EVANGELICAL
CHURCH
OF BADEN

CLIMATE PROTECTION CONCEPT 2011-2020

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and Environment

„Of course, rich countries can use their vast financial and technological resources to protect themselves against climate change, at least in the short-term—that is one of the privileges of wealth. But as climate change destroys livelihoods, displaces people and under- mines entire social and economic systems, no country—however rich or powerful—will be immune to the consequences. In the long-run, the problems of the poor will arrive at the doorstep of the wealthy, as the climate crisis gives way to despair, anger and collective security threats.

None of this has to happen. In the end the only solution to climate change is urgent mitigation. But we can—and must—work together to ensure that the climate change happening now does not throw human development into reverse gear. That is why I call on the leaders of the rich world to bring adaptation to climate change to the heart of the international poverty agenda—and to do it now, before it is too late.“

Desmond Tutu, former arch bishop of Capetown: We do not need climate change apartheid in adaptation, in: Human Development Report 2007/2008. Fighting climate change: human solidarity in a divided world, UNDP 2007, p.33.

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ABSTRACT

In late 2009 the Evangelical Church of Baden adopted a climate protection concept. Its goal is to see a 23-30% reduction in CO_2 emissions by 2015 in its 2750 parish buildings (or 720 congregations), 11 administrational and service offices and 15 facilities and with the 2005 annual figures as a baseline. This framework hinges on three action domains: the procurement of regenerative power, management based procedures (environmental management, energy checks), sensitized users (having attended training events), energy-focused building refurbishment and environmentally compatible architecture. These domains are based on the consulting instruments that the Church of Baden has introduced since 2004. They are continually being intensified and reinitialized. In total, CO_2 emissions can be reduced by almost 10,000 tons, from 42,900 to 33,000 tons. Additional emission reductions by 21% or 8,600 tons are to be achieved in a second phase from 2016 to 2020; this will result in the Church's verifiable compliance with IPCC requirements in late 2020 and a 40 – 50% reduction of CO_2 emissions as compared to the period from 2003 to 2007.

The development of electrical and heating energy needs, mobility and land use is recorded and checked using a continuous data and property management system. Solid procurement monitoring procedures will be implemented.

During the first phase the total cost is estimated to be approximately €46.5 million. Only €1.5 million of this amount must be provided by means of an additional budget. By the same token, the economization of energy costs will increase with each year. By 2016 the annual savings will be in the order of €1.8 million.

1. SCOPE OF APPLICATION AND ORGANIZATIONAL STRUCTURE

The Evangelical Church of Baden is a public corporation. Its historical domain comprises the grand duchy of Baden. It stretches from Weil on the Rhine river in the southwest to Wertheim in the northeast (a distance of some 350 kilometers) and again from Breisach on the Rhine river in the west to Immenstaad on Lake Constance in the east (some 170 km).

The head office of the church management board is the „Evangelische Oberkirchenrat" in Karlsruhe. The „Kollegium", the supervisory board of the Evangelical Church of Baden consists of eight consistorial councilors, chaired by State Bishop Dr. Ulrich Fischer. Barbara Bauer holds the office of managing consistorial councilor. During the state synode the delegates decide on the respective biennial budget and all matters of legal and spiritual concern. No more than one third of the total of 80 synod members are theologians.

The Evangelical Church of Baden comprises 550 legally independent parishes, which each are public corporations as well. A parish may comprise several congregations. At present, there are some 720 congregations. On the average, a parish consists of three to four buildings: the church, the parsonage, the parish hall and a kindergarden. The total number of parish buildings to be heated may assumed to be some 2750. Parishes are jointly managed by a pastor and the volunteer church council or, at the congregation level, a council of elders. It is these lay committees that decide on the usage of buildings, their upkeep and the associated capital spending. The parishes have centralized the majority of administrative tasks in twelve administrative and service offices as well as three parish centers which are evenly located throughout Baden.

There are 15 institutions that are affiliated with the Evangelical Church of Baden: the Evangelical Consistorial Council in Karlsruhe, Beuggen Castle, a conference venue near Basel, the „Haus der Kirche", a conference venue and its associated Baden Church Academy in Bad Herrenalb, two educational institutions for adolescents in Neckarzimmern and Ludwigshafen on Lake Constance, the Evangelical University and the Educational Center in Freiburg, the Morata Seminary and the Academy of Church Music in Heidelberg. The School Foundation directs three academies for social pedagogy (Freiburg, Karlsruhe, Nonnenweier), two secondary schools in Mannheim and Heidelberg, as well as the International Secondary and Boarding School in Gaienhofen on Lake Constance.

Some 15,000 full-time staff (not including clerical welfare and social work) are employed in administrative offices, kindergarden and children's homes, in parishes and deaneries. Nine hundred of these work in professions requiring special church training (pastors, deacons, youth instructors,

religion teachers, church musicians). More than 6,000 church council members perform management tasks on a volunteer basis. In addition, there are some 30 to 40 active members in the project teams and committees in each parish. It is safe to assume a total number of volunteers in the range of 25,000 to 30,000.

The climate protection framework applies to the 550 parishes (and 720 congregations, respectively) and the 15 Church of Baden institutions. The social services organization „Diakonisches Werk“ is not a direct branch of the Church of Baden and in this context its charitable and medical institutions cannot be factored in.

On July 28, 2009, the Church of Baden „Kollegium“ supervisory board unanimously adopted the climate protection framework outlined below. Equally, the Baden synod unanimously approved the framework on October 21, 2009, covering the period from 2011 to 2020 and providing the necessary budget until 2014 (cf. ch. 5.3).

2. MOTIVATION AND INITIAL POSITION

2.1 ACCELERATED CLIMATE CHANGE AND THE COMBINED INPUT OF GERMAN CHURCH INSTITUTIONS

Climate change can no longer be stopped, but merely contained. This realization itself is grave enough. And even more serious is the fact that there is very little time left. According to UN-IPCC the global rise in temperature until 2100 must be limited to 2°C in order to avoid a catastrophic development. This requires a change of policy within the next decade. Based on 1990 consumption figures, a 40-50% CO_2 reduction by 2020 and a 80-95% reduction by 2050 is imperative. In a global context it is especially the poorer countries that will not be able to fight or compensate for the local impact of climate change. In industrial countries, the compensation cost will render the financing of other social needs impossible. Social injustice will increase and global migratory pressure will grow continuously. It is no exaggeration to say that climate change poses the most comprehensive threat to the natural resources of today's generation, and even more so of future generations. At Kyoto Protocol follow-up negotiations, starting with the next Climate Conference in Copenhagen, all of us will enter the decisive phase of setting the course of global energy, climate and poverty policies.

All G8 countries share this assessment, they substantially fall short of reacting adequately, however. In view of the natural resources at our disposal this is unjustifiable. That's why it is all the more important that churches conspicuously lead the way and show that they not only recognize the clearly defined urgency and severity of this situation, but that they also initiate a change of course – in time to gather, sensitize and motivate our Christian community for the efforts that must be made. This also means that these efforts must start today. It is only with new, future-oriented life style patterns in society, which recognize a shared responsibility for global climate justice, that capping climate change will be possible. And it will require all of us to contribute in order to succeed.

Both the Evangelical and Catholic Church in Germany are of special significance. With some 1.4 million full-time staff the two combined churches are the second largest employer in Germany, one of the largest land holders operating some 250,000 buildings. Some 2.4 million members are active on a volunteer basis. Direct CO_2 emissions (heating, electric power, traffic) can only be extrapolated based on data gathered from the Baden region and are estimated to be in the order of 1.65 million tons (not including clerical welfare and social work). NRW energy agency estimates the churches' potential for saving to be in excess of 300,000 tons of CO_2. Thus, the churches and their associated social organizations on the one hand are considerable consumers of

resources, on the other hand they reach a large number of people both directly (full-time staff and volunteers) and indirectly (church service attendants, etc.). Furthermore, there is substantial offset potential. The church serves as a role model providing important stimuli to other sectors of society. It has the potential to assume the function of a „sustained effort" motor in society as a whole. Due to their medium scale, regional churches (as well as diocese, municipalities and townships) can develop exceptional clout, since manageable hierarchies and decision-making levels are in place. In this context, Hans Joachim Schellnhuber's phrase of „medium is beautiful" applies to emphasize the potential of medium-size organizational units as part of integrated solutions to the climate problem.

In order to live up to its mission of preserving God's creation, the Council of the Evangelical Church in Germany (EKD) has called upon its member churches to achieve a 25% reduction in CO_2 emissions by 2015.

2.2 PRESERVATION OF GOD'S CREATION AS A CORE TASK OF THE EVANGELICAL CHURCH OF BADEN

The Evangelical Church of Baden can look back on a long tradition of environmental protection, pionieered to a large extent by its first commissioner for environmental affairs, Pastor Gerhard Liedtke. Already in the 1980s he developed first concepts of parish-based energy accounting. Volunteer regional commissioners for environmental affairs continued his work in the late 1990s. Due to staff reductions, High Consistory full-time staff were only moderately able to support these volunteer efforts. As of 2001, all environmental aspects relating to buildings were operationally allocated with the church's department of planning and building inspection.

In April 2003 the Regional Synod, the highest decision-making body of the Church of Baden, passed the „Ecological guidelines of the Evangelical Church of Baden" where protection of the environment is laid down as a central task of the Church of Baden with its actions tied to a future-oriented sustainable development. The seven articles of this document describes the most important action domains pertaining to environmental protection. Furthermore, based on the positive experiences collected in the Regional Churches of Württemberg and of Westphalia, it endorses the Church's environmental managment instrument „Grüner Gockel" (Green Rooster) as an indispensable implementation tool. The Synod combined these guidelines with a fixed-term position within the Church of Baden's department of planning and building inspection expiring in 2009. In 2010 the operational sector „Energy and Environment" was embedded as one of the core tasks of the Church of Baden department of planning and building inspection and the fixed-

term position converted into a permanent position. This ensures long-term operational security to the field office.

2.3 INITIAL POSITION

Once the Grüner Gockel (Green Rooster) field office had been established in 2004, the Regional Synod initiated the more simple „Back Burner" energy check program to start in 2006, which constituted a second line of advisory services in cooperation with the Freiburg archdiocese. During that same time the consulting activities of the church's department of planning and building inspection yielded an increasing number of energy and usage-related questions, which in turn produced an increased interleaving with aspects of environmental management. The outcome of this was a series of special consulting and training programs developed by Department 8 after 2007. These included topics such as how to optimize heating settings, an energy audit and the FUNDUS structure database. The Green Rooster program was expanded into the sustainability management tool GREEN ROOSTER^{plus}. In order to make the vastly expanded consulting portfolio more transparent to the „customer", the field office was expanded as well to become the department of planning and building inspection's „Bureau of Energy and Environment" (BEE). The office oversees environmental and sustainability management, the „Back Burner" energy check program, the „Heating Settings" module, and all of their associated training programs. In this context, the Evangelical Church of Baden is a member of the Federal Ecumenical Network of Church Environmental Management (Bundesweites Ökumenisches Netzwerk für Kirchliches Umweltmanagement, KirUm). In 2008, the BEE joined the Regional Church of Baden's environmental advisory board and the supervisory board of the „Gesellschaft zur Energieversorgung der kirchlichen und sozialen Einrichtungen" (KSE, the corporation to supply energy for the buildings and social services that are part of the four Baden-Württemberg regional churches.)

By late 2010, over 90 parishes had implemented the Green Rooster environmental management tool. Half of these parishes are already EMAS certified and yet again 50% percent of these parishes have successfully undergone re-certification which is required every four years. This proves this process to be highly sustainable. Twelve facilities of the Church of Baden implemented the Green Rooster program in 2009. In Germany, Markdorf, as a pilot parish, was the first to implement the sustainability management system. In five 10-day seminars some 60 volunteer members were trained to become Church Environmental Auditors to supervise and guide the some 600 active members of the participating parishes' environmental teams. Some 200 participants were enrolled in 32 BEE training programs. By 2010, 130 parishes had made use of the „Back Burner" energy check program. Thirty volunteers have completed five half-day classes to become energy commissioners.

3. QUANTIFICATION OF GREENHOUSE GAS EMISSIONS

3.1 DATA BASIS

3.1.1 Consolidated result

In a political context, 1990 is the reference year that all future reductions are based on – this also includes the milestones of at least -40% and -80%. In case of the Church of Baden, relevant data could only be generated by running simulations that carried significant inaccuracy. Thus, this approach was discontinued as of 2003, subsequently using real data.

Even prior to the foundation of KSE, the four Baden-Württemberg regional churches cooperated as a buying syndicate for gas, oil, district heating and electric energy, in order to, as a wholesale customer, achieve favorable framework contracts for their parishes and facilities. This is why consumption data of all user locations in parishes and facilities pertaining to the years 2002 and after is available to the applicant party, i.e. the Church of Baden. These figures allow one to calculate the baselines for targeted CO_2 reductions. Based on EKD stipulations (Council of the Evangelical Church in Germany), 2005 was the first baseline initially selected. Attempts to account for local weather correction proved to be far from realistic, since this would have required numerous local parameters and would have been very difficult to implement due to the large number of user locations. Instead, the average value for the 2003 to 2007 interval was used. This period comprised both climatically milder and cooler years. This data basis allows one to calculate the total energy consumption comprising oil, gas, district heat and electric energy and amounts to 140 million kWh or a total CO_2 emission of 42,860 tons (cf. Table 1). The share attributable to these facilities comes to 3200 tons or about 7.5%. Here, the largest share goes to the parishes, due to their vast number of buildings.

Defining the baseline 13 years after 1990,

Table 1: Average energy consumption and CO_2 emissions between 2003 and 2007 as a baseline for reduction targets

	Consumption (kWh)			Emission (t CO_2)			
	Heating	Electricty	Total	Heating	Electricity	Traffic	Total
Facilities	6.741.308	2.102.773	8.844.082	1.574	1.321	311	3.205
Percentage of total consumption	5,6%	10,9%	6,3%	5,6%	10,9%	12,2%	7,5%
Parishes	113.825.037	17.254.277	131.079.314	26.575	10.836	2.245	39.655
Percentage of total consumption	94,4%	89,1%	93,7%	94,4%	89,1%	87,8%	92,5%
Total consumption	120.566.345	19.357.050	139.923.396	28.149	12.156	2.555	42.860

while at the same time maintaining the political reduction targets, leads to a substantial aggravation of the required measures. When applying the virtual 1990 baseline, this means that the Church of Baden intends to exceed the political milestones.

3.1.2 Parishes: results and data quality

Based on some 4800 user locations, thus representing 95% of all users, the data quality of heating and electricity data is realistic. When calculating traffic related emissions at the parish level, environmental reports are only available of those parishes that have an environmental management system in place, since it is only here that recording mobility is mandatory. According to current knowledge there are no other reliable church data sources in Germany. It must be assumed that Green Rooster traffic data, typically gathered in interviews of full-time staff, is of heterogeneous quality. Interviews of volunteer members are only sporadic – partially based on the premise that here mobility is of minor importance. The data basis of 16 parishes shows that traffic contributes the least to the emission total (5,6% ± 5,6% standard deviation; versus heating energy: 84% ± 9,8%; electricity: 10,4% ± 9,0%). It can be assumed that this value errs on the high side with respect to all parishes in Baden, since 35% of all Green-Rooster parishes subscribe to green electricity, thus significantly lowering emissions related to electric energy. Heating and electric energy data of administrative and service offices are accounted for in the parishes' consolidated results. Unfortunately, here the approach to the calculation traffic data is less satisfactory. Singly Meckesheim, as one of the head offices, did implement an environmental management system, thus data is available in this case. Here, traffic accounts for approximately 46% of all emissions due to numerous out-of-office appointments. Consequently, when calculating mobility's climate relevance, a value of 6% of those emissions related to heating and electric energy has been used. This is approximately equivalent to 1900 tons of CO_2 per annum (cf. Table 1).

3.1.3 Facilities: results and data quality

Power consumption for the years between 2003 and 2007 is well documented and amounts to almost 2.1 million kWh (cf. Table 1). Unlike the parish data quality, the figures for heating energy are fragmentary throughout the five-year interval. This is due to the fact that not all facilities took advantage of existing framework contracts (cf. 3.1.1). A complete set of consumption data is only available for 2008. This is why a method of extrapolation was preferred, relying on those facilities that feature a more solid data basis after having implemented an

environmental management system. These facilities represent approximately 40% of the total energy consumption. Consequently, their heating energy consumption can be estimated to be 4.65 million kWh or rather 6.75 million kWh for all 15 facilities (cf. Table 1).

For most facilities, traffic contributions play even less of a role than with the parishes since – unlike with pastors – there are virtually no out-of-office obligations. The EOK High Consistory in Karlsruhe, whose staff travel approximately 3 million work-related kilometers per year, does present the exception to this rule. Train accounts for almost two thirds of this distance, automobile one quarter, and air travel 9%. Summing up, mobility accounts for almost 30% of EOK's total CO_2 emissions.

3.1.4 Land use

In the context of political avoidance strategies, energy related emissions due to burning fossile fuels are given priority. On the other hand, direct and particularly indirect effects of land use and consumer behavior are often marginalized, although they have direct impact on site. Conversely, consumer and producer awareness in this area are of utmost importance and, at the same time, present the highest hurdle. What it boils down to is nothing less than a life style that is both environmentally compatible and sufficient. This, in total, defines the ecological footprint of the actions and behavior of our church.

This is where an important agent of the Church of Baden regarding land use comes into play, who so far has not been relevant with respect to accounting: the Church of Baden's foundation „Evang. Stiftung Pflege Schönau"(ESPS). In addition to maintaining 85 churches and 44 parsonages, ESPS manages some 14,000 ha of property throughout Baden (7,600 ha forest and 5,800 ha farmland), some 22,000 leaseholds and long-term rental contracts as well as some 1000 tenancies.

ESPS has been certified according to EMAS environmental management since 2008. The goal of this context is to achieve a comprehensive CO_2 footprint that includes not only its three office buildings, but also all properties and tenancies. A first assessment shows a positive CO_2 net balance of approximately 18,000 tons which is due to annual timber growth (cf. Table 2). Land use during the 2003 to 2007 baseline interval has remained constant, however.
This means that taking into account CO_2 repositions does not in any way change reduction targets. The ESPS balance sheet proves, however, that modifying land use management directly affects the target values.[1]

[1] Increase per annum: 70,000 solid cubic meters of timber

Tabelle 2: 2008 ESPS CO_2 footprint

	Tonnen
A) CO_2-emission	
Buildings incl. rental objects	3.580
ESPS traffic sites	70
agricultural area in use	6.000*
B) CO2 absorption	
forestry[6]	28.000
C) Net balance	18.350

*estimated

3.1.5 Procurement

For the Church of Baden, the environmental aspect of procurement can be broken down into five action domains: electricity purchase, green IT, paper, fair trade and regional economic value added. Again, a data basis is available in particular for parishes and facilities using environmental management for specified periods. Electricity purchase is a core element of the future CO_2 reduction strategy. At this point less than 5% of all parishes use „green electricity“ or „eco-power“. The foundation of KSE has brought about changeover potential for the entire Church of Baden and beyond (cf. 4.2.1).

Fair Trade originated in a church context and may safely be considered as a core competence of today‘s volunteer service within the church. There are, however, no statistical surveys for the Church of Baden. The situation is similar for the procurement sectors of mobility, office, IT and foodstuffs.

Table 3 lists paper consumption within the Church of Baden in 2008. Once again the parishes account for 3/4 of the total consumption. This does not include print products for administrations and facilities, however. The recycling share total is below 50%. This is the equivalent of approximately 280 tons in CO_2 emissions. Compiling a first solid data basis will be a challenge, since calculating CO_2 emissions relating to procurement of goods and ser-

Tabelle 3: 2008 paper balance sheet

	Sheets DIN A4	Share of total	Recycling share
Parishes	44.200.000	76%	39%
Facilities incl. ESPS	6.700.000	12%	54%
EOK	6.000.000	10%	100%
Administrational and service offices	1.360.000	2%	30%
Total	**58.260.000**	**100%**	**47%**

vices has been afflicted with a large degree of uncertainty. Even so, economic-environmental accounting does provide indications as to the quantity of greenhouse gases contained in certain product groups. Moreover, procurement data is not centrally available and, taking a realistic view, are unobtainable for some goods and services. Basic approaches are provided, however, by those parishes and church facilities that are part of the „Zukunft Einkaufen“ initiative (www.zukunft-einkaufen.de). These approaches might serve a basis when making a reliable estimate of different product groups.

3.2 MONITORING FUTURE COMSUMPTION

The key factor to a successful climate protection concept is comprehensive monitoring that periodically evaluates and records the effects of those measures as described in chapter 4 below. Here, much the same as when dealing with measures, the Church of Baden has a head start. In 2006 the EOK parish finances department started to develop the FUNDUS facility management database tailored to the particular needs of the Church of Baden. A first step was in situ mapping of every building‘s heated floor space and the programming of an Intranet interface to the administrational and service offices‘ booking system. In this way, consumption data based on the energy provider‘s invoices to parishes and facilites has been available since 2009. FUNDUS is the backbone when monitoring the climate protection concept. A second important tool will be to locally gather meter readings by means of an online portal — initially for those parishes and facilities in particular that implement either the Green Rooster environmental management tool or the Back Burner energy check. Thus, direct and local energy controlling is feasible (cf. 4.2.2 & 4.2.3).

FUNDUS also helps monitoring milestones of the climate protection concept. It is important to keep in mind that most instruments do not take effect when they are implemented, but rather with a delay of one to three years. The length of this time lag depends on the type of measure in question. Management oriented approaches typically take longer for all projected measures to be implemented, since they are preceded by a mandatory current-state analysis. Building and facility upgrades are more immediate in their effect - they do, however, come with frequently longer planning phases. It is soley the changeover to „eco-power“ that takes hold immediately. So it is possible to calculate year-specific target values for the number of reachable parishes, facilities and measures that are under way. However, their associated real and quantitative CO_2 reductions can only be determined with the time lag as described above.

4. CLIMATE PROTECTION CONCEPT SPECIFICATION

4.1 TIME SCALE AND GOALS

The climate protection concept has been projected with a 10-year term, subdivided into two phases: 2011-2015 and 2016-2020. This time scale was chosen to follow the political timeline (EKD recommendation: -25% by 2015; IPCC demand: -40 to -50% by 2020). The implementation of the second phase requires the evaluation of phase one. On July 2009 the „Kollegium" supervisory board explicitly enacted the Climate Protection Concept including its Phase 2, thus setting as an ambitious goal a final milestone of reducing Church of Baden greenhouse emissions by at least 40% by 2020.

For Phase 1, the cumulative savings of all measures is expected to be between 23% and 28%, or between 9,800 and 12,000 tons CO_2 respectively — depending on the calculation of KSE eco-power's climate compatibility, starting with its first year of availability in 2011 (cf. chapter 4.2.1). For the period from 2016 to 2020, additional savings between 20% and 23% are realistic (Figure 2). Summing up, a total CO_2 reduction of 40-50% by 2020 is feasible — thus reaching the level recommended by IPCC.

Increasing energy and resource efficency is the main goal. It can be reached either by directly upgrading buildings and facilities or indirectly by optimizing usage. It is here that BEE's experiences gained since 2004 and new architectural upgrading standards developed by the Department of Architecture and Environment pay off. These savings targets can be reached via three domains of action (Figure 1).

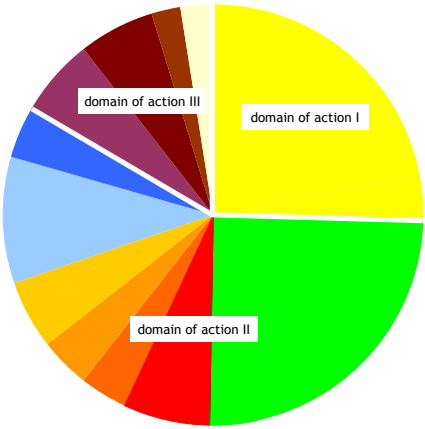

Figure 1: Domains of action and their respective percentages in the total reduction by 2020 (with respect to alternative A, figure 2). Fill colors refer to individual measures, cf. Figure 2.

Domain of action I ("Power of the customer"):
Changeover to eco-power: campaigns will promote KSE as a supplier of electrical energy with all facilities and 50% of all parishes.

Domain of action II ("Software"):
Environmental management, seminars and energy controlling.

Domain action III ("Hardware"):
Architectural upgrade measures and promoting the use of regenerative heating sources.

Domain of action II mirrors BEE‘s business field whose local management-based measures (in terms of soft measures; „Software“) are responsible for the largest percentage share of the total reduction target. Domain of action III (in terms of hard measures („Hardware“) comprises the business fields of architectural consulting of parishes and facilities, handled by Department of Architecture and Environment staff.

Church leadership top-down approaches are limited due to the high degree of autonomy that is typical of parishes and facilities. It is most pronounced with architectural upgrade projects to be approved by Department 8 (parish finances, properties and construction). Against this backdrop it pays off that, ever since 2004, solid experience has been gained, especially with respect to the potential of all those approaches that can be loosely defined as „user-specific“. In total, such zero-cost or low-cost measures (domains of action I & II) are responsible for approximately 75% of all achieved savings. This is an important aspect, especially in the context of a demographic trend within the Church of Baden which leads to a decline in church tax revenue. The crisis of the financial markets additionally amplifies this effect, if only in the short term. Thus it is no longer possible, to increase the budget for restoration projects beyond the volume already available. All of action domain II‘s approaches are bottom-up. It enables the parishes in great measure to recognize the potential of their buildings in use and to have volunteers manage them semiprofessionally. If a building then requires restoration, technical aspects are more competently established and the restoration itself can, more often than not, be executed more eco-efficiently.

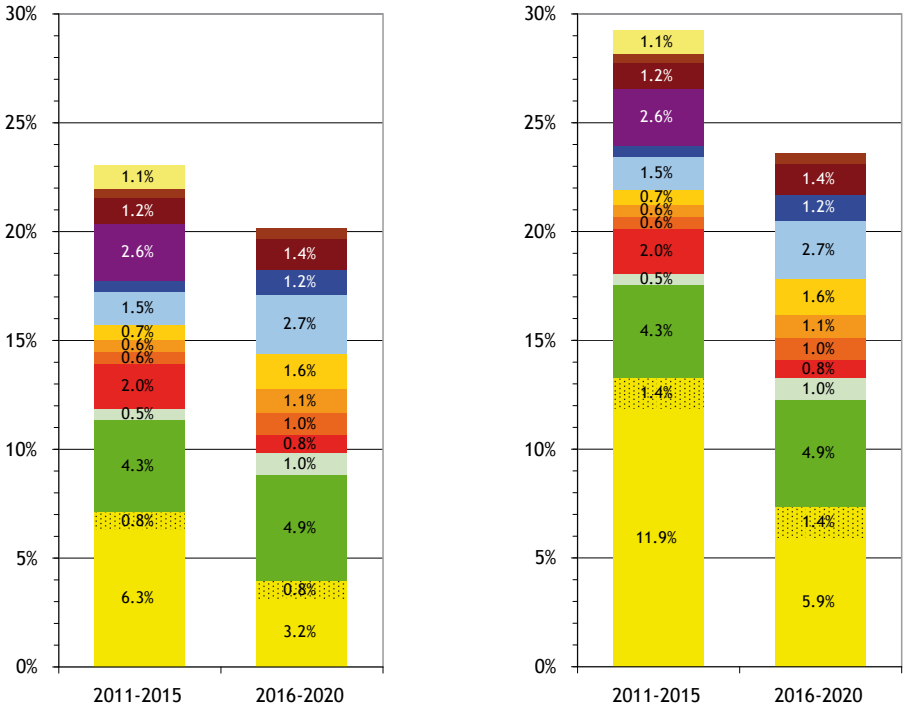

Figure 2:
Breakdown of cumulative CO_2 reductions for individual Climate Protection Concept modules offering two alternatives reflecting possible effects of the changeover to KSE eco-power:

Left — Alternative A: CO_2 equivalent = 50% of the German power mix (= 314g/kWh)

Right — Alternative B: CO_2 equivalent = 40g/kWh (hydropower)

See text for further details.

4.2 DEFINITION AND REDUCTION POTENTIAL OF INDIVIDUAL MODULES

This section features detail descriptions of the individual modules. A graphic synopsis of all modules follows at the end (Figure 3). All subsequent reduction figures are based on an overall assessment using Alternative A when calculating reduction effects due to a changeover to eco-power (cf. chapter 4.2.1 below). This alternative represents a more conservative baseline (cf. Figure 2). Target definitions for each module description refer to Phase One of the concept ending in 2015. Table 4 shows a list of the milestones until 2020.

Table 4: Climate Protection Concept milestones.

Figures are based on the respective number of parishes and facilities			
Modules	2004-2009	2015	2020
eco-power changeover / parishes	35	363	545
eco-power changeover / facilities	0	7	15
Green Rooster environmental management / parishes	80	170	365
environmental management & facility improvement	6	6	15
number of Green Rooster seminars	40	200	350
Back Burner energy check	125	525	720
energy commissioner training	30	260	720
on-site consumption data acquisition	0	250	500
optimizing heating settings	24	105	360
verger training programs	0	250	720
educator training programs	0	200	720
parsonage refurbishment program	0	200	200
energy efficiency improvements	20/year	100	220
changeover to regenerative power	10/year	50	110
1MW solar farm	0	1	1

4.2.1 Changeover to „green power“

CO_2 reduction by 2015:
7.1 – 13.2% or 3,040-5,700 tons respectively

KSE, the corporation to supply energy for church buildings and social services was founded in 2008. Its shareholders are the four regional churches in Baden-Württemberg, i.e. the Evangelical Church of Baden, the Freiburg archdiocese, the Rottenburg-Stuttgart diocese and the Evangelical Church of Württemberg. In 2009, KSE included gas in its product portfolio, starting in January 2011 it will offer hydroenergy that is 100% certified. By 2014, 50% of all parishes and facilities are expected to have gone to green power. As a church-owned energy supplier KSE is well-placed for success, since it is in direct contact to users whose framework contracts are expiring. Even so, solid PR activities are required, since only very few parishes have decided to switch to green power because cost considerations take precedence, at least initially. Even with potential customers not choosing KSE as their supplier of energy, KSE‘s public announcement has already had an effect, especially with local competitors such as public utility companies. An increasing number of products offered by these companies specifically target church customers with services of equivalent quality. Taking all of these factors into consideration, a 50% eco-power quota seems realistic.

▶ Determining the CO_2 reduction potential:

KSE‘s electricity is generated by Austrian Danube river hydroelectric plants that went online more than 12 years ago. In this sense it is electric energy which is already available in the power grid. For accounting purposes, this energy is classified as having virtually no impact on the climate. In physical terms, however, it does not increase the share of regenerative energy within the German power grid.[2] This is why the Climate Protection Concept specifies two alternatives, one reflecting physical and one reflecting accounting considerations. With respect to the physical alternative, a broad consensus among a significant majority of the scientific community has not been reached yet. This is why two alternatives have been presented: Alternative A with 314g CO_2/kWh (50% of the German average of 628g CO_2/kWh; Source: PTJ Jülich), und Alternative B with 40g CO_2/kWh. The latter is accurate in accounting terms.
Irrespective of the alternative chosen, a change in power supply is responsible for the largest share of the overall reduction, even when neglecting shrinking power consumption due to increased efficiency. Accounting also disregards the indirect effect of having numerous other church institutions participate that are not

[2] As a result of the Renewable Energy Act (EEG - Erneuerbare-Energien-Gesetz) the share of power from renewable sources is approximately 16% (2009). In reality, approximately 5% of the population use eco-power, i.e. supply exceeds demand by a factor of three.

Overall effect of the „changeover to eco-power“

Alternative	CO_2 equivalent	Consumption kWh	CO_2 Reduction (t)	Reduction by 2015 (%)
1	314	9.678.525	3.039	7,1
2	40 [8]	9.678.525	5.691	13,2

directly affiliated with the Church of Baden. Starting in 2011, KSE‘s total purchase volume on behalf of its customers will be approximately 0.4 terrawatt. 20% of this volume go to parishes and those facilities that are directly associated with the Church of Baden or the diocese. The remainder goes to independent facilities such as Diakonie or Caritas . As a result, they as well will have undergone out a changeover to regenerative power. While this effect if beneficial to the climate, it does not enter our accounting balance. It should still register as a „co-benefit“, however.

Goal: By 2015 50% of all parishes and Church of Baden facilities will subscribe to green power. This is equivalent to some 360 parishes and approximately 8 facilities.[3]

[3] Due to production factors even hydropower has a CO2 footprint.

4.2.2 Green Rooster / EMAS Eco Management

CO_2 reduction by 2015:
4.8% or 2,040 tons

Green Rooster is the Church‘s marketing name for Europe‘s Eco Management and Audit Scheme EMAS III (Eco Management and Audit Scheme - administrative order (EG) No. 761/2009). Green Rooster parishes implement a complete eco-management scheme and, following the implementation phase of 18 to 24 months, are validated by an accredited external environmental verifier. Based on this accreditation, the Chamber of Industry and Commerce issues the EMAS certificate which expired after four years, then to be renewed. The core element of the eco-management scheme is a continuous improvement process in reducing the parishes‘ and facilities‘ environmental impact. It follows the annual regulation loop „recognize - assess - act - check“. In addition to tracking energy consumption for heating, power, water and mobility it also considers procurement (paper, cleaning, office), noise pollution as well as eco training, communication and compliance

with safety regulations. This data is part of an annual eco accounting balance sheet to be made available to the public every four years in the form of an environmental statement (cf. www.gruenergockel-baden.de). This environmental statement also contains the environmental program which gives a binding list of goals, measures, target intervals and responsibilities for reducing environmental impact for a period of three years. Combined with the regulation loop management, this is the core of Green Rooster, making quick and substantial environmental protection possible — and doing so in a sustainable fashion. Eco management thinks in terms of years, not isolated operations. Its special opportunity lies in its „multiplier" effects — many people start to privately implement and share the knowledge gleaned in the parishes — which unfortunately is very difficult to quantify.

Green Rooster mandates both a church council or facility management decision and the appointment of an environmental protection manager who coordinates a local eco team (typically consisting of five to six members). During the implementation phase a church environmental auditor accompanies and coaches the parishes (cf. 4.2.6).

BEE coordinates Green Rooster operations. Its work areas comprise marketing, acquisition, work aids and accounting tools, presentations to decision-making bodies, internal parish audits, presence at validations, planning and training environmental auditors, planning and training eco teams and certified environmental auditors, data management and evaluation, mediation and presentation, as well as nationwide networking (e.g. Ecumenical Network for Church Eco Management) and committee work, and finally, representative tasks during kickoff and certification events. While supporting new parishes was the focus during Green Rooster's early years, the period since 2008 has seen a focal shift towards supporting the increasing number of validated parishes.

With 90 participating parishes and 10 facilities within the Church of Baden, Green Rooster has reached a stable participation rate. This is equivalent to just under 11% of all parishes.

In addition to statewide acquisition, starting in 2011, two new approaches featuring innovative elements will be implemented as part of the Climate Protection Initiative framework:

1) Joint implementation in no less than 50% of all parishes of a rural church district and in one large city parish where Green Rooster has barely been used. This convoy approach allows for efficient implementation and from the very beginning, presents the option of a regional network.

2) 45% of the 28 Mannheim municipal parishes have already implemented Green Rooster. By 2015 at least another 30% are to be recruited. Eight Mannheim parishes have already undergone their second validation, e.g. they have been eco-managing since 2004. In operational terms, these parishes have direct environmental impact well under control, their focus shifting more towards indirect aspects. Six of the parishes, for instance, are part of the nationwide church procurement project „Zukunft einkaufen“ („Procuring the Future“, cf. chapter 4.3). In Mannheim, there is a unique range of knowledge and experience shared with the parishes that joined at a later time. A rudimentary form of cooperation between the environmental officers and the overall Church Authority is already in place with plans to further expand it (cf. chapter 4.2.6). Geographical proximity of the parishes offers the opportunity to jointly and more efficiently conduct management and to include the targeted eight to nine parishes (= 30%) from the very start.

Goal: by 2015, in a joint effort with Church of Baden statewide acquisitions, the total number of parishes to be increased by 90 and then amount to 170.

Determining the CO_2 reduction potential: In 2009, Green Rooster reduction effects were evaluated in all those parishes that had already largely completed implementation of the first eco-management program (2005-2007). Thus, solid data was available. On average, there is an approximate 26% reduction in heating energy and a 12% reduction in power within five years. At this point there is no empirical data for effects due to the 2nd environmental program (typically after year 6). There is indication, however, that measures then tend to focus on indirect eco-management aspects, which may lead to lower reduction efficiency.

It is especially true for eco-management that, when assessing the effects, the current degree of implementation during the period to be covered must be taken into consideration. The eco effects of those parishes that have been using Green Rooster for a number of years are different from those of parishes that are still in the implementation phase. Accordingly, there needs to be a breakdown of parish type with consideration to their reduction potential. Furthermore, one must keep in mind that eco-management will successively use many of the tools that are available, whether it be optimized heating control or energy efficiency improvements. These feedback effects have been accounted for by lowering expected reduction effects by 20%. Regarding energy suppliers, a changeover rate of 66% is assumed for 2011 and beyond.

Overall effect „Green Rooster Eco-Management“:						
	Reduction potential		Reduction by 2015			
	% Heating	% Power	Heating (kWh)	Power (kWh)	t CO_2	%
Parishes that started before 2010	21	10	2.612.481	182.776	725	1,7%
Implementation (Parishes after 2009)	4	5	565.200	107.096	184	0,4%
1st environmental program (Parishes after 2007)	14	8	2.441.665	205.623	662	1,5%
2nd environmental program (Parishes before 2008)	8	5	942.000	85.676	260	0,6%
Facilities	30	30	628.294	211.969	213	0,5%
Total			**7.189.640**	**793.140**	**2.043**	**4,8%**

4.2.3 „Back Burner“ Energy Check

CO_2 reduction by 2015:
2.0% or 840 tons

Eco management as described above requires a large measure of volunteer committment and motivation, which may not be an option for every parish. At the very least, Back Burner presents an introduction to more efficient heating and power usage with significantly less effort. The energy check exclusively focuses on these two environmental aspects. It is performed by an accredited energy consultant with one of the Baden energy agencies. A purely visual inspection of the buildings following a standardized checklist will identify zero-cost or low-cost measures, which will already reduce the use of heating energy and power. This also includes user-specific measures and recommendations. The parish is given a list of measures for each individual building as well as a Top Ten list of those measures that will maximize increased energy efficiency for all buildings inspected. Back Burner concludes with the energy consultant presenting the findings to the church council.
Parishes can register via an online portal which requires them to designate a person in charge of the energy check. There is a 50% cost subsidy when implementing the Top Ten list, with a subsidy ceiling of €1000. In order to be eligible for subsidies one parish member is required to participate in a half-day seminar to be trained as energy commissioner (cf. 4.2.6). Furthermore, consumption data acquisition on a monthly basis must commence (cf. 4.2.4). These requirements offer an incentive to parishes not using Green Rooster and enable them to perform their own energy accounting.
BEE coordinates registrations, consultant assignments, training seminars, communication with third party service suppliers and service offices (cf. 5.1.2) as well as marketing. On-site consultation is not necessary.
The energy check was jointly developed with the Freiburg archdiocese where it is part of Energieoffensive I & II (cf. 5.1.4).

Goal: by 2015 the number of participating parishes is to increase from now 125 (17%) to 525 (70%).

▶ Determining the CO_2 reduction potential:

Back Burner is limited to low-cost measures. Its effects by themselves will be relatively small. At the same time its low effort threshold enables significantly more parishes to participate than is the case with Green Rooster. Even so they score 50% of Green Rooster achievement levels. Moreover, Back Burner is intended as an introductory tool to motivate parishes to use further Climate Protection Concept modules. All of this leads to increased reduction effects.

Overall effect „Back Burner Energy Check“					
Reduction potential		Reduction by 2015			
% Heating	% Power	Heating (kWh)	Power (kWh)	t CO_2	%
5	3	3.140.001	285.588	841	2,0%

4.2.4 On-site consumption data acquisition

CO_2 Reduction by 2015:
0.6% or 239 tons

This new offer is aimed at optimizing the basis for data acquisition. Lessons learned with eco management and the energy check underline the importance of consumption tracking. In many cases historical building structures in a parish prohibit consumption tracking of individual functional areas (e.g. kindergarden, parish office, parsonage, parish hall, church). Instead, a single utility meter tracks several functional areas. This situation considerably aggravates effective controlling.

Expanding Back Burner to include consumption data acquisition will create a large number of technical situations, in which heat meters and intermediate meters can be installed with manageable financial input, thus making targeted data acquisition feasible. This being one of the measures on Back Burner‘s Top Ten List guarantees a financial incentive.

To date, an on-site Excel tool is used for controlling in Back Burner parishes. The year 2011 will see the start of an online data acquisition portal which interfaces with the FUNDUS building and AVANTI management databases.

By 2015, data acquisition options are supposed to be optimized in 250, i.e one third of all parishes. This is the equivalent of 50% of all targeted Back Burner parishes.

▶ Determining the CO_2 reduction potential:

Simply using user-friendly, correct tracking of energy consumption already yields reduction effects that are purely psychological in nature and independent of potential measures being implemented. We assume these effects to be 2%.

Overall effect „On-site consumption data acquisition“					
Reduction potential		Reduction by 2015			
% Heating	% Power	Heating (kWh)	Power (kWh)	t CO_2	%
2	2	785.000	118.995	239	0,6%

4.2.5 Optimized heating settings

CO_2 reduction by 2015:
0.7% or 281 tons

Over 75% of the parishes' total CO_2 emissions are attributable to heating energy, which is the largest individual item of the operational cost. In almost every parish, eco management has shown heating settings to be less than optimal. One of the most frequent Back Burner Top Ten measures is to check heating control units. This is the target area of the heating module. It can be requested either completely autonomously or in a Green Rooster or Back Burner context. It is performed by independent energy consultants accredited with the Department of Architecture and Environment. They check and optimize heating control while taking into account the usage profile of each respective building. The staff in charge of heating are present and can receive on-site instruction on how to correctly operate the heating system. The standard time frame for dealing with one heating system is half a workday. As part of the follow-up procedure the engineer compiles documentation in down-to-earth language which enables the staff to operate the heating system independently. The heating module is best described as a combination of technical optimization and in-house training.

Goal: 25 parishes have used this tool since its inception. By 2015, another 80 parishes are supposed to participate.

▶ Determining the CO_2 reduction potential:

Due to its large share of the total energy consumption, the effect of reducing the consumption of heating energy is generally high — both with fuel and with power (recirculation pump). Typically, the fewer structures of responsibility in place, the better optimizing effects tend to be. This means that reduction effects with a Green Rooster parish will tend to be smaller than with a parish of a lower level of awareness. Correspondingly, an effect between 5% and 15% seems realistic.

Overall effect „Heating settings“:						
Combined with...	Reduction potential		Reduction by 2015			
	% Heating	% Power	Heating (kWh)	Power (kWh)	t CO_2	%
environmental program Green Rooster	5	2	196.250	11.900	51	0,1%
Back Burner	5	2	392.500	23.799	103	0,3%
None	10	5	471.000	35.699	127	0,3%
Total			**1.059.750**	**71.397**	**281**	**0,7%**

4.2.6 Training

The effectiveness of all Climate Protection Concept modules largely depends on user motivation and technical understanding. In our view, facilitating the transfer of know-how into the parishes is quintessential to the success of the overall concept. To a different degree, this transfer is a quality criterion with every module (cf. figure 3). Training local volunteer staff is structured according to target group.

▶ Training for Church eco auditors

It has been documented in experiences both in Baden and throughout Germany (KirUm network) that eco management can only be successfully implemented with continuous support. Volunteer environmental auditors provide support and coaching prior to validation by a professional environmental consultant.

Training to be a volunteer environmental auditor comprises 10 seminar days scheduled on two weekends about four to six weeks apart, to be followed by 4 Saturdays for consolidation each about 3 months apart.

Training concludes with an examination during a one-day final colloquium. Environmental auditors start consulting their parishes as soon as they have completed the 2 weekend seminars.
Training itself does not yield any immediate reduction effects – it does, however, contribute considerably to reduction effects in the parishes, while at the same time significantly reducing consultation fees.

▶ Green Rooster Training

The 2009/2010 training program of the Green Rooster field office comprised 22 training events, covering a wide range of both volunteers and technical topics. About half of the training events were carried out by external specialists, the other half by internal BEE staff. Parish venues were chosen deliberately so as to guarantee a maximum of practical relevance. Wherever possible, local eco teams were included.

Training events to ensure the continuity of operations are essential. They become even more essential, the longer a parish or facility has been eco managed. This is mainly due to the organizational structure which relies mostly on volunteer work. Another benefit of the training events is an exchange and dialog with other parishes.

Overall reduction effects have been hard to quantify. They have been taken into account indirectly in the context of eco management reduction effects (cf. 4.2.2). In other words: without training events, Green Rooster would not be as successful and effective as it currently is. The training program will undergo revision once the Climate Protection Concept commences, the goal being that all pa-

rishes be approached. Special support is to be given to two important positions: caretakers and educators (see below).

▶ Training for energy commissioners

CO_2 reduction by 2015:
0,6% or 250 tons

Unlike eco management, the Back Burner energy check is a one-time energy assessment of the current situation. Typically the measures recommended by Back Burner are only partially implemented. It is essential to take the step towards empowering participants to independently assess their future success. This is a minimum of responsibility given to the so-called „energy commissioner" of a parish. To qualify for this position a 4-5 hour training unit must be completed. The topics covered in this unit include steps towards ensuring that Top Ten measures are implemented, as well as an introduction to simple controlling by means of recording all relevant meter readings on a monthly basis. This is an interface to the more powerful Sparflamme module mentioned above (cf. ch. 4.2.3 & 2.2.4), where energy commissioners have access to an overview of meter readings of the buildings in their parish.

These training events are carried out by BEE and its cooperating energy agencies. BEE coordinates all aspects of planning and execution.

Goal: By 2015, the number of 30 energy commissioners trained so far in 125 Back Burner parishes is to increase by 230 (40% of all Back Burner parishes by 2014).

▶ Determining the CO_2 reduction potential

These manageable improvements, with respect to accountability structure and local know-how, yield another reduction of about 2%.

Overall effect „Energy commissioner training"					
Reduction potential		Reduction by 2015			
% Heating	% Power	Heating (kWh)	Power (kWh)	t CO_2	%
2	2	822.680	124.707	251	0,6%

▶ Verger training programs

CO_2 reduction by 2015:
1,5% or 600 tons

To date, this training seminar is merely an offer of the Green Rooster training program. Caretakers and vergers handle manifold tasks related to technology and facility management within their parishes. Their scope extends from controlling indoor heating and cooling to cleaning to groundskeeping. Local potentials cannot be fully used without increasing awareness levels with this group — this extends

even as far as eco management.
This new seminar aims at communicating essential energy-related cause-and-effect relationships when using buildings. It is to include lessons learned at the municipal level. As part of a pilot program with municipalities, joint training seminars are to be developed (cf. 5.1.6).

Goal: By 2015 some 250 caretakers from non-Green Rooster parishes are to have completed training. Caretakers from Green Rooster parishes also participate. The resulting reduction effects have, however, already been accounted for within the context of eco management.

▶ Determining the CO_2 reduction potential

This training event especially enables those user and administrator groups central to energy consumption to optimize efficiency as local conditions permit. Lessons learned from the municipal sector forecast a 5% reduction potential. This value is used in this context, since only attendants without an increased level of awareness resulting from eco management are eligible to participate.

Overall effect „Verger training programs“					
Reduction potential		Reduction by 2015			
% Heating	% Power	Heating (kWh)	Power (kWh)	t CO_2	%
5	5	1.962.501	297.488	598	1,5%

Educator training programs

CO_2 reduction by 2015:
0,5% or 190 tons

The Evangelical Church of Baden operates some 580 kindergartens and day care centers. Not taking into account facilities, it is this group of buildings that are used the most on a regular daily basis. Experience with eco management has shown that with most of the kindergartens and day care centers there is a significant reduction potential solely by changing usage patterns, e.g. more efficient heating and ventilation. Bringing this about requires that educators be trained accordingly, and this is what the module for this user group is all about.
In this context it should be pointed out that Green Rooster offers additional seminars on environmental education as part of its training program. These seminars focus on creating early awareness with children and are conducted by external cooperation partners. The Bureau of Energy and Environment coordinates all aspects of planning and execution and participates in regular intervals.

Goal: By 2015 some 200 educators from those parishes that are not yet eco managed are to have completed the seminar. While educators from eco managed parishes can participate as well, the resulting reduction effect is already accounted for in the eco management balance.

▶ Determining the CO_2 reduction potential:

Here, reduction effects are similar to those of caretaker training seminars, and so a reduction potential of 5% is presumed here as well. Moreover, and attributable to their continuous use, the average energy consumption of kindergartens and day care centers surpasses those of other church buildings by 50%.

Overall effect „Educator training programs“					
Reduction potential		Reduction by 2015			
% Heating	% Power	Heating (kWh)	Power (kWh)	t CO_2	%
5	5	620.864	94.114	192	0,5%

▶ Fuel economy courses

The total distance covered in cars for business use amounts to 9.5 million kilometers with parishes, and approximately 1.5 million kilometers with facilities. With respect to the Church of Baden‘s total CO_2 emissions, those from car rides amounting to roughly 1700 tons or 4% are relatively small in comparison to those attributable to heating and power.

Overall effect „Fuel economy courses“		
Reduction potential	Reduction by 2015	
%	t CO_2	%
20	30	0,1

4.2.7 Efficiency upgrades and changeover to renewable energy

The Oberkirchenrat (Superior Church Council) Department of Architecture and Environment and the regional building departments in metropolitan parishes oversee any construction work relating to parish and facility buildings. The construction business faces a backlog of deferred maintenance work which, in combination with limited funding, necessitates project prioritization. Funding for extensive renovation is available for approximately 20 buildings per year. Meanwhile, buildings to be newly constructed are also erected during building consolidation processes.

As of 2007 energy audits are mandatory prior to buildings redevelopment. These audits were jointly developed with the Freiburg archdiocese and the Regio-Freiburg Energy Agency to ensure standards of quality. These audits can only be performed by accredited architects and expert engineers that have both agreed to uphold defined standards and to abstain from participating in the realization of the respective project at a later time. This approach avoids any conflicts of interest and comprise the complete documentation of local building conditions and includes the calculation of heating requirements. Independent of redevelopment elements projected by the parish, the audit identifies all measures that improve a building's energy efficiency. With respect to the heating system, a regenerative alternative must be presented. In about 50% of all cases this alternative is implemented.

Goal: By late 2015 at least 100 buildings will be optimized for energy efficiency. 50% of these upgrades result in a changeover to regenerative heating systems.

▶ Determining the CO_2 reduction potential:

Based on the energy audit's detailed variant calculations, heating energy consumption will decrease by 45% on the average (heating system and building shell) while power consumption will decrease by 25%. Moreover, the substitution of fossil fuels by regenerative fuels in every other redevelopment project reduces CO_2 emissions per kWh of heating energy by almost two thirds.

Overall effect „Efficiency upgrades and changeover to renewable energy":

Effekt	Reduction potential		Reduction by 2015			
	% Heating	% Power	Heating (kWh)	Power (kWh)	t CO_2*	%
Energetic efficiency upgrade	45	25	1.862.592	156.857	509	1,2%
Regenerative fuels					175	0,4%
Total			**1.862.592**	**156.857**	**684**	**1,6%**

4.2.8 Parsonage refurbishment program based on energy audits

The Church of Baden requires pastors to establish residence in the housing provided by their respective parish („Residenzpflicht“). Thus, the size and present condition of a parsonage in no small measure contributes to its utility cost. The Church of Baden tries to cope with this problem situation by means of a special initiative, aiming at substantially refurbishing those 200 parsonages with the lowest ranking energy efficiency by 2015. 95% of the cost is financed by the Church of Baden. Parishes must apply to qualify. In order to ensure a maximum of objectivity when selecting participating parishes, standardized criteria and a total of 19 building topologies have been defined in cooperation with the Regio Freiburg Energy Agency.

All refurbishment projects are executed on the basis of respective energy audits.
Goal: By late 2015 at least 100 buildings will be optimized for energy efficiency. 50% of these upgrades result in a changeover to regenerative heating systems.

▶ Determining the CO_2 reduction potential:

Typically, the scope of refurbishment exceeds the upgrade measures described above. Heating energy consumption can be assumed to decrease by 50% on the average (heating system and building shell) while power consumption will again decrease by 25%. Based on FUNDUS data (cf. 3.2) average heating consumption has been calculated to be approximately 47,000 kWh.

Overall effect „Parsonage refurbishment program“					
Reduction potential		Reduction by 2015			
% Heating	% Power	Heating (kWh)	Power (kWh)	t CO_2*	%
50	25	4.700.000	297.488	1.134	2,6%

* CO_2 equivalent to calculate reduction: mean equivalent for gas, mineral oil and district heating according to the Church of Baden‘s utilization mix of 230 g/kWh. 50% of all buildings are expected to have gone to green power by 2011.

4.2.9 Development of a 1 MW solar farm

Many of the measures and modules described in this document apply at the parish and institutional level. Initiating a solar farm, however, must be seen as a Church of Baden „Lighthouse Project“ which invites both church and private investors to participate. In addition to higher ecological efficiency over typical small-scale solar power systems, as for example found on parish roofs (usually < 10 kWpeak), this project deliberately emphasizes public perception.

In this context suitable location is the key prerequisite. As far as the church is concerned, there is significant in-house potential due to ESPS‘s land ownership (cf. 3.1.4). Planning is to be under way in 2011.

Goal: Feed-in by 2015.

▶ Determining the CO_2 reduction potential:

IIn Germany a number of similar parks have been designed and completed in which CO_2 accounting also included upstream manufacturing processes11 which were in the order of approximately 600 tons per year. We forego this approach in favor of including feed-in kWh in the power mix accounting of our parishes and facilities (50% conventional power & 50% hydropower, e.g. via KSE; cf. 4.2.1).

Overall effect „1 MW solar farm“			
	Feed-in by 2015	Emissions avoided	
Nominal power	Power (kWh)	t CO_2	%
1.000 kWpeak	900.000 – 1000.000	470	1,1%

4.3 INDIRECT ENVIRONMENTAL ASPECTS

Due to the focus on environmental protection, priority is given to direct and indirect measures that increase efficiency with CO_2-intensive aspects such as heating, power and mobility. Indirect aspects refer to sectors of indirect or downstream climate relevance. In a broader sense this includes raising awareness with operators and users, procurement (food, office, construction, IT) and services (contractor, catering) as well as natural space management.

In contrast to direct environmental aspects, evaluating the climate footprint is difficult in most cases. Relatively good empirical values do exist for seminars that address direct environmental aspects (cf. 4.2.6). Such values do not exist for other seminar topics (e.g. environmental education, procurement), since here effects are vague and often affected by multiplier effects. Conversely, however, it is exactly these multiplier factors that cannot be overemphasized, their being one of the prerequisites for sustainable climate protection.

Assessing and including indirect environmental aspects is a special challenge for the type of climate protection concept that mainly addresses many local levels. For instance, there is only limited tracking of typical office supplies throughout the Church of Baden, even at the parish level. There are unclassified approaches with individual institutions.

The situation is different with Green Rooster parishes and institutions where EMAS mandates tracking in these categories. In these cases this implies a continuous improvement over the years which must be documented.

The GRÜNER GOCKEL^{plus} [4] (GREEN ROOSTER^{plus}) sustainability management tool, being tested since 2003 in some church facilities throughout Germany, takes this yet a step further. It was realized at the parish level for the first time in 2008 with the Baden Evangelical Church in Markdorf. Sustainability management includes socioeconomic aspects that are frequently coupled with environmentally relevant indirect aspects. These include the analysis of external communication / cooperation with local stakeholders (documentation of stakeholder scenarios) and the ethical / ecological discussion of financial investments. Furthermore, there are connections to global approaches of CSR (Corporate Social Responsibility) and GRI (Global Reporting Initiative).

The Climate Protection Concept therefore addresses indirect aspects as follows:

4.3.1 Improve data acquisition

A first attempt to achieve statewide adjustment of data aquisition procedures is to be made by means of questionnaires. Options for comprehensive monitoring will be examined in a second step.

[4] www.kirum.org

4.3.2 Sustainable consumption

Here, the federal ecumenical procurement program „Buy into the Future“ [5] can be named as one example. It aims at sustainable consumption in parishes and institutions. There are six participating Church of Baden parishes in Mannheim. The goal is to, on the one hand, use key account potential and, on the other hand, to initiate eco sensitive procurement criteria and guidelines.

Goal: Transfer project results to other parishes, as much as possible using the convoy technique for individual districts.

4.3.3 Promote GRÜNER GOCKEL^{plus} sustainability management (GREEN ROSTER^{plus})

GRÜNER GOCKEL^{plus} can be seen as the „premium product“ of management related tools and is an option, especially for those parishes that are already experienced in using Green Rooster eco management.

Goal: 20 parishes are to have initiated sustainability management by 2015

4.3.4 Climate-friendly woodland and farmland management

ESPS has great potential because of its substantial woodland and farmland assets. At the same time it carries special responsibility in terms of climate impact (cf. 3.1.4). Changes it its land use portfolio directly affect the overall CO_2 balance of the Church of Baden. Asset considerations give new importance to the woodland sector. Grassland and farming areas must be assessed in terms of their potential net CO_2 emissions. ESPS includes these areas with their eco management system (Grüner Gockel/EMAS).

As far as real-estate is concerned, the rule is that emissions caused in rentable properties are associated with the tenant. Thus, these emissions are included with the CO_2 budget of the Church of Baden. All the same, ESPS is interested in improving energy efficiency of these buildings in the context of the continuous improvement processes within the framework of eco management. This is an ongoing process. User behavior of tenants can only be influenced to a limited extend. One such approach is the distribution of „How to economize“ brochures.

Within the framework of the Church of Baden Climate Protection Concept these activities must be disregarded with respect to accounting. Independently, and at the very least, the context may be described — as shown here.

A more differentiated view of the situation must be taken regarding the sector of famland and woodland. Farmland is leased out in a similar way as is done with rentable properties. In this connection, mention must be made of the climate relevant potential of farmland management (crop rotation, extensive - intensive, organic farming). Lease contracts have typically been in existence for many years. A changeover to climate-friendly ma-

[5] www.zukunft-einkaufen.de

nagement can only succeed in cooperation with the respective farmer which is a long-term process. Thus, in the same way as with rental properties, potential CO_2 reductions must be disregarded with respect to the Climate Protection Concept.

Woodland is managed by the church, thus changes in this sector can be included with the CO_2 budget of the Church of Baden. There are two reasons, however, why woodland effects have not been included with the CO_2 budget of the Church of Baden:

1. Chapter 3.1.4 describes the CO_2 footprint of the individual ESPS fields of activity. Improving the data basis is prerequisite to reliably determining the climate impact. To that end, ESPS and the Institute for Energy and Environmental Research (IFEU, Heidelberg) jointly completed a scientific study in 2011 which reviewed and scrutinized all sectors and thus also included management of its farmland and woodland. However, there continues to be a great demand for research, especially as far as farmland is concerned.

2. Past estimates (Ch. 3.1.4) for woodland net CO_2 absorption are in the order of 28,000 tons. In purely arithmetical terms, this would already compensate for more than 50% of the total emission of the Church of Baden. This line of argument is reminiscent of the conflicting negotiation parties when drafting the 1997 Kyoto Protocol, which for the first time calculated national greenhouse gas inventories, not only including real emissions from fossil fuels, which are relatively simple to compute, but also including absorption due to land use. Including these so called „sinks“ has paralyzed the effectiveness of climate policy to this day, since the wide variety of land uses only allows predictions with a high degree of fluctuation, while realistic and small-scale monitoring is not feasible due to monetary considerations. Applied to the climate policy of the Church of Baden, there is a very real danger that necessary efforts are thus thwarted. Thus, even for political reasons, it does not make sense to include sinks when calculating the CO_2 impact. Nonetheless it is quite true that a sense of awareness for the value of this sink must be promoted.
In order to do justice to both aspects, a sound scientific compilation of size and type of areas cultivated is indispensable, in order to make a serious assessment of the range of potential woodland management effects.
Until 2015 the minimum requirement must be to preserve, and not divest of, woodland areas. In doing so the boundary conditions of the Church of Baden CO_2 footprint remain as they are. The prerequisite for reaching the reduction goals is exclusively emission based (i.e. energy efficiency and substitution of fossil fuels).

Goals:

- Scientific assessment of the land use portfolio with respect to climate impact.
- Audit of the monetary value of the woodland acting as a CO_2 sink.
- Incentives for more extensive use of farmland (by means of lease agreements).

4.3.5 Development of ecological building standards

As with building refurbishment in the municipal sector, there is only occasional usage of ecologically safe materials and then only for very few materials. This is quite the opposite of the scientific disciplines where respective standards have already been established and are being tried out. Based on these standards, ecological construction standards for the Church of Baden are to be developed and integrated into the planning and approval processes.

Collectively, these standards will significantly contribute to reducing environmental impact in the procurement sector. These standards do not typically fall within the purview of classical climate impact (improving energy efficiency is an a priori prerequisite for refurbishment programs, cf. 4.2.7). Instead they fall within the purview of reducing direct environmental risks and the precautionary principle in the context of health hazards.

Goal:
Development of ecological construction standards and integration into construction standards by 2015.

4.4 REDUCTION FORECASTS: ACCURACY AND MARGIN OF ERROR

Various reduction potentials described earlier in this document must be evaluated in the context of baseline quality (cf. chapter 3.1) and realistic effect assessment for each measure. Table 5 below gives an overview of assumed error margins.

It should be noted that variance may occur in both directions. This may cause cumulative reduction to either exceed or fall below. From our point of view, falling short is rather unlikely, however, since all reduction effects are based on conservative assumptions.

Table 5: Margin of error of baseline and measures. Error margins refer to the respective emission value (Ch. 4.1) and reduction potential (Ch. 4.2).

	Error margin	Comment
Baseline	± 5%	There are data gaps for annual consumption with some facilities and some years between 2003 and 2007. The data basis is still satisfactory enough to calculate average values for these years. Mobility does not account for the distance traveled using Stadtmobil Karlsruhe car sharing vehicles, which have been available to EOK members since 2008 as an alternative to using either a business or private car. According to the department in charge, a reasonable figure to be used in this context is 50% of the total distance covered in business cars. This is the value that was used. Even assuming a 200% error rate, these two gaps entail a very small error margin, since the gaps are very small in comparison to the parishes' overall energy consumption.
Migration to green power	± 5%	Given the direct possibility to correlate energy consumption with the correct CO_2 equivalent, the margin of error is insignificant. This still leaves the question as to which equivalent for KSE hydropower is to be used. This was already made transparent in chapter 4.2.1.
Green Rooster Eco Management	± 10%	Due to numerous activities in this sector there is a significant variance of reduction potential between the respective sites. Conversely, it is here that the most reliable trend data is available. As further reinsurance, only those effects exclusively relating to the first three years have been used for accounting purposes with new Green Rooster parishes and facilities.
Back Burner	± 10%	

Heating setting	± 15%	
Training	± 20%	Effectivity here largely depends on how the knowledge given in training is applied in real life. A large measure of variance is natural in this case.
Building re-furbishment & regenerati-ve power	± 20%	The effects, calculated in expert assessments based on standardized caloric requirement computations, assume precise planning and implementation, as well as optimal usage. The latter can be influenced by training and usage monitoring.
1 MW solar farm	± 10%	Exclusively dependent on the amount of sunshine.

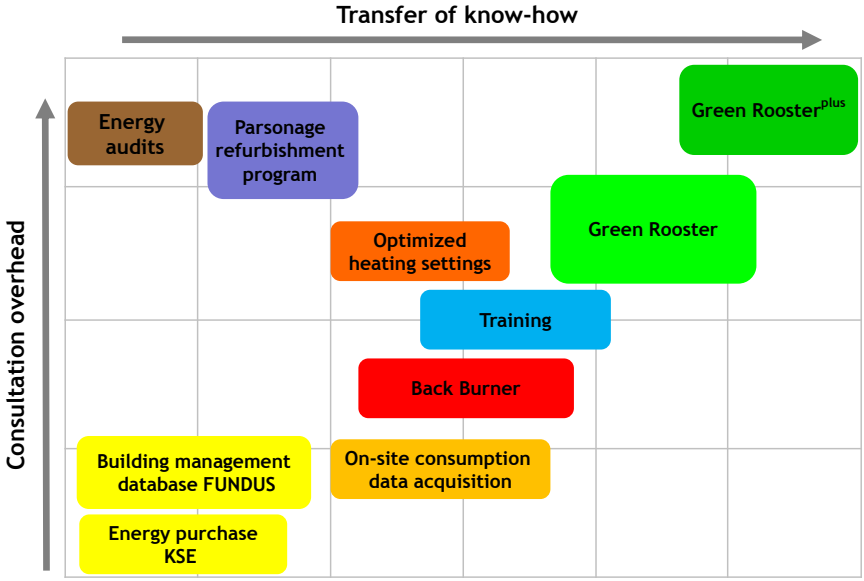

Figure 3: Synopsis of the most important Climate Protection Concept modules, clustered according to consultation overhead and transfer of know-how. The „Solar farm“ module, as an independent project, has not been included.

4.5 PUBLIC RELATIONS

The Climate Protection Concept is a big step towards a „from project to principle“ approach. Integrity of Creation is recognized as a core task by the governing bodies of the Church in Baden and promoted as such at many levels. Rather than being a sensible extra, it has become part of the „core business“. This also entails changes in public relations which will now have two main functions: a) to promote and publicize the overall concept within the Church and within society at large and b) to supply adequate information and marketing tools for each individual module. Both of these aspects will continually be in focus during the implementation of the Climate Protection Concept. Mission support must be provided by Church of Baden‘s Center of Communication (Zentrums für Kommunikation, ZfK) as well as by professional third-party art editors and PR agencies. The Church has experience and good cooperative arrangements in both of theses areas.

In early 2011 the Climate Protection Concept will be publicly launched in a large-scale climate protection campaign.

5. RESOURCES AND TIMELINE

5.1 PLAYERS INVOLVED

5.1.1 Parishes and facilities

It is the some 720 parishes that carry 90% of the reduction „load“. They are the main players of the Climate Protection Concept. While the Church of Baden facilities „merely“ contribute the remaining 10%, this figure is still significant, especially when considering their small number. They moreover function as role models at the parish level, most notably the Oberkirchenrat (Superior Church Council) as central administration in Karlsruhe with some 300 full-time staff.

All Climate Protection Concept modules have been developed and tailored with these players in mind.

5.1.2 Administrational and service offices (ASO)

These players handle all major business aspects on behalf of the individual parishes, whose budgets they audit as well. As such these ASOs are important catalysts to efficiently implement the Climate Protection Concept. Their legal status is the one of special purpose association. The efficient implementation of the Climate Protection Concept requires both optimal information flow from BEE to these offices and the best of cooperation and communication between the offices and the parishes. In the future AOS‘s accounting software will automatically export invoices for fuel, power and water procurement to FUNDUS.

Moreover, there will be increased understanding about motivation at the parish level if Back Burner and / or Green Rooster/EMAS are implemented in the ASOs. Here, ASO Rhein-Necker, certified since 2010, has taken the lead.

5.1.3 Bureau of Energy and Environment (BEE)

Together with „Gemeindefinanzen“ (Parish finances) and the Church of Baden real-estate department, BEE is part of the Department of Architecture and Environment‘s section 8. BEE will be in charge of the Climate Protection Concept and is described in more detail in Chapter 5.2.

5.1.4 Freiburg Archdiocese Office for Energy and Environment (FEU)

The „Back Burner“ and „Energy Audit“ advisory modules have been developed in cooperation with the Office for Energy and Environment since 2006. The inclusion of the regional energy agencies under the auspices of the Regio Freiburg Energy Agency is at the core of both modules .

There has been intensive cooperation between the Department of Architecture and Environment, BEE and FEU in order to a) take advantage of constructional lessons learned, b) cut costs by jointly developing projects and c) avoid redundancies.

5.1.5 Third party consultants and service providers

The pool of accredited energy consultants is drawn from energy agencies based in Baden. In addition, there are contracts for work labour with the Regio Freiburg

Energy Agency to conduct energy commissioner seminars and to provide expert support to consultants.
In the meantime, agency integration has reached the status of an expert network. Under the direction of the Department of Architecture and Environment / BEE and FEU a group of some 60 accredited energy consultants and energy auditors meet for annual conferences. The expert input and exchange of ideas then to be implemented by the Regio-Freiburg Energy Agency has proven to offer real added value.

5.1.6 External cooperation

There is external cooperation in manifold ways. FEU and energy agencies have already been mentioned.
Within the Church, the ökumenisches Netzwerk für Kirchliches Umweltmanagement (Ecumenical Network of Church Environmental Management, KirUm) considerably contributes to the exchange of information. There are many intensive cooperation efforts with various regional churches and diceses all of which striving for the same goal: to bundle ideas for more environmental protection within the church and to provide, wherever possible, necessary resources at reduced cost (e.g. handbooks, evaluation software, data acquisition tools etc.).
There are local diocese stimuli which are to be intensified in the future since social welfare work is likely to show an environmental balance that is similar to the one of the Church of Baden with its associated parishes. Thus there is a high reduction potential.
A further level within the Church is cooperation with the „Bread for the World“ campaign with a focus on campaign related projects. Among these are events in connection with the survey „Zukunftsfähiges Deutschland in einer globalisierten Welt“ (Sustainable Germany in a Globalised World) published in 2008.
There are plans and first drafts for non-church related cooperation projects with the cities of Mannheim, Heidelberg and Karlsruhe. Here the objective is to transfer know-how in how to promote climate protection from BEE to volunteer structures, such as clubs and small-sized businesses. In return it is the cities that are well equipped for conducting joint training for caretakers and educators. The overall effect is that a cooperation between the Church and local authorities offers considerable potential to support multipliers.
The foundation of KSE (cf. Ch. 4.2.1), an energy supplier that is not profit-oriented, has created a player that comes with opportunities to promote energy efficient combustion plants especially at the level of Church institutions (and here especially diaconal and Caritas institutions such as retirement homes, hospitals, sheltered employment companies etc.). Starting in 2011 implementation models will be tested that combine appropriate standardized installations (e.g. total energy units, PV power) with long-term Church bank financing models. Here KSE operates as a catalyst devoid of brokerage fees.

5.2 BUREAU OF ENERGY AND ENVIRONMENT: COORDINATION ROLE AND STAFF REQUIREMENTS

The Climate Protection Concept establishes a new basis for Bureau of Energy and Environment activities (2004-2009). All threads to implement the Climate Protection Concept converge with the Bureau of Energy and Environment.

Even as early as 2007, its broader range of tasks (Back Burner, Heater settings, KSE, etc.) could not be implemented in full due to its extremely limited staff resources (management 100%, assistance 10%). Intensifying modules already in place and developing new modules as described above push personnel needs to 360% if BEE task requirements are to be optimally met. Meeting these personnel needs was made possible by the commitment of both ESPS and the Department of Architecture and Environment, as well as by support from the federal government's Climate Protection Initiative:

i) Permanent post BEE management (100%): ESPS releases one architect post to the Department of Architecture and Environment which is converted and renamed „BEE Management". In return, the architects of the Department of Architecture and Environment will support the 85 churches and 44 parsonages in matters of construction (cf. 3.1.4).

ii) Fixed-term contracts granted by the federal government (2011 to 2013) for Ms. Erdmann (100%) and Ms. Klingberg-Adler (50%).

iii) ESPS intensifies its commitment to protect the climate and the environment by incorporating its considerable real-estate and land ownership into an integrated approach to environmental management. Due to the fact there is considerable overlap with the objectives of the Climate Protection Concept ESPS is funding a permanent BEE full-time position (Herr Schweikhardt) thus enabling and ensuring the continuation of the project in the first place.

Other than the staffing needs, there are additional funds that are necessary as outlined in chapter 5.3 below. At its autumn conference on October 21, 2010 the Baden Synod approved these physical resources required for phase one of the concept until 2014.

5.3 IMPLEMENTATION COST AND SAVINGS 2011 - 2015

The total implementation cost for phase one of all concept measures and modules amounts to €46.5 million. There are €40 million in business-as-usual costs to finance ongoing facility maintenance as well as the parsonage refurbishment program. Solar park funding is third-party. There is additional cost of €1.5 million to implement the modules of action domain II. Personnel and PR costs come to 2% of the total cost and are thus the smallest share. The „soft" modules of action domain II require 3.4% and the changeover to green power (action domain I) a mere 0.4%. 94.1% of the cost is due to the implementation of „hard measures" associated with buildings and the solar farm (action domain III; cf. Figure 5). Calculated cost of structural upgrades and refurbishment drastically exceeds all other measures when based on cost per ton of CO_2 reduction. These measures, however, are a crucial backbone of structural energy fitness.

Energy costs will decrease due to the reduced consumption of fuel and power. By 2016 savings in the amount of €1.8 million can be assumed.

Costs and savings of the same magnitude can be expected during phase two by 2020.

ECOLOGICAL GUIDELINES OF THE EVANGELICAL CHURCH OF BADEN

PREAMBLE

Believing in the love of the Creator God, we give thanks for the gift of creation and the great value and beauty of nature. Together we want to help create sustainable living conditions for the whole of creation. (from: Charta Oecumenica April 22, 2001)

1 **We see the responsibility to safeguard the creation as one of the church's core tasks**
We believe that we owe this earth and our lives to God's workings. We embrace the mandate for Creation to cultivate and safeguard Earth in its entirety. This is why we regard the protection of nature and the environment as an important task which affects all actions undertaken by the Church.

2 **We respect the right to life of human beings in other regions of the world**
Within the Evangelical Church of Baden we seek to use this world's resources such that our standard of living does not bring about the destruction of the environment, injustice and poverty in other regions of the One World.

3 **We respect the right to life of future generations**
Our business management takes into consideration the limited natural capacity of ecosystems to recover and the limited availability of energy reserves. We seek to find decisions whose outcome leave room to live for future generations.

4 **We respect the right to life of our fellow creatures**
In our economic activities we strive to protect the diversity, uniqueness and beauty of flora and fauna in their various habitats and nurture them in our land holdings.

5 **Our economic activities are sustainable, environmentally compatible and socially acceptable**
With all our projects we look for solutions that have minimum impact on the environment and that promote sustainable development. Special emphasis is given to the sparing use of raw materials and energy. We avoid and continually reduce negative effects and threats to the environment. Exceeding existing legal requirements, we seek to use the best available technology under economical considerations. We prefer environmentally sound products, procedures and services as well as fair trade products. We take ecological goals into consideration when selecting business partners.

6 **We operate as a mutually supportive community intent on learning**
We seek to achieve high environmental and quality standards by active staff participation. Basic and advanced training courses promote personal expertise. Thus we strive to achieve an organizational culture which largely builds on environmental and quality awareness as well as on the ability to think for oneself and the motivation of every individual involved.

7 **We promote environmental management within the church**
In order to implement our principles we introduce an eco management system which establishes an ongoing process of becoming aware of and optimizing our environmental impact. We periodically monitor and assess our efforts and environmental impact, define plans of action and assign responsibility. We document and review our results while aiming for steady improvement. These are the elements of our environmental management. We consider this system to be the basis on our way to develop sustainable management which takes into account social factors and the One World. Consistent with the results of our eco management we also seek to engage society in a dialog.

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