# Hydropower Sustainability Assessment Protocol

Official Assessment

E.ON Kraftwerke GmbH

# Walchenseekraftwerk

Germany

Lead Assessor: Dr Bernt Rydgren

Final

10/05/2013

**Client:** E.ON Hydro Fleet

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**Assessors-in-training:** None

**Assessment Date:** 27/02/2012 to 02/03/2012

**Project stage:** Operation

**Project size:** 124 MW

**Project type:** Storage

**Cover page photo:** The River Isar upstream of the Rißbach confluence.

# Acronyms

| Acronym | Full Text |
|---|---|
| DB | Deutsche Bahn, the German national railways |
| HEA | Hydro Equipment Association |
| ILO | International Labour Organization |
| LTI | Lost Time Incidents |
| O&M | Operations and Maintenance |
| TÜV | Technischer Überwachungsverein (Technical Inspection Association in English); German organisations working on the validation of product safety for humans and the environment |

# Table of Contents

# Executive Summary

This report presents an Official Assessment conducted in accordance with the Operation Assessment Tool of the Hydropower Sustainability Assessment Protocol. The assessment is conducted for the 124 MW Walchensee Hydropower Plant and the associated small hydropower plants that are part of the diversion system for the main plant. It is located in the state of Bavaria in southern Germany. E.ON Kraftwerke (Kraftwerke means power plant in German) is the owner and operator of the power development. However, one third of the generation is controlled by the Deutsche Bahn (the German state Railways) in accordance with a long-term Power Purchase Agreement. The Walchensee plant was constructed in the early 1920's, and generated its first electricity in 1924.

The Assessment Team recognises that some responsibility for some of the Protocol topics go beyond the control of E.ON (and Deutsche Bahn), e.g. public health, water quality, flood-control-related aspects of water and reservoir management, biodiversity etc.). The Walchensee group operates in a very stringent regulatory environment in which mainly state, but also local, federal and EU-level authorities have requirements for multiple aspects of operations, performance, preparedness, governance and community relations, to mention a few.

Governance and management is generally of a high international standard, and Walchensee and its impacts are well-managed. The plant is a showpiece in E.ON's asset portfolio, which is clearly demonstrated by the commitment to the Visitors' Centre at the plant, a centre that has close to 100 000 visitors each year.

Topic O-8 Projects Benefits, topic O-9 Project-Affected Communities and Livelihoods, topic O-10 Resettlement and topic O-11 Indigenous Peoples are Not Relevant to this assessment. O-8 and O-9 are Not Relevant owing to the absence of documented commitments at the time of the plant's development. Ongoing issues relating to benefits and affected communities are assessed under O-3 Environmental and Social Issues Management. O-10 is Not Relevant because the project's construction did not require resettlement, and O-11 is Not Relevant because there are no community groups in the project area meeting the definition of Indigenous Peoples.

The report presents an assessment of the Walchensee project, and does not assess wider E.ON performance. However, under several Protocol topics, the corporate-level performance of the owner/operator is relevant, but the assessment team has sought evidence that this extends to Walchensee itself. In addition, since the plant is part of a cascade development on the River Isar (and also affects operations in other rivers, including downstream on the River Danube) we have tried to be clear in the detailed topic evaluations on the extent to which the Walchensee project can be evaluated in isolation.

The Walchensee project has been found to be highly performing, exceeding basic good practice (a score of 3) on all but one of the 15 assessed topics. The project performs at the level of basic good practice, a score of 3, on 1 topic: O-3, Environmental and Social Issues Management.

The project performs with a score of 4 (only one significant gap at the level of proven best practice) on 7 topics: O-1, Communication and Consultation; O-5, Asset Reliability; O-13, Cultural Heritage; O-15 Biodiversity; O-16 Erosion and Sedimentation; O-18 Reservoir Management; and O-19, Downstream Flow Regime.

The project meets the level of proven best practice, a score of 5, on the 7 remaining topics: O-2, Governance; O-4, Hydrological Resource; O-6, Infrastructure Safety; O-7, Financial Viability; O-12, Labour and Working Conditions; O-14, Public Health; and O-17, Water Quality.

The sustainability profile on page vi summarises the scores found for each topic, and the table on page vii presents the significant gaps that were identified by the assessment in relation to the Protocol criteria. The numbers of significant gaps found against the Protocol criteria are as follows:

Two against the Assessment criteria, level 5, proven best practice (topics O-1 and O-3);

Four against the Management criteria, level 5, proven best practice (topics O-5, O-13, O-15 and O-18);

Two against the Stakeholder Engagement criteria, level 5, proven best practice (topics O-3 and O-19);

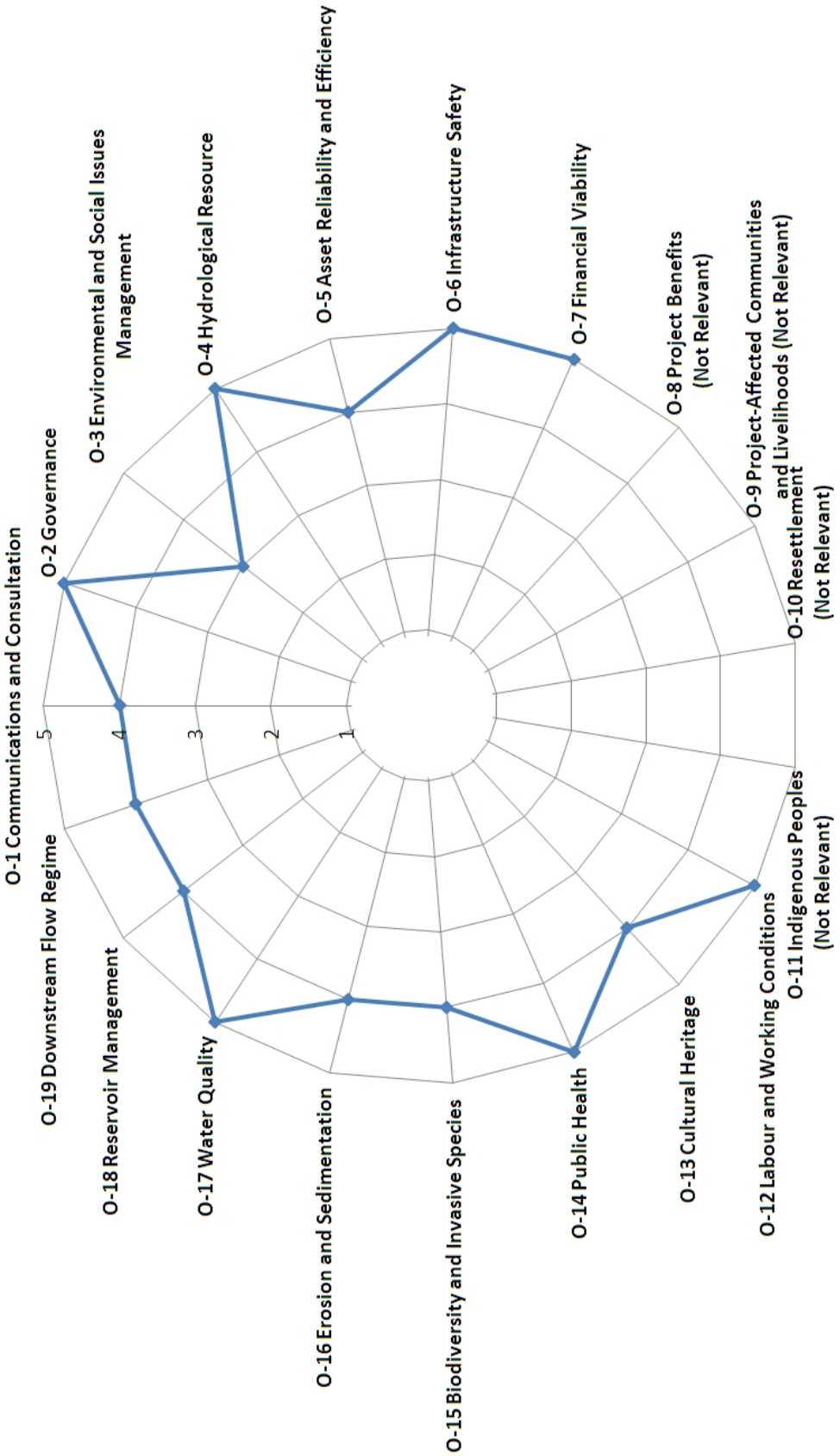
None against the Conformance/Compliance criteria; and

One against the Outcomes criteria, level 5, proven best practice (topic O-16).

The overall picture is one of a project which is well embedded in the local community, shows high sustainability performance and acts responsibly in matters concerning social and environmental issues, and generates good financial returns for its owners.

Detailed findings for each assessed topic follows in the sections numbered 1-7 and 12-19.

# Sustainability Profile



# Table of Significant Gaps

| | Level 3: Significant Gaps against Basic Good Practice | Level 5: Significant Gaps against Proven Best Practice |
|---|---|---|
| Assessment | **No significant gaps** | **O-1:** Stakeholder mapping does not map all groups of stakeholders and their interests.<br><br>**O-3:** This absence of a systematic, comprehensive process for the identification of social considerations, risks and opportunities. |
| Management | **No significant gaps** | **O-5:** Absence of a long-term asset-management program, limiting ability to schedule major investments on upgrades and expansions.<br><br>**O-13:** The lack of a more proactive and systematic process of working with regional institutions and actors in exploring the further development of the site is considered a significant gap at this level.<br><br>**O-15:** The absence of a sufficiently comprehensive process to anticipate and respond to emerging risks and opportunities.<br><br>**O-18:** Due to the shared ownership of the water resource and the strong regulatory control of reservoir operations, it is not possible for E.ON to actively respond to opportunities for improved reservoir management. |
| Stakeholder Engagement | **No significant gaps** | **O-3:** The absence of thorough and timely feedback on how issues raised have been taken into account.<br><br>**O-19:** A failure to respond to stakeholder concerns in an appropriately-timed manner. |
| Conformance/ Compliance | **No significant gaps** | **No significant gaps** |
| Outcomes | **No significant gaps** | **O-16:** Extensive erosion of the Lake Walchensee shoreline which creates significant socio-economic issues for residents and the tourism industry. |

# Introduction

This report presents the findings of an assessment of the Walchenseekraftwerk project using the Hydropower Sustainability Assessment Protocol. Walchenseekraftwerk is a 124 MW hydroelectric power plant, fully owned by E.ON, located in southern Germany.

## The Hydropower Sustainability Assessment Protocol

The Hydropower Sustainability Assessment Protocol ('the Protocol') is a framework to assess the performance of hydropower projects according to a defined set of sustainability topics, encompassing environmental, social, technical, and financial issues.

Developed by the International Hydropower Association (IHA) in partnership with a range of government, civil society and private sector stakeholders, the Protocol is a product of intensive and transparent dialogue concerning the selection of sustainability topics and the definition of good and best practice in each of these topics. Important reference documents that informed the development of the Protocol include the World Bank safeguards policies, the Performance Standards of the International Finance Corporation, and the report of the World Commission on Dams. To reflect the different stages of hydropower development, the Protocol includes four assessment tools that are designed to be used separately, corresponding to the Early Stage, and Preparation, Implementation and Operation stages of a project.

Applying the Protocol delivers an evidence-based assessment of performance in each topic, with a set of scores providing an indication of performance in relation to basic good practice and proven best practice. The scoring system is as follows:

5 Meets basic good practice and proven best practice;

4 Meets basic good practice with one significant gap against proven best practice;

3 Meets basic good practice with more than one significant gap against proven best practice;

2 One significant gap against basic good practice;

1 More than one significant gap against basic good practice.

This means that if there is one or more gap(s) at the level of basic good practice, the topic cannot score higher than a 2 or a 1, respectively. Only if all criteria at the level of basic good practice are satisfied will the assessor move on to the criteria for the level of proven best practice.

Assessments rely on objective evidence to support a score for each topic that is factual, reproducible, objective and verifiable. Key attributes of the Protocol are: (i) global applicability, i.e. it can be used on all types and sizes of hydropower projects, anywhere in the world; and (ii) consistency, i.e. the consistency of its application is carefully governed by a system of quality control encompassing accredited assessors, terms and conditions for use, and the Protocol Council.[1]

Scoring is an essential feature of the Protocol, providing an easily communicated and replicable assessment of the project's strengths, weaknesses and opportunities. The scoring system has been devised to ensure that a Protocol Assessment cannot provide an overall 'pass' or 'fail' mark for a project, nor can it be used to 'certify' a project as sustainable. The Protocol provides an effective mechanism to continuously improve sustainability performance because results identify gaps that can be addressed, and the findings provide a consistent basis for dialogue with stakeholders.

## Assessment Objectives

The owner and operator of the Walchensee plant, E.ON, identified the following objectives for the assessment:

[1] Full details of the Protocol and its governance, are available on www.hydrosustainability.org.

1. Build capacity in Protocol assessment within E.ON and assist in decision-making on how to embed the Protocol within the organisation.
2. Build capacity to apply the Protocol in very different environments inside and outside Europe.
3. Calibration/benchmarking: identify gaps for E.ON using the Walchenseekraftwerk as an example of what would be expected to be a highly performing plant.
4. Identify opportunities to reach up to Level 5 (proven best practice), as part of Operational Excellence initiatives.
5. Use the protocol assessment report to show E.ON's sustainability performance as part of efforts to win future concessions.
6. Support the case for further promoting hydropower in line with E.ON's "Cleaner and Better" strategy.

## Project Description

The Walchenseekraftwerk (Walchensee power station), located south of München (Munich), Germany, was commissioned in 1924. With the exception of some mini-hydropower plants, it is the most upstream of several plants in the cascade development along the River Isar, which enters the Donau (Danube) at Deggendorf.

Water from the upper Isar is diverted into the Walchensee, a natural lake, and discharged into the Kochelsee, also a natural lake, taking advantage of a head of 197 m between the two lakes. The most conspicuous landmark associated with the power plant is the group of penstocks: six pipes with a length of 400 m and diameters from 1.85 to 2.25 m take water from the Walchensee via the surge tank to the power house. Downstream from the power house, the water flows through the tailrace channel to the Kochelsee.

The power station generates electricity for peaking purposes, using four Francis and four Pelton turbines with a combined installed capacity of 124 MW. The Pelton generator sets generate single-phase power with a frequency of 16 2/3 Hertz for Deutsche Bahn AG (Germany's national railways). When they were first installed, these were the largest single-phase generator sets in the world. Now the Walchensee power station, with an annual energy production of about 300 GWh, remains one of Germany's largest high-pressure storage power stations. The Walchensee plant was listed as an industrial monument in 1983.

E.ON operates 110 hydropower plants in Germany, with a total installed capacity of 2,140 MW, and operates a total of 212 plants across Europe (Germany, Italy, Spain and Sweden) with a combined capacity of 4,973 MW.

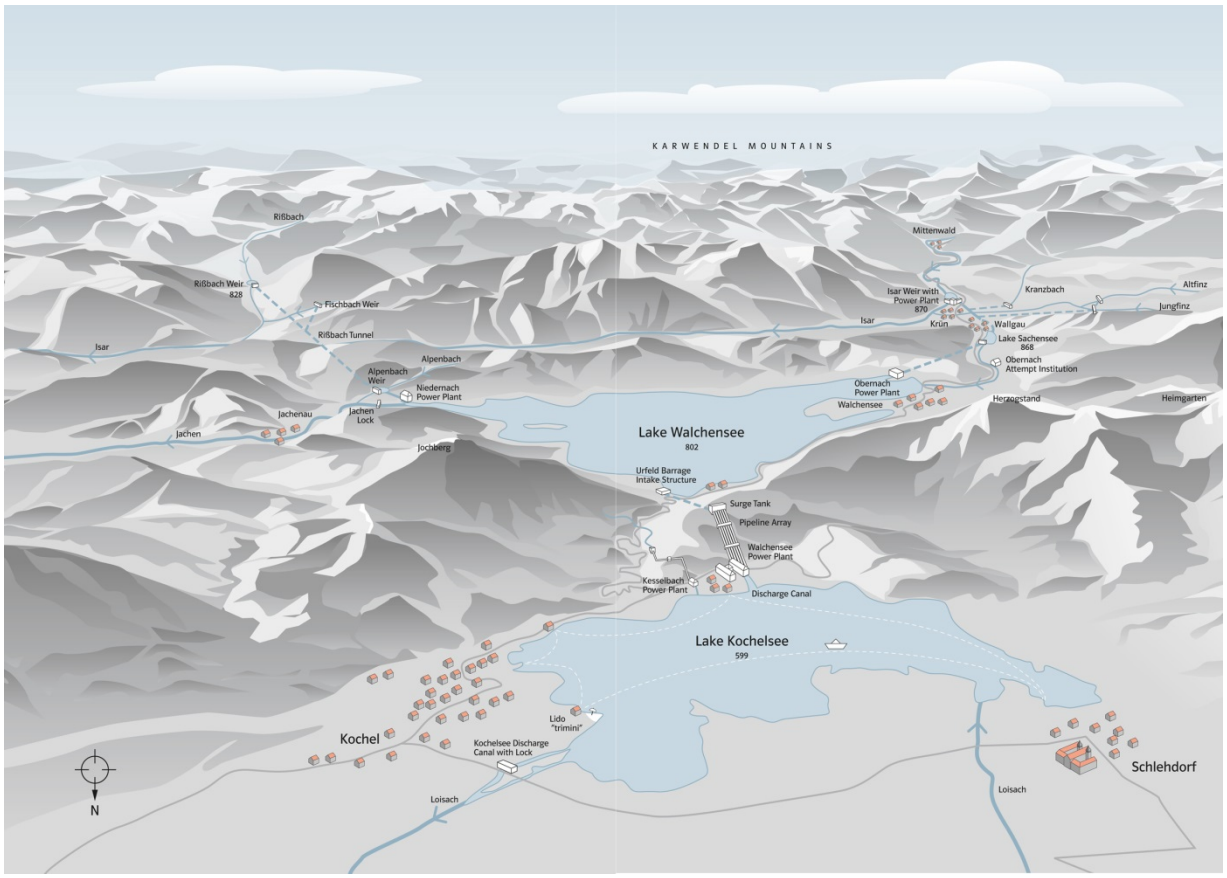



Figure 1. A schematic overview of the Walchensee project provided by E.ON.

## Assessment Process

The assessment has been conducted using the Protocol's Operation tool, which contains 19 individual topics, addressing governance, technical, financial, social and environmental issues. This tool assesses the operational phase of a project. The tool assesses performance in relation to ongoing operations and issues, and does not assess sustainability of the original preparation or implementation of a project, except in specific cases where commitments were made at the time of the project's development.

This assessment was carried out as part of the IHA – E.ON Sustainability Partnership. IHA provided a team of assessors to conduct the assessment over the period February to March 2012. A visit was made to the Walchensee site on 28-29 February and to E.ON's Landshut offices on 27 February and 1-2 March. Interviews were held at both E.ON's Landshut offices and at the Walchensee plant site. A draft report was delivered to E.ON in April 2012 and amended in response to comments received from E.ON by May 2012.

The May 2012 report did not meet the requirements of an Official Assessment, as the assessors were not accredited by IHA at the time of the on-site assessment in February-March 2012. The assessment team members have since been accredited, and the Protocol's Governance Committee has given approval for this assessment to be made an Official Assessment, following a desk review by the now-accredited Lead Assessor. The second requirement of an Official Assessment, that the written support of the Project Sponsor has been provided, is met, and this written support from E.ON is included in Appendix A.

During the desk review, E.ON presented the Lead Assessor with additional evidence for two topics, O-3 and O-12, and assessment team members reviewed these and other topics at the request of the Lead Assessor. This has resulted in changes to the findings and scoring on three topics (O-3, O-12 and O-18). Additional changes were largely editorial or bring factual statements up-to-date. The Assessment Team has not revisited the

project, or conducted any additional interviews, but has reviewed the additional documentary evidence provided by E.ON.

The assessment was supported by the Single Point of Contact, Bernhard Möstl (Head of Asset Governance, Global Fleet Management Hydro), assisted by his Local Support Team consisting of Oliver Müssig (Quality Management Officer, Global Fleet Management Hydro), Carolin Patzner (Public Relations Officer), Johannes Durner (Plant Manager River Group Isar), Johann Jochner (Work Preparation and Documentation), Markus Krinner (Information Centre Officer), Patrick Pickl (Intern, Global Hydro Fleet), and Eva Maria Zeilhofer (Team Assistant). The clients for the assessment were Professor Dr Dominik Godde (Country Director Hydro Germany), Christof Gattermann (Executive Board Member, E.ON Kraftwerke GmbH), and Dr Klaus Engels (VP Asset Strategy and Governance, Global Fleet Management Hydro).

Hans-Erik Jonsson (E.ON Nordic), Matteo Mazzarini (E.ON Italy), Ismael Reviriego (E.ON Spain), and Christine van Oldeneel (Hydro Equipment Association) observed the assessment for capacity-building purposes.

## Assessment Experience

This section addresses limitations and reflections relevant to this particular assessment.

The assessment was conducted in a highly efficient manner, and the most important logistics issue, that two of the three Assessment Team members are not German-speaking, was resolved efficiently with the aid of a highly qualified simultaneous translator for most interviews.

A range of internal and external stakeholders were interviewed, and a wide range of documents was assembled by E.ON for the team's review. In cases where the Assessment Team identified the need for further evidence and/or clarifications, the Local Support Team responded in a timely fashion.

The first assessment objective concerns internal capacity-building for E.ON. To this end, Hans-Erik Jonsson, Operation Manager for Safety and Risk of the Local Hydro Fleet Sweden, Matteo Mazzarini, Environmental Coordinator of the Local Hydro Fleet Italy and Ismael Reviriego, Head of Civil Works and Environmental Department of the Local Hydro Fleet Spain, observed the assessment in order to spread knowledge and understanding of the Protocol as widely as possible in the E.ON group. In addition, Christine van Oldeneel, Managing Director of the Hydro Equipment Association (HEA) attended as an observer.

A learning experience is that where much of the documentation is in a language not understood by some of the Assessment Team, early translation will facilitate advance familiarisation with the project, and the issues to be discussed.

The availability of assessment experience from the Walchensee assessment will greatly enhance future Protocol training processes and actual assessments.

## Layout of this Report

This report consists of nineteen sections numbered in direct correspondence with the nineteen topics of the Protocol's Operation tool. Four appendices are provided, including the written letter of support of the project developer (required for an official Protocol assessment), detailing the items of visual, verbal and documentary evidence referred to under each topic.

For each topic, findings are provided according to the criteria used in the Protocol's methodology: Assessment, Management, Stakeholder Engagement, Stakeholder Support, Conformance / Compliance, and Outcomes. Findings are presented against a statement of 'basic good practice' and a statement of 'proven best practice' for each, with a 'Yes/No' indication of whether the scoring statement is met. The significant gaps against the scoring statements, the topic score and a brief summary are presented at the close of each topic section.

# 1 Communications and Consultation (O-1)

This topic addresses ongoing engagement with project stakeholders, both within the company as well as between the company and external stakeholders (e.g. affected communities, governments, key institutions, partners, contractors, catchment residents, etc.). The intent is that stakeholders are identified and engaged in the issues of interest to them, and communication and consultation processes maintain good stakeholder relations throughout the project life.

## 1.1 Background Information

The long history of the Walchensee power plant, operating since 1924, bestows a strong relationship with local communities and an active role in tourism in the area. This has a positive effect on the project's ability to communicate with stakeholders, as well as requiring sensitive communications and consultation.

Communications and consultation are managed by the plant's local managers, as well as by E.ON's four-strong communications department based in Landshut, which is responsible for public relations, public affairs and media relations. An information centre, the 'Infozentrum', was established at the plant in 2001.

## 1.2 Detailed Topic Evaluation

### 1.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Ongoing or emerging issues relating to hydropower facility communications and consultation have been identified; requirements and approaches are determined through a periodically updated assessment process involving stakeholder mapping; and effectiveness is monitored.*

Ongoing and emerging issues and resulting requirements are identified by E.ON's communications department, through an annually updated Kommunikationskonzept (communication concepts) document, and in addition, local managers are asked to update the communications team on any projects at the site on at least a quarterly basis, allowing the team to identify communications issues and opportunities. Targets, for example on the number of press releases, are set annually and reported on. A stakeholder mapping / contacts excel sheet is updated on at least an annual basis.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, the stakeholder mapping takes broad considerations into account.*

The stakeholder mapping excel sheet identifies contacts in the local media and in local regulatory authorities. It does not comprehensively map all stakeholder groups, or analyse or differentiate stakeholder interests in a comprehensive manner. It does not take broad considerations into account. This is a **significant gap**.

**Criteria met: No**

### 1.2.2 Management

#### Analysis against basic good practice

***Scoring statement:*** *Communications and consultation plans and processes, including an appropriate grievance mechanism, are in place to manage communications and engagement with stakeholders; these outline communication and consultation needs and approaches for various stakeholder groups and topics.*

The annually updated Kommikationskonzept sets out plans for communications and consultation. A range of activities provide ample opportunity for communications, including the Infozentrum (approaching 100 000 visitors in 2011), widely distributed communications materials (including a poster for schools for example, a leaflet that was observed at local hotels, and the inclusion of the plant in tourism-promotion materials distributed by the local tourism office), and regular events held at the site. The plant is featured regularly in the local press and TV, and media articles are automatically monitored by the communications department.

Stakeholder identified by E.ON include the Walchenseestiftung, fishing associations, local tourism businesses, regulatory authorities, and households on the lakeshore that are directly affected by erosion. (For details on Walchenseestiftung and directly-affected households, see O-3). Grievances can be raised directly with the local plant managers, at the Infozentrum, and with E.ON's communications team in Landshut; issues that cannot be resolved locally are raised to Landshut. There is a well-established relationship between the plant and the local community, enabling communications that were described by some external interviewees as 'seamless'. In addition, some local stakeholders (the Bad Tölz stakeholders interviewed) are part of an E.ON advisory board that meets twice annually.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, communication and consultation plans and processes show a high level of sensitivity to communication and consultation needs and approaches for various stakeholder groups and topics; and processes are in place to anticipate and respond to emerging risks and opportunities.*

Communications and consultation show a high level of sensitivity, which is required in an area where stakeholders attach a high level of value to some aspects of the local environment, for example fish stock and the sense of ecological integrity. Communications with households on the shore of Lake Walchensee (often households of elderly people, whose houses' foundations have been undermined by shoreline erosion; see O-16) also appear to be handled in a sensitive manner. The processes of regular communications planning and events, referred to above, allow anticipation of risks and opportunities.

**Criteria met: Yes**

## 1.2.3 Stakeholder Engagement

### Analysis against basic good practice

***Scoring statement:*** *The operation stage involves appropriately timed and scoped, and often two-way, engagement with directly affected stakeholders; engagement is undertaken in good faith; ongoing processes are in place for stakeholders to raise issues and get feedback.*

Engagement with directly and indirectly affected stakeholder groups is well-established through the processes mentioned above. All external stakeholders interviewed conveyed a relationship of two-way communication and good faith, and engagement extends to joint activities in some cases (for example with the fisheries association). Activities include an annual press conference, press releases, TV features, regular events, and the Infozentrum's open door policy.

E.ON identifies which stakeholders are to be informed according to the specific activities / projects planned at the plant site and lakes. E.ON states candidly that they have learnt to provide information in advance, and they adhere to a policy that any person or organisation that makes contact is provided with a written response, signed by two E.ON officers. E.ON's communications department keeps a file on all Walchensee-related communications.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, engagement is inclusive and participatory; negotiations are undertaken in good faith; and feedback on how issues raised have been taken into consideration has been thorough and timely.*

Engagement appears to be highly participatory and inclusive, and negotiations, while not always easy, are undertaken in good faith. However, feedback on some issues has not been thorough or timely. This is a **significant gap**, but addressed under O-3 as it relates specifically to environmental and social issues management.

**Criteria met: Yes**

## 1.2.4 Conformance / Compliance

### Analysis against basic good practice

***Scoring statement:*** *Processes and objectives relating to communications and consultation have been and are on track to be met with no major non-compliances or non-conformances, and communications related commitments have been or are on track to be met.*

Processes, objectives and commitments are on track to be met, and there is no evidence of any regulatory non-compliances.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no non-compliances or non-conformances.*

There are no non-compliances or non-conformances.

**Criteria met: Yes**

## 1.2.5 Evaluation of Significant Gaps

### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

### Analysis of significant gaps against proven best practice

E.ON's mapping of stakeholders is a contact sheet of media and regulatory bodies, and does not map all groups of stakeholders and their respective interests.

**1 significant gap**

# 1.3 Scoring Summary

E.ON has highly active communications and consultations, with the flagship Infozentrum indicating E.ON's commitment to informing the public. Communications reach beyond 'informing' only, to consultation and partnership with local stakeholders, based on good faith and strong links with the local community. However, analysis of stakeholders could be improved and this would enable communications and feedback to be better targeted.

There is one significant gap against the criteria for proven best practice, resulting in a score of 4.

**Topic Score: 4**

## 1.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 122, 123, 124, 125, 126, 127, 128 |
| **Document:** | 2, 3, 4, 5, 6, 7, 8 |
| **Photo:** | 1u, 1t |

# 2 Governance (O-2)

This topic addresses corporate and external governance considerations for the operating hydropower facility. The intent is that the owner/operator has sound corporate business structures, policies and practices; addresses transparency, integrity and accountability issues; can manage external governance issues (e.g. institutional capacity shortfalls, political risks including transboundary issues, public sector corruption risks); and can ensure compliance.

## 2.1 Background Information

The station is fully-owned and operated by E.ON under a 100-year government license. The E.ON group has a complex structure with multiple operating units which own and operate the power station and transmission lines, and trade the electric power generated. E.ON (and the earlier owners/operators of the Walchensee plant) has had a long-term PPA with Deutsche Bahn (DB, the German National Railways) from the commissioning of the plant in 1924 which guarantees DB access to one third of the water stored in reservoirs for generation. DB owns the special-purpose transmission lines that transmit the power to the railway network and E.ON and DB share the available water proportionally; DB can dispatch their 1/3 of the available water independently.

The Walchensee plant is subject to regulation by multiple authorities at the local, state and federal level, and interacts with many stakeholders. The regulatory and corporate governance systems are highly developed.

## 2.2 Detailed Topic Evaluation

### 2.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Ongoing or emerging political and public sector governance issues, and corporate governance requirements and issues have been identified, and monitoring is being undertaken to assess if corporate governance measures are effective.*

E.ON is well aware of energy, water and environmental policy and regulatory developments in Germany and internationally, that could affect its hydro fleet and the Walchensee plant in particular. It is also well aware of, and monitors, developments in the corporate governance and corporate responsibility areas, in Germany and internationally.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no significant opportunities for improvement in the assessment of political and public sector governance issues and corporate governance requirements and issues.*

The assessment of external and internal governance issues is comprehensive. While there is some uncertainty about procedures and outcomes of the re-licensing process lying ahead for the Walchensee project, both the public authorities and E.ON are already preparing for this and are learning from the experiences from other re-licensing proceedings under way or due to happen before Walchensee.

**Criteria met: Yes**

## 2.2.2 Management

### Analysis against basic good practice

***Scoring statement:*** *Processes are in place to manage corporate, political and public sector risks, compliance, social and environmental responsibility, procurement of goods and services, grievance mechanisms, ethical business practices, and transparency; policies and processes are communicated internally and externally as appropriate; in case of capacity shortfalls, appropriate external expertise is contracted for additional support.*

E.ON has a broad array of internal corporate structures and processes in place to manage sustainability risks. From the communication with local authorities in the Walchensee project to lobbying efforts at the national and European level, to ensure favourable renewable energy policies, E.ON engages appropriately with public governance issues. Individual decisions are backed up consistently, by corporate systems and policies. These are generally publicly accessible.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, contractors are required to meet or have consistent policies as the developer; procurement processes include anti-corruption measures as well as sustainability and anti-corruption criteria specified in pre-qualification screening; and processes are in place to anticipate and respond to emerging risks and opportunities.*

E.ON is extending the reach of its sustainability commitments by requiring contractors to conform to the same standards as internally applied. The emphasis here is on direct, measurable workplace health, safety and environmental (HSE) management and includes anti-corruption measures and criteria. This could gradually be expanded to broader social and environmental commitments in line with the Global Compact, addressing also supply-chain environmental and social impacts. However, at the scale of procurement undertaken at Walchensee this is not seen as a significant gap.

**Criteria met: Yes**

## 2.2.3 Stakeholder Engagement

### Analysis against basic good practice

***Scoring statement:*** *The business interacts with a range of directly affected stakeholders to understand issues of interest to them; and the business makes significant project reports publicly available, and publicly reports on project performance, in some sustainability areas.*

At the corporate level, E.ON reports on its CSR commitments and efforts. Project reports of interest to the public - for example on water quality - are available either through E.ON or the responsible authorities. There are no indications that information of public interest is not accessible, or that stakeholders are not able to bring forward issues and engage with the project.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, the business makes significant project reports publicly available and publicly reports on project performance in sustainability areas of high interest to its stakeholders.*

Refer to Level 3 scoring statement.

**Criteria met: Yes**

### 2.2.4 Conformance / Compliance

#### Analysis against basic good practice

***Scoring statement:*** *The project has no significant non-compliances.*

Compliance management appears to be comprehensive, with no significant non-compliances reported.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *The project has no non-compliances.*

There are no non-compliances reported.

**Criteria met: Yes**

### 2.2.5 Outcomes

#### Analysis against basic good practice

***Scoring statement:*** *There are no significant unresolved corporate and external governance issues identified.*

No significant unresolved corporate or external governance issues were identified.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no unresolved corporate and external governance issues identified.*

No unresolved corporate or external governance issues were identified.

**Criteria met: Yes**

### 2.2.6 Evaluation of Significant Gaps

#### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

#### Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

**0 significant gaps**

## 2.3 Scoring Summary

The sustainability of the Walchensee project is supported by a comprehensive set of external regulatory institutions and internal corporate guidelines and procedures. One governance challenge (but also opportunity) lying ahead is the re-licensing process, which needs to be handled well to consolidate and modernise the conditions under which the project may operate. Another challenging area is translating new corporate sustainability commitments into practical tools for operational management, including contractor procurement and stakeholder relations in the project area. Both external and internal governance systems appear to be evolving and responsive enough to adequately respond to these challenges.

There are no significant gaps at the level of proven best practice, resulting in a score of 5.

**Topic Score: 5**

## 2.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 131, 132, 134, 139, 140, 142, 146 |
| **Document:** | 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96 |
| **Photo:** | None |

# 3 Environmental and Social Issues Management (O-3)

This topic addresses the plans and processes for environmental and social issues management. The intent is that negative environmental and social impacts associated with the hydropower facility are managed; avoidance, minimisation, mitigation, compensation and enhancement measures are implemented; and environmental and social commitments are fulfilled.

## 3.1 Background Information

Interviews with all informants indicated that the biggest environmental and social issues of the Walchensee plant relate to the plant's effects on flows in the hydrological system, including the River Isar, fish passages on various rivers and the Walchensee and Kochelsee lakes in particular. These issues are dealt with in detail under O-4, O-15, O-16, O-18 and O-19 in this assessment. O-3 concerns all environmental and social issues, and in particular how these issues are managed. In addition, the distribution of the plant's benefits, and management of the impacts on local communities are covered under O-3, as topics O-8 and O-9 are Not Relevant owing to the absence of documented commitments at the time of the plant's development.

## 3.2 Detailed Topic Evaluation

### 3.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Systematic processes are in place to identify any ongoing or emerging environmental and social issues associated with the operating hydropower facility, utilising appropriate expertise; and monitoring programs are in place for identified issues.*

The E.ON Group and its Hydro Fleet have systematic processes in place to identify issues and hazards of the hydro plants, exemplified by its ISO 14001-certified EMS with associated environmental-aspects register, HSE Handbook and the process for the identification of environmental hazards and their ranking according to severity and alert level (perception), which determine the level to which to raise the matter in the event of an incident. A hazard-identification checklist for pump-storage plants is used for Walchensee (there is no separate hazard identification for storage plants). In addition, twice-yearly meetings of the E.ON Wasserkraft advisory board, annual discussions on the damage caused by fluctuating lake levels, and meetings with the Walchenseestiftung (see O-1), provide a opportunities to identify ongoing and emerging issues.

Monitoring is conducted as part of the regular follow-up of the environmental-aspects register, incident reporting as well as various environmental parameters extensively monitored by the water-regulation authority.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, processes to identify ongoing and emerging environmental and social issues take broad considerations into account, and both risks and opportunities.*

Review of the environmental-aspects register for Walchensee shows that the EMS takes into account broader considerations, risks and opportunities for environmental issues. Examples are: the opportunities to restore and enhance biodiversity, the implementation of the Water Framework Directive and the new Water Act in

Germany (Wasserhaushaltsgesetz) to produce good ecological status through the construction of fish ladders, and reduction of resource consumption and $CO_2$ emissions (particularly through energy-saving measures).

However, this process (for the identification of issues) does not take into account broad considerations, risks or opportunities for social issues. This absence of a systematic, comprehensive process for the identification of social considerations, risks and opportunities, is a **significant gap** against proven best practice.

**Criteria met: No**

## 3.2.2 Management

### Analysis against basic good practice

***Scoring statement:*** *An environmental and social management system is in place to manage measures to address identified environmental and social issues, and is implemented utilising appropriate expertise (internal and external).*

E.ON's environmental management processes are in place, and were certified to ISO 14001: 2004 in November 2012. These processes include the HSE Handbook and a clear system for reporting of environmental incidents (weekly, monthly, annual, for E.ON Wasserkraft). These processes have recently been brought together under a single E.ON Wasserkraft EMS.

Measures are in place to deliver benefits of the project to local communities and to meet commitments made to affected communities. These include: payments to the Bavarian Forestry, the local authorities in Bad Tölz for water used, payments made to the Walchenseestiftung (with good relations; the Walchenseestiftung is a charitable fund that was established following a legal suit in the 1950s, with the repsonsibility to distribute finance to charitable causes, raised from the plant according to the exact level of the Walchensee lake, and overseen by the Ministry of the Interior), compensation for households for damage to property arising from lakeshore erosion, and sponsorship of events in the local community. Some action has been taken to manage the social impacts arising from broader Walchensee lakeshore erosion, but several stakeholders continue to demand further action. It should be noted that the Walchensee and Kochelsee lakes are part of a management plan for the river basin that has been developed by the Water Regulation Authority as part of a commitment to meet Water Framework Directive requirements. Otherwise, information on the protected-area status - the area of Kochelsee and Walchensee is a Nature 2000 reserve - appears difficult to obtain.

Appropriate expertise is used in the implementation of the management system, including E.ON internal environmental expertise, external stakeholders with local ecological knowledge, and external experts such as the Water Regulation Authority and the Institute for Fish Biology.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, processes are in place to anticipate and respond to emerging risks and opportunities; and plans and processes are embedded within an internationally recognised environmental management system which is third party verified, such as ISO 14001.*

The EMS has recently been certified to meet the requirements of ISO 14001: 2004. Processes to anticipate and respond to emerging environmental risks and opportunities include the environmental aspects register and the other processes listed under assessment above. In addition, despite the gap in identification of social issues mentioned under Assessment above, there are management processes in place to anticipate and respond to social risks and opportunities associated with shoreline erosion. These include annual inspections of erosion damage on the shorelines of Lake Walchensee and related stakeholder meetings, and rehabilitation of boat sheds at times of low reservoir levels.

**Criteria met: Yes**

## 3.2.3 Stakeholder Engagement

### Analysis against basic good practice

***Scoring statement:*** *Ongoing processes are in place for stakeholders to raise issues and get feedback.*

E.ON is strongly engaged with communities and stakeholders on environmental and social issues management. This is discussed in greater depth in O-1.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, feedback on how issues raised have been taken into consideration has been thorough and timely.*

As described briefly in O-1, some stakeholders described the amount of time it has taken to get E.ON to discuss some of their concerns (for example one referred to 'struggling for 20 years' to engage E.ON in the Obernach fish-passage proposal, see O-15 and O-19), and more than one external interviewee complained of limited feedback from E.ON and the difficulty of knowing whom to contact, resulting from repeated organisational changes, though they do say this has now improved. Others referred to being kept very well-informed at an early stage. One informant suggested that the plant should have a single contact person available on-site. The absence of thorough and timely feedback on how issues raised have been taken into account is a **significant gap** against proven best practice.

**Criteria met: No**

## 3.2.4 Conformance / Compliance

### Analysis against basic good practice

***Scoring statement:*** *Processes and objectives in environmental and social management plans have been and are on track to be met with no major non-compliances or non-conformances, and environmental and social commitments have been or are on track to be met.*

All environmental permitting and regulatory requirements are met according to several informants. Commitments made concerning environmental and social issues management are fully met, such as recent work to establish the Krün and Obernach fish passages and distribution of benefits to the Walchenseestiftung for example.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no non-compliances or non-conformances.*

There are no non-compliances or non-conformances.

**Criteria met: Yes**

## 3.2.5 Outcomes

### Analysis against basic good practice

***Scoring statement:*** *Negative environmental and social impacts associated with hydropower facility operations are avoided, minimised and mitigated with no significant gaps; and land disturbance associated with development of the hydropower project is rehabilitated or mitigated.*

The impacts of specific environmental hazards, such as the containment of oil leakage, are avoided, due to the sound management of the plant, effective technology, and the plant managers' excellent housekeeping over

decades. EIA procedures for specific local projects are followed, and impacts avoided or minimised. In recent years, E.ON has taken significant steps to mitigate long-standing environmental impacts - specifically restoration of flows in the Isar (see O-19) and impacts on fish populations (see O-15). A specific impact that remains to be addressed is the management of erosion of the banks of Lake Walchensee.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, negative environmental and social impacts associated with hydropower facility operations are avoided, minimised, mitigated and compensated with no identified gaps.*

Environmental performance at the site is high, some of the fish-passage measures can be regarded as compensation, compensation and project benefits are provided to the local community, and there are no identified gaps.

**Criteria met: Yes**

## 3.2.6 Evaluation of Significant Gaps

### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

### Analysis of significant gaps against proven best practice

The absence of a thorough and timely feedback on how issues raised have been taken into account.

The absence of a systematic process for the identification of issues that takes into account broader social considerations, risks and opportunities.

**2 or more significant gaps**

# 3.3 Scoring Summary

The Walchensee plant's performance in terms of the environmental and social outcomes of the project is very high. This has been achieved on the basis of a strong relationship with local stakeholders, strong regulatory compliance, and committed plant managers. In addition, environmental management processes have recently been certified to meet ISO 14001 standards.

However, systematic processes for the identification of emerging issues do not take into account broader social considerations, risks and opportunities, although they address environmental aspects. In addition, several stakeholders have identified a lack of timeliness and thoroughness in feedback on socio-environmental issues of concern to the local community.

There are two significant gaps against the criteria for Proven Best Practice, resulting in a score of 3.

**Topic Score: 3**

# 3.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 124, 125, 126, 127, 129, 130, 131, 132, 135, 147, 149, 150, 151, 152, 153 |
| **Document:** | 10, 14, 15, 27, 28, 31, 32, 33 |
| **Photo:** | 1d, 1k, 1m |

# 4 Hydrological Resource (O-4)

This topic addresses the level of understanding of the hydrological resource availability and reliability to the operating hydropower facility. The intent is that power generation planning and operations take into account a good understanding of the hydrological resource availability and reliability in the short- and long-term, taking into account other needs, issues or requirements for the inflows and outflows as well as likely future trends (including climate change) that could affect the facility.

## 4.1 Background Information

The owner of the Walchensee power plant is in an advanced stage of implementing a state-of-the-art control system for all hydropower assets. The Walchensee system of hydropower plants will be fully integrated into this system as of 2015. The system gives the operator outstanding control of the combined water and generating resources.

A very important aspect of water resources management at Walchensee is the fact that Deutsche Bahn (the German national railways) owns the rights to 1/3 of the plant's generation. Due to the extreme variations in DB's power demand, short-term regulation is a fundamental priority.

Walchensee is also an important black-start plant in the German electricity network, and it is policy that in case of complete grid failure, the national network is rebuilt from Bavaria.

## 4.2 Detailed Topic Evaluation

### 4.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Monitoring is being undertaken of hydrological resource availability and reliability, and ongoing or emerging issues have been identified; inputs include field measurements, appropriate statistical indicators, issues which may impact on water availability or reliability, and a hydrological model.*

The hydrological resource is being continuously monitored at a high level of detail and with good quality. Standard statistical analyses have been performed and E.ON has opted to define statistical bands within which to operate. Weather forecasts and predicted snow melting in the short term are taken into account. Monitoring is done in parallel by E.ON-external actors, the key one being the Water Authority in Weilheim, and the Walchensee operators have access to all relevant real-time data from inside and outside of the Isar catchment. Some of this data is also publicly available, e.g. flood warnings and flood monitoring. Control is exercised with the aid of a highly sophisticated system where, in a few years' time, all hydropower operations will be run from the control centre in Landshut. Stage readings are fed into the control system with regular intervals, making the system response to external and internal forces readily apparent to the operators. This is backed by a standard hydrological model of the rainfall-runoff type (in the Water Authority).

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, issues that may impact on water availability or reliability have been comprehensively identified; and scenarios, uncertainties and risks are routinely and extensively evaluated over the short- and long-term.*

The fairly limited analysis of climate-change scenarios is judged as a non-significant gap under this topic. Using traditional trend analyses is judged as a satisfactory approach, given the huge uncertainties in climate

modelling in the Alp region for purposes as detailed and refined as the operation of hydropower assets in a complex system.

**Criteria met: Yes**

## 4.2.2 Management

### Analysis against basic good practice

***Scoring statement:*** *Measures are in place to guide generation operations that are based on analysis of the hydrological resource availability, a range of technical considerations, an understanding of power system opportunities and constraints, and social, environmental and economic considerations.*

The control system is highly sophisticated and based on an ongoing analysis of the available water. Reference is continually made to flow requirements elsewhere in the systems under joint control – e.g. water depth and flow for shipping purposes on the Donau (Danube), and several others.

Operations management takes market opportunities into consideration through a shadow-pricing approach for available water, thereby optimising economic returns on the power that is possible to sell on the spot market.

Social issues are managed through frequent contacts with affected communities (mainly people residing around the Walchensee and Kochelsee lakes) as well as regular contacts with the regional authorities in Bad Tölz.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, generation operations planning has a long-term perspective; fully optimises and maximises efficiency of water use; and has the flexibility to anticipate and adapt to future changes.*

The relatively limited analysis of climate-change scenarios is a non-significant gap also under this criterion.

The integrated catchment-management planning and catchment protection provisions that are supported by the project. The incorporation of flood mitigation practices into reservoir operation and the integration of irrigation and water supply management would be examples.

Sharing the water and generation assets with Deutsche Bahn is a management challenge, but it is fully internalised into the adopted management approaches and does not affect outcomes negatively. Within the regulatory limits, which address many socio-environment considerations, the water-resource use is fully optimised.

**Criteria met: Yes**

## 4.2.3 Evaluation of Significant Gaps

### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

### Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

**0 significant gaps**

## 4.3 Scoring Summary

The hydrological resource is very well managed overall, with an extremely sophisticated control system. The fairly basic review of available climate-change research for the catchment (located in the Alps, a region that is highly debated in relation to the subject) detracts only marginally from the otherwise very solid approach to water-resources management.

It should be noted that the ownership split between Deutsche Bahn and E.ON is a management challenge, but it is well handled.

There are no significant gaps at the level of proven best practice, resulting in a score of 5.

**Topic Score: 5**

## 4.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 122, 124, 126, 127, 129, 130, 131, 134, 136, 140 |
| **Document:** | 31, 40, 41, 42, 43, 44 |
| **Photo:** | None |

# 5 Asset Reliability and Efficiency (O-5)

This topic addresses the reliability and efficiency of the hydropower facility and associated network assets. The intent is that assets are maintained to deliver optimal performance in the short- and long-term in accordance with the overall electricity generation and supply strategy of the owner/operator.

## 5.1 Background Information

With approximately 5% of the electricity generated by the German hydropower fleet of E.ON, and the ability, as a storage plant, to produce high-value peak power and ancillary grid services (including black-start capability), Walchensee is an important power station for E.ON. This requires a high level of availability of the 8 units in the main power house, which ranged between 94% and 98% between 2001 and 2010. In addition, the Walchensee plant group also consists of a number of weirs, tunnels, secondary power stations and other assets that are up to 90 years old and need to be operated and maintained to achieve a high level of plant performance.

## 5.2 Detailed Topic Evaluation

### 5.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Routine monitoring of asset condition, availability and reliability is being undertaken to identify risks and assess the effectiveness of management measures; and ongoing or emerging asset maintenance and management issues have been identified.*

E.ON maintains a comprehensive asset register and all assets are regularly inspected, cleaned, measured, tested, and maintained, at intervals between every day and every 10 years. Examples for asset inspection and maintenance works are the annual inspections of Lake Walchensee's banks which are lined and require maintenance; the ongoing supervision of the 4 Francis and 4 Pelton turbines in the main power station; the inspections and repairs by divers at the surge tank; checking of the intake tunnel by a diving robot every 8 years; the testing of the safety valve at intake twice per year. For more important assets, whether for safety or for commercial reasons, their condition and availability is tracked, and the risks from loss of assets or unplanned outages are calculated.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, identification of ongoing or emerging asset maintenance and management issues takes into account both risks and opportunities.*

When monitoring the assets of the Walchensee group, as of other assets in its portfolio, E.ON takes emerging technologies and commercial opportunities and risks into account. For example, new conditions in electricity markets are changing the importance of different electricity services, the value of certain assets, the objectives for their availability, and therefore investments into their maintenance.

**Criteria met: Yes**

## 5.2.2 Management

### Analysis against basic good practice

***Scoring statement:*** *Measures are in place to address routine monitoring and maintenance requirements of the operating facility in accordance with the overall electricity generation and supply strategy of the owner/operator.*

Routine asset monitoring and maintenance is organised through an integrated system. For major rehabilitation or upgrading projects, E.ON has introduced a prioritisation and decision-support mechanism based on AERO (Asset Engineering Risks and Opportunities), where projects are ranked according to cost, safety, and environmental and regulatory risks. No high-priority projects have currently been identified for Walchensee.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, processes are in place to anticipate and respond to emerging risks and opportunities; and asset maintenance management plans include a long-term program for efficiency improvements and asset upgrades.*

The AERO process has been introduced to systematically identify and prioritise responses to emerging risks and opportunities, over the medium term. However, there is no mechanism for long-term asset maintenance and upgrade planning, and some concern has been voiced over the ability of a reduced staff and outsourced maintenance functions to maintain asset conditions. This is a **significant gap**.

**Criteria met: No**

## 5.2.3 Conformance / Compliance

### Analysis against basic good practice

***Scoring statement:*** *Processes and objectives relating to asset maintenance and management have been and are on track to be met with no major non-compliances or non-conformances, and any asset related commitments have been or are on track to be met.*

There are no major non-conformances or non-compliances on record for the Walchensee plant group and all commitments have been met.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no non-compliances or non-conformances.*

There are no non-conformances or non-compliances.

**Criteria met: Yes**

## 5.2.4 Outcomes

### Analysis against basic good practice

***Scoring statement:*** *Asset reliability and efficiency performance is in line with the objectives of the owner/operator and any asset performance guarantees with only minor gaps.*

The performance of the assets of the Walchensee plant group is in line with the objectives of the operator and the two customers.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *Asset reliability and efficiency performance is fully in line with the objectives of the owner/operator and any asset performance guarantees.*

The performance of the assets of the Walchensee plant group is fully in line with the objectives of the operator and the two customers

**Criteria met: Yes**

## 5.2.5 Evaluation of Significant Gaps

### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

### Analysis of significant gaps against proven best practice

E.ON manages its hydropower assets on the basis of routine monitoring mechanisms. In the absence of a long-term asset-management programme, there is limited ability to schedule major investments into upgrades and expansions according to evolving corporate objectives as well as market and regulatory conditions.

**1 significant gap**

# 5.3 Scoring Summary

There is convincing evidence of a comprehensive asset-management system both at corporate and at plant level. The current performance of the Walchensee plant group - with high availability and without any major current maintenance requirements - could only be achieved with a careful and systematic approach to O&M, which needs to be sustained even with significant retrenchment and outsourcing. Any future upgrades will be subject to a decision-support mechanism which automatically prioritises compliance with safety and other statutory requirements, and investments into the continued high availability of high-value plants such as Walchensee. However, due to the absence of a long-term asset plan, such upgrades would necessarily be the result of a reactive, "bottom-up" identification mechanism, not complemented by a "top-down" mechanism which proactively takes higher-level developments into account. This is seen as a significant gap.

There is one significant gap at the level of proven best practice, resulting in a score of 4.

**Topic Score: 4**

# 5.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 124, 136, 137, 142 |
| **Document:** | 97, 98, 99, 100, 101, 102, 103 |
| **Photo:** | None |

# 6 Infrastructure Safety (O-6)

This topic addresses management of dam and other infrastructure safety. The intent is that life, property and the environment are protected from the consequences of dam failure and other infrastructure safety risks.

## 6.1 Background Information

In Germany, responsibilities for dam and other infrastructure-safety risks are distributed and managed jointly between owners/operators, supervisory authorities at the state level (in this case, the state of Bavaria), independent technical agencies such as the TÜV, and professional associations which issue guidelines and standards. The Walchensee project operates under an old license which includes few safety conditions, does not include a major dam, and public-safety risks are low compared to most other hydropower projects. However, it has minor risks because of multiple operating sites, which are remotely controlled and not permanently manned; the most hazardous elements of the project from a public-safety point of view are the surge tank and penstocks at the power plant. The black-start ability of the Walchensee power plant and emergency generators at other operating points provide for ensuring own power supply and operating safety-relevant equipment. Public-safety issues overlap with employee-safety issues (see O-12). Operations of the Walchensee plant make a positive contribution to flood-risk management.

## 6.2 Detailed Topic Evaluation

### 6.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Routine monitoring of dam and infrastructure safety is being undertaken to identify risks and assess the effectiveness of management measures; and ongoing or emerging dam and other infrastructure safety issues have been identified.*

All safety-relevant components of the Walchensee project are monitored continuously or periodically. Monitoring systems are based on the operator's own experience as well as on external guidelines.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, identification of ongoing or emerging safety issues takes into account consideration of a broad range of scenarios and both risks and opportunities.*

E.ON as operator of the project as well as professional associations and authorities in Germany permanently review and update applicable safety standards and safety-management procedures, upon which monitoring requirements are based.

**Criteria met: Yes**

### 6.2.2 Management

#### Analysis against basic good practice

***Scoring statement:*** *Dam and other infrastructure safety management plans and processes have been developed in conjunction with relevant regulatory and local authorities with no significant gaps, and provide for communication of public safety measures; emergency response plans and processes include awareness and training programs and emergency response simulations.*

Any safety issues identified through asset monitoring are addressed through regular maintenance and upgrading or rehabilitation projects. Safety-management procedures are comprehensive. The public is informed of safety risks through warning signs and visual alarms. Operational guidelines for emergencies exist and emergency-response simulations are conducted; the last one with relevance for the Walchensee project was a joint simulation with authorities for a 100-year Isar flood event.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, processes are in place to anticipate and respond to emerging risks and opportunities; and public safety measures are widely communicated in a timely and accessible manner.*

Processes are in place to respond and anticipate to emerging risks and opportunities and timely, transparent communication is evident in public information.

**Criteria met: Yes**

## 6.2.3 Conformance / Compliance

### Analysis against basic good practice

***Scoring statement:*** *Processes and objectives relating to safety have been and are on track to be met with no major non-compliances or non-conformances, and safety related commitments have been or are on track to be met.*

The Walchensee project complies with all safety-relevant guidelines and conditions, and conforms to all internal safety-relevant plans and processes.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no non-compliances or non-conformances.*

There are no non-compliances or non-conformances.

**Criteria met: Yes**

## 6.2.4 Outcomes

### Analysis against basic good practice

***Scoring statement:*** *Safety risks have been avoided, minimised and mitigated with no significant gaps.*

Safety risks are comprehensively addressed and no opportunities for further improvement can be identified. The plant has an excellent safety record.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, safety risks have been avoided, minimised and mitigated with no identified gaps; and safety issues have been addressed beyond those risks caused by the operating facility itself.*

There are no identified gaps in the avoidance, minimisation and mitigation of safety risks. The flood-protection function of the Walchensee reservoir addresses a highly significant risk beyond that caused by the plant itself.

**Criteria met: Yes**

### 6.2.5 Evaluation of Significant Gaps

#### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

#### Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

**0 significant gaps**

## 6.3 Scoring Summary

E.ON Wasserkraft in general, and the Walchensee plant in particular, maintain an excellent public-safety record, supported by strong processes, including an effective cooperation with public authorities and independent experts. There are no significant gaps at the level of proven best practice, resulting in a score of 5.

**Topic Score: 5**

## 6.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 129, 131, 136, 141, 146, |
| **Document:** | 31, 104, 105, 106, 107, 108, 109, 110 |
| **Photo:** | None |

# 7 Financial Viability (O-7)

This topic addresses financial management of the operating hydropower facility, including funding of measures aimed at ensuring project sustainability, and the ability of the project to generate the required financial returns to meet funding requirements as well as to optimise its financial opportunities. The intent is that the operations of the hydropower facility are proceeding on a sound financial basis that covers all funding requirements including social and environmental measures and commitments, and that it is aware of and responding to market trends which may influence its long-term viability.

## 7.1 Background Information

The Walchensee plant has long been a reliable source of revenue of major importance for its owner. Revenue streams come from a long-term power-purchase agreement with the German railways (Deutsche Bahn), and from sales to the associated E.ON Energy Trading company. No expenses for major rehabilitation or construction have been necessary at the main power station recently, since the information centre was constructed. Minor investments have been and are being undertaken at other points in the Walchensee plant group, some of them with financial support through feed-in tariffs under the German renewable-energy law.

## 7.2 Detailed Topic Evaluation

### 7.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Routine monitoring of the operating hydropower facility's finances is being undertaken to identify risks and assess the effectiveness of management measures; and ongoing or emerging financial management issues have been identified.*

Issues of financial relevance for the Walchensee plant group are identified by comprehensive budgeting and financial-monitoring mechanisms in accordance with E.ON's fleet-wide systems. On the operational-expenditure side, decision-making responsibilities and information requirements depend on the scale of planned O&M and capital expenditures. On the revenue side, generation is dispatched and sales are coordinated by a specialised E.ON subsidiary.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, identification of ongoing or emerging financial management issues takes into account both risks and opportunities including factors and trends that might influence future demand for electricity, water and ancillary services.*

The E.ON group maintains a strong corporate-level analytical capability to optimise its energy operations under evolving regulatory and political environments and market conditions. Less attention is paid to the evolving demand for water services - such as flood control and recreation - operational constraints arising from these, and their financial implications. This is considered a non-significant gap.

**Criteria met: Yes**

### 7.2.2 Management

#### Analysis against basic good practice

***Scoring statement:*** *Measures are in place for financial management of the operating hydropower facility.*

Comprehensive financial-management processes are in place.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, processes are in place to anticipate and respond to emerging risks and opportunities; and financial contingency measures can be implemented for environmental and social management plans if required.*

Processes are in place to anticipate and respond to emerging risks and opportunities with financial implications. E.ON has sufficient financial capacity to respond to environmental and social contingencies.

**Criteria met: Yes**

## 7.2.3 Conformance / Compliance

### Analysis against basic good practice

***Scoring statement:*** *Processes and objectives relating to financial management have been and are on track to be met with no major non-compliances or non-conformances, and funding commitments have been or are on track to be met.*

There are no major current non-compliances and non-conformances at the Walchensee plant group, and funding commitments are being met.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no non-compliances or non-conformances.*

There are no current non-compliances and non-conformances.

**Criteria met: Yes**

## 7.2.4 Outcomes

### Analysis against basic good practice

***Scoring statement:*** *The operating hydropower facility or the corporate entity to which it belongs can manage financial issues under a range of scenarios, can service its debt, and can pay for all plans and commitments including social and environmental.*

The operating facility enjoys a wide margin of financial surplus under a range of scenarios, can service its debt and pay for all socio-environmental plans and commitments.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, the operating hydropower facility or the corporate entity to which it belongs can manage financial issues under a range of scenarios, and has optimised or is on track to optimise its market position with respect to supply and demand for electricity, water and ancillary services.*

The operating facility enjoys a wide margin of financial surplus under any conceivable scenario. There might be opportunities to further increase financial viability as well as environmental and social outcomes by not just optimising within operational constraints, but analysing the financial implications of constraints and designing smarter operational rules; however, given the limited storage capacity of the Walchensee lake and the fact that the project does not control the resource, this is unlikely to result in dramatic changes, and therefore seen as a non-significant gap.

Criteria met: Yes

### 7.2.5 Evaluation of Significant Gaps

#### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

#### Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

0 significant gaps

## 7.3 Scoring Summary

The financial management of the Walchensee project is comprehensive, generating stable and positive returns for its owner. Operations are optimised within the constraints given by other objectives, such as flood control, recreation, and environmental flows.

There are no significant gaps at the level of proven best practice, resulting in a score of 5.

Topic Score: 5

## 7.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 124, 134, 136, 138, 140 |
| **Document:** | 97, 111, 112, 113, 114, 115, 116, 117, 118 |
| **Photo:** | None |

# 8 Project Benefits (O-8)

This topic addresses the benefits that were committed to alongside development of the hydropower facility, in cases where these commitments are well-documented against a pre-project baseline. The intent is that commitments to additional benefits and benefit sharing strategies made during development of the hydropower facility are fulfilled, and that communities affected by the hydropower development have benefitted. In the case of older projects where there is an absence of well-documented commitments to project benefits made at the time of project approval or an absence of data on the pre-project baseline against which to compare post-project, this topic is Not Relevant; in this case, issues in relation to project benefits should be taken into consideration under topic O-3 Environmental and Social Issues Management.

This topic is Not Relevant to the Walchensee assessment. Documents that set out commitments to the sharing of benefits, made at the time of Walchensee's development, are not available. Financial benefits of the project, distributed to householders living around Walchensee are discussed under O-3.

# 9 Project-Affected Communities and Livelihoods (O-9)

This topic addresses how impacts of development of the hydropower facility on project affected communities have been addressed, in cases where these commitments are well-documented against a pre-project baseline. The intent is that livelihoods and living standards impacted by the project have been improved relative to pre-project conditions for project affected communities with the aim of self-sufficiency in the long-term, and that commitments to project affected communities have been fully fulfilled. In the case of older projects where there is an absence of well-documented commitments to project-affected communities made at the time of project approval or an absence of data on the pre-project baseline against which to compare post-project, this topic is Not Relevant; in this case, issues in relation to project affected communities should be taken into consideration under topic O-3 Environmental and Social Issues Management.

This topic is Not Relevant to the Walchensee assessment. Documents that set out commitments to the community of Walchensee, made at the time of Walchensee's development, are not available. Financial benefits of the project, distributed to householders living around Walchensee are discussed under O-3.

# 10 Resettlement (O-10)

This topic addresses how the physical displacement arising from development of the hydropower facility has been addressed, in cases where resettlement occurred and commitments are well-documented against a pre-project baseline. The intent is that the dignity and human rights of those physically displaced have been respected; that these matters have been dealt with in a fair and equitable manner; that livelihoods and standards of living for resettlees and host communities have been improved; and that commitments made to resettlees and host communities have been fully fulfilled. In the case of older projects where there is an absence of well-documented commitments in relation to resettlement made at the time of project approval or an absence of data on the pre-project baseline against which to compare post-project, this topic is Not Relevant; in this case, issues in relation to resettlement should be taken into consideration under topic O-3 Environmental and Social Issues Management.

This topic is Not Relevant to the Walchensee assessment. The development of the project did not require physical displacement. However, physical displacement has been required since development, as the foundations of some houses located on the shore of Lake Walchensee have been destroyed by erosion. This issue is addressed under O-3.

# 11 Indigenous Peoples (O-11)

This topic addresses the rights, risks and opportunities of indigenous peoples with respect to the hydropower facility, recognising that as social groups with identities distinct from dominant groups in national societies, they are often the most marginalized and vulnerable segments of the population. The intent is that the operating facility respects the dignity, human rights, aspirations, culture, lands, knowledge, practices and natural resource-based livelihoods of indigenous peoples in an ongoing manner throughout the project life.

This topic is Not Relevant to the Walchensee assessment. There are no distinct social or cultural groups that would be regarded as indigenous groups.

# 12 Labour and Working Conditions (O-12)

This topic addresses labour and working conditions, including employee and contractor opportunity, equity, diversity, health and safety. The intent is that workers are treated fairly and protected.

## 12.1 Background Information

The Walchensee plant applies the detailed occupational safety and human resources policies and procedures of the E.ON Group and E.ON Hydro Fleet. A company-wide Workers' Council is a key mechanism for employee engagement (under German law, councils represent interests of employees and have certain rights and duties).

## 12.2 Detailed Topic Evaluation

### 12.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *A periodically updated assessment has been undertaken of human resource and labour management requirements for the operating facility, including occupational health and safety (OH&S) issues, risks, and management measures, with no significant gaps; monitoring is being undertaken to assess if management measures are effective; and ongoing or emerging labour management issues have been identified.*

The Walchensee power plant benefits from the comprehensive system of occupational health and safety as well as human resources management of the E.ON Group and the E.ON Hydro Fleet. In keeping with this system, occupational health and safety issues and management requirements are addressed, specifically through the Annual HSE Management Review, and an annually updated Safety Management Policy. It is less clear that there is a 'periodic assessment' of human resources issues, as required by the Protocol scoring statement, though Human Resources officers remain updated on legislative requirements and set annual objectives. These systems are also informed by insurance requirements.

There is regular monitoring of occupational health and safety - specifically TRI (Total Reported Incidents) and LTI (Lost Time Incidents) - with monthly and annual reporting to the Hydro Fleet Board on TRI and LTI targets and safety incidents. Detailed procedures are followed for the reporting of incidents according to the level of severity. Ongoing and emerging labour issues are systematically identified.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, identification of ongoing or emerging labour management issues takes broad considerations into account, and both risks and opportunities.*

Occupational health and safety and human resources practices, encompass broad considerations by drawing upon peer review, 'safety walk and talks' with senior management, and a keenness to improve performance. This is demonstrated by recent moves to periodically assess the safety culture of each river group managed by E.ON, based on a safety awareness survey. All employees are encouraged to report unsafe practices, and numerous posters in E.ON offices indicate management's determination to excel in safety performance.

Information on human-resources plans are shared with the E.ON-wide Workers' Council, and meetings are held with this council. The Isar river group manager is regularly invited to Workers' Council meetings.

**Criteria met: Yes**

## 12.2.2 Management

### Analysis against basic good practice

***Scoring statement:*** *Human resource and labour management policies, plans and processes are in place to address all labour management planning components, including those of contractors, subcontractors, and intermediaries, with no significant gaps.*

Extensive and detailed policies, plans and processes are in place within the E.ON Group and Hydro Fleet that apply to Walchensee. These include: a Safety Management Policy (updated annually and including vision, policy statement and roles and responsibilities for the generation fleet), Annual HSE management review, HSE handbook and procedures (c.40 procedures), annual safety improvement plans, regular reporting to the Hydro Board, annual analysis of incident numbers and severity, PPE policies, a system of four categories of incident, 'Safety awareness' reporting cards for all employees (and contractors and visitors), subcontractor management (see below), and management safety walk and talks. Incidents of a certain level of severity are investigated systematically by a working group, as demonstrated by a recent incident involving a surfing member of the public. Safety is the first item on the Hydro Management Board meeting agenda, and therefore reported on a monthly and annual basis. A Process and Plant Safety Management Procedure is planned to be put in place this year.

Contractor management has been the subject of efforts to improve performance, resulting in a reduction of incidents (from 10 to 3) in the Hydro Fleet in 2011. Measures include a policy on subcontractor management, evaluation of suppliers according to their safety performance, instruction of responsible persons on-site, and contractors are asked to present risk assessments.

Human resources are managed centrally by the Regional Unit, Germany. All employees have a contract with job description, appraisal at least once per year, and benefits (in terms of leave etc.) meet or exceed national regulatory requirements. A Workers' Council, required by law, offers a key means for E.ON discussion with employees. The Workers' Council negotiates binding agreements with management and advises on company strategy. Company doctors are employed by the Regional Unit to serve each river group.

There are some minor non-significant gaps, specifically in human resources management. Specific objectives for improving HR management are not set, and subcontractor evaluation forms do not include human resources or labour issues.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

Processes in place to respond to emerging risks and opportunities are the monthly and annual reporting of occupational health and safety performance, and the extensively promoted safety-awareness reporting cards. The company doctors focus on specific health issues to improving through awareness-raising each year.

More specifically, E.ON has introduced quality management which will oversee performance in adhering to HSE policies, and procedures on the escalation of non-conformances; contacts of the responsible stand-by persons for Walchensee are available at all times on the company intranet.

Broader opportunities that are taken and are noteworthy include the sponsorship of employee professional development, sabbaticals for education, and support to apprenticeships, though it is not clear these specifically apply to the Walchensee plant. An opportunity at the Walchensee plant that has been taken is the employment of retired employees at the Walchensee Infozentrum.

**Criteria met: Yes**

### 12.2.3 Stakeholder Engagement

#### Analysis against basic good practice

***Scoring statement:*** *Ongoing processes are in place for employees and contractors to raise human resources and labour management issues and get feedback.*

Processes are in place for employees to raise issues on occupational health and safety, labour management (including safety awareness cards), and human resources issues, through their managers, HR department or the Workers' Council.

Engagement of employees has been a key concern during retrenchment, which is ongoing in E.ON Germany. For example, this will be of pertinence to the Walchensee Control Room as it is demobilised, with control operations being centralised in Landshut: social plans are drawn up concerning compensation and relocation, following a standard format agreed with the Workers Council.

There are no outstanding grievances at Walchensee reported by the Human Resources department. Grievances in the Hydro Fleet are generally less frequent than in other parts of E.ON.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, feedback on how issues raised have been taken into consideration has been thorough and timely.*

Feedback on how issues raised have been address is thorough and timely. The chair of the Workers' Council agrees that feedback is timely and thorough. A specific example is that an employee at Walchensee requested additional training in anticipation of organisational changes, the request was facilitated by the Workers' Council and granted by management.

**Criteria met: Yes**

### 12.2.4 Conformance / Compliance

#### Analysis against basic good practice

***Scoring statement:*** *Processes and objectives relating to human resource and labour management have been and are on track to be met with no major non-compliances or non-conformances, and any labour related commitments have been or are on track to be met.*

Objectives, especially in occupational health and safety, as set out in the Safety Improvement Plans, are met or on track to be met. Human Resources commitments appear to be met. All legal requirements are set out in E.ON's Operational Manual. The Human Resources officer interviewed presented a comprehensive list of pertinent labour regulations with which E.ON complies. He also presented a key resource book E.ON uses to track regulatory requirements. The E.ON Group Human Resources Department provides updates in labour requirements relevant to the Hydro Fleet, and the officer attends seminars to keep abreast of developments.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no non-compliances or non-conformances.*

There are no non-compliances or non-conformances. The Hydro Fleet annual safety report indicates significant improvements from 2010 to 2011: all targets were reached or exceeded, contractor management improved, there were no fatalities or falls from height, and TRI Frequency was reduced by 36%. There was one severe incident at another plant (involving explosion of an industrial chemical). There are no reported non-conformances on labour management issues at Walchensee, and commitments set out in

'Betriebsvereinbarungen' (company-level agreements with the Workers' Council on working conditions) are always kept.

**Criteria met: Yes**

### 12.2.5 Outcomes

#### Analysis against basic good practice

***Scoring statement:*** *There are no identified inconsistencies of labour management policies, plans and practices with internationally recognised labour rights.*

E.ON state that their labour and occupational safety management follow ILO standards. This assessment has not found any inconsistencies with internationally recognised labour rights.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, labour management policies, plans and practices are demonstrated to be consistent with internationally recognised labour rights.*

E.ON Wasserkraft obtained certification to ISO / OHSAS 18001 in November 2012. This demonstrates that policies, plans and practices are consistent for rights concerning occupational health and safety. E.ON Wasserkraft has not demonstrated that other labour policies, plans and practices meet internationally-recognised labour rights, for example through a separate analysis. However this is not a significant gap, as it is fully legally compliant in a jurisdiction that has put into force relevant international conventions.[2]

**Criteria met: Yes**

### 12.2.6 Evaluation of Significant Gaps

#### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

#### Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

**0 significant gaps**

## 12.3 Scoring Summary

The E.ON Group's and Hydro Fleet's comprehensive occupational health, safety and labour management practices apply effectively to the Walchensee plant, and significant improvements have been made, in the assessment of risks and opportunities as well as in management processes and outcomes, in recent years. E.ON Wasserkraft has recently obtained certification to ISO / OHSAS 18001 demonstrating that its processes and plans for occupational health and safety meet internationally-recognised best practices. There are no significant gaps against the level of Proven Best Practice, resulting in a score of 5.

**Topic Score: 5**

[2] Germany has put into force all of the ILO 'fundamental' conventions and UN conventions referred to in the IFC Performance Standard on Working Conditions, with the exception of the UN Convention on the Protection of the Rights of all Migrant Workers and Members of their Families.

## 12.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 129, 131, 132, 133, 135, 145, 148 |
| **Document:** | 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 29, 30, 31, 34, 35 |
| **Photo:** | 1j, 1l, 1n, 1o, 1p, 1q, 1v, 1w |

# 13 Cultural Heritage (O-13)

This topic addresses cultural heritage, with specific reference to physical cultural resources, associated with the hydropower facility. The intent is that physical cultural resources are identified, their importance is understood, and measures are in place to address those identified to be of high importance.

## 13.1 Background Information

The Walchensee power station, its associated operating points such as upstream weirs, and its operations do not have negative impacts upon local physical cultural heritage. On the contrary, the power station itself is protected since 1983 and listed on the Ministry of Culture List of Sites of Industrial Heritage. As a landmark of industrial development in Bavaria, and perhaps the best known hydropower station in Germany, it is a major attraction for regional tourism. The total annual gross revenue from tourism is estimated as € 290 million in the county, an order of magnitude larger than the electricity sales from the Walchensee plant. The site is well-maintained and presented, with an information centre that has received about one million visitors since its opening in 2001. The small town of Kochel, where the power station is located, is particularly heavily dependent on tourism, with 225 000 overnight stays in 2011.

## 13.2 Detailed Topic Evaluation

### 13.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Ongoing or emerging cultural heritage issues with respect to physical cultural resources have been identified, and if management measures are required then monitoring is being undertaken to assess if management measures are effective.*

Cultural heritage is managed by public authorities, at different administrative levels, who are responsible for continuously identifying and protecting sites. Since the listing of the power station as industrial heritage, no new issues have been identified. Owners of listed heritage assets are monitored for compliance and liable for damage to sites.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, identification of ongoing or emerging cultural heritage issues takes broad considerations into account, and both risks and opportunities.*

Authorities at different levels maintain a comprehensive system to identify and protect physical cultural heritage assets. E.ON as the owner of the listed power station is making a substantial effort to identify new opportunities. One such area has been improved public access, even where this requires investments and constraints on operations for safety reasons.

**Criteria met: Yes**

### 13.2.2 Management

#### Analysis against basic good practice

***Scoring statement:*** *Measures are in place to manage identified cultural heritage issues.*

For any repairs and changes to components of the industrial heritage site, the owner obtains permissions from the authorities. These sometimes require adjustments, as in the case of the design and location of the information centre, or limits the amount of modernisation that the owner can undertake.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

Given the outstanding qualities and attraction value of the heritage site with its importance for tourism in the region, and the unique historic, educational and scenic qualities of the iconic Walchensee power station, the owners cannot be considered as having responded to existing opportunities. Opportunities that were mentioned in interviews were e.g.: listing as a World Heritage site; listing as an element of a Biosphere Reserve, to demonstrate the compatibility of hydro-electric generation with the conservation of nature and sustainable development; improving the public's access to the viewpoint at the surge tank terrace (possibly through access to the cable car, but there are serious issues regarding, primarily, safety, or through a constructed walkway on the side of the cable car railway). There could be innovative public-private partnership solutions that do not unduly burden the owner with activities and liabilities outside its core business. A more proactive and systematic process of working with regional institutions and actors in exploring the further development of the site may unlock further opportunities. The lack of such a process is considered a **significant gap** at this level.

**Criteria met: No**

## 13.2.3 Conformance / Compliance

### Analysis against basic good practice

***Scoring statement:*** *Processes and objectives in place to manage cultural heritage issues have been and are on track to be met with no significant non-compliances or non-conformances, and cultural heritage related commitments have been or are on track to be met.*

The owner is in compliance with regulatory obligations to protect and manage the power station as an industrial heritage site.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no non-compliances or non-conformances.*

There are no non-compliances or non-conformances.

**Criteria met: Yes**

## 13.2.4 Outcomes

### Analysis against basic good practice

***Scoring statement:*** *Negative cultural heritage impacts arising from activities of the operating hydropower facility are avoided, minimised, mitigated and compensated with no significant gaps.*

No negative cultural-heritage impacts from the plant are known to require management.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, where opportunities have been identified, measures to address cultural heritage issues beyond those impacts caused by the facility have been or are on track to be achieved.*

Several opportunities to address cultural heritage beyond the impacts caused by the plant have been realised, the Infozentrum chief among these. Many more unrealised opportunities exist, but this is addressed under Management above.

**Criteria met: Yes**

## 13.2.5 Evaluation of Significant Gaps

### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

### Analysis of significant gaps against proven best practice

The lack of a more proactive and systematic process of working with regional institutions and actors in exploring the further development of the site is considered a significant gap at this level.

**1 significant gap**

# 13.3 Scoring Summary

The Walchensee power station has no negative impacts upon the cultural heritage of the region; in fact it has become a significant cultural asset, as it has been declared an Industrial Landmark in 1983. There is some potential to more systematically explore further improvement of the visitor experience and the attraction of the site, as a major attraction in a county where tourism revenues are roughly ten times higher than hydropower revenues, and local benefits from employment and tax revenues are even more dependent on tourism.

There is one significant gap at the level of proven best practice, resulting in a score of 4.

**Topic Score: 4**

# 13.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 122, 124, 125 |
| **Document:** | 119 |
| **Photo:** | None |

# 14 Public Health (O-14)

This topic addresses public health issues associated with the operating hydropower facility. The intent is that the operating facility has not created or exacerbated any public health issues; that ongoing or emerging public health issues associated with the facility are identified and addressed as required; and commitments to implement measures to address public health are fulfilled.

## 14.1 Background Information

There are few or no issues of public health associated with the waters utilised by the Walchensee plant or its operations, and public-health system capacity in the area is high. The only possible exception being the potential impacts of flows on downstream sewage facilities, leakage of hazardous materials into waters used by the public, and possible impacts on health from electromagnetic fields around transmission lines (a hotly debated issue in the research community).

## 14.2 Detailed Topic Evaluation

### 14.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Ongoing or emerging public health issues associated with the operating hydropower facility have been identified, and if management measures are required then monitoring is being undertaken to assess if management measures are effective.*

There are no significant issues of public health associated with the Walchensee plant. The water in the lakes and rivers is reported to be of drinking-water quality (but note that all drinking-water supplies in the area are sourced from groundwater).

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, identification of ongoing or emerging public health issues takes into account public health system capacities, access to health services, and health needs, risks and opportunities for different community groups.*

The Protocol scoring statement requirements for this criterion (local public-health system capacities and the specific requirements of different community groups) are not relevant in this context, where there are no significant public-health issues and public-health system capacity is high.

**Criteria met: Yes**

### 14.2.2 Management

#### Analysis against basic good practice

***Scoring statement:*** *Measures are in place to manage identified public health issues.*

No issues have been identified and no management measures specific to public health are required. The plant's management of environmental incidents would address any risks arising from pollution of river flows.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

Walchensee has demonstrated its ability to respond to emerging risks through its management of flows for the protection of public health when the impacts of floods in 1999 on the operation of a downstream sewage plant were averted by preventing the floods from reaching the plant. The plant is now flood-proof.

**Criteria met: Yes**

## 14.2.3 Conformance / Compliance

### Analysis against basic good practice

***Scoring statement:*** *Processes and objectives in place to manage public health issues have been and are on track to be met with no significant non-compliances or non-conformances, and public health related commitments have been or are on track to be met.*

No specific commitments are required, and there are no legal non-compliances. The Water Regulation Authority reports that there are no public-health issues related to the plant, and there would not be a permit to utilise the waters if there were.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no non-compliances or non-conformances.*

There are no non-compliances or non-conformances.

**Criteria met: Yes**

## 14.2.4 Outcomes

### Analysis against basic good practice

***Scoring statement:*** *Negative public health impacts arising from activities of the operating hydropower facility are avoided, minimised and mitigated with no significant gaps.*

There are no specific public-health impacts arising from the plant's operations.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, where opportunities have been identified, measures to address public health issues beyond those impacts caused by the operating hydropower facility have been or are on track to be achieved.*

No opportunities to address public-health issues beyond the impacts caused by the project are warranted in Walchensee's context.

**Criteria met: Yes**

## 14.2.5 Evaluation of Significant Gaps

### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

### Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

**0 significant gaps**

## 14.3 Scoring Summary

This topic is not of great relevance to the Walchensee plant, which operates in waters with no public-health issues, and the public-health system capacity in the area is high. The plant's overall management of environmental hazards, and responsiveness to potential risks of floods (as demonstrated by the sewage-plant example) demonstrate effective management of public-health issues. All interviewees questioned reported that there are no public-health issues.

There are no significant gaps at the level of proven best practice, resulting in a score of 5.

**Topic Score: 5**

## 14.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 124, 125, 130 |
| **Document:** | None |
| **Photo:** | None |

# 15 Biodiversity and Invasive Species (O-15)

This topic addresses ecosystem values, habitat and specific issues such as threatened species and fish passage in the catchment, reservoir and downstream areas, as well as potential impacts arising from pest and invasive species associated with the operating hydropower facility. The intent is that there are healthy, functional and viable aquatic and terrestrial ecosystems in the area that are sustainable over the long-term; that biodiversity impacts arising from the operating hydropower facility are managed responsibly; that ongoing or emerging biodiversity issues are identified and addressed as required; and that commitments to implement biodiversity and invasive species measures are fulfilled.

## 15.1 Background Information

The area surrounding the Walchensee project is of interest for its ecological integrity. Lakes Walchensee and Kochelsee, the area between them, and River Loisach are designated as a Natura 2000 protected area under the European Habitats Directive, and the River Isar is protected along its entire length.

## 15.2 Detailed Topic Evaluation

### 15.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Ongoing or emerging biodiversity issues have been identified, and if management measures are required then monitoring is being undertaken to assess if management measures are effective.*

Biodiversity issues that have been identified are the ecological effects of diversion of water from the River Isar on downstream river ecology, and the impacts of the Walchensee group of plants on the passage of spawning fish, particularly the Lake Trout (*Salmo trutta* morpha *lacustris*). The Lake Trout is not endangered, but is valued for recreational fishing. Continuous monitoring of ecological indicators is carried out extensively by the Water Regulation Authority, and fish stocks are annually surveyed through electro-fishing surveys. A university diploma assessed the condition of the River Obernach in 2008, as a precursor to the fish-passage project (see 'Management'), and a follow-up assessment is planned following completion of the project.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, identification of ongoing or emerging biodiversity issues takes into account both risks and opportunities.*

Risks for biodiversity have been identified through the activities described for basic good practice above. In addition, opportunities for restoring fish populations have been assessed through the preparation of the fish-passage project, and through direct engagement with stakeholders. In addition, the opportunity of restoring biodiversity is identified in the environmental aspects register for Walchenseekraftwerk.

**Criteria met: Yes**

### 15.2.2 Management

#### Analysis against basic good practice

***Scoring statement:*** *Measures are in place to manage identified biodiversity issues.*

Measures in place to address biodiversity issues include the downstream-flow releases below the Krün weir on the River Isar, beginning from 1990. Recent projects include fish passages, particularly for the Brown Trout,

including a fish ladder recently constructed at the Krün weir, a fish ladder in place at the Loisach canal, and a project to remove several small weirs and other migration obstacles in the River Obernach to allow fish passage (jointly with the State Fisheries Association and Forestry Bad Tölz). E.ON meets a seasonal pattern of flows required by regulations (see O-19), and has close cooperation with stakeholders on water levels and their ecological implications. The Garmisch Fisheries Club manages a fish hatchery and translocation activities to boost populations of angling fish, and fishing rights are allocated, including to E.ON, through an annual conference.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

Biodiversity is identified as an aspect in the environmental aspects register, alongside construction, operation and maintenance of fish ladders or bypass channels, fish stocking and maintenance activities. However, it is not clear that this is a sufficient process for anticipating or responding to emerging risks and opportunities for all biodiversity issues, for example effects on waterfowl species as well as fish species. Some stakeholders reported the significant amount of effort that has been required over the years (decades according to one stakeholder) to get E.ON to respond to demands for ecological restoration. The absence of a sufficiently comprehensive process to anticipate and respond to emerging risks and opportunities is a **significant gap** against proven best practice.

**Criteria met: No**

## 15.2.3 Conformance / Compliance

### Analysis against basic good practice

***Scoring statement:*** *Processes and objectives in place to manage biodiversity issues have been and are on track to be met with no significant non-compliances or non-conformances, and biodiversity related commitments have been or are on track to be met.*

Objectives and commitments in the management of biodiversity issues are met, and the local regulator (Water Regulation Authority) reports no non-compliances with ecological legal requirements. Informants reported that there are no conflicts with the regulatory Nature Conservation Unit.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no non-compliances or non-conformances.*

There are no non-compliances or non-conformances.

**Criteria met: Yes**

## 15.2.4 Outcomes

### Analysis against basic good practice

***Scoring statement:*** *Negative biodiversity impacts arising from activities of the operating facility are avoided, minimised, mitigated, and compensated with no significant gaps.*

Following the implementation of downstream releases on the Isar below the Krün weir and recent fish passage projects, biodiversity impacts are avoided or mitigated. Informants are broadly in agreement that the

implementation of downstream releases has had a positive effect on the diversity of flora and fauna downstream of the weir. There are no significant gaps.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, there are healthy, functional and viable aquatic and terrestrial ecosystems in the area affected by the hydropower facility that are sustained over the long-term; or the facility has contributed or is on track to contribute to addressing biodiversity issues beyond those impacts caused by the operating hydropower facility.*

Aquatic ecosystems in the River Isar downstream of Krün are broadly functional following the implementation of downstream releases, and in Lakes Walchensee and Kochelsee are similar to natural conditions. Terrestrial ecosystems are almost unaffected. The ecosystem can be considered a semi-natural habitat, with broadly functional ecosystems, especially following the completion of the fish passage projects. However, there may be further opportunities to enhance the biodiversity value and ecological integrity of the system that are not identified or taken (see 'Management').

**Criteria met: Yes**

## 15.2.5 Evaluation of Significant Gaps

### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

### Analysis of significant gaps against proven best practice

The absence of a sufficiently comprehensive process to anticipate and respond to emerging risks and opportunities is a significant gap against proven best practice.

**1 significant gap**

# 15.3 Scoring Summary

The Walchensee power plant has taken significant measures to mitigate ecological impacts in the river system, particularly the restoration of flows in the Isar and fish passage projects. However all of these efforts have been in response to stakeholder demands, in some cases over several years. E.ON does not have a sufficiently comprehensive process to proactively anticipate and respond to emerging issues for all aspects of biodiversity.

There is one significant gap against the criteria for Proven Best Practice, resulting in a score of 4.

**Topic Score: 4**

# 15.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 122, 123, 129, 125, 126, 130 |
| **Document:** | 33, 36, 37, 38, 39, 151, 152, 153 |
| **Photo:** | 1c, 1d, 1f, 1i, 1k, 1r, 1s |

# 16 Erosion and Sedimentation (O-16)

This topic addresses the management of erosion and sedimentation issues associated with the operating hydropower facility. The intent is that erosion and sedimentation caused by the operating hydropower facility is managed responsibly and does not present problems with respect to other social, environmental and economic objectives; that external erosion or sedimentation occurrences which may have impacts on the operating hydropower facility are recognised and managed; and that commitments to implement measures to address erosion and sedimentation are fulfilled.

## 16.1 Background Information

This topic has some strong overlap with O-18. All relevant assessment criteria relating to erosion and sediment issues that are affected by reservoir operation in any way will affect scoring on both topics. All identified gaps will be described under both topics but in order not to over-value the significance of a particular gap, the assessors have chosen to score each as significant only under the more relevant of the two topics.

An issue relevant to this topic is the substantial amount of coarse-grained sediments that is a natural feature of the Isar river and its tributaries. It is important to note in this respect that the regulation of the Isar, and of its regulated tributaries, is done in such a way as to open the weirs whenever a high-flow event is about to occur. This is done in order to protect the infrastructure (tunnels, canals, turbines etc.), and as such is a crucial and absolutely necessary management response to each such occurrence. This means that the flows that shape the entrainment, transportation and sedimentation of the coarser sediments are very near what they would have been without regulation.

The reservoir in Sylvenstein, downstream of the Krün weir, is a Government asset used mainly for flood control. As such it is important to be able to manage sediment transport in the Isar, since excessive deposition in the reservoir would reduce its volume and, hence, its capacity to fulfil its purpose.

There are conflicting views on how the sediments on the Isar should be managed. Different stakeholders with different specialist interest (notably fishermen and ornithologists) voice contradictory concerns and desires, making it impossible to satisfy all stakeholders' priorities.

## 16.2 Detailed Topic Evaluation

### 16.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Ongoing or emerging erosion and sedimentation issues have been identified, and if management measures are required then monitoring is being undertaken to assess if management measures are effective.*

There are three main issues relevant to assessment of this topic: the transport and possible sedimentation of the (generally very) coarse-grained sediments in the upper Isar catchment; the lake-shore erosion caused by the 6+ metres of fluctuations in the Walchensee and; the potential impacts that sediment could have on the infrastructure of the Walchensee plant (both waterways and machines). All of these are well investigated and effective monitoring is in place. The Government is responsible for monitoring the first issue, and the project/its owner is responsible for the other two. The potential damage that would be caused by sediments entering the waterway necessitates continuous monitoring of water levels and changes in flow, in order to be able to shut the intakes down in time. The impacts from lake-level fluctuations on the Walchensee is monitored on an annual basis, and outside stakeholders are invited to participate. This monitoring is documented.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, identification of ongoing or emerging erosion and sedimentation issues takes into account both risks and opportunities.*

Both risks and opportunities are regularly evaluated. Examples are: communication with regulators; and the annual inspections of shoreline erosion on Lake Walchensee.

**Criteria met: Yes**

## 16.2.2 Management

### Analysis against basic good practice

***Scoring statement:*** *Measures are in place to manage identified erosion and sedimentation issues.*

In response to the three issues identifies under Assessment above, for the first one, the sediment transport on the main Isar, there is well-developed co-operation with the authorities in Bad Tölz, who are the responsible manager of this issue. The second issue is an unavoidable impact from the regulation of waters – short-term regulation is a necessity for the plant to fulfil its purpose and the larger, inter-seasonal regulation is a license requirement, in order to provide extra flood control. The third is a survival issue for the Walchensee plant – experience has shown that allowing sediments to pass through the waterways cause extensive damage and will shut down operations for a considerable time, while waiting for repairs.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

The EMS in combination with regular communication with relevant stakeholders and regulators ensure that emerging risks and opportunities can be acted upon.

**Criteria met: Yes**

## 16.2.3 Conformance / Compliance

### Analysis against basic good practice

***Scoring statement:*** *Processes and objectives in place to manage erosion and sedimentation issues have been and are on track to be met with no significant non-compliances or non-conformances, and erosion and sedimentation related commitments have been or are on track to be met.*

All relevant commitments and regulatory requirements are met with no significant gaps.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no non-compliances or non-conformances.*

All relevant commitments and regulatory requirements are met with no gaps.

**Criteria met: Yes**

## 16.2.4 Outcomes

### Analysis against basic good practice

***Scoring statement:*** *Erosion and sedimentation issues are avoided, minimised and mitigated with no significant gaps.*

All relevant issues are either avoided or mitigated to the full extent possible.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, erosion and sedimentation associated with operating facility do not present ongoing problems for environmental, social and economic objectives of the facility or the project affected areas.*

The rather extensive damage to the Walchensee shoreline resulting from the 6+ metres regulation amplitude of the lake is a significant social and economic issue for the residents and the tourism industry around the lake. The problem is mitigated, but not avoided, and the lakeshore resident remain with a considerable impact to their living environment. This is a **significant gap** against proven best practice, even if the Walchensee project and its owner do not have full control over lake management.

**Criteria met: No**

## 16.2.5 Evaluation of Significant Gaps

### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

### Analysis of significant gaps against proven best practice

The extensive erosion damage to the Walchensee shoreline resulting from the 6+ metres of regulation amplitude is a significant social and economic issue for the residents and the tourism industry around the lake.

**1 significant gap**

# 16.3 Scoring Summary

This is a highly complex and important issue for the Walchensee plant. Very large amounts of coarse-grained sediments in the upper Isar is a significant management issue for both the plant itself and for the authorities in terms of nature conservation and habitat management as well as reservoir management for the Sylvenstein flood-control reservoir. Added to this is the shoreline erosion around the Walchensee lake, causing damages to private homes and affecting the very important tourism industry in the area. The issues are well managed and negative impacts are avoided or mitigated to the extent possible.

There is one significant gap against the criteria at the level of proven best practice, resulting in a score of 4.

**Topic Score: 4**

# 16.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 122, 124, 125, 126, 127, 130, 131, 137 |
| **Document:** | 32, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 68, 76, 77, 78, 79 |
| **Photo:** | 1a, 1b, 1g |

# 17 Water Quality (O-17)

This topic addresses the management of water quality issues associated with the operating hydropower facility. The intent is that water quality in the vicinity of the operating hydropower facility is not adversely impacted by activities of the operator; that ongoing or emerging water quality issues are identified and addressed as required; and commitments to implement measures to address water quality are fulfilled.

## 17.1 Background Information

Water-quality management is a highly regulated issue in Germany and Bavaria. Responsibility rests with the "Bayerisches Landesamt für Wasserwirtschaft" (the Bavarian state office for water affairs). That institution maintains a very comprehensive monitoring programme in order to address its responsibilities under the EU "Water Framework Directive" (directive 2000/60/EC).

## 17.2 Detailed Topic Evaluation

### 17.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Ongoing or emerging water quality issues have been identified, and if management measures are required then monitoring is being undertaken to assess if management measures are effective.*

The quality of the water in the Isar and Walchensee is very good. The Walchensee has even been investigated for the possibility of use as a source of drinking water (it has, however, not been used as such). Ongoing, very comprehensive, monitoring is undertaken by the Bavarian state office for water affairs.

Identified issues are potential accidental releases of dangerous substances upstream of the intakes as well as the sometimes poor water quality in the Loisach river, leading to problems in the Kochelsee and the Loisach downstream from there.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, identification of ongoing or emerging water quality issues takes into account both risks and opportunities.*

The comprehensive monitoring programme allows early identification of emerging risks and opportunities.

**Criteria met: Yes**

### 17.2.2 Management

#### Analysis against basic good practice

***Scoring statement:*** *Measures are in place to manage identified water quality issues.*

There are well defined communication channels for accidents with chemicals and other dangerous substances. The Government is the responsible actor, and informs the Walchensee managers if there is a need for their assistance. If this happens there are clear guidelines for how this relates to normal management and operation, and if needed, crisis routines might be invoked. Poor water quality of the Loisach's inflow to Kochelsee will sometimes cause the authorities to request increased releases from the Walchensee power plant, in order to dilute the Loisach load on the Kochelsee water.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

The comprehensive monitoring programme allows anticipation and response to emerging risks and opportunities.

**Criteria met: Yes**

## 17.2.3 Conformance / Compliance

### Analysis against basic good practice

***Scoring statement:*** *Processes and objectives in place to manage water quality issues have been and are on track to be met with no significant non-compliances or non-conformances, and water quality related commitments have been or are on track to be met.*

There are no non-compliances or non-conformances and all commitment are met without gaps.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no non-compliances or non-conformances.*

There are no non-compliances or non-conformances and all commitment are met without gaps.

**Criteria met: Yes**

## 17.2.4 Outcomes

### Analysis against basic good practice

***Scoring statement:*** *Negative water quality impacts arising from activities of the operating hydropower facility are avoided, minimised and mitigated with no significant gaps.*

There are no negative water quality impacts from the operation of the Walchensee plant.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, water quality in the area affected by the operating hydropower facility is of a high quality; or the facility has contributed or is on track to contribute to addressing water quality issues beyond those impacts caused by the operating hydropower facility.*

The water is of very high quality and the plant contributes to the alleviation of water quality problems in the Kochelsee and River Loisach caused by other actors in the upstream parts of the Loisach catchment.

**Criteria met: Yes**

## 17.2.5 Evaluation of Significant Gaps

### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice

**0 significant gaps**

### Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice

**0 significant gaps**

## 17.3 Scoring Summary

The water in the Isar and Walchensee is of a very high quality. The operations do not cause any degradation to this quality. The Loisach river (which runs through Lake Kochelsee, into which the Walchensee power plant releases its tail-water) is sometimes heavily polluted and the authorities will then call on the Walchensee plant to increase its generation in order to use Walchensee water for the dilution of the Loisach inflow.

There are no significant gaps against the criteria at the level of proven best practice, resulting in a score of 5.

**Topic Score: 5**

## 17.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 124, 130 |
| **Document:** | 55, 56, 57, 58, 59, 60, 61, 74, 75 |
| **Photo:** | 1a, 1b, 1c, 1d, 1e, 1g, 1h, 1i |

# 18 Reservoir Management (O-18)

This topic addresses management of environmental, social and economic issues within the reservoir area during hydropower facility operation. The intent is that the reservoir is well managed taking into account power generation operations, environmental and social management requirements, and multi-purpose uses where relevant.

## 18.1 Background Information

This topic has some fundamental overlap with O-16. All relevant assessment criteria relating to erosion and sediment issues that are affected by reservoir operation in any way will affect scoring on both topics. All identified gaps will be described under both topics but in order not to over-value the significance of a particular gap, it is scored only under the more relevant of the two topics.

The major issue of reservoir management is the operation/regulation of the Walchensee. It is both the very source of the main project benefit (electricity with short-term regulation capacity) and the reason for one of the main problems (the shore-line erosion around the Lake Walchensee).

A very important aspect of the Walchensee plant comes into play under this topic: the PPA dividing the water available for electricity generation with Deutsche Bahn (the German state railway). The railway system's need for very short-term regulation limits Walchensee's ability to respond to other expressed management needs, but the two have developed an optimisation tool that handles the sharing to the satisfaction of both parties.

## 18.2 Detailed Topic Evaluation

### 18.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Ongoing or emerging reservoir management issues have been identified, and if management measures are required then monitoring is being undertaken to assess if management measures are effective.*

All issues are assessed and regular monitoring is in place to flag the need for changes to management responses.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, identification of ongoing or emerging reservoir management issues takes into account both risks and opportunities.*

E.ON actively communicates with stakeholders on an ongoing basis in order to assess emerging risks and identify opportunities.

**Criteria met: Yes**

### 18.2.2 Management

#### Analysis against basic good practice

***Scoring statement:*** *Measures are in place to manage identified issues.*

The two main issues, especially for external stakeholders, are tourism impacts and shore-line erosion. The tourism issue is managed through the water-rights instruction, which allows for lower regulation amplitude

(the base case is 1.5 metres during the first half of the summer tourist season and 0.9 metres during the second half). The erosion issue is managed by annual inspection tours on the lake, to which external stakeholders (authorities, NGOs and private) are invited.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

Processes are in place to anticipate emerging risks and opportunities, but the ability to respond to certain opportunities for improved management cannot be seized, since the reservoir management is shared and also subjected to strict regulations. This is a **significant gap** that the Walchensee plant cannot address by itself.

**Criteria met: No**

## 18.2.3 Conformance / Compliance

### Analysis against basic good practice

***Scoring statement:*** *Processes and objectives in place for reservoir management have been and are on track to be met with no significant non-compliances or non-conformances, and reservoir management related commitments have been or are on track to be met.*

There are no significant non-compliances or non-conformances and all commitments are being met.

**Criteria met: Yes**

### Analysis against proven best practice

***Scoring statement:*** *In addition, there are no non-compliances or non-conformances.*

There are no non-compliances or non-conformances and all commitments are being met.

**Criteria met: Yes**

## 18.2.4 Evaluation of Significant Gaps

### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

### Analysis of significant gaps against proven best practice

Due to the shared ownership of the water resource and the strong regulatory control of reservoir operations, it is not possible for E.ON to actively respond to opportunities for improved reservoir management. This gap is, however, beyond the full control of the Walchensee plant and its management.

**1 significant gap**

# 18.3 Scoring Summary

Assessment, management and conformance/compliance are all good, but shared ownership of the resource and generation, as well as regulatory control of reservoir management, limits the project's ability to respond fully to the opportunities for improved reservoir management. This is a gap against proven best practice.

There is one significant gap against the criteria at the level of proven best practice, resulting in a score of 4.

**Topic Score: 4**

## 18.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 122, 124, 126, 129, 131, 137, 140 |
| **Document:** | 31, 62, 63, 71, 72, 73, 120, 121 |
| **Photo:** | None |

# 19 Downstream Flow Regime (O-19)

This topic addresses the flow regimes downstream of the operating hydropower facility infrastructure in relation to environmental, social and economic objectives. The intent is that issues with respect to the operating hydropower facility's downstream flow regimes are identified and addressed, and commitments with respect to downstream flow regimes are fulfilled.

## 19.1 Background Information

There are in total nine weirs which divert water into the Walchensee system. The system is further complicated by the fact that there are two small power plants developed in order to utilise some of the head resulting from some of these diversions, but not utilised in the Walchensee plant. Beyond the impacts on the mainstream Isar, this has led to flow impacts on e.g. the Jachen stream (what used to be the very small drainage from the Walchensee), the Rißbach (a fairly substantial tributary to the Isar), as well as the Obernach, Fischbach, Alpenbach, Kranzbach, Altfinz and Jungfinz (all small streams). The Obernach was originally used as the conduit stream for the Krün diversion to the Walchensee. This was changed with the later development of the small Obernach power plant where this stream enters the Walchensee.

## 19.2 Detailed Topic Evaluation

### 19.2.1 Assessment

#### Analysis against basic good practice

***Scoring statement:*** *Ongoing or emerging issues relating to the operating hydropower facility's downstream flow regimes have been identified, and if management measures are required then monitoring is being undertaken to assess if management measures are effective.*

The flow regime of the upper Isar has been the subject of extensive analyses, debate and discussions ever since the diversion at Krün was implemented in the 1920s. The Walchensee plant and its owner have co-operated extensively with both the responsible authorities and other relevant stakeholders, notably the local fishermen's organisation, in assessing the situation and suggest measures to mitigate the impacts of the diversion.

This has led to two major mitigation interventions, both firmly based on studies conducted by external experts, one on the main stream of the Isar and one on the Obernach stream.

Functioning monitoring is ongoing, both by the project and by other stakeholders.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, issues identification takes into account both risks and opportunities. In the case of a need to address downstream flow regimes, an assessment has been undertaken that includes identification of the flow ranges and variability to achieve different environmental, social and economic objectives based on field studies as well as relevant scientific and other information.*

Very comprehensive studies have been the basis for both decisions to release downstream flows. The project owner has continuously analysed opportunities to implement additional mitigation, and when such an opportunity recently presented itself on the Obernach, action was taken.

**Criteria met: Yes**

### 19.2.2 Management

#### Analysis against basic good practice

***Scoring statement:*** *In the case of a need to address downstream flow regimes, measures are in place to address identified downstream flow issues; and where formal commitments have been made, these are publicly disclosed.*

There is a formal published commitment to release 4.8 $m^3/s$ to the main Isar river course below the Krün weir in summer, and 3.0 $m^3/s$ in the winter.

A mitigation project was recently finished, re-establishing flow on the Obernach stream, a measure that was specifically designed to create spawning areas for the Walchensee population of lake trout. There is a constant release of 0.5 $m^3/s$, and fish can now pass freely all the way from the Obernach outlet into the Walchensee up to the Sachensee.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In addition, processes are in place to anticipate and respond to emerging risks and opportunities. In the case of a need to address downstream flow regimes, in addition commitments are made in relation to downstream flow regimes that include the flow objectives; the magnitude, range and variability of the flow regimes; the locations at which flows will be verified; and ongoing monitoring.*

The project continuously monitors the needs and opportunities. The releases that have been committed are also continuously monitored, in the case of the Krün weir, a micro-hydro has been installed which functions as a monitoring device for the flow release.

However, the flows that are being released cannot be considered optimised as they rely on constant-flow approaches, even if the releases on the Isar do vary between summer and winter. There is no attention paid to the potential need for variations in the flow, mimicking pre-regulation variability. Given the complexity of the issue and the extensive studies that underlie the flow determination, this is considered a non-significant gap, since the Operations Protocol stipulates: "For operating hydropower facilities, if a pre-project baseline does not exist then the present condition is taken as the baseline".

**Criteria met: Yes**

### 19.2.3 Stakeholder Engagement

#### Analysis against basic good practice

*Stakeholder engagement is not assessed at level 3.*

#### Analysis against proven best practice

***Scoring statement:*** *In the case of a need to address downstream flow regimes, in addition the assessment and management process for downstream flow regimes has involved appropriately timed and two-way engagement with directly affected stakeholders, and ongoing processes are in place for stakeholders to raise issues with downstream flow regimes and get feedback.*

In spite of expressing overall satisfaction with much of the implemented mitigation, several stakeholders do express a concern for the slowness in the feedback and engagement on the part of the Walchensee project. This is judged as a **significant gap** at this level.

**Criteria met: No**

### 19.2.4 Conformance / Compliance

#### Analysis against basic good practice

***Scoring statement:*** *In the case of a need to address downstream flow regimes, processes and objectives in place to manage downstream flows have been and are on track to be met with no significant non-compliances or non-conformances, and downstream flow related commitments have been or are on track to be met.*

All downstream flow commitments are being met, and they are well managed by the Isar river group within the Walchensee owner's organisation. There are no significant non-compliances or non-conformances.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In the case of a need to address downstream flow regimes, in addition there are no non-compliances or non-conformances.*

There are no non-compliances or non-conformances.

**Criteria met: Yes**

### 19.2.5 Outcomes

#### Analysis against basic good practice

***Scoring statement:*** *In the case of a need to address downstream flow regimes and commitments to downstream flow regimes have been made, these take into account environmental, social and economic objectives, and where relevant, agreed transboundary objectives.*

The downstream flows committed to are all based on sound scientific analyses combined with wide-based stakeholder interaction, guaranteeing a good balance between the different sustainability criteria.

**Criteria met: Yes**

#### Analysis against proven best practice

***Scoring statement:*** *In the case of a need to address downstream flow regimes and commitments to downstream flow regimes have been made, in addition these represent an optimal fit amongst environmental, social and economic objectives within practical constraints of the present circumstances.*

The flow commitments are based on comprehensive studies by external experts and flows are committed on the river/stream sections that have been identified as those of highest priority. Weighing environmental, social and economic (production) objectives, this is judged to be the optimal solution.

**Criteria met: Yes**

### 19.2.6 Evaluation of Significant Gaps

#### Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

**0 significant gaps**

#### Analysis of significant gaps against proven best practice

Several stakeholders express the opinion that the Walchensee project and its owners often fail to respond to stakeholder concerns in an appropriately-timed manner.

**1 significant gap**

## 19.3 Scoring Summary

When the plant was constructed there were no downstream flow releases. This was standard practice at the time of construction. With increasing stakeholder concern and changing societal paradigms in this field, the project has responded well, and there is now a significant release on the main Isar (varying between summer and winter, but only at two distinct levels) as well as the release on the Obernach. This is coupled with the fish-passages constructed on the Obernach to augment spawning of the Walchensee population of lake trout as well as the new fish ladder allowing river-living trout to pass the Krün weir on the Isar. Several stakeholders do, however, express concern over the sometime lack of appropriately-timed communication on the part of the project.

There is one significant gap at the level of proven best practice, resulting in a score of 4.

**Topic Score: 4**

## 19.4 Relevant Evidence

| | |
|---|---|
| **Interview:** | 122, 124, 130, 131, 136, 151, 152, 153 |
| **Document:** | 31, 32, 37, 50, 64, 65, 66, 67, 68, 69, 70 |
| **Photo:** | 1a, 1c, 1d, 1i, 1g, 1f |

# Appendix A: Written Support of the Project Operator

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2. Mai 2013

**Assessment of the Walchensee Project Using the Operation Tool of the Hydropower Sustainability Assessment Protocol**

Dear Mr. Taylor,

E.ON is pleased to be amongst the first to implement the Hydropower Sustainability Assessment Protocol, as a Sustainability Partner of IHA. E.ON welcomes the application of the Operation Tool of the Protocol to the Walchensee project as part of this partnership, and hopes that the experience will provide important lessons for increasing adoption of the for Protocol around the world, and the future development of the Protocol, as well as for E.ON. We provided our full support and coordination to the Assessment Team conducting this assessment of the Walchensee project.

Kind regards

# Appendix B: Verbal Evidence

| Ref | Interviewee/s, Position | Organization | Department | Date | Location | Lead Interviewer |
|---|---|---|---|---|---|---|
| 122 | Christian Orschler, Head | E.ON Wasserkraft | Communications Department | 27/02/2012 | Landshut | Doug Smith |
| 123 | Rudolf Plochmann, Representative | Forestry, Bad Tölz | - | 28/02/2012 | Walchensee-kraftwerk | Doug Smith |
| 124 | Cristoph Gattermann, Managing Director, E.ON Wasserkraft; Josef Niedermaier, Head of District Bad Tölz (Landrat), State Bavaria; Thomas Holz, Mayor of Kochel. | Local authority stakeholders | - | 28/02/2012 | Walchensee-kraftwerk | Bernt Rydgren |
| 125 | Veronika Sgoff, Tourism Officer | Tourism office, Kochel | - | 28/02/2012 | Walchensee-kraftwerk | Doug Smith |
| 126 | Hans-Peter Schanderl | Fisheries Association Garmisch | - | 29/02/2012 | Walchensee-kraftwerk | Doug Smith |
| 127 | Josef Heilinglechner, Chair of Walchenseestiftung; Martin Böhm, Member of Walchenseestiftung and Chair of Fisheries Cooperative, Walchensee. | Walchenseestiftung and Fisheries Cooperative, Walchensee | - | 29/02/2012 | Walchensee-kraftwerk | Doug Smith |
| 128 | Carolin Patzner, Communications Officer | E.ON Wasserkraft | Communications Department | 01/03/2012 | Landshut | Doug Smith |
| 129 | Christian Merkl, HSE Engineer | E.ON Wasserkraft | | 27/02/2012 | Landshut | Doug Smith |
| 130 | Cornelia Breiter | Water Regulation Authority, State Bavaria | - | 29/02/2012 | Landshut | Bernt Rydgren |
| 131 | Johannes Durner, Head of Isar River Group | E.ON Wasserkraft | Isar River Group | 29/02/2012 | Landshut | Doug Smith |
| 132 | Harald Weiß, Head of Quality Management of Global Hydro Fleet, Oliver Müssig, Quality Management Officer, Global Hydro Fleet | E.ON Global Hydro Fleet | - | 01/03/2012 | Landshut | Doug Smith |
| 133 | Christian Wiesheu, Human Resources Manager | E.ON Wasserkraft | Human Resources Department | 01/03/2012 | Landshut | Doug Smith |
| 134 | Michael Brucker, Head of Energy Economics, E.ON Wasserkraft, Frank Ohlemacher and Mr Preis, DB Energie | E.ON Energy Economics and Deutsche Bahn | - | 01/03/2012 | Landshut | Joerg Hartmann |

| Ref | Interviewee/s, Position | Organization | Department | Date | Location | Lead Interviewer |
|---|---|---|---|---|---|---|
| 135 | Hermann Stadlberger, Asset Management | E.ON Wasserkraft | - | 01/03/2012 | Landshut | Doug Smith |
| 136 | Hans-Peter Pöckl, Head of Control Center | E.ON Wasserkraft | - | 27/02/2012 | Landshut | Bernt Rydgren |
| 137 | Johann Jochner, Technician | E.ON Wasserkraft | - | 01/03/2012 | Landshut | Joerg Hartmann |
| 138 | Ludwig Tremml, Head of Operational Controlling | E.ON Wasserkraft | - | 01/03/2012 | Landshut | Bernt Rydgren |
| 139 | Christian Kraus, Legal Counsel | E.ON Wasserkraft | - | 02/03/2012 | Landshut | Joerg Hartmann |
| 140 | Michael Gattermann, Representative | E.ON Energy Trading | - | 28/02/2012 | Landshut | Bernt Rydgren |
| 141 | Heike Bussmann, Team Member of ARG | E.ON Wasserkraft | - | 01/03/2012 | Landshut | Bernt Rydgren |
| 142 | Josef Grantner, Head of O&M Strategy & Implementation, Global Hydro Fleet, and Robert Krämer, Plant Engineer, E.ON Wasserkraft | E.ON Global Hydro Fleet and E.ON Wasserkraft | - | 02/03/2012 | Landshut | Joerg Hartmann |
| 143 | Markus Krinner, Information Centre Officer | E.ON Wasserkraft | Isar River Group | 28/02/2012 | Walchensee-kraftwerk | Bernt Rydgren |
| 144 | Mr Schweiger | E.ON Wasserkraft, | Isar River Group | 29/02/2012 | Landshut | Bernt Rydgren |
| 145 | Anton Baumgartner, Chair | E.ON Wasserkraft | Workers' Council | 02/04/2012 | Telecon | Joerg Hartmann |
| 146 | Hermann Stadlberger, Asset Management | E.ON Wasserkraft | - | 27/02/2012 | Landshut | Joerg Hartmann |

# Appendix C: Documentary Evidence

| Ref | Author / Organisation | Title | Year | Language | Description / Notes / Weblink |
|---|---|---|---|---|---|
| 2 | E.ON | Kommunikationskonzept Wasserkraft | 2010 | German | Powerpoint file |
| 3 | E.ON | Jahresrückblick 2011 EED-VP Team Süd. | 2011 | German | Powerpoint file documenting key communications on Isar River group in 2011 |
| 4 | Various | Series of press articles concerning Walchensee | 2009 - 2011 | German | 33 articles in total from October 2009 to December 2011, in the Münchner Merkur, Süddeutsche Zeitung (München), and Augsburger Allgemeine, Garmisch-Partenkirchner Tagblatt, Donaukurier and Tölzer Kurier newspapers |
| 5 | E.ON | Kochelsee a. See, Walchensee | | German | Tourism Promotion Brochure featuring Walchensee powerplant |
| 6 | Various | Press releases | 2010 - 2012 | German | Series of 16 press releases concerning Walchensee powerplant, from January 2010 to February 2012. |
| 7 | E.ON | Stakeholder mapping | | English | excel file, showing press contacts for Walchensee, stakeholders for Isar group, and press contacts for Isar group. |
| 8 | | Tourism event schedule for schoolchildren | | German | includes events at Walchensee powerplant. |
| 9 | E.ON | Safety Perception Survey, February 2012 | 2012 | German | Powerpoint presentation setting out plans for survey to assess safety culture of each E.ON Wasserkraft River Group |
| 10 | E.ON | Lieferantenbewertung | | German | Form to evaluate suppliers based on 12 criteria including safety compliance and environmental compliance |
| 11 | E.ON | Safety Management Policy | 2010 (Updated 2011) | English | |
| 12 | E.ON | Hydro Fleet Safety Performance Report | 2012 | English | Powerpoint presentation |
| 13 | E.ON | Common Incidents and definitions of the 7 levels in safety triangle | 2011 | English | Powerpoint presentation |
| 14 | E.ON Wasserkraft | Technical Instruction 7.1.1.2.8 Contractor and Business Partner | 2011 | English | |

| Ref | Author / Organisation | Title | Year | Language | Description / Notes / Weblink |
|---|---|---|---|---|---|
| | | Management | | | |
| 15 | | Supplier HSE questionnaire | 2011 | English | |
| 16 | E.ON Group | Health and Safety Standard HSE.A2.EA Reporting and Investigation of Incidents | 2011 | English | |
| 17 | E.ON Hydro Fleet | Policy for Usage of PPE | 2012 | English | |
| 18 | E.ON Hydro Fleet | Safety Improvement Plan | 2011 | English | |
| 19 | E.ON Group | Group Policy: Safety and Occupational Health Management – Minimum Standards | 2008 | English | |
| 20 | E.ON Group | Operating Procedure OP.EA.HSE.2 Incident Reporting and Investigation | 2011 | English | |
| 21 | E.ON Group | Operating Procedure OP.EA.HSE.3 Contractor and Business Partner Management | 2011 | English | |
| 22 | E.ON | Monthly Safety Report on Hydro Fleet | | English | |
| 23 | E.ON | Process and Plant Safety Management - Report to Hydro Board | 2012 | English | |
| 24 | | Report and detailed analysis of near hit at weir Oberzolling, 2011-10-20 | 2011 | German | |
| 25 | E.ON Hydro Fleet | Safety Improvement Plan and Environmental Improvement Plan | 2012 | English | |
| 26 | E.ON | 'Overview over existing regulations agreed on with workers council' | not dated | English | Human resources document |
| 27 | E.ON | Environmental Incidents Regular Reporting Process | not dated | English | Powerpoint presentation |
| 28 | E.ON | Significant Environmental Incident Reporting Form | | English | |
| 29 | E.ON | Registration of accidents / near hits / first aid injuries for the units of Hydro for 2011 | 2011 | English | |
| 30 | | Aufgabenteilung | 2010 | German | Responsibilities for HSE between owner and operator |
| 31 | E.ON Wasserkraft | AUG Handbuch | 2005 | German | HSE Handbook |
| 32 | E.ON | GewasserentwicklungKonzept Isar | | German | series of maps that appear to form or be part of a river |

| Ref | Author / Organisation | Title | Year | Language | Description / Notes / Weblink |
|---|---|---|---|---|---|
| | | | | | management plan for the Isar |
| 33 | NATURA 2000 | NATURA 2000 in Bayern, 8334-373 Kesselberggebiet | | German | |
| 34 | E.ON | Internal safety audits for Happung and Haag projects | | German | |
| 35 | Schedule of planned safety walk and talks by senior management | | | English | |
| 36 | E.ON and Landesfischereiverband Bayern | The Lake Trout as a shared conservation project between BaySF | 2011 | German | Powerpoint presentation, July 2011 |
| 37 | Provided by Hans Peter Schanderl | River Warden, Garmisch-Partenkirchen District Angling Club | | German | Note on flows in River Isar, fauna and sedimentation |
| 38 | Denic, M. | Evaluation of Obernach as Waters for the Reproduction of Lake Trout from Walchensee, | 2008 | German | Diploma submitted to Institute for Fish Biology, Technische Universitat Munchen |
| 39 | Hans Peter Schanderl | River Warden, Garmisch-Partenkirchen District Angling Club, Lake Trout surveys | 2008 and 2009/10 | German | Powerpoint presentations |
| 40 | Landsratsamt | Water rights decision: Wasserkraftwerk trial flood retention | 2007 | German | |
| 41 | | KRU BEU Betriebsschema | 2012 | German | Operation Scheme |
| 42 | E.ON | Die Obere Isar | | German | The Upper Isar |
| 43 | E.ON | Betriebsschemata Walchensee | | German | Operation Scheme Walchensee |
| 44 | E.ON | Energiebericht | 2010 | German | Energy Report, page 23 – climate change analysis |
| 45 | Hans-Peter Schanderl | Entwurf 2 Restwasserversuch 2008 und Trockenfall 19 | 2008 | German | Design drip dry test in 2008 and Case 19???; Powerpoint presentation |
| 46 | Hans-Peter Schanderl | Ergebnis des 3. Versuchs 2009 - 2010 | | German | Trial results, Powerpoint presentation |
| 47 | Hans-Peter Schanderl | Nachhaltigkeit | undated | German | Sustainability, Word document |
| 48 | Hans-Peter Schanderl | Pictures 001-004 | undated | | |
| 49 | Sylvenstein | Längsschnitt Isartal Krüner Wehr | undated | German | Longitudinal section of Krün Weir |
| 50 | Michael Becker | Teilrückleitung der Oberen Isar - Problemstellung, Aufbau und Ergebnisse der Analyse | undated | German | Partial Flow Release of the Upper Isar - Problems, Design and Analysis of Results |

| Ref | Author / Organisation | Title | Year | Language | Description / Notes / Weblink |
|---|---|---|---|---|---|
| 51 | | Teilrückleitung der Oberen Isar am Krüner Wehr | | German | Partial Flow Release of the Upper Isar at Krün Weir |
| 52 | Provided by Hans-Peter Schanderl | Überleitung Krün - Obernach powerplant | | German | Diversion |
| 53 | Provided by Hans-Peter Schanderl | Überleitung Rißbach - Niedernach powerplant | | German | Diversion |
| 54 | Professor Reich | The upper Isar, vegetation, floods, flora and fauna (pages 54 - 96) | | German | provided by Water Regulation Authority |
| 55 | Landsratsamt (District Office) | Bad Tölz | 2011 | German | Bathing water quality, Walchensee |
| 56 | Bavarian Environment Agency | Water Quality Isar | 2009 | German | |
| 57 | Bavarian Environment Agency | Water Quality Walchensee | 2009 | German | |
| 58 | Bavarian Environment Agency | Water Quality Kochelsee | 2009 | German | |
| 59 | | Gewasserstruktur | 2001 | German | Water structure |
| 60 | | Water quality map of Bavaria: trophic status | 2001 | German | |
| 61 | | Water quality map of Bavaria: bacterial levels | 2001 | German | |
| 62 | E.ON Wasserkraft | Flood management of the Isar River Group | 2009 | German | |
| 63 | Merkur Online | Flood Protection | 2011 | German | |
| 64 | | Schanderl, Übersichtslageplan Walchenseekraftwerk | | German | Location overview |
| 65 | | Contract with Fisheries Club for the supply of water at the Krün weir | | German | |
| 66 | Fisheries Association | Testing Ecological Flow | 2010 | German | |
| 67 | Fisheries Association | Testing Ecological Flow | 2008 | German | |
| 68 | Bayernwerk Wasserkraft | Letter from Bayernwerk Wasserkraft to Garmisch Fisheries Association, October 1997 | 1997 | German | |
| 69 | | Vertrag über die Abgabe von Isarwasser am Krüner Wehr und am Oberförhinger Wehr in das Fluβbett der Isar zwischen der Bayerwerk AG und dem Freistaat Bayern | 1989 | German | This is the contract regarding the releases on from the Krün weir. Dated 25 August, 1989. |
| 70 | | Die Obere Isar, Information de bayerischen | | German | General information brochure with relevant pictures and text. |

| Ref | Author / Organisation | Title | Year | Language | Description / Notes / Weblink |
|---|---|---|---|---|---|
| | | Wasserwirtshaft | | | |
| 71 | E.ON Wasserkraft | Wasserteilungsmodell Walchensee | | German | Water management model for the Walchensee |
| 72 | E.ON Wasserkraft | Bauwerksuntersuchungsbericht | 2007 to 2011 | German | Building inspection reports |
| 73 | E.ON Wasserkraft | Erstellung eines Programms zur Speicherbewirtschaftung des Walchenseekraftwerks für zwei unabhängige Stromkunden | | German | A program for the memory management of Walchenseekraftwerk work for two independent power customers?? |
| 74 | | Web site with Government water-quality monitoring and management, lakes | | German | http://www.lfu.bayern.de/wasser/gewaesserqualitaet_seen/index.htm |
| 75 | | Web site with Government water-quality monitoring and management, rivers | | German | http://www.lfu.bayern.de/wasser/gewaesserqualitaet_fluesse/index.htm |
| 76 | | Walchensee Uferbefahrung | 2009 | German | Invitation to regular monitoring boat trip of the Walchensee shoreline |
| 77 | | Walchensee Uferbefahrung | 2010 | German | Invitation to regular monitoring boat trip of the Walchensee shoreline |
| 78 | | Gutachten E.ON2 | | German | Damage to buildings on the Reindl family house in Walchensee Altlach |
| 79 | | E.ON Reindl Peint, | | German | Regarding the Reindl family house in Walchensee Altlach |
| 80 | | Flusslandschaft Isar - Von der Landesgrenze bis Landshut - Leitbilder, Entwicklungsziele, Maßnahmenhinweise | | German | Isar River Landscape - from the border to Landshut |
| 81 | | Wasserrechtsbeschied | | German | Series of water rights decisions from 1919, 1925, 1928, 1958, 1960, 1961, 2001, 2007 |
| 82 | Regierung Oberbayern | Beschied Standseilbahn | 2006 | German | |
| 83 | | WKW Bescheide DMS (Betriebsrelevante Bescheide Übersicht) | | German | Infobasis intranet |
| 84 | | Walchenseekraftwerk drawings | 1926, 1931, 1958, 2002 | German | |
| 85 | | Series of documents and decisions from Landratsamt Bad Tölz, Regierung Oberbayern, and Bayern authorities | 1952, 1953, 1954, 1955, 1957, 1958 | German | |

| Ref | Author / Organisation | Title | Year | Language | Description / Notes / Weblink |
|---|---|---|---|---|---|
| 86 | E.ON | E.ON Werte Auszug aus Verhaltenskodex | | German | |
| 87 | E.ON | E.ON Werte Intranetauszug | | German | |
| 88 | E.ON | E.ON Werte kompletter Auszug | | German | |
| 89 | E.ON | E.ON Wasserkraft Organisation Handbook | | German | Contents List |
| 90 | E.ON | E.ON Fleet organisational charts | | English | |
| 91 | E.ON | E.ON Asset Management organisational chart | | English | |
| 92 | E.ON | E.ON 2010 Annual Report | 2010 | English | |
| 93 | E.ON | E.ON 'Important advice for using AIF' sheet | | German | |
| 94 | E.ON | Integrated Compensation and MR Sheet | 2011 | German | |
| 95 | | ausführlich für HR Manager | 2011 | English | HR Guideline |
| 96 | E.ON | E.ON document setting out 'Whistleblower' procedure | | German | |
| 97 | | VEH unplannmassige stillstande | | German | unplanned downtime |
| 98 | | KRU BEU Betriebsschema | | German | KRU BEU operation scheme (PDF Intranet Infobasis) |
| 99 | | KRU SCM RI Schemata | | German | KRU SCM RI schemes (PDF Intranet Infobasis) |
| 100 | | WKW Schwarzstartkonzept | | German | Black-start Concept (PDF Intranet Infobasis) |
| 101 | | WKW Wasserschlossregler | | German | WKW surge control (PDF Intranet Infobasis) |
| 102 | | WAL_Speicherteilung | | German | |
| 103 | | Energiebericht | 2012 | German | Energy report in 2012 |
| 104 | | WKW Brandschutzordnung | | German | Fire safety regulations (Intranet Infobasis) |
| 105 | | Standard Safety Walks and Awareness final | | English | |
| 106 | | Auftragsübersicht | | German | 'Order Overview' |
| 107 | | Aufgabenteilung HSE 2010 09 13 | 2010 | German | Division of tasks HSE 2010 09 13 |
| 108 | | AERO User Process Guide Draft February 2012 v12 | 2012 | German | |
| 109 | | AERO and Pprio Introduction V12 DE | 2012 | German | |

| Ref | Author / Organisation | Title | Year | Language | Description / Notes / Weblink |
|---|---|---|---|---|---|
| 110 | | AERO and Pprio Introduction V12 | 2012 | German | |
| 111 | E.ON | Änderung Abrechnung - MI 5/11/2009 | 2009 | German | Change in accounting |
| 112 | E.ON | Walchensee production costs | | German | |
| 113 | E.ON | Monthly report on budget Isar | | German | |
| 114 | E.ON | Monthly KPI report | | German | |
| 115 | E.ON | Monthly Report Projects | | German | |
| 116 | E.ON | MTP Project Prioritization Ranking List | 2011 | German | |
| 117 | E.ON | MTP Project Prioritization | | German | |
| 118 | E.ON | Risk reporting quantifiable Risks | | German | |
| 119 | E.ON Wasserkraft | E.ON Wasserkraft brochure | | English | |
| 120 | E.ON Wasserkraft | Wasserteilungsmodell Walchensee | 2009 | German | |
| 121 | Martin Donauer | Erstellung eines Programms zur Speicherbewirtschaftung des Walchenseekraftwerks für zwei unabhängige Stromkunden. Technische Universität München | 2009 | German | |
| 147 | E.ON Wasserkraft | Presentation on E.ON Wasserkraft becoming certified acc. ISO 14001 on E.ON's intranet | 2012 | German | |
| 148 | Tüv Süd | Certificatate proving certificatation in accordance with ISO 18001:2007 | 2012 | German | |
| 149 | Tüv Süd | Certificatate proving certificatation in accordance with ISO 14001:2004 | 2012 | German | |
| 150 | E.ON Wasserkraft | Environmental-aspects register for its ISO 14001 EMS | 2013 | German | |
| 151 | Landratsamt, Bad Töltz - Wolfratshausen | Letter on fulfilment of requirements in regards to fish-passage construction at Krün on the Isar river | 2013 | German | |
| 152 | Tagblatt | Newspaper article on the Krün fish passage. | 2012 | German | |
| 153 | Bavarian regional TV | Video clip on the fish passage at Krün on the River | 2012 | German | |

| Ref | Author / Organisation | Title | Year | Language | Description / Notes / Weblink |
|---|---|---|---|---|---|
| | | Isar. | | | |

# Appendix D: Visual Evidence

Photo 1a: Downstream of Krün weir, 29.02.2012

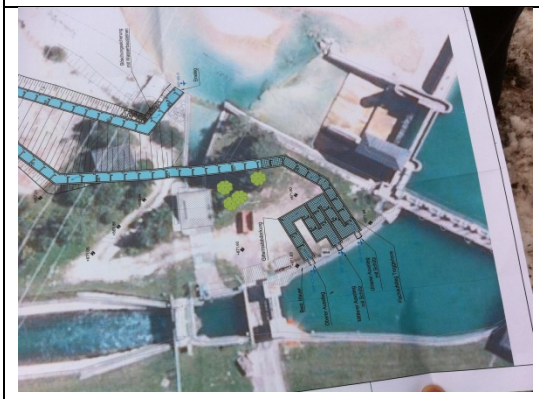
Photo 1b: Large amounts of sedimentation downstreamof Rißbach weir, 28.02.2012

Photo 1c: Fish passage on the Obernach, 29.02.2012

Photo 1d: Fish passage under construction on the Obernach, 29.02.2012

Photo 1e: Penstocks at Walchensee Powerplant, 28.02.2012

Photo 1f: Obstacle to fish migration on the Obernach, soon to be converted to a fish ladder, 29.02.2012

| | |
|---|---|
|  |  |
| Photo 1g: River Isar upstream of Rißbach confluence, 29.02.2012 | Photo 1h: Weir at Krün, 29.02.2012 |
| | |
|  |  |
| Photo 1i: Lake Trout varying up to 40 cm in length, downstream of Krün weir, 29.02.2012 | Photo 1j: Emergency equipment at Krün, 29.02.2012 |
| | |
|  |  |
| Photo 1k: Plan of fish ladder to be constructed at Krün, 29.02.2012 | Photo 1l: Safety signage at Krün, 29.02.2012 |
| | |

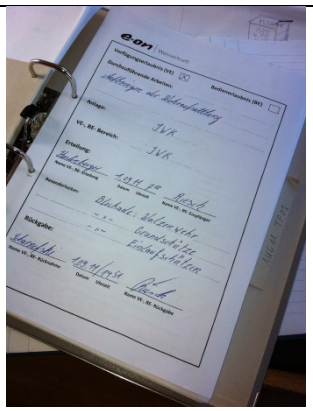
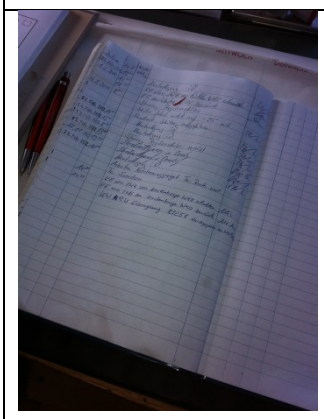
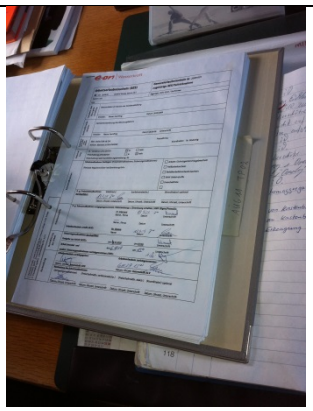
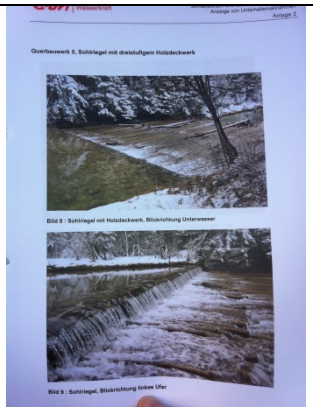
| | |
|---|---|
|  |  |
| Photo 1m: Separation of construction waste at Krün, 29.02.2012 | Photo 1n: File of permit-to-work forms held at Krün, 29.02.2012 |
| | |
|  |  |
| Photo 1o: Logbook at Krün, 29.02.2012 | Photo 1p: File of safety management forms at Krün, 29.02.2012 |
| | |
|  |  |
| Photo 1q: Notice displaying emergency procedures at Krün, 29.02.2012 | Photo 1r: 'Before' pictures of obstacles to fish migration on the Obernach in a plan for their conversion to fish passes, 29.02.2012 |
| | |

Photo 1s: Current construction of fish pass on the Obernach, 29.02.2012


Photo 1t: Infozentrum (internal), 28.02.2012

Photo 1u: Infozentrum (external), 28.02.2012


Photo 1v: Safety signage at Walchensee power plant, 28.02.2012


Photo 1w: First aid signage at Walchensee power plant, 28.02.2012


Photo 1x: Sourcebook on Employment Law displayed by the Human Resources Officer, 01.03.2012