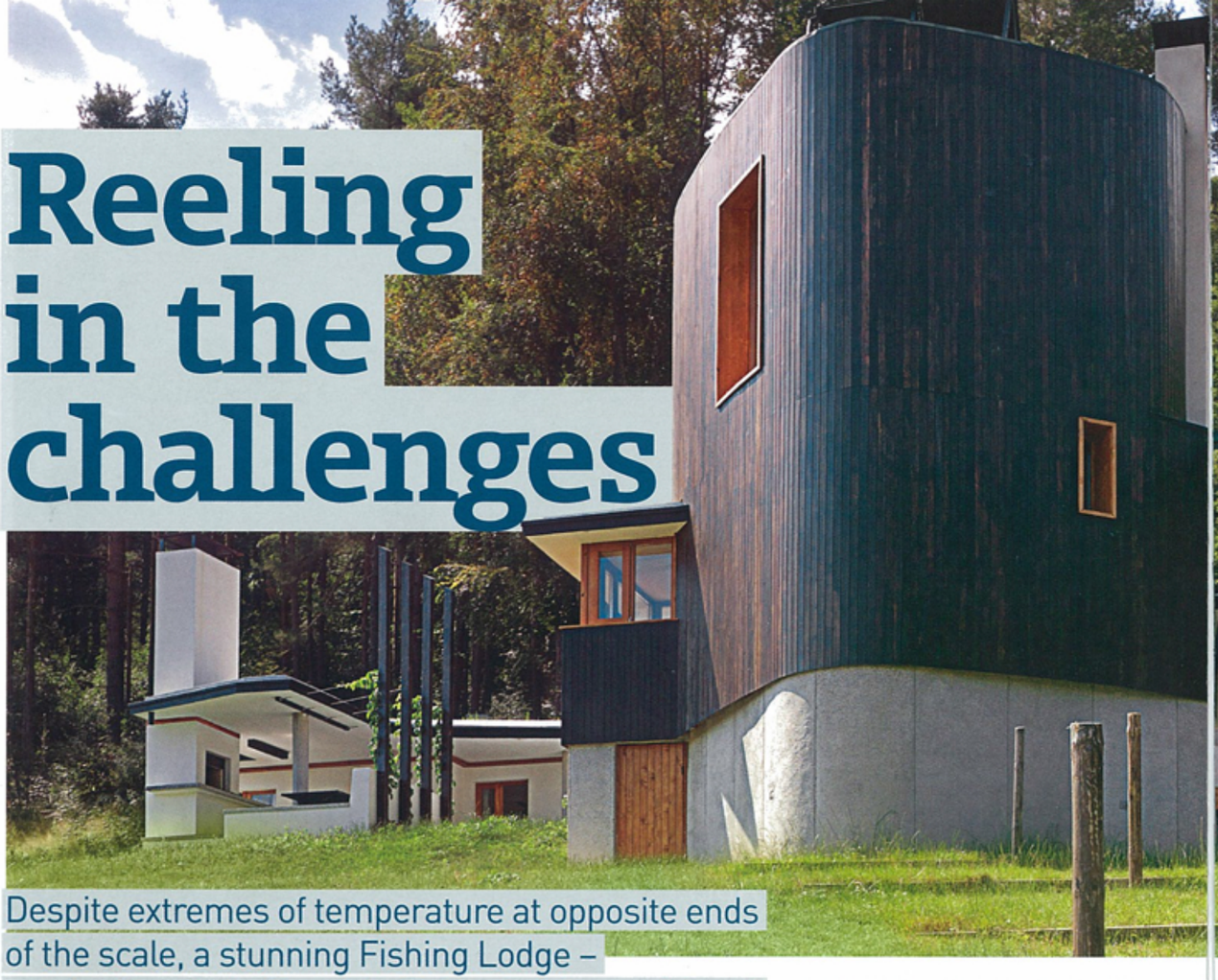
BUILT ENVIRONMENT MATTERS

Bringing the outside in



Plus: Smart cities
Intelligent Buildings
Water Efficiency / Passivhaus

Reeling in the challenges



Despite extremes of temperature at opposite ends of the scale, a stunning Fishing Lodge – overlooking Lake Batak in Bulgaria – has achieved year-round excellent comfort standards for occupants enjoying fishing expeditions. Simon Gill, owner and founder of Simon Gill Architects, explains how it was all achieved using a common sense, gadget-free attitude...

Overlooking the beautiful lake of Batak in the Rhodope Mountains of Bulgaria, Fishing Lodge was built as a holiday home – and in particular to be used as a base from which to launch fishing expeditions on and around the lake. Our clients were my in-laws and the house was largely built and project managed by my father in-law, making it a thoroughly family affair.

Challenging geography

From an environmental point of view, the geography was challenging. Whilst the view to the lake is extremely beautiful, the physical site lies approximately to the north meaning that any windows facing the lake were never going to admit any sun. The ground slopes away down to the lake at a 1:5 gradient but also up behind, where it is forested with very high trees. This means there is very little sun falling on the site through most of the day, only in the height of summer is there generous insolation. Then there was the climate to deal with. In the summer, despite the site being at an altitude of 1400 metres, the temperature can reach 40 degrees, whilst in winter it will often sink to minus 20 at night, with a metre of snow quite typical. This full range needed to be addressed as the house was to be used all year round.

How then to respond to these extremes?

With such a drastic temperature gradient it made sense to put accommodation underground where it would be warm in the winter and cool in the summer. However, a building into which the sun never entered didn't seem desirable, especially in a region that is reputed to have 300 days of sunshine per year. To enjoy this sun, and to be able to take advantage of its solar panels, the house had to climb up high, given that cutting down trees was seen as undesirable.

So the basic form of the building was established: four bedrooms, where light is less important, were built into the hillside with windows facing the view, whilst the living, kitchen and dining areas stand on a plinth above the ground level to catch the sun coming across the site in the morning and from behind through summer days. The obvious further benefit of placing half of the building underground is that it has much less visual impact on the landscape and also that no large shadow is cast in front of it. The volume above ground has a curved form in order to merge into the tree line behind, it also reduces the surface-to-volume ratio and, not least, simply for the feeling of cosiness it provides internally. There are few windows to the west as the adjacent area is covered in trees which prevents much sunshine entering the house, and denying views out. On the east side, however, the views are beautiful and the morning sun can stream into the dining area through windows around the table.

Selection of materials

Where the house is above ground the walls include substantial insulation. There are two wall build ups; render on 50mm PIR ridged insulation, on 125mm thermal blockwork, a 160mm cavity with 160mm mineral wool and finally another leaf of 125mm thermal blockwork inside. Where the building is clad in wood, behind it is 100mm of PIR in front of the structural frame, followed by 225mm PIR between insitu concrete columns and floor/roof plates with 125mm thermal block inside. The timber cladding comes from the local lumber town 10km away, the timber itself all grown locally. Floors have 50mm PIR under the slab and the roof is insitu concrete with 50mm PIR on top, and then 120mm of soil planted with grass on top of that.

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The use pattern of the house was an important factor in the selection of these materials. As the house is predominantly only used at weekends, a massive thermal flywheel effect wasn't considered appropriate. A medium approach was taken, and the internal wall leaf of thermal block helps the building to warm up relatively quickly once the heating is fired up. A certain amount of thermal mass is provided by the concrete floors and ceilings.

Low-cost cosiness

The heating itself is provided by a wood burner. In the mountains of Bulgaria, which are heavily forested, this is a very normal way of life. The bedrooms have radiators, with heated towel rails in the bathrooms. These allow them to be quickly heated up on arrival. Elsewhere there is underfloor heating (with small radiators under the dining area seating for a little extra cosiness). Hot water comes principally from the aforementioned solar panels, but from the wood burner if necessary.

In overall terms, no scientific, calculation-based approach was taken to the building – more a common sense, gadget-free attitude. There is, thus, no statistical information to prove the success of the scheme. However, in the house's first winter, that of 2011-12, which was one of the hardest in living memory in Bulgaria, the owner of the nearest house – about 200 metres away – was unable to use it because he simply couldn't get the temperature up to an acceptable level. That house was insulated to conventional Bulgarian standards with heating powered by electricity. Fishing Lodge, by contrast, was thoroughly cosy and cost a fraction of what the nearby owner paid to even attempt to heat his house. Neither did it experience the burst pipes that plagued many other houses in the area. And in summer, the house has never felt remotely as if it could ever need air conditioning.