# The Theory of No Change

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## Abstract

Theory-based evaluation is the order of the day. However, many theory-based evaluations focus on programme logics rather than actual theories of change. Programme logics start with the components of the project or programme, and discount all contextual factors and activities of other actors as external. This is inadequate as it does not account for the potential relevance of these external factors. Theories of change (as opposed to programme logics) reflect systems, including all relevant actors and actions. Based on the inadequacy of the existing approaches, Dr. Wörlen developed a concept that helps framing complete theories of change that is based on a review of case studies and evaluations and synthesizes these experiences into a coherent and consistent set of preconditions for project success that can serve as the basis for evaluations.

The Theory of No Change (TONC) is a theory of change for sustainable energy programmes. These typically start from a certain level of e.g. renewable energy deployment or utilization of energy efficient appliances in a country and the objective is to make these technologies used more widely, through policies, market transformation programmes, subsidies and additional financing or information interventions. It starts with the four main groups of stakeholders which can influence the effectiveness of such a project or programme in the energy policy field: the users, the providers of goods and services ("supply chain"), the financiers and the policy makers. All of these have a role to play in order for the project or programme to be effectively implemented, and if they do not play this role, this constitutes a barrier to project success. Six types of barriers have been identified: they are not aware, they do not have the expertise to fulfil this role, they cannot afford to play the role, they are not motivated or interested in playing the role, playing the role would not be cost-effective or they have no access to the technology.

The TONC has been developed on the basis of two meta-reviews of evaluations of two sectoral transformations. Its general applicability to different areas of policy and evaluation is being tested.

## A big field without too many theories

Many theory-based evaluations overlook the context of programmes, e.g. an energy efficiency program evaluation that omits to address the challenges of market transformation. For example, an investment subsidy programme or subsidized credit line for building retrofits does not address the information gaps of house owners. An energy efficiency label does not address the challenge of long replacement periods for home appliances or the fact that people might purchase an efficient refrigerator and keep the old one running in their basement. But too easily, project "theories of change" and the evaluations that are based on them, fail to systematically include external factors that have not been included in the programme logic.

Evaluating a programme on the basis of its own programme logic therefore might be adequate to understand project performance but not project impact. Factors external to the programme – so often responsible for actual impact – are not systematically evaluated. Rather, they are tagged on to the programme theory as afterthoughts. Often, this comes in the shape of a more or less superficial and open ended reflection on possible "drivers" and "assumptions" that the evaluator adds to the programme theory as the basis for the evaluation. These are typically heuristic additions reflecting what could go wrong or be an external supporting factor from the viewpoint of the evaluator.

It is obvious that this is inadequate: It can be highly subjective. There is also no common and full terminology or guidance for how to formulate these assumptions or drivers – for example, which level of generality or abstraction would be appropriate, can it be based on a stakeholder analysis and if yes,

what kind, and what are the borders of the system that needs to be looked at, how many externalities need to be considered.

This approach thus is not "theory-based", but it is really programme-based and rather subjective. A theory-based approach would need to be deductive – there should be a theory of how things work, and the evaluation should look at two things:

- How did the programme map onto this theory, what parts of the necessary aspects to effect change, and what other parts of the necessary factors for change have been affected by the programme, or what other actors were responsible for influencing these factors so that change could happen.
- Where the activities of the programme also sufficient to alter these factors to the degree necessary for change.

It can then also add an inductive aspect by testing the theory. But obviously, that would not be an evaluation of the energy programme, but of the theory.

In addition, this approach makes it hard to understand why a specific intervention or policy does **not** work : did the project's performance lead to a failure or was it external factures ? Were these foreseen or not foreseeable? A stock answer from Impact Evaluators could be that this failure indicates that a supposed causal mechanism does not exist. Other evaluators have been quick to point out that the causal mechanism may in fact work, but that the intervention did not succeed due to "implementation failure". In fact, the reasons for failure can be manifold, and very few evaluations can clearly identify why something does not work. Many current evaluation tools are not geared to identify implementation failure or differentiate it from design failure, or "unexpected" changes in external circumstances (that might be considered foreseeable in hindsight). Therefore, most current evaluations are condemned to look for positive evidence in story form (it works!), while having to disregard the richness of information embedded in negative evidence (it doesn't work!) which could help avoid mistakes in the future.

However, the biggest barrier for such an approach in the energy policy field is the lack of theories with significant explanatory value. Theories of change (as opposed to programme logics) should reflect systems, including all relevant actors and actions. This is a challenge that is hard to master due to the complexity of these systems, for example when looking at energy efficiency market transformation.

Such theories can arise from first principles or academic theories, or they can consist in conceptualizations that arise inductively from a large number of cases. This paper is presenting the results of the latter.

## Methodology of the analysis

The Theory of No Change (TONC) has been developed on the basis of a meta-review of the theories of change and project success and failure of two sectoral transformations - energy efficient appliances in Thailand (Woerlen 2011b) and district heating systems in Poland (Woerlen 2011c). For both sectors, a large number of evaluations and programmes were included in the analysis, covering two decades and providing a comprehensive outlook on the mechanisms of change. Its general applicability to other areas of policy and evaluation is being tested.

Comparing and contrasting these evaluations it became clear that a limited number of stakeholders assume a limited number of roles in sustainable energy and market transformation processes. The analysis went back and forth between inductive and deductive approaches. It started out based on the concept of barriers to market transformation. This concept says that market transformation to more energy efficient products can be hampered by many missing factors which are usually referred to as "barriers". These barriers can be on many levels, in very different dimensions (e.g. financing, policy frameworks, awareness, etc.) and can rest with many agents that play a role in the market environment for the new technologies, e.g. the buyers of the technology, the sellers, the producers, the financiers, and also the policymakers. Looking through the documentation and case

studies on market transformation, such barriers have been identified.

The development of the TONC (Woerlen 2011a) started out by systematically scanning a large number of evaluations for the description of these barriers, and resulted in a categorization of barriers into six groups of barriers and four groups of stakeholders. This was done on the basis of two long-term market transformation incidents, energy efficient products and appliances in Thailand (Woerlen 2011b) and district heating in Poland (Woerlen 2011c). It was shown that all barriers in these situations could be subsumed under these 24 barriers (6 barriers of 4 stakeholder groups) by changing the terminology or disaggregating terminology that was used in the case studies / evaluations. In addition, it was possible to show that some of these barriers are very unlikely to occur due to specific characteristics of the stakeholder groups. For example, most supply chain actors are private sector businesses. If these businesses see a growth opportunity, the "lack of motivation" barrier will be non-existent. As "enough is enough" is not a likely attitude among retailers, it can be logically justified to not even look at this barrier, and assume that this will not be limiting barrier.

## The barrier approach

The idea behind the barrier approach is that it is not always the behaviour of the target group of an intervention that makes the intervention fail. The analysis has identified – for the case of energy efficiency – four (macro-) groups of actors whose behaviours typically constitute relevant barriers to change: users of energy, suppliers of energy-using equipment, financiers and policy makers. Each of these can face one or more of six generic types of barriers: lack of motivation, lack of awareness, lack of access to the technology, lack of technical expertise necessary to use the technology, lack of affordability and lack of cost effectiveness.

## Barriers by stakeholder groups

As discussed above, each of the four identified stakeholder groups can face one or more of six generic types of barriers:

**Users.** "Consumers" or "users" as the central group of agents in this model are the operators of the equipment that uses or converts energy, ultimately causing the GHG emissions. Climate mitigation means that they change their behaviour and use energy more efficiently or convert to non-GHG emitting fuels. Consumers and users of energy typically encounter several barriers to behaving in a more climate-friendly way:

1) Lack of awareness: They do not know that they are causing GHG emissions, or if they know they do not know an alternative to their behaviour. The users are not aware of a product/technology or how to apply it. We will call this the ignorance barrier. It includes misconceptions about the product's technical performance and safety as well as usability.
2) Lack of interest/motivation: They do not mind that they emit GHG, or the sustainable alternative is unattractive for another reason, e.g. perceived as too risky, or not comfortable in operation or simply not fashionable.
3) Lack of expertise: They know the alternative but they do not have the right level of technical expertise to own or operate the equipment.
4) Lack of access: The technological alternative might not be available to them.
5) Lack of cost-effectiveness: The alternative behaviour would be more expensive than the emitting behaviour so that a change of behaviour would not be cost-effective.
6) Lack of affordability: It might be cost-effective in the long run but the users might still not be able to afford it, for example because the cash flow structure might require high upfront investments.

"Consumers" or "Users" can be part of any of the major energy consuming groups: households, industry, commerce, public institutions, transportation services. All these groups have different decision making parameters: For businesses who consume a lot of energy, minimizing the cost of

energy might be a high priority. This will most likely not be the case for consumers or businesses with low energy consumption. Public institutions might have administrative limitations to the choices that they can make in practice, e.g. a school might not be paying directly for it's energy from its own budget and thus energy saving might not be cost effective. Transportation service providers might value fuel availability and the service and maintenance infrastructure along their main routes higher than the environmental impacts that their fuel consumption causes. In the case of renewable energy technology deployment, the "Users" are mostly specialized owner-operators, ranging from utilities to Independent Power Producers or owners of single family homes with grid connected solar roofs or grid-independent solar home systems.

The user can control only very few of these barriers. This means that the consumer alone can never transform the market independently: a market consists of demand and supply. The market transformation model therefore needs to also account for the supply chain for the product or service.

**Supply chain.** The supply chain consists of all the organizations that provide the hardware and the services for operation and maintenance of the sustainable energy technology. The supply chain is typically a multi-layered structure, and can go all the way upstream to the manufacturers for the energy efficient equipment. In all cases it includes at least the distributors and installers or retailers of a technology and mostly also a service or operation and maintenance structure.

If there is sufficiently large demand from consumers / users of a technology or service, the providers are assumed to try to build up a supply chain that delivers this (sustainable) technology or service. Lack of interest is hardly a barrier as supply chain members are standing in competition with each other and are assumed to look for new business opportunities most of the time. However, even if the supply chain would "like" to serve a particular demand, it might encounter its own set of barriers:

1) Lack of awareness: They do not know the alternative, might underestimate the market or the technology (ignorance).
2) Lack of expertise: They know the alternative but they cannot handle it.
3) Lack of access: It might not be available to them, for example because it has to be imported.
4) Lack of affordability: They might not have sufficient working capital to add another line of business.
5) Lack of cost-effectiveness: They might not be able to expand their business to the sustainable energy application, because they have sufficient more profitable other products on which they focus their attention.
6) Lack of demand: There might not be a market for this product yet (lack of demand). If market development is not driven by demand, but by another force (e.g. policy), most of these barriers will still apply for the supply chain.

**Financiers.** Both, supply and demand need to put financial resources into the development of a market for a new product or service. In those cases where they cannot use their own resources for this – either because they do not have enough financial means or because it would not be cost effective for them to use these – they will need to rely on financial intermediaries for loans. If financial intermediaries do not understand the income generating opportunity that is provided by the sustainable energy investment, they might not be willing to lend money for such an investment, or might only do so at very high interest rates. Therefore, well informed financial intermediaries are generally important for smooth market development. Reasons why financiers would not support sustainable energy are for example:

1) Lack of awareness: Lack of information and misconceptions about the technical risks and financial benefits of energy conservation (ignorance).
2) Lack of expertise: Lack of financial and technical expertise for appraisal and risk assessment. Lending terms that they would be able to give (e.g. in terms of tenors) would not be appropriate for cash flow structure of sustainable energy technology (lack of business model).
3) Lack of cost-effectiveness: There are more attractive lending opportunities in conventional alternatives, e.g. because of additional transaction costs as compared to standard lending products, e.g. in appraisal/consideration and monitoring.

There will be a number of mitigation options where no financing is involved and thus financial intermediaries are not needed. However, there are two levels of financing that might be necessary: one is the financing for the users in order to invest in the change of equipment. The second level for which financing might be necessary is at the level of the supply chain. In the case studies, these two are sometimes not easy to set apart.

**Policy makers.** Policies and programs are in many cases important instruments for facilitating market transformation. Policy makers need to be capable of putting in place enabling policies, including market introduction and technology transfer strategies, standards and certification as well as quality control options. As market change is not a one-off activity but an ongoing process, policies are necessary to maintain the momentum of change. In addition, sometimes there are policies that impede the transformation of markets towards higher energy efficiency. Therefore, policy makers are an important stakeholder group for a barrier model of market transformation. Policy makers, too, encounter a number of barriers when trying to enhance policy frameworks:

1) Lack of awareness: They have insufficient knowledge about GHG emissions, are climate change deniers or lack knowledge of emission sources and mitigation strategies.
2) Lack of motivation/interest: They do not care about GHG emissions, that they are causing climate change, where they come from and how to avoid them and/or they do not trust the alternatives in terms of technical performance, local availability of (fuel) resources, scale, costs or other aspects.
3) Lack of expertise: They do not know what policies would work or they know the alternative but they cannot design it.
4) Lack of affordability: The policies would be fiscally unaffordable e.g. in the case of large-scale subsidy programmes.

## The Theory of No Change Barrier Matrix

A mapping tool has been developed (cf. Figure 1) that uses a traffic light colour scheme. It allows for instant analysis of a situation: the barriers that have proven to be effectively limiting change are marked in red, those that exist but are not decisive bear orange and yellow, and barrier-free dimensions are displayed in green. The analysis is a snapshot at one point in time, looking at the same market in a later stage the colours might change, e.g. a product has fallen in price and is now costs effective.

However, as highlighted in Figure 1, it can also be used to illustrate transitions. Here, the same project situation before and after the project is illustrated with the traffic light scheme. The arrows in the fields are another illustration for the strength of the barrier. However, this second graphic element could also be used to e.g. signify whether or not the project is active in this field, or whether or not there is a trend in this respective field, towards an improved or deteriorated barrier situation.

| | Barrier | District heating | | Geothermal | | Coal to Gas | | Biomass | |
|---|---|---|---|---|---|---|---|---|---|
| | | prior to project | 2004 | prior to project | 2004 | prior to project | 2004 | prior to project | 2002 |
| Users | Ignorance | ↑ | ↑ | ↗ | ↘ | ↗ | ↑ | ↘ | ↑ |
| | Lack of expertise | ↗ | ↗ | ↗ | ↗ | ↗ | | ↘ | ↗ |
| | Lack of access to technology | ↘ | ↗ | ↓ | ↑ | ↘ | ↑ | ↘ | ↑ |
| | Lack of cost effectiveness | ↘ | | ↑ | ↘ | ↗ | ↗ | ↘ | ↘ |
| | Lack of motivation / interest | ↘ | ↑ | ↘ | ↘ | ↘ | ↑ | ↘ | ↑ |
| | Lack of affordability | ↓ | | ↗ | ↗ | ↓ | ↘ | ↘ | ↗ |
| Supply Chain | Ignorance | ↑ | ↑ | ↘ | ↑ | ↗ | ↑ | | ↑ |
| | Lack of expertise | ↑ | ↑ | ↑ | ↑ | ↘ | ↗ | ↘ | ↑ |
| | Lack of access to technology | ↑ | ↑ | ↗ | ↑ | ↗ | ↑ | | ↑ |
| | Lack of cost effectiveness | ↑ | ↑ | ↑ | ↓ | ↗ | ↑ | | ↑ |
| | Lack of business model | ↑ | ↑ | ↓ | ↘ | ↘ | | ↘ | ↑ |
| | Lack of affordability | ↑ | ↑ | ↘ | ↗ | ↘ | | ↑ | ↑ |
| Local Financiers | Ignorance | ↗ | | ↗ | ↗ | ↘ | ↑ | ↘ | |
| | Lack of expertise | ↓ | | ↓ | ↗ | ↓ | ↑ | ↘ | |
| | Lack of cost effectiveness | ↓ | | ↘ | ↓ | ↘ | ↓ | ↓ | |
| | Lack of business model | ↓ | ↓ | ↘ | ↓ | ↘ | ↘ | ↓ | ↓ |
| Policy Makers | Ignorance | ↑ | | ↗ | ↑ | ↗ | ↗ | | |
| | Lack of expertise | ↗ | | ↓ | ↑ | ↗ | ↗ | ↗ | |
| | Lack of motivation / interest | ↗ | | ↑ | ↑ | ↑ | ↑ | ↘ | ↑ |
| | Lack of affordability | ↘ | | ↑ | ↓ | ↓ | ↗ | ↑ | ↑ |

Figure 1. TONC barrier matrix from Poland study (Woerlen 2011c)

## Application in Programme Design

We are currently using this methodology in assessing the impact of an intervention on energy access. The first experiences from this analysis have been that it will most likely be possible to give important pointers for the design of these interventions, already in the period of the first formative evaluation. But we are not ready to discuss these experiences.

Another set of experiences that we have collected was our attempt to use the TONC in designing climate mitigation programmes. The National Climate Initiative (NCI) of the German Ministry for the Environment BMUB was launched in 2008 and aims to support and promote innovative mitigation projects in Germany. Until 2014 around 19.000 projects have been supported

with around 555 million Euros. The NCI funds projects and programmes that were especially created for the initiative, but also serves to extend the financing of several projects that have existed prior to the NCI. The range of projects and programmes is wide, targeting industry, consumers, and municipalities on areas as diverse as environmental education and training, energy efficiency, mobility, renewable energies, and climate-friendly investing.

For the structured and strategic identification of further areas for funding, the team undertook a systematic review of GHG savings potentials in the areas that could be influenced by recipients of grant funding from this programme. These are consumers, businesses (within the limitations of the EU subsidy restrictions), municipalities and NGOs. Some promising GHG savings opportunities that were identified were support to building retrofits, the promotion of the use of bicycles for short distances, energy audits tailored to different types of small businesses as well as support to the roll-out of hybrid busses.

The NCI is a programme that can provide two types of support: it can support model projects, e.g. of NGOs that would implement awareness campaigns, information provision, training courses or other activities that the NGO would implement. Alternative, it can provide standardized investments subsidies if the overall dimensions of the programme do not extend a certain volume. The barrier assessment is necessary to understand if programmes can be designed in such a way that the support from the NCI would really be able to make a difference. Therefore, for each of these sectors, a literature review of the published barriers was undertaken to understand what kind of programme could be effective.

In the area of building energy retrofits, for example, Germany's existing support programmes have not really been able to ramp up the rate of building energy retrofits to the level that would be necessary to reach the national energy efficiency targets. For retrofitting residential buildings the following barriers were identified in the literature: A. There is a lack of motivation on the side of the users, which is often driven by the age of the users and/ or the complexity of retrofits. B. Users often face a lack of expertise regarding the different alternatives for climate friendly retrofits. C. Many users are also deterred by the lack of cost effectiveness, represented by a relatively long repayment period. D. This can make the retrofit unaffordable to some users, including very specific groups like senior citizens. The existing support programmes for building retrofits in Germany are mainly addressing two barriers: there is a group of projects, including some on the local level, that (co-)finance energy audits for buildings. This would address barrier B. However, in order to get building owners to actually use these grants, they would have to have overcome barrier A. Actually, the NCI portfolio already contains a very interesting "push" approach to overcoming inertia on the level of the building owners, so there are no more opportunities for additional interventions by the NCI. The sole window of opportunity for the NCI in building energy retrofits on the basis of this analysis would have been measures combating barrier D., most notably a loan-independent intervention that makes the retrofits more affordable for e.g. senior citizens. Options are a tax break - although retirees already pay fewer taxes than employees – or a direct subsidy. Both were considered beyond the financing scope possible in the context of this project. Thus, the barrier analysis led to the conclusion that a programme in buildings energy retrofits would not be an effective addition to the NCI.

While this seems straightforward, it did in this and many other cases that we studied prevent the Ministry from setting up ineffective grant funding. But a bigger challenge and contribution of the TONC was the power that it provided in terms of summarizing barrier assessments from the literature. In the literature, the terminology on barriers is very inhomogeneous. As multiple experts were involved in this analysis, we also faced challenges in translating the literature into the TONC language – some level of subjectivity and personal interpretation needed to be mitigated through stricter guidance. While it was easy to attain a conceptual grasp of the TONC, it was more difficult to digest the wealth of information available on the various barriers and to interpret the descriptions in the literature with respect to the barriers. Many studies on various aspects of the different barriers were available, but the team members often refrained from 1. mapping them on the barrier matrix, and 2. simplifying them sufficiently. One reason for this was that many studies focused on a subset of the stakeholders only,

but then provided too much detail on the barriers so that the "bigger picture" got lost. Other analyses were "problem" oriented and promoted a specific "solution". In other words, rather than being objective and scientific, the analyses provided in the literature were limited to a certain aspect of eg. consumer behaviour and use a partial assessment of barrier, e.g. as a justification for their preferred policy intervention, and refrained from undertaking a full-scale analysis. These studies did not give the team the confidence that all barriers were discussed. Where they were, these barriers were often discussed in such pseudo-comprehensive ways that they did not map neatly into the barrier cells. For example, they did not distinguish between the barriers of lack of affordability (e.g. a user lacks the upfront capital) and lack of cost effectiveness (a product is not cost-competitive with an alternative one), or between information, expertise and motivational barriers. In addition, almost none of the barrier analyses were looking at the whole range of stakeholders. Thus, for most of the interventions that we attempted to design, hypothetical assumptions or own barrier analyses were necessary.

This does not discount the value of the TONC but rather highlights how important it is that project designers have such a framework at their disposal. While it does not replace a certain amount of experience with market transformation approaches and the courage for expert judgement, it certainly helps assess what gaps in knowledge need to be addressed before a useful intervention can be designed, and what barriers might prevent an intervention from being effective.

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