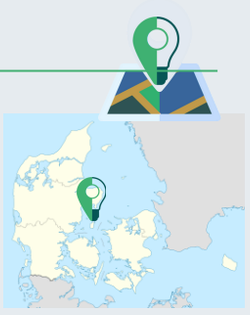
Samsø

Country: Denmark
Population: 3760
Type of area: Island
Governance: Local elected mayor
Administrative level: LAU 2 with several settlements

About Samsø



Samsø is an island (114 km2) in central Denmark consisting of 22 villages and settlements. Three ferries take care of transport to/from both Jutland and Zealand. The island has a long tradition for agriculture. Back in the last century, there were many farms and, following the Danish tradition, the farmers formed cooperatives: a slaughterhouse and five dairies. All these cooperatives were closed down before the year 2000.

Tourism is an important part of Samsø's economy: more than 300,000 tourists come from both Denmark and abroad, enjoying peace and quiet and the sandy beaches. Samsø displays a multinational character: despite its population of fewer than 4,000 residents, they include 42 different nationalities. This is not based on one single circumstance - but a combination of several – for instance agriculture, energy transformation, cultural / artistic traditions and more. The key asset for Samsø today is most probably the awareness, knowledge and experience they have accumulated throughout the last 25 years of energy transition of the island.

Being an island transport is a big challenge. The three ferries all run on fossil fuels. One of the ferries is on its way to be electrified, which will introduce another challenge to ensure charging capacity. Plans are in the making to find a sustainable solution for the two municipally owned ferries – to be run on locally produced biogas or to be electrified as well.

Smartness of Samsø

The smartness of Samsø stems back to 1997 when it became part of a visionary national energy plan that offered the chance to become Denmark's first carbon-neutral island. The original start was not bottom up, but after some hesitation the island's citizens eventually embraced the challenge, and by 2007, they proudly declared themselves carbon negative. The **local participation in the process was vital** and it was the main reason why it was possible. Before the transition, the inhabitants of the island had well-established tradition of agricultural cooperatives, strong networks, and a willingness to explore new solutions. These strengths were leveraged during the transition, showcasing how a successful community-led energy shift could happen and act as a catalyst for enhancing various aspects of a community: employment, economy, cooperation, and awareness. **Today, Samsø is recognized worldwide as an energy transition pioneer, especially for involving the local community.** This draws many visitors to the island, up to 10,000 energy tourists a year, who come to learn from their experiences and find inspiration.

Recognizing the importance of sharing the knowledge and experience, the Samsø Energy Academy (EA) was established early in the process. The Academy, a crucial NGO, plays a prominent role not only in energy transition but also in broader development and sustainability on Samsø. A strong and productive collaboration exists between the Academy and Samsø Municipality.

Participating in the energy transition for 25 years has ingrained sustainability as an integral aspect of both the municipality and the lives of most residents. This is apparent through numerous diverse projects on Samsø, often initiated by locals and frequently carried out in collaboration with Samsø Municipality and/or the Energy Academy.

The Smart Journey of Samsø

The carbon-neutral island

In 1997, Samsø was selected in a national competition to become Denmark's renewable energy island with the goal of achieving carbon neutrality within a decade by involving the local community in the transition.

1997

Samsø faced social and economic challenges, including job losses due to a major slaughterhouse closure. In relation to energy consumption the island heavy relied on imported fossil fuels and coal-fired power plants, making the island vulnerable to fluctuations in energy prices. During the green transition,
Carbon neutrality was achieved through local engagement, creating jobs, energy independence, and economic growth in the process. Cooperatives were formed to invest in energy-efficient solutions and private individuals made significant investments in improving energy efficiency within their homes and installing photovoltaic solar panels to generate renewable energy.

To kick-start energy transition, experts on Samsø decided to tackle the heating system first. District heating was established and privately owned oil and gas boilers were replaced with four district heating systems powered by locally sourced biomass and/or solar thermal.

Title of initiative: District heating system
OVERALL BUDGET: € 9,000,000
Public fund: € 1,500,000
Private investment: € 7,500,000
Duration: 1998-2005

To cover the use of electricity on the island, eleven 1 MW on-shore wind turbines were built. A crucial step in gaining community support was to invite locals to own the turbines. On Samsø, the applied principle was simple: if a resident could spot a turbine from their window, they could become a co-investor. With much of the island's community directly involved as stakeholders in the wind turbines, a strong consensus emerged in favor of the shift to self-generated renewable energy.

Title of initiative: On-shore wind turbines
OVERALL BUDGET: € 9,000,000
Private investment: € 9,000,000
Duration: 2000

To offset the fossil fuel emissions from transportation, considering the lack of well-established green roads and eco-friendly ferry systems, ten 1 MW off-shore wind turbines were set up off-shore the island. Two off-shore wind turbines are cooperatively owned, while the municipality owns a further five turbines, which generate income to be reinvested in sustainability measures.

2011

Title of initiative: Off-shore wind turbines
OVERALL BUDGET: € 30,000,000
Public fund: € 700,000
Private investment: € 29,000,000
Not specified: € 300,000
Duration: 2002-2003

The Samsø Energy Academy was established to address the need for sustainable energy solutions and to drive the transition towards more environmentally friendly practices on the island of Samsø.

The Academy consolidated as an institution after the opening of its building in 2007 to serve as a workspace, meeting hub, and a model of sustainable construction. The academy embodies the island's commitment to sustainability. To conclude the ten-year energy transition journey led by Samsø Energy Academy, key stakeholders gathered to reflect on the process. During these discussions, the Academy gathered stories and insights to create 'The Pioneer Guide' – a valuable resource for emerging communities. This guide serves as a practical tool and source of inspiration for other communities, drawing lessons from Samsø's success.

Title of initiative: Construction of Samsø Energy Academy
OVERALL BUDGET: € 2,200,000
EU fund (ERDF): € 400,000
Public fund: € 760,000
Private fund: € 260,000
Duration: 2006-2007

Since 2011, the municipality of Samsø has been promoting sustainability by investing in 40 electric cars for public use. These cars, powered by solar photovoltaic cells, are shared among municipal employees through an online rental sign-up system. The initiative aims to actively participate in the green transition and embrace sustainable transportation options, serving various purposes such as in-home elder care and official municipality business on and off the island.

Title of initiative: Solar panels for charging municipality e-cars
OVERALL BUDGET: € 300,000
Public fund: € 300,000
Duration: 2011

The SamBiosen, Samsø's cultural and sports center, was renovated and expanded by the municipality from 2011 to 2016. In 2017, a locally formed association took charge and gained permission to oversee the budget and management of the facility. Through collaboration with associations, institutions, self-organized citizens, and other partners, SamBiosen has been developing a range of cultural events, sports activities, and recreational programs creating opportunities for residents to socialize and participate in various activities. This significantly contributes to the island's vibrant cultural and sports scene.

2016

Title of initiative: Renovating Sambiosen
Overall budget: € 1,400,000
EU fund (LEADER) : € 400,000
Public fund: € 1,000,000, with the municipality contributing € 670,000
Duration: 2011-2016

Formed in 2012 by island residents, companies, and leisure clubs, the Samsø Broadband Association addressed island-wide internet problems, including gaps and slow speeds. Their aim was to ensure reliable broadband for residents, businesses, and visitors, initially wireless until commercial companies offered fibre broadband for the entire island. The association was at first volunteer-run, later they employed technicians for faster broadband deployment.

Title: Broadband
Overall budget: € 78,311
EU fund (LEADER) : € 25,423
Other public funds : € 6,356
Private fund: € 46,532
Duration: 2012-2017

Night light project focused on the light pollution. The aim was to raise awareness of the effects of light pollution for both local people and tourists. Minimising the light pollution enables a better view to the night sky. Mercury-based light sources were replaced with LED lighting in one village and has since been expanded to the entire island of Samsø,

2021

Title of initiative: Night light project
Overall budget: € 400,000
EU fund (Interreg Europe): € 20,000
Public fund (municipality): € 380,000
Duration 2017-2021

Organic Samsø is an initative that started in 2013 Through community ownership, young farmers can pursue self-employment in farming, promoting biodiversity and local food production, while actively engaging and inviting the local community to participate in managing the shared cultural landscape. In 2022, the initiative received LEADER support to develop the concept and attract more investors.

Title of initiative: Økologisk Samsø (Organic Samsø)
Overall budget: € 1,200,000
EU fund (LEADER) : € 35,000
Investors (mainly local): € 900,000
Not specified: € 265,000
Duration: 2013-still ongoing

The Smart micro-grid project in Ballen harbor, Samsø, involved the development of a charging system for boats using a combination of solar PV and batteries. This smart-grid is interconnected with nearby facilities, allowing for the utilization of excess electricity. The knowledge gained from this project has been applied to design future charging facilities for the ferries.

Title: SMILE micro-grid project
Overall budget: € 12,000,000
EU fund (Horizon 2020): € 10,000,000
Other public funds : € 2,000,000
Duration 2017-2021

The **local "Samsø Golfklub"** wanted to contribute to Samsø's image of Renewable Energy Island. Collaboration between Samsø Golf Club, Samsø Municipality, Samsø Energy Academy enabled the golf course to be fossil-free. Recycling water, use of organic fertilisers, and geothermal system are just some of the sustainable solutions in Samsø Golfklub. This project later inspired two local football clubs on Samsø to do similar changes on their football fields and the municpality to plan its green areas.

Title: Samsø Golfklub
Overall budget: not defined
The project was realised with voluntary support from Samsø Energy Academy and Samsø Golf Club
Duration: 2017-2021

The municipality wanted to demolish the building originally established in 1899 for gymnastic for students. A local support-association was established and has since worked to prevent demolishing and to raise money to renovate and make good use of the building by villagers, associations or event - makers as community center and theatre.

Title: Øvelseshuset Practice House
Overall budget: € 850,000
EU fund/ LEADER: € 11,000
Public fund (municipality): € 106,000
Private funds : € 390,000
Fund to be established: € 343,000
Duration: 2016-ongoing (until 2024)

A collaborative effort between Samsø Municipality, Klimaskov Denmark (non-profit organisation) and the University of Copenhagen resulted in 2021 in the planting of a forest funded by donations to address the climate and biodiversity crisis. Designed by University of Copenhagen researchers, the forest aims for high CO2 absorption while serving as a recreational area, with the greatest climate impact achieved through optimal tree management, including selective thinning, utilization of mature trees, and replanting.

Title of initiative : Samsø climate forest
The project was funded by donations from companies and private individuals
Duration: 2021

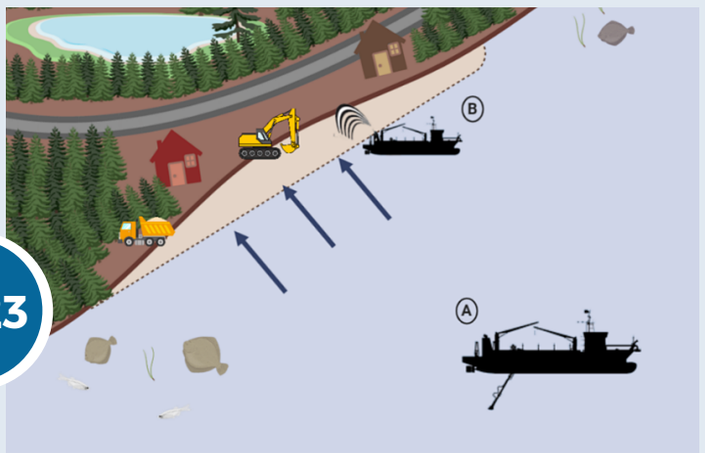
The participation of Samsø Energy Academy in the Interreg Europe project was important to Samsø's community as it addressed the island's pressing issues, including declining population due to restricted employment opportunities, especially among the youth. The project's objective was to reshape islands into centres of innovation, effectively attracting and retaining the younger generation. Achieving this involved refining policies, facilitating learning sessions, formulating action plans, and implementing initiatives on the island. Engaging in this project had the potential to elevate Samsø's status as a role model in the region and expedite the growth of businesses and job opportunities.

Title of initiative: Islands of innovation
Overall budget: € 1,534,520
EU fund (Interreg Europe): € 1,534,520
Duration: 2017-2021

Years of removing stones from the sea around Samsø has led to a degradation of the coast and habitats. A stone reef will be established to bring back sea life and to protect the coast. In collaboration with the Danish Technical University, underwater video cameras will be positioned at 150 locations on the reef to monitor the impact of the project.

Title of initiative: Barreef
Overall budget: € 920,000
Private funds (Veluxfonden & Vattenfall) € 920,000
Duration 2021-ongoing

2023



After a change in national regulation in 2023 it is possible for a cooperation between the municipality, **Samsø Energy & Environment Office and the Electrified-transport association to set up 44 publicly accessible charging points** in addition to the 17 that already exist. This corresponds to 16 charging points per 1,000 inhabitants – a significantly higher ratio compared to the highest elsewhere in Denmark,

A collaborative endeavor aims to offer opportunities for locals, especially children, to explore and experience music, alongside envisioning a local cultural powerhouse of international stature. This fusion of culture, nature, and community, embodied in art, sustainability, and social connections, can be collectively envisaged through an innovative, climate-friendly, and environmentally sound holistic construction project. The long-term objective involves constructing a multifunctional concert hall within an ambitiously landscaped permaculture garden, where new benchmarks for cultural and sensory experiences will be established.

Title of initiative: Opera Søholm
Overall budget: Fundrasing is still in process

In Focus: Sustainable energy transition through local participation

Goal:

The goal of Samsø is to continue its successful sustainable development through further involvement of local citizens. Big goals have been achieved in the past, but constant engagement is necessary for future growth. Some possible solutions are already looked into like building a biogas plant and big solar PV production, implementing more electric vehicle chargers, and switching ferry fossil fuels for more sustainable ones like biogas and electricity. But energy solutions are not the only focus of Samsø, sustainable buildings in form of tiny houses are also one of the possible future projects as well as rewilding projects.

Experience to date:

So far citizens of Samsø implemented four sustainable district heating systems, eleven on-shore wind turbines and ten off-shore wind turbines most of which are owned by local cooperatives or individuals. These solutions enabled Samsø to become climate-neutral and stand out as a lighthouse in Denmark that people from all around the world come to see and be inspired by.

- A recent innovation is the smart grid developed in Ballen harbor (SouthEast part of the island). A complex system including photovoltaics and batteries is implemented to enable visiting boats to be charged by utilizing local sustainable energy.
- Another innovative initiative is a fleet of electric vehicles acquired by the municipality. The cars are used by the municipality's employees, mainly within the elder care service, and electricity is provided by solar panels on top of their parking lots. Residents have the chance to experience these electric vehicles, leading to increased interest and inspiration among them to purchase electric cars for themselves
- As part of the energy transition Samsø has introduced four common heating system using straw produced locally – as they express it: "this way we don't import the oil, so we improve our local economy". Around € 1.5 million per year used to buy straw on the island instead of importing fossil fuel. Additionally burning of the straw is cleaner than burning oil since growing the straw absorb the same amount of CO2 as when burning it.

Next steps:

Samsø achieved carbon neutrality partly by offsetting emissions through the production and export of surplus electricity, primarily generated by their off-shore wind turbines. Samsø's current objective is to achieve fossil-free status by 2030, which revolves around finding innovative alternatives for transport and especially the ferries currently dependent on fossil fuels.

- One of the ferry lines is actively working on a new electric ferry set to commence operations in 2024
- In response to the current obstacles posed by constrained grid, battery, and charging capacity, Samsø is engaged in collaborative efforts with ferry companies in Denmark to develop innovative and more efficient solutions.
- Future initiatives encompass transitioning certain district heating systems from biomass to heat pumps and expanding the infrastructure of car charging stations.

Governance & participation

Local governance (public sector):

Samsø, a small municipality by Danish standards, operates under an elected board comprising 11 members, with one serving as the appointed mayor. Elections are held every four years. The municipality is located in the Danish region of Midtjylland.

Local community (civil society):

The main part of Samsø's population are active members of the community. Many people are volunteers in sports associations, different organisations, at local events, or in local cultural centres.
The local NGO, Samsø Energy Academy is acting on behalf of energy-actions but also other sustainable projects. Through the process with the renewable energy they have gained a lot of experience in governance. A strong and productive collaboration exists between Samsø Municipality and the Academy.

Businesses :

Local small businesses actively participate in the implementation of project solutions. They play a key role, with local craftsmen being integrated into construction and upkeep activities on the island. The principle is to prioritize capable and educated local craftsmen for maintenance tasks. This is facilitated through small tenders and stipulated service requirements in the bidding process. The collaboration among local craftsmen is encouraged, fostering a supportive environment and contributing to the growth of the local business community.

Research (scientific sector):

The municipality maintains a strong partnership with PlanEnergi, a renewable energy consultancy, in the creation of local climate plans for Samsø and other municipalities. Additionally, Samsø Energy Academy collaborates closely with international and Danish universities, including Aalborg University (SMILE), Danish Technical University (Barreef), and Copenhagen University (Climate Forest). The Academy also assists various companies in developing innovative and sustainable solutions. This involves presenting them with specific challenges and subsequently evaluating and implementing the resulting products.

Community engagement process

The local community actively participates in defining the island's needs, goals, and strategies. A strong and close relationship exists between the municipality and its residents. This connection is essential for the community's unified development and is nurtured through regular gatherings involving residents, homeowners, individuals, and businesses engaged in various projects, along with the municipality. These meetings are open to all residents.
The lively community that has been created results from a successful collaboration among local administrators, private entrepreneurs, and regional and national entities. After many years of development driven and executed by the locals, there is a general expectation that various subjects and new projects are presented for feedback. The Samsø Energy Academy frequently facilitates these open meetings.
The Municipality has established its social media platform containing relevant information. This platform also includes Kommune-TV, where council meetings can be watched online or offline. This approach ensures transparency remains at a high level, enabling citizens to stay informed about important topics.
The Samsø Energy Academy, actively engaged in the majority of energy and environmental projects on the island, ensures transparency by making all project information and data accessible through their website and the Academy's database

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***Further information*:**
Smart Rural 27 website: https://www.smartrural27.eu/village/samso/