

# ACTION PLAN FOR SAMSØ



## Islands of Innovation Project

Innovation Policies for Sustainable European Islands

January 2020

**Part I – GENERAL INFORMATION**

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Project: Islands of Innovation — Innovation Policies for Sustainable European Islands  
Partner organization: Samsø Energiakademi (Samsø Energy Academy)  
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**Summary**

*Islands of Innovation* is a cooperation project under the Interreg Europe program. Partners representing island regions in The Netherlands, Denmark, Portugal, Estonia, and Greece have worked together for three years. During that period the partners exchanged their experiences concerning innovation policies for islands. This action plan is for Samsø, Denmark. It specifies what will be done as a result of the cooperation. On Samsø, innovative energy actions, such as installing new energy plants, require permanent residents, jobs, buildings, land, and energy. However, those resources are limited on Samsø. Therefore, the action plan focuses on the management of those resources while at the same time keeping track of greenhouse gas emissions. The following two years the project will monitor the progress of the action plan. Eventually, the project will evaluate the impact of the actions and the project cooperation.

Signature: 

Date: 31/1/2020

<https://www.interregeurope.eu/islandsofinnovation/>

## Part II – POLICY CONTEXT

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*The Action Plan aims to impact:* Regional development policy instruments.

*Titles of the policy instruments (PI) addressed:*

- PI 2, Samsø Municipal Plan (Kommuneplan)
- PI 2b, Samsø 3.0
- PI 2c, Action Plan for the Business and Settling Strategy 2019-2020 (Handleplan for Erhvervs- og Bosætningsstrategi 2019-2020)

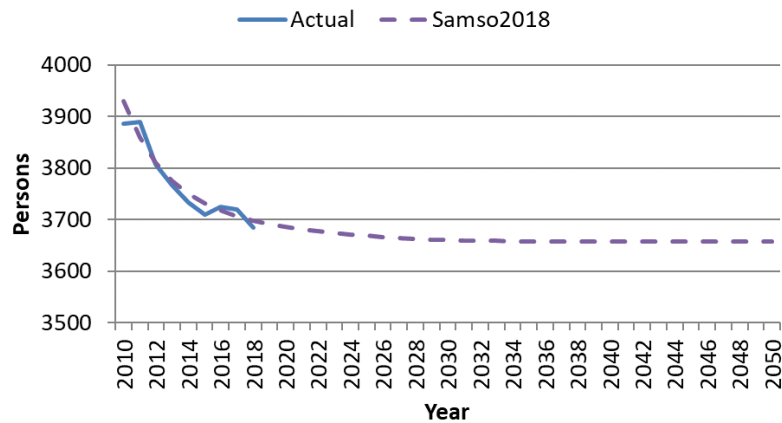
*Further details on the policy context and the way the action plan should contribute to improve the policy instrument:*

Samsø is relatively small with a population under 3700 permanent residents. It is comparable to the Dutch islands of Ameland (population 3600) and Vlieland (1200) in the Wadden Sea. All three islands are small compared to the other participants in the *Islands of Innovation* project: Madeira (250 000), North Aegean islands (200 000), Saaremaa (30 000), and Azores (250 000) (Islands of Innovation: Comparative Country Study, 2018). The large islands have universities, tertiary schools, and start-up aid such as science parks. The small islands, including Samsø, have limited resources in comparison.

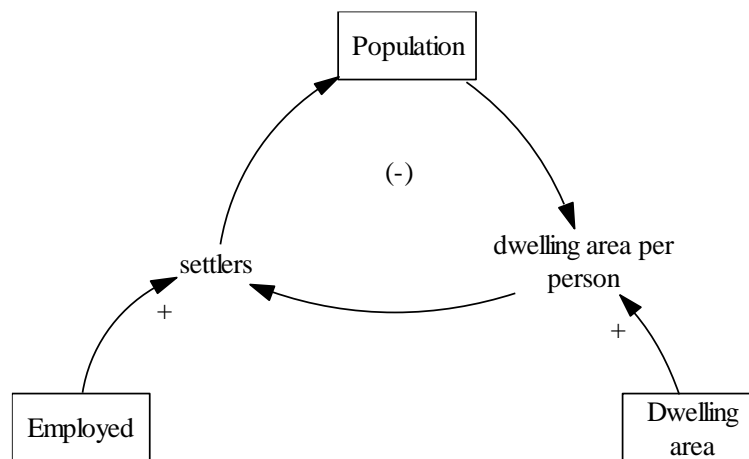
In Azores, for instance, the science and technology park NONAGON aims to promote collaboration between the public, private, and university sectors (Islands of Innovation, NONAGON, good practice). Samsø does not have a university, but the Samsø Energy Academy works informally with Danish and foreign universities. This could be formalised akin to NONAGON.

Samsø's population is declining, and it is now at the lowest level ever. The overarching political aim is therefore to halt the decline. In both Ameland, Vlieland and Samsø the population is ageing, also called 'greying' (Islands of Innovation: Comparative Country Study, 2018). Figure 1 depicts Samsø's population since 2010. There have been temporary increases in population, but the trend is negative. The figure also shows a forecast until 2050 from a model developed under the *Islands of Innovation* project.

According to the forecast, the population stabilizes in the future; it does not tend to zero. A skewed age distribution causes more deaths than births, continuing for the next 20 years. Fortunately, a net in-migration — mostly from other countries, but also from Danish municipalities — dampens the natural decline. On Samsø one third of the population is older than 65 years and hence outside of the labour market. Attracting settlers is therefore an obvious priority.



1. Samsø's population is declining. Historical data (full line) and forecast (dashed line).

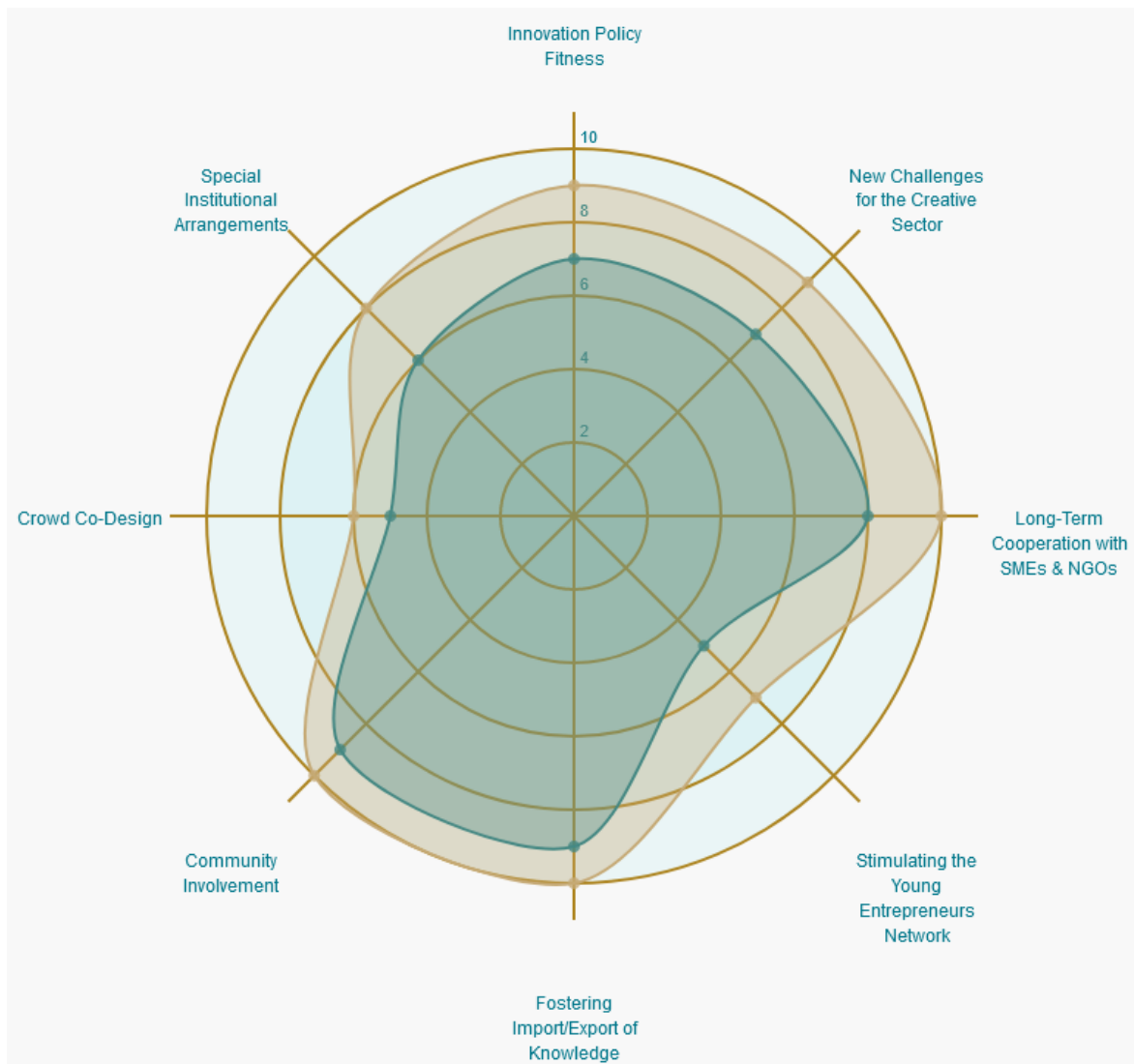


2. Cause-and-effect diagram of the Samsø population model.

According to the underlying population model, Figure 2, an increase in settlers will increase the population — all other things being equal. However, an increase in population causes less living space per person given the existing stock of dwelling space. In turn, less living space per person deters settlers from coming. The chain of effects forms a balancing loop, which stabilizes on a level where the natural decline balances the in-migration. There are two policy actions which will halt the decline and possibly even reverse the trend: 1) To increase the number of jobs by means of innovation, and 2) to increase the available housing for permanent citizens. The two policy actions must act in concert to maintain a higher population of employed permanent residents.

The energy sector is a key smart specialisation sector. To preserve the island's leadership with regard to new energy solutions — meaning, a high degree of local participation and a large share of local ownership — it is necessary to improve innovation policies in the energy sector in an ongoing fashion. The following lists the essence of the municipal vision for the year 2030.

- To no longer use fossil fuels and propellants on Samsø.
- To run all transport engines, including ferries, on renewable energy.
- To extend and establish partnerships between energy consumers, energy producers, installers, and research labs.



3. TIPPING wheel showing the innovation potential in the energy sector on Samsø. Existing state (inner contour) and desired future state (outer contour).

The energy sector has innovation potential. That was already discovered during the past renewable energy island project (1997-2007). Figure 3 indicates the innovation potential within the energy sector. The figure compares the current level of innovation and the desired future level of innovation with respect to the eight corners of the so-called *TIPPING wheel* (*Islands of Innovation: TIPPING Wheel*, 2019). There is room for improvement. In particular, two corners are weaker than the others: 1) stimulating the young, and 2) crowd co-design. Item 1) is difficult to improve when the young people leave the island at the age of 17. *Islands of Innovation* performed a survey among 26 pupils in two classes in secondary school. It showed that 96% of the pupils were ready to leave the island to seek further education. But then it would help to create educational opportunities on the island, or perhaps create more frequent ferry connections, which would enable some of the young to stay a little longer on the island. Item 2) concerns *co-design*, which Samsø has not done in the modern *crowd* sense of the term. On the other hand, to become *Denmark's Renewable Energy Island* in ten years (1997-2007) did require civic engagement and local ownership, which could be seen as a variant of crowd co-design. These considerations lead to the following guideline.

*Policy guideline 1.* It is necessary to improve Samsø's innovation policies and the innovation chain, because actions in that direction help to create more jobs and to attract settlers.

More concretely, 'to improve the innovation chain' shall mean 'to reserve resources'. Samsø is a small island, and some resources are scarce. Innovative energy actions, such as installing new energy plants, require the following resources: permanent residents, jobs, buildings, land, and energy. Those resources are limited on Samsø, as the case is on the other small islands of the project. Furthermore, greenhouse gas emissions must be reduced. The following guidelines emphasizes the need for compromises.

*Policy guideline 2:* Samsø is a small island, and the need to make compromises is a circumstance of living there.

*Policy guideline 3:* Areas of compromise are best identified in the policy instruments.

The policy instrument Samsø Municipal Plan (PI 2) describes the desired, future land use on the island. It documents the policies that the municipal board of 11 politicians has agreed upon. It is written for the citizens and the authorities, so they can plan future activities in specific areas of the island.

The planning horizon of the municipal plan is 12 years. The plan is revised and improved every 4 years in a forward moving process. The current plan comprises the period 2017-2029. The next revision will be in 2021, which is within the monitoring phase (Phase 2) of *Islands of Innovation*. The main improvement of the policy instrument will be to introduce monitoring of the land use. Currently, the amount of land to be used for energy projects is not calculated, although the municipal plan suggests particular areas suitable for wind turbines and a biogas plant (so-called *prospective areas*). In fact, the various uses of land mentioned in the plan (agriculture, forest, nature, urban zones) are not checked against the size of the island; they add up to more than 100% of the surface. A simple account of the land cover would therefore improve the credibility of the municipal plan.

The policy instrument Samsø 3.0 (PI 2b) is a working document. It is itself an action plan for fulfilling the vision to transition Samsø to a fossil fuel free island by the year 2030. The document is updated occasionally. It is divided into three chapters with the following headings: "Smart fossil fuel free energy system", "Food production in balance", and "The resource landscape". It describes a transition guided by two main principles: (1) a smart energy system, and (2) a circular economy. It prepares the ground for energy innovations, and for social innovations as well.

The main improvement of the policy instrument will be to introduce *net-zero* emissions in agreement with the Paris climate meeting in 2015 (COP21). The existing account of the energy balance includes emissions (CO<sub>2</sub> equivalents) resulting from energy use only. The next step is to add emissions from agriculture, industry, and the waste cycle. This requires a *climate balance* based on an account of CO<sub>2</sub> emissions.

The policy instrument Action Plan for the Business and Settling Strategy (PI 2c) is itself an action plan for 2019-2020. The main focus is on the following areas: tourism, food industry, education, infrastructure, settlers, and renewable energy. The policy instrument touches upon the following four, out of eight, national smart specialisation priorities: energy and climate; tourism and experience based economies; the food industry; and ICT and digital growth. The political Committee on

Businesses and Settlers updates the policy instrument every two years. It is subordinate to the shorter parent document titled Business and Settling Strategy, which covers the years 2014-2020. Thus, the latter plan is due to be updated within the monitoring phase (Phase 2) of *Islands of Innovation*.

The main improvement of the policy instrument will be to emphasize housing as a focus area. Innovation, which creates jobs, cannot attract settlers alone. There must also be affordable housing. Particularly rental apartments, of which there are relatively few.

### Part III – DETAILS OF THE ACTIONS ENVISAGED

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#### ACTION 1. To introduce a land account

Policy instrument: PI 2, Samsø Municipal Plan (Kommuneplan)

1. **Relevance to the project** (*please describe how this action derives from the project and in particular from the interregional exchange of experience. Where does the inspiration for this action come from?*)

The small Dutch islands of Vlieland and Ameland have limited space, and wind turbines are prohibited for environmental reasons (Islands of Innovation: Interregional learning session, Texel and Vlieland, Netherlands, June 2018). Energy innovations potentially create local jobs, which explains the relevance to *Islands of Innovation*. Ameland has installed the largest solar park (6 MW) of The Netherlands (Islands of Innovation: Comparative Country Study, 2018).

Similarly, the touristic development in a Natura 2000 area (Greece) required compromises on the use of land (Islands of Innovation: Good Practice, The Case of Eastern Lemnos). On Lemnos (population 17 000), protected nature was converted to an eco-friendly tourist destination. Contrary to the case of Samsø, new housing had to be avoided.

These learnings from the other partners made Samsø realize the importance of reserving land on a small island, or at least keep a record of the land cover. A land account emphasizes how land is used, and that will likely trigger discussions on how land should be used in the future.

2. **Nature of the action** (*please describe precisely the content of action 1. What are the specific activities to be implemented?*)

Agriculture occupies two thirds of Samsø's surface. New energy projects — such as wind turbines, photovoltaic plants, district heating plants, and a biogas plant — require space, which must be taken from other land use, such as farmland.

This is a potential source of conflict, which could hinder innovation. Land use is hitherto only informally considered. In order to be realistic, and to help solve future conflicts, *Islands of Innovation* proposes to introduce a land account in percentages, which must sum to 100%. The land account should consist of nonoverlapping categories, for example: agriculture; forest; other nature area; urban zone; cottage house zone; recreational land area; roads and construction; and energy plants in the rural zone.

Furthermore, climate emissions depend on how the land is used. The land account is therefore a prerequisite for calculating greenhouse gas emissions.

The following list summarizes the actions to be taken

- Introduce the land account concept to the politicians and the municipal planners.



- Introduce land accounting in the so-called Plan Strategy, which is a precursor to the updated municipal plan
  - Define non-overlapping categories of land use.
  - Calculate the area of each category, checksum 100%.
  - Introduce the land account in the municipal plan as a planning tool.
  - Use the land account as a tool for monitoring changes over time.
3. **Stakeholders involved** *(please indicate the organisations in the region who are involved in the implementation of the action1 and explain their role)*

The politicians, especially the eleven members of the municipal council, have the greatest influence, since they take the final decision to include a land account in the municipal plan. The municipal staff, especially the planners in the technical department, perform the background calculations. The investors in energy projects have a high interest, because new projects must comply with the municipal plan. Citizens, particularly neighbours, have a high interest in the future land use and its regulation.

4. **Timeframe** *(please specify the timing envisaged for the action)*

The planning horizon of the municipal plan is 12 years. The municipal plan is revised and improved every 4 years in a forward moving process. The current plan covers the period 2017 – 2029, and the next opportunity to integrate a land account will be 2021.

5. **Costs** *(please estimate the costs related to the implementation of the action)*

The decision to include a land account is political, at no cost. However, the development and calculation of a land account will be labour intensive on behalf of the municipal staff. The calculations require access to existing tools based on aerial photography.

6. **Funding sources** *(please describe how the action will be financed. Is it through the policy instrument(s) indicated in part II):*

The work hours are to be funded by the municipal fiscal budget. Samsø Energy Academy will contribute man hours for monitoring during phase 2 of *Islands of Innovation* (2020-2022).

## **ACTION 2. To introduce a climate balance**

Policy instrument: PI 2b, Samsø 3.0

1. **Relevance to the project** *(please describe how this action derives from the project and in particular from the interregional exchange of experience. Where does the inspiration for this action come from?)*

Samsø has calculated an energy balance every second year since 1997. It informs about the energy demand, the fuel sources, and whether the energy is renewable. This approach is listed as a good practice on behalf of Samsø (Islands of Innovation, Energy Balance, Good Practice). Madeira uses a similar approach, managed by AREAM (Regional Agency for Energy

and Environment of the Autonomous Region of Madeira). During the Interregional Learning Session on Madeira (Nov 2017) we met and identified together possible improvements in our original approach.

Lab Vlieland (Netherlands) is a living lab related to a festival with smart power management systems, re-use of (waste) water, design for circular economy, and new production technologies (Islands of Innovation, Lab Vlieland, Good Practice). LabVlieland has organised a climate neutral trade mission to the Dutch Wadden islands. That showed us that being 'climate neutral' is in demand on some islands.

These insights fuelled our ambition to update the policy instrument with a new climate balance concerning greenhouse gas emissions. Emissions are relevant to all municipalities today.

2. **Nature of the action** (*please describe precisely the content of action 1. What are the specific activities to be implemented?*)

Samsø produces an abundance of electricity, but the island has limited amounts of biomass. Samsø envisions a move to a so-called smart energy system, which combines the energy sectors in an optimal manner. The excess electricity, which today is exported on the sea cable to the mainland, is to be used for district heating instead, by means of heat pumps. Biomass (straw, wood chips), which is today burnt in district heating boilers, is to be used in a (planned) biogas plant. The biogas plant is to produce biofuel for heavy transportation, including ferries.

The Danish *Islands of Innovation* stakeholders organised a workshop (Nov 2018) and contributed input to a revision of Samsø 3.0. The editor was an external expert (PA Sorensen, Planenergi). The workshop was performed as the good practice labelled *The Circle* on the project web site<sup>1</sup>.

Based on the stakeholder input, a new *climate balance*, similar in nature to the energy balance, is proposed for Samsø 3.0. Agriculture emits greenhouse gases owing to the metabolism of plants and animals. Consequently, emissions depend on land use. Emissions are relevant for all municipalities today in connection with climate actions. Land use, which is treated in the municipal plan (PI 2), has a direct effect on emissions.

The following list summarizes the actions to be taken

- To revise the Samsø 3.0 document.
- Reshape the contents according to a net-zero emissions balance.
- Obtain approval of the policy instrument from the municipal council.
- Monitor the greenhouse gas emissions.

3. **Stakeholders involved** (*please indicate the organisations in the region who are involved in the implementation of the action1 and explain their role*)

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<sup>1</sup> <https://www.interregeurope.eu/islandsinnovation/>

The politicians, especially the eleven members of the municipal council, have the greatest influence on Samsø 3.0, since they take the final decision to approve the new version. The municipal staff, especially the staff in the technical department, perform the background work, which includes procurement of data. The Samsø Energy Academy coordinates and writes documentation. The regional stakeholder group assumes the role of a supervisory committee. The investors in energy projects have a high interest, because new projects must comply with the vision for the year 2030. Farmers have a high interest in CO<sub>2</sub> accounting, because it is often used against them.

4. **Timeframe** *(please specify the timing envisaged for the action)*

The planning horizon of Samsø 3.0 is the year 2030. The plan is revised and improved occasionally in a forward moving process. A prototype of a CO<sub>2</sub> accounting tool is scheduled for 2020.

5. **Costs** *(please estimate the costs related to the implementation of the action)*

The decision to approve Samsø 3.0 is political, at no cost. However, the development of a CO<sub>2</sub> tool requires funding of a prototype from an external funding agency: 1 350 000 DKK (180 000 EUR).

6. **Funding sources** *(please describe how the action will be financed. Is it through the policy instrument(s) indicated in part II):*

The energy transition will be co-funded by citizens, who wish to invest in renewable energy. The CO<sub>2</sub> accounting tool is financed from a funding agency (EMD Foundation, Denmark).

**ACTION 3. To focus on new housing, particularly rental apartments**

Policy instrument: PI 2c, Action Plan for the Business and Settling Strategy 2019-2020 (Handleplan for Erhvervs- og Bosætningsstrategi 2019-2020)

1. **Relevance to the project** *(please describe how this action derives from the project and in particular from the interregional exchange of experience. Where does the inspiration for this action come from?)*

The Comparative Country Study (Islands of Innovation), shows that the population dynamics on Vlieland, Ameland, and Samsø are similar, including brain drain and an ageing population. During the interregional learning session in The Netherlands (Texel, Vlieland, Amsterdam, June 2018), we learned that the Wadden islands have many recreational visitors. Recreational housing for non-residents occupies a relatively large share of the building stock, while permanent residents struggle to find affordable housing. A visit from Samsø to Vlieland and Texel (Nov 2019) — to participate in a Dutch stakeholder meeting thus making it interregional — highlighted their focus on building new housing, particularly rental housing. However, this is hampered by a recent Dutch governmental decision to halt new construction work due to greenhouse gas emissions.

Ameland tries to extend the season for tourism and attract settlers by means of arts (Islands of Innovation, Kunstmaand Ameland, good practice). Samsø also wishes to extend its tourist season.

Samsø then realised that the building stock is an important resource for innovation. However, it takes a relatively long time to build new housing, so long-term planning, in the order of 30 years, is essential.

2. **Nature of the action** *(please describe precisely the content of action 1. What are the specific activities to be implemented?)*

The starting point was a statistical analysis of the population on Samsø. The analysis was implemented in our computer model for what-if simulations. The model is instrumental for showing the effect of innovation and housing on the size of the population. One result from the simulation is mentioned previously: Jobs and housing must grow in concert.

The results were presented to the Samsø Committee for Businesses and Settlers in a one hour exclusive meeting in the autumn of 2018. This was followed by a personal meeting with the mayor (Dec 2018). The policy instrument then went into a public hearing phase, and Samsø Energy Academy submitted an official hearing reply that suggested to focus on rental apartments (25 Jan 2019). The proposal was eventually inserted in the official policy instrument (PI 2c, 23 Apr 2019).

The investigation of the possibilities for creating new rental apartments is an ongoing process, which involves the municipal staff, housing companies, and private investors.

The following list summarizes the actions to be taken

- To describe the simulation model.
- Attempt introduce a more general policy on innovation and housing in the parent document Business and Settling Strategy.
- Monitor the actual developments with regard to new housing (square metres of land use, target 20 000 sqm).
- To monitor the annual developments in population, jobs and housing by means of a graphical chart (Islands of Innovation, TIPPING Wheel).

3. **Stakeholders involved** *(please indicate the organisations in the region who are involved in the implementation of the action1 and explain their role)*

The politicians, especially the eleven members of the municipal council, have the greatest influence on the policy instrument, since they take the final decision to approve the new version of the policy instrument and the parent document "Business and Settling Strategy". The municipal staff, especially the staff in the technical department, perform the background work, which involves a collaboration with building associations and developers. The regional stakeholder group will monitor the developments. The investors in building projects have a high interest, because constructing and operating new housing could be profitable.

4. **Timeframe** *(please specify the timing envisaged for the action)*

The planning horizon of the policy instrument (PI 2c) is the end of year 2020. The parent document Businesses and Settlers Strategy is to be updated in the beginning of 2021, and its horizon is the end of 2026.

5. **Costs** *(please estimate the costs related to the implementation of the action)*

The decision to approve the plan is political, at no cost. However, the construction of new housing requires substantial investments, mostly private funding. In the case of social housing, the municipality must invest 10% of the construction costs. In return, the municipality receives a right to promote citizens to the apartments.

6. **Funding sources** *(please describe how the action will be financed. Is it through the policy instrument(s) indicated in part II):*

Private funding and ownership. Investment by a housing association with 10% municipal funding.