Seeing is believing – Visualizing helps realize the hidden benefits of energy efficiency

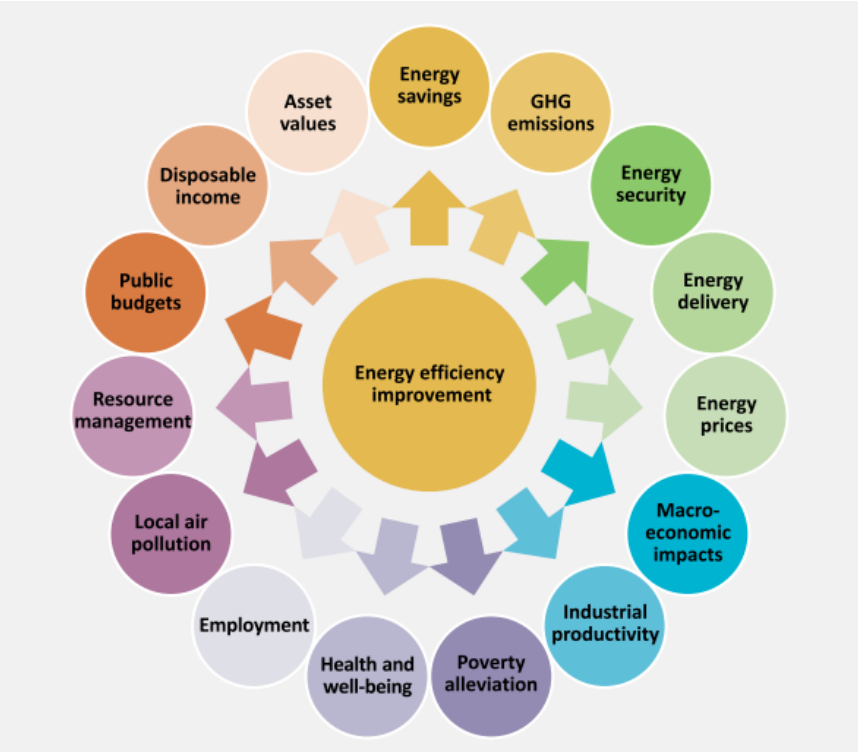
Agneta Persson, Anthesis Group,
Head of Energy Nordic Region

Kristina Landfors, WSP Sweden

Anthesis

May 31st, 2017

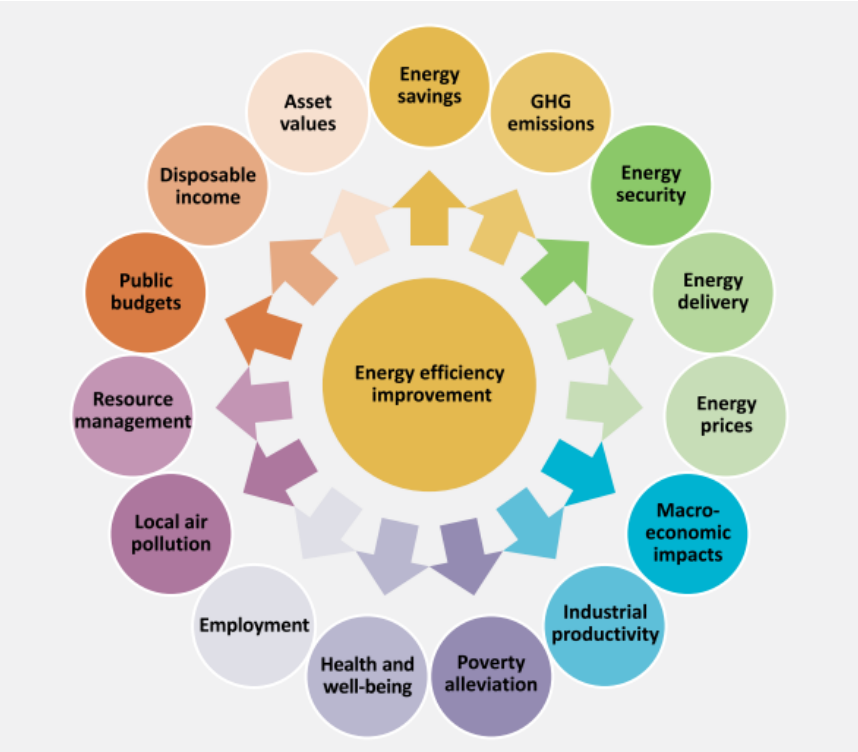
Visualizing the multiple benefits of energy efficiency



- ”Traditional” energy-efficiency assessments are myopic
- Side effects neglected - mainly due to lack of methods to calculate their economic value
- The Swedish Energy Agency initiated a visualization project to better understand the multiple benefits
- Based on IEA’s Capturing the multiple benefits of energy efficiency (2014)

Anthesis

Multiple benefits of energy efficiency - visualization model

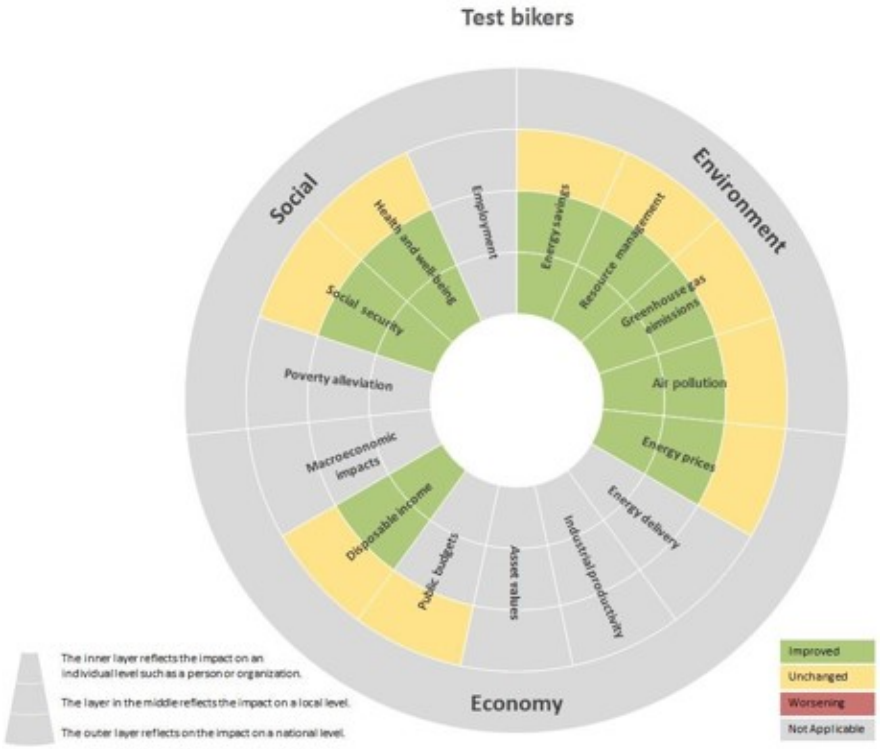


Several possible purposes:

- Early project planning
  - To assess what added values the project may contribute to
  - As a part of decision-making documents
- Comparison between different measures
- Follow-up and assess impact of implemented projects
- Knowledge and awareness raising
- …

Anthesis

Development in two phases – Phase 1 pilot project

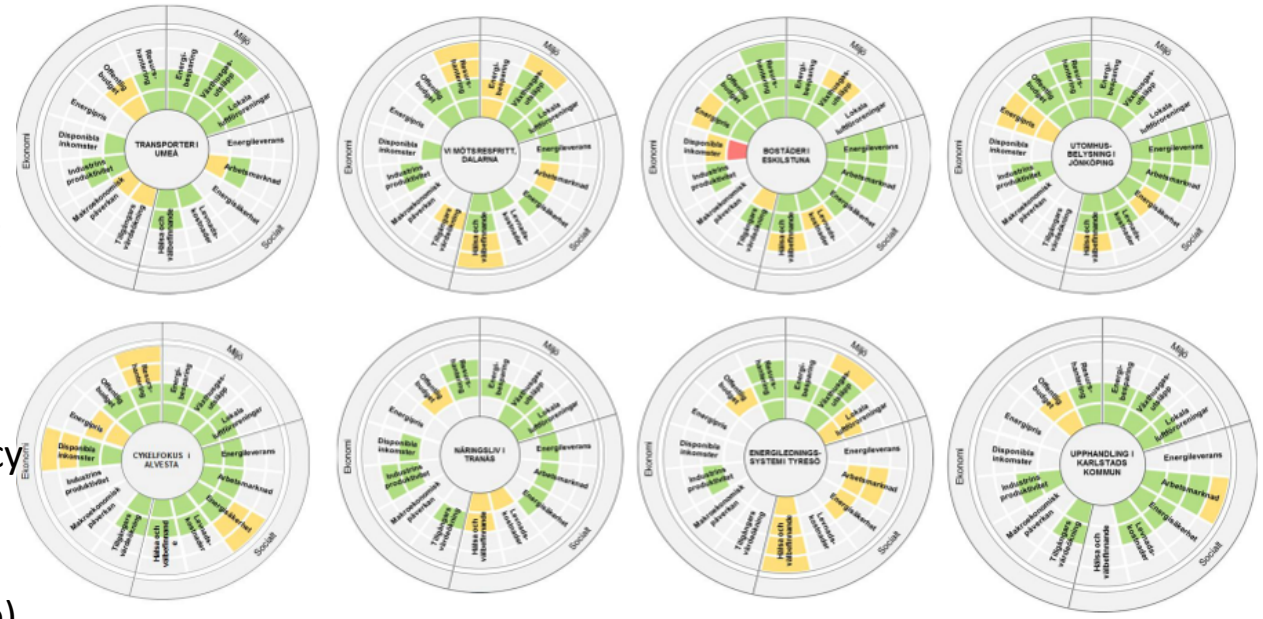


- Literature review
  - State of the art
  - What was published showing a Swedish context?
- Development of a visualization tool
  - Based on an existing tool called Orbis
  - Four layers and 15 categories
  - Set of questions developed
- Test of model - 8 projects
- Interviews with the 8 project managers
- Analysis and presentation of results

Anthesis

Pilot phase projects – a wide spread

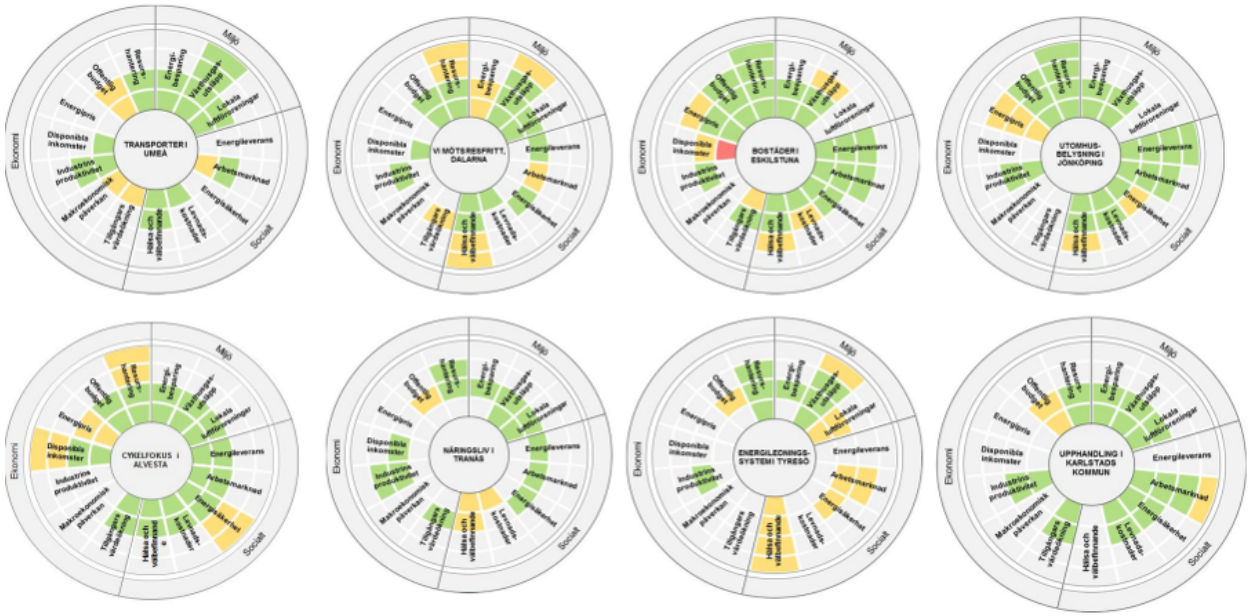
1. **Transport:** Green parking (Umeå)
2. **Transport:** Travel free meetings (Dalecarlia)
3. **Residential buildings:** In-deep renovation Lagersberg (Eskilstuna)
4. **Lighting:** Outdoor lighting Jönköping (Jönköping)
5. **Sustainable city planning:** Bicycle focus in Moheda (Alvesta)
6. **Industry:** Modell for energy efficiency in SMEs (Tranås)
7. **Systematic energy-efficiency work:** Energy management system (Tyresö)
8. **Procurement:** Routines and capacity building (Karlstad)



Anthesis

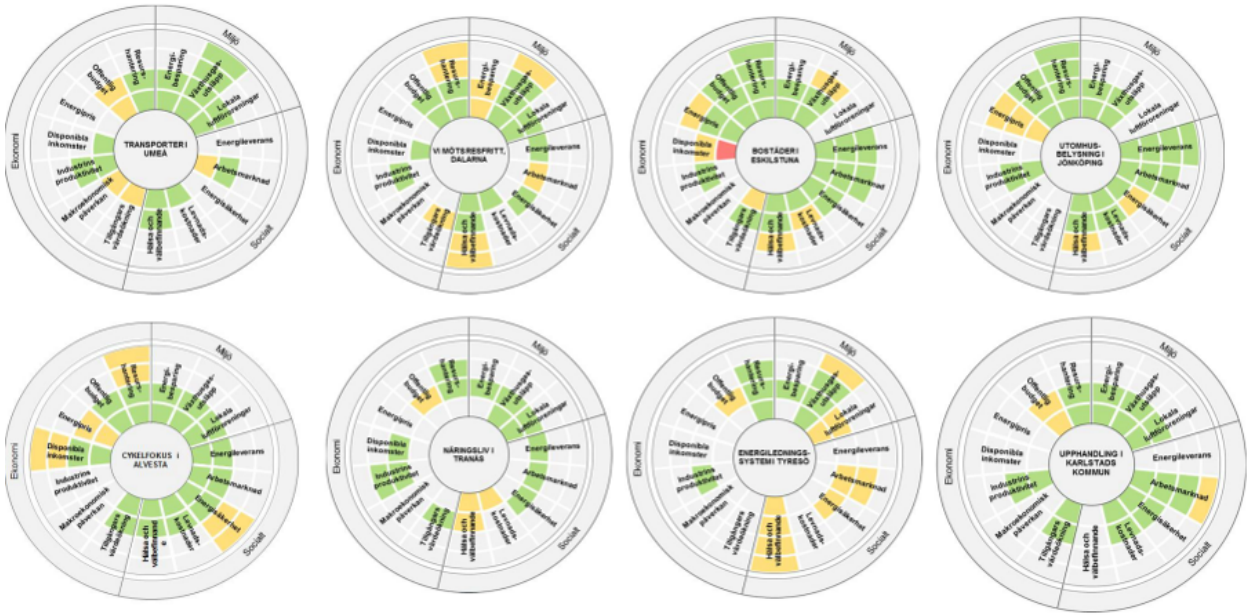
Pilot phase results

- Goal: Visualize additional benefits of energy-efficiency measures
- No attempt to calculate economic values in this phase
- Presentation of results: Visual images
- The model can be used for several different purposes
- Interviews indicate that the model is valuable and filled a need
- A large number of hidden benefits were found, at all levels, in all of the 8 projects
- Only a few of the categories were found irrelevant for the eight projects



Some unexpected effects…

- Increased property values in Moheda
- Travel-free meetings improved democratic processes through information accessibility, knowledge and participation
- Increased knowledge and awareness in local government and companies (several projects)
- Increased demand of PV on the Swedish market as a whole - inspired investments from other actors



Pilot project conclusions and recommendations

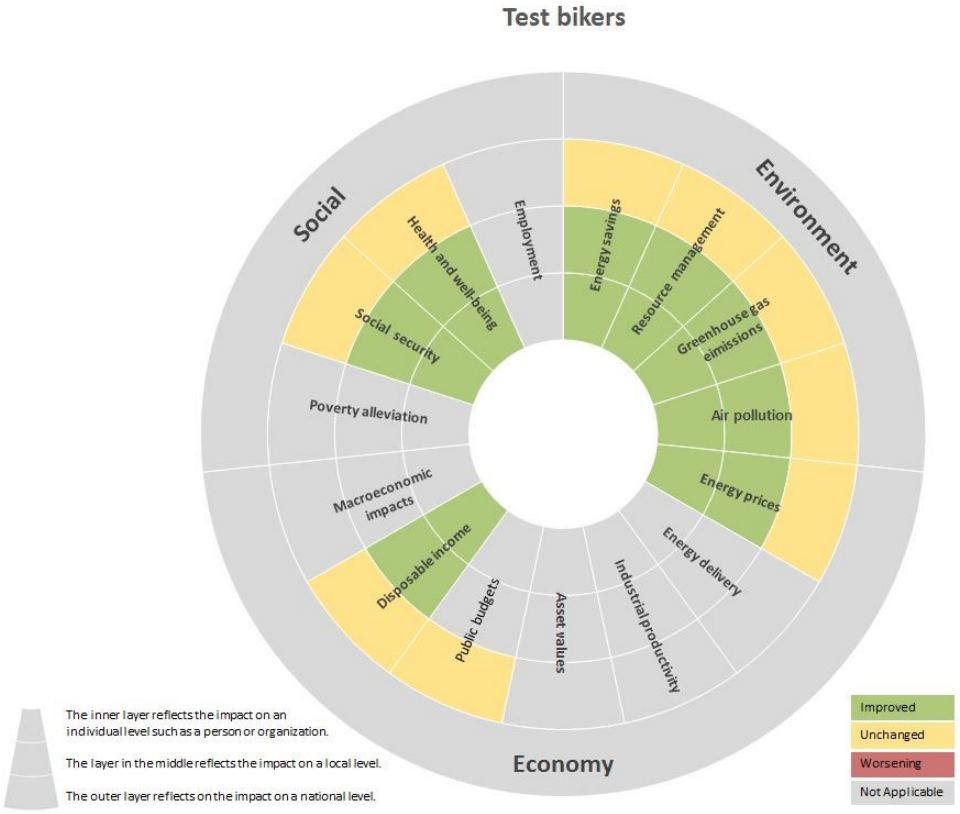
- The set of questions needs to be more stringent and adapted to the particular project
- A standardized way to assess the different aspects is needed
- The tool is complex – fewer levels may be better
  - E.g. for assessment of projects and evaluation of proposals 3 levels be better (individual, locally and nationally)
- Many of IEA's aspects are overlapping - clarification necessary to avoid double counting of effects
- Macro-economic effects ws difficult to identify
- In a Swedish context it may be suitable to combine Disposable income and Poverty alleviation
  - However, there is a value in keeping all of IEA's categories in order to create opportunity for international comparisons
- Energy supply and Security of supply could be merged to one added value
- Democracy, Increased knowledge and Enhanced networks have been identified as additional benefit categories in addition to the 15 IEA categories
- Working environment is included in IEA's Resource Management and Health and well-being - could be added as a benefit category of its own. Alternatively these categories need to be clarified.

Phase 2 of the visualization tool development

Goal: Create an easy to use tool

Target group: Local and regional government administrations

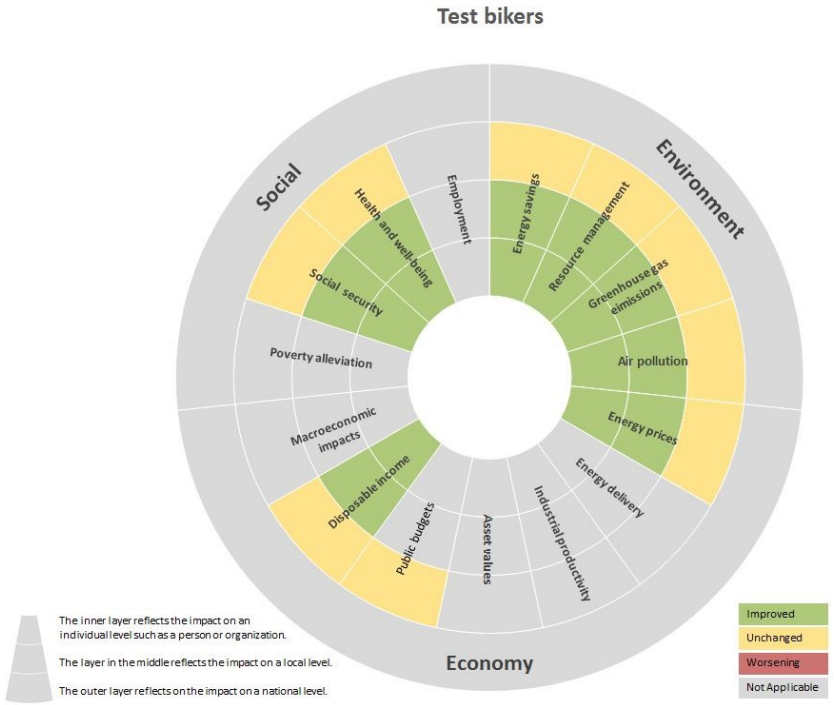
Use: To visualize the added values of implemented or planned energy-efficiency measures



Anthesis

Phase 2 of the visualization tool development - methodology

- 2 reference groups: 1) experts from the Swedish Energy Agency + 2) representatives from potential users
- Create a web-based tool?
- Revision of question set
- Brief explanation, descriptions and examples for each of the questions
- Three levels
- Scale: improved, unchanged, impaired or not applicable
- In a Swedish context Macroeconomics and Poverty alleviation were assessed to have no/very low impact on individual projects at local or regional level – dimmed out
- New testing round – 7 projects
- Parallel assessments by project managers & development team
- Comparison between the two assessments



Phase 2 test projects

1. **Public buildings:** Energy efficiency in municipality owned buildings (Skåne)
2. **Schools:** Holistic retrofitting (Total Project Method) of a kindergarten (Eskilstuna)
3. **Transport:** Test bikers (Gothenburg)
4. **Transport:** Coordinated transport of goods in the Södertörn municipalities (Huddinge et al)
5. **Strategic development:** Improved competitiveness from energy efficiency in Tranås and Eskilstuna
6. **Lighting:** Energy-efficient road lighting (Örebro)
7. **Residential buildings:** In-deep renovation Ålidhem (Umeå)

Anthesis

Example – test bikers

- Carried out in the region of Göteborg
- Implemented in 2014
- Aimed to contribute to citizens modal shift from cars to bicycles
- Participants were ordinary citizens who became test bikers for six months
- They could borrow a bike was adapted to their personal needs, and were asked to report how many car trips they replaced by the bike
- A coach helped the participants to set individual goals and supported and encouraged them during the test period

Anthesis

Results Phase 2

- Comparison between assessments made by project managers and development team - only minor differences in the assessment results
- Important to emphasize for new users that they need to allocate time to understand the definitions of the benefit categories
- Using a team of employees with different backgrounds to answers the questions will probably give more robust results
- Interviews show
  - Test users are generally positive to the model
  - Perceived as easy to use and the manual and explanations easy to understand.
  - Test users say the model provides a clear view of their project's additional benefits, and that the tool is useful
  - Test users say the tool is useful when presenting the achieved results from a project in a wider perspective

Anthesis

Conclusions and reflections

- For most of us seeing truly is believing
- Visualization of multidisciplinary facts makes it easier to make better informed decisions
- This is valid even if the monetary value of the additional benefits cannot be calculated
- The model fills an important function highlighting the many benefits from energy-efficiency measures
- Visualizing the multiple benefits adds value in several ways
- Is the model misleading since all benefits are treated equally? No - Some benefits will be more important than others, depending on the context and assumed perspective. But decisions will always be subject to discussions based on the current organizational values and conditions.

- No ideal world so all benefits cannot be estimated in financial terms and easily compared.
  - Assessment of many of the benefits are associated with significant efforts and resources, or even impossible to carry out
  - In other cases the additional benefits are not even identified
  - A simple visualisation of the multiple benefits of energy efficiency may therefore be of larger value than an incomplete monetary comparison
  - The major purpose with this visualization model is therefore to provide a basis for a broadened discussion to include the benefits that usually are ignored because they are hard to quantify

Thank you for your attention

Agneta Persson
agneta.persson@anthesisgroup.com
+46-70 546 76 53

Anthesis