Norwegian
Water Resources and
Energy Directorate

NVE

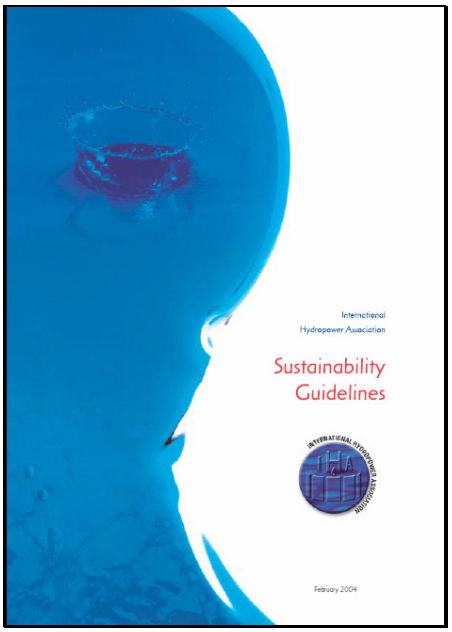
Norad

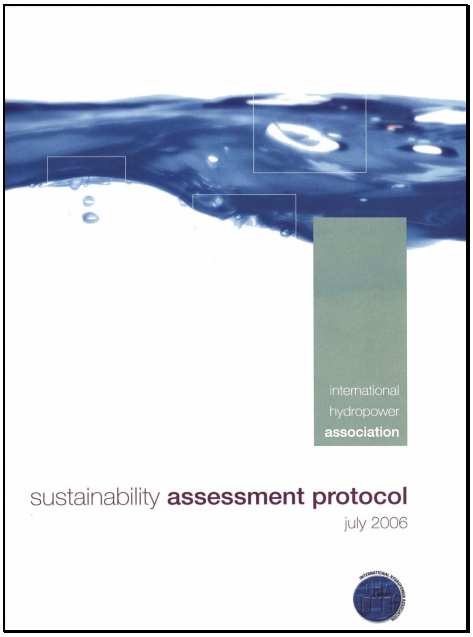
HYDROPOWER SUSTAINABILITY ASSESSMENT FORUM

REVIEW OF NORWEGIAN EXPERIENCE

in the use of the

IHA SUSTAINABILITY ASSESSMENT PROTOCOL





May 2008

Norwegian Water Resources and Energy Directorate

NVE

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1. EXECUTIVE SUMMARY

This document presents the experiences gained by Norwegian institutions in using the International Hydropower Association's (IHA) Sustainability Assessment Protocol (SAP). It is based on views on the need for revisions and updating solicited from those institutions by the Norwegian Water Resources and Energy Directorate (NVE) on behalf of Norad. This is intended to support the efforts to establish a broadly endorsed sustainability assessment tool to measure and guide performance in the hydropower sector.

Institutions contacted were Det Norske Veritas (DNV), Statkraft, SNPower and NIVA, as well as input from NVE. Of these DNV, NVE and Statkraft gave input from their experience from the Protocol, based on a Survey Form which was developed for the purpose.

The main conclusions and recommendations of the results of the Survey and discussions held during the review are as follows:

- The World Commission on Dams Report, although based on sound strategic priorities, does not constitute a suitable operational tool for objective third-party assessments of hydropower projects. The IHA Protocol could become such a useful tool if lifted to industry standard levels and if relevant opponents to the Protocol are brought on board to enhance it.
- The IHA Forum and Reference Group should focus on sharpening the aspects where room for subjective analysis is too wide.
- The image of the Protocol as a tool of the Hydropower industry must be changed through broader involvement and acceptance by NGO's and other stakeholders.
- The Protocol should be developed as a Certification Standard. It is, however, perceived that it can not be expected that this will replace national certification or licensing systems. It will rather be in addition to such licensing for projects where international organisations or financing is involved.
- The question of possible weighting of the various aspects should be addressed by the Forum. A flexible system should be strived for which can be adjusted to the most relevant aspects in different countries.
- All three sections of the Protocol should be maintained and instructions and examples of in which situations each one may be most applicable should be developed.
- Possible logical flaws in the various aspects in the different sections should be checked. For example the points outlined by Statkraft's comments (e.g. B9 can be seen to be a repetition of B8; B18 does not cover adequately issues related to reservoirs-see specific notes by Statkraft on pages 18 and 19).
- Training of auditors should be established which concentrates on development of auditing skills so that they are able to better understand the context of the various aspects and give a more quantitative and less subjective assessment.
- Availability and quality of evidence should be emphasised and more examples of adequate documentary evidence, plans etc. given.

- Further work on improvement of the Protocol is best done in a workshop or Forum manner in which representatives from the different sectors and stakeholder groups are represented. This is already seen to be achieved through the HSAF and the reference group. It could, however, be supplemented by national discussion groups, at least in Norway, where most of the relevant sectors have experience from use of the Protocol. Such a discussion group could be led by Norad who have a genuine interest in arriving at a standard that can be endorsed by a range of key stakeholder organizations.

Further details of the Norwegian experience are given in the subsequent chapters and in the appendices to this report.

2. METHODOLOGY

The methodology for the study was divided into six main activities:

- Identification and selection of available experienced personnel from NVE staff,
- Basic survey to establish contact with persons and institutions in Norway who have knowledge of and experience with the IHA Sustainability Protocol,
- Design of survey form,
- Interviews of relevant persons who have knowledge of or have used the IHA Sustainability Protocol,
- Analysis of results from the survey forms, and
- Reporting.

Identification and selection of available experienced personnel from NVE staff,

In staffing the project for the review work, in addition to their long experience from both technical, environmental and social aspects of all stages of hydropower development, NVE's chosen staff also have a thorough knowledge of the IHA Sustainability Guidelines. The NVE team's major reference in this respect is their assignment recently carried out for the Norwegian Ministry of Finance who commissioned the team to assess a hydropower project in China using the IHA Sustainability Protocol. This hands-on experience from the application of the Protocol gave them an advantage in this respect.

Basic Survey

The first step in the review of Norwegian experience in the use of the IHA Sustainability Protocol was the identification of relevant persons and institutions that actually had used it. Fortunately a good start was given by the Norad expert Mr Hans Olav Ibrekk, who already had quite a good knowledge of the relevant institutions.

These persons were first contacted by telephone and they were able to give further information on other persons and institutes that had used or had considered using the Protocol. Finally, a search was made on the Internet in order to try and find further examples of Norwegian use of the Protocol.

The result of this basic survey was that two institutions had already used the Sustainability Protocol on specific projects, two further institutions were committed to using it or were seriously considering using it, whilst several other institutions had actively given input to the development of the protocol in connection with its drafting.

Design of Survey Format

In designing the survey format emphasis was placed on using a format based on one which had also been used by the International Hydropower Association (IHA) so that the results could be easily assimilated into the review work currently being carried out by them[1]. In addition to the questions placed by the IHA in their international survey, the Norad-NVE form included some further specific questions which were designed to reap the users' experiences with the use of the Protocol and their ideas for its enhancement.

Interview of Relevant Persons who have used or have Knowledge of the IHA Sustainability Protocol

Since most officials have a busy workload, most interviews were held by telephone (which was followed up by and supplemented when necessary with more details by e-mail). One of the institutions (Det Norske Veritas - DNV) also attended a meeting at NVE's offices when they were able to meet and have interesting discussions with the NVE review team to discuss experiences with the Protocol from both sides.

Several of the institutions expressed their interest in attending a possible meeting with Norad to discuss the way ahead for the Sustainability Protocol and its use.

Analysis of Survey Form Results

In addition to NVE's own response to the Survey Form, two other institutions completed and returned the survey forms. Consequently three samples was established for analysis.

None of the survey replies addressed Section A of the Protocol (New Energy Projects), whilst two replies addressed Section B of the Protocol (New Hydropower Projects), and one addressed Section C of the Protocol (Operating Hydropower Facilities).

The results of the survey were categorised for presentation and discussion in this report.

Reporting

In response to the request from Norad, the reporting of the results has been kept simple so that ideas, opinions and experience can be easily highlighted and brought forward for use in advancing the Sustainability Protocol.

In addition to the main volume of this report which analyses the results, the actual survey forms themselves are included in the appendices.

[1] IHA has initiated the Hydropower Sustainability Assessment Forum. The objective of the Forum is to carry out an expert appraisal of the IHA Sustainability documents, with a view towards a future sustainability standard for the sector. Experts on environmental, social and economic/financing aspects participate, along with representatives of developed and developing countries involved in hydropower. By seeking to operate by consensus, the goal of the first phase is to deliver an enhanced Protocol that can be endorsed by a range of key stakeholder organizations, and to make recommendations on pathways toward a sustainability standard.
For more info on the Forum: http://www.hydropower.org/sustainable_hydropower/HSAF.html

3. INSTITUTIONS AND COMPANIES CONTACTED

The following institutions and companies were contacted during the review:

Institution / Company	Contact persons	e-mail
Det Norske Veritas (DNV)	Runa Haug Khoury Tor Haakon Bakken	Runa.Haug.Khoury at dnv.com Tor.Haakon.Bakken at dnv.com
Norwegian Water Resources and Energy Directorate (NVE)	David A. Wright Torodd Jensen	daw at nve.no tje at nve.no
Statkraft	Tormod Schei	tormod.schei at statkraft.com
SNPower	Marte Lerberg Kopstad	Marte.L.Kopstad at snpower.no
NIVA	Håkon Thaulow Dag Berge	haakon.thaulow at niva.no dag.berge at niva.no

Survey forms were sent to all institutions/companies and Statkraft, Det Norske Veritas and NVE completed and returned forms, copies of which are to be found in the appendices.

4 DET NORSKE VERITAS (DNV) EXPERIENCE AND COMMENTS

Introduction of DNV

Det Norske Veritas (DNV) is an independent foundation with the objective of safeguarding life, property, and the environment. DNV history goes back to 1864, when the foundation was established in Norway to inspect and evaluate the technical condition of Norwegian merchant vessels. Today DNV is active throughout the world in many fields including energy.

DNV was one of the institutions who returned a partly completed survey form, having answered general questions 1, 2, 3, 4 and 5 whilst leaving the specific questions on the various aspects of each section blank pending actual experience from the use of the Protocol on projects.

DNV's General Comments

DNV forms part of the Reference Group to the IHA Hydropower Sustainability Assessment Forum (HSAF). Through this participation they have committed themselves to conducting two field test assessments (where self-assessment has already been done) against the protocol. DNV also provides input and advice on other relevant areas such as the scope for developing a certification regime.

At this point they had not yet conducted any third-party assessment against the Protocol. Their responses to the survey form were therefore based on other participation in the ongoing IHA processes as well as on an internal analysis of the Protocol as an assessment tool within DNV.

DNV acknowledges the need for an improved tool to assess the sustainability of hydropower projects. Our experiences with assessing against the World Commission on Dams Report is that this document, although being based on sound strategic priorities, does not constitute a suitable tool for objective third-party assessments of hydropower projects. The document is too vague in its requirements and lacks realistic operational "check-points". The ongoing debates and lack of common approach among EU member states in meeting its criteria (to be compliant with the Linking Directive's Article 11 (B) 6) illustrates the inherent vagueness of the report.

In light of the above, together with the apparent appetite in the industry for a more operational tool to track and demonstrate the sustainability aspects of hydropower projects, DNV believes the IHA Protocol could become a useful tool. They believe that the success of lifting the Protocol to industry standard level will, to a large extent, depend on the following two key points:

- The ability of the Forum & Reference Group to enhance the quality of the Protocol, including sharpen the aspects where room for subjective analysis (upon the third party verifier/certifier) is currently too wide.

- The ability of the Forum to broader endorse the buy-in of the Protocol across stakeholder groups. It is essential that the image of the Protocol as "the industry's tool" is removed or at least toned down. The more key governments, financial institutions and NGOs that embrace the Protocol as the optional way forward, the better.

DNV participated in the February 2008 IHA Workshop on developing an accreditation and certification regime around the Protocol. They believe the Protocol could serve as a certification standard given that certain key aspects are tackled:

- The Protocol has gone through an enhancement process in the Forum and is perceived to be of sufficient quality to be used as a third party assessment tool.
- A sensible accreditation model is put in place. An issue would be allocation of costs – would industry pay for building and running this accreditation unit? Would they be willing to take on this cost?
- A suitable certification model is established. The IHA may have to give away some of the current ownership of the Protocol and the process, to ensure sufficient independence of the Protocol as an industry standard.

As regards which section of the Protocol they found most relevant, DNV believes section A to be very wide and slightly less relevant than B and C for the purpose the Protocol aims to serve. DNV has focused mainly on section B so far but also sees the relevance of section C.

Should a certification regime be developed around the Protocol, a feasible approach would be a one off certification against section B during the planning phase, followed by, for example, three annual (or other) assessments against section C to uphold the certification. Based on this, DNV regards section B and C as good, complementary sections (but still with scope for refinement on the individual aspects).

5 NORWEGIAN WATER RESOURCES AND ENERGY DIRECTORATE (NVE) EXPERIENCE AND COMMENTS

Introduction of NVE

The Norwegian Water Resources and Energy Directorate (NVE) is subordinated to the Ministry of Petroleum and Energy, and is responsible for the administration of Norway's water and energy resources. NVE's goals are to ensure consistent and environmentally sound management of water resources, promote an efficient energy market and cost-effective energy systems, and to contribute to the economic utilization of energy.

NVE was one of the institutions who returned a completed survey form, having answered general questions 1, 2, 3, 4 and 5 and the specific questions on the various aspects on sections B and C of the Protocol.

NVE's General Comments

NVE was engaged by the Norwegian Ministry of Finance to carry out an assessment of the 180 MW Dahuashui Hydropower Project in China. The object of the assessment was to establish whether the project had been developed according to "International best practices" from a technical, environmental and social aspects standpoint. The Norwegian Ministry of Finance, under advice from the Norwegian Ministry of Petroleum and Energy, instructed that the IHA Sustainability Protocol be used for this purpose. The Norwegian Ministry of Finance is considering purchase of the Clean Development Mechanism (CDM) Certified Emission Reduction credits for the project and required the sustainability audit in order to support their decision.

The Dahuashui Hydropower Project is located in Kaiyang County of Guizhou Province in southern China and is connected to the South China Grid (26°49' 00.14" N and 107° 14' 59.93" E). The project has a reservoir with a live regulated storage capacity of 135.5 million m^3 impounded by a 134.5 m high roller compacted concrete arch dam built in a narrow gorge on the Qingshuihe River, a tributary of the Wujiang River. The average annual runoff at the dam site is 76.5 m^3/s. The reservoir area is 7.5 km^2. Planned power production is 723 GWh/annum with an installation of 2 x 45 MW.

According to the findings of the audit some 200 hectares of farmland were inundated and some 1159 persons were resettled. The project had been recently commissioned at the time of the audit which was carried out in January 2008, although construction work was still ongoing and no power was being produced at that time.

The audit was carried out through a field trip to China with meetings with national authorities in Beijing and with Provincial authorities, representatives of affected peoples and the project developers and owners at the project site.

The Sustainability Protocol itself was found to be a very useful tool when carrying out the audit during the field trip to China. The Protocol covers many different aspects and therefore the auditor could not be expected to be an expert in every issue. The notes and guidelines included as examples of evidence to look for under each issue were therefore a very good supporting tool to the auditor.

Inevitably, some level of subjectivity is difficult to avoid when making the assessment and when allocating scores. This is one weakness of the system. Another question is, once each of the 20 aspects has been assessed, how one should combine the individual scores from each aspect to arrive at a final overall result for the project. In the end it was decided to use an average of all the 20 aspect scores as the end result for the project assessment, but undoubtedly some aspects could be given more weighting than others in this process. Some guidance could be given in the protocol to help the auditors decide how to tackle this question.

In Norway NVE is responsible for considering applications for and issuing licenses for hydropower and other energy generation projects. The system used has been built up over a number of years and, although it does employ many aspects which are applicable worldwide, it is inevitably tailored to the national requirements and conditions in Norway.

If the IHA Sustainability Protocol were to be used on projects in Norway as part of the licensing system, it would have to be considerably adapted to local conditions. We feel that this would render it less relevant for use in other countries.

Consequently, NVE foresees that the IHA Sustainability Protocol is not directly useable as part of the Norwegian licensing system, although it could be a useful tool for verifying the sustainability of a project if, for example, the intention was to attract foreign investment or other similar reason. Thus it could serve as an independent check of a project's sustainability, in addition to any national regulatory requirements.

In its use of the Protocol NVE had to assess an operating hydropower project which was very recently commissioned. Consequently, Section C appeared at first to be most relevant. After completion of the audit, however, it became apparent that many of the aspects from Section B could in fact be more relevant for such a newly implemented project. Also perhaps a clearer definition should be given of what is meant in Section B with regards to "new hydro projects", especially when section A uses the term "new energy projects".

NVE concluded that all three sections of the Protocol could be relevant according to the stage the project has achieved in its development.

NVE's Specific Comments on Protocol Sections

NVE found that both sections B and C represented an effective method of assessing the sustainability of a project. However, the success of the method lies in the objectivity achieved by the auditor when ascertaining scores for an aspect. Often it can be quite difficult to decide exactly which criteria are met sufficiently to merit the score. Undoubtedly a certain amount of subjectivity is inevitable since this can not be reduced to a simple mathematical process.

As regards the ***comprehensiveness of the aspects*** included in the protocol, NVE found that the following aspects could also be included in Section B:

- The demonstrated need for the project
- Greenhouse gases
- Operational risks (include in B4?)

As regarding the ***weighting to be given to various aspects*** assessed in the protocol, NVE gave equal weighting to all 20 aspects. NVE found, however, that it could be argued that more weight should be given to, for example, the social aspects than the technical aspects. Furthermore, a system whereby a project could not pass if certain key aspects did not pass should be considered implemented.

NVE's assessment of the importance of Aspects in Section B

1	2	3	4	5	6	7	8	9
Not at all		Partly		Reasonably		Very		Extremely

No.	Aspect	Score	No.	Aspect	Score
B1	Political risk and regulatory approval	8	B11	Safety	9
B2	Economic viability	8	B12	Cultural heritage	9
B3	Additional benefits	8	B13	Environmental impact assessment and management plan	9
B4	Planned operational efficiency and reliability	7	B14	Threshold and cumulative environmental or social impacts	9
B5	Project management plan	7	B15	Construction and associated infrastructure impacts	9
B6	Site selection and design optimisation	7	B16	Land management and rehabilitation	9
B7	Community and stakeholder consultation and support	9	B17	Aquatic biodiversity	9
B8	Social impact assessment and management plan	9	B18	Environmental flows and reservoir management	9
B9	Predicted extent and severity of economic and social impacts on directly affected stakeholders	9	B19	Reservoir and downstream sedimentation and erosion risks	8
B10	Enhancement of public health and minimisation of public health risks	9	B20	Water quality	8

NVE's assessment of how each of the Aspects in Section B are measured:

1	2	3	4	5	6	7	8	9
Not at all		Partly		Reasonably		Very		Extremely

No.	Aspect	Score	No.	Aspect	Score
B1	Political risk and regulatory approval	6	B11	Safety	7
B2	Economic viability	6	B12	Cultural heritage	7
B3	Additional benefits	6	B13	Environmental impact assessment and management plan	8
B4	Planned operational efficiency and reliability	6	B14	Threshold and cumulative environmental or social impacts	8
B5	Project management plan	6	B15	Construction and associated infrastructure impacts	6
B6	Site selection and design optimisation	6	B16	Land management and rehabilitation	6
B7	Community and stakeholder consultation and support	7	B17	Aquatic biodiversity	6
B8	Social impact assessment and management plan	7	B18	Environmental flows and reservoir management	6
B9	Predicted extent and severity of economic and social impacts on directly affected stakeholders	7	B19	Reservoir and downstream sedimentation and erosion risks	8
B10	Enhancement of public health and minimisation of public health risks	6	B20	Water quality	8

NVE's assessment of the importance of Aspects in Section C

1	2	3	4	5	6	7	8	9
Not at all		Partly		Reasonably		Very		Extremely

No.	Aspect	Score	No.	Aspect	Score
C1	Governance	9	C11	Suppliers and service providers	4
C2	Economic viability	8	C12	Cultural heritage	8
C3	Additional economic benefits	7	C13	Social commitments	9
C4	Markets, innovation, and research	6	C14	Directly affected stakeholders (including the local community)	9
C5	Operational efficiency	7	C15	Environmental commitments and management	9
C6	Operational short-term and long-term reliability	9	C16	Reservoir management	9
C7	Community acceptance	9	C17	Environmental flows	9
C8	Dam, power station, and associated infrastructure safety	9	C18	Biodiversity and pest species	9
C9	Employee safety, occupational health, and well-being	9	C19	Water quality	7
C10	Employee opportunity, equity, and diversity	8	C20	Sedimentation and erosion	7

NVE's assessment of how each of the Aspects in Section C are measured:

1	2	3	4	5	6	7	8	9
Not at all		Partly		Reasonably		Very		Extremely

No.	Aspect	Score	No.	Aspect	Score
C1	Governance	6	C11	Suppliers and service providers	7
C2	Economic viability	6	C12	Cultural heritage	7
C3	Additional economic benefits	6	C13	Social commitments	7
C4	Markets, innovation, and research	6	C14	Directly affected stakeholders (including the local community)	7
C5	Operational efficiency	6	C15	Environmental commitments and management	7
C6	Operational short-term and long-term reliability	6	C16	Reservoir management	7
C7	Community acceptance	7	C17	Environmental flows	6
C8	Dam, power station, and associated infrastructure safety	7	C18	Biodiversity and pest species	6
C9	Employee safety, occupational health, and well-being	7	C19	Water quality	7
C10	Employee opportunity, equity, and diversity	7	C20	Sedimentation and erosion	6

6 STATKRAFT EXPERIENCE AND COMMENTS

Introduction of Statkraft

Statkraft is a Norwegian state-owned enterprise. The Statkraft Group is a leading player in Europe within renewable energy. The Group generates hydropower, wind power and district heating and constructs gas power plants in Norway and Germany. Statkraft is a major player on the European energy exchanges. Statkraft's business is developed in accordance with the company's vision of being a European leader within environment-friendly energy. The starting point for the strategy is that the Group shall be an active contributor to sustainable development within the European energy market.

Statkraft was one of the institutions who returned a completed survey form, having answered general questions 1, 2, 3, 4 and 5 and the specific questions on the various aspects on section C of the Protocol.

Statkraft's General Comments

Statkraft have used the IHA Sustainability Protocol to assess both planned projects and existing schemes. These are :

- The Theun Hinboun Expansion Project in Laos (used as a test case – still under finalization),
- as an (ongoing) planning tool in more than 4 hydropower projects in the Balkans
- in the now terminated plans for hydropower development in the Vefsna Watershed in Norway (Projects called Possibilities-Helgeland and Trollheim Power Plant- existing)

Statkraft consider the Protocol as a good benchmarking tool to help them get an impression of where they are in regards to their corporate vision (of being the European Leaders in Environmental-friendly Energy), policy and governing principles in regard to sustainability in general, and environment in particular.

Statkraft also sees the Protocol as a way of highlighting areas where projects can be improved.

Furthermore, it gives a good common ground for communicating with NGOs, especially the environmental organisations, but also with other project-specific stakeholders. It is also perceived as a very strong communicative tool with respect to the media etc.

Statkraft have found that there are several aspects in the protocol that need to be improved or given a deeper understanding. They do, however, consider that this is best discussed in a work-shop like setting with several experts present. They also invite Norad to discuss these matters in plenum meetings in Norway which they consider would be a good way of bringing the Protocol forward in Norway.

Statkraft is a member of the IHA and has decided to use the protocol to test/check out the performance of hydropower projects – both in Norway and in international projects. They support the ongoing process regarding a possible certification of projects based on the

protocol. They also attend the reference group set up by the IHA to support the Hydropower Sustainability Assessment Forum.

So far, Statkraft believes the protocol is a more practical and realistic tool than for instance the World Commission on Dams (WCD) criteria. It covers core values and strategic principles in the WCD final report quite well, as they see it. The protocol also seems to cover the same issues that for instance is set out in the World Bank Safeguard Principles. Statkraft hopes that the Protocol will eventually become a tool to establish best practices for hydropower.

Statkraft considers Sections B and C of the Protocol as the most relevant sections. To choose between energy options (Section A) will as a rule be the privilege of the National State. On occasions when Statkraft as a company evaluates such options (when and if they are free to do so) Section A could be useful, but they fear that Section A, in its present form, could be seen to favour hydropower.

Statkraft's Specific Comments on Protocol Sections

Statkraft commented mostly Section B and noted that much of the comments refer also to Section C of the Protocol.

Statkraft found that Section B does give a good evaluation of the project addressed. It would be possible to increase the efficiency of the protocol. This, however, depends on a more thorough understanding of what is to be measured (i.e. by the operative company and/or the project owner), or of the degree of impacts and a clarifications of the uncertainties. This needs to be part of a process and not mere proposals from single persons. Statkraft see no single good solutions to these questions.

Statkraft found Protocol Section B to be comprehensive enough. However, there are some aspects of hydropower developments that are not sufficiently well reflected. For example, if a small river gets increased flow due to the project, the river will after some time become enlarged due to erosion and sedimentation. The regulation will then have created a larger river and a changed ecosystem. In the upstream area, if an artificial reservoir is created a river will change into a lake. The first phenomenon is given a specific aspect, but the second (the reservoir) is not discussed or is relatively superficially discussed. The closest aspect in regard to this is B18, but here management of the reservoir is the issue. This could mean that changing a river into a larger river is given more weight in the Protocol than changing a river into a lake. To Statkraft (Tormod Schei) this seems to represent a logical flaw in the assessment, or a misunderstanding on his part.

As regards the question of applying a weighting system to the various aspects assessed in the Protocol, Statkraft found that the importance of the aspects will vary between countries and regions and in regard to a large set of criteria. This could be because of, for example, culture, the need for energy, climate zone, types and wealth of biodiversity, laws and regulations in the nation at hand, policy and principles of the company at hand etc.

As earlier mentioned, Statkraft did find that there seem to be logical flaws when two aspects are compared. For instance could B9 be seen to repeat B8, or it is not immediately clear what is new in B9, since the two aspects obviously could be seen to overlap the meaning and thereby their relative importance is difficult to judge.

Statkraft did find that some aspects in Section B should be given greater weight and some less – but this will vary between nations, geography or biological/ecological region – as the number of utilized watersheds increase within a nation or region the value of the next river will increase and hence the weight of a given aspect.

Statkraft's assessment of the importance of Aspects in Section B

Statkraft pointed out that the points given here should be perceived as very relative considering their previous general comments.

1	2	3	4	5	6	7	8	9
Not at all		Partly		Reasonably		Very		Extremely

No.	Aspect	Score	No.	Aspect	Score
B1	Political risk and regulatory approval	7	B11	Safety	8
B2	Economic viability	7-8	B12	Cultural heritage	7
B3	Additional benefits	6-7	B13	Environmental impact assessment and management plan	8
B4	Planned operational efficiency and reliability	8	B14	Threshold and cumulative environmental or social impacts	6-7
B5	Project management plan	8	B15	Construction and associated infrastructure impacts	5
B6	Site selection and design optimisation	8	B16	Land management and rehabilitation	7
B7	Community and stakeholder consultation and support	8-9	B17	Aquatic biodiversity	7
B8	Social impact assessment and management plan	8-9	B18	Environmental flows and reservoir management	7
B9	Predicted extent and severity of economic and social impacts on directly affected stakeholders	8-9	B19	Reservoir and downstream sedimentation and erosion risks	7
B10	Enhancement of public health and minimisation of public health risks	8	B20	Water quality	7

Statkraft's assessment of how each of the Aspects in Section B are measured:

Statkraft noted that "How well is each of the Aspects Measured" depends, in their view, on the quality of the various plans that a project creates – the aspect in itself does not measure, but is considering the totality of plans that comprises a project.

Accordingly Statkraft did not complete this part of the Survey Form.

7 OTHER NORWEGIAN EXPERIENCE

Other institutions contacted did not complete the Survey Forms since they did not yet have hands-on experience from actually using the IHA Sustainability Protocol on actual projects.

For the sake of completeness the reasons are given here.

SNPower

SN Power is an international hydropower company and is a commercial investor, developer and operator of hydropower projects in emerging markets. SN Power was established in 2002 as a Norwegian limited company owned by Statkraft and Norfund. SN Power is headquartered in Oslo, Norway, and currently operates hydropower plants in Latin America and Asia and is expanding into Africa.

SNPower are currently in the process of seeing how to systemise the use of the IHA Sustainability Protocol in their projects and are planning to carry out a pilot project in this respect.

NIVA

NIVA is Norway's leading multidisciplinary research institute in the field of use and protection of water bodies and water quality, in fresh and marine waters. NIVA is a foundation and its board is appointed by the Norwegian Ministry of the Environment, the Research Council of Norway and the employees at NIVA.

Although preliminary investigations indicated that NIVA had some experience in the use of the IHA Sustainability Protocol, it turned out that this was in connection with recommendations which NIVA put forward during the actual development of the Protocol. NIVA have not actually used the protocol subsequently.

8 CONCLUSIONS & RECOMMENDATIONS

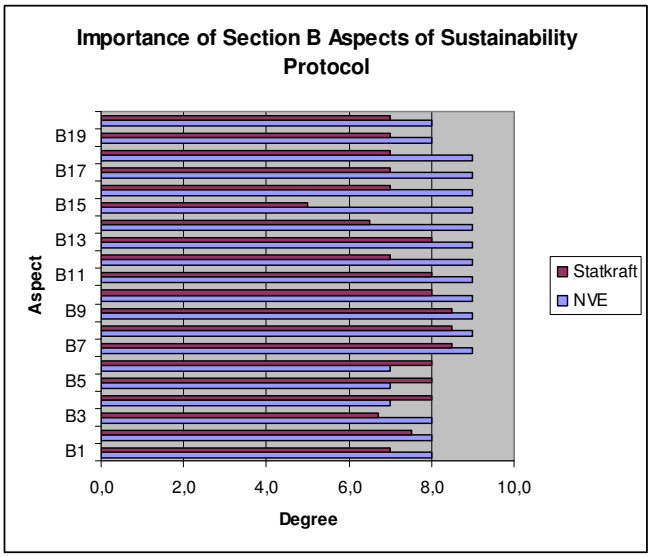
Introduction

Although Norwegian experience in the use of the IHA Sustainability Protocol is so far limited and too small to make any statistical analysis of, it does represent a relatively important brick in the continued building and strengthening of the Protocol. This is especially so since there is experience from both government regulators (NVE), owners/operators (Statkraft) and from certification (DNV).

In the light of this it is interesting to compare the results and comments from these different types of actors in the hydropower field.

Analysis and Discussion of Survey Results

Comparison of NVE's and Statkraft's Hands-on Experience



Summary of Aspects and Scores (New Hydro Projects)

No.	Aspect	Score	No.	Aspect	Score
B1	Political risk and regulatory approval		B11	Safety	
B2	Economic viability		B12	Cultural heritage	
B3	Additional benefits		B13	Environmental impact assessment and management plan	
B4	Planned operational efficiency and reliability		B14	Threshold and cumulative environmental or social impacts	
B5	Project management plan		B15	Construction and associated infrastructure impacts	
B6	Site selection and design optimisation		B16	Land management and rehabilitation	
B7	Community and stakeholder consultation and support		B17	Aquatic biodiversity	
B8	Social impact assessment and management plan		B18	Environmental flows and reservoir management	
B9	Predicted extent and severity of economic and social impacts on directly affected stakeholders		B19	Reservoir and downstream sedimentation and erosion risks	
B10	Enhancement of public health and minimisation of public health risks		B20	Water quality	

The Figure above gives the results from both Statkraft's and NVE's assessment of the importance of the 20 aspects in Section B of the Protocol. The table on the right hand side identifies the content of each aspect in this section which is an assessment of new hydro projects.

It can be clearly seen that NVE (the regulator) and Statkraft (the developer) have, naturally enough, different viewpoints as regards the importance of each aspect. The regulator is generally more preoccupied with such aspects as political risk and regulatory approval, economic viability and additional benefits, as well as the social and environmental aspects, whilst the developer/owner is more interested in such aspects as planned operational efficiency and reliability, project management plan, site selection and design optimisation, and reservoir and downstream sedimentation and erosion risks.

This observation would seem to underpin the strength of the IHA Sustainability Protocol in that it does not simply focus on aspects which are favoured by single stakeholders but embraces all relevant aspects of a development which should be considered. (In this respect Statkraft have actually pointed out the weaknesses inherent in the World Commission on Dams work in this respect).

Conclusions on the relative importance of Sections A, B and C of the Protocol

In their comments regarding the relative importance of the three sections:

Section A: New Energy Projects
Section B: New Hydropower Projects
Section C: Operating Hydropower Facilities

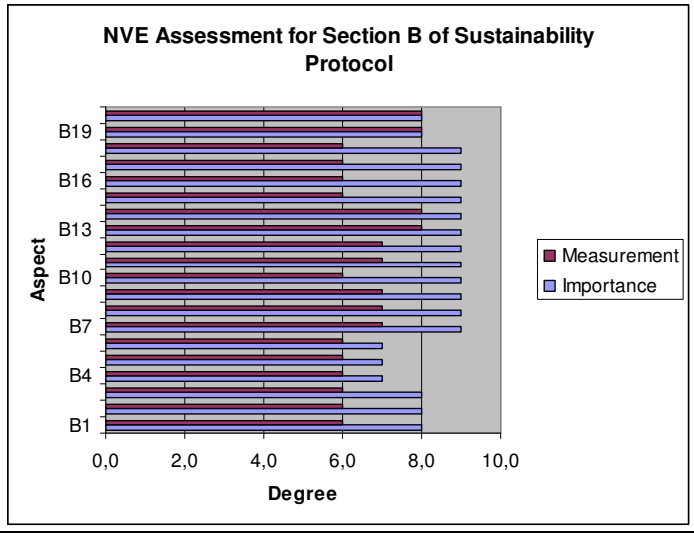
The Regulator (NVE) found that all three sections of the Protocol were relevant at the appropriate stage of project development.
The Developer (Statkraft) considered Sections B and C as most relevant, but recognised the fact that Section A would be relevant for governments (regulators).
The Certifier (DNV) considered Section A least relevant.

Again, these results emphasise the versatility of the Sustainability Protocol, and how it can be used in all stages of a project.

Conclusions on effectiveness of measurement of the various aspects in the Sustainability Protocol

This part of the Survey Form was completed by NVE (Sections B and C). In addition Statkraft gave some general comments.

The results from NVE's response are reproduced graphically here.



Summary of Aspects and Scores (New Hydro Projects)

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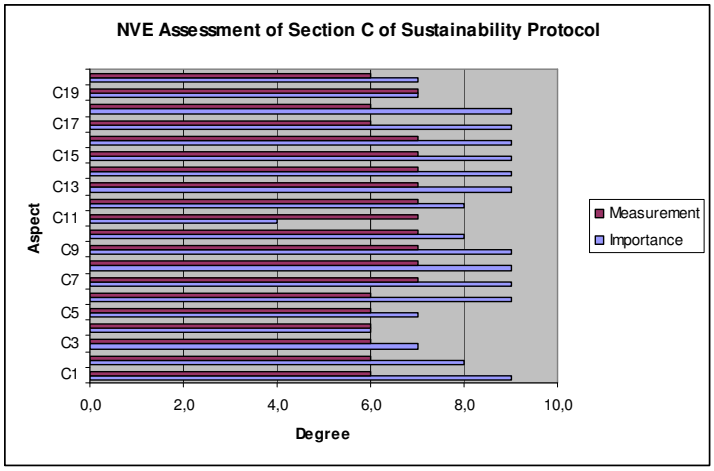

Summary of Aspects and Scores (Operating Hydropower Facilities)

No.	Aspect	Score	No.	Aspect	Score
C1	Governance		C11	Suppliers and service providers	
C2	Economic viability		C12	Cultural heritage	
C3	Additional economic benefits		C13	Social commitments	
C4	Markets, innovation, and research		C14	Directly affected stakeholders (including the local community)	
C5	Operational efficiency		C15	Environmental commitments and management	
C6	Operational short-term and long-term reliability		C16	Reservoir management	
C7	Community acceptance		C17	Environmental flows	
C8	Dam, power station, and associated infrastructure safety		C18	Biodiversity and pest species	
C9	Employee safety, occupational health, and well-being		C19	Water quality	
C10	Employee opportunity, equity, and diversity		C20	Sedimentation and erosion	

The results show that there is still room for improvement as regards the efficiency of the measurement of the scores for the various aspects.

Furthermore, the general comments regarding measurement indicate the following areas for improvement/further development:

- The quality and amount of detail of plans and other evidence should be increased to give a better "database" of evidence fro assessing each aspect.\ and in turn reducing the subjectivity of the assessment.
- Training of auditors to achieve better objectivity

Summary of Main Conclusions and Recommendations

- The World Commission on Dams Report, although based on sound strategic priorities, does not constitute a suitable operational tool for objective third-party assessments of hydropower projects. The IHA Protocol could become such a useful tool if lifted to industry standard levels and if relevant opponents to the Protocol are brought on board to enhance it.
- The IHA Forum and Reference Group should focus on sharpening the aspects where room for subjective analysis is too wide.
- The image of the Protocol as a tool of the Hydropower industry must be changed through broader involvement and acceptance by NGO's and other stakeholders.
- The Protocol should be developed as a Certification Standard. It is, however, perceived that it can not be expected that this will replace national certification or licensing systems. It will rather be in addition to such licensing for projects where international organisations or financing is involved.

- The question of possible weighting of the various aspects should be addressed by the Forum. A flexible system should be strived for which can be adjusted to the most relevant aspects in different countries.
- All three sections of the Protocol should be maintained and instructions and examples of in which situations each one may be most applicable should be developed.
- Possible logical flaws in the various aspects in the different sections should be checked. For example the points outlined by Statkraft's comments (e.g. B9 can be seen to be a repetition of B8; B18 does not cover adequately issues related to reservoirs-see specific notes by Statkraft on pages 18 and 19).
- Training of auditors should be established which concentrates on development of auditing skills so that they are able to better understand the context of the various aspects and give a more quantitative and less subjective assessment.
- Availability and quality of evidence should be emphasised and more examples of adequate documentary evidence, plans etc. given.
- Further work on improvement of the Protocol is best done in a workshop or Forum manner in which representatives from the different sectors and stakeholder groups are represented. This is already seen to be achieved through the HSAF and the reference group. It could, however, be supplemented by national discussion groups, at least in Norway, where most of the relevant sectors have experience from use of the Protocol. Such a discussion group could be led by Norad who have a genuine interest in arriving at a standard that can be endorsed by a range of key stakeholder organizations.