

Interactive knowledge transfer as a tool for stimulating energy efficiency on the regional and local level: lessons-learned from a Swedish case study

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Keywords

transport policies and measures, capacity building, case studies, dissemination, local government initiatives, interactive knowledge transfer

Abstract

The immense and urgent climate crisis calls for radical measures to phase out fossil fuels and to use energy more intelligently, in all sectors and levels of society. Whilst new knowledge certainly needs to be developed, already existing solutions and technologies have great potential for reducing energy consumption.

However, existing knowledge is often not disseminated efficiently or utilised to its full potential. Significant economic and human resources are therefore spent on simply reinventing the wheel. We argue that to have any chance of combating climate change, increased attention needs to be placed on the mechanisms and structures for the transfer and exchange of knowledge between key stakeholders, such as municipalities, which hold the mandate, capability and responsibility to act. In fact, the municipal sector hosts a multitude of examples of good practice and proven solutions that could easily and cost-effectively be applied more widely.

To successfully disseminate knowledge and experience of successful energy efficiency work from one context and customise it to the needs of another, it is critical to recognise three key principles: to focus on the learning journey of the individual and the context and preconditions of the organisation that wants to learn from peers in another; to employ a systematic and highly structured process; and to set clear objectives to solve a problem or to make significant improvements.

This paper will describe and discuss lessons learned from a successful pilot project where the abovementioned principles were applied in practice – a 2015 knowledge transfer project between municipalities in the County of Stockholm on the topic of sustainable and energy efficient transport.

Making the case for interactive knowledge transfer to accelerate energy efficiency and sustainability efforts at local level

The immense and urgent climate crisis calls for radical measures to phase out fossil fuels and to use energy more intelligently, in all sectors and levels of society. Whilst new knowledge certainly needs to be developed, already existing solutions and technologies have great potential for reducing energy consumption.

However, existing knowledge is often not disseminated efficiently or utilised to its full potential. Significant economic and human resources are therefore spent on simply reinventing the wheel. We argue that to have any chance of combating climate change, increased attention needs to be placed on the mechanisms and structures for the transfer and exchange of knowledge between key stakeholders, such as municipalities, which hold the mandate, capability and responsibility to act. In fact, the municipal sector hosts a multitude of examples of good practice and proven solutions that could easily and cost-effectively be applied more widely.

It is commonplace for government agencies and other organizations that want to promote dissemination and wider deployment of good practice solutions in different fields to compile, describe and present such examples on websites, in reports

and invite representatives to make presentations at conferences and seminars. Such activities are useful to spread information and raise awareness about different solutions. However, most of them can hardly be described as true vehicles for the transfer of *knowledge* between organizations and individuals.

The purpose of this paper is to describe in very practical terms how knowledge, experience and lessons learned from successful energy efficiency or sustainability initiatives can be shared in an efficient manner amongst local authorities. Hence, it does not aim to discuss theoretical aspects pertaining to the field of knowledge transfer or knowledge management.

Below is a description of a method for interactive knowledge transfer that was applied in a 2015 knowledge transfer pilot project for three municipalities in the Stockholm region on the topic of energy efficient and sustainable transport. The purpose of the project was twofold. Firstly, the County Administrative Board of Stockholm wanted to test the usability of the knowledge transfer method, and to customise it to the needs of municipalities working to cut CO₂ emissions and become more energy efficient. And secondly, the project was designed to transfer important knowledge and lessons learned at a very concrete level, regarding sustainable transport solutions from Botkyrka municipality to two other municipalities in the region, Järfälla and Haninge.

The knowledge transfer process has been developed by Light-Switch, and is based on influences from best practice benchmarking¹, action learning² and various workshop techniques aimed at promoting interactive and participatory learning. It is a generic method that could be used for inter-organizational knowledge transfer regardless of sector or theme. For this project, the method was customized in partnership with the County Administrative Board of Stockholm, to suit the specific needs and context of municipal organizations and to promote inter-municipal interaction and development, in regard to energy efficient transport solutions.

WHAT DO WE MEAN BY INTERACTIVE KNOWLEDGE TRANSFER?

Without elaborating on the theoretical foundations related to the mechanisms of knowledge transfer, it is worth mentioning that the model described below is based on the following basic assumptions.

Firstly, there is an important difference between information and knowledge³. Put simply, one could say that knowledge is something that is personal and individual, and that comes about as a result of the intellectual processing of information. To be able to utilise information we must understand it. Unless we already have the necessary background knowledge or experience to do so we need to *learn* how to make sense of the information.

Secondly, we recognize the notion of explicit (“know-what”) versus tacit knowledge (“know-how”). Tacit knowledge is often based on practical experience and is generally difficult to codify and disseminate as it is imbedded in individuals or groups of individuals. In interactive knowledge transfer (henceforth abbreviated IAKT) projects the focus lies on extracting the tacit and imbedded knowledge of experienced individuals through facilitating structured dialogue between peers.

Individual learning and customisation

To be able to deploy good practice and innovative solutions from one locality to another, the primary focus must be on the learning journey of the individual, and the context and preconditions of the organisation at the receiving end of the knowledge transfer activity (i.e. the process must be designed to match their knowledge needs).

When talking about knowledge transfer between organisations, it is important to remember that organisations are made up of individuals, and it is only individuals that can intellectually process new information (learning) that eventually can lead to action and problem solving. Without proper attention and focus on the needs and drivers of the individuals (e.g. current level of knowledge or challenges in regard to the issue in focus) involved in a knowledge transfer process, it is highly unlikely that these persons will be able to operationalize the new knowledge into their own organization and context.

Another important aspect is that interactive knowledge transfer is not about copying what others have achieved. Rather, it is about identifying and extracting only the relevant knowledge from those one wants to learn from. To make a pre-existing solution or approach applied in one locality work in a new context it often needs to be customized. This customization process is at the core of the IAKT approach.

Structure

To create the necessary learning environment for individuals taking part in knowledge transfer activities it is of critical importance to employ a systematic and highly structured process. Generally speaking, to work efficiently, regardless of topic and context, tasks should be approached in a systematic and structured manner. This is especially true when it comes to new areas, or when a new approach is to be employed, in this case when tackling new knowledge to be customized and applied in practice in a new context. If one adopts a systematic approach it is easier to make sure that one does not fall into old habits, or take short-cuts that will negatively affect the end result.

To ensure a systematic approach and traceability (e.g. “how did we come to this conclusion?”), as well as to enable the further dissemination of knowledge beyond the group of individuals taking part in the knowledge transfer exercise, it is also imperative that every step is carefully documented.

Success factors

To fulfil the potential of the IAKT approach, the following success factors should be in place:

- The topic of the project is a priority for the participants (e.g. a problem needs to be solved).
- The participants have a clear goal in regard to the project result (e.g. a solution to the problem will be found).

1. Benchmarking is a comparative method (there are many different varieties) whereby organizations evaluate aspects of their work in relation to other “best practice” organizations that are active in the same field to identify development potential and to improve performance.

2. Action learning is an approach (there are many different varieties) to find solutions to real problems, which includes taking action and also reflection on the results. For further description and references, see e.g. https://en.wikipedia.org/wiki/Action_learning#References.

3. For references related to the “DIKW pyramid” which structurally and functionally differentiates between data, information, knowledge and wisdom, see for example: https://en.wikipedia.org/wiki/DIKW_pyramid.

- The participants are highly committed to the project and allow sufficient time for analysis, dialogue, reflection, and implementation of results.
- The project has a sufficiently narrow focus to allow for deep-divide analysis and to enable real implementation of results post-project.
- The right people are involved (e.g. those who understand the topic well and have the mandate or responsibility to act in regard to the issue in focus).
- The participants have an open mandate and acceptance from the organization to enable implementation post-project.
- Participants are open to learn from others and are also willing to share their knowledge with others.
- The project is logically designed and follows a well-thought-out structure taking the topic, the participating individuals' and their respective organizations' contexts into account.
- Detailed documentation throughout the project.

CASE STUDY: INTERACTIVE KNOWLEDGE TRANSFER PROJECT ON SUSTAINABLE MUNICIPAL TRANSPORT IN THE STOCKHOLM REGION

Amongst the 26 municipalities in the Stockholm County there are a multitude of examples of good practice in areas related to energy efficiency and CO₂ emission reduction. Many innovative energy efficiency and sustainability solutions have the potential to be scaled up and applied more widely. A general problem however, has been that, despite the County Administrative Board's numerous network initiatives⁴ for the municipalities in the region, the level of knowledge transfer leading to real implementation has generally been quite low. In 2015 the County Administrative Board of Stockholm⁵ therefore took the initiative to a pilot project to test and customize the IAKT method developed by LightSwitch to suit the knowledge needs of these municipalities.

Emission reduction strategies of Botkyrka municipality

In this pilot project, Botkyrka municipality was chosen as an outstanding example of successful long-term work to cut emissions from the organization's transport activities. Their achievements are well known in the region and nationally, and several other municipalities had expressed interest in learning more about their strategies and experiences.

Botkyrka's transport strategy is based on a very ambitious climate strategy adopted in 2009, which states that the local authority as an organization should be fossil fuel free by 2015 (this goal has been achieved) and climate neutral by 2020.⁶

The climate strategy was developed based on the fact that in 2009 about 75 % of the CO₂ emissions from the municipal organization originated from transportation of goods and people. Hence, the strategy targeted these transport-related emissions specifically, and laid the foundations for tackling these in a variety of ways, including:

- innovative procurement strategies for low emission vehicles and fuels (including active dialogue and cooperation with transport sector stakeholders, e.g. in regard to the establishment of a biogas facility and filling station)
- setting low emission procurement requirements also on suppliers' transports of products and services to the municipality (e.g. printing products)
- changing the ownership structure of vehicles to a common logistics unit in the municipality from where vehicles were leased to the various municipal functions (e.g. the departments for schools and elderly care)
- introduction, and thorough follow up of municipal travel policies to change travel behaviour, lower travel demand and solutions to make travel more efficient
- extensive collaboration with 8 neighbouring municipalities⁷ to coordinate logistical structures for transport of large-scale supplies (e.g. food to all municipal functions) with the aim of cutting both CO₂ emissions and costs.

Botkyrka has also been very thorough in gathering annual statistical data on travel patterns and CO₂ emissions and they have used this data to continuously develop their work for lowering emissions and to ensure they are on track to deliver on the climate strategy with targets for 2015 and 2020 respectively. They have also been active in several research and innovation projects in collaboration with universities in the region, in order to develop and test new solutions for more energy efficient transport.

Knowledge transfer from Botkyrka to Haninge and Järfälla

Two other municipalities, Haninge⁸ and Järfälla⁹ who were also working actively on emission reduction strategies in regard to municipal transport, were particularly interested in learning about Botkyrka's work. The IAKT project was hence designed to transfer knowledge from Botkyrka to the municipalities of Haninge and Järfälla. To provide a broader perspective on the topic, a researcher on sustainable transport from the Royal Institute of Technology (KTH) in Stockholm was also involved as a bouncing board in the discussions. The County Administrative Board of Stockholm was the project owner, whilst the knowledge transfer consultancy LightSwitch was responsible for project design, project management, and process facilitation.

The project consisted of four workshops and three work assignments for Haninge and Järfälla whereas Botkyrka participat-

4. Primarily facilitating meetings between municipal climate/energy strategists, including sometimes arranging presentations about examples of good practice in the County.

5. The County Administrative Board is a government authority responsible for ensuring that decisions from parliament and the Government are implemented in the county. It coordinates government activities (e.g. regional spatial planning) and provides support to municipalities in regard to climate and energy issues. For more information see www.lansstyrelsen.se/stockholm/En/Pages/default.aspx.

6. Information about Botkyrka's climate and energy work can be found here (in Swedish only): www.botkyrka.se/Klimatochmiljo/hallbarutveckling/botkyrkakommunklimatarbete.

7. The collaboration is called "Samordnad varudistribution" (coordinated distribution of goods). For more information (in Swedish only), see <http://sodertornskommunerna.se/projekt/samordnad-varudistribution>.

8. Information about Haninge's climate and energy work can be found here (in Swedish only): haninge.se/bygga-bo-och-miljo/klimat-miljo-och-hallbarhet/.

9. Information about Järfälla's climate and energy work can be found here (in Swedish only): www.jarfalla.se/bygga-bo--miljo/miljoarbete.html.

Table 1. Project overview.

Process step	Activity	Involved	Content	Result
(H = Haninge municipality, J = Järfälla municipality, B = Botkyrka municipality, R = researcher)				
“Prepare”	Briefing participants	H, J, B	<ul style="list-style-type: none"> – H, J received written documentation about the achievements of B – Explaining the IAKT process 	– All participants understand and commit to the IAKT process
“Focus”	Workshop 1 (full day)	H, J	<ul style="list-style-type: none"> – Exploring the topic of sustainable municipal transport (brainstorm and structuring exercise) – Prioritizing sub-topics (vehicles/fuels, procurement, policies, transport patterns, and behaviour) – Deciding on precise focus for the project (i.e. the knowledge needs of H and J) 	<ul style="list-style-type: none"> – H, J identified and prioritized which areas of B’s work they needed to learn about – H, J set individual goals for the IAKT project
“Reflect”	Work assignment A	H, J	<ul style="list-style-type: none"> – Self-diagnosis: H and J fill out detailed questionnaire (designed based on the outcomes of Workshop 1) about their current situation, including statistics on vehicles, fuels, procurement practices, etc – H and J prepare questions to B (ahead of Workshop 2) 	<ul style="list-style-type: none"> – Analysis and documentation of current situation in H and J – Questions to B (informed by self-diagnosis)
“Talk”	Workshop 2 (full day)	H, J, B	H and J meets B for a full day of: <ul style="list-style-type: none"> – Question & answers – Reflection on answers – Documentation – Joint discussion 	– H and J gain knowledge about B’s work that is relevant to their own respective situations/contexts (as identified in self-diagnosis)
“Learn”	Work assignment B	H, J	<ul style="list-style-type: none"> – Comparative analysis (detailed questionnaire based on result of the project steps thus far) using documentation from Work assignment 1 (self-diagnosis) and from Workshop 2 (answers from B.) – “What are the differences/similarities between the work/approach of B. and H/J?”, “What conclusions can we draw from this?”, “How could we develop/improve the situation?” – Follow-up questions to B 	– H and J develop an understanding of how the experience of B could be applied in their own respective situations/contexts
“Learn”	Workshop 3 (full day)	H, J, B	<ul style="list-style-type: none"> – H and J present their analyses (Work assignment B) to B and each other – Follow-up questions and discussions with B – Preparation for developing customised action plans 	H and J deepens understanding of B’s work/experience
“Act”	Work assignment C	H, J	– H and J prepare individual action plans (for the coming 18 months) and liaise with relevant colleagues in their organizations	Draft action plans for H and J respectively
“Act”	Workshop 4 (half day)	H, J, B, R	<ul style="list-style-type: none"> – H and J present their respective action plans – H and J receive feedback on action plans from B and R 	Improved action plans
“Evaluate”	<ul style="list-style-type: none"> – Workshop 4 – Questionnaire – Interviews 	H, J, B	All participants were asked questions about their experience of the project, both in the concluding workshop and a few weeks after project completion	See lessons learned

ed in three of the workshops. Participants were representatives from the transport departments as well as the energy/climate strategists from these municipalities. The County Administrative Board also participated in the workshops as observers.

In the workshops a variety of facilitation techniques and exercises were employed to guide and support the participants through the logical steps of the IAKT process.

Find a schematic overview of the project in Table 1¹⁰, which was carried out during the period April-June 2015.

10. “Focus” content: The prioritization was made based on the participants’ (from Järfälla and Haninge) competence and experience as well as their perceived development needs.

LESSONS LEARNED

The IAKT project described above resulted in concrete and customised action plans (for the ensuing 18 months) for the two learner municipalities, Haninge and Järfälla. These plans were designed to fit into the context of pre-existing strategies and plans of the two respective organizations.

The objective and level of ambition for the project was to test whether IAKT could significantly improve the conditions for knowledge transfer about an example of good practice between municipalities, compared to the “business as usual” approach (network meetings lacking the step-by-step structure and interactive components of IAKT). At the same time, the project was *not* designed to meet all development needs of the two receiver

organizations in regard to the multi-faceted theme of sustainable municipal transport (that would require significantly more time, personnel and economic resources).

The participant evaluations were positive, both from the perspectives of the knowledge “senders” and “receivers”. Botkyrka’s representative (“knowledge sender”) stated that (translation): “This is a very good and efficient way of sharing knowledge. Instead of wasting lots of time on ad hoc phone calls and e-mail, I much prefer to set aside time to discuss these issues more in-depth with peers from other municipalities that I know are interested in our approach. In this way one can take the time to handle more complex issues. This has also developed the relationship between our municipalities and has led to follow-up dialogue on these issues, which is very positive”.

A representative from Haninge (“knowledge receiver”) said that (translation): “This project exceeded our expectations. It was time consuming but gave good results that we can use. An added benefit was that the relationship between our departments within the municipality was developed.”

Overall, the project was deemed by both organizers and participants to successfully have met the stated objectives. There were however a few lessons learned to note for similar future projects:

- *Time and timing.* To reach its full potential, IAKT projects like this one demands sufficient time and commitment from the participants. Therefore it is important both that municipal representatives are invited to participate many months in advance, and that the project does not coincide with busy periods in the regular annual working cycle of the municipalities (i.e. during major planning or reporting phases).
- *Depth vs. breadth.* At a general level there is a trade-off between focusing on a holistic set of solutions or going into depth on a more narrow topic. In this project the participants themselves chose to learn about several different components of Botkyrka’s work to lower municipal transport emissions. They felt that it was more important for them to learn about the combination of different aspects than getting all the details about one sub-topic. Compared to the County Administrative Board’s traditional approach to foster and promote the exchange of knowledge and good practice between municipalities (i.e. network seminars), the described IAKT project went much more into depth and allowed the participants to learn and develop customised action plans suited to their own contexts. However, given time and financial constraints for the project, some participants expressed some frustration that they would have wanted to go even further into detail regarding certain sub-topics. In the future, this could be handled e.g. by arranging follow-up projects on prioritised topics or handling different themes in parallel sub-projects, involving a larger number of people.
- *Scalability.* Related to both above points about time and depth, it should be pointed out that knowledge transfer projects like this can be scaled up to either go deeper into the subject matter and/or handle a wider set of sub-topics. This depends entirely on the preconditions in terms of the par-

ticipants’ level of ambition, funding, time frame, etc. A more ambitious project would likely involve more workshops over a longer period of time. The number of workshops and intermediate work assignments chosen in this project was deemed as realistic in terms of the participants’ capacity (time and personnel) and was also conditioned by the County Administrative Board’s budget for this pilot project.

- *The academic contribution.* Due to practical circumstances the transport researcher from KTH could only participate in the last of the four workshops. We believe there may be great untapped potential for similar future projects to involve an expert more (i.e. in more workshops), to serve as an independent bouncing board in the dialogue between peers from different municipalities. Independent experts may provide another perspective and feed in knowledge about state-of-the-art on the topic in focus. This would also mitigate the risk that a particular good practice example may be considered by some IAKT project participants as the one and only “blue print solution” for the problem or development area in question. We believe that having an academic partner in IAKT projects could stimulate further innovation in the knowledge receiving organizations. Municipalities could largely benefit from such feedback on their action plans. Conversely, it should be noted that it is also important for the academic side to interact with stakeholders at municipal level to gain a better understanding of needs and conditions “on the ground”. I.e. we believe that both municipal and academic stakeholders can mutually benefit from the in-depth dialogue that characterises the IAKT approach.

CONCLUSION

Given the urgency of the climate change threat, all societal actors must make the most of scarce personnel and financial resources, particularly at municipal level, to promote sustainability in general and to use energy more efficiently. The aim of the IAKT approach is to enable pragmatic partnerships between organizations for the efficient transfer of knowledge and experience, focused on well-defined development areas or concrete problem solution. IAKT projects are needs-based and designed with the perspective of the knowledge “receiver” in focus.

The IAKT process is highly structured and systematically promotes pragmatic capacity building (learning) amongst project participants. It takes organizational context into account and supports customization of knowledge, and experience from one locality to another. The individualised action plans that result from IAKT projects are the result of the transfer of pre-existing knowledge from a peer and innovation (customisation) by project participants for the implementation in their own respective contexts.

This paper has described the IAKT approach by providing an example of a project involving three municipalities in the Stockholm region. This generic knowledge transfer method can be applied to suit many different situations, subject areas, and constellations of stakeholders at various societal levels from the local to the international level.