

NRP-project SCAN (SCenario ANalysis)

Analysis of the social significance, acceptability and feasibility of long-term low energy/low CO₂ scenarios for The Netherlands

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Abstract

Long term low energy/low CO₂ scenarios are developed for an interdisciplinary research about the significance, acceptability and feasibility of such scenarios.

The social psychological research - to measure the acceptability - is directed at three determinants of cooperative behaviour in a social dilemma situation: knowledge, trust and morality. On the basis of this triad, research variables have been formulated and a research model has been developed.

The sociological research - to measure the feasibility - concerns an assessment of resistances, blockades, interests, and conditions for cooperation of the involved organisations with regard to the (package of) measures and the expected effects of the measures.

The economical research - to measure the significance - will be mainly directed to acquire qualitative insight into effects of sectoral measures and packages of measures at a macro-economic level.

Introduction ¹

The aim of the research in the SCAN-project is to supplement general long-term low-energy/low-CO₂ scenarios and to clarify these in terms of their social significance, acceptability and feasibility. This research is conducted by an interdisciplinary team (psychology, sociology, economic and environmental sciences).

The following research questions in the SCAN-project are discerned:

- A.1. What is the expected quality of life within the variants of these scenarios?
- A.2. What is the acceptability of the proposed scenario variants?
- A.3. What is the feasibility of the prospective elements of the proposed scenario variants?

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Firstly, a new scenario is devised, i.e. packages of measures aiming at a (substantial) reduction of the energy consumption and the CO₂-emission by The Netherlands. This scenario has been revised and evaluated by experts with regard to energy conservation and CO₂-emission reduction, and to the behavioural and economic effects of the considered measures.

The scenario consists of measures derived from different relevant categories, i.e. technical measures, regulatory measures, measures providing financial-economic incentives, educative and communicative measures and measures aiming at organisational and institutional change. It is supposed, that an effective scenario should cover all these categories.

The scenario measures are directed at four sectors: industry, greenhouse-horticulture, freight transport and (household) consumption. About 80% of the total energy use of The Netherlands is consumed by these sectors.

This scenario is the starting point for the research, concerning the social significance, acceptability and feasibility of low energy/low CO₂ scenarios.

The relationships with these issues and the different disciplines are presented in figure 1.

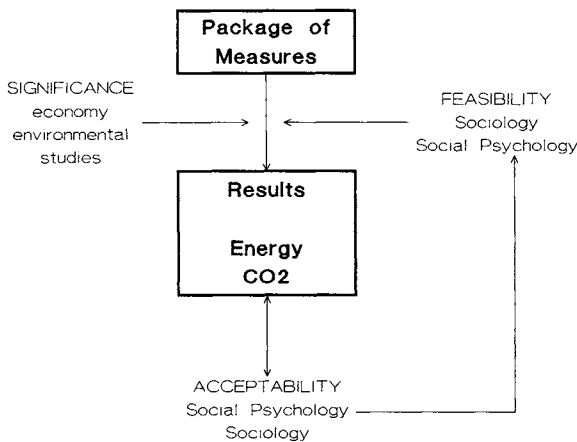


Figure 1 Integration of the 3 SCAN lines of research.

The results of these scenarios are predicted with help of the **economic and environmental analysis**. The results are described in terms of reduction of the total Dutch energy consumption, of reduction of the Dutch CO₂ emission, and of the changes of relevant economic parameters e.g. employment for industry, greenhouse horticulture and freight transportation. These results will demonstrate the environmental and economic **significance** of these scenarios.

The issue of **acceptability** of the scenarios is primarily elaborated by **social-psychological research** by a postal survey among a large sample (several thousands) of households. Also the significance of individual and economic effects is measured for the households by this research.

The issue of the **feasibility** of these scenarios is examined by a **sociological field research**. Political and institutional actors are interviewed about their interests, opinion, position, resources and influence. In this way major resistances and barriers concerning the acceptance of CO₂ emission reducing measures will be determined and the feasibility of these measures will be estimated.

The survey results about the acceptability of CO₂ emission reduction measures by households may influence also the feasibility of these measures. Political and institutional actors will be confronted with these acceptability judgments of households.

The social psychological line of research

The social psychological line of research, aims at understanding and predicting the acceptability of policy measures at the individual level. For this purpose, specific policy measures aiming at the energy saving behaviour of individuals and households have been selected. This kind of behaviour can be characterised as a social dilemma; long term benefits can only be achieved by the cooperative behaviour of others.

Theoretical background

Dawes (1980)², who elaborated on the social dilemma paradigm, earlier introduced by Hardin (1968)³, argues that the three most important determinants of cooperative behav-

iour in a social dilemma situation, are best described by the psychological constructs knowledge, trust and morality. On the basis of this triad, research variables have been formulated and a preliminary model has been developed.

The model can be characterised, as demonstrated in figure 2, by the two 'routes', by which the acceptability is influenced. The first route concerns the causation of the problem and the uncertainty about environmental processes. Knowledge, problem awareness, responsibility for causing the problem and the perceived solvability of the problem are the key variables. The other route affects the solutions proposed to tackle the problem and the uncertainty about the (cooperative) behaviour of others. The impact of the proposed solutions (or policy measures) on the individual 'quality of life', the amount of

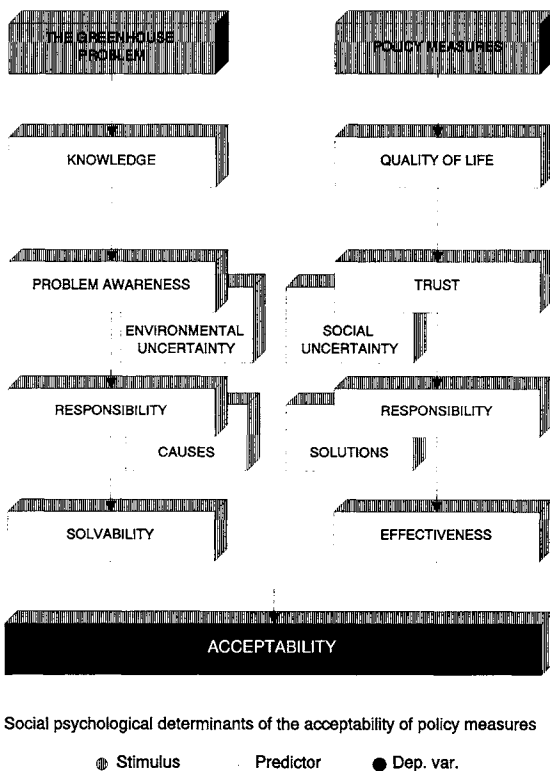


Figure 2 Model and variables for the social-psychological research approach to assess the acceptability of energy reduction measures and scenarios.

trust in others, the responsibility for solving the problem and perceived effectiveness of the policy measures are the key variables here.

Methodology

In a large scale postal survey research amongst 3000 households, a package of future policy measures presented is presented as a short scenario. The model parameters are supposed to have a predicting value in relation to the acceptability of the policy measures in the scenarios. This will be tested by means of a multiple regression model. Furthermore, differences between certain groups will be inspected. Next to the variables mentioned above, attention will be paid to individual and group differences, regarding income level, education, age, gender, type of household, car use and ownership, etc. Final results can be expected in the spring of 1995.

The sociological line of research

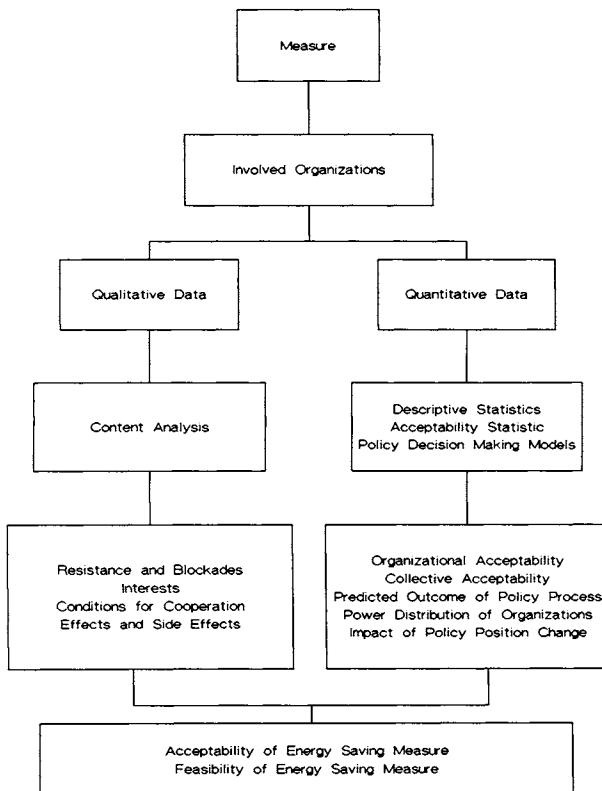


Figure 3 Sociological approach to study the feasibility and acceptability of energy use reducing measures and scenarios.

The research objective of the sociological research line is to determine the short term and long term social political feasibility of extensive and controversial energy saving measures on four social sectors each having large energy saving potentials. The defined package of measures for the sector Households will be completely covered and for the other sectors some measures are selected according to controversiality, effect size, concreteness and the number of involved organisations. For each sector the acceptability and feasibility of the introduction of an energy tax will be examined. For the sector Glasshouse Industry the establishment of usage quota

of natural gas and for the sector Freight Transport of the realisation of the Betuwespoorlijn are analysed specifically.

Methodology

The methodological framework is demonstrated in figure 3. The first stage of the research consists of the specification of the measures and the determination of the organisations who participate in the political decision making process concerning that measure.

In the second stage qualitative data as well as quantitative data will be gathered in expert interviews for each involved organisation.

In the third stage the data will be analysed. Content analysis of the qualitative data will result in resistances, blockades, interests, conditions for cooperation of the involved organisation with regard to the (package of) measures and the expected effects and side effects of the measures. The quantitative data will be analysed using several statistics and political decision making models. This will result in estimates about the acceptability, predictions about the outcome of the decision making process, in an overview of the power distribution of the involved organisations and an assessment of the impact of policy position change of key organisations. The final results are judgments of acceptability and feasibility of the (package of) energy saving measures. The other (not selected) measures will be dealt with in a merely qualitative way.

Though the survey is not yet completed, it seems that most energy saving measures will be supported at the institutional level. The notion appears to exist that energy saving measures are necessary and inevitable. These initial results make the question about the political feasibility of the measures very salient.

The economic line of research

The main research question of the economical research line is about the economic significance of the considered low energy/low CO₂-scenarios, i.e. packages of measures concerning the sectors Glasshouse Industry, Industry and Freight Transport in the Netherlands.

Before this main question can be answered, another question arises: How, from an economic point of view, has the present situation arisen concerning energy use and CO₂-emission in the Netherlands?

In answering these research questions two phases can be distinguished. The first phase has already been finished. These results will be applied in phase 2.

In the first phase attention was paid to the description of the relations between the two basic economic elements 'production' and 'consumption'. In doing so emphasis was laid upon a qualitative approach. Within this framework the following question was answered: How, from an economic point of view, has the present situation arisen concerning energy use and CO₂-emissions in the Netherlands? The accent was on establishing the connection between the economic development during the 20th century and the economic sector structure. The importance of this phase lies in the fact that it generates a diagnosis by

which possible economic bottle-necks can be demonstrated to get to a low-energy/low CO₂ future. Supplemented with elementary quantitative data on energy-use, CO₂-emissions and economic performance, it also offers a first general insight into possible ways a measure or a package of measures might work out in social-economic terms during the time needed to get from the present situation to a low-energy/low CO₂ society (the transition period). This in turn offers the opportunity to recognise possible social-economic problems in time and to think of strategies to avoid them.

Conceptual framework

In phase 2 the main research question will be answered based on the general concept shown in figure 4. In answering this question interviews will be held with both general economic experts and experts from the relevant sectors. Concerning the economic significance two angles can be distinguished. Firstly, attention will be directed towards the meaning of a sectoral package of measures for the economic sector structure. In this way

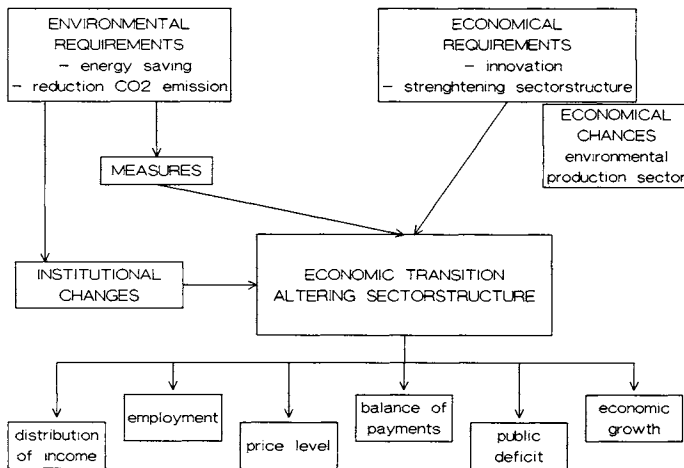


Figure 4 Conceptual framework regarding environmental and economic requirements.

it is tried to generate some qualitative insight into effects of sectoral measures and packages of measures at a macro-economic level. Next to that, the significance of the packages at a sectoral level will be examined. In that connection more quantitative research is carried out.

References

1. This paper is partly based on the interim report of the SCAN-project of July 1994. A final report will be produced in the spring 1995.
2. Dawes, R.M. (1980). Social Dilemmas. *Annual Review of Psychology*, 31, 169-193
3. Hardin, G. (1968). The tragedy of the commons. *Science*, 162, 1243-1248