

# Abstract

## Industrial symbioses as an example of the implementation of the national materials efficiency programme

The National Audit Office has reviewed the implementation of the national materials efficiency programme. The aim was to determine the effectiveness of the central government activities and the factors impacting the assessment of efficiency in the promotion and support of business activities in the national materials efficiency programme and especially in industrial symbioses. Encouraging industrial symbioses was one of the proposals made by the working group examining the issue of materials efficiency. The working group's proposal for a national materials efficiency programme was presented in December 2013. The updating of the programme at the end of 2017 is included in the Government's Action Plan. Materials efficiency includes economical use of natural resources, efficient management of side streams and reduction of the amount of waste.

In industrial symbioses, there is close cooperation between companies in business networks in which the companies share materials, by-products of production processes and expertise so that the amount of wasted material can be minimised. Under the FISS operating model (Finnish Industrial Symbiosis System), created in Finland to promote symbioses, companies and other actors are assisted in their efforts to share resources more efficiently and to create new business. Funding for the FISS operating model has come from the Ministry of Economic Affairs and Employment, Ministry of the Environment and a number of other parties (such as Sitra), which granted a total of about 750,000 euros to the model between 2014 and 2017. The activities are coordinated and administered by Motiva.

Industrial symbioses are part of the circular economy, which is also estimated to have significant economic potential in Finland. A total of 500,000 euros was allocated for the promotion of materials efficiency in the Finnish state budget each year between 2009 and 2016. In the proposal for the 2017 state budget, a total of 400,000 euros is allocated for the purpose. A total of 323 million euros has been allocated between 2015 and 2018 to the priority area 'Bioeconomy and Clean Solutions' set out in the Programme of Prime Minister Juha Sipilä's Government. Under the Government Programme Action Plan, a total of 63 million euros will be allocated to the key project 'Breakthrough of the Circular Economy and Clean Solutions', which comes under the priority area referred to above.

In the questionnaire surveys conducted for the review, respondent groups gave somewhat conflicting answers when asked about the implementation of the materials efficiency programme. However, the conclusion made in the review was that the programme has not been fully implemented in accordance with the objectives set out during its preparation. In the preparatory process, performance targets were only set for a small number of measures and the effectiveness of the measures was not thoroughly assessed in advance. The costs of the programme incurred by central government were extensively assessed in advance. At the same time, however, its benefits to central government were only cursorily assessed in advance.

The questionnaire surveys conducted as part of the review show that the national materials efficiency programme has only resulted in slight improvements in the competitiveness, productivity or

employment capability of the companies involved. However, the programme has helped the companies to use materials more efficiently and it has also led to the establishment of networks between the companies.

According to the answers submitted by the respondents, the current waste legislation and environmental permit procedures can prevent the creation of industrial symbioses. The view is that, in terms of its usability and openness, the existing FISS resource database is not particularly well suited for promoting industrial symbioses at practical level.

In the review, the parties involved in the FISS activities also gave their views of how central government could promote the creation of industrial symbioses. Under the FISS operating model, companies developing industrial symbioses are offered support and resources for creating symbioses in such environments as workshops. Industrial symbioses could be promoted better by motivating companies to take part in activities arranged in different parts of Finland and to continue as active FISS participants.

According to the FISS participants, Finland's waste legislation and environmental permit procedures should be improved and the use of secondary raw materials should be made economically more attractive. The participants also proposed that central government should support research promoting industrial symbioses and that central government should also make more use of recycled products in public purchases.

### Recommendations of the National Audit Office

Based on the review, the National Audit Office proposes that the Ministry of Economic Affairs and Employment and the Ministry of the Environment, to the extent that the recommendations fall within their competence,

1. should develop national steering for materials efficiency that would provide a basis for positive competitiveness impacts in companies. This would require improvements in the waste legislation and environmental permit practices.
2. should in the preparations and implementation of development programmes designate the parties responsible for the implementation of the measures, set out the performance targets for the programme measures and monitor them, and assess the costs and benefits to central government arising from the programmes in sufficient detail.
3. should develop the FISS operating model so that companies would be more motivated to join the development measures and remain participants in the process.
4. should improve the functioning, usability and openness of the database used in the FISS operating model.