KFW DEG

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Evaluation of selected DEG Energy Sector Projects in Asia

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Summary report

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Content

Executive Summary

DEG has initiated a study to evaluate five energy projects in Asia, analyzing the projects' quantitative and qualitative sustainability as well as aiming to obtain general lessons learnt for DEG's energy sector. The original study was authored by Professor Wilhelm Löwenstein during 2011/2012; the present abridged version was compiled by DEG.

The sample includes five energy sector projects from countries in Asia that adequately reflect DEG's portfolio of energy investments in the region. It covers two thermal plants (a diesel-fired plant in Sri Lanka and a gas-processing plant in Pakistan), a wind farm (in PR China) and two hydropower projects (one each in PR China and India). The installed capacity ranges from very small (wind park: 16.35 MW) to medium-sized (gas-fired plant with 220 MW).

In all sample countries provision of electricity is a major bottleneck for development, with more or less frequent occurrences of power cuts and load shedding (i.e. rationing through systematic power cuts for certain electricity consumers). While there are large differences in the energy mix of the case study countries, the regulatory approaches of the electricity sector among the countries are quite similar, relying on strict government regulation and large, state-owned enterprises (SOEs). Independent private providers are mainly active in niches, e.g. in small scale thermal or hydropower projects or in power generation from other renewables, and all are integrated through fixed Power Purchasing Agreements (PPAs).

In a first step, the study aimed to validate the DEG's corporate policy project rating (GPR), a tool that evaluates the project effects from an investor's perspective. The GPR is based on a multi-stage, multi-criteria analysis which assesses four major dimensions/yardsticks of project performance and creates an overall weighted score (GPR-index). The dimensions cover a project's long-term sustainability in economic terms, profitability for DEG as an investor, developmental impacts and additionality of DEG-financing. The process of filling the GPR is software-based and fully automated, so the analyst is only requested to answer sets of yardstick-related questions, while the process of scoring the answers and calculating a weighted composite score is automatically done by the software.

As part of the evaluation, the consultant filled out a GPR for each of the projects and compared the results with the GPRs that were filled out by DEG. All five projects are performing well in both the internal as well as external GPRs. In four out of five projects the external GPR yielded even better values than the internal assessment as the internal assessment often did not take sufficiently into account positive effects from the project companies' Corporate Social Responsibility (CSR) measures, the role of DEG as well as in some cases the potential to contribute to saving CO_2 emissions.

In a second step, the study analyzed to what extent the OECD's Development Assistance Committee (DAC) evaluation criteria apply to the five selected projects. All projects were found to be highly relevant (in terms of improving domestic energy provision) and efficient in their developmental and environmental effects. In some cases the impact was more important in quantitative terms (especially in small countries); in others the impact was qualitative in introducing new or advanced technologies. As a major downside, the long-term sustainability of projects suffers from the macroeconomic environment, i.e. the highly subsidized energy prices in all countries. In the long run, if these cannot be maintained by the respective governments, this may have a significant impact on the project companies.

In a final step, the study analyzed the effects of the Sri Lanka project from the perspective of the local population by implementing a Cost-Benefit-Analysis (CBA). In this case, the project compa-

ny supported neighborhoods around the power plant in the development of a piped water grid. Residents could connect their houses to the new water grid (at a limited charge), which constitutes a big improvement compared with previous water supply from wells/rivers. The detailed CBA revealed that income from agriculture and other productive activities (day labor, small scale craft, trade etc.) both were positively affected by the CSR-activities, the former by enabling the farmer households to irrigate their small home gardens, the latter by saving labor time as there was no need for the beneficiaries anymore to fetch water from far away.

Overall, the evaluation illustrated how to deal with the important trade-off between economic development and climate protection. DEG and other DFIs offer instruments to provide financing for power plants that are more climate-friendly or at least more efficient and balanced in their negative effects.

DEG should continue to mobilize private investment for equally efficient power generation in more sustainable and climate-friendly ways and in parallel encourage companies to invest into CSR measures. Such a strategy may include the development of a CSR toolbox based on good-practice examples from DEG's energy portfolio.

In addition, the GPR has been confirmed to be a very advanced and appropriate tool for project evaluation, especially from the investor's perspective. In view of the increasing trend towards thorough ex-post evaluations covering particularly the beneficiaries' situation, DEG could assume a leading role in the DFI sector in developing and strengthening additional evaluations that consider these factors.

I. Introduction

DEG has commissioned a study to assess its internal ratings of the performance of five energy projects in Asia by external evaluations. The objective is to investigate the projects' quantitative and qualitative sustainability and long-term impacts according to DEG's internal GPR ratings as well as the international DAC criteria. This also contributes to a better understanding of energy sector projects to inform DEG's future selection, steering and rating of energy projects. The evaluation was carried out by an external consultant who visited all project companies (at their head offices as well as on-site) for several days, talking to executives as well as other staff. In addition, the study was accompanied by a detailed cost-benefit-analysis at one of the sites to assess the development contribution of the companies' CSR activities in the neighborhood. This study was carried out based on a survey with random sampling of the relevant household, with subsequent quantitative (econometric) assessment of the effects.

DEG as a development finance institution invests into projects across almost all economic sectors, alone or in syndication with other investors. In all projects, DEG assesses project performance along four basic criteria ("yardsticks"):

- Yardstick 1: Profitability – long-term sustainability and success potential for the project company
- Yardstick 2: Development Effectiveness – e.g. job creation, social and environmental effects, tax revenues for the state
- Yardstick 3: DEG's Role / Subsidiarity – unique and relevant role for DEG as investor
- Yardstick 4: DEG's internal return (RoI) – profitability of investment

In addition, contributions to the Millennium Development Goals (MDG) are assessed. Investment managers complete questionnaires on the above topics, usually based on desk-research and their knowledge of the project company and sometimes also based on field visits. Index points are allocated to each answer (e.g. economic performance, rates of return, the number of jobs created, the amount of tax revenues generated, contribution to physical infrastructure or health services etc.). Then the ratings are aggregated and projects are categorized into an EPOL-group (for developmental effects), a GPR-group (comprising all four yardsticks) and the MDG-contribution is recorded.

Within this framework, energy sector projects stand out in multiple ways, because of their special characteristics. For example, they often entail large-scale infrastructure investments and manifold economic activity, but they often enjoy tax exemptions for several years. Energy projects generate many direct jobs during the construction phase, only few afterwards. Nevertheless, infrastructure – and especially energy sector – projects are of great importance for the development of a given economy. The reliable provision with electricity is essential for steady economic development because frequent power cuts or load shedding not only reduce private welfare of citizens, they are also detrimental to economic activity. Uncertainty about power availability greatly reduces economic outputs, while mitigating measures (such as private generators) increase production costs. In Pakistan, for example, economic growth has picked up, but at the same time, insufficient reforms and worsening security conditions have hindered investments. Hence, even in major cities unannounced load shedding for 20 hours or more and water supply cuts have occurred, entailing riots and public unrest. In the growing economies in Asia, the electricity sector faces the challenge of continuously expanding the generation capacities to meet the growing demand for electricity by industry and private households. Continuous capacity expansions require large amounts of financing, and especially construction of large power plants involves investment amounts that single private firms are unable or unwilling to finance because of the associated risks. Hence, state actors often dominate energy sectors, as in all of the selected country case studies.

While this demonstrates the importance of energy projects, investors are caught between two somewhat conflicting goals: in order to achieve economic growth and lift people out of poverty, electricity is necessary. However, cheap and easy to handle technologies are often linked with high CO_2-emissions and environmental (or social) damages, which makes the expansion of electricity provision difficult or costly. National and international news just reported that between 2009 and 2010 the global CO_2 emissions have grown with unprecedented rates. This growth is primarily due to the dynamic economic development in newly industrializing countries in Asia which illustrates the strong linkages of power production, greenhouse gas emissions and economic development. However, projects that serve to reduce CO_2-emissions can engage in so-called "Verified" or "Voluntary Emissions Reduction" (VER) schemes that make the reductions tradable. Contributions are calculated based on standardized and certified mechanisms, and can then be sold by the generating party (e.g. the energy projects) to entities wishing to compensate for their pollutions. Contributions to such plans have been noted in this study, where applicable.

This underlines the special role that Development Finance Institutions such as DEG may assume: finance projects that help to reduce energy bottlenecks, while introducing sophisticated and climate-friendly technologies and mitigating side-effects for the population (e.g. resettlement, pollution etc.).

This paper is structured into 5 sections: Section II presents the five different projects within their domestic context and compares their evaluation according to DEG's GPR rating, as seen by DEG and the external consultant. Section III measures these results against the international DAC criteria. Section IV describes in more detail the CSR activities of one of the project companies and discusses costs and benefits to the local population by implementing a Cost-Benefit-Analysis. Lessons learned are provided in Section V.

II. Energy Projects and GPR Ratings

1. China I: Qingdao Huawei Windpower Plant

1.1 Project Description and Market Environment

The business activities of Qingdao Huawei Windpower Co. Ltd. (QHW), founded in 2000, comprise the construction and operation of a wind park in Qingdao, Shandong province,[1] at the seawind exposed East coast of the PR China. The wind farm consists of 15 turbines with a total capacity of 16.35 MW that were erected on three spots of land in an intensively used agricultural region, a two-hour drive away from Qingdao, between 2001 and 2003. DEG is on involved with a 10-year loan (gross investment: 3.45m €) provided in 2002.

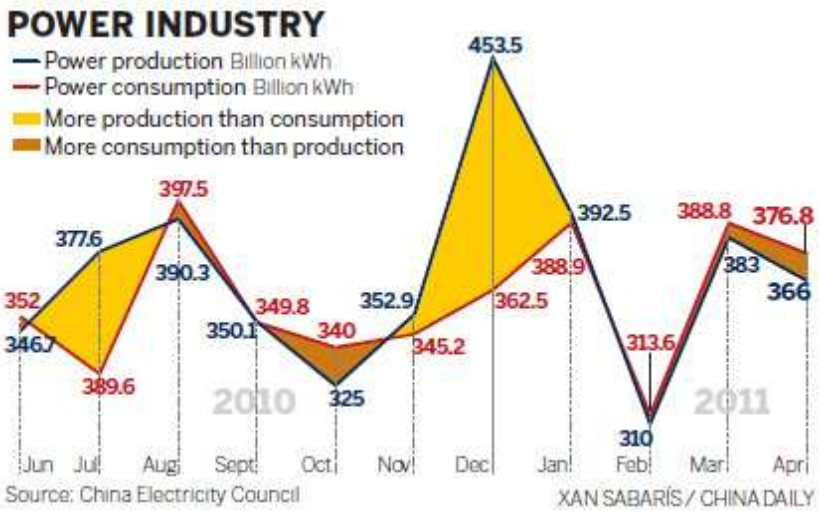
The wind farm started production in late 2003, but energy production was not the main aim of the project. Rather, the sponsors and the hosting provincial government expected the project to demonstrate that wind power harvesting is an economically viable option for China. The German sponsor Nordex SE, a manufacturer of wind turbines with more than 4,600 installed turbines since 1985, also hoped for a showcase to promote their exports, while the local government wanted to get involved in a new technology.

Indeed, the number of wind power plants in the Shandong province has increased from one (the above project) in 2003 to a total of 32 wind parks at present. It should be noted, though, that most of these were built with local – not imported – technologies.

[1] According to PR China's National Statistics Bureau Shandong is one of the wealthy provinces with a GDPPC of 6078 US$ which is 137% of the realized average in mainland China in 2010 and 60% of Shanghai's GDPPC which is the highest in the country. Shandong's realized average wealth places the province on rank 9 of all provincial divisions.

Economic and social development of the PR China is largely based on maintaining a fast pace of per-capita-income growth. Two-digit growth rates of GDP p.a. have been realized in the past decades, and even after the decline of global economic activity in the aftermath of the 2008 financial crisis the country's net production is growing with a rate of around 8% p.a. This fast growth is fuelled by an even faster expansion of electricity production which has been rising with a yearly average rate of 11.5% since 2005.[2]

Fig. 1: Excess demand and supply in China



Despite this impressive growth, there are frequent periods with gaps between power supply and demand, as Figure 1 above illustrates. Especially in the provinces, power cuts and load shedding in 2010[3] have led to output losses and threaten especially the country's SME-sector.

PR China's electricity production is historically coal-based (contributing almost 80% of power production) as the country disposes of considerable coal deposits. Despite considerable growth of installed capacities, other sources, like natural gas, nuclear power, oil and renewables still play a negligible role. In addition, most production is in the hands of state-owned enterprises (SOEs)[4] so that the sector is highly concentrated and state rather than market-driven. Private power producers are mainly active in niches, as e.g. in small scale hydropower projects or in power generation from renewables.

The historical dependence on coal as main input for the drastically increasing power production in the PR China changed the country's role on the international energy markets from an important net-exporter of coal into a net-importer. With rising coal prices (and related power producers' losses) PR China's government has ordered to freeze 2011 prices and raised electricity prices for industrial, commercial and agricultural users in 15 provinces and municipalities by 16.7 RMB per 1,000 kWh while keeping power prices for residential users constant.[5]

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2 World Development Indicators online (WDI).

3 See Lan Lan, Du Juan and Chen Jia: "Industry faces rising power cost". In: China Daily, 31.05.2011.

4 The five largest SOEs each directly contribute around 10% to PR China's energy production. On top of that and through their listed subsidiaries they indirectly contribute 5% each in addition so that 75% of the country's electrical power is generated by a network of 5 SOEs.

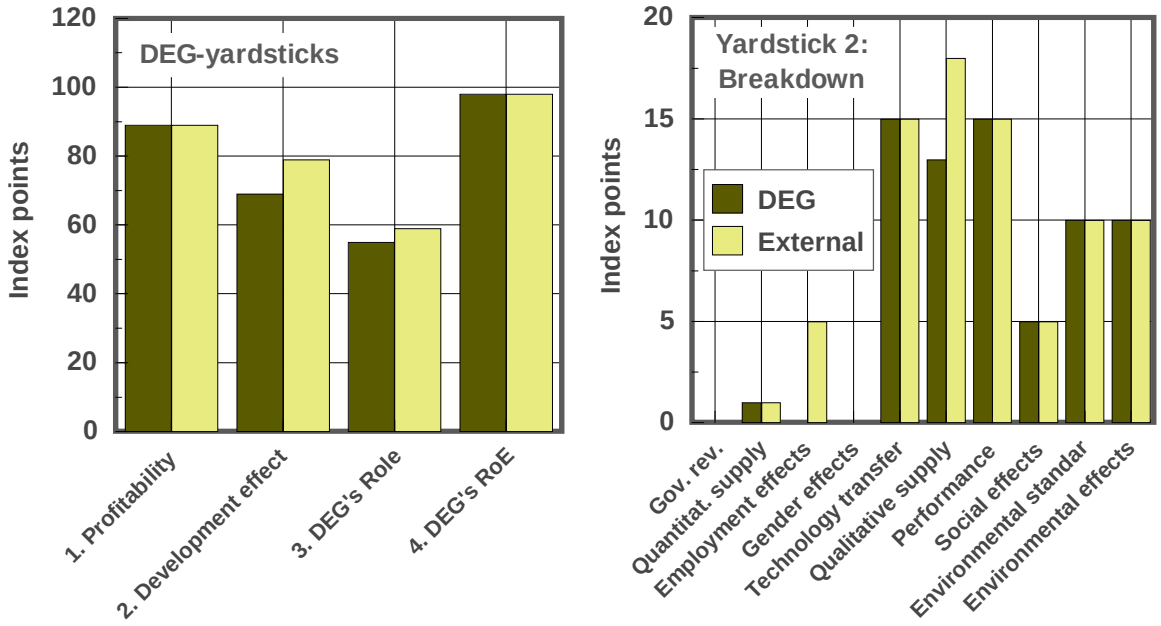
5 See By Hu Yang: "China freezes 2011 thermal coal prices". In Chinadaily.com.cn, 10.12.2010, and Xinhua: "Hydropower increase won't end electricity shortage", 26.06.2011.

1.2 Project Evaluation

Regarding the project's assessment, Figure 2 shows that the external GPR is slightly better than the internal GPR. Minor differences exist in the judgments and evaluations pertaining to developmental effects and DEG's role in the project.

Fig. 2: External validation of the Qingdao Huawei Windpower Plant GPR

Project summary	DEG-GPR	External GPR
GPR-group	1	1
EPOL-group	3	3
MDGs (count)	1	2



Particularly, interviews revealed that the wind park does pay a number of taxes (e.g. river maintenance, business and property tax) totaling 1,252,715 RMB in 2011 (about 139,190 € p.a.). All these payments are recorded by the company as part of 'other operating expenses' and were not recorded in DEG's initial internal rating.

In addition, the internal rating ignored the fact that energy provision contributes to economic growth and hence to poverty reduction as in MDG1. On the other hand, the project was assumed to improve the electricity coverage of previously unsupplied areas, which could not be ascertained, because all production was fed into the national power grid. In addition, the wind farm was not erected on unused land, but rather in areas already intensively cultivated, which – as a downside – entailed proximity to villages. Finally, DEG underestimated its own role as a lender of risk capital, where other funding would have been difficult to obtain. Taken together, this improved the overall GPR rating by 14 index points, but left the classification of GPR- and EPOL-groups unchanged.

National effects: Due to a misplacement of some of the turbines, an overly optimistic wind study, and power losses in the transition to the grid, the wind park never produced the projected annual output of 30.5 GWh. Expected output was gradually reduced to 22.08 GWh p.a. In 2010/11 the wind farm produced 22.24 GWh and sold it in accordance to the PPA at a price of 0.76 RMB per kWh. Comparing that unit price with the electricity tariff that different customer groups are paying

in the country – between 0.3060 RMB/kWh and 0.7625 RMB/kWh[6] – the prices are probably subsidized. One rationale may have been the showcase character of the wind farm, and other wind parks in the Shandong region are also benefiting from subsidized prices. Despite the subsidized price, QHW is unable to make profits (covering fixed costs only) at present as the wind park's actual capacity amounts to only 72% of the initially calculated capacity, but producer surplus is expected to increase upon repayment of DEG's loan. The market distortions (subsidies etc.) make a more detailed evaluation of supply and demand impossible.

Local impacts: As the generated power is directly fed into the national grid, interactions with local neighborhoods mostly arise from the use of land by QHW for the wind farm and the transmission line. The wind farm occupies a total of 6,600 sqm for the service station and the turbines and has paid a lump sum of 500,000 RMB for its use over a 50-years period to the local government. In addition, local government gets an annual fee of 100,000 RMB for an access road to the service station and to some of the turbines. From the total, an unknown percentage may trickle down to the locals. Conflicts from the turbines' noise or shadow production are not reported and could not be felt during the field visit.

Other types of conflicts do arise occasionally, when local villagers claim compensations for the use of land and tree logging along the transmission lines. Villagers emphasize such claims by road blocks two to three times a year. In these cases, the local manager, Mr. Yang invites the village chiefs to discuss how to stop the road blocks and negotiate about the level of compensation. All the payments and compensations, add up to a total of 200,000 to 300,000 RMB p.a.[7] This sum can be interpreted as the monetary value of QHW's CSR activities from the perspective of QHW, because the firm is contributing to the local population on a voluntary basis to pacify relations.

Global effects: In terms of climate-friendliness, the wind farm is active in the production of verified emission reductions (VER) and produced CO_2-emission reductions of 21,094 t CO_2 equivalents in 2010 (UPM - Environment Project Financing and Management, Beijing). With the assistance of DEG, QHW entered into two subsequent agreements with Firstclimate, the latest valid until 2012, to generate additional revenues.

2. China II: Yunnan Whitewaters Hydropower Plants

2.1 Project Description and Market Environment

The Yunnan Whitewaters Hydropower Plants has built, owns and operates three hydro power stations on the Bai-Shui-Jiang (White Waters) River, with a total installed capacity of 78 MW. The three cascades are located in Yiliang and Yanjing County, Yunnan province, in PR China's southwest bordering to the Sichuan province in the East, to Vietnam, Laos and Myanmar in the South. Yunnan is the second poorest province of PR China. It realized a GDP per capita of 2,320 US$ in 2010, which is roughly half of the country's average and a quarter of Shanghai's per capita income.[8] Despite the fact that the province is one of PR China's food baskets it is still rather disconnected from the rest of the country due to topographical reasons.

The construction works of the project started in March 2004 and the cascades became operational between December 2007 and November 2009. DEG is involved in the project with a loan of 10.1m € since 2006. Sponsor of the project is Kunming Sanchuan Energy Development Co. Ltd., which in turn is owned by Zhongda Sanchuan Hydropower Develoment Company Ltd., Zhejiang Jingchuan Trade Co. Ltd. and by IFC, ADB, Global Environmental Fund, China Hydro Company Ltd., China Clean Energy.

[6] http://www.ebeijing.gov.cn/feature_2/GuideToHeatingElectricityWaterAndGas/PriceGuide/t1107813.htm
[7] As reported by the local QHW manager, Mr. Yang.
[8] In terms of GDPPC Yunnan holds rank 30 out of 31 provincial divisions in PR China. See National Bureau of Statistics.

The Yanjin County government is another stakeholder of the sponsor. The county was granted its ownership stake through transferring ownership of 18.5 MW of small hydropower stations to the Project Company which illustrates the importance for private companies in the energy sector of getting the public sector on board. With a total installed capacity of 220 MW in three provinces, the sponsor is one of the largest private or semi-private providers in the hydropower sector of the PR China. Nevertheless it cannot compete with the SOEs in the sector and therefore concentrates on the niche of hydropower plants with a capacity below 50 MW.

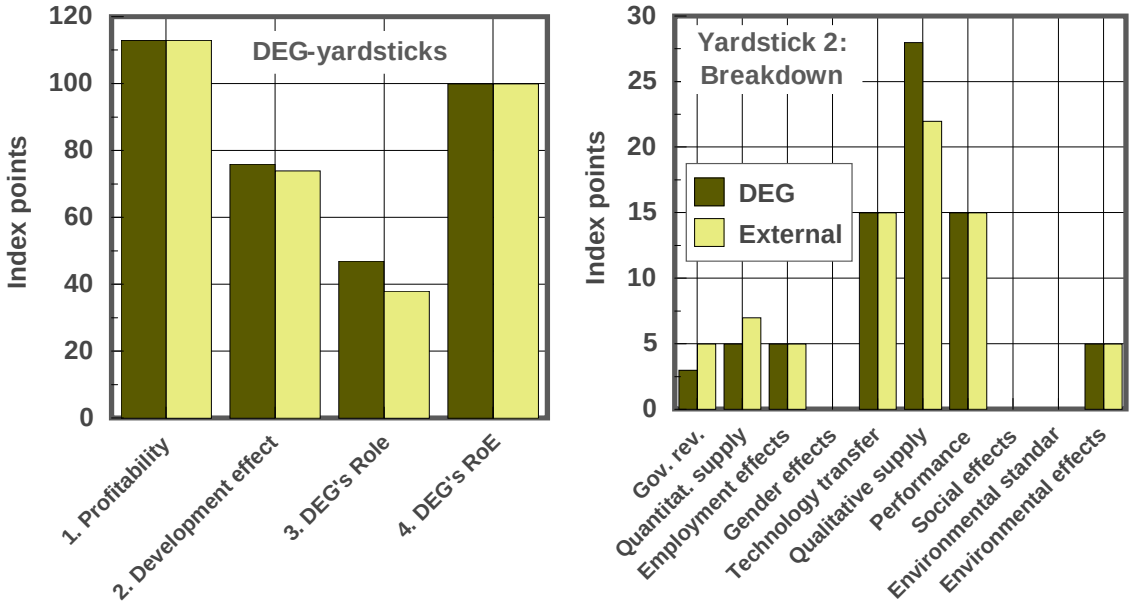
The market environment in China is, as described in detail for the previous project, characterized by state regulation and involvement, and frequent gaps between supply and demand, especially in the more remote provinces.

2.2 Project Evaluation

As illustrated in Figure 3, the rating is a bit lower in the external GPR compared to DEGs GPR. This was the only project where the external rating was below the internal one. The changes arise from minor differences in the judgments and evaluations pertaining to developmental effects and DEG's role in the project. Even though the GPR rating decreased slightly, the GPR- and EPOL-groups remained unchanged.

Fig. 3: External validation of the Yunnan Whitewaters Hydropower Plants GPR

Project summary	DEG-GPR	External GPR
GPR-group	1	1
EPOL-group	3	3
MDGs (count)	2	2



The Project Company contributed to government revenues more than recorded in DEG's internal rating, generating 1.4m Euro in 2010 and probably even more in 2011 because of newly levied infrastructure taxes. Likewise, employment effects as well as the quantitative supply of energy were initially underestimated by DEG which further improved the external GPR rating.

Qualitative contributions were also reassessed: firstly, the resettlement of households entailed newly constructed homes equipped with piped water and wastewater devices, which can be considered an improvement for the local population (however, DEG's evaluation appeared to have some inconsistencies in this regard). In contrast, the project did not directly improve provision with electricity of previously uncovered areas (as assumed by DEG). Rather, the effect was indirect because electricity is directly fed into the national grid and improves overall reliability and electricity provision.

National effects: The three cascades are nowadays producing at their expected capacity. Annual output in 2010 was 315.2 GWh which is sold entirely to the provincial utility Yunnan Provincial Power Grid. The Project Company would like to negotiate directly with consumers, but direct sales are forbidden by the power purchasing agreement.[9] The unit prices that the Project Company gets are equal to 0.222 RMB/kWh, (gross) but the net tariff is 0.215 RMB/kWh (after resettlement compensations). As already pointed out in the case of QHW, an economic evaluation of the Project Company's quantitative output from a demand side perspective is not feasible, as the electricity prices are politically determined. For Kunming Sanchuan Energy Development Co. Ltd., total output will generate revenues of about 7m € p.a. plus generating a surplus for the state budget.

Local impacts: The local population is mainly affected by Yunnan Whitewaters Hydropower Plants by the construction works that at present are going on along the Whitewater River, which are creating jobs and opportunities to sell goods and services for the villagers. In addition, some 2600 villagers were affected by resettlement and land sales, where compensations were deemed adequate by the population. Overall, the Project Company is trying to compensate for wealth and income losses according to its legal obligations, but voluntary contributions or CSR-activities could not be identified.

Global effects: Yunnan Whitewaters Hydropower plants are active in the generation of verified emission reductions (VER) and currently produce CO_2-emission reductions of 274,560 t CO_2 equivalents p.a. and have entered into a sales agreement with the Italian Carbon Fund.

3. Sri Lanka: Embilipitiya Fuelpower Plant

3.1 Project Description and Market Environment

The Project Company ACE Power Embilipitiya Pvt Ltd. (ACE) has built and now owns and operates a thermal power plant running on heavy oil with a total installed capacity of 100 MW. The project is operational since April 2005. ACE's main sponsor is Aitken Spence, a 130 years old conglomerate listed at the Colombo Stock Exchange, which is active in many sectors (e.g. tourism, transport and logistics, financial services). Aitken Spence holds 74% of the ACE shares, the remaining 26% - equaling an equity investment of 4.969m € - are held by DEG.

Sri Lanka, a fast-growing economy, has to bring domestic electricity capacities up by 7% in order to sustain the growth rate of 6 to 8%. In 2010, installed capacities were equally based on thermal power and hydropower with roughly 1,400 MW each. Under normal conditions, the capacity expansion would be sufficient to meet the needs of the growing economy, but late-coming monsoons bring about problems because hydropower is affected by this. If in such a situation some of the thermal power plants are under repair and unable to produce at full capacity, a power crisis with regional power cuts and load shedding occurs. This happened in 2002 and again in July 2011.

[9] The corresponding PPA-rules also imply that the villages neighbouring the three hydropower plants do not get the electricity from there but are electrified through the already existing regional grid.

The generation of thermal energy is largely relying on imported oil. Hydro electricity production and biomass-based energy supplies, which are the only large-scale indigenous primary energy resources available in Sri Lanka, are expected to increase only marginally in the near future because resources for these are increasingly limited. The necessary expansion of the capacities will therefore have to rely on imported fossil fuels. [10]

Sri Lanka's electricity sector is dominated by the state owned Ceylon Electricity Board (CEB).[11] CEB is vertically integrated and the sole entity with the right to generate, transmit and distribute power, contributing 60% to Sri Lanka's power generation. The state also acts as a monopolist in the oil refining business through CEYPETCO and is one of two oligopolists in the distribution of petroleum, the other one is the Lanka Indian Oil Company.

Independent Power Producers (IPPs), i.e. private and private-public enterprises contribute 40% to the country's power generation. All of them are operating on power purchasing agreements (PPAs) and they are depending on the provision with diesel fuel with which they are supplied by the state. This, combined with regulatory structures, ensures that competition in the generation, transmission and distribution of electricity in the country is near zero (except in the bidding process for new licenses).

Despite the fact that the electricity prices in Sri Lanka are higher than in most other countries in South, Southeast and East Asia[12] the applied electricity tariffs in Sri Lanka still seem to be too low to cover the costs of energy supply. Nevertheless, there is a significant incentive for private power producers to perform in an efficient way, because lower production costs translate into higher revenues, given the terms of the PPA.

3.2 Project Evaluation

Figure 4 shows that the external GPR scores considerably better regarding the development effects of the projects, due to which both the EPOL- and GPR-group improved with one point.

Although there was (as in the other cases) no direct extension of electricity coverage, the supply effects to the national grid were much larger than initially recorded (also regarding the provision of water and roads as side-effects). In addition, the plant is relatively environmentally friendly with low levels of pollution and excellent mitigating measures (e.g. reforestation).

The CSR measures also affected contribution to MDGs. In addition to the already recorded contribution to MDG 2 (education), the project also contributed to poverty reduction (MDG 1) through economic growth, as well as to the reduction of child mortality (MDG 4) and to improved environmental sustainability (MDG 7) through the water provision component.

Regarding DEG's role, a change in calculation methods entailed a loss of index points (compared to DEG's internal rating). However, this effect was more than compensated by an improvement in the rating of developmental effects. Namely, the supply effects were reassessed and the company's extensive CSR activities properly taken into account. These were also subjected to a more detailed cost-benefit analysis, as the company's support of local water provision schemes had significant effects on local communities.

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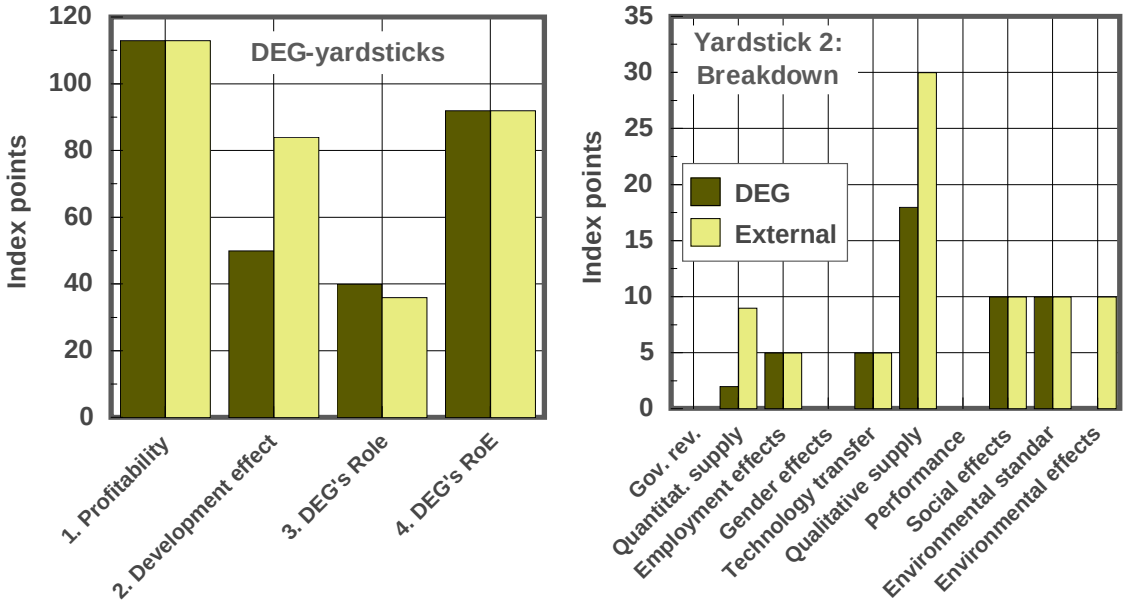
[10] The Gazette of the Democratic Socialist Republic of Sri Lanka – EXTRAORDINARY - No. 1553/10 – TUESDAY, JUNE 10, 2008. PART I: SECTION (I) — GENERAL, Government Notifications, MINISTRY OF POWER & ENERGY: National Energy Policy & Strategies of Sri Lanka, p. 1A-13A.

[11] In the coastal regions of the South another SOE, the state owned Lanka Electricity Company Pvt. Ltd. (LECO), is active in energy transmission and distribution.

[12] RAM Ratings Lanka Ltd: Sector Report Power Industry - Revving up Sri Lanka's Power Sector 2010 (http://www.ram.com.lk/reports/pdf/PowerSector2010.pdf).

Fig. 4: External validation of the ACE thermal power plant GPR

Project summary	DEG-GPR	External GPR
GPR-group	2	1
EPOL-group	4	3
MDGs (count)	1	4



National effects: Since it became operational, ACE has occasionally had to master technical challenges (especially from bad petrol quality supplied by an SOE), which hampered production in the first half of 2011. In 2010, however, an average output of 306 GWh was produced over a six month period, and ACE is now back on track and produces at normal capacity. Nevertheless, normal capacity is below potential capacity as CEB, where possible, satisfies its demand by purchasing cheap power from the hydropower plants first, as foreseen in the PPA.

Sri Lanka's strategy of electrification is unique in that electrification is built up in the rural areas first. Thus, this project did indeed imply the electrification of previously unsupplied areas as its implementation required a true extension of the electricity grid. ACE sells its total output to the CEB at a price of around 10 US-cents/kWh (= 11 LKR/kWh) which is guaranteed by the PPA. Local end user tariffs are apparently subsidized by the state, so a proper evaluation of market forces was impossible.

Local impacts: From the perspective of the local population ACE's core activities, i.e. generating thermal power, does not play an important role for their daily economic activities. The emissions of air pollutants are low, the noise emissions from running the generators are absorbed by the green belt that surrounds the plant and the water used in the production process is cleaned after use and returned to the local water flows. All types of emissions are considerably below the maximum permissible limits[13] so that they are not likely to be felt by the local population.

Furthermore, ACE engages in extensive CSR activities, which to date have covered 6 villages with more than 2,000 households. These activities were developed in response to the local communities' priorities, namely co-financing the establishment/connection to piped water and electrifi-

[13] See National Building Research Organisation: Report on the Stack Emission Testing of 100 MW ACE Power Plant, Embilipitiya (4th quarter 2009), National Building Research Organisation: Treated Water Sample Analysis for Embilipitiya Power Plant (22 February 2010).

cation of one village. The changes brought about by ACE's CSR activities are subject of a cost-benefit analysis, for details see section IV.

Global effects: As ACE generates power using fossil fuels, the plant produces CO_2 emissions amounting to 263,000t p.a. despite the fact that sophisticated technology is being used.

4. Pakistan: Qadirpur Gas Processing Power Plant

4.1 Project Description and Market Environment

Engro Energy Limited (Engro) has built and owns a 220 MW gas-fired power plant in Qadirpur at the road between Sukkur and Lahore which became operational in March 2010. The plant is utilizing permeate gas from the neighboring Qadirpur gas field that otherwise would either be flared or vented. Thus, the project contributes to reducing CO_2 emissions.

The sponsor is Engro Corp. where Engro stands for Energy and Growth. Engro is located in Karachi and is one of Pakistan's big conglomerates (dairy products, coal mining, commodity trade etc.). Engro's fully owned subsidiary Engro Powergen was incorporated in 2008 to develop power projects in Pakistan. Engro Powergen is to 95% owned by the sponsor, 5% are held by IFC. External financing totaling almost 150m US$ is syndicated between IFC, FMO, OFID, Proparco, Swedfund and DEG, the latter contributing about 13% and acting as monitoring agent for the European investors.

Pakistan's energy production capacity of 19,786 MW is relying on fossil fuels with gas contributing 48.6% to installed capacity and oil another 32%, plus small amounts from imports and other sources. The electricity sector in the country is regulated by a number of bodies. IPPs are providing 39% to the thermal capacities while producing an over-proportional 46% of the country's total electricity output.

Pakistan is at present in a severe power supply crisis due to several reasons. Firstly, persistent GDP growth rates generated accelerated energy demand. Secondly, energy reforms remained incomplete and there were failures and delays in implementing energy projects. Finally, security conditions deteriorated. All these factors discouraged or stopped investments in the sector.[14] According to local newspapers, load shedding for around 20 hours in Lahore and other cities of the Punjab, related closures of power-run tube wells and cut-offs in water supply even led to riots. Adding to these, newspapers report that circular debt between actors and agents in the energy sector as well as political considerations held up negotiations to resolve the crisis.

4.2 Project Evaluation

Figure 5 illustrates a considerable improvement in the external GPR compared to DEG's GPR for both the development effects of the project as well as the role of DEG in the project, due to which both the EPOL-group improved with two point and the GPR-group with one point.

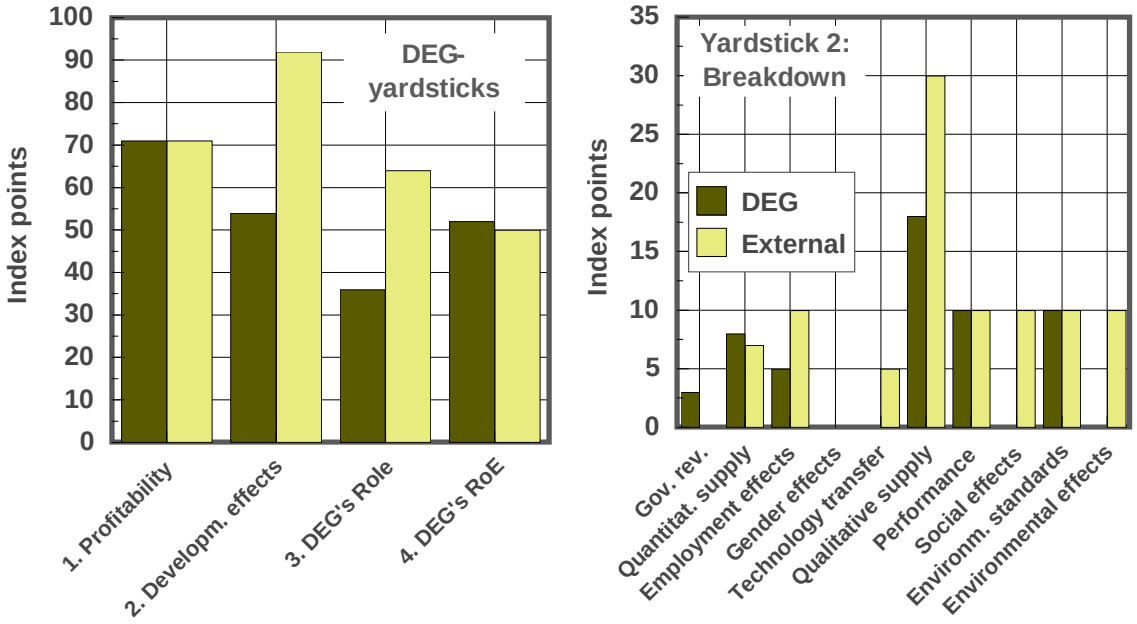
Regarding the developmental effects, although the project did not (as expected in DEG's internal rating) generate state revenues, this was compensated by much higher employment figures (42 additional fixed staff plus 100 staff on a contract basis). Adding to this, the project's novel use of permeate gas was considered a technology transfer. The supply effects and social and environmental impacts from the company's CSR measures were found to be larger by the external review. Specifically, Engro contributes to local schools by financing construction works and teachers through a dedicated Engro Foundation. Overall, this improved the rating from EPOL-group 4 to 2.

[14] Friends of Democratic Pakistan: Integrated Energy Sector Recovery Report and Plan, July 2010, p. 1.

In Yardstick 3 (Role of DEG), the external evaluation rated Pakistan as a high-risk low-income country, where DEG's investment had strong subsidiary character and alternative investors are reluctant to get involved, which improved the rating such that the overall GPR-group improved from group 4 to 3.

Fig. 5: External validation of the Qadirpur Gas-Processing Plant GPR

Project summary	DEG-GPR	External GPR
GPR-group	4	3
EPOL-group	4	2
MDGs (count)	0	7



National effects: The Project Company's generated quantity amounted to 1,197 GWh in 2010 (in 10.5 months of operation) and 791 GWh during the first eight months of 2011. This is significantly below the potential production as envisaged by the company.

Engro will be able to rely on permeate gas until the Qadirpur gas field is exhausted, which is expected between 2017 and 2020. At that time, the Project Company will have to invest significant amounts to adjust the plant so that it can operate on high-speed diesel. The plant is operating under long-term gas sales and a power purchase agreement with public entities. Its sales price per kWh is 4.5 PKR which includes various cost components (maintenance, insurance etc.). This implies a return on equity of 15% p.a. over the life time of the project for the Project Company. A comparison with other gas-fired plants prices indicates that prices for electricity are fully politically driven in Pakistan and do not reflect market relations.

Local impacts: Local pollution and emission effects are minimal because the plant adheres to IFC/World Bank standards, hence local neighborhoods should hardly be affected by them. A major impact arises from the CSR activities of Engro Powergen, which amount to 1% of the company's income before taxes, according to the company's management. These activities are coordinated by the Engro Foundation which has the mission to finance and manage CSR for all subsidiaries of Engro Corp, detailed in the company's sustainability report. In the larger neighborhood of the Qadirpur plant, the company supports several education projects:

- a school at the Village Rasheed Ahmed Arian, where Engro funded two female teachers and two more teachers in the future. Engro will also support an expansion of the school building to accommodate the increasing number of students.
- at the villages Jumma Arbani and Sabal Arbani, Engro Powergen provided one more teacher (one already funded by government), covering training and salary. The company also provided temporary and permanent buildings (respectively) through construction funding.
- an educational program called Talent Hunt, paying for education at the Technical Training Institute at Khairpur for a three year diploma course in electrical and mechanical technologies. Two students have graduated this year, and four more students have been selected for enrolment at the Polytechnic Institute Daharki, for a three-year diploma.

In addition, the Project Company was active in the health sector. Main activities include: i) the organization of an annual three-day free eye camp which covers the entire District of Ghotki, ii) a medical camp in a village close to the plant area and iii) funding a mobile medical unit (to support victims of the 2010 flooding). This latter is now run on a regular basis. Finally, there are a number of village development projects (pavement, sewage, irrigation etc.) supported by Engro, which started in 2010 and cover five villages at present.

Global effects: Despite the fact that the Engro power plant is gas-fired it is eligible as Clean Development Mechanism (CDM) project due to the use of permeate gas instead of other fuels, and reduction in emissions because the technology avoids flaring the gas. Specifically, CO_2 emissions will be reduced by 510,066 t p.a. The standard three-year verification (VER) process is still ongoing.

5. India: Bhandardara Hydropower Plants

5.1 Project Description and Market Environment

The Bhandardara Hydropower plants (BH I and II) are located at the North East of Mumbai at the Paravara river. BHI is located upstream and operates an irrigation dam that was erected by the British colonial government between 1910 and 1925. Taken over and continued by the Government of Maharashtra, the plant got operational in the mid 1980ies, produced electricity for five years, and was abandoned after the collapse of a turbine. It was then sold to Dodson-Lindblom (DLZ), an Ohio based project developer owned by an American-Indian family. Using the old structures (dam, powerhouse, tunnel) the new owner replaced the total technology and started production with a capacity of 12 MW in 2001. This capacity cannot be fully utilized over the year as the water from the dam is still used for irrigation so that there are periods of standstill of the plant in non-monsoon times when the refill of the dam is the priority.

BHII is located around 10 km downstream of BHI and was built by the provincial government starting in 1985. It was 15 years in operation and then bought by DLZ from the provincial government in 2006. This plant has a capacity of 34 MW but that capacity was hardly ever fully utilized. As located downstream of the BHI-dam this second plant also depends on the seasonality of water supplies. Between November 2011 and June 2011, the plants have produced a total of 57 GWh, due to good rains in the monsoon season, generating electricity on nearly 70 days of the 90 days of monsoon. Outside of the rainy season, the plants are only able to operate when there are scheduled spills for irrigation purposes. Clearly, the focus is on irrigation and electricity production only a by-product.

In addition, the sponsor has constructed two hydropower plants in Himachal Pradesh, two more in the region are under construction. These latter 4 plants were not visited, although there are financial linkages between the projects.

India's total electricity production amounts to 830,126 GWh[15], largely relying on thermal power plants (65.3% of total installed capacity) and hydroelectric power plants (21.5%). In recent years, the country has also invested heavily in renewable and nuclear energy utilization and will continue to do so in the future. The per capita electricity consumption in the country rose by 5% p.a. between 2001 and 2008 and the Indian government is struggling to maintain that pace. There are a number of issues Indian energy policy has to respond to, i.e.: fast economic growth and increasing household incomes, environmental degradation as a result of fast growing production and consumption, and limited domestic reserves of fossil fuels, especially of coal.[16] The Indian energy policy was quite successful in meeting these challenges, but in more remote areas, availability and reliability of power are still a problem.

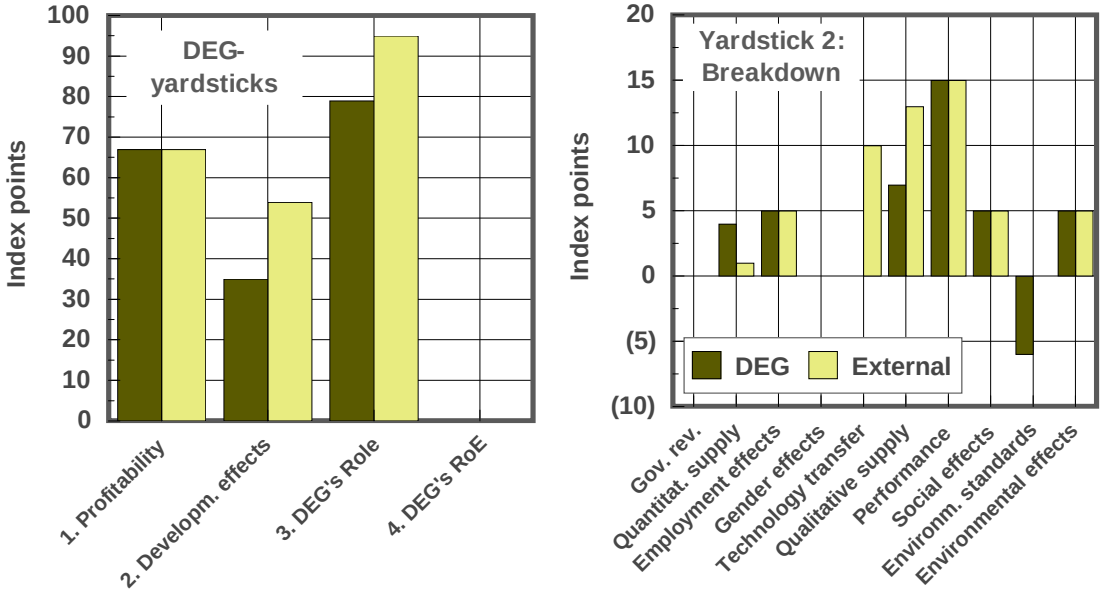
India's energy policy is controlled by the Government through its Ministries of Power, of Coal and of New Renewable Energy and is administered locally by various SOEs. At state level, additional organizations and the Power Grid Corporation of India are also involved in the generation and intra-state distribution of electricity.

5.2 Project Evaluation

Figure 6 illustrates that the external GPR and DEG's GPR differ regarding DEG's role and developmental effects, entailing a change in group classification. The external rating was slightly higher because the assessment valued the improved management and technologies introduced by DLZ, as well as the contribution in terms of energy supply. Consequently, the classification into EPOL-groups improved from group 5 to group 4.

Fig. 6: External validation of the Bhandardara hydropower plant GPR

Project summary	DEG-GPR	External GPR
GPR-group	5	4
EPOL-group	5	4
MDGs (count)	0	2



[15] WDI. Generating figures refer to 2008.
[16] http://www.krishnaninc.com/Power_India_01.pdf

Regarding DEG's role (yardstick 3), changed methods of point aggregation and India's classification as a low-income country (which DEG recently revised due to India's economic growth) improved the rating. Taken together, this resulted in an overall GPR-group classification into group 4 (instead of 5). In addition, the external validation found that the project adhered to local environmental standards and contributed to a number of MDGs. Specifically, energy supply is closely related to reducing poverty (MDG 1) and the project's hydropower character contributed to environmental sustainability (MDG 7).

In addition, the external evaluation found a number of inconsistencies in the project, possibly arising from its character as a historic project taken over in the course of the investment (e.g. relating to resettlement measures, CSR activities, and quantification of CO_2 savings).

National effects: The Project Company's generated output amounted to 74 GWh in 2010 which is a bit below the potential production (79 GWh total) as reported by Dodson's management. Generally, this output can be partly attributed to improved management (especially in the case of BHII) and partly to restoration of physical infrastructure (BHI). Both project components are operating under PPAs with the Maharashtra State Electricity Board. BHI is guaranteed a unit price of 2 INR /kWh which allows for the realization of a RoI of 16% while BHII' PPA does not foresee a unit-based pricing but a fixed lump-sum payment of 150m IR p.a., which allows for a 14% RoI. Again, the purchasing prices are far away from being market driven.

Local impacts: In contrast to all other evaluated projects, the physical infrastructure of BHI and BHII existed years or even decades before the Project Company stepped in. The project company simply continued with projects that the British colonial power and the succeeding state government initiated. Hence, any immediate effects on the neighborhoods cannot be attributed to Dodson, and the company did not initiate any CSR activities.

Global effects: The Project Company produces electricity from hydropower in a country where the energy mix is largely dominated by thermal energy, hence the potential for CO_2-emission reductions is obvious and Dodson has registered BHI and BHII as CDM-projects.

III. DAC-Evaluation of DEG's Energy Projects

The above described and analyzed projects are now mirrored against the DAC evaluation criteria. For this exercise, the 2007 study of Peter Hartig „*Anwendbarkeit der DAC-Evaluierungskriterien für DEG-Vorhaben*" served as a starting point. The project overview presented below follows in parts the suggestions made by that study. As most of the DAC criteria take the beneficiaries' perspective, some frictions could not be avoided and the analysis departs from the DEG ratings and perspective. For the summarizing overview of the projects, the BMZ definitions[17] of the DAC criteria are applied despite the fact that they differ considerably from the definitions given by DAC. Furthermore, the table's composition follows the spirit of Hartig's proposal to assign the outputs computed from using the DEG yardsticks and its subcomponents to the DAC criteria.[18]

[17] See BMZ: Evaluierungskriterien für die deutsche bilaterale EZ: Eine Orientierung für Evaluierungen des BMZ und der Durchführungsorganisationen. 2006. Bonn.

[18] Hartwig, P.: Gutachten zur Anwendbarkeit der DAC Evaluierungskriterien für DEG-Vorhaben. 2007. Manila, p. ii.

Tab. 1: Case studies and achievement of adjusted DAC Criteria

Project	Relevance	Effectiveness	Efficiency	Impact	Sustainability
Qingdao wind	High: demonstration project	Effective according to GPR	High due to high RoI, and CO_2 savings	Quantitatively small, but, qualitatively large as successful demonstration project	Highly profitable project, except for PPA subsidy
Yunnan Water	High: energy reliability improved, but no new technology	Effective according to GPR	Very high RoI, high CO_2 savings	Overall small	Highly profitable project, but would allow more gov. revenues
Embilipitiya Diesel	High electricity contribution, no new technologies	Effective according to GPR	Very high RoI	High quantitative impact nationally, plus CSR measures locally	Profitable project, very low nationally due to terms of PPA
Qadirpur Gas	High electricity contribution, plus new technologies	Effective according to GPR, plus mobilization of other funds	Moderate RoI, high CO_2 savings	Moderate quantitative and large qualitative impact, very high CSR impact	Moderately profitable project, negative impact from circular debt and PPA long-term not sustainable
Bhandardara Water	High electricity contribution, no new technologies	Effective according to GPR	Rather low RoI, but high CO_2 savings	Overall small impact	Moderately profitable project, but would allow more gov. revenues

Relevance: The table indicates that all projects are highly relevant with respect to the specific situation on the national energy markets. All host countries have in common that the quantitative supply and the reliability of electricity are a bottleneck for development which is widened by the projects. In addition, all projects are also highly relevant with respect to the strategic role that DEG is playing in contributing to project finance.[19]

Effectiveness: Furthermore, all projects are effective in terms of absolute profitability but the projects' performance does not reach the portfolio average which may be a consequence of the specific characteristics of the energy sector.

Efficiency: The result is also quite homogeneous in terms of the projects' efficiency. Four out of five projects show an above average DEG return on equity, adequate development effects and high contributions to efficiency due to their ability to save CO_2. In terms of impact, the ratings are much more heterogeneous. The national impact from electricity production is only of quantitative importance in a small country (Sri Lanka). However, in two other countries, the qualitative impact from introducing new technologies was high (Qingdao, China and Qadirpur, Pakistan).

Impact: Finally the contribution of the projects to the MDGs was analyzed. As all countries were suffering from energy shortages, electricity generating projects all contribute to poverty reduction (MDG1), by improving reliability of electricity and fostering economic growth and income generation. It is also evident that at least the three water and wind power projects in the sample will automatically contribute to environmental sustainability (MDG7) and it has been found that the two thermal plants also contributed to MDG7. Some projects contributed to even more MDGs, mostly arising from CSR measures. The two Project Companies in Sri Lanka and Pakistan financed activities in the provision of the adjoining villages with improved water, with support for schools and

[19] The sample's relevance as measured at yardstick 3 is even larger than the average of the infrastructure portfolio 2002-09.

for local health posts or by financing other community development projects and increased with these activities their local impacts and hence contributed to additional MDGs.

Sustainability: All five projects are financially sustainable over the lifespan of the investments as this lifespan is usually covered by the PPAs, which guarantee a sufficiently large RoI. In most cases there are doubts with regard to the economic sustainability of the project settings because in many cases the prices that are guaranteed under the PPA are too high and end-user tariffs too low to cover the costs of electricity generation, transmission and distribution. Hence, the public entities that are managing the different stages between generation and consumption may run into deficits. In other cases, the perspectives for economic sustainability are a bit better as the purchasing prices paid for the electricity generated by the two plants is significantly below the end user prices so that it can be assumed that these two plants generate a surplus that can be used for maintaining the total chain from purchasing to distributing power.

IV. Cost-Benefit-Analysis of Water Project

In order to estimate the effects that a project may bring about from the local population's perspective, a Cost-Benefit Analysis (CBA) was conducted. A CBA is a systematic process for calculating and comparing benefits and costs of a project to see whether the benefits outweigh the costs, and by how much. The CBA was done for the project company ACE, which operates the Embilipitiya fuel power plant in Sri Lanka, described in Section II, Chapter 3.

From the perspective of the local population the core activity of ACE, i.e. generating thermal power, does not play an important role for their daily economic activities. Due to the power purchasing agreement the Project Company is unable to sell electricity to the locals so that they do not directly benefit from it. In addition, the emissions of air pollutants are low, the noise emissions from running the generators are absorbed by a green belt that surrounds the plant and the water used in the production process is cleaned after use and spilled back into the local water flows. For all types of emissions it was found that they are considerably below the maximum permissible limits so that they are most probably not felt by the local population. Instead, another activity of ACE plays an important role in the rural population's life, i.e. the Project Companies corporate social responsibility (CSR) projects which focus on providing rural households with improved access to water. This section concentrates on discovering the changes that ACE's CSR projects brought about for the affected households and to translate these changes into monetary terms, i.e. into economic benefits and costs.

Since 2005, ACE allocated a sum of 716,000 € for its CSR activities of which 455,000 € were spent for the needs-based subsidiary financing of individual households' access to water. ACE was involved in funding water tanks, pump houses and filters in six villages surrounding the Embilipitiya power plant, contributing between 4% and 20% of total construction cost. Local funding covered most of the cost, including the establishment of a water grid for the houses. Villagers wishing to participate have to pay (in cash or through labor contributions) an initial fee for the connection (varying between 1,500 and 7,300 LKR) plus monthly membership and maintenance fees, plus user tariffs per cubic meter of water received. To date, almost 3,000 households have applied, although not all of these are connected yet.

The average household in the region realizes an income below the poverty line of 1.5 US$ per day, partly derived from small-scale agriculture, partly from other activities (employment, day labor, handicrafts). In view of this, the connection to piped water induced considerable changes. Firstly, the availability of water helped to increase income from agricultural activities, because irrigation enabled farmers to plant different crops (for example from subsistence to cash crops). In addition, because it is no longer necessary to fetch water from far-away sources, i.e. the river, time was saved which either led to more leisure time or left more time for other productive activities (e.g. employed work).

A systematic analysis must thus try to weigh the individual costs of the water connection against the benefits in terms of higher household income. For this, an econometric analysis based on the income method was used. The application of the income method requires comprehensive household data that include quantitative information on how the specific household benefits from the CSR activity, on the demographical composition of the household, its production factors, its production activities and its income.

The information was collected using a standardized questionnaire that was applied to a stratified random sample of 215 households. On average, each household had 4.3 members with a share of 27% of non-working members (too young or too old). Monthly income was on average 19,532 LKR per month, equaling about 40 US$. Finally, the use of piped water, i.e. the quantitative effect of the CSR activity, amounted to roughly 11 m^3 per month and household.

The determinants of monthly income for these households were derived on the basis of agricultural production functions and labor supply theory. The choice of these theoretical approaches was informed by the field surveys: they revealed that income from agriculture and income from other productive activities (day labor, small scale craft, trade etc.) both were affected by the CSR-activities, the former by enabling the farmer households to irrigate their small home gardens, the latter by saving labor time as there was no need for the beneficiaries anymore to fetch water from far away. The households' agricultural output - depending on the plot sizes of land of different qualities, household labor, irrigation patterns (amount of water used) and a number of control variables - was estimated using different multivariate regression approaches and different functional forms of the underlying production function. The estimation of the households' labor supply function - assumed to depend on demographical data, agricultural income (serving as reservation wage), and control variables - followed the same estimation strategy.

Based on the statistically most efficient regression models the regressions show that the consumption of one more cum of piped water brought about an increase in monthly average farm income of 446 to 558 LKR which - at the given water consumption of the households - adds up to an increase of average monthly farm income between 5,077 and 6,345 LKR. Along similar lines, the CSR-induced reduction of wasting labor time for fetching water adds around 2,800 LKR to monthly income of households involved in day labor, craft etc. month which results from an increase of the households' labor supply.

In a last step, the effects of the CSR activities were aggregated at the household level, summing up the above described income improvements, as well as considering the project induced additional expenditures of the households from installing the access to the grid, from paying membership and maintenance fees to the local CBO and from the monthly water bill. The following Table 2 displays the aggregate effects in Euros:

Tab.2: Net annual benefits from the water projects

Gross annual benefit from: rising farm income	718,525 € to 921,541 €
rising other productive income	105,000 € to 131,000 €
Total	823,525 € to 1,052,541 €
Annual costs from	
increased expenditures for using individual water access	120,000 €
Net annual benefit **(Gross annual benefit minus annual costs)**	**721,525€ to 932,541 €**

The above calculated net CSR-benefits of rural households is resulting from the investment of ACE in setting-up the water supply schemes in six villages neighboring to the thermal power

plant. Between 2005 and the end of 2011 ACE spent an annual average amount of 65,000 € which must be seen as additional CSR project-induced use of resources (costs). Integrating this resource use in the total balance brings about an impressive net regional benefit of ACE's CSR activities of between 656,000 € and 867,000 € per annum.

It should be noted that these benefits have accrued in the primary stages of the project. As households learn how to best invest their time and effort, set up new business projects or expand profitable activities, it is likely that additional benefits materialize in the future.

V. Lessons Learned for DEG

1. CSR measures

The five power plants analyzed within this study are all situated in underdeveloped rural areas. Irrespective of whether they operate on more (wind farm, diesel- and gas-fired plants) or less sophisticated technology (hydropower plants), all can be seen as "islands of modernity" that are located in pre-industrialized environments. The population that lives in the surroundings of these "islands of modernity" observes the flows of money to the plants and their employees. Comparing the living conditions of those working in plant to their own, they may observe discrepancies which induce claims on the project companies. Corporate Social Responsibility (CSR) measures can help to mitigate such divisions and pacify relations. This is in the interest of all stakeholders, i.e.

- of the local population at the project sites as their living conditions are improved,
- of the Project Companies as they can do business uninterrupted by local conflicts and as they can improve their reputation,
- and of DEG in realizing reputation gains.

Two of the projects excelled with outstanding CSR activities, namely the Qadirpur gas plant in Pakistan and the ACE thermal plant in Embilipitiya, Sri Lanka.

Concluding from the considerable benefits that CSR activities bring to all involved parties it may be an important lesson learned for DEG to consider a more proactive role in fostering CSR within the Project Companies. The project reviews have revealed the effectiveness of well-conceptualized CSR activities in mitigating local conflicts and improving welfare in the host countries. DEG could foster CSR activities to be undertaken by its Project Companies. Such a strategy may include the development of a "CSR toolbox" that provides the Project Companies with conceptual knowledge on

- how to define individual CSR portfolios together with the populations at the sites where large-scale infrastructure is constructed and operated,
- how to mobilize additional funding for implementing a defined CSR portfolio, including funding from available development programs in the host countries and from the benefiting communities,
- how to implement and manage a CSR portfolio that has the potential of gaining financial sustainability, including schemes that foresee user fees for running elements of the portfolio,
- how to use an implemented CSR portfolio as an element of the Project Companies' public relations strategy.

Good-practice examples from DEG's energy portfolio – like from the ACE project in Embilipitiya or from the Engro project in Qadirpur – may serve as blueprints for the development of such a "CSR-toolbox".

2. Support of energy projects in times of global warming

The introduction and description of market environments have illustrated a number of key characteristics of energy sector projects: they usually require large-scale investments in sectors that are state-dominated and feature little competition. In addition, there are often conflicting objectives regarding quick and cheap expansion of power generation for economic growth on the one hand, and – costly – climate-friendliness on the other hand.

However, the case-studies also demonstrate that there is some market potential in small and medium-sized power plants for private investors. These investors act under strong state regulation, but PPAs and other contracts guarantee output quantities and prices for all projects (and even input prices for the thermal power plants). This implicitly guarantees a comfortable RoI for private power providers. In particular, private providers have a comparative advantage in efficiency vis-à-vis state-owned power producers, which makes them an attractive bidder in public auctions and bidding processes. In view of fixed PPA conditions, with efficient maintenance private providers are able to reduce costs below those anticipated in the PPA and can maximize the RoI. Overall, DEG's investments into the energy sector of Asian countries can be regarded as a fairly profitable low-risk activity.

As outlined in the introduction (and partly in the case studies) there is a trade-off between economic development and climate protection, even given the emerging new technologies that recent years have witnessed. These are costly and thus especially difficult to establish in developing countries, where economic growth and poverty reduction are often the first priority. The case studies illustrate how DEG and other DFIs have the instruments to reduce this trade-off by providing private finance for highly efficient power plants and mobilizing private investments. This in turn would promote a faster adoption of climate friendly technologies in developing countries.

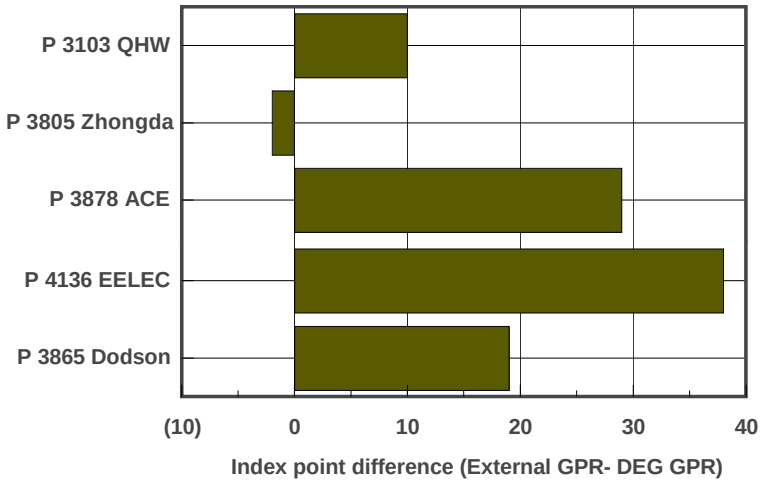
Finally, the external evaluation was also informative on the application and ratings that are derived from DEG's rating tool, GPR, also in comparison with the international DAC criteria. Development cooperation is increasingly challenged to demonstrate the extent to which its investments have produced positive spill-overs and created benefits for the people in the host society. With its existing rating tools, DEG is well-equipped to perform ex-ante or in-process ratings from an investor's viewpoint of the profitability of its project or of the subsidiarity of its financing.

The evaluation demonstrated that none of the five projects produced more than negligible, unmitigated environmental or social conflicts between the Project Companies and the population at the project sites. The projects' environmental and social friendliness is apparently the result of DEG's pressure on the Project Companies to implement high environmental and social standards.

3. Performance of GPR as a tool to capture development effects

Regarding the implicit evaluation of GPR as a monitoring and assessment tool, the validation showed that GPR is very appropriate in capturing the manifold dimensions of energy sector projects. In application, DEG's internal evaluation tended to understate the positive effects and the external validation in most cases resulted in improved ratings. Most of the differences were arising from issues related to developmental effects (yardstick 2). Figure 7 shows that the index points differences are the smallest with respect to first two projects in China. They are more significant in the three remaining cases.

Fig. 7: Yardstick 2 - Differences between external GPR and DEG's GPR (index points)



To some extent, differences must be attributed to inconsistencies in the GPR set-up. For example, in large countries the quantitative contribution to energy supply may not be significant and can hardly be calculated by the number of direct beneficiaries. Nevertheless, it does improve reliability and foster economic growth in more general terms. This may create a bias against small-scale projects in large countries or those with regional disparities in energy provision, when GPR is used to evaluate the initial project clearance.

Nevertheless, these issues appear minor, when considering that most of the GPR assessments were overall valid and rather underestimating positive effects. For the analyzed cases a systematic bias between the GPRs can be observed which results from a different treatment of the CSR activities undertaken by the Project Companies. The support of local communities with projects in education, health, water provision, and in a variety of construction works had a considerable impact on the local populations that was not always fully recorded in the GPR. The present desktop practice is over-emphasizing the information from available reports provided by the Project Company. However, as ratings rather understate those positive impacts, internal ratings are still an appropriate tool and DEG could only improve its position by paying more attention to these factors.

Finally, regarding its own role as a special investor with a subsidiary mandate, the external validation highlighted that DEG lives fully up to its assignment. Again, internal ratings tended to understate this aspect, implying that DEG is rather more than less important for the projects in question. The case studies also clearly illustrated how DEG – and its syndicated partners – act as a standard-setter and support the introduction of better standards and improved technologies, as reflected in the CO_2-emission reductions.

Insofar as the GPR could be mapped towards the DAC evaluation criteria, the results were also encouraging. Although DEG has a different perspective, the mapping demonstrated that projects perform well according to those DAC criteria where a mapping was possible. The more in-depth external evaluation also evaluated the DAC perspective of beneficiaries, which confirmed these results.

However, all these results reflect mostly the investor's perspective, especially from the investment decision side. For example, the assignment and weighting of index points is devised by DEG and – in lack of detailed information – not by the populations of the host country. In order to meet the challenge of an ex-post evaluation of its development impacts from the perspective of the affected populations, DEG could assume the lead by strengthening ex-post evaluations with a different focus, as done in the present study.