The meanings of local practices for energy efficiency in companies

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Starting point

- Energy efficiency gap – performance gap
- A large number of improvement measures are not implemented, even though the measures are seemingly cost-effective – how can we understand that?

My conclusions will be

- That we need to consider that decisions are made in local practices and in situated actions….

Energy use

- Understanding energy consumption is about understanding everyday activities and mundane decision-making
- People are not seeking energy services
- people do certain things when they are home or at work
- The things people do with and in their home/work place often use energy

Demand of energy efficient technology

- Energy is used in a context
- Embedded in complex mundane decision-making that relates to demand, price, values, habits, culture…
- This is part of the explanation of why energy efficient technology isn’t used
- Technology does not exist in a vacuum, independent of a social context

Bottom-up perspective

- Questionnaire, interviews, time-diaries and participatory observations
- Homes and workplaces

Decision-making

- One way to understand decision-making in organizations is to have a situated action perspective
- When studying decision-making in this perspective, all activities are seen as situated and impossible to predict
- decisions on energy efficiency are made locally, in the practices where people meet, act and perform

Thollander and Palm , Industrial Energy Management Decision Making for Improved Energy Efficiency—Strategic System Perspectives and Situated Action in Combination *Energies* **2015**, *8*, pp 5694-5703

Decision-making in meetings

- Top-down perspective - the outcome will depend on existing policies, already decided goals and established procedure
- Situated action perspective - the outcome of a meeting is a much more open issue
- Rather than depending on a goal in a document or procedures in a standard it will be dependent on which actors participate in the meeting
- The actors attending a meeting will not have memorized all policies, standards and procedures that exist in the organization
- They base input and contribution to the discussion on their culturally embedded understanding of how to act and what decisions seem to be suitable in different settings

Situated action

- the outcome of an energy efficiency decision will be dependent on which actors participate on that occasion
- If the meeting will be repeated but with totally new actors, then the discussions at the meeting will differ and thus also the outcome
- Financial managers for example will discuss energy efficiency from their perspective which is different from say an HR manager or mechanical engineer

Suchman, L. *Human-Machine Reconfigurations. Plans and Situated Actions*; Cambridge University Press: Cambridge, UK, 2007

Situated action

- The decisions made during a meeting are also a result of group dynamics and the participating actors' mutual relationships
- The participants in meetings take different roles, and the roles actors have in one group will differ from their roles in another group
- Actors take different roles, and in this sense roles are situated
- For that reason it is not unusual or even strange that one actor can have one opinion at one meeting and then change opinion at another meeting with another constellation of actors

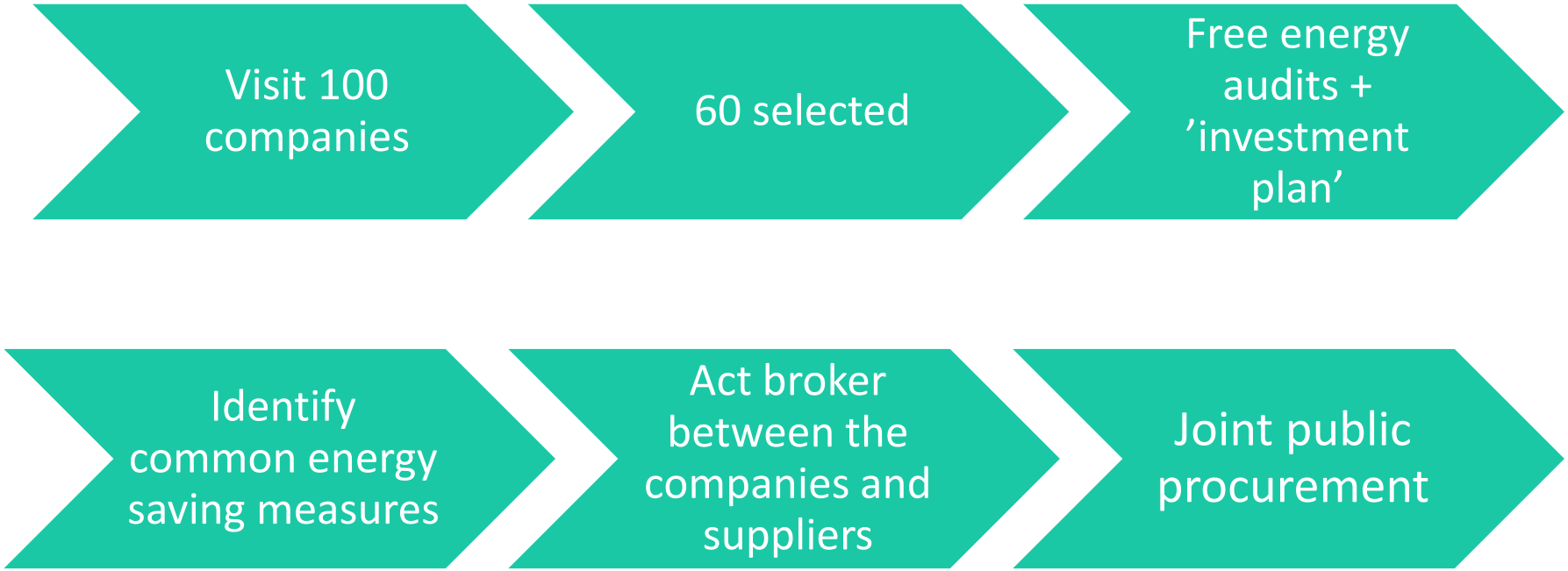
How to influence energy use in companies?

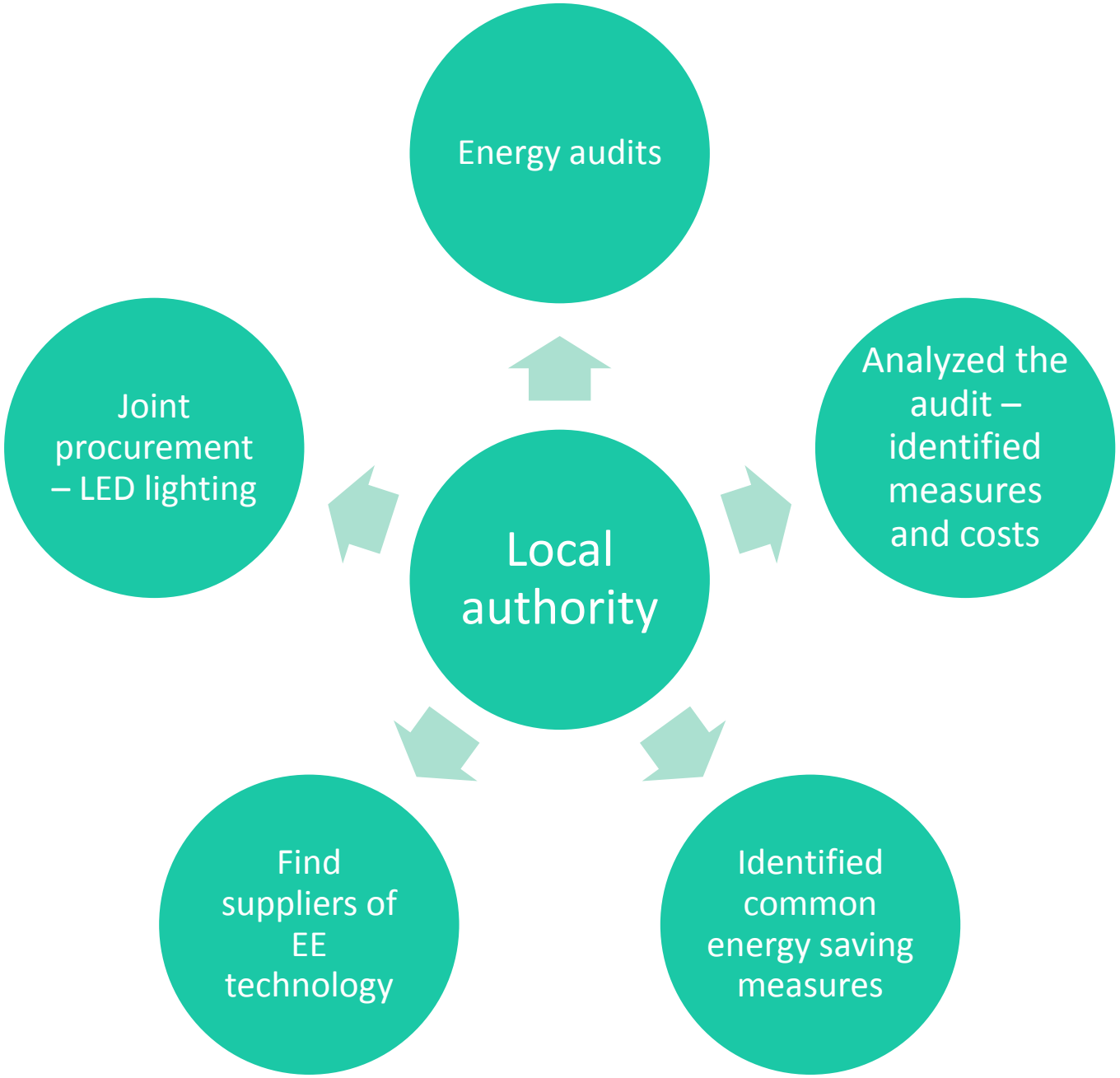
- Two existing role models for how Local authorities in Sweden can work with energy efficiency in SMEs
- Two network models, both presented as “Good examples” of the Swedish Energy Agency

Tranås Municipality : Network governed by the Local authority

- Project ”Energy driven business” initiated and run by the Local authority in Tranås in 2011
- Funded by the Municipal Council, County administrative board, The regional county and the Swedish Energy Agency
- Targeted companies with 5 to 250 000 employees. 200 possible companies
- 100 companies were selected – 60 were finally included

Tranås – the process




Energy audits
Analyzed the audit – identified measures and costs
Identified common energy saving measures
Find suppliers of EE technology
Joint procurement – LED lighting
Local authority

Results in the companies

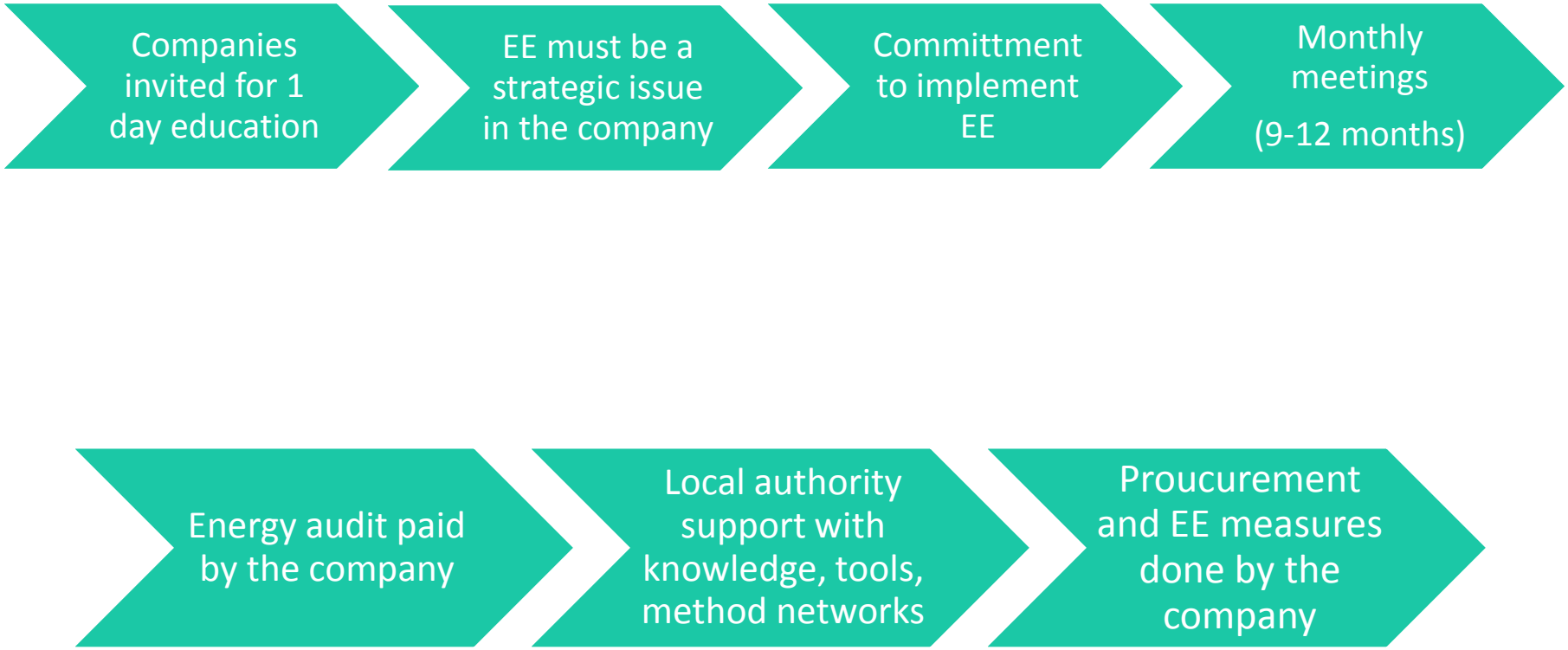
Interviewed 27 of the 60 companies

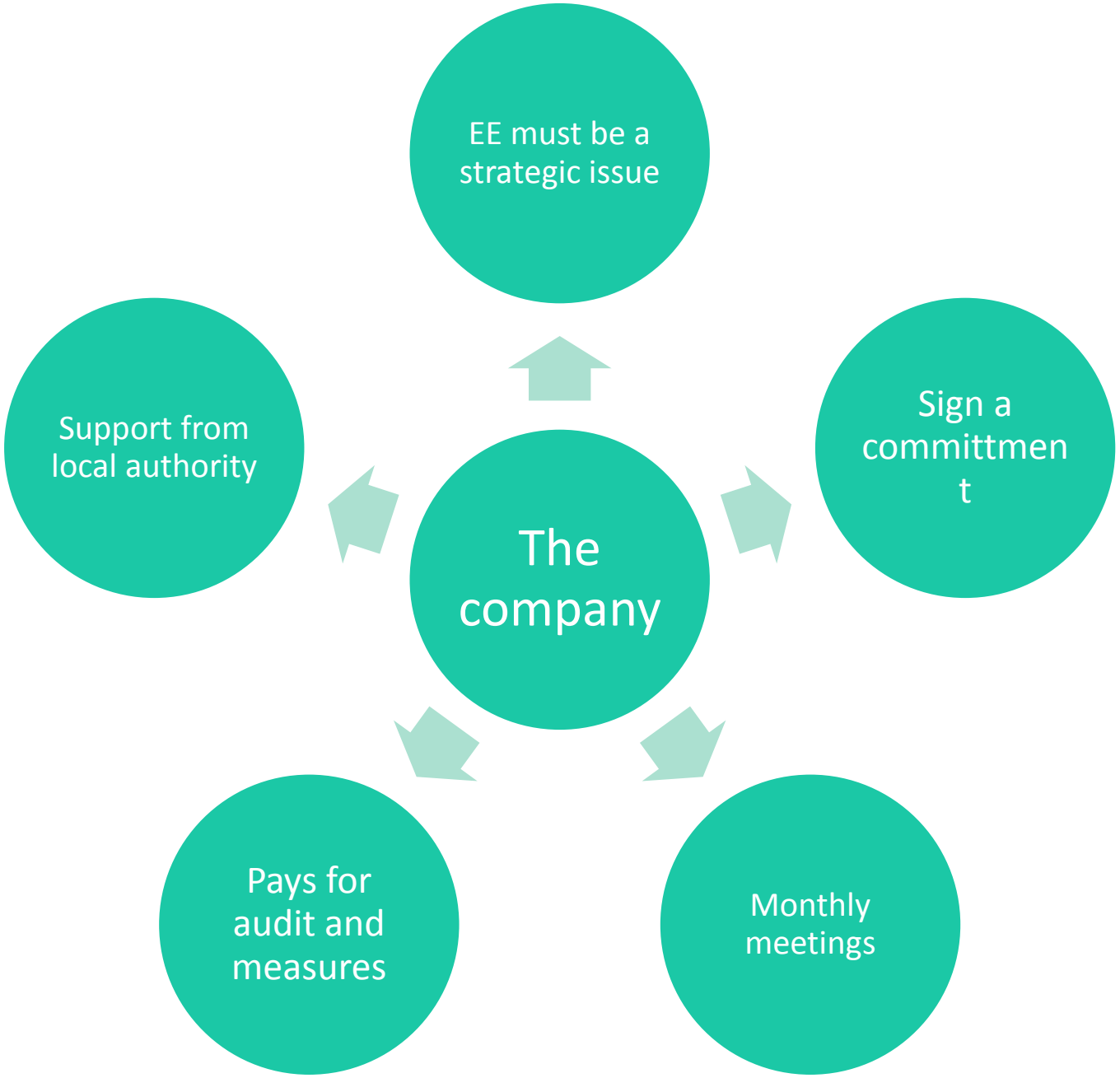
- 9 companies had done nothing
- 1 didn’t know
- 17 had implemented minor measures like changed lighting, adjusted compressor/pump/ventilation, changed windows
- 3 of the companies participated in the joint procurement
- Lack of knowledge was still a major barrier for EE
- No learning within the company

Eskilstuna Municipality: Network support

- Since 2009 worked with EE in industry
- 27 companies have participated
- Fewer companies but more in-depth
- Paid from the local authorities' existing budget and by the involved companies

Eskilstuna – the process




EE must be a strategic issue
Sign a committmen t
Monthly meetings
Pays for audit and measures
Support from local authority
The company

Results

Follow up of 22 companies

- All companies have done some EE measures
- Also here smaller investments dominates, but all companies have implemented more measures
- The companies have started internal processes

TRANÅS:

- It takes no resources such as money, time, competence from the involved company
- Local authority is crucial for holding together and advancing the project
- Companies' goals and demands are ignored or not seen relevant
- Intercompany cooperation is absent
- Local Authority need to possess competence in EE
- No learning effect in the companies

ESKILSTUNA

- The companies need to put in resources such as money, time and competence
- The companies need to be committed and have a EE strategy
- Local authority support the companies based on their problem formulations
- Intercompany cooperation is vital and meetings every month
- The learning is in the companies

TRANÅS

- fits if the wish is to implement EE measurements in companies that have no possibilities/resources/interest in energy
- Is a one-time effort
- EE is not related to the social context of energy consumption
- Cannot expect any major improvements in EE

Eskilstuna

- wish to establish EE as a strategic issue in companies
- is more resource demanded for the company
- EE is integrated into the social context and engaged committment is expected
- Can expect long-lasting improvements in EE

How are the two role models?

- According to the Swedish Energy Agencys website the two models attract different kind of companies:
- Tranås is for companies with no resources
- Eskilstuna is more demanding already from the beginning and requires already committed companies
- But in the Tranås model nothing happens within the companies – there are no situated action

The committed company

- Even if the company is committed it can be difficult to work with EE

Example from one case study

- A municipal housing company in Sweden
- Renovation of residential, rented apartment buildings from the post-war period (50s, 60s)
- Overall goals: Explore how to include energy-efficiency measures in an effective way

Palm, J & Reindl, K (2016) Understanding energy efficiency in Swedish residential building renovation: A practice theory approach, *Energy Research & Social Science*, Volume 11, January 2016, pp 247-255

- The housing company has an overarching goal to reduce energy consumption in its housing stock with 25 % to 2025

- Following 3 renovation processes that had improved energy efficiency as an explicit goal

- **Planning and design phase**
  - measures to be implemented determined and decided upon
  - interest in *prioritizing process of certain measures* – why a tender document was design the as it was

- How and why some energy-efficiency measures are promoted and brought into the planning and design phase of a renovation project and others are rejected.

Methods

- Case study – 3 renovation processes
  - 32 Interviews with all involved actors
  - 25 participant observation of planning and design meetings and meetings with tenants
  - Documents (provided by/about the housing company)
- Main field work period: December 2012 – October 2015

The three renovation projects

#RP1

#RP2

#RP3

	Project 1	Project 2	Project 3
Built	1961	early 1950s	1961 (partly renovated in 1985)
Number of apartments	12	33	32
Floors	4	3	4
Energy consumption of the buildings	153 kWh m^{-2} y^{-1}	141 kWh m^{-2} y^{-1}	154 kWh m^{-2} y^{-1}
Problems in the buildings	Poor external façade, poor roof construction, poor performance of windows, several cases of water damage in bathrooms, and problems with balconies	Poor piping, inadequate ventilation, outdated wiring, inadequate fire insulation, and limited accessibility	Indoor environmental problems, low and varying indoor temperature, stuffy air, and odours

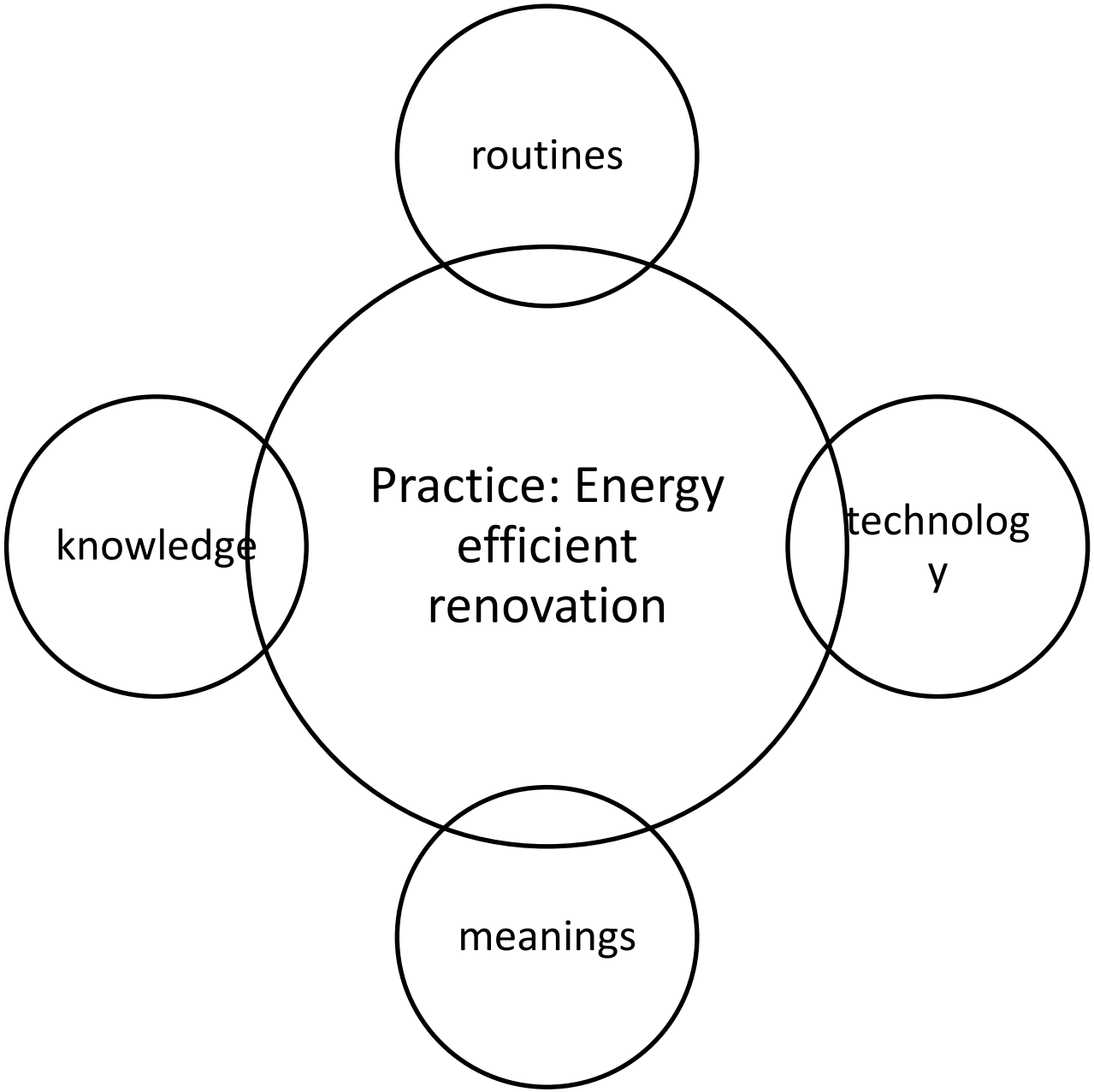
Planning and design meetings

- Practical work done between meetings – results presented at meetings – decisions on what to do next
- Meetings every second to third week
- Usually a 4 months process

Our purpose has changed

- Our aim changed during the process and it became to understand why energy was not on the agenda and discussed more

RP 1	RP 2	RP 3
Internally involved people		
Project leader A	Project leader B	Project leader A and Project leader C
Energy manager	Energy manager	
HVAC manager	HVAC manager	
Electricity controller	Electricity controller	
Trainee A	Trainee A	Trainee B
Rent negotiator A	Rent negotiator A	
Refurbishment coordinator A	Refurbishment coordinator A	
area managers A	area managers B	area managers A
RP 1	RP 2	RP 3
Externally involved consultants		
Electricity controller A	Electricity controller A	Electricity controller A
HVAC-consultant A	HVAC-consultant B	HVAC -consultant A
Fire consultant A	Fire consultant B	Fire consultant A
Architect A, B, C, D	Architect E	Architect C
Energy audit consultant	Building engineer	
	Construction consultant	

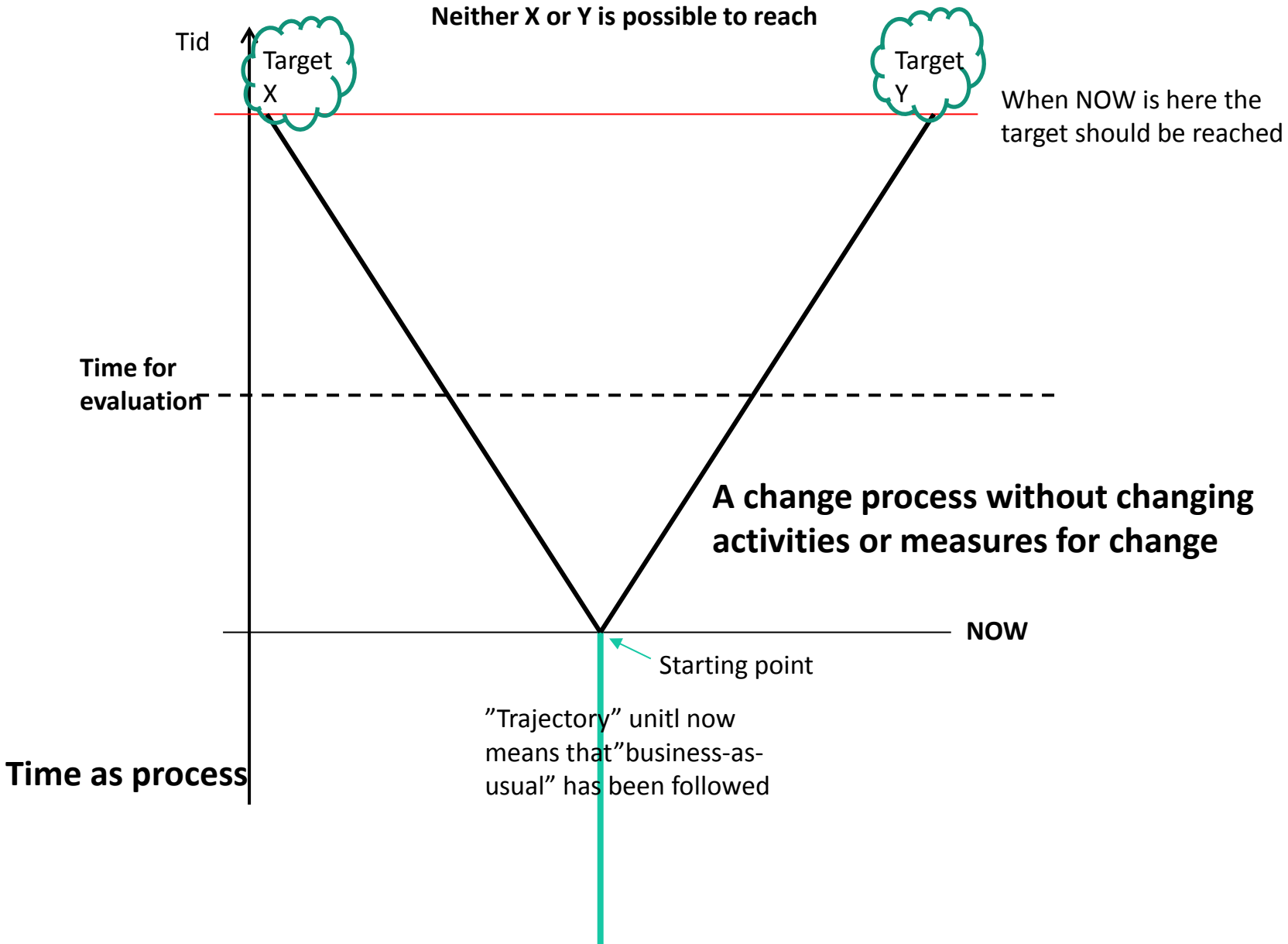

routines
knowledge
Practice: Energy efficient renovation
technolog y
meanings

Routines

- The meetings were structured from a pre-defined agenda – a template for meetings
- Administration, documents, architecht, HVAC, electricity/phone/IT, other installations….
- The questions were similar in all three renovation processes
- Each involved professional/consultant talked with the project leader about his/hers questions
- All suggested measures were the usual ones
- No time was set a side for brain storming or surprises

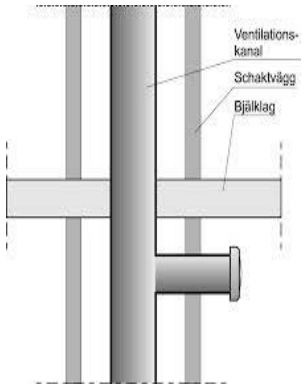
Routines

- Discussions of electricity were quite practical, concerning, for example, where to locate outlets or whether cables should be exposed
- When HVAC and electricity were discussed, most of the time was spent telling anecdotes
- many references were made to earlier projects, especially if other buildings had recently been renovated in the same area
- By the time those issues had been dealt with, time had started to run out
- Other issues (e.g., tenants' views, insulation, and solar panels) repeatedly had to be treated very briefly, usually leading to the conclusion to return to these issues at the next meeting.
- This procedure was repeated at every meeting, however, so little time was ultimately spent on these issues.


Neither X or Y is possible to reach
Tid
Target X
Target Y
When NOW is here the target should be reached
Time for evaluation
A change process without changing activities or measures for change
NOW
Starting point
”Trajectory” unitl now means that”business-as-usual” has been followed
Time as process

Technology

- HVAC shaft positions were a central concern and all installations needed to be coordinated around them
- The goal was to make that happen, not to discuss or come up with new ideas for reducing energy consumption

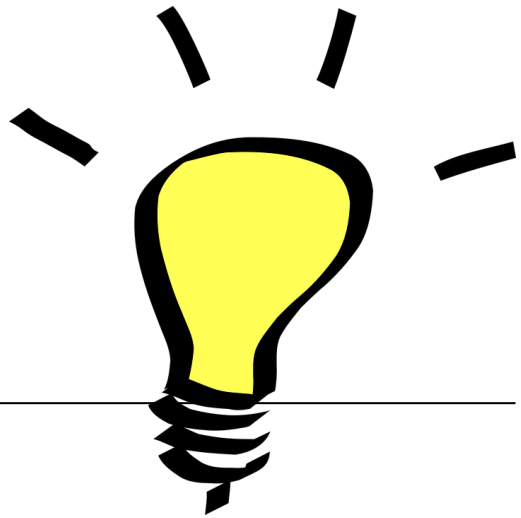


Meaning of EE

- What does EE renovations mean for the professionals?
- The housing company's 25-25 goal not at all present
- But everyone meant that you should save as much as possible in all projects
- The consultants do what they are paid for – no more no less

Meaning

- Even in these projects, which specifically prioritized energy reduction, many electricity-saving measures had a difficult time gaining access
- Most focus on heating. Electricity result in too small saving; “even if you save 50 % it is like a drop in the ocean” (HVAC consultant)



Knowledge – formal and tacit

- The external consultants have specific professional knowledge as well as favourite suggested measures that they always recommend
- These energy-efficiency measures are often installed without any further investigation to determine what would actually be the most useful in specific buildings – as though all the actors just automatically apply rules of thumb

Knowledge

- The reason given as to why certain measures are used is that people “know they are working”, as most of the involved consultants have used these measures for many years
- “I’m an old builder” – this statement was enough to legitimate more or less anything

Knowledge

- regarded as valuable was that project actors could demonstrate that they had implemented measures in earlier projects
- and that the measures were believed to function well
- There were at the same time a lack of evaluations of earlier projects
- relied on the general impressions of the participating professionals

Conclusions

- Situated action can partly explain the lack of new EE measures, but structures as the pre-defined agenda is as important
- The meeting agenda encourage contributions from individual rather than to encourage the creation of a project group
- Nothing in the meeting agena encourage measures that go beyond the usual
- Energy calculation surprisingly absent
- practical knowhow and experience of trying out a product or solution in earlier renovation projects, more important than calculations and evaluations
- General measurements are discussed more than measures specific for a building
- The energy target to reduce 25 % to 2025 is not known or discussed
- The meeting repeated itself - for better or worse

Conclusions on energy efficiency

- Pressure from policy makers, the markets, internal processes for EE measures
- This pressure needs to be captured in local processes
- It is in situated actions measures to change behavior and activities will be initiated
- When measures and ideas not come through existing cultures and get access to local situated actions nothing will happens
- Then more interaction is needed with both employees and managers and processes need to be started
- an awareness of the importance of energy efficiency needs to be embedded in the culture

Thank you!

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