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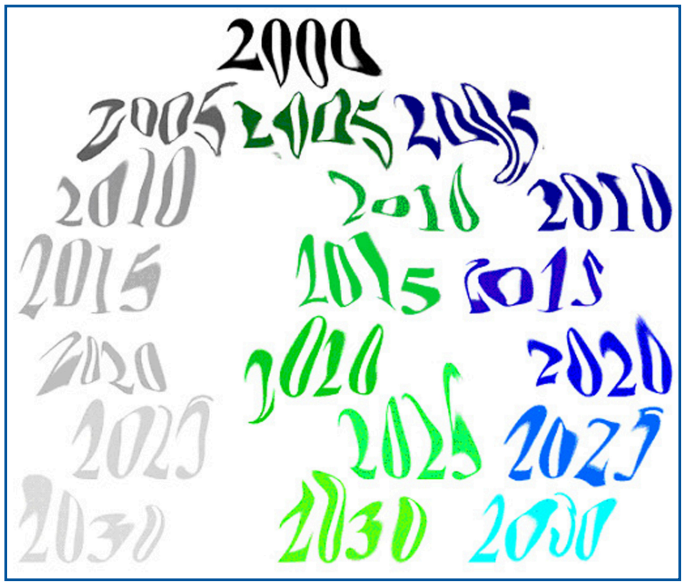
Grey, Green, Big Blue: three regional development scenarios addressing the future of Schleswig-Holstein



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ISSN 0344-9629

GKSS 2003/25

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GKSS-Forschungszentrum Geesthacht GmbH • Geesthacht • 2003

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ISSN 0344-9629

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Grey, Green, Big Blue: three regional development scenarios addressing the future of Schleswig-Holstein

Dennis Bray, Charlotte Hagner, Iris Grossmann

61 pages with 18 figures and 8 tables

Abstract

In this paper three scenarios for the north German region of Schleswig-Holstein are presented. The first scenario, ”Grey”, addresses the relationship between demographic and technological change. The second scenario, labelled ”Green”, is based on the current concern for a change towards environmentally friendly sustainable development. The third scenario, ”Big Blue” addresses the attempt of the region to maximize its potential by emphasizing regional participation in the ‘new economy’

All three scenarios are intended only as food for thought. While the futures presented herein are the sole product of the authors’ imaginations, the contemporary condition is represented by scant facts. Before presenting the scenarios there is a brief introduction as to what scenarios are and how to go about constructing them. Three different approaches to scenario building are also employed. The Grey scenario uses an empirical based model to project a broad social trend and suggests that the trend might lend itself to the development of a niche economy and suggests that any region considering its future would be well advised to take stock of existing resources and trends and contemplating means of turning such existing circumstances into a beneficiary situation. The Green scenario, starting with empirical evidence of the current situation, proceeds with a narrative account of how the future might evolve under the inertia of the demand for sustainable development. In effect, this is a trend based analysis of existing environmental concerns, a linear projection towards the features of sustainable development. The Big Blue scenario suggests the roles of emulation and innovation in the transition to a high-tech based ‘new’ economy, an economy in which competition is fierce and preconditions a significant factor.

Grau, Grün, Blau: drei Szenarien der regionalen Entwicklung von Schleswig-Holstein

Zusammenfassung

In dieser Studie werden drei regionale Szenarien für das Bundesland Schleswig-Holstein vorgestellt. Das erste Szenario – “Grau” – untersucht die Zusammenhänge zwischen demographischem und technologischem Wandel. Das zweite Szenario – “Grün” – basiert auf dem gegenwärtigen Trend in Richtung umweltfreundlicher und nachhaltiger Entwicklung. Das dritte Szenario – “Blau” – beschreibt den Versuch der Region, durch den Aufbau einer regionalen ‚new economy’ ihr bestmögliches Potential zu erreichen.

Die drei Szenarien sollen zum Nachdenken anregen. Die Beschreibung der gegenwärtigen Bedingungen beruht auf Fakten, aber die sich daraus entwickelnde Zukunft entstammt rein der Phantasie der Autoren. Den Szenarien vorangestellt ist eine kurze Einleitung, in der die Bedeutung von Szenarien und mögliche Konstruktionsmethoden beschrieben werden. Es werden drei verschiedene Ansätze der Szenarien-Entwicklung verwendet. Für das Graue Szenario wurde mit Hilfe eines empirischen Modells ein breiter Bevölkerungstrend ermittelt. Die sodann entstehende Wirtschaft baut auf der durch diesen Trend gegebenen Nische auf. Die implizite Folgerung ist, dass eine Region bei der Entwicklung einer Zukunftsvision zunächst eine Bilanz über existierende Ressourcen und Trends ziehen sollte, um diese sodann geschickt zum Wohle der Region auszunutzen. Das Grüne Szenario beginnt mit einer Betrachtung der gegenwärtigen Lage. Die Zukunft, die dann beschrieben wird, entsteht unter der Annahme des andauernden Einflusses einer verstärkten Nachfrage nach nachhaltiger Entwicklung. Die Methodik ist eine Analyse der gegebenen wachsenden Priorität von Umweltbelangen, in Kombination mit einer linearen Projektion in Richtung nachhaltiger Umweltentwicklung. In dem Blauen Szenario führen Innovation und Emulation von Erfolgsfaktoren zu dem Entstehen einer high-tech-basierten ‚new economy', in deren hohem Konkurrenzdruck die regionalen Voraussetzungen entscheidend sein können.

Manuscript received / Manuskripteingang in TDB: 2. Oktober 2003

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INTRODUCTION

In the following, the ontological assumption is that futures exist as alternatives. While 'dreaming *a* future' is a political process, the purpose of scenarios is to identify possible avenues of action. They are not intended to be prescriptive. The assumption is also made that human behaviour is not governed by natural laws and is difficult to predict. Consequently, when constructing scenarios of future possibilities, which are influenced by decisions made in the present, it is human perceptions that shape these decisions and the decisions are, therefore, not immutable. Perceptions (driving forces behind decisions) change over time, decisions change over time, external contexts change over time and, consequently, scenarios, if they are depicting the transition of time, should also change over time: there is no human-the-social-being 'steady state' in which a perturbation produces predictable results. Human existence is a continuous succession of changes.

Recently some progress has been made to bring the role of human perceptions into the assessment of the human-world-natural-world patterns of interaction. This has taken on the label of 'stakeholder

involvement' and is also included under the rubric of cultural studies (of which further discussion is presented in the latter part of this paper). Under the less fashionable labels of 'human perceptions' and 'worldview' there is of course a long multidisciplinary tradition, not to mention the neglected reams of work devoted to Weltanschauung and hermeneutics. Unfortunately, the stakeholder-as-expression-of-modern-democracy-and-governance approach has paid little attention to the lengthy body of existing literature and to the fact that stakeholders also change their minds over time and according to differing conditions. Also neglected is the fact that 'stakeholders', identified by some comprehensive category such as 'industry', 'public', etc., do not necessarily constitute a homogeneous set of beliefs. More to the point, notably absent is any effort to understand the driving forces behind the perceptions. While this is somewhat related to the 'driving forces' behind the following scenarios, the full discussion of the driving forces behind human perceptions is the topic of another paper. Nonetheless, we should be aware that there are driving forces behind human perceptions and that human perceptions are themselves, in turn, driving forces that give rise to differing decisions and differing human conditions and all of this changes over time. It should also be kept in mind that single situation might be perceived in multiple ways and sometimes the perceptions are conflicting. While we recognize the potential, we do not address the issue or issues of conflict.

One factor that is decisive in the way we think about the future, and indeed the way the future is shaped, is the image we might have of, or for, the future ('for' emphasizing a proactive, perhaps action oriented, or activist, approach). This image can be the product of our aspirations, for the future we want, or the product of our imagination of the future (possibly a negative future), given the occurrence of certain events. The difference here lies in the fact that what might be considered a positive future based on aspirations for one group, might be viewed as a worst case scenario by another group (again, this is the issue of arising conflict) and what might be considered a positive future based on aspirations of one group at one time might not be viewed as positive by the same group at a different time. For an example of the first instance, consider the stakeholders 'fishermen' and 'administration responsible for subsidizing regional activity'. From the fishermen's' perspective, resources allocated to their interests would be the favourable course of events but given the contribution of fisheries to regional economics, it might be perceived by resource allocating authorities that the resources could best be used elsewhere. In the second instance, a cohort at one point in history during which the economy, standard of living and social situation are very good might, for example, emphasize the need and expend the energy to ensure the maintenance of a 'good' environment. Changing circumstance, perhaps achieving the target level of environmental quality, or failing economics and declining standard of living, might prompt the same (now older) cohort to expend their energy addressing somewhat different issues, shifting their perspective of what constitutes significant concern, for example, shifting funds from nature preservation to health care programs. Consequently, desirability and objectivity are elusive characteristics in the construction and evaluation of scenarios.

The following then, provides only fodder for further discussion. While the scenarios are, indeed, a product of fantasy, it is good practice to attempt to avoid any expression of desirability (unless of course the scenario is being designed for a goal oriented objective, corporate wellbeing for example).

The following scenarios are not elaborate and not detailed. Detail should be supplied in any further use or development of the scenarios, that is, in any attempt to evaluate the real utility of the scenario at

the level of implementation. The following then, is just a beginning. However, in any pursuant discussion, one should keep in mind the effect of his or her own aspiration i.e. economic development, improved quality of life, environmental stability, etc. Pieces of each scenario might act to reconcile differing interests. As presented here, the scenarios simply represent stark contrasts of possible futures. It should also be kept in mind that visions of the future are not necessarily robust. They (your vision included) might change over time. One vision disappears and another new vision emerges. History provides adequate confirmation of this phenomenon[1].

Following, then, are three scenarios of the possible futures for the coastal bordered German *land* (state) of Schleswig-Holstein[2]. The scenarios are, it could be said, simply an exercise in *imagineering* that sometimes attempt to step beyond the typical paradigm. Before presenting the actual scenarios however, it is necessary to briefly discuss, first, what a scenario is, and second, how to go about constructing one. Eventually three scenarios will be presented: 1. Grey, addressing the reality of an aging population, 2. Green, depicting the consequences of environmental concern, and 3. Big Blue, depicting a transition to the 'new economy'. These three scenarios will address possible regional futures for Schleswig-Holstein.

In the presentation "North Sea Commission Study Tour" (*Ministerium für Wirtschaft, Technologie und Verkehr des Landes Schleswig-Holstein*) in the workshop "Regional development in rural coastal areas" (Volker Kruse, 2003) it was suggested that emphasis in the region be given to the development of "wind energy / construction of wind turbines; marine technologies; life science technologies, and; tourism". The following scenarios contain elements of these endeavours but take a broader approach than a sector specific analysis. The similarity between the "North Sea Commission Study Tour" and the following scenarios is purely coincidental.

Also, there is a deviation from the normal selection of what have been typified as driving forces and a move to the more remote corners of what is typically ignored as causal. Briefly, the driving forces are demographic change, the push for sustainable development and the role of technology. The scenario, "Grey", based on patterns of demographic transition, draws on the prospects of an all too real resource, (or detriment if perceived as such). In this scenario, life science technologies are given a prominent role along with a slight deviation in the typical prospects for maintaining tourism. This scenario focuses on the opportunities and the reality of demographic transition to an aging population coupled with the deployment and development of opportunities for evolving technology both within

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[1] If we look at the last 30 or so years we find the focus of broad concerns to demonstrate a shifting pattern: the 1970s saw the discovery and concern with 'environmental' issues; the 1980s saw the rise of concern over the information revolution; the 1990s saw outcry and concern about 'globalization'; rapidly evolving is concern over bio-genetic engineering. This is stated simply to illustrate that today's concern might be the future's forgotten episode. It is not likely that each phase will abruptly be displaced by the next phase of concern. There is bound to be a significant overlap, but emphasis *will* change. As an exercise, imagine the impact of another 1930's.

[2] For those readers not familiar with the geo-political structure of Germany, a '*land*' can be considered the equivalent to the more familiar 'state', as in for example, Texas in the USA.

the life sciences and age related low tech devices, complete with the ripple effect to service sectors[3]. However, if technology and innovation can be a resource, then why not an abundance of old people (a renewable resource at that)?[4] In the "Green" scenario the concept of sustainable development is emphasised, definitely influential in the shaping of future circumstances. This scenario touches on the matters of wind energy and tourism. The third scenario, based on prospects of the 'new economy', employs the roles of technology, economy, structural and political tendencies, and the hopes and promises of economic theory. To some degree, this scenario touches on life science technologies. It should be noted however that the driving forces employed, although emphasized for each particular scenario, are not mutually exclusive.

WHAT IS A SCENARIO?

Ged Davis (1998) of Shell International Ltd., an advocate of the use of scenarios in business, tells us "Scenarios are plausible, pertinent, alternative stories of the future". Shell International Ltd. has acquired somewhat of a reputation as having expertise in the development of scenarios.[5] The concept of scenario, however, dates back a little longer than Shell's use of it. It is borrowed from the entertainment arts, works of fiction, and it means an outline or sketch of the plot of a play, or ballet, or novel, with details of the scenes or situations. In this context it is a description of an imagined situation or a postulated sequence of events. And that is precisely what a scenario is. But, as Ged Davis continues "They are powerful tools for addressing what is both fundamentally significant and profoundly unknowable – the future." Here a slight addition is necessary. Not only do they address the future but also have the potential to shape the future. Scenarios themselves cannot act as objective guides to the future but their representation of the future can indeed have an impact on people's perceptions and decisions and therefore come to actively bear on the future. At the extreme, scenarios

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[3] Kruse (2003 North Sea Commission Study Tour) states the economic structure of Schleswig-Holstein as: agriculture 2.3%, industry 22%, and services 75% suggesting that the service industry is a major contributor to the regional economic structure. This, of course, has been a trend in the developed world, a move from primary sector through industrial/manufacturing sector though to service sector.

[4] Resource: a stock or reserve that can be drawn upon; available assets; the collective means possessed by a country for its own support. The New Shorter Oxford English Dictionary, 1993.

[5] 30 years ago a French oil executive (Pierre Wack, with a fondness of Indian mysticism, the work of mystic philosopher George Gurdjieff and for a form of Islamic Sufism) had the insight that extrapolation from the past did not necessarily forecast the future. Under Wack's influence, Royal Dutch/Shell began employing scenarios in corporate planning. In this form, the role of the scenario was to describe a future *worth* creating (worth creating of course from a corporate perspective). Since that time, Shell's scenario unit, now called Global Business Environment (GBE) has produced three new scenarios each year. Peter Schwarz, one time (and possibly still) headed up the scenario group of Shell International and authored both "The Art of the Long View: Paths to Strategic Insight for Yourself and Your Company (1996) and "The Art of the Long View" (1991), two books addressing the art of scenario construction. More recently Shell International has decided that scenario construction, as it was, had become a tired cliche and developed what it has called the TINA – "There Is No Alternative" – 'model' of addressing the future. Further information is available from the SHELL website.

might not only represent the future then, but might also actively participate in creating it or in blinding decision makers to other options. *Scenarios, then, both reflect and construct social interests, and are both socially and culturally embedded, projecting the future in terms of social interests and cultural resources that have been employed in their design.* These are indeed significant issues, but will not constitute a significant discussion in this paper. This is the typical warning, but it should be given even more consideration. Social interests and cultural resources should indeed be part of the scenario but things social and things cultural do change. We should consider the forces that act towards causing such change and the forces that act to prevent such change, for these are significant 'driving forces', particularly in the long term. We cannot always assume that people 20 years from now will think the same as we do at this moment. It is unlikely that a young child now, in twenty years time, will think the same as you think now. It is equally unlikely that you, in twenty years time, will think the same as you do now. Consequently, to incorporate a rigorous cohort analysis, while requiring significant effort and resources, would also suffer from the fact that people's perspectives change over time, for instance, the youthful concern of some issue today might not maintain the same concern as the same group of people grows older: the rebel of the present might be the conservative of the future[6]; more prominent issues might arise, and such events would act to de-emphasize previous concerns. Nonetheless, cohort effects and shifting concerns, no matter how portrayed or incorporated into scenarios, offer a more accurate prospect.

While there are numerous and lengthy discussions of 'what a scenario is' the above should be suffice for a general understanding. In short, a scenario is a purposeful combination of the imagination and logic designed to present a future as it could happen.[7]

There are also a number of 'types' of scenarios that can be employed. There is a cookbook approach in which scenarios are adopted from other work. Two examples include the ever popular 'business as usual' scenario (which is somewhat of an oxymoron if the projection into the future is of any considerable duration as business practises an interests and technology *do* change) or the likes of that adopted in many climate scenarios; the CO^2 doubling scenario or population doubling scenario. Such scenarios have becomes standards. While their use is economic in terms of design and compatibility with other scenarios is high, they tend to narrow the perspective of what other futures might be possible. Scenarios based on the opposite approach tend to stray from the tried and accepted and move towards the more esoteric of driving forces, typically requiring a multidisciplinary effort and the use of liberal doses of imagination and speculation. We are also very accustomed to trend based scenarios in which existing trends are simply projected into the future (this also includes business as usual and CO^2 doubling as examples). Such scenarios tend to be extremely linear and cannot accommodate contingent events; change is typically perceived as being invariant. Contrary to trend based scenarios we find event based scenarios that attempt to incorporate the characteristic of

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[6] On this matter, a couple of prominent contemporary political figures come to mind, but shall herein remain unnamed. Anyone's recollection can produce similar examples.

[7] On the downside of scenarios, scenarios can also, when they become repetitive and common, dampen the imagination of what options might exist to demonstrate a potentially different future, one that lies outside of the common box of fashionable concepts and constructs. They can also become so convoluted that they deny utility.

nonlinearity. In such an approach to scenario construction it is possible to account for the fact that the pattern of change itself might change.

In the case of the following, the scenarios are preceded with a factual basis and then employ a more than liberal dose of imagination. These scenarios address the issue of 'process' as much as they do end-state. They attempt to demonstrate one possible way 'how' a situation might arise rather than ask 'what-if' this situation arose. Of course, there are alternative routes of arriving at similar or totally different ends.

CONSTRUCTING SCENARIOS

To make the task easier, one should begin with a scenario question. Experience seems to sugest that this is more difficult than one would expect. Determining the key question or the key issue is critical. What is the scenario question here? "In what possible ways might the region of Schleswig-Holstein evolve socio-economically over the next three decades?" We do not provide an exhaustive list but explore three possibilities. (Other approaches might include "if this happens (and we supply 3 magnitudes of the 'happening' for example) this will be the consequence".) This is an equally valid approach. But, back to the case of Schleswig-Holstein and the approach to providing scenarios of a possible future, we could simply say leave the region to follow the current trajectories, and no doubt, the region would survive through various modes and means of accommodation to changing circumstances. But what could happen? What could be the outside possibilities of its evolution? This is what is explored – extreme options and radical change.

Other scenarios might adopt a narrower focus, for example, the future of the fishing industry of Schleswig-Holstein (if the water is 5°, 10°, or 15° degrees warmer) or of the potential impacts of off-shore wind parks. Questions then can lead from the broad and grand to the narrow and specific. The task is to make the question well defined.

Having identified the issue, the next consideration is what driving forces should be considered. If for example, our focus was on climate change, our driving forces that might shape the circumstances of Schleswig-Holstein might include rising temperatures, rising sea levels, increasing storminess, and so on. (We would not go as far back as human behaviour attributed to the cause of climate change, as on a regional level, these behaviours are somewhat inconsequential, unless of course, the scenario was how Schleswig-Holstein would deal with policies designed to reduce emissions or what actions could be taken.) At the broader end of the spectrum of driving forces, driving forces might include social dynamics, economic issues, political issues, technological issues, changing ideologies, etc. Some of the driving forces can be considered as being predetermined in that they are outside of our control, the current demographic basis of a region for example.

Basically, driving forces can be divided into six major categories:

1. Cultural role, for example, the interaction of a coastal region and tradition, and other culturally significant patterns.

2. Social dynamics, such as demographic issues, values, lifestyles, demands, political influence, etc.

3. Economic issues, such as macro economic trends and forces shaping the economy as a whole, and micro economic dynamics in the proximity of the coast.

4. Political issues.

5. Technological issues.

6. Natural phenomena.

The next step is, identify the variables that are of relevance to the scenario in mind, listing all variables that could reasonably be included and then narrow the list to most important variables. Assess the potential relationships among the variables over a reasonable time horizon. There is no complicated methodology involved at this stage of scenario construction, only the rigorous use of the imagination and logic.

Historical change might represent patterns one could expect in the future to some extent but current conditions would likely give rise to different patterns of change that could not have occurred in the past. Therefore, a good imagination and a questioning mind is a key asset. In short, there are no real methodological procedures for constructing scenarios although there have been many attempts to document them. To this extent, it could be suggested that scientific efforts be limited to providing a framework for decision makers on which they can impose their own scenarios, however, in the following we have gone beyond our own advice.

One should keep in mind at this point that scenario building is an art, even when employed in the most arduous ‘scientific’ spirit (this point is elaborated in the section labelled ‘Critique’). As soon as any set of established equations is challenged by the insertion of an arbitrary value, the magnitude of the value and its point of insertion is not a matter of science but of human choice, personal persuasion or politics.

There are, of course, many instruction books on how to construct scenarios that provide much more detail than noted above. There is also an entire discipline devoted to such endeavours, namely futures studies. What is not often reported as being required is a grounded knowledge of theory that relates the concepts employed in the scenario, often resulting in naive attempts of offering utility. In the following, all procedures noted above are implicit, not explicit. With this in mind we present the conditions expressing the starting point of the scenarios.

CURRENT SOCIO-ECONOMIC CONDITIONS

Before beginning the regional scenarios there are some facts that need to be considered to provide the context from which the future will evolve. This is the state of the existing circumstances and the point from which the scenarios will begin. Unfortunately, time, resources and space have meant the exclusion of any detailed historical feature. In this case, and at this point of the discussion, the facts are those related to the broader German national context, the context in which Schleswig Holstein is embedded.[8]

- In 2002 Germany has one of the poorer performing economies in Europe, with no more than 0.6% growth in 2001, the worst in the EU. Some growth forecasts for 2002 are as low as .25%.
- In 2002, unemployment surpassed the 4 million mark.
- In autumn 2002, business investment fell for the 7th quarter.
- In 2002 consumer spending was flat.
- In 2002 the retail trade and construction industries were in crises.
- In 2002 bankruptcies increased 25% over the previous year.
- In 2002 bankruptcies were expected to reach 40,000 and result in the loss of 600,000 jobs.
- In the 2002 world competitiveness ratings, compiled by the International Institute for Management Development, Germany slipped to 15th out of 49 countries. For its inflexible labour market policies, Germany ranked among the lowest.
- Industrial labour costs in western Germany were higher than in any other country.
- Germany's tax and social welfare burden was one of the heaviest in the world.
- Germany's health care system was the second most costly in the world.
- Germany's education system was failing – coming in 21st in the 2001 OECD study of educational performance of 15 year olds.
- Pension reforms were being formulated to supplement dwindling state pension funds.
- Public spending approximated 50% of the GDP with aims of reducing it to 42%.

[8] Source of all 'facts': "Special Report: Germany's Election, 'The Economist', Sept. 21, 2002: 23-25.

- Public debt was approximately 60% of the GDP.
- Social welfare contributions hovered around 40%.
- New immigration law allowed urgently needed foreign specialist workers into the country while tightening restrictions on others.
- Agricultural reform was underway to try and wean Germany's 430,000 heavily subsidized farmers away from ever greater production and into more environmentally friendly farming practices.

In Schleswig-Holstein, as in most of the western world, rhetoric is given to a vision of a world in harmony with its environment and dedicated to the betterment of the quality of life, with an emphasis on the economic quality. (Here the relevant literature is so abundant as to be deemed unnecessary to provide reference, one can find Vision this or Vision that with very little effort, for any region one chooses.) The same or similar statement finds its way into the mission statements of most regimes, local, regional, national and international. Typically it comes without the provision of a means for attaining the end.

GENERAL 'COASTAL' TRENDS

Schleswig-Holstein has a coastal border. A lot of literature on coastal protection/management/ ecology etc. begins with alarming statements suggesting that almost 50% of the world's population will reside in a coastal region in the not too distant future; the claim goes on that cities in coastal regions are increasing in size and population faster than inland cities, and; coasts are coming under ever increasing stresses. etc. Irregardless of the elaboration of increasing threats to coastal zones, the statement is extremely general, or should we believe that all coastal regions are in dire straits and all undergoing the same degenerative processes? The facts below might indicate that Schleswig-Holstein, in fact, runs contrary to these claims.

The Schleswig-Holstein Coast

We are told by some geographers that the 'length' of a coast is impossible to measure due to problems with the definition, problems with tide and water level changes etc.(personal correspondence). However, the coast line of Schleswig-Holstein is assumed to be 402 km. on the Baltic Sea and 468km. on the North Sea.[9]

[9] All information pertaining to Schleswig-Holstein is from Statistisches Landesamt Schleswig-Holstein, http://www.statistik-sh.de/ and /or Statistisches Bundesamt Deutschland, http://www.destatis.de/jahrbuch/jahrueb.htm

We are also told, in the general literature regarding coastal regions, of the high population density in coastal regions. Information from the statistics branch of Schleswig-Holstein indicates otherwise for its own case. Figure 2 emphasizes the *lack* of high population density, and Table 1 indicates *no* existing or rising megalopolis.

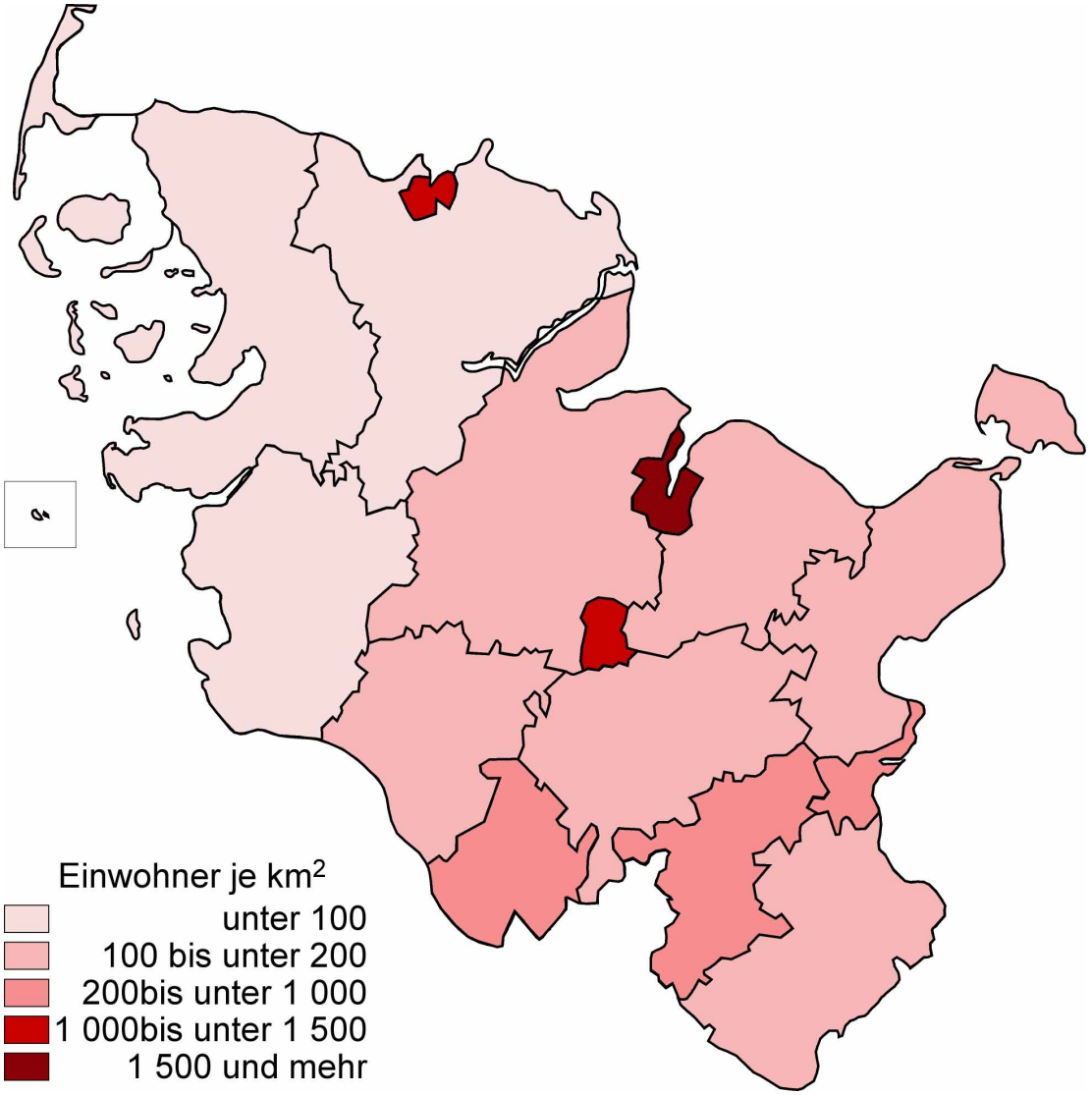


Figure 2. Population Density of Schleswig-Holstein.

Table 1. Population of Regions, Schleswig-Holstein.

Order by size	Place	Region	Population
1	Kiel, Landeshauptstadt	-	232 218
2	Lübeck, Hansestadt	-	213 352
3	Flensburg, Stadt	-	84 423
4	Neumünster, Stadt	-	79 626

5	Norderstedt, Stadt	Segeberg	71 753
6	Elmshorn, Stadt	Pinneberg	47 471
7	Pinneberg, Stadt	Pinneberg	39 448
8	Itzehoe, Stadt	Steinburg	33 625
9	Wedel, Stadt	Pinneberg	32 059
10	Rendsburg, Stadt	Rendsburg-Eckernförde	29 365
11	Ahrensburg, Stadt	Stormarn	29 292
12	Geesthacht, Stadt	Herzogtum Lauenburg	29 152
13	Henstedt-Ulzburg	Segeberg	25 109
14	Schleswig, Stadt	Schleswig-Flensburg	24 913
15	Reinbek, Stadt	Stormarn	24 597
16	Bad Oldesloe, Stadt	Stormarn	23 509
17	Eckernförde, Stadt	Rendsburg-Eckernförde	23 329
18	Husum, Stadt	Nordfriesland	21 043
19	Heide, Stadt	Dithmarschen	20 589
20	Bad Schwartau, Stadt	Ostholstein	20 039
21	Quickborn, Stadt	Pinneberg	19 947
22	Mölln, Stadt	Herzogtum Lauenburg	18 320
23	Kaltenkirchen, Stadt	Segeberg	18 143
24	Uetersen, Stadt	Pinneberg	18 046
25	Schenefeld, Stadt	Pinneberg	17 801
26	Eutin, Stadt	Ostholstein	16 902
27	Stockelsdorf	Ostholstein	16 224
28	Glinde, Stadt	Stormarn	16 088
29	Bad Segeberg, Stadt	Segeberg	16 044
30	Neustadt in Holstein, Stadt	Ostholstein	15 897
31	Halstenbek	Pinneberg	15 879
32	Preetz, Stadt	Plön	15 518
33	Ratekau	Ostholstein	15 332
34	Schwarzenbek, Stadt	Herzogtum Lauenburg	14 222
35	Brunsbüttel, Stadt	Dithmarschen	13 943
36	Bargteheide, Stadt	Stormarn	13 732
37	Rellingen	Pinneberg	13 510
38	Ratzeburg, Stadt	Herzogtum Lauenburg	13 224
39	Plön, Stadt	Plön	12 960
40	Bad Bramstedt, Stadt	Segeberg	12 692
41	Tornesch	Pinneberg	12 673
42	Glückstadt, Stadt	Steinburg	12 169
43	Barsbüttel	Stormarn	12 158
44	Kronshagen	Rendsburg-Eckernförde	12 055
45	Lauenburg/Elbe, Stadt	Herzogtum Lauenburg	11 798
46	Scharbeutz	Ostholstein	11 450
47	Harrislee	Schleswig-Flensburg	11 301
48	Malente	Ostholstein	10 699
49	Büdelsdorf, Stadt	Rendsburg-Eckernförde	10 293
50	Wentorf bei Hamburg	Herzogtum Lauenburg	10 059
51	Oldenburg in Holstein, Stadt	Ostholstein	10 038
52	Altenholz	Rendsburg-Eckernförde	10 019
53	Kappeln, Stadt	Schleswig-Flensburg	10 002

The two largest cities in Schleswig-Holstein, it seems, have not yet surpassed one quarter of a million in population numbers. One could assume that there has not been a recent 'coast rush', nor has there seemed to be one in the past for that matter. In fact only two cities have populations of greater than 100,000. There are no New Yorks, no Singapores, and no Hong Kongs. With such a low population density and an absence of rapid urbanisation, much of the region seems to have remained involved in (now heavily subsidised) agricultural production as indicated in Figure 3, indicating that in fact much of the economy is, in effect, 'artificial' if one is inclined to considers subsidies an artificial measure of profit. The regional economy then could be radically altered with the stroke of a pen.

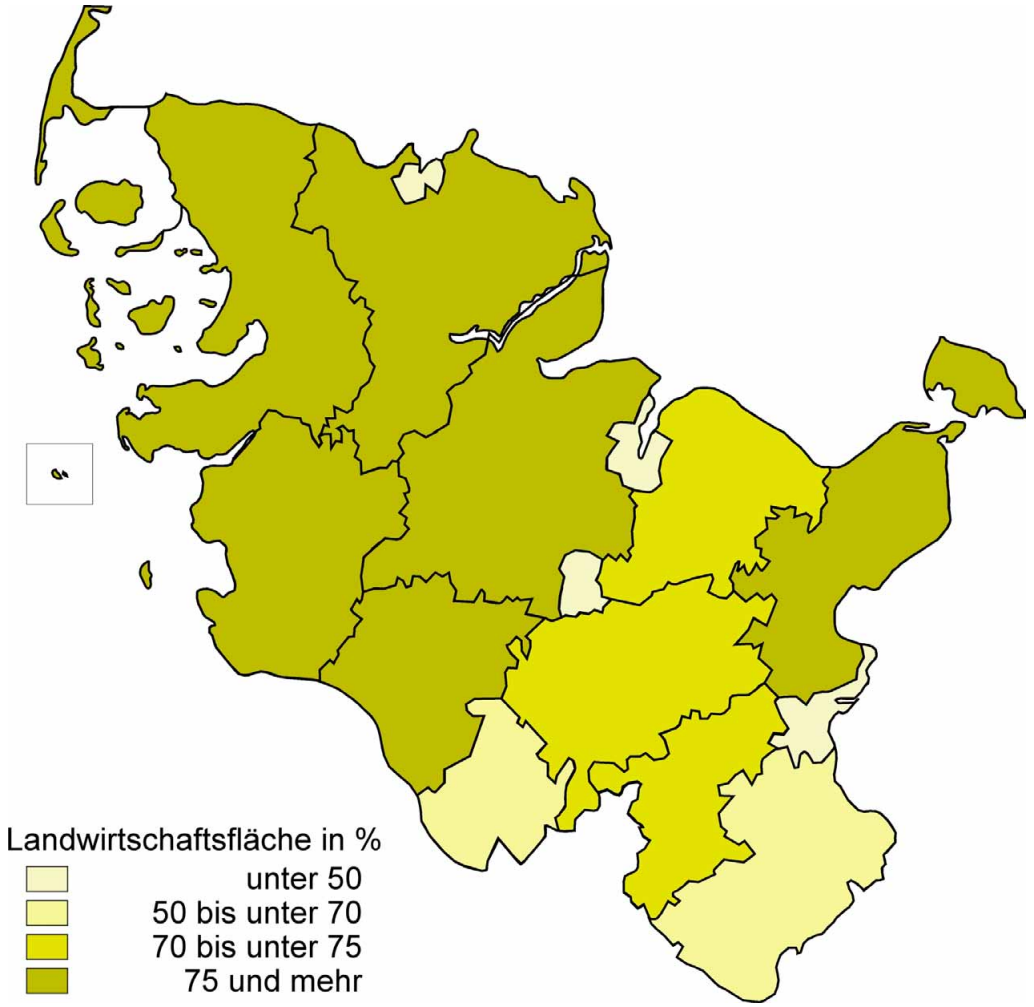


Figure 3. Agricultural Land Use in Schleswig-Holstein.

(% of land used for agricultural purposes)

As is typical in coastal regions, tourism also plays a significant economic role. The tourism patterns are presented in Figure 4. It should be noted that, with the exception of a sharp increase in the early

1990s, (perhaps a result of German reunification) the trend has been to level off or decline slightly, as has the investment in new tourist accommodation facilities.

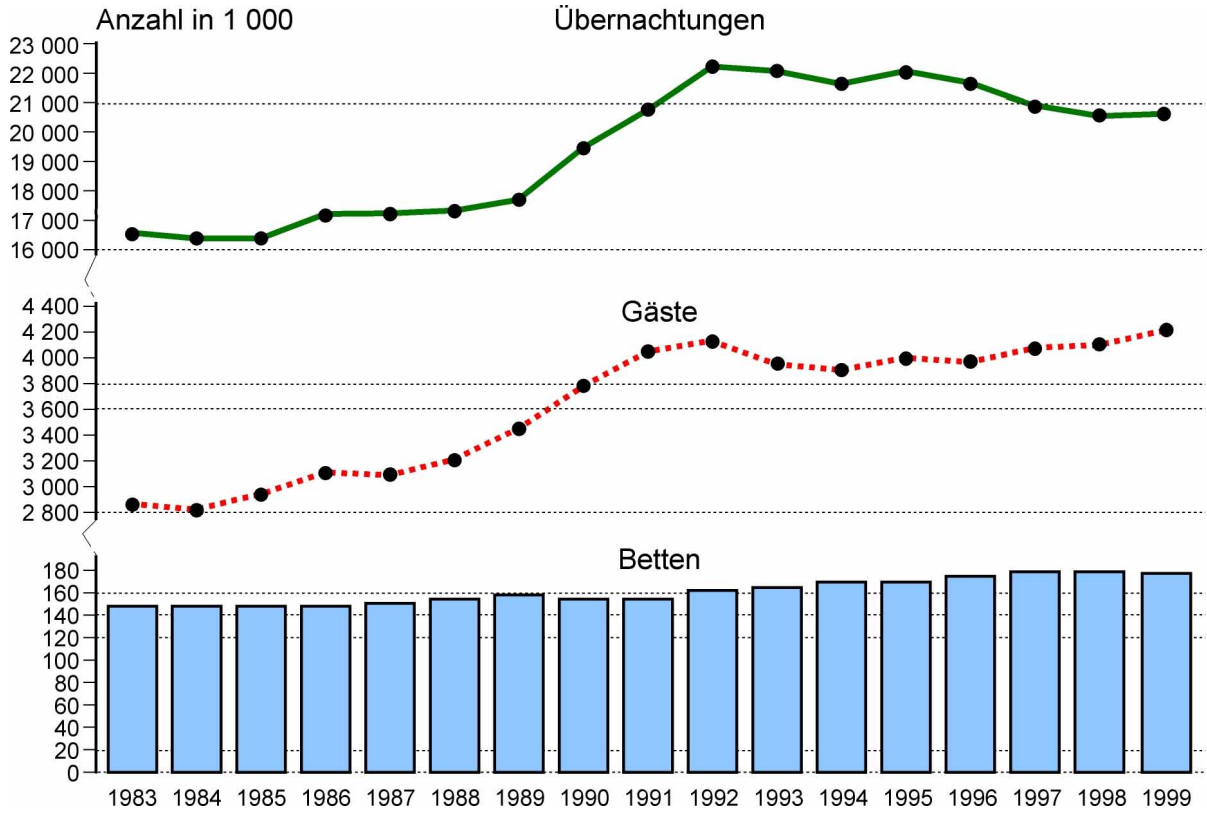


Figure 4. Regional Tourism, Schleswig-Holstein.

(number of overnight stays, guests and beds 1983–1999)

Investment in tourist facilities seems to be related more to the behaviour of tourists than to the cost of land for such facilities (although this likely excludes the high cost of shore-line property) as Figure 5 indicates, some areas that one would expect to attract tourists also have the cheapest land:

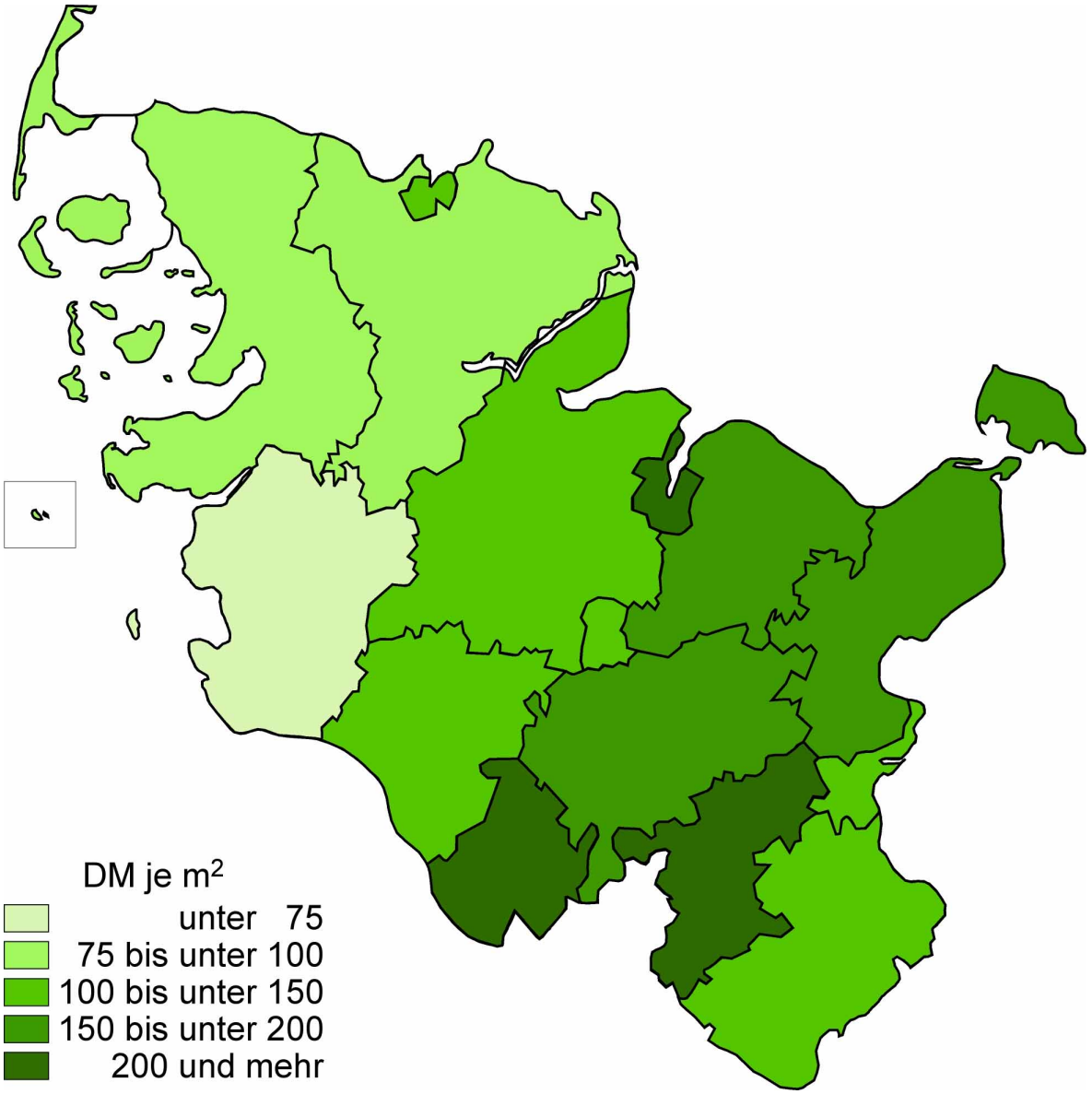


Figure 5. Cost of Building Land, Schleswig-Holstein.

Fishing as an industry does not appear as a separate indices in the regional statistics, so one is led to believe it is not a significant factor in regional economics.

Table 2 shows the increasing debt of the region up to the year 2000 (the last year for which data is available).

Table 2. Debt Growth 1989-2000, Schleswig-Holstein.

Year	Total Debt Million Euro	Debt per resident Euro
1989	9,630.5	3,746.2
1990	10,291.3	3,936.9
1991	10,732.2	4,074.5
1992	11,289.9	4,242.7
1993	12,205.9	4,545.4
1994	12,662.7	4,691.1
1995	13,481.2	4,964.1
1996	14,132.1	5,175.3
1997	14,822.7	5,391.1
1998	15,235.9	5,518,2
1999	15,574.0	5,622.3
2000	16,000.3	5,761.2

Source: Ministerium für Finanzen und Energie des Landes Schleswig-Holstein, 2001

Summary of the Existing Situation

Schleswig-Holstein is within a national context in which the national economy is performing poor, unemployment is high, business investment is dropping, consumer spending is flat, retail and construction are in crises, bankruptcies have increased and therefore so have the number of jobs being lost, global competitiveness is dismal, regulation in the labour market is an inhibitive factor for the creation of small firms, labour costs are high and not competitive in a global market, the tax system is one of the highest in the world, the health care system the second most costly in the world, recent school leavers have not received a sufficient education to make them competitive in an international market, there is some leeway in immigration policy to allow specialist workers to work in Germany, pension funds are in crisis and there seems to be an increasing interest in environmental issues. The region of concern for the following scenarios advocates the resolution of environmental issues and it has an economic basis primarily consisting of tourism and a mix of ecologically friendly and traditional agriculture. Ninety-eight percent of business in Schleswig-Holstein is listed as being small and medium sized enterprises (Kruse, 2003). It does not seem to be on the brink of ecological or real economic disaster (at least as one could speculate, as long as agricultural subsidies remain). However, the increasing debt load per resident would indicate that change is necessary.

Kruse (2003) identifies five regional policy targets: 1. supporting structural change, 2. promoting competitive enterprise in small and medium sized enterprises, 3. stimulating education, research and the service sectors, 4. development of transport infrastructure, and 5. the creation of new jobs. To assist in reaching these goals, targets of support are listed as: 1. support to start-ups and young enterprise, 2. support to industrial areas especially for small and medium enterprise, 3. support to public institutions to improve the attraction of regional economic sites (especially technology projects), 4. stimulating transfer of technology and innovations, 5. improvement of harbour infrastructures (regional ports) and regional airports, 6. support of tourism infrastructure, and 7. stimulating education/qualification (vocational training institutes). Examples of the economic clusters to be given priority are 1. wind energy/construction of wind turbines, 2. maritime technologies, 3. life

science technologies, and 4. tourism. The following scenarios address a combinations of these priorities.

With this background in mind, we can begin to look at some possible futures for the region. Notably absent from the discussion is any 'vision' of the future held by the inhabitants of the region. It is quite reasonable to assume that they might well, on the whole, be satisfied with the current conditions and trajectories and see no need for any radical change. Notably absent from the goals of the *Ministerium für Wirtschaft* is any emphasis on agriculture. The scenarios are each divided into three time periods, starting in 2002 and ending in 2030.

The Scenarios

The Grey Scenarios: *NECO* and *AMAP*

In this scenario, emphasis is given to a broader national and international trend which is inevitable at this point in history, as well as an opportunist stance towards new technology, expansion in the life sciences, spin off opportunities for the service and tourism sectors and the development of small and medium sized manufacturing enterprise. The broader national (and international) circumstance is the ageing of the population, a phenomenon which has not been given its due in discussions of sustainable development. Explicitly, demographic change is perceived of as the main driving force for the scenario and in this case, the driving force needs to be harnessed with the potential for opportunity.

Some of the *facts* specifically relevant for this scenario include:

In 1950 about 200 million people in the world were aged 60 or over. By 1975 that population had grown to 350 million and projections estimate that there will be 1 billion people aged 60 and over by 2025. This population will have grown 224 percent in about 50 years, while the total world population will have grown about 102 percent. By 2025 the world population of elderly (60+) will be about 14 percent of the total world population. (Salas 1982 cited in Novak, Mark, 1993: 63)

Bearing in mind this forecast was made in 1982, one can only assume that the potential of contemporary technology was not part of the equation. Certainly those inclined towards a market ethos could only exclaim "what a potential market", yet they didn't. As of yet, it is mostly untapped. According to the same sources, by 2025, about 75% of the world's elderly population will be living in the developed nations. This, of course, is a good basis on which to induce for-profit research. The new technology considered in this scenario is the development of nanotechnology and gene technology, as well as low-tech aids and appliances. The following also provides a brief account of a relevant cultural perception. The discussion begins with a brief description of the demographics.

Figure 6 is shown separately as it both represents the most current data, and includes the detail necessary for an understanding of the presentation of the following population trend (Figure 7). We can see from Figure 6 that there is a 'bubble' moving

through the regional, Schleswig-Holstein, population, which indicates that in the next few years the *proportion* of elderly people will increase. All things remaining the same, this would mean a significant increase in the dependency ratio. The dependency ratio is the ratio between those members of society who are working and contributing to the financial resources of the state to those members of society that draw their income from the state (i.e. the young, pre-working age group and the elderly retired group). In the following, ***no allowance is made for working age members of the population who are unemployed for either lack of opportunity or choice, perhaps arising from family circumstances***. ***All that is depicted is the population potential for a dependency ratio based on age***. In reality, the dependency ratio is considerably higher as a result of unemployed members of the population and those couples who by circumstance choose to remain single income families. These conditions are maintained throughout all discussion of the Grey scenario in this paper.

It is customary in western society that the young draw most of their support from the family and the elderly draw most of their support from the state, often based on contributions made during working life. It is also obvious today that those contributions were miscalculated or misused, as western nations all seem to face a crisis in pension funds. The elderly are also the demographic category most likely to draw heavily on health care resources, another social benefit system that is in financial crisis. How such a transition occurs becomes obvious if population trees are viewed over time as demonstrated in Figure 7. On this basis, the assumption is made in this scenario that the Federal Government and Regional Government are persuaded to give some financial support, in terms of tax incentives or other means for participating corporations, on the basis that a shift from the prevalent medical model of care for the elderly (which contributes a significant amount to the financially troubled national healthcare policy) towards a social and health promotion model, which attempts to keep elderly people as independent people, and in better health in general, subsequently resulting in a much lower health care cost, while at the same time, stimulating the regional economy.

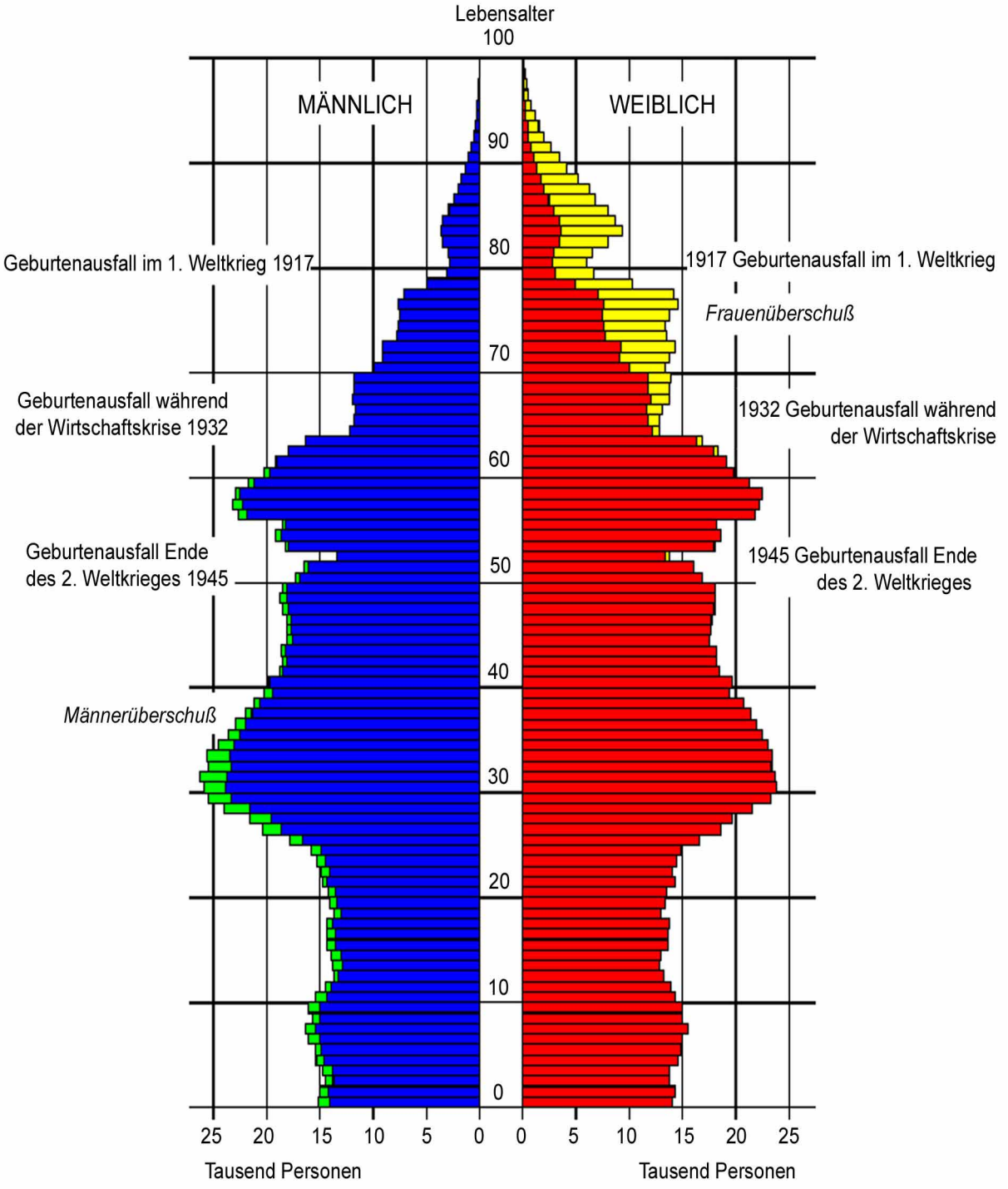
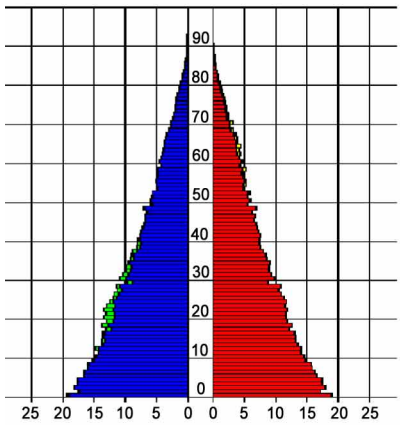


Figure 6. Population Structure 1997: Schleswig-Holstein.

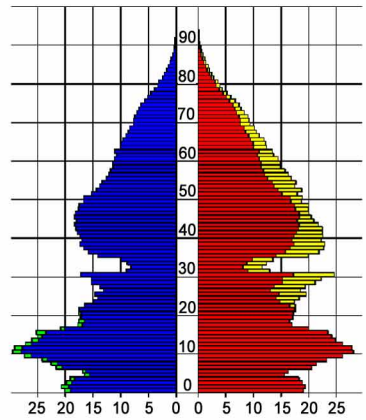
source: Regional sources - Statistisches Landesamt Schleswig-Holstein

In Figure 7 the ‘bubble’ is shown moving through the population over time.

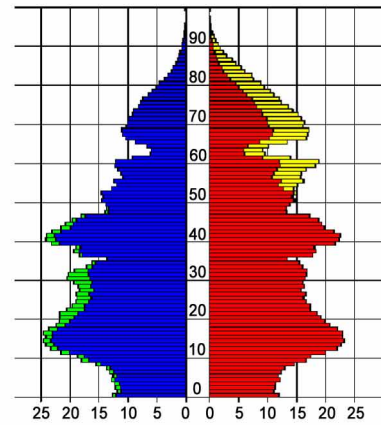
S.H. 1900 (Fig.7a)



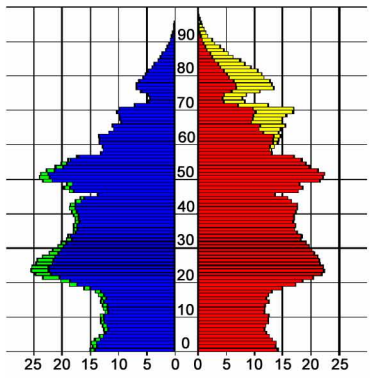
S.H. 1950 (Fig. 7b)



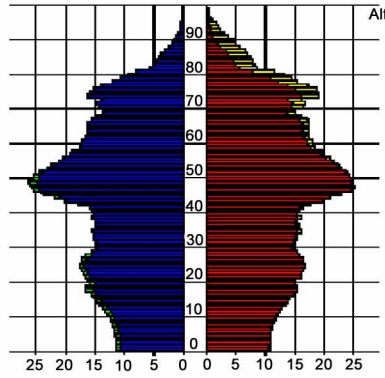
S.H. 1980 (Fig. 7c)



S.H. 1990 (Fig.7d)



S.H. 2015 (Fig.7e)



National 1999 (Fig. 7f)

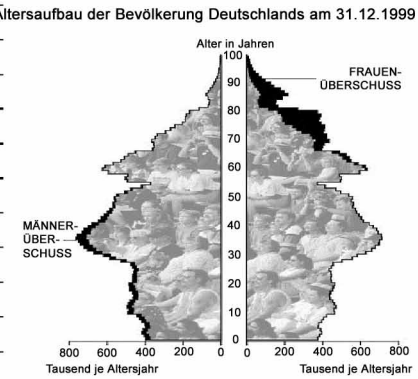


Figure 7. Population Pyramid, Schleswig-Holstein / Germany.

sources: Regional sources - Statistisches Landesamt Schleswig-Holstein,
National sources – Statistisches Bundesamt Deutschland

As Figure 7f indicates, national trends follow a similar pattern. The centre column of numbers represents age. The left half of each figure represents the male population and the right half the female population. The x axis represents thousands of people. The population pyramid of the national population is self-explanatory. In terms of *numbers* of elderly people (over 65 years of age), growth, as based on a linear trajectory of the present and on a scenario condition of increased longevity, is presented in Table 3. In effect, Table 3 represents two scenarios of population projections, one with a scenario based on a longevity of 80 years and one with longevity set at 100 years, as a result of the benefits of technology, beginning in the year 2012.

Table 3. Long term Projections of Number of People Over 65: Schleswig-Holstein /Germany: longevity = 80 years and 100 years.

Projections of number of people over 65 *				
	average longevity 80 years		average longevity 100 years beginning 2012	
year	national population*	Schleswig Holstein	National population*	Schleswig Holstein
1999	13,567,229	454,771	13,567,229	454,771
2000	13,419,631	450,654	13,419,631	450,654
2001	13,337,371	449,882	13,337,371	449,882
2002	13,302,399	451,383	13,302,399	451,383
2003	13,301,632	454,373	13,301,632	454,373
2004	13,325,741	458,294	13,325,741	458,294
2005	13,368,175	462,757	13,368,175	462,757
2006	13,424,390	467,496	13,424,390	467,496
2007	13,491,238	472,342	13,491,238	472,342
2008	13,566,509	477,188	13,566,509	477,188
2009	13,648,585	481,971	13,648,585	481,971
2010	13,736,190	486,655	13,736,190	486,655
2011	13,828,219	491,225	13,828,219	491,225
2012	13,923,624	495,669	14,287,975	507,792
2013	14,021,351	499,981	15,094,809	535,466
2014	14,120,309	504,153	15,878,163	561,885
2015	14,219,361	508,176	16,638,395	587,108
2016	14,317,334	512,035	17,375,638	611,184
2017	14,413,042	515,715	18,089,840	634,150
2018	14,505,306	519,195	18,780,814	656,036
2019	14,592,982	522,454	19,448,275	676,864
2020	14,674,989	525,469	20,091,887	696,653
2021	14,750,328	528,218	20,711,289	715,417
2022	14,818,102	530,680	21,306,128	733,167
2023	14,877,531	532,836	21,876,083	749,915
2024	14,927,961	534,670	22,420,880	765,670
2025	14,968,871	536,168	22,940,312	780,444
2026	14,999,874	537,320	23,434,250	794,249
2027	15,020,714	538,121	23,902,642	807,099
2028	15,031,264	538,569	24,345,528	819,009
2029	15,031,517	538,665	24,763,033	829,999
2030	15,021,578	538,414	25,155,368	840,087

*Population projections made using population module of Scenario Studio (Bray, unpublished, 2002)

For the scenario of increased longevity in Table 3 it is assumed that advances in medical technology by the year 2010 allow the average life expectancy to reach 100 years. That is to say, that until the year 2010 both scenarios were set at longevity = 80 year whereas after 2010 one scenario was run with longevity = 100 years. Needless to say, it appears the number and proportion of elderly people will increase significantly in the next few decades, regardless of the scenario. This is not an unreasonable assumption. According to Robert Stowe England, "The Fiscal Challenge of an Aging Industrial World", Washington: Center for Strategic and International Studies, Jan. 2002, the future of extended life expectancies will result from genetic engineering, gene therapy and the development of new

materials for replacement body parts. With the potential for new medical breakthroughs, some scientists are confident that longevity can reach 120 years in the not too distant future.

A little needs to be said about nanotechnology, as it is often misunderstood. Nanotechnology is a suite of technologies. It is a combination of a number of streams of research addressing: 1. understanding, duplicating and adapting natural microbiological processes such as protein synthesis (the 'wet' side of nanotechnology), 2. molecular engineering which addresses the construction of tiny machines, and 3. the miniaturisation of computing. One of the key concepts here is the conceptualisation of tiny machines that can reproduce themselves or act as catalysts for other processes. Of particular interest to this scenario is the possibility of tiny machines that will float in human bodies enabling cell repair and perhaps control over the ageing process. (see "Comback Kid" and "Microchips in the blood", The Economist Technology Quarterly The Economist, Sept. 21, 2002 , pp.3,7)

Finally, on the cultural side, there seems to be a unique faith in the curative properties of mud and sea air among the German population, and Schleswig Holstein has an abundance of both. It seems then, there is a confluence of large trends: the demographic trend (where more people live longer and healthier lives), the technological trend (leading to a hi-tech society and extending life), perhaps a cultural trend (where older people might be less inclined or less able to live in near total leisure, due to declining pension funds), a shortage of younger workers in the labour force (and a healthier elderly population that would enable them to partially participate in the workforce.). Concerning the national culture, there may be a tendency of German people to favour coastal regions for health benefits. Before beginning a discussion of how these benefits might be tapped, it is necessary to point to a possible trajectory that could occur if demographic changes are ignored.

Continuation of Current Demographic Trajectory

Before beginning this scenario of the future of Schleswig-Holstein, some definitions and a clarifying discussion of preconditions are necessary. Much of the preliminary discussion will revolve around a changing *over all dependency ratio*. To repeat, this is the a dependency ratio that gauges the burden that the old and the young place on people in the middle aged income earning group. Typically, this ratio is simply the sum of people under the age of 18 and people over the age of 65. This is compared to the population aged 18 to 65. The three parts of the scenario will tell how it comes about that changes in the dependency ratio occur to the detriment of the region.

It should be kept in mind that public expenditures on the elderly (for example, health care and well being) and public expenditures on the young (education) are significantly higher than those of the working age category. However, a compatible decrease in people in the under 18 group and increase in the over 65 group does not lead to a balanced budget as the health care costs of the elderly far exceed the educational costs of the young. Furthermore, an increasing age dependency ratio also indicates a proportional shrinking labour force and results in a shift of government service costs in terms of pensions, social security payments and health care costs.

To repeat a previous statement, it should be noted that when discussing the dependency ratio hereafter in this paper, no allowance is made for working age members of the population who are unemployed for either lack of opportunity or choice, perhaps arising from family circumstances. All that is depicted is the population potential for a dependency ratio based on age. In reality, the dependency ratio is considerably higher as a result of unemployed members of the population and those couples who by circumstance choose to remain single income families.

Future dependency rates depend on a number of social conditions. A weak economy, low birth rates, low immigration rates and a rise in the costs of services increase the burden on the working age group. A strong economy, higher birth rates, more immigration and a rise in per capita income for the working age group will mean less burden for the working age group. Changes in social values and change in retirement age could also decrease the dependency rates.

Using Scenario Studio (Bray 2000, unpublished), a 30 year trajectory (Figure 8) of the dependency ratio for Schleswig-Holstein is constructed. Figure 8 represents the outcome of a trend based analysis, the linear projection of current values. In Figure 8, life expectancy is fixed at 80 years and retirement age is fixed at 65 years. Without any change in any form it is obvious that within the next 30 years the working people of Schleswig-Holstein will be required to contribute more to the well being of an aging population.. This is not fiction.

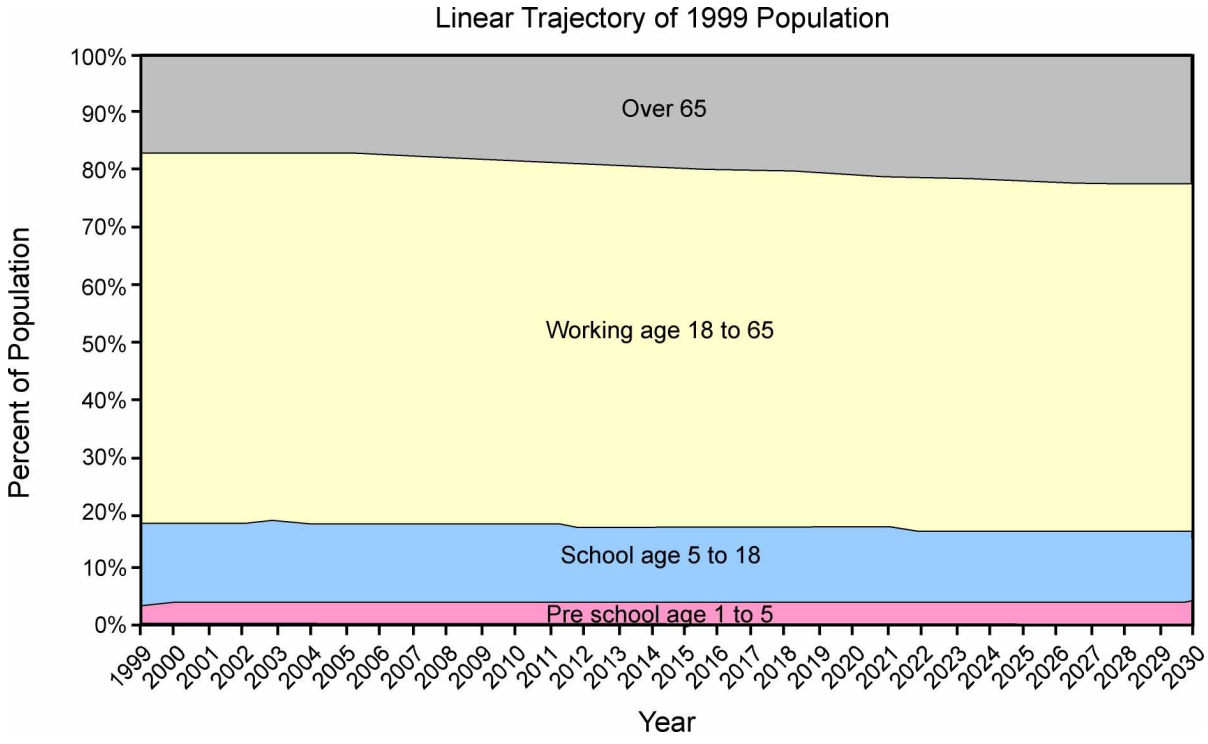


Figure 8. Dependency Ratio Based on Linear Projection of Current Values, Schleswig-Holstein (1999 Longevity Held Constant at 80 Years).

NECO (Hi-Tech New-Eco Restructuring): Phrasing the Future

A second aging pattern scenario is presented in Figure 9, based on increasing pattern of change in longevity. Figure 9 indicates a marked increase in the number of elderly when compared to Figure 8. Following Figure 9 is a decadal analysis of a situation that could give rise to such an increase in the age dependency ratio. This is a fictitious scenario based on the possibility of increased longevity (100 years).

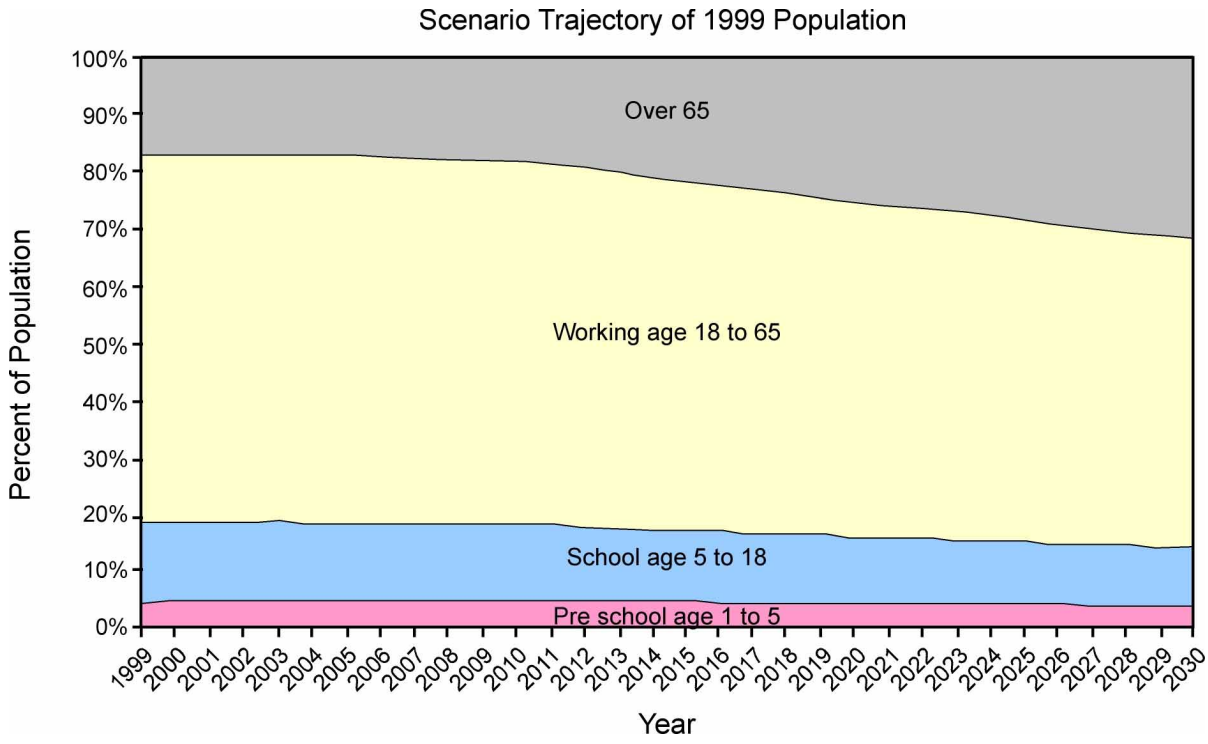


Figure 9. Dependency Ratio Based on Scenario Conditions, Schleswig-Holstein (Decadal Increasing of Longevity).

With the typical (and now somewhat standard) proposed changes in the socio-economic structure of Schleswig-Holstein (similar to the goals of many other competing regions) , the future might unfold as follows.

Schleswig-Holstein 2000–2010: Scenario Conditions *NECO* (Hi-Tech New-Eco Restructuring)

In the first decade of the scenario, values used in Scenario Studio are longevity = 80, retirement age = 65, not an uncommon combination in the developed world. The graphic representation of the *decade* is presented in Figure 10 and the values employed in the *scenario trajectory* are presented in Table 4.

At this point in the scenario they are merely a *linear trajectory of current values*. Migration rates to and from Schleswig-Holstein are the rates given in 1999 and are held constant for this 10 years period. Mortality rates (death rates) are treated in the same manner.

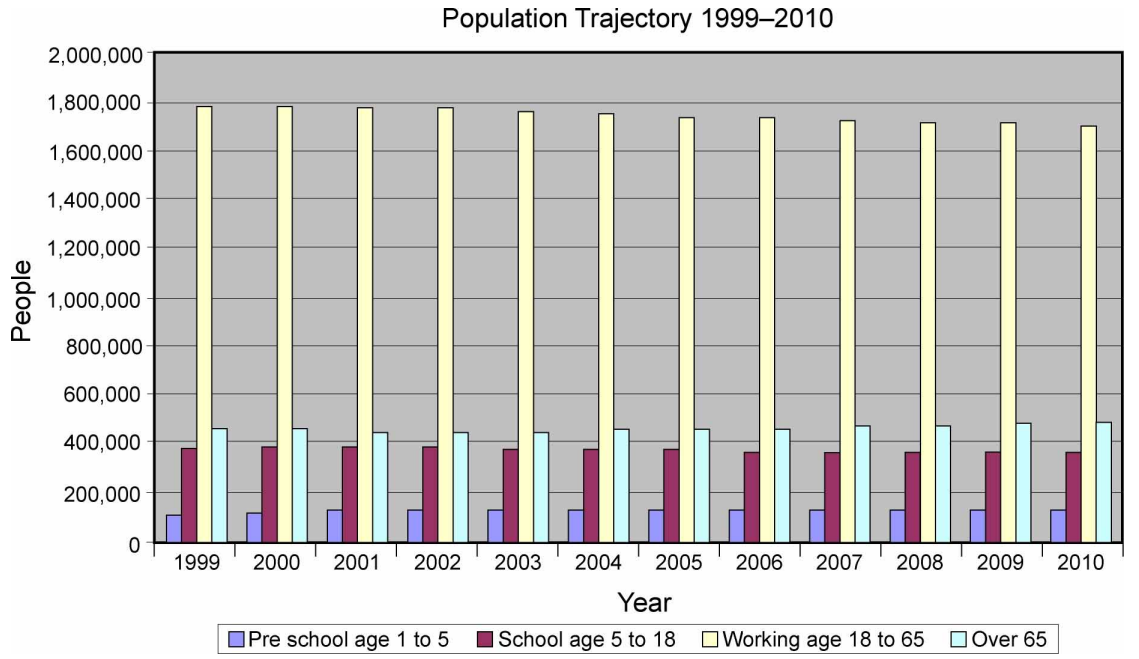


Figure 10. Population Trajectory 1999-2010, Schleswig-Holstein.

Table 4. Mortality and Migration Rates 1999–2010, Schleswig-Holstein.

Age Group	Mortality Rate	Migration rate
1–3	.0003	+.0133
3–5	.0003	+.0133
5–10	.0001	+.0070
10–5	.0001	+.0077
15–18	.0003	+.0094
18–21	.0003	+.0094
21–25	.0006	+.0089
25–30	.0008	-.0026
30–35	.0007	+.0052
35–40	.0012	+.0064
40–45	.0018	+.0048
45–55	.0039	+.0033
55–60	.0076	+.0032
60–65	.0102	+.0039
65–75	.0222	+.0032
Over 75	.0883	+.0048
Longevity is set at 80 years	Age categories are those reported by the Statistics office of Schleswig-Holstein	

It should be noted that, based on existing data, in the age category 25 to 30, more people of this age leave Schleswig-Holstein than come to live in Schleswig-Holstein. In this part of the scenario the aging population remains a minor concern for regional administrators, as it has been for some considerable time. However, it is not at the forefront of administrative priorities nor perceived of as a means to regional growth.

In the period 2002–2010 a number of changes begin to occur in Schleswig-Holstein (these changes are consistent with other standard politically espoused trajectories of a new socio-economic future) as it pushes towards a compatible composition of hi-tech new-eco industry and a green philosophy (*NECO*). During this time, industries pursing the goal of energy innovation begin to receive large subsidies (consistent with the current practices and proposals for the development of wind energy). The state also begins to offer an "ecological agriculture subsidy program" increasing what are currently in place (although Kruse 2003, representing the Economic Ministry of Schleswig-Holstein, would seem to indicate that eco-agriculture is not a priority, National and European proposed and existing subsidy programs suggest that agricultural subsidies are in a phase of re-appropriation, take from the traditional and give to the ecological).

With regional plans unfolding towards schedule, there is a need for highly skilled labour in the evolving *NECO*. As the migration trends indicate, there is a slight positive in-flow of a working age population (see Table 4, these are current rates of 1999, with the exception of the 25–30 year old group). This is considered enough to maintain the labour needs of Schleswig-Holstein. The administration of Schleswig-Holstein also decides to invest in education to maintain its demand for highly skilled labour.

As the economy and socio-economic structure begins to shift to one of hi-tech new-eco promises of prosperity, there is speculation that the conditions will become highly attractive to people living outside of the region. (Indeed the positive migration rate of 1999 seems to suggest this is an existing fact, *without* increased employment and economic opportunities.) Consequently, there is speculation in the land and housing markets. Keeping in mind that land and housing in Schleswig Holstein has been relatively less expensive than other parts of Germany, this speculation simply raises the costs to that equivalent of a national level and no problems are perceived.

Schleswig-Holstein 2010–2020: Scenario Conditions *NECO*

Given that the population is now healthier, benefiting from the technical advances of medicine, there is a strong possibility that people will live longer and make a more continual contribution to the levels of the dependency ratio. The population as such might be depicted as in Figure 11. Table 5 gives the mortality rates and migrations rates used in the 2010–2020 scenario trajectory. It is assumed that morality rates are reduced by one third and that migration rates are a zero balance.

The period 2010–2020 begins with significant increases in medical technology, which of course, is available to the population of Schleswig-Holstein. In countries where public health care is not available it is common practice to take a loan against property in an effort to meet medical expenses.

As state health care has reached almost crisis state (which is the current condition in many public health care systems), much of the benefits of the new technology can only be received by partial personal cost contributions. While basic health care remains available to all, much of the benefit of new technology must be attained by private needs. At this point, quality and provision of health becomes an equity issue based on wealth and income. Many of the older people of Schleswig-Holstein still maintain private home ownership and the costs of single family housing has increased significantly, giving them the access to personal capital from which to draw the costs of advanced healthcare techniques. This becomes the case in Schleswig-Holstein and the level of private savings drops dramatically.

In an effort to maintain modern medical standards and care for the increasing proportion of elderly, and to avoid voter backlash (as the elderly now constitute a considerable proportion of the voting population) taxes are raised on the already highly taxed working population. Existing companies, in an effort to maintain their existence, have drawn heavily from hi-tech and now, like the conditions of all regions participating in the hi-tech new-eco economy, require a highly educated and flexible workforce. However, as finite funds have been diverted for other social needs, educational standards have slipped in an effort to maintain the regional budget, local labour supplies are not available and the level of taxation and costs of living in the region are not overly attractive to people outside of the region.

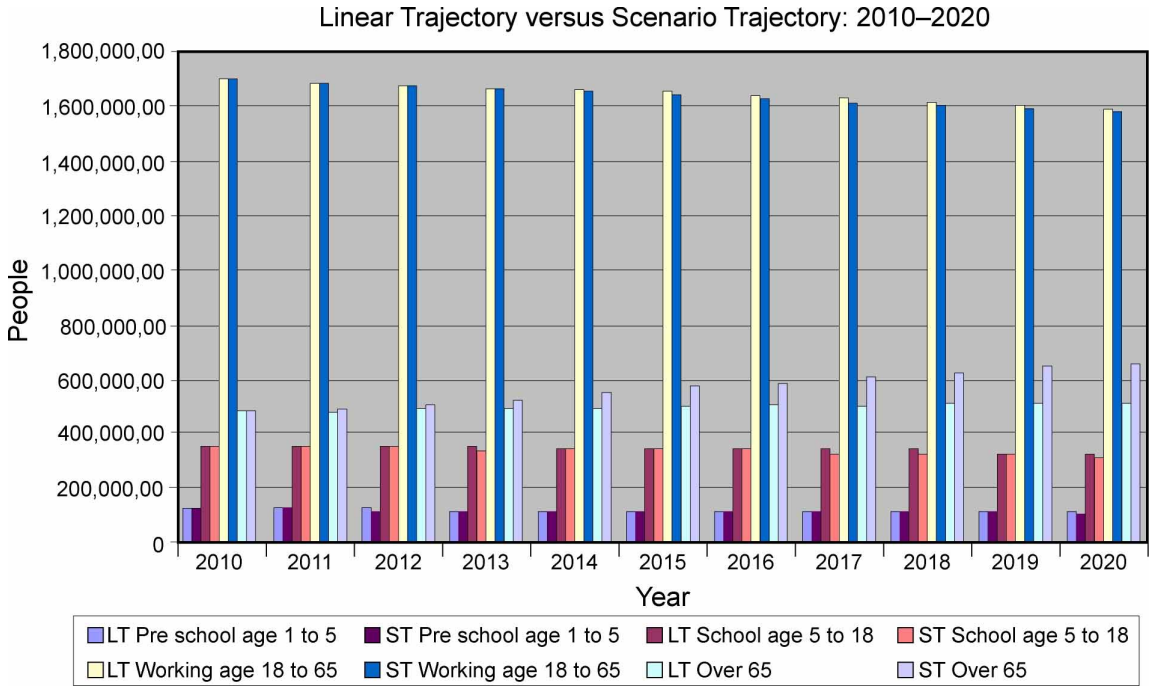


Figure 11. Scenario Population Trajectory 2010–2020, Schleswig-Holstein.

* LT = linear trajectory of current trends (longevity = 80 years)
ST = scenario trajectory with increased longevity (longevity = 90 years)
mortality rates reduced by 1/3 of rates of previous decade

Of note here is the proportional rise of the over 65 category.

Table 5. Scenario Mortality and Migration Rates 2010–2020, Schleswig-Holstein.

Age Group	Mortality Rate	Migration rate
1–3	.0002	0
3–5	.0002	0
5–10	.00006	0
10–15	.00006	0
15–18	.0002	0
18–21	.0002	0
21–25	.0004	0
25–30	.0005	0
30–35	.0005	0
35–40	.0008	0
40–45	.0011	0
45–55	.0026	0
55–60	.005	0
60–65	.0068	0
65–75	.0148	0
Over 75	.0580	0
Longevity is set at 90 years		

Gradually, the scarcity of available labour begins to increase as more people leave the workforce (join the ranks of the old age dependency group). However, this is initially interpreted as a positive indicator as statistically this lessens the unemployment rate. Nonetheless, for those employers seeking employees, the decline in available labour is noticed. As such, there is competition among employers to draw from the available pool. As a consequence, the demand for 'educated' employees is often waved, with employers happy to draw from what is readily available.

Social expenses, i.e. remaining pensions and healthcare costs begin to increase slightly to cover the costs of the rising number of non-working retired adults. At the same time, the number of school age children is also marginally decreasing so payments are transferred from education to health care and the well being of the non working population and the state finances remain is a somewhat balanced state. The relative scarcity of labour creates demands for higher wages and inflation begins to take its course.

The shortage of labour also begins to have another effect on what industries exist in Schleswig Holstein. Existing industries see the need to begin to substitute capital for labour. This begins to produce a tendency for quicker obsolescence of productive capital and creates a period of relatively rapid renewal of plants, in some cases replacing manpower with capital and slightly increasing unemployment rates of the near aged sector of the workforce, the reason being, that the implementation of new technologies requires a different education than that of the older worker. Consequently there is a demand for a relatively scarce younger age workforce and inflation begins to increase at a significant rate as demands are made by young workers on the basis of supply and demand.

Schleswig-Holstein 2020–2030: Scenario Conditions *NECO*

One way or another, the budget of Schleswig-Holstein suffers, on the first account as a result of fewer contributions in terms of taxes and on the second account by having to support either a growing number of unemployed people or debts accrued according to an increasing dependency ratio.

In terms of population, the bio-med advancements would likely mean a further reduction in mortality rates. For the population projection for this last decade, minimal out migration rates have been assigned and a reduction of 1/3 of the mortality rate of the decade 2020–2030 has been employed. The reduced reduction in mortality rates suggests that the most significant advancements of the technology are made at its introduction. Longevity, for this last decade of the scenario, has been increased to 100 years. Patterns and values are represented in Figure 12 and Table 6 respectively.

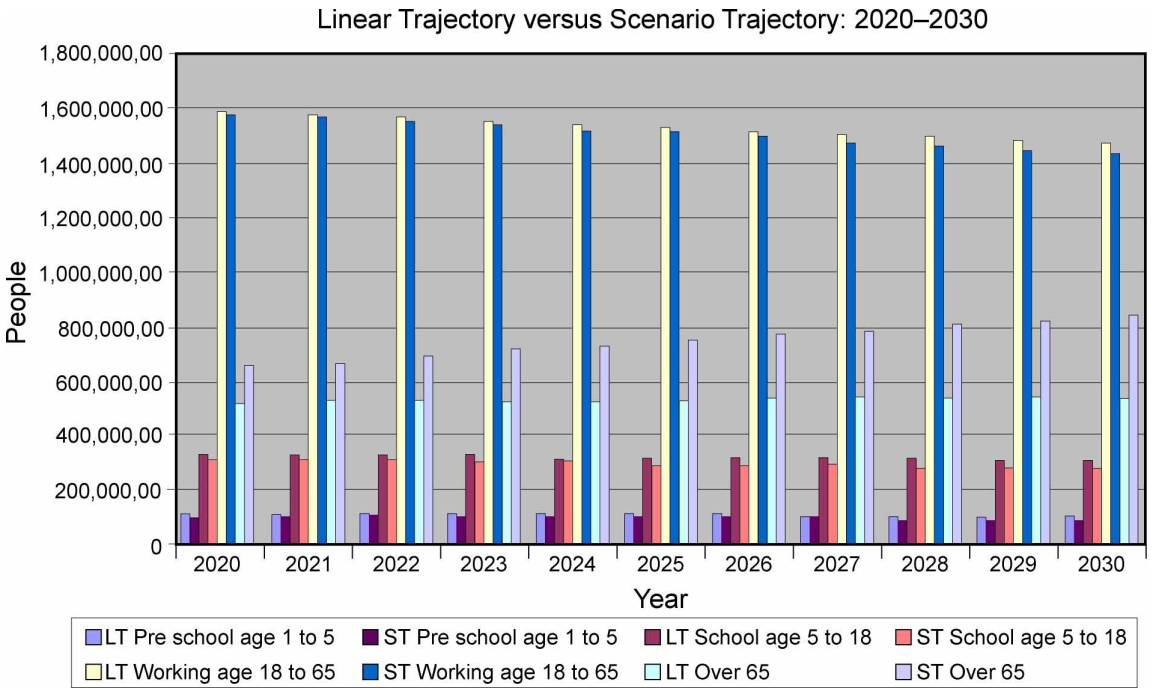


Figure 12. Scenario Population Trajectory 2020–2030, Schleswig-Holstein.

* LT = linear trajectory of current trends (longevity = 80 years)
ST = scenario trajectory with increased longevity (longevity = 100 years)
mortality rates reduced by 1/3 of rates of previous decade

Again, noteworthy is the increasing proportion of the old age dependency ratio between current projections (LT) and the scenario projections based on the impact of technology (ST).

Table 6. Scenario Mortality and Migration Rates 2020–2030, Schleswig-Holstein.

Age Group	Mortality Rate	Migration rate
1–3	.00013	-.0124
3–5	.00013	-.0124
5–10	.00004	-.0070
10–15	.00004	-.0770
15–18	.00013	-.0075
18–21	.00013	-.0075
21–25	.00026	-.0083
25–30	.00034	-.0027
30–35	.00030	-.0052
35–40	.00052	-.0068
40–45	.0008	-.0045
45–55	.0016	-.0035
55–60	.0033	0
60–65	.0044	0
65–75	.0096	0
Over 75	.0384	0
Longevity is set at 100 years		Last 4 age categories remain as 0 since it is unlikely that people of this age would consider relocation if avoidable.

If the future was to unfold in the pattern suggested in this scenario, Schleswig-Holstein would be faced with a situation whereupon the dependency ratio of working age to over 65 is approximately 2:1. This does not account for the dependent young. This socio-economic crisis would also occur at a time of rising unemployment.

As a result of this demographic change we could expect rising tensions between regional and national levels of government over issues of transfer payments. Individuals in the region could face either increasing tax rates or lower levels of social benefits. Increases in the retirement age, increases in legislation for private pension plans and/or more flexible retirement options could possibly contribute to stability. The elderly of the period 2020–2030 will no doubt be a generation that are accustomed to society meeting their individual needs (for housing, education, healthcare, etc.). This suggests the possibility that contextually there will be demands for unreasonable (or unattainable) levels of social support.

However, if one views the aging population as a source of opportunity, the scenario could unfold in an entirely different manner.

AMAP (Adaptive Management and Aging Population): Rephrasing the Future

Schleswig-Holstein 2002–2010: *AMAP*

Realising it is likely not possible to become a leader in the new economy and that ‘green’ is an idealist life style but not an economic plan, the administrators of the region decides to take an inventory of

regional assets. The final result includes: an ageing population; physical room for expansion; relatively cheap costs of real estate; a tendency on a national basis to attract tourists; a tendency to attract people seeking health benefits from *kurs* (for which it has a number of existing centres), and; subsequently, the potential to attract rising technology related to health and ageing. They realise the basis for the future of the region is already in place, it simply needs to be consolidated. They also realize that trends change, hence the focus on modelling the economy to considering continual change. To this end, the goal is towards adaptive management in the situation of an aging population (*AMAP*) Explaining the situation to the large and powerful, the administration creates a lot of interest in Schleswig-Holstein as becoming a centre for the advancement of the medical understanding of ageing and innovative care of the elderly, an underdeveloped component of the life sciences. The current emphasis on research and development in life sciences works to their benefit. By 2005 a number of related corporations and vested interests have been convinced to locate small centres of research near some of the *kur zentrum* (health resort, spa) and ageing communities, in short, near the people that could benefit from scientific and technological advancements.

Schleswig-Holstein 2010–2020: *AMAP*

By 2010, the reputation of the region as a centre for the health needs of the aged and related research is spreading and existing facilities become full to capacity and research centres are expanding. (The human drive for immortality is a significant driving force.) In the same year it is decided to put considerable investment into new facilities and 'centres for the well-being of the aged' start to dot the landscape. Realising however that the elderly are now healthier than in years gone by, there is a push towards centres that allow semi-independent living (lesser costs) rather than the institutional model (higher costs) of care for the elderly. As this will ultimately act to lower national financial burdens, the Federal government agrees to make significant contributions. This growth, as would be expected, gives rise to growth in related service and construction industries, which in turn provides economic impetus to long existing regional small and medium sized businesses. Small communities for the elderly are planned that are designed to offer semi-independence, autonomy and security for the elderly. Publicity raises national interests and it seems, the flat lands of Schleswig-Holstein are much more sympathetic to old legs than are the foothills of the Alps, not to mention the benefits of a more moderate climate. Elderly people from all regions of Germany begin to view the prospects of relocation with a higher degree of enthusiasm.

By 2015 the region is becoming internationally known for its research into ageing. Research has also moved beyond the hi-tech, with niche relevant architecture and design also becoming common places small businesses. There are architectural experiments (both low-tech and hi-tech) with enriched housing where extra facilitation for the elderly is incorporated into the housing design. Communities for independent living are also designed to ensure social and health care support are close at hand.

Transportation and mobility become a major issue for the elderly living in such regions, giving rise to technological development and change in organisational and service-related innovation (better bus shelters, special traffic lights, on-line group requests, etc.). Small, related, home-grown software houses begin to sprout, designing means that allow readily access to transportation (scheduling and

booking; i.e. groups to cultural events or individuals to medical assessments) and also providing access to knowledge needs and interests of the elderly. For less urgent situations there is also on line medical advice, reducing the demands on physicians. Central medical monitoring systems are also developed allowing the remote monitoring of acute and chronic conditions of the elderly from a central location, with rapid dispatch in times of emergency.

There is also the matter of occupying one's time. By 2015 there are enough of the elderly people living in the region to begin to voice their concerns. As a result of better health, many older people take on part time work, alleviating the problems associated with a shortage of younger people in the workforce. This also alleviated some of the financial problems caused by declining pension funds. Given access to a supplemented income, the healthy elderly also seek recreation. Golf courses begin to replace unprofitable (and now only partially subsidised) agricultural land. (There is no national shortage of food as EU members in eastern Europe are well suited to providing the agricultural needs of EU members). Cultural events are given double duty, as elderly people prefer to attend such things during daylight hours, preferably with the assistance of a co-ordinated transport system, hence, the elderly enjoy the offerings in the daytime and the working age group in the area enjoy the same offerings in the evening. These booking possibilities begin to draw performing artists from surrounding regions and a small performing arts community begins to develop. Fitness clubs now have 'over 60' afternoons and also run double duty, providing for the working age groups in the evening. As such local businesses that used to be limited to primarily evening customers (and often only seasonal tourist trade) are now open during the day time and small private (subsidised) transportation companies are beginning to evolve as well as transportation provided directly by the owners of the venue. The evening venues are filled to capacity with the new service workers and professional relocating to the region.

Schleswig-Holstein 2020–2030: *AMAP*

By 2020 there are a considerable number of elderly now living in the region. Along with the increase in the number of elderly there has been an increase in the number of people working in research and development, from hi tech-medical equipment to low-tech design, from medical to mobility. There has also been a shift from R and D to include mass production of the benefits of the R and D. Along with this rise in employment there has also been a surge in the need for supporting businesses.

Overlooked by the regional administration was the fact that offspring did not relocate with their parents. Consequently there is a sudden surge of 'visitors' to the region. Since most of the newly styled and accordingly priced elderly living units do not have facilities for guests, there is a surge in the tourist accommodation sector and a switch from the longer term holiday accommodation towards services catering for shorter visits of one or two days. The attraction of the regions is no longer controversial 'theme parks', but family. In addition, the performances of the growing performing arts community also begin to attract people from further afar.

Hi-tech rests along side the traditional mainstay of tourism in the region. The traditional enterprise of farming continues to a lesser degree and the ecological farms are just as inclined to use the labours of

the healthy elderly as they are to import foreign labour, benefiting both the elderly in terms of providing them a sense of contribution and the incentive to remain communally active, and benefiting the farmer, as the elderly are just as likely to labour as much for labours sake as for wages.

The tourist industry has be slightly reshaped and remains in healthy condition with a mix of 'family visitors', short term visitors for cultural events and the traditional tourists (many of whom now bring golf clubs). As for the future – the elderly are a wonderfully renewable resource. Research and development begins to decline towards typical levels and a profitable sense of stability endures. Of course, the aging population does not last disproportional forever and regional authorities must once again assess plans for the future. However, as Figure 13 indicates, the pattern of demographic change is reasonably enduring. In Figure 13 the scenario of population change as presented in *NECO* is extended until 2060, with no change occurring in any rates after 2020.

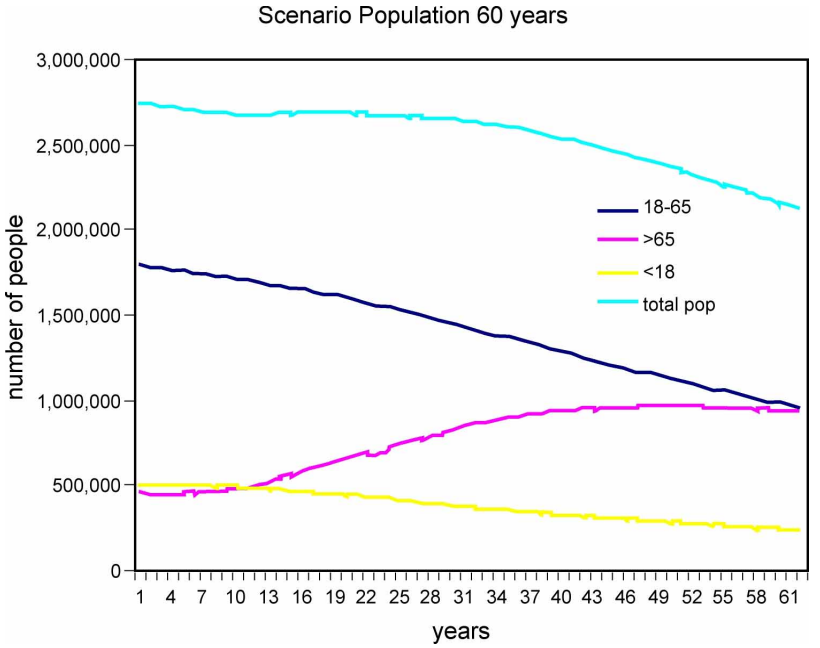


Figure 13. Scenario Population Trajectory 1999–2060, Schleswig-Holstein.

As is shown, the total population declines, the age group 18–65 declines, the age group under 18 declines and the age group of 65 or older increases and then begins to level off. Extending the scenario of the socio-economic possibilities for Schleswig-Holstein beyond 2030 would require an account of even greater forces.

The Green Scenario

In this scenario the main driving force is the idea of sustainable development. Human beings are thought to live in harmony with nature. The right to economic and social development must be

fulfilled so as to equitably meet developmental and environmental needs of present and future generations. Environmental protection is an integral part of the development process.

Current State of Affairs

To describe the present economic state in Schleswig-Holstein, the development of the gross added value in the service, manufacturing and agriculture, forestry and fishery sectors in the administrative districts are presented in Figure 14 and Table 7.

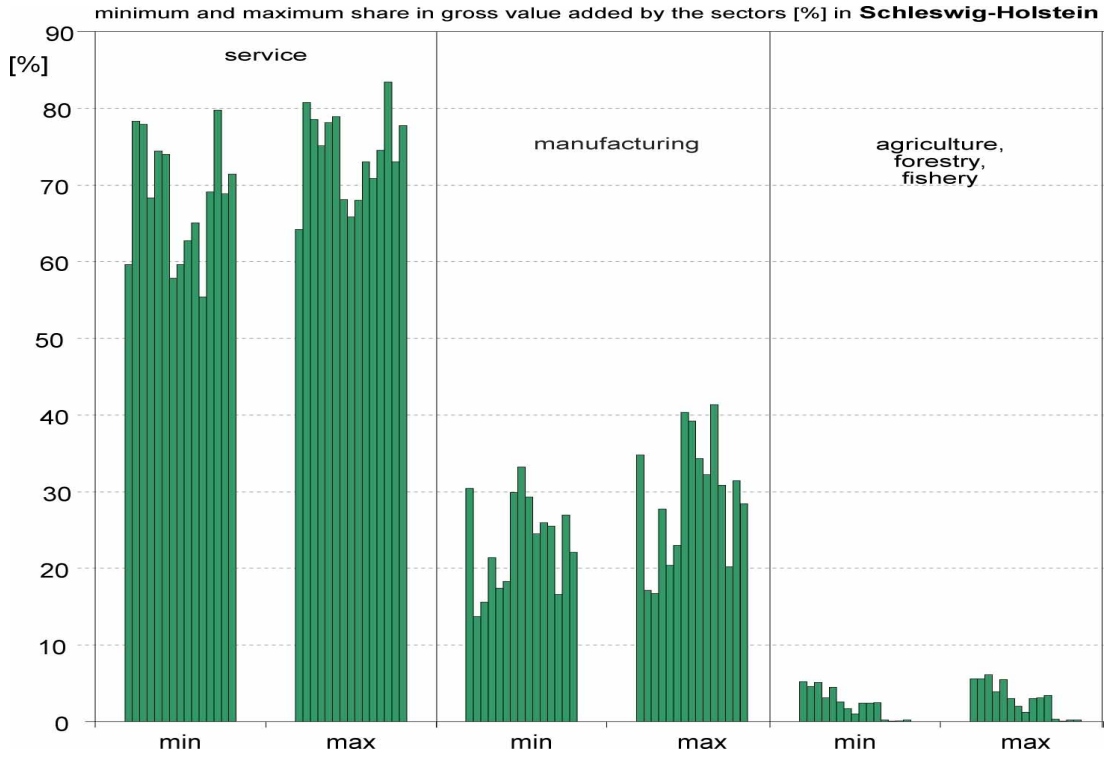


Figure 14. Minimum and Maximum Share in Gross Added Value by Sector, Schleswig-Holstein 1992–2000
Each column represents an administrative district of Schleswig Holstein (Table 7).
source: (Hagner, 2003)

In the years 1992–2000 the most important economic sector was the service sector, which includes the industries of the new economy, except the production of hardware, the trade, the hotel and restaurants sectors, financial corporations (banking and insurance branches), leasing and public and private services, as for example the public administration or health care and social system (Fischer/Guenther 2002). In all administrative districts the share in gross added value in those years was more than 55% and reached its highest level in the town Kiel where up to 83% of the gross added value was generated in the service sector (Table 7).

In the districts Steinburg and Pinneberg the service sector was the most productive compared to other regions in Schleswig-Holstein. In the year 2000 the gross added value per person in employment was about 62,000 € in Steinburg and 57,000 € in Pinneberg, both areas benefiting from the general trend that service industries with high added value tend to be located around larger cities, as in this case the town Hamburg. This economic development can also be stated for the district Stormarn where 52,000 € per person in employment were produced in the service sector in the year 2000 but not for the district Segeberg (Table 7).

Table 7. Gross Value Added by Service, Manufacturing, Agriculture, Forestry and Fishery 1992–2000, Schleswig-Holstein.

administrative district*	year									per person in employment in 2000 (in 1000 €)	share in gross value added (in %) 1992–2000
	1992	1993	1994	1995	1996	1997	1998	1990	2000		
	gross value added (in million €) by the service sector										
Schleswig-Holstein											
RD Dithmarschen	1298	**	1340	1402	1452	1518	1561	1553	1637	43.2	59.6-64.2
RD Nordfriesland	1992	**	2177	2262	2327	2433	2502	2511	2582	42.4	78.3-80.7
RD Schleswig-Flensburg.	2000	**	2082	2187	2272	2369	2433	2439	2422	42.6	77.9-78.5
RD Rendsb.-Eckernförde	2585	**	2982	3081	3153	3287	3372	3510	3576	45.2	68.3-75.1
RD Plön	957	**	1020	1088	1147	1185	1206	1234	1280	42.1	74.4-78.1
RD Ostholstein	2194	**	2385	2467	2526	2613	2659	2663	2651	40.9	74.0-78.9
RD Segeberg	2635	**	2966	3134	3272	3337	3348	3286	3301	43.7	57.8-68.1
RD Stormarn	2454	**	2665	2762	2834	2966	3048	3149	3097	52.4	59.6-65.8
RD Herzogtum Lauenburg	1425	**	1521	1648	1759	1822	1858	1887	1900	44,9	62.7-68.0
RD Pinneberg	3313	**	3572	3864	4122	4331	4459	4541	4575	57.1	65.0-73.0
RD Steinburg	1414	**	1494	1570	1630	1710	1765	2054	2360	62.4	55.4-70.8
T Flensburg	1732	**	1712	1762	1796	1847	1871	1817	1771	42.3	69.1-74.5
T Kiel	5255	**	5429	5708	5935	6073	6119	6108	6188	50.9	79.7-83.4
T Neumünster	1293	**	1253	1336	1408	1420	1408	1389	1398	42,9	68.8-73.0
T Lübeck	3303	**	3424	3610	3764	3871	3915	3971	3980	44.4	71.4-77.7

administrative district*	year									per person in employment in 2000 (in 1000 €)	share in gross value added (in %) 1992–2000
	1992	1993	1994	1995	1996	1997	1998	1990	2000		
	gross value added (in million €) by the manufacturing sector										
Schleswig-Holstein											
RD Dithmarschen	615	**	703	792	848	850	871	766	788	54.7	30.4-34.8
RD Nordfriesland	397	**	397	405	394	442	500	547	531	44.3	13.7-17.1
RD Schleswig-Flensburg	409	**	414	450	467	488	521	509	499	36.2	15.6-16.7
RD Rendsb.-Eckernförde	1047	**	1078	1067	1011	976	964	1072	1031	44.1	21.4-27.7

* Administrative distict: rural district (RD), urban district (T). ** No available data.

administrative district*	year									per person in employment in 2000 (in 1000 €)	share in gross value added (in %) 1992–2000
	1992	1993	1994	1995	1996	1997	1998	1990	2000		
	gross value added (in million €) by the manufacturing sector										
Schleswig-Holstein											
RD Plön	258	**	277	288	287	288	295	291	285	36.1	17.4-20.4
RD Ostholstein	680	**	674	694	684	643	617	663	613	38.8	18.3-23.0
RD Segeberg	1836	**	1836	1771	1630	1533	1471	1512	1501	50.4	29.9-40.3
RD Stormarn	1613	**	1628	1657	1616	1593	1607	1622	1559	52.7	33.2-39.2
RD Herzogtum Lauenburg	779	**	767	846	889	835	801	861	821	51.0	29.3-34.3
RD Pinneberg	1640	**	1736	1708	1606	1572	1573	1596	1533	52.7	24.5-32.2
RD Steinburg	1055	**	1035	1089	1096	1033	993	930	884	59.7	25.9-41.3
T Flensburg	629	**	704	674	615	716	834	745	716	53.0	25.5-30.8
T Kiel	1333	**	1330	1332	1277	1233	1216	1321	1327	54.2	16.6-20.2
T Neumünster	583	**	575	582	565	557	563	523	515	46,4	26.9-31.4
T Lübeck	1311	**	1182	1253	1270	1205	1168	1157	1129	47.6	22.1-28.4

administrative district*	year									per person in employment in 2000 (in 1000 €)	share in gross value added (in %) 1992–2000
	1992	1993	1994	1995	1996	1997	1998	1990	2000		
	gross value added (in million €) by the sectors agriculture, forestry and fishery										
Schleswig-Holstein											
RD Dithmarschen	110	**	120	127	136	136	138	129	133	35.9	5.2-5.6
RD Nordfriesland	141	**	138	148	161	163	157	148	155	34.4	4.6-5.6
RD Schleswig-Flensb.	157	**	157	166	178	181	170	157	164	32.2	5.1-6.1
RD Rendsb.-Eckernförde	154	**	149	157	169	172	161	148	155	27.7	3.1-3.9
RD Plön	71	**	62	66	71	73	76	70	74	30.8	4.5-5.5
RD Ostholstein	90	**	81	87	95	96	101	94	98	30.6	2.6-3.0
RD Segeberg	87	**	85	90	96	98	94	86	90	25.7	1.7-2.0
RD Stormarn	48	**	46	49	52	53	50	46	48	19.2	1.0-1.2
RD Herzogtum Lauenburg	67	**	67	70	75	76	74	68	71	23.7	2.4-3.0
RD Pinneberg	142	**	172	172	176	178	163	150	157	31.4	2.4-3.1
RD Steinburg	83	**	85	90	96	97	91	83	87	32.2	2.5-3.4
T Flensburg	173	**	159	137	156	164	149	167	171	30.0	0.2-0.3
T Kiel	3	**	2	2	2	2	2	2	2	5.0	0.04
T Neumünster	3	**	3	3	3	3	3	3	3	7.5	0.1-0.2
T Lübeck	10	**	9	9	10	10	11	10	10	14.3	0.2

* Administrative distict: rural district (RD), urban district (T).
** No available data.
Data source: Computed based on data sets of Statistisches Landesamt Baden-Württemberg 2002, Grocholski-Plescher and Erichsen (personal communication).

Tourism as part of the service sector was an economic mainstay in rural and coastal regions of Schleswig--Holstein in the last years. As it is not possible to calculate the gross added value of this sector exactly, the N.I.T. (Institut für Tourismus- und Bäderforschung in Nordeuropa) estimates that in the year 2001 about 4.6% of the income of Schleswig Holstein was generated in the tourism sector. This was 64% more than the average of the German federal states. Additionally the share of

employees in the hotel and restaurant sector of about 7% of all employees in Schleswig Holstein in the year 1999 was the highest in Germany (N.I.T. 2001).[10]

The manufacturing sector includes the energy and water supply, mining, the building and processing sector. In all rural and urban districts of Schleswig Holstein it was the second important economic sector in the years 1992–2000 (Figure 14 and Table 7). Wind energy is of high regional importance. In 2001 the first approval for the installation of 12 wind turbines northwest of the island Borkum was admitted and in the year 2002 a wind park consisting 80 turbines west of the island Sylt got permission for installation. In 2002, three turbine manufacturers of Schleswig-Holstein held 33% market share of the turbine market segment in Germany. Furthermore, 24 project applications in the North Sea with partly more than 100 turbines, are handled by the Federal Maritime and Hydrographic Agency. In Husum for example, it is estimated that already 1200 jobs are related to the wind industry and the chamber of commerce calculates the regional gross surplus share of wind energy to be 12–15% (Kannen 2003).

In all rural and urban districts of Schleswig-Holstein the share of gross added value produced by the sector agriculture, forestry and fishery is quite low (Figure 14 and Table 7). In the years 1992–2000 it varied between 0.1% and 0.3 in the urban administrative districts Neumünster and Flensburg and about 6% in Dithmarschen, Nordfriesland and Schleswig Flensburg. Compared to the service and manufacturing sectors, the sector agriculture, forestry and fishery is the least productive which is indicated by the gross added value per person in employment. In the year 2000 the highest amount was produced in Dithmarschen where 36,000 € per person were generated.

However this sector is a very important rural development factor as it cultivates the landscape and maintains biodiversity, especially when farmers produce in accordance to ecological agriculture.[11] A diversified landscape is one pillar of success of tourism in Schleswig-Holstein. Due to this aspect agriculture and coastal fishery supported tourism which was an important factor of income in the past and a possible economic and structural development path in the future.

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[10] Regarding the number of overnight stays in tourist accommodations as an indicator for the development of tourism in Schleswig-Holstein, however, the number decreased from 22.1 millions in the year 1992 to 20.9 millions in 2000. Compared to the overnight stays in the "Alte Bundesländer" in Germany in the years 1992-2000 which decreased by about 3%, the development in Schleswig-Holstein is more negative in those years (-5%). In the "Neue Bundesländer" the overnight stays in tourist accommodations show a positive trend of about + 4% in that period (N.I.T. 2001).

[11] In the year 2001 only 307 farms (1,7% of all agricultural enterprises) in Schleswig-Holstein produced in accordance to the directives for ecological agriculture of the European Union (EU guideline No. 2092/91). That means, however, that from the year 2000 to 2001 the acreage of ecological farming increased by 8% up to about 20,000 hectares which was 1,95% of the total agricultural area in Schleswig-Holstein (SÖL 2003). In the year 2002 the German government proclaims the political goal to extend the ecological farming up to 20% of the agricultural area in Germany in ten years (Federal Ministry of Consumer Protection, Food and Agriculture 2003).

Schleswig-Holstein: 2003–2010

In the year 2003 a "commission for the future" is established. Experts, politicians, relevant people from the economy and citizens discuss the potential future developments of Schleswig-Holstein. After controversial and severe discussions about the question which way the future should take, the commission focuses on the topic of sustainable energy production. Most members believe in the scenario that in 2015 half of today's known oil resources will be exploited and important reserves will exist only in the region of Kazakstan and the Persian Gulf. China, due to enormous economic development in the beginning of the 21.th century, will then be one of the largest importers of oil and gas. Moreover in 2050 natural gas resources are limited to the Commonwealth of Independent States (CIS). Therefore it is decided that Schleswig Holstein has to reduce its dependency on oil and natural gas imports and the commission recommends investments in renewable energy sources such as wind energy, photovoltaic and solar power.

Additionally the experts react on the political goals by the Federal Government of Germany proclaiming to increase the share of renewable energies up to 12,5% by 2010 and up to 50% in the year 2050. The German Environmental Ministry estimates that this would require the installation of wind parks producing about 20,000 MW per year, covering an area of about 2000-2500 km^2 (Kannen 2003). The government of Schleswig-Holstein decides to join these development strategies as investing largely in this technology would be a possibility to become the most important federal state for wind energy and the relating industries. Therefore a large program to stimulate innovations in the renewable energy sector is passed. Firms which establish capacious offshore wind farms in the North Sea receive subsidies. This is a capital flow into the manufacturing sector and a great opportunity to improve the economic productivity of this sector not only in the rural districts along the North Sea. As shown in Figure 14 and Table 7 only 14–17% of the gross added value in the manufacturing sector was produced in Nordfriesland and 30–35% in Dithmarschen in the 1990s. Significant economic growth and improved productivity are expected by the government of Schleswig-Holstein becoming a worldwide leading exporter of offshore wind park technologies. Although especially nature protection organisations emphasize the negative impacts of offshore wind parks on ecosystems, as for example on migratory birds or marine mammals and on other fish, the wind technology stakeholders prevail. They claim that not only economic benefits and additional employment could be realised but that wind energy reduces environmental risks by decreasing fossil fuel usage and carbon dioxide emissions.

A "Centre of Excellence" is founded where researchers and private firms work on solutions for more efficiency – technical and economical – of renewable energy resources. It is located in the administrative district Pinneberg where already a highly productive service sector including industries of the new economy exists (Table 7). Additionally as Pinneberg is near by Hamburg it is thought to benefit from the economic prosperity of the proximity to a large city.

Significant funding is raised to support the development of hydrogen technology. The idea is to obtain "clean electric power" from a fuel cell based on the electrochemical reaction between hydrogen and oxygen to water. That would be a great step realising the idea of a zero-emission transport system.

Since the reform of the health system people have to pay most of the health costs themselves. Only basic medical care is guaranteed by the state. This change intensifies people's health awareness and

the health and wellness movement booms. Recreational centers have steadily increasing numbers of customers. The demand for healthy food from ecological farming rises. This development is enforced by several severe food scares, as for example a new virus of swine fever imported from the Netherlands and mass mortality on poultry farms.

Schleswig-Holstein starts to decouple its agricultural development from the European Union. A new "ecological agriculture subsidy program" is passed, based partly on the funding of the program "Gemeinschaftsaufgabe zur Verbesserung der Agrarstruktur und des Küstenschutzes" and other pecuniary resources of the federal state budget. Ecological agriculture and not conventional farming is subsidised because it is more in accordance with the idea of sustainability. It means working compatibly with natural cycles and living systems. The long-term fertility and biological activity of soils are increased by using locally adapted cultural, biological and mechanical methods. Mineral fertilizers and pesticides are forbidden. Crop species are cultivated which are adapted to the local soil and climate conditions over centuries. Therefore they have developed a certain tolerance to pests and diseases. The health and well-being of animals is maintained through balanced nutrition, stress-free living conditions and breed selection for resistance to diseases and parasites. The stocking density guarantees that all feed comes from the farm itself or is produced in the region.

The high level of governmental subsidies for ecological farming enhances the competitiveness of ecological production compared to conventional agriculture. In general conventional producing farms harvest more tons of crops per hectare than ecological farms. As it is shown in Table 8 the production level of grain of ecological agriculture was less than half of that of conventional farming in the year 1999/2000. Also the milk production per cow was far below the productivity of conventional milk producers. Due to higher production costs and increasing consumer demand, however, the producer and consumer price level for ecological products was above that of products from conventional agriculture. Already in the year 1999/2000 the proceeds of ecologically produced grain were about twice as much compared to conventional grain earnings and ecological milk proceeds were approximately 25% higher (Table 8). These price developments and enhanced subsidies cause a conversion of more than half of the conventional producing farms into organic farms in Schleswig Holstein.

Table 8. Ecological Agriculture vs. Conventional Agriculture 1999–2000.

		ecological agriculture		conventional agriculture	
		best performers*	over all average*	best performers*	over all average*
Proceeds					
1. Grain	DM/dt**	50.68	55.86	25.21	24.62
2. Milk	DM/KG	0.81	0.82	0.64	0.64
Production					
1. grain	dt/ha***	40.08	34.60	89.27	84.04
2. Milk	kg/cow	4763	6122	7318	6777

*: best performers are the best 25% of farms based on gross income; overall average are 50% of all farms with an average gross income. **: DM/dt – Deutsch Mark per 100 kilograms. ***: dt/ha: 100 kilograms per hectare.
Source: Matulla et al. 2003.

Other farmers give up food production and concentrate on cultivating crops for biomass energy. Moreover, a third production line gains importance. The demand for renewable resources, i.e. crops as natural resources for certain industrial products, increases. The pharmaceutical industry, for example, needs medicinal plants as consumers prefer medicine with natural ingredients to synthesized agents. Many plastic materials are replaced by renewable resources, i.e. in the automobile industry. The chemical industry asks for oil plants with special fatty acids to produce paints and cosmetics.

Due to the "green consciousness" of large parts of the population, the protection of nature has a high value. Therefore not only the Wadden Sea National Park as part of the Trilateral Wadden Sea Cooperation of Germany, Denmark and the Netherlands are maintained but also further protected land and sea areas are created. Funding is forthcoming from the United Nations Environment Programme (UNEP) as the United Nations have implemented a subsidy program for land preservation. The National Parks are especially dedicated to nature protection, the maintenance or increase of biological diversity and of natural and associated cultural resources. Parts of these areas, the zone 1, are closed to human use. They are reserved for the preservation of species and genetic diversity. Other areas (zone 2) are used for recreation and sustainable tourism. Investments in this sector are based on various tourism surveys about preferences of travellers. In a study of the World Wildlife Fund for Nature in the year 1999, for example, about the relevance of national parks for tourism, 72% of the interviewees answered that they prefer to spend their holidays enjoying the nature of a national park (NIT 2001). Additionally people can appreciate their leisure time without long travelling. Overseas tourism is rejected because people in Schleswig Holstein believe it destroys natural resources and it is conform with the anti-globalisation philosophy which deprecates long transport distances. As studying nature is favoured, nature trails and ecosystem education centres are created in zone 2 of the national park.

The high unemployment rate starts to decrease. Many jobs are created in the highly productive service sector as for example in the sustainable tourism business . Other jobs are generated in the expanding agricultural sector, the ecological farming or the production of renewable resources. Highly trained employees are needed in the expanding energy sector. Therefore training centres are established to qualify people in innovating renewable energy technologies.

Schleswig-Holstein: 2010–2020

Sustainability is still the most important value of the society. People want to live in harmony with nature. Preserving the earth and its resources for future generations determines the way of living. As every creature is thought to be valuable, genetic engineering is rejected. The assessment of quality of life changes. Material richness such as a lot of money is not an important aim of life. Instead people aspire to knowledge. People prefer to live in small communities. Living as a single person has become obsolete. Cultivating one's friendships is a central part of everybody's life. Many people realise their own personal fulfilment partly through contributing to the fulfilment of others. It is perceived that there is a shared value in the well being of all.

The regional economy is still market-based, but these markets do not facilitate or depend upon concentrations of capital or power. They are *post-capitalist* markets. They support the realisation of

diverse, shared or personal values, not just the accumulation of material wealth and the concentration of power. Consumers become more aware of what affects their quality of life and of how economic influences impact upon them. Consumers learn how to use their purchase decisions to secure environmental, social and other effects. Thus they boycott those products which do not fit the designs of the current politics and philosophy.

Driven by the need to market themselves and their products to increasingly sophisticated and demanding consumers, companies invert their priorities. They begin to develop a corporate identity with non-financial objectives. Particularly those in the energy sectors proclaim environmental and social responsibilities of the firm. “We Care” becomes an increasingly popular corporate slogan. The economic significance of non-profit corporations increases. Consumers, increasingly somewhat aware of the proportion of purchase price that is accounted for by marketing and distribution costs, increasingly judge products by the social and responsible production and distribution.

Schleswig Holstein has become an innovation centre for renewable energy. Due to capacious offshore wind farms in the North Sea the region is able to cover its energy demand solely from wind energy. It even produces an overcapacity, so that energy can be exported to other regions of the European Union. The impacts of offshore wind parks on the ecological systems along the coast have turned out to be negligible. The technology is improved so that the producer price of wind energy is significantly lower than that of the traditional and now scarce energy resources oil and gas. Therefore the subsidies for wind energy are removed, allowing reinvestments in other expanding economic sectors and the education system of Schleswig-Holstein. Northwest of Husum a large harbour and logistic centre is built to maintain the offshore wind farms. Since it is established according to the principle of sustainability, many international experts come to the harbour to study this project. In Kiel the shipbuilding industries are transformed into industries producing offshore wind park technologies.

Due to important innovations in the Centre of Excellence the firms there have become large export companies for photovoltaic and solar energy plants – they are one of the European market leaders in the innovative market segment of solar energy technology. The efficient and cheap construction of biogas plants is copied all over the world. The fuel cell based on hydrogen technology is near commercial application. The research and development groups of the Centre of Excellence working on the utilisation of geothermal energy are renowned in the international scientific community.

The agricultural sector of Schleswig-Holstein is nearly completely converted to ecological farming. Not only the domestic demand for organically produced food in Schleswig-Holstein but also an increasing demand for ecological products in other regions in Germany and the European Union guarantee an income the farmers can easily live on. The rising foreign demand is partly caused by eco-tourists who have been to Schleswig-Holstein before. There they become acquainted with food from organic farming. They not only tasted the difference from their food at home but also observed the impressive state of health and contentment of the citizens of Schleswig-Holstein. Back in their home countries buying ecological products is perceived of as one way to copy the lifestyle in Schleswig Holstein. This situation enables the government to stop the ecological agriculture subsidy program. Moreover, farmers cultivating renewable resources benefit of this development. An increasing number of consumers supporting the idea of sustainability who buy ecological products cause an increasing demand for renewable resources by processing industries.

The no longer needed monetary resources of the agricultural program are used to subsidise medium-sized business which process the products of the ecological farms. Regional sustainable producing dairies, slaughter houses and crop processing firms are established. They process according to ecological standards providing the population with fresh and healthy products. Additionally short transport distances save energy. This small meshed food chain creates a deep trust between producers and consumers and ensures the maintenance of high quality products.

Eco-tourism is still booming. A temperature rise due to climate change, makes the region even more attractive. However following the principle of sustainability the number of visitors is limited. The protected areas are very popular. Many volunteers help the professional landscape conservation workers to maintain the ecosystems. But changes in plant populations have to be accepted. Some species cannot tolerate the increased temperature and rainfall of climate change.

The problem of unemployment vanishes. As material richness isn't an important goal any more, people share their jobs and work only part time. Having more leisure time is valued more highly than lots of money.

Private transport has become very expensive as an enormous federal tax is raised upon it. This money is reinvested to modernise and expand the public transport system. Within cities and villages public bicycles can be used by everybody paying a deposit. When the bike is not needed any longer it is put back into one of the storing positions which are spread all over the town. Citizens appreciate this innovation because it supports their health and saves environmental resources.

Schleswig-Holstein: 2020–2030

In the small communities life is very communicative. People have a high community spirit. Child care and the support of sick people are organised within the neighbourhood. Everybody enjoys being a useful member of the community. Elderly people don't retire but keep on working part time as long as possible. After years of political discussions in the 2010s about how to reform the pension system in Germany, the part time working program for people older than 65 years was one central amendment of law to lower the expenditures. The income from these voluntarily accepted jobs and the fact that people care less about material richness compared to the beginning of this century allow pension costs to be reduced significantly.

Due to long-term increasing research capacities in renewable energy Schleswig-Holstein remains a worldwide leading innovation centre in energy technologies. A group of researchers working south of Iceland, where the Eurasian and North American Plates collide, develop new technologies to exploit geothermal energy. This becomes the most efficient and cheapest technology to gain energy. Firms specialised in plant engineering and construction are founded in Schleswig Holstein and struggle to become an important exporter to the world market of geothermal energy technologies. Experts think that this form of technology has finally solved the world's energy problem. Wind energy farms are now thought to be an outdated and inefficient second best technology. The market for those plants starts to shrink. Employees loosing their jobs change into the growing geothermal energy sector.

The research program for fusion energy is finally given up. Despite several decades of research it was not possible to solve the material problems which emerge at a temperature of about 100 millions degree Celsius needed to fuse helium nuclei.

Firms producing photovoltaic and solar energy plants are able to retain their world market share. The fuel cell based on hydrogen technology has revolutionised the automobile sector worldwide. The large amount of funding supporting this innovative technology in Schleswig-Holstein since the year 2003 starts to amortize. As the Centre of Excellence possesses the patent of the construction of this kind of fuels cells a lot of money is earned by selling these rights.

In other regions of Germany and Europe the developments of Schleswig-Holstein are starting to be copied because people are impressed by the economical, social and environmental successes. This solves the problem of on the one hand an increasing number of people interested in visiting Schleswig-Holstein during the last decade and on the other hand the limitation of tourists due to sustainable principles. Areas of sustainable tourism are established elsewhere in Europe. The training centres, however, created in Schleswig-Holstein teaching protected area management are fully booked.

The domestic ecological agriculture profits from the changes into a sustainable society in Europe. As the number of European farms which convert to ecological production rises, crop production farmers in Schleswig-Holstein can export more and more organic seeds. This compensates the decreasing export possibilities of ecological food products from Schleswig-Holstein to the European market.

The economy is still dominated by small and medium sized firms. They are quite flexible and have no inventory. Sparing resources they produce not before getting an inquiry. They mainly comply with the local demand but export capacities are built up in the pharmaceutical sector, as a high level of health awareness is no longer a domestic phenomenon but spread over developed countries. This has caused a strong demand for natural medicine and domestic drug firms are an important player on that market.

Private transport is still very expensive and taxed highly although it does not cause air pollution any more. To preserve nature the road system is kept as small as possible. People prefer to use the public transport system because it is well organized and cheap.

Due to the innovations in the energy and automobile sectors the emissions of carbon dioxide decrease significantly. Being able to halt further climate change and its potential negative ecological and economic impacts becomes realistic.

The Blue Scenario

In the blue scenario the main driving force is economic and technological change, namely the present global transition from traditional manufacturing-based industries to industries in which the major part of value-creation stems from the use of information technologies and information networks. With information technology, or information as such, a new major production factor is becoming available. This leads to the emergence of new economic sectors and drastic restructuring processes in traditional

industries. Global pressure on traditional industries increases dramatically and companies can only survive by substituting established production processes with new ones and reducing the number of and expenses on workers and other traditional production factors.

The "new economy" in this scenario is understood to comprise not just companies and industries selling almost exclusively content, information or internet and electronic services. It also includes industries based on applications that require an extent and precision of calculation work and data processing that has been unthinkable fifteen, ten or even five years ago. Important examples are biotechnology and biomedicine, but also intelligent and sustainable new building and waste processing concepts[12].

Like other German regions, Schleswig-Holstein sees itself confronted with the need to invest in new economic directions and to be successful with these. The questions explored in this scenario can be stated as: What options does Schleswig-Holstein, a sparsely populated, mostly rural region dominated by agriculture have in this new and global economy? What are the most important risks and weaknesses that the region has to pay attention to if it wants to succeed?

A much publicized "feature" of the new economy is the profound change in locational factors and skill requirements, mobility and patterns of investment. This may lead to the premature conclusion that a more "rural" region like Schleswig-Holstein has equal chances to attract and *keep* capital, new companies and a qualified workforce. In fact, however, there are other indispensable requirements without which new companies may be formed but will most likely soon relocate to a more urban environment, in this case Hamburg. Another fact to note about Schleswig-Holstein is the dominance of the agricultural sector and the impact this has on its culture. Even if the more "urban" parts of Schleswig Holstein, namely Lübeck, Kiel and small towns adjacent to these or to Hamburg, may develop well in a new economic direction, the majority of farmers will be inclined not to shift to a high-tech profession – "a farmer will not become a biotechnologist" – as has often been said.

In the following we will look more closely at these and other conditions in Schleswig-Holstein at the end of the century and determine how well these match with the new requirements. We will also give a brief account of new economic developments during the nineties and the measures taken to promote these.

Schleswig-Holstein distinguishes itself by the lack of a major world-class city with a lively and attractive urban environment and a large and well educated workforce. Consequently, the economic success envisioned at the end of the nineties is only possible if the region addresses its structural weaknesses. When seen in comparison with Bavaria, the region's climate, recreation offers and general natural environment are most likely not stunning enough to allow decision makers to rely

[12] For instance, advanced automated waste water treatments require techniques such as advanced image analysis for the needed constant, highly accurate survey of the treatment process (c.f. "Innovative Technology and Solutions for Infrastructure", Tekes, Finland 2001 or "Research and Development in Finland and achievements in civil engineering and construction, Tekes 2001.)

entirely on the "soft locational factors" of Schleswig-Holstein, assuming that due to the "information revolution" the other factors no longer matter and will just "sort themselves out".

It is particularly important for the region to give strong support to small innovative companies with close connections to the region's research hubs. If the region's new economy is based on offshoots of existing big players this will result in a lack of mobility and attractivity to the needed creative workforce and reduce the likelihood for a spirit of true innovation to develop in the region.

It is also essential for the region to pick economic fields that are new enough not to be occupied by other regions or cities already. Otherwise, Schleswig-Holstein would have to compete both against the market share *and* the significant assets of knowledge and expertise that other regions (with better conditions) have already secured. Simple imitation will not work. Equally essential is the question whether the developing new industries grow out of existing knowledge and interests in the region. The economic orientation must fit with the region's culture and find public acceptance.

Schleswig-Holstein possesses established research strengths in medicine, agricultural sciences, marine biology and biochemical or biotechnical sciences.

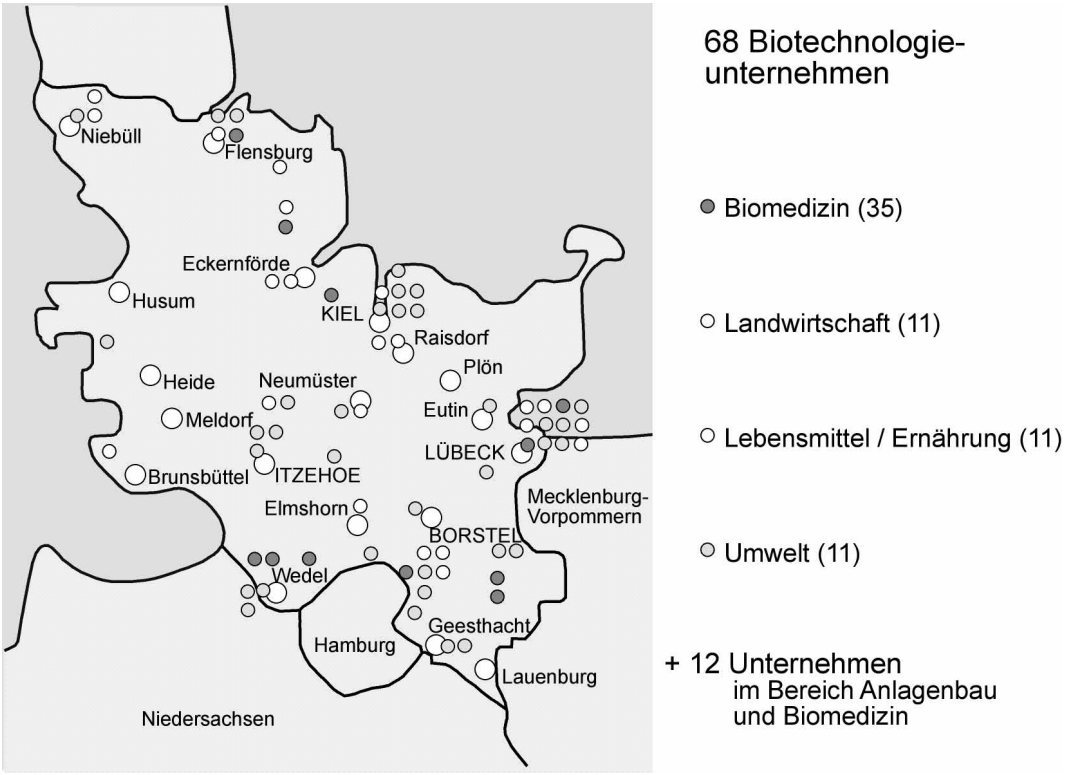

Figure 15. Biotechnology companies in Schleswig-Holstein in 2000.

Source: "Technologie-Dialog Schleswig-Holstein", 30, June 2000

During the eighties and nineties research in these fields expanded into new directions with the help of computer sciences. Universities adopted biotechnology, biomedicine, life sciences, marine microbiology and aquaculture, biotechnical agriculture and highly sophisticated plant breeding. During the nineties, biotechnology became recognized by the government, investors and parts of the scientific community as a promising economic venue for Schleswig-Holstein. At that time, there was still a realistic chance for newcomers to secure a place on the emerging new market. Extensive promotion programs were set up. At the same time, the public and parts of the research community expressed persistent opposition against this new economic orientation. The task of the *Technologie-Transfer-Zentrale Schleswig-Holstein*, which was founded in the early nineties, is to address these concerns through mediating, informing the public and generally building up trust in the emerging new commercial fields. While this showed considerable success with respect to the *number* of biotech-related companies founded during the next few years, the *type* and orientation of these companies shows that public opposition continued. The Germany-wide or even European trend that "red biotechnology" (medical technology and life sciences) is preferred over biotechnical agriculture ("green biotechnology") is even more pronounced in Schleswig-Holstein with its long-standing green orientation and the conservative culture (see Figure 15 for scientists working in medical technology and bioinformatics in Schleswig-Holstein in 2000).

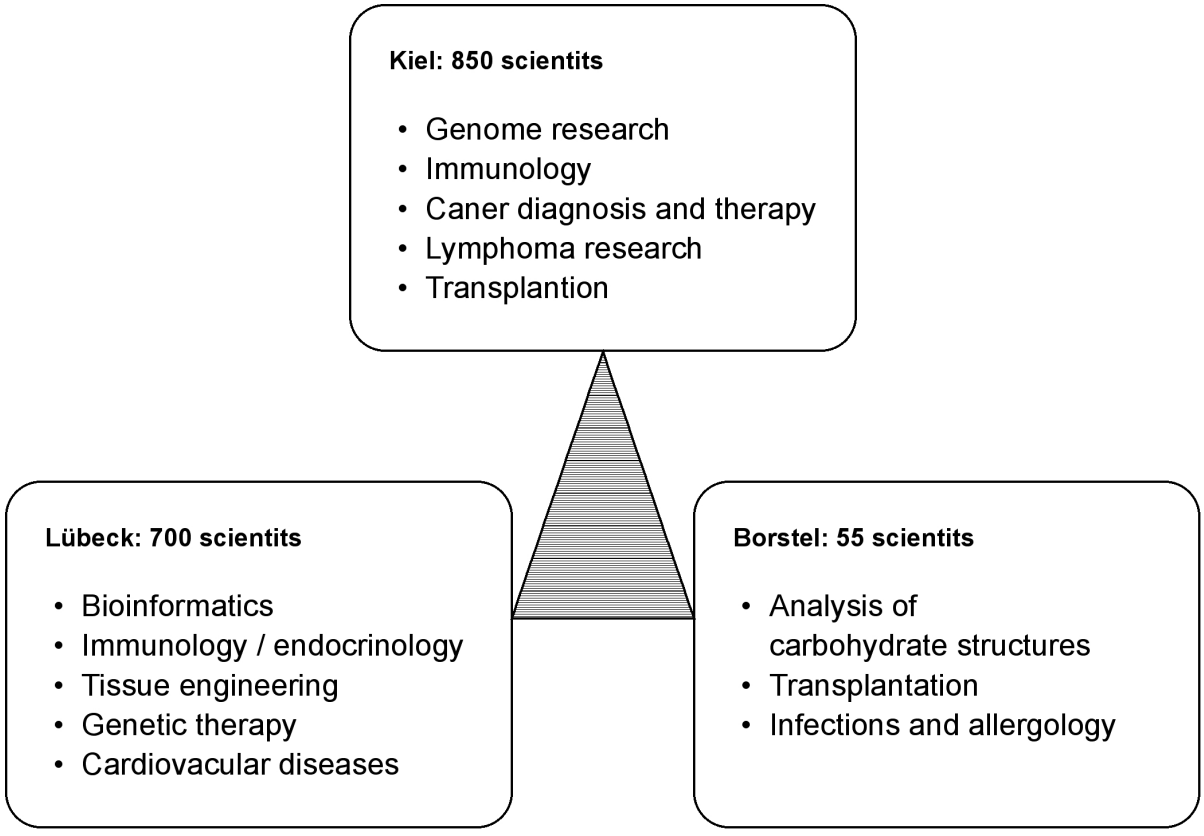

Figure 16. Schleswig-Holstein based scientists in medical technology and bioinformatics in 2000.

Source: "Technologie-Dialog Schleswig-Holstein", 30, June 2000

Schleswig-Holstein's close neighbor, Hamburg, also has strong potentials in biomedicine and medical technology. If Hamburg is successful in building up an industry of commercial application of these fields companies in Schleswig-Holstein might well relocate to Hamburg in order to benefit from the amenities of a large city. Schleswig-Holstein needs to realize this in time and extend the existing cooperation. Schleswig-Holstein also needs to make use of its proximity, geographic as well as cultural, to the Baltic region. Finally, within the region itself, a number of measurements are needed in order to ameliorate structural weaknesses and to be able to draw upon the region's strengths. This should include promotion for the founding of new companies - including venture capital and financial assistance, consulting services at a reasonable price, and the reduction of bureaucratic barriers. Trade fairs are needed not just for newly established companies. Given the scattered structure of the region network building is mandatory, and with it the facilitation of frequent exchange between project partners, corporations and the research community etc. Another necessity, especially on the long-range, is the consistent advancement of the education system and the constant involvement and information of the public. A number of such measures were put into action already during the nineties. At the end of the nineties, a number of small companies in biotechnology-related fields were founded out of research institutes or as startups initiated by small research teams interested in commercial application (see Figure 16).

Figure 17. Number of companies founded in the German federal states per 1000 inhabitants – average of months January to November 2001.

Source: Federal Statistical Office.
*with Berlin, ** without Berlin.

From 1994 onwards, the institutional needs of the newly developing sector were addressed by the government-founded *Koordinationsstelle Biotechnologie in Schleswig-Holstein* (Coordination post for biotechnology in Schleswig-Holstein). This coordination post offers consulting and other services specifically to newly forming companies in biotechnology-based fields. The BMBF-initiated Germany-wide BioRegio-competition in 1996 finally led to a significant increase in enthusiasm within the research community and the purposive generation of biotech-expertise. The issue of public acceptance meanwhile remained an open question.

Schleswig-Holstein: 2002–2010

Most of the biotechnology companies that formed in the late nineties and during the first decade of the new century were started out of research institutes. The prevailing culture in these companies tends to be innovative and open. Expectations for economic renewal through the new possibilities are high. The need to gain an economic foothold outside of agriculture has become clear. A considerable number of business promotion programs and institutes are formed. Both venture capital and business support are aimed mainly at small, innovative companies. Support programs are tied, for instance, to conditions that ensure that the promoted companies are "innovative" – which is commonly defined as being the first to implement a new technology, or to build a new product or service. Other measures are exclusively available to companies that are bound to technology-transfer by contract, have been formed by university graduates or by other members of the research community. The attendance of technology trade fairs is also promoted. These measures are not only crucial in terms of practical and financial aspects but also considerably improve the innovative climate of the region. They are one of the most essential factors needed for the growth of the new sector in the region after it had remained dormant for almost twenty years[13].

Institutions like the coordination post for biotechnology in Schleswig-Holstein, the center for technology transfer, the *Kieler Innovations- und Technologiezentrum*[14] or the *BayToBio-Förderkreis* – all of these founded already in the nineties – facilitate the active cooperation and exchange between the government, companies, investors and the research community. Such exchange had not existed before because historically biomedicine and biotechnology have been pure research-fields without connections to the commercial world. Through these initiatives, small and medium-sized companies are helped to use advanced information and communication technologies for exchange with other companies and for the systematic search for project-partners, clients and employees. This is of particular importance for Schleswig-Holstein as the newly formed companies and the research institutes or universities are divided up between several small towns[15]. The ministry for economy,

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[13] Institutes in Lübeck, Kiel and other locations have pursued in-depths research in medical technology, life sciences and other related fields for approximately the last 20 years.

[14] Centre for innovation and technology Kiel.

[15] At the beginning of the decade, there were research institutes and universities for medical research in Kiel, Lübeck and Borstel, institutes of agricultural science and agricultural economics, soil science and related fields in Kiel, Rostock and Rendsburg/Osterroenfeld. Study programmes for coastal and marine research as well as for

technology and traffic of Schleswig-Holstein pays close attention to the coordination of the different support programs, making sure that the high number of promotion measures available does not turn into another sophisticated hurdle to be overcome by small new companies. Schleswig-Holstein is also one of the first federal states within Germany to significantly reduce the extent of formalities and negotiations with public authorities needed when forming a company.

With 1.66 companies formed per 1000 inhabitants Schleswig-Holstein had the highest proportion of company formations within Germany in 2001[16]. This trend continues during the following few years before gradually slowing down after 2006. By then a large number of small new companies has been formed, most of them in close proximity to the major research centres – Lübeck, Kiel and Borstel. The vast majority of companies ranks in the field of "red biotechnology"[17], the number of companies counted among "green biotechnology" [18] remains small. Schleswig-Holstein had been one of the first federal states in Germany to start experimenting with genetic engineering within agriculture – in 2002, it was the only federal state besides Sachsen-Anhalt to cultivate genetically modified trees. In 2003, the cultivation of genetically modified food became legal on a EU-wide scale and the government of Schleswig-Holstein immediately set out to specify rules on the application of genetic engineering in parts of its large agricultural sector. These rules were meant to protect consumers and ensure the safety of "GE-free" agricultural areas. The public however, given the growing health-awareness in particular with respect to nutrition, maintains a tentative attitude. Organic agriculture is seen by many as a viable alternative and is able to grow quite well with the support of a number of promotion programs set up since the late nineties. In the last years of the decade the EU-agricultural-reform is enacted. This means that countries and regions within Europe have to adopt the newest, more efficient farming methods if they want their agricultural sector to survive – including the usage of genetically modified seeds. The prevailing mood in Schleswig-Holstein is that neither the exclusive cultivation of genetically modified crops with the extent of known and unknown risks[19] nor the threat of massive unemployment in rural areas is an acceptable option. This leads to the extension of the existing promotion programs for the highly sophisticated, GE-free (and usually organic) agriculture that has

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environmental technology were offered in Büsum; biotechnology and biochemistry could be studied in Kiel, Lübeck and Flensburg.

[16] Wirtschaftsbericht der Landesregierung Schleswig-Holstein 2002, department of economy, technology and traffic.

[17] I.e. biomedicine.

[18] I.e. biotechnical agriculture.

[19] This starts with the uncontrolled spread of genes from genetically modified crops – according to studies conducted by the Institute of Science in Society in 2003, pollen from a Brassica crop (Brassica napus, the second most valuable crop in Canada) may travel as far as a kilometer or more. More drastic examples are pesticide-resistant crop-pests and "superweeds" that may develop in response to the usage of considerably more aggressive chemicals. The usage of patented hybrid-seeds that are not able to reproduce themselves and have to be bought every year from a monopoly-position supplier implies a much higher risk for farmers, in particular in poorer countries and dryer regions, e.g. Africa where one year of drought or a crop-pests can render the farmers not just unable to feed themselves, as before, but in addition unable to buy seeds for the next year which are necessary as the seeds of originally cultivated crops have become lost.

begun to develop in Schleswig-Holstein. A cornerstone of this is the strategic cultivation of crop-types that are specifically adapted to the conditions (climate, soil type and nutrients, varmints etc) of different German regions, "natural" enhancement of the immune defense of crop plants[20] and in particular gene banks with a wide range of crops that are not on the index of agricultural species within the EU. Another new venue is the coordinated production of specific organic material that is of high-value to the life-sciences sector.

Schleswig-Holstein: 2010–2020

In the second decade, the biotech-sector moves into the next development-stage. This increases the need for close cooperation both with Hamburg and with the Baltic. With the growing competition for market share the economic requirements change too. Investors tend to concentrate on companies that display a sound business concept in addition to innovative entrepreneurial spirit. A number of newly started companies become insignificant and some disappear, leaving the remaining ones with the opportunity to expand rapidly – provided that their business strategies are designed for this. Expansion brings with it the problem of accessing a much wider market, which is difficult to do from such a remote corner. Collaboration with Hamburg in the fields of biomedicine and life sciences has been building up since the joint performance of Hamburg and Schleswig-Holstein at the Bio-Regio-competition in 1996 and the joint establishment of the "Bay to Bio Förderkreis" in 2000. Schleswig-Holstein and Hamburg both have traditional strengths in medical research. Throughout the first decade, Schleswig-Holstein has developed so well in several of the new fields that it now has a more or less equitable position in the negotiations that start to take place. Agreements are struck that relocate some customer relations and distribution centres to locations in or near Hamburg[21]. Others are able to remain in Lübeck which is by then part of the public transport system of Hamburg. Research and development continues in the established centres in Schleswig-Holstein – Lübeck, Kiel, Borstel etc.

The increased cooperation and identification with the Baltic Sea region also brings with it new economic venues. The Baltic Sea region has been successfully redefining itself via a common vision centred around innovation, entrepreneurship and sustainability since the nineties. Sustainability in particular is a topic that resonates with the prevailing attitudes and culture of Schleswig-Holstein. At the beginning of the second decade, the potential of high-tech solutions for sustainability in Germany is still very high. Developments in this fields in Germany have been slow up to 2010. One of the greatest stumbling blocks is the perception of the irreconcilability of technology and environmental protection. While green groups displayed hostility towards "new technology", the corporate world in Germany persisted in rejecting sustainability concepts as "reactive" and "conservative" – in addition to being unprofitable. In Scandinavian countries, most of all Sweden and Finland, both attitudes, in particular the green hostility towards technology, were by far not as common and certainly not a reason to hold up new developments in either research or commerce. In newly developing city quarters

[20] C.f. "Forschungsvielfalt für die Agrarwende", Institut für angewandte Ökologie, Februar 2002.

[21] In particular Itzehoe, Pinneberg and Norderstedt.

in Helsinki buildings for biotech companies quite naturally served also as a testing-ground for new concepts of sustainable building[22]. During the first decade, Scandinavia has easily grown into a leading position on the rapidly expanding market for products that offer previously unachieved levels of sustainability and environmental friendliness through the well targeted utilization of highly advanced technologies. This includes the market for sophisticated sustainable building materials and concepts[23], waste water treatment and recycling systems, alternative energy production (in particular houses and cars equipped with fuel cells), the establishment of conditions needed for extensive telework such as IT-infrastructure, and new developments in telematics and in the dematerialisation of production - in particular in relation to road building and daily consumption products.

Schleswig-Holstein is a federal state that combines a fairly strong green orientation and strong emphasis on agriculture with a high proportion of self-employed people[24] and a big share of people researching, studying or working in new technological fields (compare figure 16).

Figure 18. Number of self-employed people in German federal states in 2001.

Source: Federal Statistical Office.

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[22] Professor Jürgen Pietsch, TU Hamburg-Harburg, personal conversation.

[23] Consistent with the definition of "new economy" given on page 1, sustainable building materials and concepts are here seen as part of the new economy because they usually have massive data and calculation requirements, both as part of the development and building process and at a later stage as part of the monitoring required. Similarly, advanced automated waste water treatments require techniques such as advanced image analysis for the needed constant, highly accurate survey of the treatment process (c.f. "Innovative Technology and Solutions for Infrastructure", Tekes, Finland 2001 or "Research and Development in Finland and achievements in civil engineering and construction, Tekes 2001.)

[24] In 2001, Schleswig-Holstein took the second place with respect to the proportion of self-employed people (c.f. *Wirtschaftsbericht 2002 der Schleswig Holsteinischen Landesregierung*).

Schleswig-Holstein also has a leading position for wind energy in Germany and a strong position on the market of environmental technologies. Through this predisposition and the region's historic affinity to the Scandinavian countries Schleswig-Holstein is able to develop interest and openness to the market of sustainability solutions employing high-technology at a stage where this is still anathema to other German regions. The most important new fields for Schleswig-Holstein in this field are sustainable building materials and concepts as well as power generation through fuel cells. The Northern German areas suitable for wind-parks have been used up since 2005. The demand for energy from alternative sources continues to increase. Investors in Northern Germany recognize the opportunity and start buying into the fuel-cell-market. The most important two usages are the equipment of sustainable houses with fuel cell units that supply all the electricity and heat needed and the development of fuel-cell-cars. A new technology center is established to explore and secure the options for Schleswig-Holstein to become an important player on the market of "sustainable and intelligent" houses[25]. Another market niche opens up in the monitoring and life cycle calculation of dams and bridges through the usage of more sophisticated materials (for instance optical fibers).

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The cooperation with Hamburg has helped the life sciences and the medical technology and biomedicine-sector to expand its success and access a wider range of customers within Germany but also on the European market. The fuel cell industry is very successful. Most cars in Germany now run on fuel cells and Schleswig-Holstein maintains a good market share in the production of the fuel cells used in the automobile production. Houses are increasingly equipped with fuel cells too and "intelligent" houses that are energy-efficient and build from sustainable materials have become fashionable as they offer new amenities, in particular comfort. Another industry that has turned out successful for Schleswig Holstein is the monitoring and life cycle calculation of dams and other infrastructure. The wind-energy sector is in decline, but redundant employees in the wind-energy-sector are mostly able to move on to new fields within the environmental technology sector.

Through the region's involvement in these new sectors Schleswig-Holstein has come to see itself and be seen ever more as part of the Baltic region. This is of particular importance to the scientific exchange with Scandinavia and other Nordic countries. With the expansion of the new companies into international markets the need for convenient international travel grows. The airport in Hamburg, however, offers only a very limited choice of international flights and has to close in the evenings. Through the region's growing association with Scandinavia, the airport in Kopenhagen registers considerable gains in importance for Northern Germany and Schleswig-Holstein in particular. International plane connections from Schleswig-Holstein now usually proceed via Kopenhagen. The airport in Lübeck picks up the chance to serve as a "feeder-airport" for Kopenhagen. In addition it expands its schedule of direct flights to London and to a number of Scandinavian cities.

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[25] Since the nineties, Schleswig-Holstein has excelled in setting up technology centers at a high speed if needed – in 2002 there were 14 centers for technology and company formation, c.f. the "Wirtschaftsbericht 2002" of the provincial government of Schleswig-Holstein 2002.

In rural areas, a small number of people are employed in GE-free organic agriculture. The strategic cultivation of crop-types adapted to a range of different conditions found in Germany has become an established venue accounting for a large percentage of the jobs available in rural areas. Gene banks are also successful though they do not account for a large number of jobs. The remaining proportion of the rural population is busy in the production of specific and often highly valuable organic material for the life-sciences sector. The unemployment rate in rural areas has dropped to a level below that of the nineties.

Already in the second decade Schleswig-Holstein had succeeded in establishing itself in new economic sectors, most importantly medical technology and high-tech sustainability or environmental technology. Also, Schleswig-Holstein has managed to absorb the impending unemployment catastrophe in its rural areas. The very deliberate, committed offer of promotion programs, consulting, venture capital and financial assistance has been indispensable in the establishment of the new industries, as has the cooperation with Hamburg and the Baltic region. Finally, the narrowing down of the initially wide range of biotechnology-companies to medical technology and life sciences on the one hand and the successful building up of high-tech sustainability and environmental technology companies underlines the importance of a close agreement between the economic orientation and the given attitudes, interests and culture.

Conclusion

Typically, scenarios are written with a client in mind and are designed to address the issue or issues of concern of the client. In the preceding, there was no client in particular. The scenarios were presented as an exercise in sceanrio construction. However, in a presentation representing the *Ministerium für Wirtschaft, Technologie und Verkehr des Landes Schleswig-Holstein* (Kruse 2003) it would seem that our scenarios coincide on many accounts with the proposals for future development for the region. This is purely coincidental. Our purpose was merely to demonstrate the range of possibilities for potential futures of a given region, to provide possible broad developmental frameworks and to demonstrate means of constructing scenarios. Comments from early readers have included sentences and comments that begin with “What about ...? “ or “... should be included.” These concerns are legitimate but are more appropriately directed at a scenario for that particular purpose. One could amass a considerable number of issues for any given region. Typically this is done prior to the construction of the scenarios by consultation with various stake-holders, *after an issue has been identified*. There is no sense holding a stake-holder meeting when there is nothing to discuss. Again, this process has not been adhered to in this brief report. No stakeholders were consulted. Rather, it is hoped that the preceding will *evoke* requests from stakeholders. The reader then, should consider the scenarios merely as a sample of what is possible in terms of regional economic transition.

Specificity of issues, as in many other endeavours, is a matter of scale. *Spatial scales*, for example, might range from a small wet land to a nation. For demonstration purposes we limited the spatial scale to a single politically defined region, namely Schleswig-Holstein. In terms of the *scale of the issue*, similar conditions applied. A scenario could concern for example, the fishing industry or the preservation versus the development of a small area. These represent *economic scales*. At this level

we again chose larger concerns for the politically defined region. One more scale needs to be considered. This is the *scale of the driving force* leading to change. This could include the likes of regional tradition or the protection of an endangered species through to the force of globalization. On this account we chose to employ a mixture. The driving forces employed were somewhat broad (as opposed to for example, the relationships between agricultural processes and the constitution of run off water). Each scenario was driven respectively by regional demographics, the philosophy of sustainable development from an environmentalist perspective and technology representing a shift in the regional economic base away from traditional enterprise and towards greater participation in the 'new' economy. Often, all three were woven into the scenarios but overall emphasis of a single driving force remains obvious.

While scenarios could concern, or at least include, the position of communal ethics and cultural identity, the specific focus of the scenarios was on regional economic developmental frameworks, a concern that recent polls indicate is at the forefront of public consciousness. The scenarios are presented in a manner in which ethics and regional identities are *implicitly* addressed, for example, the potential to shift agriculture from a primary sector component to a service sector component with a dual purpose (tradition enhances tourism and produces agricultural produce in a system where tourism is given more emphasis than harvest, in short, traditional practices become tourist attractions, shifting the purpose of the enterprise somewhat). We *did not* attempt to address equity issues that would arise in such transitions and we *did not* address the potential for conflict in such transitions. Rather, we presented large frameworks as a platform for further discussion, possibly leading to the awareness of conflicting interests.

The development of scenario trajectories (at least scenarios that contain human influence) is a political process. To this extent, it is (or should be) the role of the scientist to model the structure and the process, or to present what could happen, no more, when the issue involves human values. The role of the scenario maker should be limited to the identification of the variable, modelling relevant structure and process, and/or providing a useable means or a base for decision makers to manipulate the values of the independent variables. In short, the efforts of science should be towards the design of tools for manipulating variables relevant for the scenarios, either in a mathematical language or in the common form of a narrative. Finally, if we are to develop scenarios, it is necessary that they accommodate more than the comfortably familiar. We need to address the options of science fantasy in meaningful and systematic way.

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