Wider economic and social implications of sustainable economy approaches

Some insights from a scenario exercise

For sustainable economy approaches to gain more political support and be more present in forums of public debate, they must be allowed to have their wider economic and social implications subjected to scrutiny. Our focus is on the nexus of intended emission reduction and unintended structural implications on the economy. In order to gain insights into the possible implications, we construct two sustainable economy scenarios for Germany. The scope of these scenarios is based on 30 research projects of the funding measure Sustainable Economy. *Our model based analysis shows that the effects of these scenarios on emissions are in the order of magnitude of seven to twelve percent of German annual CO_2-emissions. The net effects on employment are moderate, but labor markets face huge challenges in managing the high number of job turnovers.*

Rainer Walz, Clara Oldenburg, Matthias Pfaff, Johannes Schuler, Matthias Gotsch, Frank Marscheider-Weidemann, Michael Hiete

Wider economic and social implications of sustainable economy approaches. Some insights from a scenario exercise
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There are an increasing number of research projects on the sustainable economy, such as those funded by the German Federal Ministry of Education and Research (BMBF) in its *Social-Ecological Research* program *(SOEF)* on the *Sustainable Economy (Nachhaltiges Wirtschaften, NAWI)*. Within this funding measure, 30 research projects (*NAWI* projects) investigated a variety of approaches for a sustainable economy. A few looked at systemic behavior on the meta level, such as transformation paths and public welfare. Others focused on company strategies, such as managing value chains or involving employees, or on new methodologies, such as living labs or tools for sustainability evaluation. Most projects, however, focused on sector-specific approaches to sustainable consumption and production, such as mobility, housing, the sharing economy, soft tourism, sustainable diets and clothes (see the description of the funding measure *Sustainable Economy* in the introduction to this special issue and additional information in the online supplement, appendix 11). The approaches investigated in the *NAWI* projects have in common that they do not focus on technological innovations, but intend to change consumption patterns and business models (see additional information in the online supplement, appendix 1).

However, there is limited information about the intended environmental implications of the approaches investigated in these projects (see also online supplement, appendix 1, with a survey of the 30 *NAWI* projects). From the perspective of policymakers, it is not only the magnitude of the intended effects of emission reductions that is important, but also the magnitude of any unintended effects on production, employment and income within the economy. In particular, the question about which sectors and which groups might be affected is important from the perspective of political economy: agency and the political power of groups affected by the policies determine whether policies can be agreed on, and what accompanying measures are necessary to adjust policies to the needs of the potential losers. In addition, not only the interests of companies matter. Sectoral and regional economic effects translate into social impacts on those employed within these sectors. The ongoing debate about Germany's phaseout of lignite shows the importance of such implications.

The wider economic implications of climate policies were investigated early on (see Walz and Schleich 2009 for an overview of German studies). More recently, the debates about renewable

Prof. Dr. Rainer Walz | Competence Center Sustainability and Infrastructure Systems | +49 721 6809236 | rainer.walz@isi.fraunhofer.de

Clara Oldenburg, MA | clara-oldenburg@t-online.de

Matthias Pfaff, MA | matthias.pfaff@isi.fraunhofer.de

Dr. Johannes Schuler | johannes.schuler@isi.fraunhofer.de

Prof. Dr. Matthias Gotsch | matthias.gotsch@isi.fraunhofer.de

Dr. Frank Marscheider-Weidemann | frank-marscheider-weidemann@isi.fraunhofer.de

all: Fraunhofer Institute for Systems and Innovation Research ISI | Breslauer Str. 48 | 76139 Karlsruhe | Germany

Prof. Dr. Michael Hiete | Ulm University | Chair of Business Chemistry | Ulm | Germany | michael.hiete@uni-ulm.de

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energy support, or about the *German Climate Action Plan 2050* are now accompanied by such impact analysis (Duscha et al. 2016, Öko-Institut et al. 2018, Sievers et al. 2019). As well as climate policy, a few studies have been conducted on the circular economy (Walz 2011, Pfaff and Sartorius 2015, Distelkamp and Meyer 2017). These studies indicate that a circular economy will have small positive net employment effects, but substantial structural implications.

The starting point of our essay is the claim that sustainable economy approaches must be willing to subject themselves to scrutiny with regard to their wider economic and social implications. In order to demonstrate the need for such an undertaking, we performed a scenario exercise, which illustrates the wider economic and social implications of sustainable economy approaches. Thus, our essay is not based on a fully-fledged study which analyzes the emission reduction potential of sustainable economy approaches and the resulting effects in detail. In particular, we do not intend to quantify the emission reductions that can be achieved by sustainable economy approaches. Instead, our focus is on the nexus of intended emission reduction and unintended structural implications on the economy. The *NAWI* projects aim to reduce emissions. At the same time, they intend to preserve – if not increase – the personal well-being of the actors involved. Our objective is to raise awareness that the economic implications that accompany intended emission reductions might be substantial due to indirect structural effects. In order to demonstrate the importance of these indirect effects, we quantified the implications in two generic scenarios of sustainable economy approaches.

The wider environmental, economic and social effects of sustainable economy approaches

Impact assessment studies of climate change abatement generally build on scenario analysis. Depending on the modeling approach used, this analysis is performed by integrated models (e.g., *IMACLIM*), which are used in particular for impact assessments of very aggregated and long-term scenarios, such as the long-term analysis of *Shared Socioeconomic Pathways* of the Intergovernmental Panel on Climate Change (IPCC) (see Marangoni et al. 2017). Another approach often used to analyze technological and structural detail is to link techno-economic simulation models, which simulate technological change and associated changes in costs and demand, with economic models, such as in the literature cited above on the German energy transition *(Energiewende)*.

The logic of analyzing the implications of sustainable economy approaches is somewhat different and more closely resembles the analysis of circular economy approaches. As mentioned in the introductory section, the emission reductions of the approaches analyzed in the *NAWI* projects are not triggered by a technical change in the production process or in products, but rather a change in the level of demand for products or services. Thus, the sustainable economy approaches can be described as a sum of positive and negative demand impulses. These demand impulses lead to further increases (if impulses are positive) or decreases (if impulses are negative) of demand along the respective value changes, which induce changes in emissions, employment and value added. There are different kinds of demand impulses:

- Changes in consumption patterns and increasing sufficiency imply a reduction in the demand for and therefore the production of certain products (negative demand impulse).
- Changes in the type of product or service within a sector (e.g., change from conventionally produced towards organic food) imply that demand is reduced (negative demand impulse) in some segments of the sector, and increased in others in the same sector (positive impulse).
- Substitution between sectors shifts demand from one sector (negative demand impulse) to another (positive demand impulse).

The effects of these impulses induce further changes along the value chain. Thus, positive impulses induce an increase in demand for the associated value chain, and vice versa for negative impulses. In sum, the shift from value chains affected by negative impulses to value chains affected by positive ones leads to structural change within the economy. As the specific emissions of the production of goods in each sector differ, changes in value chains also lead to different emission levels. However, different sectors also show different import and employment intensities, different regional distribution, and different qualification requirements. Ultimately, shifts in demand lead to structural change within the economy.

Scenario methodology

Deriving the demand impulses, which extend along the respective value chains and ultimately drive changes in emissions, employment and value added, requires quantitative assumptions about demand changes. As there are neither detailed models available, nor in-depth studies of the diffusion of the different sustainable economy approaches, we constructed quantitative scenarios for our exercise. Scenarios do not aim at projecting the future, but define a possible future. They are a well-known methodology to handle uncertainty, and are frequently used in combination with strategic foresight and scenario workshops (Durance and Godet 2010). In Germany, scenarios are even included in the official standard setting of methodologies for technology assessment (VDI guideline 3780 on technology assessment). Quantitative scenarios consist of a storyline, framework assumptions, and specific assumptions, which are used to derive the impulses. Together, they describe the scenarios in quantitative terms (Craig et al. 2002). >

1 The supplement is available at *https://www.oekom.de/supplementary-files.html#c15041*.

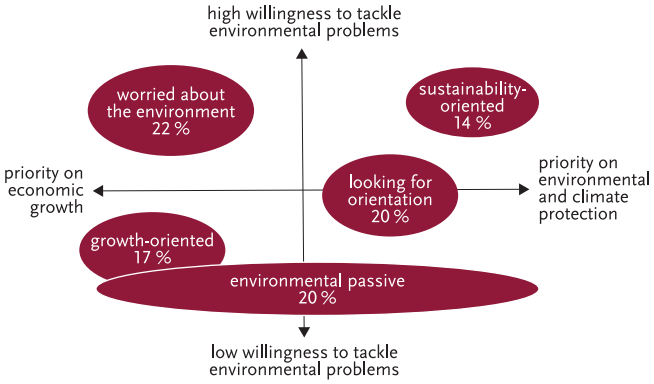

FIGURE 1: Lifestyle segments framed with regard to the environment. Source: based on Scholl et al. (2015).

Scope of scenarios

We draw on the 30 *NAWI* projects to define the scope of the scenarios. We performed a desktop study of documents from these projects, supported by a survey sent to all the project leaders. Based on this information, it was possible to characterize the *NAWI* projects with regard to the thematic scope of the sustainability strategy, and mechanisms likely to lead to the diffusion and impacts of the approaches studied within each project. According to this characterization, most *NAWI* projects focus on sector-specific strategies, in particular mobility, housing, the sharing economy, soft tourism, sustainable diets and clothes (see online supplement, appendix 1, Walz and Wilhelm 2019, in this issue). As some *NAWI* projects also include non-sector-specific approaches, such as managing value chains, valuation and communication tools, or new business models, we also included crosscutting elements in our scenarios.

Storylines of scenarios

Based on the information gathered from the desktop study of *NAWI* project publications (see full literature list in the online supplement, appendix 4), the scope of the scenarios and the storylines were developed. Simultaneously, we performed a literature review of various foresight studies and linked these to the storylines (see online supplement, appendix 2). Applying this dual approach allowed us to develop plausible storylines and quantitative assumptions. Once developed, the scenarios were reviewed, and the plausibility and consistency of assumptions were confirmed in an expert workshop.

The following trends are mentioned in the foresight studies we reviewed (see online supplement, appendix 2): there is an increase in environmental literacy and environmental awareness. There is a development towards a knowledge and information society, and digital solutions are increasingly implemented, assuming that issues of data security and privacy do not develop into major obstacles. Cyber-value chains and more decentralized production systems become more competitive. Finally, lifestyles continue to become more heterogeneous, with issues such as work-life balance, and the need for flexible solutions tailored to individual needs becoming more important.

Our analysis of the *NAWI* projects showed that their approaches are related to two different storylines: shifts within and across sectors that utilize new solutions, and approaches that put more emphasis on behavioral aspects and sufficiency strategies. Based on these storylines, we constructed two scenarios. The stringency of these scenarios is not extreme, but more moderate, reflecting changes that might be feasible within a medium time horizon (e. g., ten years). The base case for comparison is always today's level of activities. We checked the plausibility and consistency of these scenarios by embedding these scenarios into the trends identified in the foresight studies mentioned above (see online supplement, appendix 2, table A-2-2 on key factors for scenario storylines).

Scenario *S1* represents a "modernization embedded in an information and knowledge society". It assumes no major changes in the distribution of lifestyles among the population, and no major changes in consumption patterns. Basically, we assume that the high importance of environmental issues supports a strategy of increasingly using technological and organizational megatrends to lower the transaction and opportunity costs of sustainable economy approaches, and make them more convenient for consumers. This trend is supported by the increasing importance of individualistic solutions, without compromising comfort levels.

Scenario *S2* encompasses the changes assumed for scenario *S1*, but adds major changes in behavior. Thus, we call it a "value and lifestyle transformation embedded in an information and knowledge society". The cornerstone of scenario *S2* is the assumption that the share of population following a sustainability-oriented lifestyle, which is currently estimated at about 14 percent (figure 1), increases to 30 percent. Furthermore, it is assumed that the actual behavior of this sustainability-oriented segment embraces environmental awareness and attitudes much more stringently. We assume that these changes also extend to consumption. The concepts of "using less" and sufficiency strategies become the social norm within the sustainability-oriented segment. According to the post-growth paradigm (Paech n. y.), income and quality of life are increasingly decoupled. Thus, the interest in nonformal and collaborative work increases (figure 2) (even though this might be less productive when measured in standard terms), and the willingness to reduce both working hours and income increases.

Scenario assumptions and quantification

Analyzing the scope of *NAWI* projects revealed the major sectors addressed by sustainable economy approaches. The following sector-specific strategies were considered (see online supplement, appendix 3 for details):

- Sharing schemes and longer product lifetimes lead to a declining production of consumer goods, but increased activi-

ties such as rentals, maintenance and repairs, and the associated additional transportation requirements. We assume that the potential for this strategy is much higher in scenario *S2*, because people are willing to use it for environmental reasons even if it leads to additional (opportunity) costs.

- In scenario *S2*, we assume that people following a sustainability lifestyle are also willing to substitute air travel for leisure by domestic vacations. This leads to an increased demand for domestic rail and road transportation, but also for services provided by the domestic hotel and restaurant sector. No such shift is assumed for scenario *S1*.
- Increased availability and supply of new mobility concepts, which are supported by IT solutions and accompanying business concepts, make the use of public transport more attractive in scenario *S1*. Thus, public transport services substitute motorized individual transport. This shift is even more pronounced in scenario *S2*, because people are willing to use public transport for environmental reasons, even if it is associated with less convenience and higher (opportunity) costs. In scenario *S2*, this also leads to a drop in the number of private cars owned.
- The demand for new clothing is reduced due to lifestyle changes towards slow fashion and secondhand clothing, and is supported by an increased environmental awareness (see also Kleinhückelkotten and Neitzke 2019, in this issue). Compared to scenario *S1*, this effect is twice as strong in scenario *S2*, because people pursue this strategy much more strongly, due to sufficiency strategies becoming the social norm in the sustainability-oriented segment of the population.
- Lifestyle and improved ways of classifying and marketing high quality food bring about a shift in demand from conventional towards organic food in scenario *S1*. Furthermore, it is assumed that better coordination leads to a reduction in food waste. In addition, in scenario *S2*, more people change their eating habits towards higher shares of vegetarian food and less meat in absolute terms.
- New housing concepts are also part of sustainable economy approaches (see Hacke et al. 2019, in this issue). The increasing use of management systems linked to smart homes and metering lead to an increase in the demand for electronics, but reduce the energy demand associated with housing. In scenario *S1*, it is assumed that these shifts are cost neutral for consumers. Scenario *S2* assumes that there is a willingness to use these technologies to a higher extent, even though they might lead to additional consumer costs. Furthermore, it is assumed that people change their behavior to save heating energy.

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FIGURE 2: A space for encounter, community and cooperation: *Open Workshops* provide more than knowledge, tools and materials. They contribute to sustainable social development. Hand-made products help to reflect consumption und production patterns.

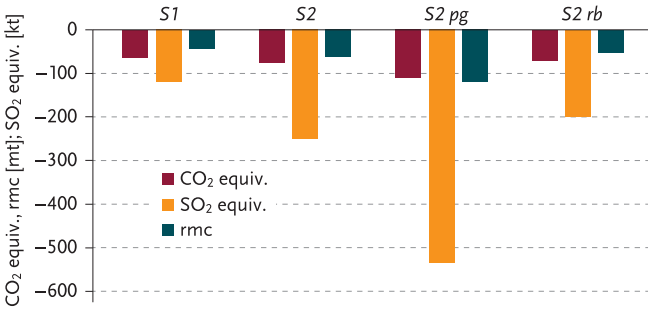

FIGURE 3: Emission reductions of the scenarios *S1, S2, post-growth (S2 pg)* and *rebound (S2 rb)* compared to Germany's current emissions. All scenarios show substantial emission reductions. equiv. = equivalents, rmc = raw material consumption, t = metric ton, mt = mega tons, kt = kilo tons.

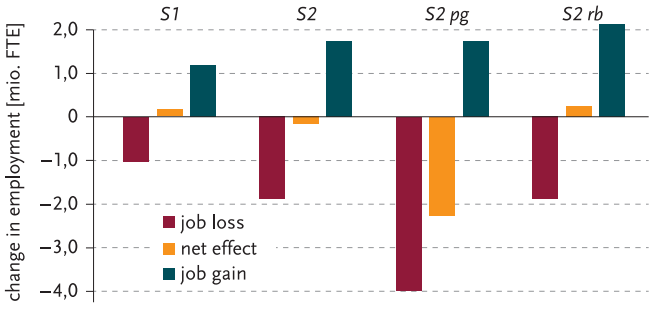

FIGURE 4: Employment effects of the scenarios *S1, S2, post-growth (S2 pg)* and *rebound (S2 rb)* in full-time equivalents (FTE) compared to current German employment. All scenarios lead to structural changes; scenario *S2 pg* shows the greatest impacts.

In addition to these sector-specific shifts, we assume that better information and communication technologies lead to increased transparency along the value chain (see also Hiete et al. 2019, in this issue about changes along value chains). Thus, the information costs required identifying products with a more environmentally friendly supply chain decrease. This is supported by strategies to encourage employees to become ambassadors of their companies' environmentally friendly products (see Süßbauer et al. 2019, in this issue). For both scenarios, we assume that the supply chains of consumer products exploit their no-regret potentials more intensively, resulting in lower emissions at no additional costs.

Based on a literature analysis, estimations on the project level, and the survey of project leaders, this storyline was translated into quantitative assumptions about the strategies to be included in the scenarios. In an expert workshop including researchers from *NAWI* projects, among others, the assumptions were discussed and various changes suggested. A detailed list of the assumptions made and the rationale for choosing specific figures are shown in the online supplement, appendix 3.

Impulses from the scenarios

In scenario *S1,* the sum of positive impulses (increasing demand for environmentally friendlier products and services) equals the negative impulses. In scenario *S2,* the negative impulses exceed the positive ones (see online supplement, appendix 3 with detailed information on the impulses). In line with the storyline of scenario *S2,* we assume that a sustainability-oriented lifestyle leads to a re-evaluation of the importance of income obtained by formal employment versus quality of life and having more time available for other activities. We assume that people are not using the reduced expenditures to buy other goods, but that people who reduce their consumption are willing to reduce their employment and associated earnings by the same amount, too.

In a sensitivity analysis, we posit that this assumption does not hold. Instead, we assume that the level of employment and the income of those who reduce their consumption expenditure do not change. As earnings do not change, we assume that the reduced expenditures (the difference between higher negative and lower positive impulses) is used for consumption. This is equivalent to a macroeconomic rebound effect, which is why we call this sensitivity analysis *Scenario 2 rebound (S2 rb)*. In the post-growth literature, however, it is also argued that a post-growth mentality is associated with both a reduced consumption level and a voluntary reduction of employment in order to increase personal well-being (Kallis et al. 2018). Indeed, Paech (n. y.) assumes that people might reduce their employment to 50 percent of a full-time equivalent in a post-growth society. In order to account for this perspective, we performed a second sensitivity analysis for such a *Scenario 2 post growth (S2 pg)*. It assumes that the sustainability-oriented population segment reduces its employment and associated earnings by 25 percentage points. The resulting reduction in earnings exceeds the reduction in consumption expenditures (the difference between higher negative and lower positive impulses) roughly by the factor of four. Economic consistency requires that the reduction in earnings equals the reduction in consumer demand. Thus, we assume that there is an additional reduction of consumer demand in the order of about 75 billion euros.

Impacts of the scenarios

We used a static environmentally extended global multi-regional input-output model (cf. Miller and Blair 2009) to analyze the impacts of the scenarios. This is based on version 3.3 of the multi-regional input-output database *EXIOBASE* (Stadler et al. 2018), which contains input-output tables up to the year 2011. Prior national versions of this model have been used, for example to analyze the effect of circular economy strategies, or the impacts of material efficiency technologies (Walz 2011, Pfaff and Sartorius 2015). More information on input-output modeling, especially on how to use static input-output analysis in the context of prospective scenario analysis can be found in the online supplement, appendix 3.

In order to highlight the structural changes of growing and shrinking activities, the impulses of the two scenarios described above are fed into the model separately. The overall net effects represent the difference between the effects of positive impulses along

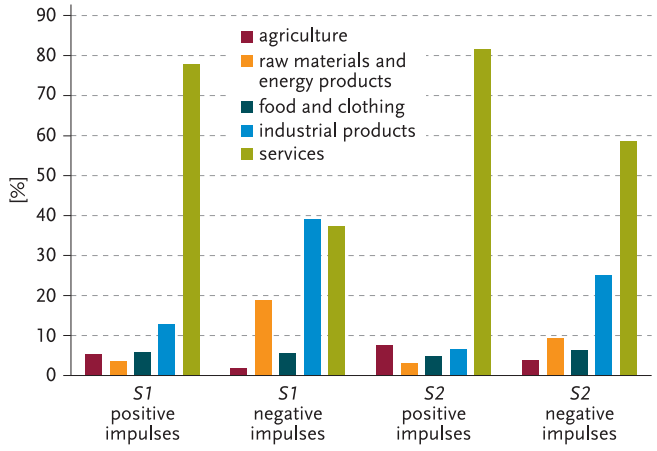

FIGURE 5: Sectoral composition of the value chains of positive and negative demand impulses. In both scenarios *S1* and *S2*, the difference in the composition of the value chain of positive and negative impulses indicate that shifts in demand lead to a higher share of services and a lower share of industrial production.

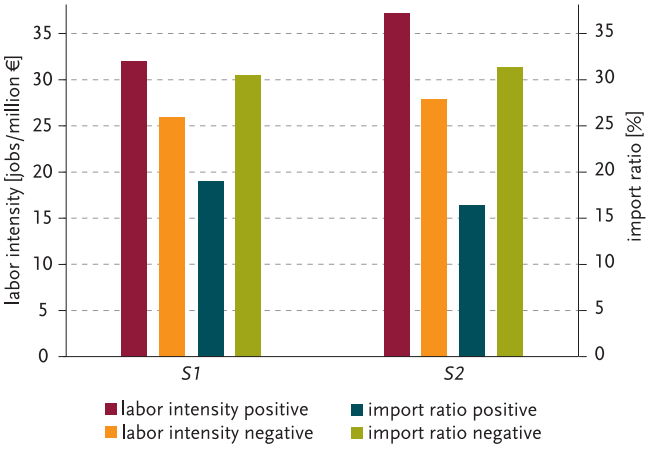

FIGURE 6: Labor intensity and import ratio of the value chains of positive and negative demand impulses. In both scenarios *S1* and *S2*, the differences between the value chain of positive and negative impulses indicate that shifts in demand lead to a lower import ratio and a higher domestic labor intensity.

the value chain and the effects of negative impulses along the value chain. The model is economically consistent and accounts for the dependency of the different sectors along the value chain, including effects on imports. It yields results of economic effects such as production, value added and number of jobs, as well as environmental impacts. The economic and environmental results reported here refer to impacts within Germany only.

Simulating the impacts of the scenarios yields results on various levels. Figure 3 presents key results concerning the effects of the two scenarios and the sensitivity analysis on emissions. There are substantial reductions in emissions. Compared to today's level, the emission reduction for example for greenhouse gases is equivalent to seven to twelve percent of German annual emissions. The difference between scenarios *S2* and *S2rb* can be interpreted as the size of the macroeconomic rebound effect. Nevertheless, this difference is only about ten percent of the emissions reduction achieved in scenario *S2*. Thus, even if people in the sustainable lifestyle segment are not willing to reduce their employment, there are still substantial emission reductions.

The economic implications of the scenarios show a small increase in value added for scenario *S1*. For scenario *S2*, the value added decreases by twelve billion euros, induced by the reduction in consumption expenditures. The loss of value added is much higher in the *post-growth scenario S2 pg*, reflecting the much higher reduction in labor earnings. It is interesting to see that value added also increases in the *rebound scenario S2 rb*.

Figure 4 outlines the employment effects associated with the scenarios. These employment effects are reported in full-time equivalents (FTE). Thus, they do not show how many people work part-time. The figure shows job losses and gains, and net employment effects. The net effects are small for scenarios *S1, S2* and *S2 rb,* with small employment gains for *S1* and *S2 rb,* and a small decrease for *S2*. Not surprisingly, scenario *S2 pg,* shows greater impacts, with substantial reductions in employment induced by people opting to work less.

It also becomes obvious that the scenarios lead to major structural changes as well. The number of jobs gained, induced by positive impulses, and of job losses, induced by negative impulses, are both substantial. The labor turnover rate in scenarios *S1* and *S2* is in the order of three to four million jobs, indicating a considerable challenge for the labor markets to accommodate these changes.

Sustainable economy approaches will only gain wider support on the political level if it can be shown what their indirect structural effects are, what unintended social frictions they might cause, and how these frictions can be mediated.

A more thorough analysis leads to additional information about what drives these changes. The shift in demand from the value chains of the negative impulses to the value chain of the positive impulses leads to substantial changes in the sectoral composition of the economy. Compared to the value chain of the negative impulses, the value chain of the positive impulses shows a much higher share of services, and a lower share of industrial production (figure 5). This difference is especially strong in scenario *S1,* but also substantial in scenario *S2*. Thus, sustainable economy approaches are likely to induce sectoral change towards an increase >

in the importance of service sectors. As different sectors also show different propensities to import and different labor intensities, the sectoral changes translate to differences in import and labor intensities between the value chains: for all scenarios, the import intensity of the value chain of negative impulses is higher than that of the value chain of positive impulses (figure 6). Thus, the sustainable economy scenarios act like an import substitution strategy. Furthermore, the labor intensity of the domestic value chain of positive impulses is higher than that of the value chain of negative impulses (figure 6). This explains why the impact on employment is stronger than the impact on production and value added. Finally, the sectoral changes also lead to other structural effects: the net employment effects are more positive for women than for men. Furthermore, there are effects on qualification levels. The scenarios bring about a polarization of qualification requirements, with low and high qualification requirements more positively affected than medium qualification levels.

What can we learn from analyzing the wider implications of *Sustainable Economy* approaches?

The magnitude of emission reductions obviously depends on the scenario assumptions. If more options are included that have a greater effect of specific emission reductions, or if a higher level of diffusion in the population is assumed, more emissions can be reduced. On the other hand, one could argue that our assumptions are rather optimistic. For example, it is by no means guaranteed that all the sharing options will lead to a reduction in emissions (see Wruk et al. 2019, in this issue). The assumption in scenario *S2* of an increasing share of the population who follows a sustainable lifestyle and changes their actual behavior towards sustainability is also optimistic in our view, especially when looking at the past development of consumption behavior (Scholl et al. 2015). Finally, further technological change might reduce the specific emission reduction potential that can be mobilized by behavioral changes. Clearly, we need more studies that explicitly examine the aggregated potential of sustainable economy approaches. Thus, it is necessary to continue developing and assessing more elaborated scenarios – our results are only a first step in this direction.

The employment results can be explained by differences in labor intensities and the export ratios of the positive and negative impulses. We evaluate these structural effects as rather robust. The shift in demand from negative to positive impulses leads to lower import intensity. Thus, sustainable economy approaches act as import substitution strategies. The results also indicate structural change towards more service-oriented activities with higher labor intensity. Thus, the scenarios are likely to reinforce some of the structural changes that are typical for other modernization strategies. This also includes the polarization of qualifications: the structural change from industry to services also reduces the overall share of medium qualifications in the scenarios.

Towards a debate on intended and unintended effects

The main goal of this essay was to spark a discussion about the intended and unintended effects of sustainable economy approaches. It can be debated whether ten percent is the upper ceiling of the additional reductions that can be achieved by such approaches in the medium term, or whether much higher or lower potentials are realistic. From our point of view, reducing emissions by ten percent compared to current German emission levels represents huge progress, as this is on top of the emission reductions achieved by technical innovations. Nevertheless, a debate is clearly necessary on the realistic diffusion potential of sustainable economy approaches.

Second, if we look at the net effects on production and employment, there seem to be no strong unintended effects. The modeling results indicate a modernization of the economy and structural changes that actually bring about moderate positive net employment effects for Germany. The strong negative effects on employment in a post-growth scenario are an integral part of such a scenario and could be interpreted as intended effects from the perspective of people willing to reduce their working time voluntarily.

Third, we regard structural adjustments as posing the biggest challenge. Indeed, the moderate net effects mask the huge challenge that labor markets face in managing the high number of job turnovers. There is no guarantee that regional or qualification-specific labor markets will be able to absorb job losses and provide new jobs in their respective segment. This could translate in a substantial involuntary reduction of employment. The structural shifts also indicate less jobs in industry and more jobs in service oriented sectors. This triggers the polarization of the required qualification levels, and led us to the hypothesis that well-paid industrial jobs might be substituted by both more low-paid and more high-paid jobs in other sectors. There is a need to analyze the effects on personal income distribution in much more detail to corroborate these results, for example by differentiating income quartiles. The same holds for regional effects, which proved to be an important dimension in the analysis of Sievers et al. (2019). However, if a thorough and more detailed analysis reveals detrimental effects, it has to be kept in mind that these can have substantial political implications. A loss of industrial jobs might contribute to political changes, as seen, for example, in the US, the UK debate about Brexit, or the analyses of political developments in Germany that link support for the populist right-wing party AfD to regions strongly affected by the loss of industrial jobs due to globalization (Südekum et al. 2017).

The structural effects are most pronounced in the post-growth sensitivity analysis of scenario *S2 pg:* there are intended effects in the form of voluntary lower earnings in the sustainable lifestyle segment. However, these effects also lead to reductions of production and employment in all sectors and among all segments of the population. Thus, there are also strong unintended effects on segments of society that may have no interest at all in following a post-growth path.

To sum up our arguments, we see multiple challenges arising from the unintended indirect effects of sustainable economy approaches. These challenges do not represent an argument against these approaches. However, we do see the need to move the debate about sustainable economy approaches forward: it is not enough to look at how to design such approaches and overcome obstacles, nor is it enough to improve direct evaluation by looking on the intended direct impact of the approaches. These approaches will only gain wider support on the political level if it can be shown what their indirect structural effects are, what unintended social frictions they might cause, and how these frictions can be mediated. Only then will all groups in society perceive sustainable economy approaches as fair. Our scenario exercise demonstrates that the unintended structural effects might indeed be substantial. This underlines the importance of analyzing the wider economic and social implications in much more detail than our scenario exercise. Such a thorough analysis would be a necessary starting point to moving towards a debate that truly embeds sustainable economy approaches in an overall economic transformation strategy on a domestic as well as an international level.

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Rainer Walz
Born 1960 in Freiburg/Brsg., Germany. PhD and habilitation in economics. Since 1991 at Fraunhofer Institute for Systems and Innovation Research ISI, Karlsruhe, Germany, since 2009 head of the Competence Center Sustainability and Infrastructure Systems. Adjunct professor at Karlsruhe Institute of Technology (KIT), Germany. Research interests: sustainability and innovation, assessment of environmental policies.

Matthias Pfaff
Born 1986 in Ulm, Germany. MA in economics and international relations (University of St Andrews, Scotland), and MA in environmental sciences (Columbia University, New York City). Since 2013 researcher at Fraunhofer Institute for Systems and Innovation Research ISI, Karlsruhe, Germany. Research interests: interface between material flow and macroeconomic modeling, impact assessment of environmental technologies.

Clara Oldenburg
Born 1991 in Hamburg, Germany. MA in environmental governance (University of Freiburg, Germany). International work experience with Fraunhofer Institute for Systems and Innovation Research ISI, Kreditanstalt für Wiederaufbau (KfW), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the German Foreign Ministry in Uganda, Vietnam, Ethiopia and Germany. Research interests: sustainable development, transition research, environmental governance.