Assessing Social Sustainability

The Social Dimension of Sustainability in a Socio-Economic Scenario

Ines Omann and Joachim H. Spangenberg

Sustainable Europe Research Institute SERI

Schwarzspanierstr. 4/7, A-1090 Wien, Austria, Tel./Fax +43-1-405 5673

Grosse Telegraphenstr. 1, D-50676 Köln, Germany, Tel./Fax. +49-221-2168-94/-95

e-mail Ines.Omann@seri.at, Joachim.Spangenberg@seri.de

Presented at the 7th Biennial Conference of the International Society for Ecological Economics“ in Sousse (Tunisia), 6-9 March 2002

Abstract

The social dimension of sustainable development has most often been neglected when developing future scenarios, or, at best, been dealt with as a framework condition for successful environmental sustainability strategies. However, given the long-disputed trade-off between social and environmental improvements in a market economy, environmental and social criteria must be developed and incorporated to scenario design from the very beginning and on equal footing, if a bias of the results violating the basic concept of sustainable development is to be avoided. The scenario presented reflects such integrative approach, including social sustainability criteria from the very offset.

In social science, so far no consensus has emerged on what are the adequate criteria for social sustainability. Consequently, each project derives its own set of indicators and criteria specific to the research question analysed, but rarely applicable on the macro level of societies' social sustainability. For any such more general approach it is necessary to integrate criteria of different quality, and to pay due respect to their importance attributed to them by various stakeholders.

Standard evaluation methodologies are not capable of handling this situation, in particular the need to simultaneously take a variety of objectives into account, the lack of a common numeraire, and the fact that no unambiguous optimum exists in multi-dimensional optimisation, but only a range of acceptable solutions can be defined.

Multicriteria evaluation provides an alternative in these cases. It is applied to the scenario, first in a narrative manner, then by applying an ordinal scale for measurement. The social sustainability of the scenario is evaluated as "good, but not perfect", including a sensitivity analysis.

To make sure that this result is not a methodological artefact based on using the same criteria for project development and evaluation, other social sustainability criteria from different literature sources are applied to the scenario in another multicriteria evaluation. The assessment turns out to be stable even with this extended set of criteria.

Key words: social dimension, sustainability scenarios, multicriteria evaluation, indicators

1. Introduction

The concept of sustainable development has emerged as a new paradigm during the last decade. As a normative concept including social, economic, environmental and institutional objectives (UNDPCSD UN 1996, UNDSD 2000, UNECOSOC 2001) it is calling into question the orientation towards a global deregulated free trade economy with no social or environmental conditions attached (Roddick 1998). Emphasising the importance of the social and institutional dimensions thus has a double purpose: on the one hand, these dimensions are essential to the concept of sustainable development and must be respected in their own right, on the other taking them into account is a necessary precondition for obtaining the environmental and economic objectives based on broad public endorsement of the sustainability paradigm.

Sustainable development is perhaps the most challenging policy concept ever developed. Its core objective – a kind of ethical imperative - is to provide to everybody everywhere and at any time the opportunity to lead a dignified life in his or her respective society. This demand for a high quality of life is assumed to include a decent standard of living, social cohesion, full participation and a healthy environment (WCED 1987). Policies towards sustainability thus require

- the integration of economic, social, environmental and institutional objectives into a coherent strategy safeguarding the essential interests of each dimension,
- the (re-)introduction of a normative orientation towards distributional justice in and between countries into economic, trade, development and other policies, and
- the extension of the policy perspective to include distant regions and future generations.

The former condition requests to identify and exploit synergies and to minimise trade offs between objectives from different dimensions of sustainable development. Such an integration will not leave any of the policies involved unchanged (Hans-Boeckler-Foundation 2001), and consequently it will require a careful assessment of the given institutional setting, changing preferences and the mode and means of government and governance.

The latter condition rules out the generation of externalities (social as well as environmental) to be passed on, as the global and intergenerational perspective includes all those who have to bear the burden.

In the international economic debate, sustainable development is most often described as the need to maintain the stocks of human, man-made, natural and social capital (Serageldin 1997) needed by societies to generate a sustainable, i.e. Hicksian income. While there is a lot of discussion regarding the possibilities and limits of substituting these capitals against one another (Daly 1991, Pearce, Atkinson 1993), all these debates tend to focus on increasing the stock of man made capital and the degree to which other capital stocks may be reduced for this behalf. In other words, sustained growth is – often implicitly – assumed to be a part of the concept of sustainable development by most authors, and only a small fraction of ecological economists disagrees. In the macro-economic debate, few other economic sustainability criteria are mentioned, like innovativeness, competitiveness etc.

Environmental scientists and some ecological economists take the long term perspective and point out that in a limited biophysical system as the Earth, is no subsystem can have unlimited growth without harming the other (social and environmental) subsystems, and thus undermining the basis of its own existence. This establishes the need to limit the throughput of resources through our societies in absolute terms, as these are what counts for nature. Reducing fuel consumption by a factor four is by now broadly accepted as a target for safeguarding the climate in the 21st century (IPCC 2000), while for material flows a factor 10 reduction is considered a first indicative goal (Schmidt-Bleek 1999). For land use, only preliminary targets have been suggested so far (Spangenberg 2002c).

Social sustainability focuses on the personal assets like education, skills, experience, consumption, income and employment, while institutional sustainability aims at interpersonal processes like democracy and participation (institutional mechanisms), distributional and gender equity (institutional orientations) or independent and pluralistic sources of information (organisations) (Spangenberg 2002b). Obviously institutional settings often provide the opportunity space for social sustainability to develop; as a certain overlap cannot be avoided institutional aspects will have to be taken into account when discussing social sustainability.

The socio-institutional challenges we are faced with on a way towards a sustainable society include (European Council 2001), but are not restricted to

- the challenge of unemployment, in particular of long-term and youth unemployment,
- the challenge of an ageing society, including the changing roles of elder persons,
- the challenge of changing role models, in particular regarding gender,
- the challenge of the future learning and knowledge society.

As an overall institutional objective, an ”enabling society” should foster participation, openness, transparency and accountability, inviting its citizens to get involved into public decision making as far as possible (United Nations 1993). In contrast, social sustainability would be more focussed on the quality of life, the possibility to sustain oneself and all dependants on the basis of one’s salary, on the access to paid labour for all who want so, and for social security in times without paid work, but maybe still working for the common good (UNDPCSD 1995, Hans-Boeckler-Foundation 2001).

Regarding conflicts of interest, e.g. economic growth is considered a necessary condition for providing income and employment on the one hand, while on the other sustained and unconditioned growth is considered a major threat to integrated sustainable development. These tensions, unavoidable as they are in any multi-dimensional concept, clearly illustrate that sustainable development has no unambiguously defined optimum (as it is usual when only two competing targets have to be taken into account). Instead, benchmarks need to be defined, distinguishing potentially sustainable from definitively unsustainable development trends (Spangenberg 2001). Such benchmarks are a key element for the multicriteria analysis more systematically introduced later in this paper.

Social sustainability, as an independent dimension of sustainable development, and equally important as the economic or environmental dimension (United Nations 1993) still lacks broad recognition by scientists as well as by decision makers. Currently social sustainability is at best dealt with regarding the social implications of environmental politics, but not as an equally constitutive component of sustainable development (OECD 2001b, a). Social objectives are not explicitly defined, nor is their interaction with environmental and economic objectives discussed.

On the other hand, social science and social policy research have developed a plethora of social objectives, strategies and measurement instruments, but with little regard for the sustainability perspective (Metzner 2000). Economic concerns are integrated (e.g. in research on poverty and unemployment), even beyond the scope of traditional economics e.g. by integrating the effects of unpaid work (Fukami 1999), but the environmental dimension is largely ignored. Sociology in general suffers from a neglect of the physical (i.e. non-social) reality (Brandt 1997), resulting in difficulties to present the wealth of available knowledge in a way suitable for integration into the sustainability perspectives.

Indicators for measuring social sustainability are lacking; first proposals have been tabled, but mainly based on ad hoc indicator systems on the company (GRI 2000; Hertin et al. 2001, WBCSD 2001) or the local level (New Economics Foundation 1996-1999, Valentin, Spangenberg 2000). Simple and clear benchmarks helping to distinguish (potentially) sustainable patterns of social development from definitively unsustainable ones are still missing. These would have to take into account core social sustainability objectives and their interlinkage to institutional settings, economic effects and environmental impacts in a systematic manner.

The "Work and Environment" Project

Only few projects so far have undertaken to address this specific challenge, or even focus on it. According to an international overview by Grunwald and colleagues (2001) the largest and most comprehensive one to do so is the project ”Work and Environment” (Hans-Böckler-Stiftung 2000), which despite its more narrow title covers all four dimensions of sustainability and analyses their interlinkages in scenarios, model simulations and a broad range of case studies.

A foundation of the German trade unions, the Hans Böckler Foundation (HBS) has initiated and funded this project to analyse the interlinkages of social sustainability - with special emphasis on labour and health, the traditional anchor concepts in the German discourse - with economic and environmental sustainability. This includes the identification of potential synergies as well as antagonisms, and means for their reconciliation (Omann 2000). Finally, the project had to produce outlines for possible policy strategies to provide trade unions with scientifically tested strategy options for a kind of sustainability policy which respects the role of social sustainability as a dimension in its own right and on equal footing with the economic and environmental one.

For this behalf the three participating scientific institutes (the German Institute for Economic Research DIW, the Wuppertal Institute for Climate, Environment, Energy and the Science Center Berlin for the

Social Sciences WZB) first formulated sustainability criteria and objectives for the economic, the environmental and the social dimension from their respective disciplinary point of view. These were used throughout the project to mutually assess the results of all partners. In more than 80 case studies the interaction of these objectives was analysed, providing input to three qualitative scenarios, focussing on ”cost cutting”, ”conditioned growth” and ”policy integration”. In the next step these scenarios were used as the basis for quantitative simulations, using the complex, highly disaggregated econometric model ”PANTA RHEI”, a dynamic input-output model based on empirical data. It is part of the international INFORUM group of models, but extended to accommodate energy and material flows (Meyer et al. 1999, see also http://www.gws-os.de).

The reference scenario is less detailed as it mainly served for comparison purposes. It represents a simplified cost-cutting strategy, a policy approach that gives preference to little public intervention into the economy, salary increases below the productivity gains (i.e. more export oriented than towards strengthening the domestic demand), tax cuts and subsequent privatisation of public services.

According to the intentions of their authors, both the ”conditioned growth” and the ”policy integration” scenario are sustainability scenarios, but with a different emphasis. The former aims at maximising economic growth while reducing CO_2 emissions and maintaining social security, the latter one at simultaneously reducing unemployment, increasing dematerialisation of resource consumption, enhancing participation and providing a tax-funded basic income. Both comprise revisiting harmful subsidies, productivity based salary policies and reducing the average working time. Regarding resource taxation, the conditioned growth scenario includes a tax on CO_2, while the policy integration scenario combines lower energy tax with an additional Material Input Tax MIT on all resources used, both linear taxes stepwise increasing over time (Omann 2002). Without these assumptions, social and environmental sustainability targets turned out to be out of reach in the modelling.

Since the integrated policy scenario is the most ambitious one regarding social as well as environmental objectives, it will be explained in some more detail in section 3, and the social sustainability criteria developed in section 2 will be applied to in section 4 by means of a multi criteria analysis MCA (Munda et al. 1994a, Omann 2000). Section 5 concludes with an interpretation and some thoughts on the perspectives of measuring or assessing social sustainability.

2. Assessing Social Sustainability: Objectives and Indicators

2.1 The challenge

Deriving social sustainability objectives and their corresponding indicators is a challenging task due to four core problems:

1. There is a significant *lack of conceptual clarity*. Whereas in Germany issues like labour, employment opportunities and the future of work as well as health and safety are dominating the debate, in the Netherlands consumption, gender aspects and the ageing society play a more important role, as do poverty issues in the UK, and in Scandinavia, taking the international dimension into account has a long history. On the transnational level, the European Commission has emphasised issues like employment and job creation, education and training for employability, and the labour market participation of women in the future knowledge society.
2. The *complexity of the concept* might not be manageable in the current institutional settings. Consequently sustainability is reduced to a kind of ”21st century environmentalism”, with the non-environmental dimensions of sustainability either ignored or reduced to side effects of environmental policies to be kept under control (OECD 2001b). At best social sustainability is mentioned separately including social objectives, but not fully integrated into the sustainability framework (European Council 2001).
3. The *bad experience of the 1960s* makes social scientists hesitant to formulate normative targets. In order for social sustainability to be dealt with on equal footing with other dimensions of sustainable development, explicit social targets must be formulated. In the 1960s with their still quite homogenous lifestyles, strong feelings about social objectives and the belief in the capacity of public authorities to steer society developments many such objectives have been suggested, with limited public resonance or even fierce rejection as ideological strait jackets. Today, most social scientists are hesitant about this kind of approach, denouncing it as not

scientific and focussing their analytic capacities on small-scale issues accessible to their methodology. As a result, indicators and targets are suggested for small sections of social development, but little is said about the overall trend. The CSD, although suggesting a great many of indicators, is hesitant to formulate any explicit targets (UNDSD 2000).

4. Defining social objectives as part of an overall sustainability concept poses *questions to the very basis of the current European development model*, which is essentially a productivistic or fordistic model of society (Opielka 1997). It presupposes that people accept alienating working conditions for a compensation by high consumption levels. This model only counts paid work as a valuable source of income; only market transactions are considered to contribute to the standard of living. This way, the immense value of unpaid work is ignored, resulting in a systematic bias of welfare measuring against women (Spangenberg 2002a). Furthermore, the social costs of production are externalised, and the social security system is predominantly labour based, resulting in financial problems exactly in a time when it is least desirable, i.e. times of slow growth and high unemployment. So is our social security based on a model which is neither economically nor environmentally sustainable? Is it no longer affordable when broader sustainability concerns are taken into account?

Despite these obstacles, and based upon the basic elements of sustainable development as pointed out by the Brundtland Commission (WCED 1987), still a number of social sustainability objectives can be derived which are elaborated in a nutshell in this paper.

2.2 Social Sustainability Criteria

Sustainability is essentially an anthropocentric concept of inter- and intragenerational justice (Grunwald 2001), claiming the right to a dignified life to humans (Littig 2001). One core element is its commitment to the social cohesion of societies, the aversion against social exclusion and discrimination (including gender) and the need to foster citizens' participation in public affairs. Access to social processes, and access to the benefits of the modern society for most of the population most of the time is one critical orientation, including the right to a dignified standard of living for all citizens. Social sustainability comprises every citizen's right to actively participate in his/her society as an essential element. The precondition for this is the access to the respective societies' resources, including a variety of aspects: physical access demands the existence of the appropriate technical, social and institutional infrastructure, legal access calls for the right to make use of it, economic access means the affordability of using it, educational access is supported by appropriate (life-long) learning opportunities, and participatory access stresses the influence on the evolution of such infrastructures. Access is not a demand restricted to individuals: social groups, including minorities will claim the same right, resulting in an unavoidable overlap of social and institutional sustainability concerns.

As a means to assess the state of social sustainability, some (but few) projects have defined criteria, goals or indicators. So e.g. in the "work and environment" project the following social sustainability criteria have been used (Hans-Boeckler-Foundation 2001):

- self-determined lifestyle including a mix of paid and informal work,
- satisfaction of basic needs,
- a reliable and sufficient social security system,
- equal opportunities to participate in a democratic society, and
- enabling of social innovation and structuring of work types.

Furthermore, two of the economic sustainability criteria have a social sustainability connotation:

- safeguarding the basis for satisfying material needs, and
- full employment, social security, fair distribution of burdens between generations.

Although not based on subjective perceptions but on objective goals, these criteria obviously do not suggest themselves for a quantitative assessment. Nonetheless they provide criteria which can be applied in assessing the scenarios, e.g. if by the provision of a basic income poverty is effectively overcome (as it is the case in the aforementioned "integrated policy scenario"), the satisfaction of basic needs should be given. Other criteria are less easily transformed into assessment criteria: a "self-determined lifestyle including a mix of paid and informal work" requires qualitative judgements; it includes the promotion of new concept of labour called "mixed work", in which paid labour, community work, caring work and work as a self-provider are considered equally important to society at large, justifying public support for unpaid work. The criterion furthermore includes the right of all citizens to

choose if and how they want to work, to combine different kinds of work and the opportunity to reverse such choices throughout the active life.

In the affluent states of Europe, most of the above mentioned and other social sustainability conditions are linked to employment as it does not only provide the most important source of income, but the entitlement to social security payments is based on earlier participation in the work force, and the social contacts in the work place are essential to the individual well being. So it is only consequent that new concepts of social sustainability need to discuss new models of the welfare state and a new role of paid labour as illustrated by the innovative concept of ”mixed work” mentioned above.

In a similarly qualitative fashion (in form of rules) and also with a certain emphasis given to the future of work the HGF-project (Jörissen et al. 1999) has characterised its social sustainability criteria:

1. Basic supply: A minimum supply of basic needs (habitation, food, clothing, health) and assurance against central risks (illness, invalidity) must be guaranteed for all members of a society.
2. Independent security of subsistence: Security of subsistence through voluntarily taken activities has to be guaranteed all members of a society.
3. Equal opportunities: All members of a society must have equal opportunities concerning access to education, employment and information.
4. Social resources: To guarantee the social cohesion, tolerance, solidarity, ability of integration, orientation towards social welfare, and potentials for non-violent conflict controlling have to be strengthened.

Another highly interesting approach is the one developed by the Institute for social ecology, Frankfurt (Empacher, Wehling 1999). It comprises subjective as well as objective indicators of social sustainability as listed in the following tables.

Table 1: Objective key indicators of social sustainability

Criterion	**Indicator**	**Target**
Basic needs	HPI 2: UNDP Human Poverty Index for Industrialised Countries - % of population with life expectancy not above 60 years - % insufficient reading and writing capabilities (functional analphabetism) - % relative poverty, i.e. incomes below 50% of the national mean income - % long term unemployed	low
Social resources	Average time spent for voluntary activities (incl. community work, caring and politics)	high
Equal opportunities	Gini-Coefficient of income distribution	low
	GEM UNDP Gender empowerment measure: - % women in parliament, leadership in administration and management, in science and engineering jobs, - female share in total labour income	towards 1
Participation	Weighted voter turn out and engagement in other, non-institutionalised kinds of participation	high
Sustaining oneself	Long term unemployment rate, extended unemployment rate	declining
Cultural diversity	Support for developing, sustaining and documenting of a broadly accessible and understandable cultural life in pluralistic diversity by culture, education and research politics.	high

Source: Empacher, Wehling 1999, Kopfmüller 2000

The public acceptance of new policies like those suggested for sustainable development is not least based on the individual, subjective feeling of well-being in the course of the changes. This poses a serious challenge to any innovative policies as people tend to be risk-averting, preferring the current bad to a potential good as long as they have not experienced it (Machiavelli 1524). Therefore not only for the target setting, but even more for a successful implementation process the subjective indicators

are of crucial importance. Empacher and Wehling (1999) have suggested a few such indicators (see table 2).

Table 2: Subjective key indicators of social sustainability

Criterion	Indicator	Target
Basic needs	General life satisfaction	high
Social resources	Share of population who - frequently feel lonely - believes things have become too complicated	low
Equal opportunities	Satisfaction with participation	high
Participation	Satisfaction with political participation	high
Sustaining oneself	(no key indicator)	(no targets)
Cultural diversity	Support for developing, sustaining and documenting of a broadly accessible and understandable cultural life in pluralistic diversity by culture, education and research politics.	high

Source: Empacher, Wehling 1999, modified.

Still another categorisation of objectives and needs has been suggested by Littig (2001). Table 3 includes a number of selected criteria with special relevance for social sustainability as defined in this paper.

Table 3: Selected social objectives, criteria and indicators

Objective	Criterion	Indicator	Goal
social security	basic material security, meeting of needs, social security	??	
health	physical and psychological safety	??	
social integration	involvement in social activities	share of population that is involved in social activities	high
participation	political participation and empowerment	share of population that is participating at political processes	high
gender equity	gender mainstreaming	??	
justice and welfare orientation	solidarity	??	
personal freedom concerning the way of life	freedom to choose different models of ways of life	??	

Source: Littig (2001), modified.

The choice of criteria in projects is based on the social situation in Europe (with the HGF project trying to formulate globally applicable rules, but not indicators) – in countries where the informal sector dominates the economy, where social security is not based on public services but on family solidarity, or where relevant communication happens in the coffee house rather than in the office, other factors than those mentioned here (e.g. paid work) would be more relevant.

3. The Policy Integration Scenario: From Concepts to Strategies

For the project reported here, social sustainability was considered an integrated part of sustainable development, and social sustainability criteria (as well as economic and environmental ones) were used as the normative basis for the scenarios and strategies to be developed. According to this integrated understanding, the social aspect includes the core social objectives as well as those more closely associated with the interlinkages of the social and other dimensions of sustainability. In particular in the integrated policy scenario, social criteria were ranked higher than – due to their partly qualitative nature – could be expressed in the econometric simulation. So while this section focuses on the modelling results, the final assessment in section 4 will pay due respect to the prominent role of qualitative aspects in social sustainability.

The integrated scenario in particular is based on an ecological-economics theoretical background and is thus broader in its focus than the cost-cutting or the conditioned growth approach. The main ideas are derived from the critique of the prevailing policy approach regarding the environment. Alongside the realisation of environmental goals (reduction of CO_2-emissions and material flows), this scenario emphasises social components of sustainability (employment and basic income), as well as the economic (e.g. innovation and competitiveness) and institutional (e.g. participation and gender issues) dimension.

The draft of the scenario underwent a consultation process with societal actors including trade union representatives, environmental NGOs, feminist groups and the churches and was discussed in a final hearing with scientists from economics, social and environmental sciences. The scenario is thus based on a transdiciplinary approach (Mittelstraß 1992), and rightfully claims to be an example of post-normal science (Funtowicz, Ravetz 1993) (more details about the scenarios are provided in Bockermann et al. 2000, Hans-Boeckler-Foundation 2001).

Regarding the social dimension, a variety of non-quantifiable strategies in the fields of education and research, land use, transport and revaluation of non-compensated and/or honorary work are suggested in the scenario. The parameters listed in table 4 were selected to transform these basic orientations into model parameters.

Using and refining them, simulation runs were conducted with PANTA RHEI, the only econometric input-output-model for Germany that captures energy consumption, material flows (Meyer et al. 1999) and, in the most recent version, land use as well.

The simulation runs served as quantitative illustrations of the different strategies and instruments proposed in the scenario. The model divides the economy into 58 sectors, based on the System of National Accounts SNA and is thus able to provide information about inter- and intrasectoral structural change as induced by a certain policy approach. Furthermore, it produces a wide range of standard economic indicators from inflation to investment. The simulation was calibrated 1980 – 1994 and run 2000 – 2020 (for more details and additional references see Spangenberg et al. 2001).

The results provide insights into possible trade-offs between social, economic and environmental variables such as economic growth, unemployment rate and material flows due to specific policy instruments (see table 5).

Table 4: Selected elements of the integrated scenario

Parameter	Comments
Real wage	Orientation on labour-productivity per hour
Working week & overall lifetime work	About 50% of the increase in productivity are transformed into reduction in working hours
Transfers abroad	Foreign aid is increased to 0,7% of GDP until 2010, payments to the EU increase to 2% of GDP until 2010 and then remain constant.
Material Input Tax MIT	Tax on material flows, gradually increased to 31 €/ton in 2020.
CO_2-Tax	Tax on emissions, gradually increased to 128 €/ton in 2020.
Subsidies	Restructuring and reduction between 2000 and 2020 following ecological criteria
Investment-Plan	One third of the revenues gained by a cut in Subsidies are used for

	investment in some economic sectors
Financial policy	Expansive: Discount rate lowered by 1%
Research funding	Expenditures doubled between 2000 and 2020
Value Added Tax	Gradually raised to the EU-average (20%), however, reduced VAT of 10% for certain products which are chosen using social, cultural and ecological criteria

Table 5: Selected scenario results

Parameter (2020, 1991 prices)	**1994**	**Cost cutting**	**Growth**	**Integration-**
Priv. consumption (bio €)	868	1315	1485	1270
GDP (bio. €)	1429	2286	2648	2459
Gross salary (€/h)	13.9	18.4	22.5	21.9
Total work (bio h)	48672	45563	45827	45290
Individual work (h/a*cap)	1550	1375	1255	1226

Source: Hinterberger, Omann 2000

The results of the scenario - simulations clearly indicate that from an economic point of view all three scenarios seem feasible: significant economic growth, rising salaries and private consumption, plus reduced individual working hours are parts of a pattern familiar to Europeans. Surprisingly, integrated sustainability yields more GDP growth than a conservative cost cutting scenario, but the preference for reduced working hours in this scenario limits the growth of private consumption to +46% as compared to +51% in the cost cutting scenario.

In the integrated scenario, the rate of unemployment decreases from 12% in 2000 to about 3% in 2020 with 1.2 millions of unemployed left. This can be considered as full employment, meeting the objective to reduce social problems such as poverty, social exclusion, psychological and socialisation problems and the like. The working time per capita per year is decreasing, the average weekly working time in 2020 is about 27 hours per week. Effects of a more flexible pension age regulation and the re-valuation of non-paid labour (Spangenberg 2002a) are not captured, however, although the decreasing time occupied by paid work enhances the opportunities for unpaid work (caring, community and voluntary work, etc.) thus making appropriate legal and institutional frameworks for these activities more urgent than ever before.

Distributional equity, necessary to fulfil the sustainable development requirement of intragenerational equity, is improving: the trends of a permanently declining labour share in the national income is halted and slightly reversed.

4. Assessment

The first part of the assessment covers the basic narrative evaluation done within the project. In section 4.2 the scenario is evaluated using the criteria presented in Tables 1, 2 and 3 as means for a simple multicriteria evaluation testing if the scenario meets the requirement of being socially sustainable. Section 4.3 shows how the four dimensions influence each other and which interlinkages do exist between them.

4.1 Basic social evaluation of the integrated policy scenario

As discussed in the introduction, one important part of the project “work and environment” was an evaluation of the scenarios developed according to three groups of sustainability criteria: economic, environmental and social. We will focus here on the social evaluation of the scenario and on a critical consideration of the criteria themselves. How are their relations towards each other, do they contradict each other?

In the course of the project, the WZB evaluated the scenarios applying the social criteria developed in the project:

1. self-determined lifestyle through a mix of paid and voluntary work,
2. satisfaction of basic needs,
3. a reliable and sufficient social security system,
4. equal opportunities to participate in a democratic society, and
5. enabling of social innovation and structuring of work types.

As these criteria are qualitative and have not been transformed into quantitative indicators, the evaluation was qualitative as well. Although all elements of the scenarios were evaluated, special emphasis was put on:

- arrangement of paid work,
- arrangement of transformations between different forms of work (paid work, voluntary work), and
- arrangement of social security, in particular basic security.

As the scenarios are highly complex, five priority issues have been singled out from it to serve as a basis for the evaluation. For each of these issues a brief explanation of their relevance and the evaluation based on the above criteria are presented.

Flexibilisation of working time

Relevance: Flexibilisation at work can be seen as an opportunity for employees, as it may improve their quality of life if the flexibilisation provides a high level of self-determination. However, if company interests play a dominating role, the employees have less, not more freedom of choice. They are held in a permanent state of alert which significantly reduces the quality of life for them and their families (Jürgens, Reinecke 1998).

Evaluation (criterion 1): Flexibilisation is an issue in the scenario, including measures to limit the negative consequences for the life quality of the employees affected. It supports individual work arrangements and the avoidance of a “24 hours society”. That is why the scenario can be seen as supporting the flexibilisation policy with priority for the freedom of choice of the working population, trying to minimise the potential negative impacts (Hans-Böckler-Stiftung 2000, p. 467).

Part-time work, gender equity, life-forms:

Relevance: The creation of part-time jobs for **men** and women is an important mean to support gender equity. So far part-time jobs are mostly held by women, who nevertheless are mainly responsible for the household and the children (Hans-Böckler-Stiftung 2000, p. 470). A precondition for the increase of part time jobs is a basic income guarantee and the consideration of caring or voluntary work as additional qualification. Schulze Buschoff (2000) and others have shown that there is a high demand for the reduction of working time for full time workers (more than 50%) and for an extension of working time for part time employees (more than 50%).

Evaluation (criterion 1): It was not possible to model the increase of part-time work with PANTA RHEI, thus the evaluation is based on the qualitative scenario. The scenario favours the creation of part-time jobs for men and women, foreseeing a basic income in the form of a negative income tax. The working time reduction (to 27 hours per week in 2020, a reduction of 27%) is comparable to that of the 1970s-1980s and significantly higher than the current trend. An even stronger reduction of working time would have helped the equal treatment of gender, and would have permitted earlier realisation of working time priorities for full time workers wanting less, and for part time workers wanting more hours of paid work.

Working time reduction and –redistribution, full employment

Relevance: The opportunity to lead a self-determined life central to a socially sustainable development has as one important precondition the ability to sustain oneself based on own work. Hence the employment situation (unemployment, full employment, redistribution of work) is a key criterion of social sustainability.

Evaluation (criterion 1, 2, 3): In the scenario the reduction of paid working time is the basis for a new type of full employment based on "mixed work". Progressive social insurance tariffs, redistribution of work to support part-time employment, and sabbaticals combined with further education are suggested, though not modelled. The increase in labour productivity is partly paid out as higher income and partly as paid working time reduction. The unemployment rate decreases to 3%, but quite slowly. The idea of working time reduction combined with informal activities, supported by a negative

income tax, and part-time jobs corresponding with the phase of life is seen as crucial to fulfil criteria 1 and 2.

Informal work

Relevance: Psychologically as well as socially paid work still plays a decisive role, but regarding the total time devoted to it, the significance is decreasing. On the other hand there is the increasingly important quantitatively dominant role of informal and caring work, making up for about 3/5 of the total working time (Spangenberg 2002c). The increasing relevance is the result of a number of socio-economic processes, including

- flexibilisation eroding the borderlines of paid work and free time (only 56% of the working population in Germany still enjoy 'normal work' conditions (Hans-Böckler-Stiftung 2000, p. 484),
- changing non-continuous labour biographies, with paid work interrupted by periods of adult education, of predominantly voluntary activities and of unemployment,
- the still existing unequal distribution of formal and informal work, payment, reputation and career opportunities between gender.

Evaluation (criterion 1, 4): According to the scenario voluntary (caring, honorary) work shall be seen as providing additional qualification for paid labour. Incentives for a redistribution of caring work to men are planned. Positive elements of formal and informal work shall be transferred to the other one. This way values such as responsibility, precaution etc. shall penetrate into the economy. The evaluation turned out positively in general, but some measures are too vaguely developed. How can a transfer of the negative elements between the sectors be avoided? This transfer might be dangerous and is not explicitly dealt with in the scenario.

(Social) Innovations and participation

Relevance: Innovations are a central category of sustainable development. Complex systems innovations are gaining importance, away from technical innovations towards the relations between organisational, technical, social and institutional innovations. Active participation at economic, political and social processes is desired. Social innovations shall be strengthened. They comprise: 1. new organisational, institutional or procedural solutions, 2. more efficient than previous solutions from the perspective of their supporters, 3. combined with a change within social relations and 4. a shift of production factors, and 5. have to be stabilised and influence the direction of societal change.

Evaluation (criterion 4, 5): The scenario promotes a new understanding of progress. (Social) innovations shall be supported through the extension of societal and company participation, education, higher expenditures for research and education. The evaluation is positive, as there is a broad participation approach, emphasis on education as frame conditions for social innovations. What is missing is a systematic link of the social innovation in all areas of the scenario.

Social security

Relevance: In Germany, the key conditions for social security include safeguarding the standard of living and in particular avoiding poverty. Poverty hinders sustainable development, although poor people use less resources and material input. Social security is a precondition for sustainable development as it opens possibilities for actions based on conscious decisions. An immaterial increase of welfare can only start beyond poverty (Hans-Böckler-Stiftung 2000, p. 509).

Evaluation (criterion 3): The main instrument for social security in the scenario is the negative income tax (for more details see Ziegler 2002), integrating and thus replacing a variety of social transfers. By being set slightly above the poverty level, it virtually eradicates poverty, but does not guarantee a sustained standard of living in general. Other consequences of the negative income tax are quite unsure. Does it support informal work and gender equity as expected? Will people be abusing it?

In a nutshell, the reduction of unemployment and the improvement of the immaterial quality of life through reduced working time are evaluated positively. Qualitative social aspects are considered, such as time management, relation of paid work and informal work, gender issues. On the other hand, there is a number of critical issues: the consequences of changes of paid work are not considered in detail; a stronger reduction of working time might provide earlier relief on the labour market; social innovations are intended, but not concrete; a development perspective of social security beyond subsistence security is missing.

How are the criteria related among each other? Are there synergistic and/or antagonistic effects? Both kinds of effects can be found in the set of criteria used as illustrated by the following examples, based on the five social criteria, plus an economic one, the "*fair distribution of burdens between generations".*

Synergistic effects: Criterion 1, the self-determined lifestyle supports the chances to participate in democratic processes, as self-determination of lifestyle includes not only labour but also other activities. The other way round, the fulfilment of criterion 4 supports the will to determine about one's life, including labour (criterion 1). Both criteria influence each other in a positive way.

The satisfaction of basic needs (criterion 2) provides personal freedom to decide about one's own lifestyle and to grasp the opportunities to participate in social processes (criterion 4). This participation can in turn increase well-being and psychological health, strengthening the satisfaction of immaterial needs, also called for in criterion 2.

Antagonistic effects: Applying the concept of mixed work (criterion 1) might reduce the monetary income which might hinder the satisfaction of basic needs (criterion 2). However, if social security is guaranteed according to criterion 2 (e.g. by basic income as in the scenario), then there is no trade-off.

There might be antagonistic impacts on intergenerational justice (the new criterion 6) if with the resource base given income and satisfaction of basic needs (criteria 1 – 3) cannot be provided for the present generation without significantly increasing the burden for future generations.

4.2 Mulitcriteria Evaluation

Based on the qualitative evaluation of the preceding section, a deepened one is performed in this section. For this purpose, a simple form of a multicriteria evaluation is used. MCDA stands for Multicriteria Decision Aid, as these methods are used mainly for decision analysis or aid. Their basic ideas, however, can as well be used for evaluations or assessments.

4.2.1 Short introduction into MCDA

Multicriteria methods belong to the family of non-monetary evaluation methods (Munda et al. 1994b). The approach of MCDA is a broad set, including different methods presenting decision aid or evaluation tools. It is generally used for decision problems with various objectives (Zimmermann, Gutsche 1991). As these objectives are operationalised with one or more criteria, various criteria exist. MCDA methods differ from conventional methods as they are taking into account a set of objectives and criteria, that can be conflictual, multidimensional, incomparable and incommensurable. The information contained in the criteria and concerning the effects of the decision can be uncertain as well as qualitative (Munda 1995). Considering the social sustainability dimension (section 2) and its criteria, it is obvious that many of these characteristics apply (f. ex. uncertain, qualitative, incommensurable).

Another characteristic besides multiple criteria is the variety of scales to measure the criteria. Some criteria can be transformed into quantitative indicators, others use qualitative parameters, presented in linguistic terms such as good, moderate, bad. Qualitative parameters can be used directly as linguistic variables or can be transformed into cardinal ones and then used as quantitative variables (Munda et al. 1994a).

They are able to tackle environmental-economic-social integration, multiple use, inter-regional spatial links and trade-offs, families of conflictual criteria, qualitative information and uncertainty. They are thus of fundamental importance for the concept of sustainable development (Munda et al. 1994a, p.6) and present an appropriate tool to operationalise efficiency and sustainability criteria.

The concept of MCDA is perfectly compatible with the concept of ecological economics (Munda et al. 1994b); it leads away from economic commensurability and strong comparability of neo-classical economics and of CBA towards multi-criteria evaluation of evolving realities (Martinez-Alier 1998, p. 283).

In the case of a multicriteria problem, the concept of one optimal solution does not hold, as there is in general no action that dominates the others with respect to all criteria considered. Consequently, solving a multicriteria problem does not mean searching for one single optimum, but helping the decision maker in bringing more transparency into the problem and thus in advancing towards a solution. The objective is not to obtain simultaneously the "best" value for each parameter but to choose convenient values, with parameter performing "too badly" (Roy, Vanderpooten 1996, p. 28). The resulting decision is mostly a compromise, depending on different factors, including the

personality and preferences of both the decision makers and the stakeholders, but also on the prevailing circumstances,

Basically a MCDA is done in the following steps (Munda et al. 1994a; Strassert 1995).

Table 6: The steps of a MCDA

Step 1: definition and structuring of the decision/evaluation problem
Step 2: definition of the objectives
Step 3: generation and clear definition of the options/alternatives
Step 4: definition of a set of evaluation criteria and their indicators
Step 5: preparation of the decision - elaboration of the impact table
Step 6: identification of the preferences of the decision makers and the affected groups of the society
Step 7: choice and application of an aggregation procedure
Step 8: interpretation of the result and application of sensitivity and/or robustness analyses

Step 1:

In order to apply any decision analysis or an evaluation, a definition of the decision/evaluation problem at hand is necessary as a starting point for the MCDA. Without this, it is not possible to know which decision need to be made or what shall be evaluated according to which goals.

Step 2:

The elicitation of objectives and the acceptable form of the solution is undertaken in a common process with all stakeholders.

Step 3:

If a decision is to be prepared, the different alternatives have to developed and described carefully, no matter if the aim is to choose the best option, to generate a ranking or to group the alternatives.

Step 4:

Criteria are used to operationalise the objective(s) and to compare and evaluate the potential alternatives according to a well-defined point of view. The consistent family of the criteria should represent the different aspects of the problem at hand while avoiding redundancies (Vincke 1992). Requirements for the set of criteria are: it has to be complete, operational, minimal, and non-redundant.

The criteria may be conflicting, which means that benefiting one criterion detracts from at least one other criterion. Measures that increase environmental and social sustainability have often adverse effects on economic objectives such as economic growth. MCDA reflects these conflicts and tries to find ways to minimise the existing trade-offs.

Step 5:

The data which is needed for the application of the MCDA method is usually summarised in a so called impact matrix. The entries in this matrix are used to represent the evaluation of an option according to a criterion made concrete through its impact (sometimes also called evaluation or performance).

Step 6:

The elicitation of the preferences needs the involvement of stakeholders. With their support, the importance of the criteria has to be determined, which usually leads to the formulation of weights. These weights are then assigned to criteria.

Step 7:

The aggregation procedure is at the heart of the MCDA. It is often called **the** method, transforming the given information into a solution, aggregating over the criteria and/or alternatives. Usually a computer software is used for the different variants of MCDA.

Step 8:

The analysis itself does not result in final recommendations. It is necessary to interpret the result, given the information used in the different steps. Additionally, a sensitivity analysis or robustness analysis is imperative. It helps to increase the understanding of the results, their impacts and their potential support. The most common way to do this analysis is by means of variations of weights and preferences. This way it can be seen which criteria are crucial, and which can be neglected because of their minor influence on the result.

4.2.2 A multicriteria social sustainability evaluation of the scenario

For a simplified multicriteria evaluation of the social dimension of the integrated scenario, the steps of the MCDA are applied one by one:

Step 1: The problem is defined as to evaluate the social dimension of the integrated scenario against the reference scenario based on business as usual (BAU) politics in Germany.

Step 2: The objective is to reach social sustainability (see section 1) in Germany as soon as possible.

Step 3: The options for our case is the BAU and the integrated scenario. The changes occurring as a result of the politics implemented in the scenario provide the base for this evaluation.

Step 4: The evaluation is performed using the six criteria already known from section 4.1.

Step 5: A simple impact matrix for the six criteria and the option “integrated scenario” is presented in table 7. The change from the status quo is measured on a qualitative scale with 5 steps: aggravation, no change, slight improvement, improvement, or strong improvement as compared to the BAU scenario. They are numbered according to the Austrian school marks system, 1 (best) to 5 (failed).

Table 7: Impact Matrix according to the project criteria

Criterion	Impact of the option “integrated scenario”	Ordinal evaluation
1 (self-determined life and mixed work)	improvement	2
2 (satisfaction of basic needs)	strong improvement	1
3 (reliable and sufficient security system)	strong improvement	1
4 (equal opportunities, participation, democracy)	improvement	2
5 (social innovation)	improvement	2
6 (intergenerational equity)	slight improvement	3

ad 1: There is an obvious improvement, but still with a focus on paid work.

ad 2: With the negative income tax (see criterion 3) material basic needs are satisfied.

ad 3: The negative Income Tax stands for a tax funded general basic income guarantee above the poverty threshold, with transfers decreasing with earned income.

ad 4: A variety of measures in the scenario is intended to support participation, gender equity and so forth. However, regarding their effectiveness uncertainties still exist.

ad 5: The evaluation has been positive, but a systematic link between all areas of the scenario is lacking.

ad 6: The scenario provides an attempt to set conditions for burden sharing between generations; success is most obvious in the environmental dimension.

Step 6: This evaluation is done to “test” the validity of the verbal evaluation by means of a simplified multiciteria approach. Stakeholders were not involved and thus no preferences are elicited. Nevertheless for demonstration purposes different weights are allocated to different criteria below.

Step 7: The evaluation compares two alternatives (the BAU and the integrated scenario), evaluated according to an ordinal scale. If equal weight for each criterion is assumed, and if homogeneity of the

ordinal scale and equidistant classes 1 to 5 are assumed, the evaluations can be read as a quantitative ordinal scale and aggregation procedure can be a very simple one, such as the weighted sum. These assumptions, however, are not verified here.

In this case, the overall result can be derived as the sum of impacts divided by number of criteria as 11/6 = **1.833**.

Step 8: The result of the valuation is good, though not perfect. In case a higher priority is given to a specific criterion and correspondingly a higher valuation factor is chosen – say tripling the importance of poverty reduction through a reliable and sufficient social security system – the result is modified. Based on these assumptions it would be 13/8 = 1.625 If intergenerational equity were the factor to be given triple weight, the result would be 17/8 = 2.125. In either case, the result would be good, but not perfect, indicating a rather sufficient stability of the evaluation outcome.

4.2.3 Evaluation with an extended set of criteria

The purpose of this extended evaluation is to test if the scenario is still evaluated as socially sustainable if the set of social sustainability criteria is changed, i.e. if the result is a mere methodological artefact or can be based on a broader set of social science analyses. This comparison can as well be seen as a specific kind of sensitivity analysis. Instead of changing weights (as demonstrated above, but making more sense, if stakeholders are involved who elicit their preferences) the set of criteria is enlarged.

For this exercise, steps 1 to 3 remain the same as in the section 4.2.2.

Step 4: The criteria from Tables 1 to 3 are checked, whether they are complete, operational, non-redundant and minimal. This is not self-explaining, as in general the number of social indicators is high and many of them are fuzzy, not operational.

Selection of criteria from tables 1 and 2:

Basic needs as defined in the research underlying the tables are measured differently than in the project. Hence it is taken as an additional criterion.

Social resources: introduces a new component and is taken as a new criterion.

Equal opportunities is partly included in criterion 4, but with an emphasis on equal distribution of resources, high social mobility, and social inclusion.

Objective participation is covered by criterion 4.

As the indicators of *cultural diversity* are the same for the objective and the subjective criterion they are considered as one criterion.

From table 3, only *Justice and welfare orientation* is not covered yet and thus taken as an additional criterion.

The resulting new list of criteria contains 16 conditions for socially sustainable development from four independent research projects:

1. self-determined lifestyle including a mix of paid and informal work;
2. satisfaction of basic needs (habitation, food, clothing, mobility, information) including physical and psychological health;
3. a reliable and sufficient social security system
4. equal opportunities to participate in a democratic society
5. enabling of social innovation and structuring of work types
6. fair distribution of burdens between generations
7. objective basic needs
8. subjective basic needs
9. objective social resources
10. subjective social resources
11. objective equal opportunities
12. subjective equal opportunities
13. subjective participation

14. objective sustaining oneself
15. cultural diversity
16. justice and welfare orientation

As a first result, the core criteria from the project turn out to be essential to other evaluation systems as well, indicating that they are suitable, but maybe too narrow. If the extension of the criteria applied makes a difference regarding the evaluation outcome is tested in the next steps by applying all criteria simultaneously.

Step 5: The impact matrix is developed the same way as in the evaluation above.

Table 8: Impact matrix with broad set of criteria

Criterion	Impact of the option "integrated scenario"	Ordinal evaluation
1 (self-determined life and mixed work)	improvement	2
2 (satisfaction of basic needs)	strong improvement	1
3 (reliable and sufficient security system)	strong improvement	1
4 (equal opportunities, participation, democracy)	improvement	2
5 (social innovation)	improvement	2
6 (intergenerational equity)	slight improvement	3
7 (objective basic needs)[a]	strong improvement	1
8 (subjective basic needs)	improvement	2
9 (objective social resources)	improvement	2
10 (subjective social resources)	slight improvement	3
11 (objective equal opportunities)	improvement	2
12 (subjective equal opportunities)	improvement	2
13 (subjective participation)	improvement	2
14 (objective sustaining oneself)[b]	strong improvement	1
15 (cultural diversity)	slight improvement	3
16 (justice, welfare orientation)	slight improvement	3

a: quantitative indicator: HPI-2 b: quantitative indicator: long-term unemployment rate

Of course, this interpretation of the scenario results is subjective as quantifiable criteria are not available (except for criteria 7 and 14) to test the evaluation and in particular the equidistance of the different evaluations. The intersubjective agreement of the authors, however, has been solidified by presenting the results to stakeholders and taking account of their points of view. Furthermore, the evaluation against each criterion is done by explicitly arguing as pointed out below.

Criteria 1 to 6 are given the same impacts as in Table 7.

ad 7: The indicator suggested by Empacher and Wehling (1999) is the HPI-2. The exact calculation of this index is as follows (UNDP 2001):

$HPI\text{-}2 = [1/4 (P_1^{\alpha} + P_2^{\alpha} + P_3^{\alpha} + P_4^{\alpha)}]^{1/\alpha}$

Where:

P_1 = Probability at birth of not surviving to age 60 (times 100)

P_2 = Adults lacking functional literacy skills

P_3 = Population below income poverty line (50% of median disposable household income)

P_4 = Long-term unemployment rate (lasting 12 months ore more)

The HPI-2 in Germany of 1999 was **10,5%**, with the probability at birth of not surviving to age 60 10,6%, the rate of adults lacking functional literacy skills 14,4%, the rate of population below income poverty line 7,5% and the long-term unemployment rate 4,5% (UNDP 2001).

Based on the suggestions and assumptions in the scenario the probability at birth of not surviving to age 60 is expected to decrease to about 8%, and the rate of adults lacking functional literacy skills to about 5%. The rate of population below the income poverty line as well as the long term unemployment rate are expected to approach 0%. .

The resulting HPI-2 is $[1/4(8^3 + 5^3 + 0^3 + 0^3)^{1/3}$ **= 5,42%.**

This corresponds to a reduction of slightly less than 50%, representing a quite significant improvement. The countries with the lowest HPI-2 in 1999 were Sweden with a HPI-2 of 6,8%, Norway with 7,5% and the Netherlands with 8,5%.

ad 8: Resulting from the objective factors mentioned in 7 and a variety of additional measures in the scenario the objective preconditions are there for the subjective satisfaction to increase: basic needs are satisfied, freedom concerning forms of life and work is guaranteed, social security is improved. Different groups of the society were interviewed before developing the scenario about their needs and desires for the future, and the results integrated in the scenario. However, the feedback procedure after completing the scenario involved only a part of those groups.

ad 9: The average working time is reduced, providing more spare time which probably will be used for voluntary activities to a certain extent (Spangenberg 2002a).

ad 10: The evaluation of this criterion is based on the assumptions applied in scenario development. With more leisure time, better social service and higher value attributed to caring activities there should be less people feeling lonely and confused. This assessment, however, is a vague one, and based on optimism regarding the effectiveness of the measures suggested. To be on the safe side, only a slight improvement is assumed in the evaluation.

ad 11: The data provided by the simulation do not permit to calculate the Gini-Coefficient (suggested indicator for this criterion together with the GEM). However, a slight increase of the labour share in the functional income distribution indicates an end to the redistribution process from the bottom to the top of the income pyramid which dominated the last decades. On the income distribution within the labour force no further assessment can be made.

Concerning the GEM, no quantitative data can be provided, but as a consequence of the explicit gender empowerment policy inherent to the scenario more women are expected to hold leadership positions in parliament, administration, management and science. Similarly, the female share in total labour income is expected to increase, although the simulation runs do not provide data on this question.

ad 12: Based on the trends explained above, an improvement in the subjective satisfaction with participation opportunities is expected.

ad 13: Political participation is explicitly supported by improving information rights and NGO rights to appeal in court, by calling upon civil society organisations to open up to more participatory approaches, and by introducing direct democracy on the local and regional level. If these measures are effective, there is a high probability that satisfaction in this area is increasing.

ad 14: During the 20 years of the simulation the unemployment rate (for paid work) is decreasing to 3% which can be called full employment. Long term unemployment will virtually cease to exist under these circumstances, and the increasing employment rate decreases the number of unregistered unemployed.

ad 15: Policy measures supporting culture and arts are foreseen in the scenario; the expenditures for education and research are assumed to double.

ad 16: Overall justice within one generation, between men and women etc. is increasing, but concerning solidarity no estimations can be made.

Step 6: see evaluation in 4.2.2.

Step 7: We stick to the simple aggregation method and obtain a value of 32/16 = **2.0**. Thus the overall evaluation is slightly worse than with the original set of the 6 criteria used in the project, but the judgement "good, but not perfect" remains unchanged. The new value lies is in between the two variants based on different weights as illustrated in section 4.2.2.

Step 8: Two questions can be answered with this evaluation.

1. Are the narrative evaluation of the project and the more formal one based on the immanent set of criteria still valid, if an extended set of criteria is applied? The result can be understood to confirm the evaluation according to the project criteria, while illustrating the variability resulting from the choice of criteria. According to all measures, the integrated scenario significantly improves social sustainability.
2. Is the result obtained in 4.2.2 stable in a sensitivity analysis? As no stakeholder involvement was part of the evaluation process, attaching differing weights to the criteria could only be done for illustration purposes. However, the results as well as those of the second analysis using an extended set of criteria confirm that the result is indeed stable.

4.3 Linkages between the dimensions in the project

The scenarios evaluated in section 4.1 and 4.2 have been analysed to identify core action zones of an integrated sustainability policy (Hans-Boeckler-Foundation 2001, p. 44 ff). As the evaluations have demonstrated, social sustainability is one of the core objectives of the scenarios, and this is reflected in the policy suggestions. Five such action zones were found to be essential to achieve sustainable development in an interdisciplinary discourse: all participating disciplines had to agree on them as representing backbones of a sustainability strategy before they were included in the final list:

1. Environmental concept for structural change,
2. Social concept for structural change,
3. Technological and social innovation,
4. Working hours policy, and
5. Changing consumption patterns.

Each of them has been analysed from an economic, an environmental, and an employment and social perspective, combining policy proposals from different schools of thought and selecting the common minimum as core policy suggestions.

Social sustainability is at the heart of action zones 2 (social concept) and 4 (working hours), but in order to produce the positive results obtained from the scenarios social objectives have been included in each action zone. So for instance the extension of worker participation rights through an environmental mandate of works councils is a social sustainability element in action zone 1, the environmental concept for structural change. Extended participation is expected to yield enhanced levels of (social) innovations (action zone 3), providing synergies between economic, environmental and social objectives. In action zone 5, consumption patterns, the strengthening of self-help and self-provision is a clear social objective.

While it goes without saying that social concerns are predominant in action zones 2 and 4, these as well include economic and environmental objectives. So in the former, the social concept for structural change includes economic concerns like the stabilisation of the budgets of existing social security systems, and environmental ones like support for voluntary activities including environmental protection. In action zone 4, working hours policy, flexibilisation of working times is an economic objective, while supporting reduced working hours with further education including environmental issues is an environmental one.

Although a detailed analysis of the synergies between the five action zones is beyond the scope of this paper, one conclusion that can be drawn from this section is the existence of a lot of them. Basic sustainability targets from an economic, an environmental and a social point of view are not identical, but they offer significant room for a reconciliation of otherwise diverging policy approaches. However, this synergetic effect of social, economic and environmental politics is by no means self-explaining: it depends on a variety of policy decision that need to be taken with the full spectrum of objectives in mind – otherwise the undeniably existing trade-offs may gain a dominant role. A political, discursive process based on best available scientific insight is vital to realise these opportunities and to minimise the trade offs.

5. Outlook, Conclusions

Sustainable development is usually defined to comprise three dimensions, economic, social and environmental. In more recent debates, a fourth dimension – the institutional one – has been added to the scheme. Whereas for the environmental dimension a wealth of sustainability objectives and indicators for monitoring exists, this is much less the case for the other dimensions, in particular for the social one.

The scenarios developed in the German ”Work and Environment” project were equally based on environmental, social and economic criteria. They demonstrate that – despite all trade offs between environmental and social sustainability (Spangenberg et al. 2002) – compromises can be found that pay due respect to all dimensions of sustainable development (Hans-Boeckler-Foundation 2001). With a proper selection of policy measures it is possible not only to reduce environmental pressures and increase economic prosperity, but as well to contribute to social sustainability. This has been demonstrated by performing a number of multicriteria evaluations, narrative and formal, based on different sets of social sustainability criteria.

As a result of this analysis, the possibility to develop integrated policies for sustainability with equal emphasis given to the social dimension has been demonstrated. However, so far the body of knowledge on social sustainability is quite limited, in particular as researchers from the sustainability discourse are primarily engaged with the environmental and the economic dimension, while social science researchers only in exceptional cases have got involved in sustainability research. In particular for the further development of sustainability as a political paradigm, both these deficits in providing scientific input have to be overcome.

Multicriteria analysis has been demonstrated to be an appropriate evaluation tool for the difficult task of assessing social sustainability. However, due to the multidimensional optimisation inherent to sustainability strategy development, this cannot be expected to lead to a hierarchy of options allowing to identify one optimal solution ("vertical MCA" in Spangenberg 2001a), but will rather result in a spectrum of sustainable solutions to chose from ("horizontal MCA") according to the preferences of the stakeholders involved.

A systematic analysis of the role of social aspects in implementing a sustainability strategy and its diverse policy recommendations in a broad set of political action zones will be performed to complete the analysis. However, this cannot be dealt with in this paper

References

Bockermann, A., Meyer, B., Omann, I., Spangenberg, J.H. (2000), *Modelling Sustainability with PANTA RHEI and SuE. Beiträge des Instituts für empirische Wirtschaftsforschung Nr. 68*, Universität Osnabrück, Osnabrück.

Brandt, H. (Ed.) (1997), *Nachhaltigkeit - eine Herausforderung für die Soziologie*, Buderich und Leske, Opladen.

Daly, H. E. (1991), *Steady State Economics*, Covelo, Washington.

Empacher, C., Wehling, P. (1999), *Indikatoren sozialer Nachhaltigkeit*, ISOE Diskussionspapiere 13.

European Council (2001), *Presidency Conclusions*, Göteborg European Council, European Council.

Fukami, M. (1999), *Monetary Valuation of Unpaid Work in 1996 in Japan*, Centre for Development Alternatives, International Seminar on Time Use Studies, Centre for Development Alternatives.

Funtowicz, S. O., Ravetz, J. R. (1993), *Science for the post-normal age*, Futures, 25 (7), pp 739 - 755.

GRI Global Reporting Initiative (2000), *Sustainability Reporting Guidelines*, GRI, Boston MA.

Grunwald, A., Coenen, R., Nitsch, J., Sydow, A., Wiedemann, P. (Ed.) (2001), *Forschungswerkstatt Nachhaltigkeit: Wege zur Diagnose und Therapie von Nachhaltigkeitsdefiziten*, edition sigma, Berlin.

Hans-Böckler-Stiftung (Ed.) (2000), *Arbeit und Ökologie, Endbericht*, Setzkasten, Düsseldorf.

Hans-Boeckler-Foundation (Ed.) (2001), *Pathways towards a sustainable future*, Setzkasten, Düsseldorf.

Hinterberger, F., Omann, I. (2000), *Möglichkeiten und Grenzen einer ökologisch-sozialen Entwicklung*, perspektiven ds, 17 (2), pp 21-32.

IPCC Intergovernmental Panel on Climate Change (2000), *IPCC Special Report: Emission Scenarios*, IPCC, New York, Nairobi.

Jörissen, J., Kopfmüller, J., Brandl, V., Paetau, M. (1999), *Ein Integratives Konzept nachhaltiger Entwicklung*, FZ Karlsruhe Research Reports, FZKA 6393, Karlsruhe

Jürgens, K., Reinecke, K. (1998), *Zwischen Volks- und Kinderwagen. Auswirkungen der 28,8-Stunden-Woche bei der VW AG auf die familiale Lebensführung von Industriearbeitern*, edition sigma, Berlin.

Kopfmüller, J., Brandl, V., Sardemann, G., Coenen, R., Jörissen, J. (2000), *Vorläufige Liste der Indikatoren für das HGF-Verbundprojekt*, HGF Project Working Papers, Karlsruhe

Littig, B. (2001), *Zur sozialen Dimension nachhaltiger Entwicklung*, Strategy Group Sustainability.

Machiavelli, N. (1524), *Il Principe*, German editiion: Der Fürst, Insel Verlag, Frankfurt 1990.

Martinez-Alier, J., Munda, G., O'Neill, J. (1998), *Weak comparability of values as a foundation for ecological economics*, Ecological Economics 26, pp 277-286.
Metzner, A. (2000), *Caring Capacity and Carrying Capacity - A Social Science Perspective*, Paper presented at the INES 2000 Conference: Challenges for Science and Engineering in the 21st Century, Stockholm
Meyer, B., Bockermann, A., Ewerhart, G., Lutz, C. (1999), *Marktkonforme Umweltpolitik*, Physica, Heidelberg.
Mittelstraß, J. (1992), *Auf dem Wege zur Transdisziplinarität*, GAIA, 1 (1), pp 5-11
Munda, G. (1995), *Multicriteria Evaluation in a Fuzzy Environment*, Physica, Heidelberg.
Munda, G., Nijkamp, P., Rietveld, P. (1994a), *Multicriteria Evaluation in Environmental Management: Why and How?*, Paruccini, M., Applying Multiple Criteria Aid for Decision to Environmental Management, Kluwer Academic Publishers, Dordrecht.
Munda, G., Nijkamp, P., Rietveld, P. (1994b), *Qualitative multicriteria evaluation for environmental management*, Ecological Economics, 10 (1), pp 97-112.
OECD (2001a), *The Well-being of Nations. The role of human and social capital*, OECD, Paris.
OECD (Ed.) (2001b), *Analytic Report on Sustainable Development SG/SD(2001)1-14*, OECD, Paris.
Omann, I. (2000), *How can Multi-criteria Decision Analysis contribute to environmental policy making? A case study on macro-sustainability in Germany*, Paper presented at the 3rd Biannual Conference of the European Society for Ecological Economics, Transitions Towards a Sustainable Europe. Ecology-Economy-Policy.
Omann, I. (2002), *Materialinputsteuer als Instrument sozial-ökologischer Nachhaltigkeit - ein Versuch der Integration*, Spangenberg, J. H., Nachhaltigkeit in Deutschland. Ein ökologisch-soziales Szenario, oekom, München, pp
Opielka, M. (1997), *Kein Wachstum - kein Sozialstaat ?*, ISÖ Working Papers, 7/97, Bonn
Pearce, D. W., Atkinson, G. (1993), *Capital Theory and the Measurement of Sustainable Development: An Indicator of Weak Sustainability*, Ecological Economics, 8 (1), pp 103-108.
Roddick, J. F. (1998), *El Nino, El Viejo, and the global re-shaping of Latin America: surviving the UNCED coups*, Manuscript, Edinburgh University, Edinburgh.
Roy, B., Vanderpooten, D. (1996), *The European School of MCDA: Emergence, Basic Features and Current Works*, Journal of Multicriteria Decision Analysis, 5, pp 22-38.
Schmidt-Bleek, F. (1999). *The Fossil Makers.* www.factor10-institute.org
Schulze Buschoff, K. (2000), *Vom Normalarbeitsverhältnis zur Flexibilisierung - über den Wandel der Arbeitszeitmuster: Ausmaß, Bewertung und Präferenzen.*, WZB Discussion Paper. WZB,Berlin.
Serageldin, I. (Ed.) (1997), *Expanding the Measure of Wealth; Indicators of Environmentally Sustainable Development*, The World Bank, Washington, D.C.
Spangenberg, J. H. (2001), *Investing in Sustainable Development*, Int. J. Sustainable Development, 4 (2), pp 184-201.
Spangenberg, J. H. (2002a), *The changing contribution of unpaid work to the total standard of living in sustainable development scenarios*, Int. J. Sustainable Development, accepted for publication.
Spangenberg, J. H. (2002b), *Development of Institutional Sustainability Indicators*, Sustainable Development (accepted for publication).
Spangenberg, J. H. (2002c), *Sustainable Development - A New Challenge for Landscape Design*, Landscape Design, accepted for publication.
Spangenberg, J. H., Omann, I., Hinterberger, F. (2002d), *Sustainable growth criteria. Minimum benchmarks and scenarios for employment and the environment*, Ecological Economics, accepted for publication.
Strassert, G. (1995), *Das Abwägungsproblem bei multikriteriellen Entscheidungen*, Peter Lang, Frankfurt.
UNDP (2001) *Human Development Report 2001*.
UNDPCSD UN Division for Sustainable Development. Department of Policy Co-ordination and Sustainable Development (1995) *Work Programme on Indicators of Sustainable Development, Document UN/E/CN.17/1995/18.* United Nations, New York.
UNDPCSD UN Division for Sustainable Development. Department of Policy Co-ordination and Sustainable Development (1996), *Indicators of Sustainable Development, Framework and Methodologies*, United Nations, New York.
UNDSD Division for Sustainable Development. UN Department of Economic and Social Affairs (2000), *Indicators of Sustainable Development, Framework and Core Set, Draft of September 20th, 2000*, United Nations, New York.
UNECOSOC United Nations Economic and Social Council (2001), *Implementing Agenda 21 - Report of the Secretary General*, UN Documents, Advance Unedited Text E/CN.17/2002/PC.2/..., New York
United Nations (Ed.) (1993), *Earth Summit: Agenda 21, the United Nations programme of action from Rio*, United Nations, New York.
Valentin, A., Spangenberg, J. H. (2000), *A guide to community sustainability indicators*, Environmental Impact Assessment Review, 20 pp 381-392.
Vincke, P. (1992), *Multicriteria Decision-Aid*, John Wiley & Sons, Chichester.
WCED World Commission on Environment and Development (1987), *Our Common Future*, Oxford University Press, Oxford.
Ziegler, R. (2002), *Materialinputsteuer als Instrument sozial-ökologischer Nachhaltigkeit - ein Versuch der Integration*, Spangenberg, J. H., Nachhaltigkeit in Deutschland. Ein ökologisch-soziales Szenario., oekom, München, pp
Zimmermann, H. J., Gutsche, L. (1991), *Multi-Criteria Analyse*, Springer, Berlin, Heidelberg, New York.