

**Solardome Industries team up with an aspirational Norwegian couple to create a 'Grand Designs' style eco-home**



### At a glance

#### Client

Benjamin & Ingrid Hjertefolger

#### The challenge

To provide a glass dome to cover a house and partial garden. It must be able to withstand the extreme wind and snow loading conditions of the Arctic Circle.

#### The solution

15m diameter SOLARDOME<sup>®</sup> PRO

#### Dome specification

- Six-frequency geodesic dome
- Diameter – 15m
- Height – 7.5m
- Volume – 919m<sup>3</sup>
- Floor area – 177m<sup>2</sup>
- Able to withstand over 4KN/m<sup>2</sup> of snow loading and wind speeds exceeding 31m/s
- 6mm single-glazed toughened glass, double doors, 11 windows, 5 of which are digitally controlled, and a large aperture linking the internal house to the outside area
- Exterior metal components polyester powder coated white

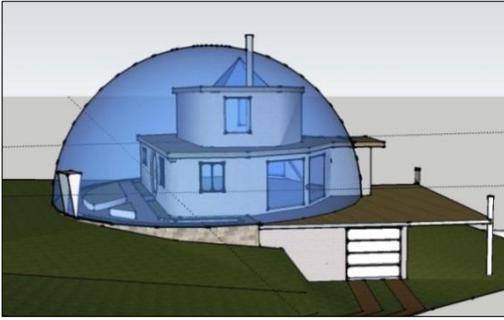
### The challenge

The Hjertefolgers were planning a unique Norwegian eco project. Inspired by the Nature House in Sweden, they wanted a large glass structure to cover an entire house and partial garden on their 7000m<sup>2</sup> remote island site near Bodo, in the Arctic Circle. Their vision was to create a sustainable home and way of life for their family that would be beautiful, ecological and healthy.

The Hjertefolgers, aware of the robust properties of a geodesic dome, wanted a dome to provide a strong glass cover to their home. So, as an established glass geodesic dome company, they approached Solardome Industries.

Solardome have long been an advocate of sustainability in its products and practices and so took on the challenge to make this environmental eco home a reality.

In order to fulfil their dream of green living the Hjertefolgers needed the dome to: provide complete weather protection from the high winds and extreme snow loadings of its location; dramatically reduce heating bills of the COB house they planned to build within; provide an environmentally friendly way of maintaining a uniform temperature throughout the year; be strong and long lasting; reduce ultraviolet radiation; and minimise building maintenance. The glass dome also needed to act as a greenhouse enabling the Hjertefolgers to grow a vast abundance of plants and produce that would not normally survive in the extreme Northern European climate to help create a self-sustainable way of life.



## The solution

The Hjertefolgers' project was the first of its kind and led to the development of the new SOLARDOME® PRO system. This scalable architectural system allows custom design and manufacture of geodesic domes between 8m to 25m diameter. It is an incredibly strong and robust design that can withstand the extreme snow loadings of the Arctic Circle.



A 15m diameter dome was the ideal size to cover the proposed house and garden (200m<sup>2</sup> three-storey house and an 80m<sup>2</sup> garden and 100m<sup>2</sup> rooftop garden). Following the design and manufacture, it took just three weeks for the 15m diameter, 7.5m tall dome to be built on site. With no deep foundations needed, it has very low impact on the environment itself. It contains 360 glass panels and a total length of 832m recycled aluminium framework. The decreased surface area of the dome means it requires 30% less building materials than conventional rectangular structures enclosing the same space, and the aluminium frame that has a structural lifespan of over 100 years doesn't require regular maintenance. The bespoke geodesic dome structure includes a set of double doors, 11 windows, five of which are digitally controlled, and a large door aperture enabling the internal house to flow out on to the outdoor decking area.



## Building the COB house

The PRO dome was the first part of the project to be completed. The dome provided shelter to build the eco-home within. Whatever the weather, the Hjertefolgers were able to work inside, protected from the elements. They built a home over three levels using COB walls on the first floor (a mixture of clay, sand and straw) and straw bales stacked, compressed and finished with clay plaster on the second floor (Nebraska style). The house has five bedrooms, two bathrooms, lounge, kitchen, dining space and a garage. Traditional building methods, materials and recycled products have been used throughout creating a warm, inviting and eco-friendly home. Recycled pallets and old wooden planks create a feature wall, old glass bottles decorate the internal surfaces, and recycled tiles and stone from the beach adorn the bathroom floor.



*"Our house is amazing – we have been blown away by the magnificence of the dome and the life it is helping us to lead. We have all worked really hard to create our home, our dream, and our little sustainable bubble that supports our eco values and that will allow our family to grow up in a beautiful, ecological and healthy environment."*

Benjamin and Ingrid Hjertefolger



## The results - life in the dome

The Hjertefolger family is now living in their Nature House. Their lifetime dream of creating a sustainable, self-contained environment has become a reality.

The 15m diameter SOLARDOME® PRO geodesic dome provides shelter for their three-storey self-build home and garden, but it has other benefits too.



Adhering to the basic principles of a passive house the geodesic dome minimises heat loss and provides good air flow via the mechanical ventilation system. The passive solar gain, coupled with excellent thermal mass qualities of the thick COB walls, means it's easy to keep the house warm in the winter and cool in the summer. This passive house approach has resulted in better utilisation of energy and dramatically reduced heating requirements.



The technology and systems in place mean a uniform temperature can be maintained throughout the year. A log burning stove and solar panel technology provides seasonal warmth and heats the water tank. This water is used for showers, baths and sinks, and the first floor underfloor heating. The dome's electronic windows allow natural ventilation and help create the desired uniform temperature. A water filtering system in the basement means clean water comes in and clean water goes out. Water is recycled and reused within the garden areas. Also helping the garden to flourish is a natural ventilation system of underground pipes and the dome's electronic windows.



Plants can also be found thriving in the garden areas within the dome. The plants provide natural insulation and sound absorption, and also fresh fruit and vegetables for the family and local community. This enables self-sufficiency and provides the family with a beautiful garden with flowering plants and bushes - something not normally achieved in this extreme climate.



This innovative build has brought the community together as friends, family, and volunteers from the local area have been involved with its creation. It has also been embraced by the wider community, with volunteers from all over the world, including America, Argentina, Denmark, Sweden and Columbia. It has provided a talking point and a place for learning about sustainable living and has now become an attraction for tourists visiting the island. The Hjertefolgers have hosted international COB workshops in the dome to demonstrate and teach how to build using the COB method and after an influx of visitors asking about their new home, the Hjertefolgers have organised guided summer tours.

*"The Solardome team have been fantastic throughout. They have been polite, reliable and very hard working. The end result is breathtaking. It feels better that we could have ever imagined. It's an absolutely beautiful place to be - we are excited about the years ahead."*

Benjamin and Ingrid Hjertefolger



## The future

The Hjertefolgers have plans to hold further courses, workshops and concerts within their nature house and build several small cabins on the land showcasing different types of ecological building techniques. These will help fulfil their future plans for hosting yoga retreats and family summer camps where guests can learn about traditional building techniques, sustainable cultivation of food and benefit from the beautiful natural surroundings of its location.

Follow their blog for more details on the project  
[www.naturhuset.blogg.no](http://www.naturhuset.blogg.no)