



EKOenergy hydropower criteria review: Background Study

A working document

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Table of Contents

Introduction.....	3
1. PART ONE: Analysis of ecolabels for energy and what they say about hydropower.....	4
1.1. The scope of the analysis.....	4
1.2. Results.....	5
1.2.1. Permits and legislation.....	5
1.2.2. Criteria for hydropower.....	5
1.2.3. Mitigating the environmental impacts of hydropower.....	6
1.2.4. Compensation of the negative environmental impacts of hydropower.....	7
1.2.5. Application procedure for power plants.....	8
1.2.6. Auditing.....	8
1.2.7. Public documentation.....	9
1.3. Summary.....	10
1.4. References.....	11
2. PART TWO: Expert interviews.....	12
2.1. The Scope and method of the study.....	12
2.1.1. Data collection and analysis.....	12
2.2. Results of the expert interviews.....	14
2.2.1. General idea of the EKOenergy ecolabel.....	14
2.2.2. Laws and permits as minimum level.....	17
2.2.3. Application procedure and decision-making.....	19
2.2.4. Stakeholder consultation.....	21
2.2.5. Measure list.....	23
2.2.6. Environmental criteria (environmental flow).....	27
2.2.7. Monitoring of environmental performance.....	33
2.2.8. Environmental fund.....	35
2.2.9. List of labelled hydropower plants.....	38

Introduction

EKOenergy is the international ecolabel for renewable energy. It can be used by sellers of renewable energy as well as by their consumers.

EKOenergy sets criteria for tracking and avoidance of double counting, for the sustainability of the power plants where the energy is being generated, and for 'additionality'.

The sustainability criteria for EKOenergy-eligible hydropower plants are being reviewed and updated in 2017-2020. The present criteria have been in use since 2013, when the international EKOenergy label was created. Experiences of the EKOenergy Secretariat, energy sellers, producers and other stakeholders, as well as purposefully collected data such as this report, will be utilized during the review process.

This background study was carried out in 2017. It consists of two parts: a comparative analysis of other ecolabels in the hydropower field, and expert interviews that explore opinions on EKOenergy criteria and procedures as they appear in 2017.

This study report serves as a resource material for further work. In the next phase of the criteria review process our task is to define goals, scope, content, process, relevant parameters and stakeholders for the hydropower criteria review.

The criteria review is coordinated by EKOenergy as a part of Freshabit LIFE IP project.

The overall timetable for the process is the following:

- Background study for the hydropower criteria review completed and reported (31.12.2017)
- Drafting the revised criteria, procedure and documentation for EKOenergy-labelled hydropower (31.3.2018)
- Collecting feedback and amendments to the criteria draft (31.12.2018)
- Piloting the new hydropower criteria, procedure and documentation in five hydropower plants in Finland (31.12.2019)
- Revised criteria accepted by the EKOenergy board (31.12.2020)

The background study has been carried out and reported by two people. Virpi Sahi works for EKOenergy as the Environmental Director. She has been the leader of the study project and in charge of the expert interviews in Finnish. Karlina Ozolina has been working for EKOenergy as an expert on migratory fish and hydropower. She has been in charge of the ecolabel comparison and the expert interviews in English.

1. PART ONE: Analysis of ecolabels for energy and what they say about hydropower

1.1. The scope of the analysis

All hydropower generation has negative effects on the local ecosystem. The role of ecolabels lies with setting a standard for minimum environmental performance (through environmental criteria), mitigating these negative impacts (through a list of mitigating measures) and compensation (through an environmental fund).

The aim of this report is to provide an overview of how EKOenergy determines which hydropower production can be sold as EKOenergy. And we compare it to how other electricity ecolabels deal with hydropower. We focus on labels that have been developed in Europe: Bra Miljöval in Sweden, CH2OICE in Italy and Naturemade Star in Switzerland. Both Bra Miljöval and Naturemade Star are active ecolabels, whereas CH2OICE is no longer active.

It is worth noting, that in addition to these third-party ecolabels, a hydropower production company can voluntarily comply with other, internal quality standards issued by the ISO (the worldwide organization comprised of national standards bodies). In particular, the ISO 14001 is an environmental management standard aimed to improve an organization's resource management (energy consumption, waste disposal, pollution etc.) through the formation of Environmental Management System and increased leadership participation. Though important and often presented by power producers as evidence of environmental consciousness, these standards do not deal with the principles and practicalities of sustainable energy production, therefore will not be discussed in this report.

1.2. Results

1.2.1. Permits and legislation

EKOenergy's criteria, including the sustainability criteria for eligible power plants are described in the document "EKOenergy network and label", which was approved by the EKOenergy Board in 2013 after a 18-months consultation process in line with the ISEAL Code for Standard Setting.

General requirements for all EKOenergy labelled electricity production are concerned with legal obligations as stated on page 8 of the document:

"In order to be able to be sold as EKOenergy, the production devices where the electricity originates from, have to fulfil

- All legal requirements in force at the place of production*
- All the requirements imposed by their permits."*

Bra Miljöval does not specifically state legal or permit-based requirements for their licensed power plants. All Naturemade power plants must meet all technical, legal and other requirements for operating the plant. Certified plants outside of Switzerland must comply with not only local/national requirements but also with the standard applicable in Switzerland (adapted to country-specific conditions). CH2OICE certified power plants must operate in agreement with the EUs Water Framework Directive.

1.2.2. Criteria for hydropower

In EKOenergy's criteria, as they exist until now (2018) the focus is on a consultation process. Production from hydropower plants can only be approved after a consultation of local environmental organisations and stakeholders. This is a result of the challenge to create Europe-wide (let alone worldwide) criteria. Because of a lack of unanimity in 2013, it was agreed that local experts and organisations would have a decisive voice in the approval processes.

The only explicit environmental criterion for hydropower plants (in addition to legislation and permits mentioned above) can be found on page 11:

"The power plant will be removed from the list if it does not guarantee at least 5% of the ecological flow from its annual average flow. A smaller proportion is allowed if 5% cannot be achieved due to drought or force majeure." EKOenergy Board can also accept some other reason (For example, a minimum of 5% would be a significant disadvantage for electricity generation and would not be of environmental benefit).

In the Bra Miljöval criteria too, an annual minimal flow is the only specifically listed environmental criterion.

In contrast, CH2OICE and Naturemade Star both include a long list of environmental criteria and factors to be investigated, such as the environmental status of the water body (biological, physiochemical, hydro-morphological) and the impacts of the hydropower plant present. However, such strict requirements are not feasible for many, if not most hydropower producers, as the cost of carrying out such investigations generally would outweigh the benefits of having the certification. This is especially evident with the CH2OICE ecolabel that is no longer in operation. The Naturemade star label is only used for sales in Switzerland.

1.2.3. Mitigating the environmental impacts of hydropower

When proposing a power plant or a list of power plants, the proposer (owner of the plant or other) is to draw up “*a list of measures to restore aquatic ecosystems and improve the living conditions of the species affected by power plants*” (page 10). One measure must be presented per each five power plants or each 50 MW.

The measures to be listed must be agreed between the relevant stakeholders so that the stakeholders are engaged in implementation when the funds are available, to seek co-funding and to seek to optimize the ecological benefits and allow the monitoring of their effects.

Within this formulation of a measure list, it is unclear what is the role of the power plant owner and their financial responsibility for the implementation of these measures. Relationships with the permits and obligations set by authorities and law remain unclear. In other words, it is not clearly stated if EKOenergy accepts measures that are already ordered by law, through a permit or other legal instrument used by the authorities of the target country. This is the subject of constant debate in the stakeholder consultation process, due to this lack of clear definition in the document.

The guidelines do not indicate whether measures should be designed for the power plant about to be certified or the water body it is built upon (i.e. mitigation), or for other power plants owned by the same producer, or can the measures be implemented anywhere (compensation). What is more, it is not defined in the document how the measure implementation will be monitored or what are the consequences of not carrying out the measures in the 5-year period.

Bra Miljöval requires a list of measures to be presented by the applicant and clearly states that legally required improvements cannot be included in the measures list, but these measures do not have to be carried out within the same water body where the power is

generated. Both CH2OICE and Naturemade Star have a complex, multi-level assessment process where the ecological impacts of the specific hydropower plant are presented and a list of measures that need to be implemented is put forward. This assessment must be carried out by certified professionals and the cost must be covered by the owner of the power plant. The CH2OICE ecolabel that is no longer in operation.

1.2.4. Compensation of the negative environmental impacts of hydropower

To compensate for the environmental damage of hydroelectric power (page 9) "*For each MWh hydropower sold as EKOenergy, the seller must pay at least EUR 0.10 (ten euro cents) to the EKOenergy Environmental Fund.*"

For the other types of renewable electricity generation that is ecolabelled by EKOenergy (such as solar, wind and biomass) only a fee of EUR 0.10 for the EKOenergy Climate Fund, to finance renewable energy projects in developing countries. The Climate Fund fee is also added to hydroelectricity production.

According to the document, the funds from the Environmental Fund can be used to implement two types of measures: measures that were defined in the certifying process to mitigate the environmental impacts of the certified power plant, and measures that have been proposed through Water Management Plans, designed in accordance to the EU Water Framework Directive.

EKOenergy does not manage the projects that it finances, but supports projects, proposals and operating models initiated and managed by others. The funding decisions consider cost-effectiveness, ecological and social impact, opportunities for additional funding, the country of origin of the electricity generated and the country where the electricity was sold.

Bra Miljöval and Naturemade Star both require the certified hydropower to contribute towards an environmental fund. Bra Miljöval requires an annual contribution of 1500 SEK/GWh hydropower sold (the approximate equivalent to 0.150 EUR/MWh) to be put aside for environmental projects either through a fund managed by the power plant owner, or through contribution to a centralized fund managed by the Swedish Society for Nature Conservation. This environmental fee is in addition to the non-refundable application fee of 10 000 SEK + 500 SEK (approx. EUR 1000 + EUR 50) for each power plant included in the application, which has to be paid irrelevant of the actual outcome of the certification process; and annual licensing fee that consists of two parts – the basic fee of 5000 SEK (EUR 500) and 0.6 SEK (EUR 0.06) for each MWh of electricity sold. Under the Naturemade Star certification, the owner of the power plant must too create an environmental fund and finance regular mitigating projects. CH2OICE does not require a defined environmental fund as such, but all the mitigating measures proposed during the certification process have to be financed by the power plant owners. But, as mentioned above, the CH2OICE ecolabel that is no longer in operation.

1.2.5. Application procedure for power plants

The approval process for the hydropower plant generally involves five parties or groups: proponent of the certificate (power plant owner or other entity), the EKOenergy Secretariat (the process leader and the rapporteur, the gatherer of all necessary basic data unless the candidate for the certificate brings them), the EKOenergy Board (responsible for the approval or refusal of a certificate unless the Board delegates it to a national or regional environmental organization for a specified period and destination), and interested stakeholders, in particular national and regional environmental organizations and water management co-operation groups. There is no official guidance on how to run the process, but in practice, for example, a written statement on a certification application is presented on the website. All decisions made by the EKOenergy Board are "*based on an intensive consultation of relevant stakeholders*" (Page 3).

EKOenergy's criteria say the following about the approval process:

" Anybody can provide the EKOenergy Secretariat with a list of hydropower plants he/she wants to include in the EKOenergy scheme, combined with a list of measures to restore aquatic ecosystems and to improve the natural habitats of species affected by hydropower plants. (...) A measure can only be listed if the involved stakeholders (note that this is not necessarily the owner of the hydropower installation) agree to:

- Implement the measure as soon as funding is available for its realization.*
- Look for co-funding for the implementation of the measure.*
- Do everything possible to optimize the ecological benefits of the measure.*
- Allow monitoring of the effect of the measure."*

In practice often the EKOenergy Secretariat initiates the application – finds the power plant, researches the environmental impacts, suggests measures and writes the report needed for EKOenergy Board. The time frame for each application varies depending on the available information and the competence of the EKOenergy Secretariat.

For all other ecolabels, the application process must be initiated by the owner of the power plant. They either involve specialist groups and committees, or a complex auditing procedure before a power plant can be certified. As part of the application process, CH2OICE requires a public consultation, whereas Bra Miljöval and Naturemade Star do not. In addition, all ecolabels require a list of mitigating measures to be presented by the applicant.

1.2.6. Auditing

In EKOenergy, which is an ecolabel for renewable energy sales and consumption, not for

production units, hydropower plants are not audited by a third party.

Naturemade Star, which is an ecolabel for power plants, audits the power plants before certification, and at defined time intervals (annually, or every few years) thereafter. The audits must be carried out by a third party, meaning qualified auditors, and the costs of the audit must be covered by the owner of the power plant. The CH2OICE ecolabel had a very complex and expensive audit process too. The label is no longer in operation.

1.2.7. Public documentation

Summary reports on the approved power plants can be viewed on a website. However, the extend of the documentation varies. There is no public documentation on the hydropower plants that were not accepted.

There are no publicly available lists of certified hydropower plants for Bra Miljöval or CH2OICE. None of the other ecolabels have publicly available documentation (reports, summaries) on the power plants (or production capacity) certified under their ecolabel.

1.3. Summary

EKOenergy is the international ecolabel for renewable energy. It can be used by sellers of renewable energy as well as by their consumers.

EKOenergy sets criteria for tracking and avoidance of double counting, for the sustainability of the power plants where the energy is being generated, and for 'additionality'.

EKOenergy's approach towards hydropower is pragmatic, but relies too much on the active involvement of local stakeholders during the approval process, as well as on information that is publicly available, but in many countries very little information is publicly available.

During the upcoming criteria review, EKOenergy should/will concentrate on the development of clearer environmental criteria and a clear application guidelines.

In conclusion, below is the SWOT analysis of EKOenergy's approach for approving hydropower (situation december 2017)

<p>STRENGTHS</p> <ul style="list-style-type: none"> -Inexpensive (for the applicant) -International -Supported by international NGOs -Environmental Fund for river restoration -Climate Fund for tackling energy poverty 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> - Vague criteria - No guidelines for the application process - Relies on the secretariat team to do all the research/writing
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> - Demand for "greener" hydropower is growing, as renewables are becoming mainstream - Demand for EKOenergy is growing - As more old hydropower dams are upgraded, more of them become suitable for EKOenergy certification 	<p>THREATS</p> <ul style="list-style-type: none"> - Different expectations + different implementations in different countries. - Too depending on information that is publicly available but not necessarily correct/updated

1.4. References

"EKOenergy – Network and label", by EKOenergy Secretariat

"Electricity 2009:4 – Bra Miljöval Criteria" by Jesper Peterson, Emanuel Blume, Jenni Lehto, Annah Lintorp and Mathias Gustavsson (Swedish Society for Nature Conservation)

"CH2OICE Certification for Hydro: Improving Clean Energy. Technical proposal of rules and criteria for an independent body issuing a WFD-compliant hydropower certification label" by Giulio Conte, Andrea Moretto, Andrea Goltara, Natasa Smolar and Marko Gospodjinacki

"Certification Guidelines. Conditions and Criteria for Naturemade Star and Naturemade Basic" by the Association for Environmentally Sound Energy (VUE)

2. PART TWO: Expert interviews

2.1. The Scope and method of the study

As a part of the hydropower criteria review, expert opinions were studied, focusing on the positive and negative elements of the EKOenergy labelling, but also receiving suggestions for future development. The aim of the study was to investigate issues with various topics within EKOenergy and thus produce a document that could be used as the basis for the criteria review. This study focused on analysing the official document "EKOenergy - Network and label", accepted by EKOenergy Board in 2013, particularly analysing the statements on hydropower.

2.1.1. Data collection and analysis

Twelve experts from the field of river ecosystems and environmental costs of hydropower were interviewed. They included 9 people from Finland and 3 people from abroad (Germany, Italy and Austria), with 4 researchers, 2 working in administration, 3 representatives from hydropower production sector and 3 representatives from NGOs.

The interviews with Finnish people were carried out in person, and took 1.5-2.5 hours. The interviews with people outside of Finland were carried out either over telephone/Skype or through emails. Before the interviews, the participants were asked to familiarise themselves with two documents: the hydropower chapter in the "EKOenergy – Network and label" document and the list of current EKOenergy approved hydropower plants.

A checklist was applied to cover the most important issues during the interview. Notes were prepared on the discussions and after the interviews all documented material was organised on themes according to the main topics discussed:

- General idea of the labelling
- Laws and permits as minimum criteria for certification
- Application procedure
- Stakeholder consultation
- Measure list
- Environmental criteria (in particular ecological flow)
- Monitoring of environmental performance
- Environmental fund
- List of current hydropower plants

The general views of each participant on each topic were categorised according to four

categories. These categories were created by writers of this report during the analyses phase:

- I. works well
- II. amendments needed
- III. new strategy suggested
- IV. no comments/not discussed

In the chapters below, we have presented the results of these interviews grouped together based on the main topics discussed.

2.2. Results of the expert interviews

In the chapters below, the results of expert interviews are grouped together based on the main topics discussed. The general summary is presented first, indicating the overall performance of EKOenergy (works well, amendments needed, new strategy needed) with regards to each topic discussed. Thereafter we present a list of positive remarks, problems and suggestions picked up from the material. Finally, at the end of each chapter, the original notes, i.e. material collected during the interviews and processed under the themes, is presented.

2.2.1. General idea of the EKOenergy ecolabel

EKOenergy is an international ecolabel for renewable energy. During the interviews, the general idea of ecolabelling and its applications in hydropower sector was discussed. Overall, of the people interviewed, majority (9) answers indicated the need for amendments, with the remaining three suggesting alternative strategies.

Positive opinions on EKOenergy ecolabel were given for the compensation through the Environmental Fund (3) and for having an ecolabel for hydropower (2) as it can serve as an incentive for a better industry performance. It was also stated that EKOenergy is more successful than other, stricter procedures/ecolabels.

Negative opinions on the ecolabel were given with regards to the potential risk of greenwashing (2), especially as many bad ecolabels exist (2) and it is easy to be cynical and suspicious of ecolabels. A label with weak criteria could be attractive for hydropower companies who do not wish to renew their concessions/permits nor look at their environmental impacts objectively. Several insufficiencies in the manner the ecolabel currently functions were noted, for example the measures have not been well defined. Also the seller gets the product, but the producer has to cover the costs of the measures. In addition, the lack of approved Finnish hydropower was noted.

However, plenty of possibilities for improvement were foreseen and guidance was given for the further development of the ecolabel:

- better define of the goals of the ecolabel (2)
- be more explicit and predictable (2)
- be non-political and neutral
- estimate/analyse the benefits of ecolabelled hydropower in general
- increase the role of the beneficiary (i.e. the hydropower company) in the approval process
- encourage hydropower companies to allocate larger water volumes for the benefit of the environment
- more weight on ecological compensation and publicity
- less weight on criteria that cannot be formulised/applied on a general level

- consider the ecological loss per produced energy unit estimations
- approve larger hydropower to raise more funds for the ecolabel
- combine the interests/viewpoints of electricity seller and producer
- openly discuss the FANC's role in the labelling process and decision making
- work on public image to win public's trust
- get support from big nature organisations
- include positive examples from the industry (2)
- communicate to consumers about the impacts of hydropower similarly to the "traffic-light system" of WWF's Fish Guide
- construct the label based on a scoring system, similar to one used by Bra Miljöval or the MSC-certification for sustainable fish
- establish a coaching/improvement program for hydropower producers (costs covered by the producers)
- define more general criteria (e.g. continuous flow and river continuum upstream and downstream)

Amendments needed:

- *Naturemade Star ecolabel includes positive examples such as Roppoldingen (river Aare) and Rheinfelden (river Rhine). The most strategic asset for a hydropower plant is the water flow – the ecolabel should encourage hydropower plants to allow larger volumes of water for the benefit of the environment. This would obviously lead to increased electricity prices for the consumer, but this is the right approach to ensure any environmental benefit (reproduction sites, environmental flow) is achieved. According to criteria, the plant operator should organize the flow, but consumer should pay for it. EKOenergy is attractive for hydropower companies who do not wish to renew their concessions or look at their environmental impacts objectively. EKOenergy could demand amendments for the existing hydropower plants.*
- *More weight should be put on the ecological compensation and publicity, and less weight put on criteria that are difficult to formulate in a general level. Also the ecological loss per produced energy unit should be considered.*
- *An environmental label is an incentive for a better performance and worth developing. One possibility is to construct the label based on a scoring system, similar to one used by Bra Miljöval or the MSC-certificate for sustainable fishing. It is also possible to establish a coaching/improvement programme for hydropower companies (paid by the hydropower companies), that could including mapping of the development needs, action programme, new level of performance and reaching the label. However, the company should finance such a project either through their own funds or funds applied from EU etc.*
- *The goal of the labelling should be better defined, then also means (measures) would be more obvious. The criteria can be defined more generally (continuous flow and river continuum upstream and downstream) and examples should be given. The role of*

the beneficiary i.e. the hydropower company must be stronger. Compensation through the fund is useful.

- *An ecolabel for electricity is positive and it is good that also hydropower is included. Finnish hydropower plants are almost absent from the list of labelled plants, and the measures are not well-defined. The Environmental Fund is a positive. In the future the labelling should be more explicit and predictable. Environmental labelling needs market-driven growth i.e. that consumers would ask for environmentally friendly product. Most important now is the price. 10% of consumers change their electricity seller annually.*
- *Environmental label for hydropower is a positive. There is need to add predictability of the labelling process, including a clear message to the stakeholders on what is the scope of the label. Also FANC's role in the labelling process as a decision-maker should be openly discussed.*
- *Most researchers in the field of river protection are quite cynical and suspicious of ecolabels. There are a lot of bad ecolabels out there, so EKOenergy should work on their public image and get big organisations to support the label to make it seem trustworthy to the scientists working with river issues and in order to win the public trust.*
- *The main motivation to invest money has to be a strict governmental pressure to get the laws effective.*
- *EKOenergy looks for simpler solutions to provide funding for river restoration projects and is certainly more successful than other procedures in Europe, as long as there are producers willing to be certified. Stricter system (such as CH2OICE) could be used in more environmentally conscientious communities/countries. However, CH2OICE never worked because it was just too complex.*

Another strategy suggested (2):

- *When labelling hydropower, a risk of greenwashing exist, at least according to the experiences from Norppaenergia and EKOenergy – has EKOenergy estimated if it is a good idea to label hydropower at all? On the other hand, if large plants such as Imatra would join, the amount of funding EKOenergy would receive (through license fees, Climate Funds and Environmental Fund) would be remarkable.*
- *The main question is: how to combine the interests/viewpoints of electricity seller and producer? The present paper is prepared from a seller's point of view. The seller gets a product, whereas the producer has to do the measures. Who is paying the expensive measures and what is the intensive to do them? The producers role and benefits (the "carrot") should be more obvious.*

2.2.2. Laws and permits as minimum level

According to EKOenergy, *"in order to be able to be sold as EKOenergy, the production devices where the electricity originates from, have to fulfil*

- *All legal requirements in force at the place of production*
- *All the requirements imposed by their permits."* (EKOenergy network and label 2013, 8.2.)

Of the people interviewed, all said something about this topic, with majority (10) suggesting some amendments, and two people suggesting it works well.

In general, laws and permits were mentioned as a good starting point (5), and indispensable for the ecolabel. However, it was pointed out that fulfilling legal requirements has no added value (3), and obeying laws does not mean environmental responsibility. They cannot be the only criteria. In addition, legal obligations (e.g. building a fish pass) often are not completed, and the Water Framework Directives exemption clause is often used to operate plants in sensitive areas. Also, Legal compliance may be difficult to monitor outside of the EU.

Several suggestions were made to further develop EKOenergy:

- demand more than the existing concessions/obligations (3)
- anticipate ecological issues/progressive legal development for the future
- support and demand an update of the Finnish Water Act to include regular permit updates
- support voluntary transparency from the industry
- clear up the permits and concessions during the application/approval process (2)
- build compensatory habitats
- when approving, ask a producer to apply for changes in their concession to include the new measurements/achievements from the ecolabel

Works well:

- *When assessing the environmental performance of a hydropower plant, fulfilling the concession obligations is a starting point.*
- *In the environmental policy of this hydropower company "legal compliance" is the minimum level and after that comes continuous improvement to reduce negative impacts on the environment, combatting climate change and enhancing circular economy.*
- *This is indispensable! But can't be the only thing.*
- *Obviously this should be the bare minimum requirement!*

Amendments needed:

- *An environmental label must proactively demand more than the existing concessions and thus anticipate ecologically more progressive permits/concessions for the future. E.g. in addition of fishways, also compensatory habitats should be build. In Germany and Canada these laws on compensatory habitats already exist.*
- *The prevailing concessions and permits are the starting points and must be cleared up (the company knows them). A recent study is relevant (Study on fisheries obligations in the concessions of the Finnish hydropower plants up to 5 MW, according to the Water Act, including related regulation permits). This study revealed that often obligations are not put into practise. Putting a legal obligation into practise should not be labelled as such, and the hydropower company should finance this kind of activity anyway. It is important that the EKOenergy label would give support and demand the changing of the Finnish Water Act.*
- *A performance according to laws and permits automatically affects anybody living in a society and does not have added value as such. However, the application procedure where the permits and obligations are to be cleared up as a starting point, could increase transparency of the hydropower production sector. The applicant (plant owner) would produce this information voluntarily, although it is naturally available in administration's databases as well (e.g. VESTY database in SYKE that is updated by ELY-centres). In general, eternal concessions for hydropower plants should be eliminated in Finland and replaced with regular permit updates.*
- *Obeying laws does not mean responsibility. In addition, the Water Framework Directive defines the level in Europe but it has to be implemented nationally – what is the legislative minimum from the WFD point of view, is a question worth considering. The target to meet the requirements for the WFD for the Finnish ministry for the environment has been postponed and is now year 2027. Also directive on renewable energy is implemented simultaneously. But if talking about Finland, by now hydropower companies have already exploited 100% of the rivers and they have to give this up.*
- *Law and permit as a minimum level does itself indicate that the criteria (for flow and continuum) are ok. If a company is completing a measure without the EKOenergy labelling (voluntarily), it is ok – but if it is completed only because of legal obligations, then it cannot be counted as an EKOenergy measure. WFD means that Finnish Water Act has to be updated.*
- *The benefit of a permit is permanency. The permit stays even though owner of the plant would change. If better practises - such as allowing for continuous flow in river stretches that were completely dry before - are created within labelling, how would they become permanent? What happens if a plant leaves the labelling system? Should the*

labelling include a demand that the company would apply for changes in their concession according to the achievements within the label? However, the Finnish Water Act does not protect river ecosystems. If a fish way obligation is included in an old concession, then the authority can demand its construction. But it takes a long time: AVI Regional concession authority → VHO Water Court → KHO High Court. Also, the permanency of concessions have a negative side, they should actually be checked every 20-30 years. For example concessions where regulation rules mention only water level in upper channel and thus make hydro-peaking possible – these should be checked (E.g. in river Siikajoki there are tens of such cases).

- *Good, but relying on legal documents does not actually add anything. WFD is a legal instrument, but vague and WFD exemption clause is often used in the development of controversial power plans. Difficult to monitor outside of the EU too.*

2.2.3. Application procedure and decision-making

Of the people interviewed, majority (7) suggested new approach is needed, two people suggested some amendments were needed and one person thought that it works well. Two people had no comments on this topic.

The ease of EKOenergy labelling was regarded as a positive feature, as a minimal effort is required from the producer and it is the easiest ecolabel available. The democratic system with the EKOenergy Board as the decision maker was regarded as a benefit as well.

However a clear majority of comments indicated problems in the application procedure and decision making:

- lack of definition on acceptable measures (2)
- weak role of the producer
- lack of third-party audits
- lack of clear criteria
- decision making can be delegated from the EKOenergy Board to national or regional-bodies
- it is FANC, not EKOenergy Board who are the decision makers

Several suggestions on how to improve the ecolabel were also presented:

- define and increase the role of the producers
- clear up the criteria and application guidelines
- carry out an environmental analysis of potential power plants
- the applicant should be the power producer/owner (5)
- permits and concessions should be checked and cleared as the first step of the application
- EKOenergy Secretariat should include a research committee

- the costs of the application procedure and background studies should be covered by the applicant/producer
- producer should cover the costs of mitigation measures

Works well:

- *It appears to be clear enough and done with minimal effort required from the producer/applicant. If a producer is interested, EKOenergy procedure is the easiest ecolabelling procedure for them.*

Amendments needed:

- *To prepare an application, it is hard to understand what kind of hydropower plant would be eligible because of the unclear criteria and lack of definition what counts as an acceptable measure.*

- *It is a democratic system with the EKOenergy Board making the final decision. But must rely on the input from local NGOs.*

Another strategy suggested:

- *The power plant owner must be committed to the ecolabel. In FANC (EKOenergy Secretariat) there should be a committee that would collect statements from other parties (how much time of the administration could be used?). The applicant should pay the costs of the procedure and background studies. Alternatively clear criteria and guidelines should be available.*

- *The power plant owner must be the applicant. As a first step, the prevailing permits and concessions must be cleared up.*

- *Presently the process lacks a third-party-audit that would allow plenty of room and time for interpretation, so the role of the EKOenergy secretariat is to make the decisions. Have you considered a third-party audit? Also the possibility of the EKOenergy board to delegate the decision-making to national or regional bodies raises questions.*

- *The hydropower company as the main beneficiary should be the initiator of the labelling process, with a clearly defined role. Now the role is extremely weak. This allows a company to gain benefit from action/funding provided by some other stakeholder (e.g. if another party constructs/pays for the installation of a fishway). The hydropower company must cover some of the expenses.*

- *"Anybody can suggest..." is too vague— it should be the plant owner who decides.*

The owner should also have a clearly defined role in the making of a better environmental performance, e.g. how much is the minimum funding share of the owner when a fish pass is constructed (%) or how many cubic meters of water should the owner allow.

- The owner's role in the process should be strong. It is highly weird to say that the owner does not need to be a partner in the labelling process and agreement. Instead of speculating with measures in the future, an analyses of present state of the hydropower plant should be carried out, with the following aspects: migratory fish, regulation and flow.

- According to our experience, it is FANC's board that actually has a decisive role in Finnish cases. However, in the beginning of our process EKOenergy secretariat gave another picture on the procedure. In the case of rivet Oulujoki, this lead to a farce where the hydropower producer applied for eligibility for Montta and Pyhäkoski hydropower plants. The stakeholders seemed to have no idea of the actual scope of the EKOenergy label and the monetary value of it - expenses and incomes for the company – and even referred to other sectors of the company such as nuclear power.

2.2.4. Stakeholder consultation

Of those interviewed, majority (6) indicated that a new strategy was needed for the stakeholder consultation. Three people gave answers that suggested some amendments and one person suggested that it works well. Two people had no comments on this topic

The stakeholder consultation in principle is good and useful, and is needed to take into account different local issues, e.g. among local coastline inhabitants, fisheries societies, recreational users of the local waterways.

However, at present the stakeholder consultation seems to replace weak criteria and lack of clear goals from the ecolabel. Consultations produce large amounts of varying views and suggestions without a clear scope. Without an understanding of the scope and value of the ecolabel, the stakeholders may expect anything and everything from the labelling. In the process, the role of the hydropower plant owner as well as the main goal – to improve the state of river nature – may be lost.

Suggestions to develop the stakeholder consultation:

- instead of the dominating role of the stakeholder consultation (as it is presented now), a stronger role should be given to the plant owners and their knowledge (2)
- stakeholders must be clearly informed on the scope and goals of the ecolabel
- should lean on the experience of FANC and other experts
- consultation process allows alternative solutions to be reached, in comparison to permit procedures that only approve/deny something
- consultation is necessary to establish acceptance and partnership
- role of the administration should be important in the consultation process

- all stakeholders in different countries/language groups should be given equal treatment
- the stakeholders role should not be too big
- stakeholders must understand the monetary value the monetary value of the licensing
- instead of the consultation process, should develop 'no go' areas (like WWF and River Watch) using the same principles for hydropower as for wind/solar (no natura2000, no bird areas)
- should guarantee that consultation process works outside Finland too

Works well :

- *This is necessary to get acceptance and to establish a good partnership of all parties in the process.*

Amendments needed:

- *On a local level, the significance of various issues is always different. The role of administration such as in Finland ELY-centres should be important.*
- *The consultation of stakeholders is a positive, but equal treatment of stakeholder consultation in different countries and language areas would be good.*
- *Positive that stakeholder discussion is fostered, e.g. local coastline inhabitants and fisheries societies are important, and the users of local water areas. Stakeholder process works in Finland, but how about other countries?*

Other strategy needed:

- *Presently the stakeholder consultation seems to replace environmental criteria and it shows up as a bureaucratic liturgy. A stronger role of the plant owner and knowledge is suggested instead of stakeholder consultation as it is presented now.*
- *Formulation "it is good to discuss in advance with stakeholders" is a pretty light expression. Stakeholder consultation should not occupy major role in the labelling, but nature and fish should. It is important that EKOenergy can lean on the expertise of FANC. If EKOenergy/FANC do not have expertise of their own, it must be searched from outside. On the other hand, compared with authorities who only admit/deny a permit, this process of stakeholder consultation allows the search for alternative solutions during the process.*
- *Stakeholders and interest groups are numerous and that produces a large amount of different views on needed measures and their volume. If a hydropower plant owner would join the labelling system, his views should have a strong weight in the process and*

cannot be disregarded. Often the views of other stakeholders is dominating, including people who are for fish, environment, law, river basin management programmes, fisheries and other local issues.

- The stakeholders must be clearly informed on the contents and scope of the label. Otherwise they believe that anything can be included in labelling. The stakeholders also must understand the monetary value of the label for a company: what is invested and what is the outcome. The result is that Finnish hydropower plants did not pass the process and the seller organization is getting labelled hydroelectricity from Norway, which in turn is criticized.

- All for it in general, but how efficient is it for EKOenergy? There will always be people who are against hydropower. Would be better to developing a strategy like the WWF and River Watch 'no go' areas. Also EKOenergy's wind and solar has 'no go' areas (power plants in Natura 2000, or Bird Areas are not suited for EKOenergy, why aren't there the same principles for hydropower?)

- It may be cost effective, but it's weak. It is not trustable, as you will always find some people who oppose all hydropower (and vice versa!).

2.2.5. Measure list

Majority (6) of the people interviewed suggested a new approach was required. Two people believed it needed amendments and four people had no comments (or were not asked about this topic)

Positives:

- has potential, if the measures are well defined according to their environmental benefits
- recognizes the uniqueness of each hydropower plant
- supports Water Framework Directing and mentions water management plans (2)
- measures can be accomplished by some other stakeholders
- options for additional financing

Problems:

- current measure list is confusing
- measures per plant, per MWh are artificial
- a measure is not guaranteed by the different parties (need an undersigned agreement?)
- no role for the hydropower company
- unclear goals

- not known what counts as a measure, no examples given (3)
- willingness/permits are not a sufficient reason
- measures are abstract and hopeful
- measures are often cosmetic
- not defined who is doing the measures and who is paying for them
- should all the measures be new? If so, the best hydropower plants would be excluded
- how does this work in other countries?
- the volume of measures is weirdly defined – would only 1 of 5 plants need a fish pass?

Suggestions:

- measure must have additional value on top of the permit obligations (4)
- if a measure is not carried out and audited, it should not be included in the criteria list
- measures must be clearly outlined according to their environmental benefit (2)
- relevant measures should include sufficient water flows, constructing fish ways/bypass channels, creating compensatory habitats (e.g. for fish reproduction) according to the loss of original habitat
- measure should be better defined (2)
- ecological effectivity/efficiency (positive impact on the ecosystem) should be applied as the main criteria when evaluating any measures
- measures must adapt to the situation
- a measure should be completed or written in an agreement
- there should be a guarantee that upon completion of the agreed measures, EKOenergy ecolabel would be awarded (validated with a letter of intent)
- a coaching/training programme should be an option
- should define what is going to happen within the 5-year labelling period
- should include fish migration and reproduction areas
- regulation should not spoil the watercourse downstream
- should provide equal treatment of all power plants
- must consider the cost-benefit balance (2)
- a measure should be defined in terms of geographical area
- measure must be possible to be carried out and influenced by the power plant owner
- a measure should be a multiple biodiversity improvement strategy, not just a fish pass
- examples should be presented
- in addition to future measures, current environmental performance of the power plant should be assessed
- the measures should be funded from the Environmental Fund
- need to formulate the wanted measures in more explicit ways and therefore increase the predictability
- there should be a checklist: “if you have these points, you will probably get the

Amendments needed:

- *The requested measures must be clearly outlined according to their environmental benefit. Relevant measures include 1) allowing sufficient water flows for lower channel/by-pass channel, 2) constructing fish ways/by-pass channels 3) creating compensatory habitats (e.g. for fish reproduction), according to the loss or original habitat that has been destroyed. The volume of measures should be better defined (only 1 of 5 plants would need to build a fish pass?). The measures should include something on top of the concessions. Compensatory habitats are build on low-value land. Urban stream in Imatra city (2016) is the first example in Finland and this compensatory habitat is fed by a stream using former filtrate water. The water flow there is only 300 l/s, in winter 100 l/s. Trout have found the stream despite the small water flow - for comparison, normally in a fish pass the minimum water flow is 500 l/s. In river Vuoksi, the hydroelectricity producer operating there has put efforts on building compensatory habitats.*

- *The idea of a measure list in principle is good. It is good that it recognizes the uniqueness of each single hydropower plant: location, environmental aspects and possibilities for fish mitigation and cost efficiency. It is better to check what can be done in a specific hydropower plant than have a standard measure. Obviously there is a need to formulate the wanted measures in more explicit way and thus increase predictability. For example, in the river Oulujoki case, measures that were already ongoing or part of the multiple use programme were not suitable according to FANC’s board, although the representative from EKOenergy secretariat said they would be ok. Also the monetary balance of carrying out measures should be taken into account. We should openly discuss money: what is done to get the label, what is expected from the label. Our work for the environment consist of a compulsory part plus continuous improvement together with local communities. It is a good question to ask as a consumer "why would I pay more for electricity because these environmental benefits are achieved anyway". Our multiple use programme for Oulujoki has lasted some tens of years, also ELY-centres take part and influences from WFD has been taken. The Montta (name of the hydropower plant on the river) fish relocation technology has been partly funded by government.*

New strategy suggested:

- *It is good that the Water Framework Directive is supported and water management plans are mentioned. The labelled measures must have additional value on top of the permit obligations. Also, if a measure (or measure list in the criteria paper) cannot be carried out and audited, it must be erased.*

- *Presenting measures per plant, per MWh is artificial – in real world the measures must adapt to the situation. Another problem is how it is verified that different parties agree on something – must there be an undersigned agreement? E.g. Kemijoki company could*

apply for the label with a fish way plan from the 1950s and confirm that "we start implementing the plan as soon as we get funds". Yet another problem is the absence of the role of the hydropower company – shouldn't the company be the main actor?

- The goal of the labelling should be better defined, then also means (measures) would be more obvious. E.g. in case of Kemijoki river, is the goal to rehabilitate the natural reproduction cycle of salmonid fish and if so, where and how much upstream migrating fish do we want? After this exercise (hydropower criteria review) it is easier to define means. Currently, the unclear goals lead to chaos and absence of a clear measure list. In the original criteria paper, measures are mentioned, without telling which kind they should be and with no examples. It is crucial to indicate, should the measures e.g. foster the natural reproduction cycle of fish (which I think is essential) or is fish planting ok, how about habitat restoration or measures in other watercourses? If a company is completing a measure without the EKOenergy labelling, it is ok – but if it is completed only because of legal obligations, then it cannot be counted as an EKOenergy measure. A good example – the multiple use programme of river Oulujoki, run by Fortum, ELY-centre and municipalities was established in addition of permit obligations. Other companies have similar cooperation programmes as well. Another question is when the label could be issued: willingness/permits are not a sufficient reason, but a measure should be completed or written in an agreement. From a company's point of view, there should be a guarantee that completing agreed measures produce eligibility for EKOenergy label and this could be validated with a letter of intent. As an incentive for labelling, a coaching programme might work but who would finance this? In river Mustionjoki it is good that fish biology specialist Petri Karppinen tells clearly what must be done (in order to solve detailed problems of up and downstream migration through technical fish passes that are being build).

- The measure-chapter includes hopeful and abstract text on a measure list. How to get rid of the "well of good beliefs", i.e. the measure list as it is defined presently? Should 10 example cases be written, or just a list with 10 points? And define what is going to happen within the 5-year labelling period. In Finland's plateaus, hydropower projects have negative impacts compared to e.g. projects in Norway. Win-win situation where both hydropower and nature would be beneficiaries are rare. As a result the measures are often cosmetic. The measures should include fish migration and reproduction areas, including the idea that regulation would not spoil the watercourse downstream from the plant. For example the project in river Kokemäenjoki, Harjavalta benefitted both fish migration and hydropower. A smaller turbine sustains a more continuous water flow downstream from the hydropower plant where five free-flowing stretches are located.

- The idea of a measure list is good, but in practise there are presently numerous question marks. Should the measures all be new? If so, the best hydropower plant would stay out from labelling. Thus equal treatment of all power plants when formulating the requirements is crucial. It is a good idea that the measures can be accomplished by some other stakeholder than the hydropower plant. But what counts as an acceptable measure is not clear; on the other hand it is reasonable that the definition is open and measures are based on an impact assessment. The wording "will optimize the benefits of the

measures....” is a good target but will it outline something out? Searching other financing is good as well. The measure list is only announced in a general level and examples/cases should be given on a measure that benefits the environment. The “balance between measures and environmental impacts” is requested but no instructions are given where the balance should stay, to be on acceptable. There should be a checklist: “if you have these points, you will probably get the label”. Also cost-benefit balance should be considered. And how is the measure of a hydropower plant defined in terms of geographical area = impact area of hydropower plant? Could it include any sub-reach downstream from the plant? Good that water management plans are mentioned since here future pressures and threats are identified – but how does this work in other countries than Finland? With regards to fish migration, the measures must be such that it is possible to carry them out, and the plant owner is able to influence them. E.g. the owner cannot influence fisheries restrictions which means that the final result of a fish way or fish plantation cannot be solely the owners responsibility. A multiple biodiversity enhancement is needed in aquatic ecosystems in addition of migratory fish, e.g. removing aquatic vegetation, and establishing butterflies on shoreline meadows.

- *It is not clearly defined in the paper who is doing the measures and who is paying for them. It is a contradiction that the owner is not necessary an agreeing party, but the measures, however, affects the hydropower plant owners operation. What is the reasoning for investing in the measures, if they do not benefit the producer? What is meant by measures? Possibly they mean fish ways and amending fish migration. On the other hand watercourses and hydropower plants differ from each other and thus examples might help. In addition of measures in the future, scanning of environmental performance of the plant NOW should be done, including 1) migratory fish: what can be done, what has been done already, is there a fish pass/other measure 2) negative environmental impact related to regulation: what are they, how to mitigate them e.g. in the lake and its shoreline and the reach downstream 3) flow: are their obligations concerning discharging water, is there a reasonable manner for over flow channel (when the levels are too high)– e.g. discharge through the over-flow channel is not reasonable when the water could be directed towards a dry side-channel. Would it be possible to finance the measures from the Environmental fund? In present paper this is not articulated.*

2.2.6. Environmental criteria (environmental flow)

Of the people interviewed, majority (8) gave answers that suggested the environmental criteria require a new strategy, whereas the remaining 4 suggested amendments were needed. After a closer look at the interview results it became obvious that there was some confusion among the interviewees what the “5 % minimum flow” (as stated on the EKOenergy criteria paper) refers to. On the one hand, 5 % could refer to the average annual flow legally allowed downstream of the power plant. This is the bare minimum of the average flow of the original waterway that has to be maintained. According to the document, if this is not maintained, the power plant will be removed from the EKOenergy

list. On the other hand, however, 5 % also could have referred to the amount of water that should be redirected away from the power production, for example towards a fish passage, or towards a by-channel. When interpreted as this, many participants highlighted that 5 % is a huge volume of water especially for the bigger rivers. Because of this confusion in the criteria document, there may be some confusion in the answers below, with some participants stating that 5 % is too much, while other stating it is not enough.

Positive:

- the concept of environmental flow is crucial for the criteria
- WFD management plans are mentioned
- With regards to the 5 % flow, it is good that there is mention of a possible exception
- Good that CH2OICE and Naturemade Star power plants are automatically approved

Problems:

- Depending on the type of permits, 5 % of water towards a fish pass cannot be guaranteed (or given by the power plant owner without a financial compensation)
- How is the ecological flow defined/measures? (3)
- No clear environmental criteria (5)
- Not clear what the 5 % flow means (4)
- Fish passes are not mentioned
- Unclear which hydropower companies would have suitable power plants
- 5 % of the annual average in the downstream channel of the river is a tiny amount and would not safeguard aquatic wildlife (2)
- 5 % of flow is a lot (2)
- In heavily modified/regulated rivers, the flow criteria would have no additional environmental benefit
- There is no correlation between the flow discharge in fish-passage systems and the efficiency of these. Therefore, there is a danger that a high discharge flow is used to cover the bad function of fish passes.
- The only environmental criteria is the view of the stakeholders, but who looks for them?

Suggestions:

- The impact of regulation on habitats should be used as a starting point
- 5 % of the annual flow is a lot, and should be targeted towards a by-pass channel
- The criteria should demand continuous ecological flow (4)
- Overflow discharging and normal regulation must be separated
- The operation of plants in one river should be analysed as a chain of plants
- Compensation measures should be considered in cases where mitigation is not possible
- The environmental impact/efficiency/impact of a power plant and the suggested measures should be studied (2)
- The goal should be that the plant is operated in a reasonable manner in the

- framework of the incoming water volume
- The criteria should focus on ecological connectivity
 - Should include an example of a power plant that meets the environmental criteria/ examples of good environmental performances from different types of plants (3)
 - Moving fish over dams by car should not be sufficient
 - The 5 % flow criteria should be mentioned before labelling
 - Flow needs should be estimated on a case by case basis
 - Hydropeaking should be prohibited (2)
 - The environmental benefit of 5 % flow should be verified
 - Possibility for exception should be kept in the criteria
 - The criteria should only include a minimal set of exclusive criteria
 - The criteria should offer possibilities to the sector on how to do better
 - In the balance of economics vs the environment, an ecolabel should always side with the environment
 - Annual flow average is downgrading the concept of ecological flow – should be removed if more complex criteria cannot be met/safeguarded

Amendments needed:

- *The concept of environmental flow is crucial for the criteria. In EKOenergy criteria, the impact of regulation on habitats should be used as a starting point. But "5% from the average annual flow" is much and that water should preferentially be targeted to by-pass channels. E.g. In Oulujoki river 5% would mean 250 m³/s, of which 5% is 12,5 m³/s - in fact only 0,5% would be enough for a fish pass. In Koitajoki river, Pamilo: flow in old natural channel from 2 m³/s - 8 m³/s – could work in Lieksanjoki, Lieksankoski as well. In river Mustionjoki, the disappointment was that the ecological flow of 5% will not be safeguarded by building technical fish ways, and the water for these fish ways will not be given for free by the hydropower company Koskienergia (because the permits do not state that they have to do that). According to Finnish legislation and the permits, allowed regulation/discharging may in some cases happen in peaks that does not safeguard the continuous (ecological) flow in the lower channel. The EKOenergy criteria should demand continuous ecological flow (e.g. a by-pass channel or another small turbine in continuous operation). How is the ecological flow defined/measured? Under EKOenergy over-flow discharging and normal regulation must be separated. The spring water in (technical) fish passages for fish migration upstream is only one aspect of ecological flow.*

- *With regards to 5% flow it is good that there is a mention of a possible exception: "if significant environmental benefits cannot be reached". Ecological flow means different things to different people. In general, it means the flow that is needed in the river, to sustain the ecosystem. But do we always need flow versus would the river be dry – these are different questions. In the further development of the criteria, the environmental benefit of 5% flow should be verified or possibility for exception to be kept in the paper. A study on the concession obligations of hydropower plants was done by ET (Energy Industry). It was ordered from OF konslutit (Vesirakentaja). All big hydropower producers*

answered, from the smaller hydropower producers, only 43% answered. Minimal flows and zero flows were studied. Zero flows occurred in 30% of hydropower plants (large plants do not have this issue, only small plants). Most common reason for this was "normal operation of the plant" i.e. scarce water. According to the consult, a negative environmental impact that is classified as higher than "very small" occurs in 4 hydropower plants. The criteria set should include only a minimal amount of exclusive criteria. In opposite, it should offer possibilities for the sector on how to do better. less prohibition, more incentives.

- The flow must be included in the estimation of environmental performance of a hydropower plant. Depending on the hydropower plant the demand for 5% flow can be too difficult to achieve. My understanding of the flow statement is: the plant must discharge this amount of water somehow in a way that is outside the turbines, e.g. directing water to a dry reach, fish passage or similar. It is unclear could the mitigation of this demand include a momentary diminishment of the flow, or could the demand be lowered on a permanent basis.

- How to interpret wording "does not guarantee min 5%..." - does that mean continuous (without any interruption) flow, a daily average, a weekly average? Ecological flow may also refer to annual cycle, or to where the water is discharged: through flood traps, or through machine, or is there a longer dry reach. In case of Montta and Pyhäkoski hydropower plants in river Oulujoki, this requirement and an exception for that was interpreted in a reasonable way. In river Oulujoki all fall height is harnessed for hydropower. The flow criteria would mean no additional positive environmental impact but only less possibilities for adjust electricity production. Discharging more water continuously to the lower channel would only mean a higher water level there without impact on other natural conditions.

Another strategy needed:

- Is there actually any environmental criteria at all? The environmental flow of 5% is mentioned in the end "the power plant must be excluded from the list, if....". (obviously the support for legislative development and the environmental fund are considered more relevant)

- It is not clear what "5% ecological flow" means in the criteria paper. Generally it means that a sufficient, natural-like flow variation is allowed to the river ecosystem. In totally dammed rivers such as river Oulujoki this is impossible. The concept is applied river by river, but in criteria paper it is possible to apply it for a plant (i.e. in France it is applied). EU WFD does not as far as I know give direct guidance on 5% flow. The operation of plants is often synchronised in one river and should be analysed as a chain of plants. If this is not possible in case of a plant chain, compensation measures should be considered. E.g. Oulujoki river → compensation in Simojoki and Kiiminkijoki rivers. SYKE has developed a Building block methodology for defining an environmental flow (which also includes recreation, in addition of natural ecosystems). To be applied in concrete river

cases, the concessions of the plants should be opened up for revision (→ changes in operation and regulation). Thus applying environmental flow demand changing the Finnish Water Act and "eternal" permits. It is impossible to define e.g. five criteria to ensure an environmentally friendly hydropower plant. More interesting would be the environmental performance (positive influence on ecosystem) of measures, e.g. compensatory measures. Also comparing the efficiency rate (produced megawatts per ecological loss) would be interesting (similar to the EKOenergy biomass efficiency criteria). E.g. Paimionjoki and Kuusinkijoki rivers (small flows during a large part of the year lead to hydro-peaking): a possible formula could be water used for electricity generation per incoming flow (cubic meters). The goal should be that plant is operated in a reasonable manner in the framework of the incoming water volume. It is not reasonable to operate a plant with a too low construction flow (e.g. Paimionjoki Askala) or disrupt an important river continuum due to minimal electricity generation (e.g. Kuusinkijoki with one plant).

- No clear formulations of the environmental criteria is found in the paper. E.g. fish passages are not mentioned. However, minimum 5% of the annual average flow is mentioned, as well as compelling laws and permits. In Finland, there are plenty of small plants who have not fulfilled their obligations to build a fish way. But in addition, in Finland permits allow 50 small (under 5 MWh) plants to operate without any mitigation measures for fisheries. According to WFD, the operational flow must allow the ecosystem to function. It is possible to avoid speaking of fish migration in the criteria, if "ecological connectivity" is used instead, as in the WFD. In operational level it means that the plant does not, in excessive manner, prohibit the migration of organisms upstream and downstream. Most rivers have migrating species despite the extinction of salmon. In Finland, connectivity may be true in small hydropower plants that were constructed during the time when the entire river dams were not allowed (Kuninkaanväylä). E.g. Huopanankoski, Viitasaari, Vanhankaupunginkoski, Helsinki – the side-channel is not dammed. Often the hydropower plant is constructed on an artificial side-channel and old main channel is dammed. These are potential restoration objects. E.g. Tengeliönjoki, Portimokoski. In Norway the appearance of hydropower in the landscape differs from Finland. Watercourses are not always constructed near the coast like in Finland but up in the mountains, thus keeping river connectivity and free reproduction areas near the sea. However, regulation and storage up in the mountains causes environmental problems. Oscillation of water level can be seen with the naked eye since the slopes are deep.

- Presently it is hard to understand what are the criteria and which hydropower companies would have hydropower plants that would fulfil the requirements. I miss an example of a plant that would deserve the label, although examples should be cases that do not bind (just an example, not a rule). However, water management plans according to WFD are mentioned – but they include measures that ELY-centres have prioritized and do not cover everything. What does "5% flow" refer to? Flow where? Assuming it means 5% of the annual average in the lower channel of the river, it is a tiny amount that does not safeguard the life of organisms, i.e. if the average flow is 10 m³/s, 5% allows a small amount of water to run in the middle of the channel. The wording should be: a minimum continuous flow (to hinder a dry channel) must be guaranteed plus recommendations for

ecological flows must be applied. The criteria can be defined in general level e.g. 1) continuous flow = no hydropеaking/ katkokäyttö and 2) river continuum = fish can migrate on their own, preferably upstream and downstream which includes monitoring = thus e.g. moving fish over dams by car is not sufficient. Examples should be given.

- The criteria "5% flow" should be mentioned before labelling, not like "the plant is erased from the list if..". 5% flow is a lot e.g. in Imatra, the hydropower company would surely not join this system. Does this 5% include/refer to water to fish way/attraction flow of a fish way/introducing flow in an old dry reach? Does it mean exactly the incoming flow to the hydropower plant or an average flow of the river? Imatrankoski hydropower plant can use up to 600 m³/s, but sometimes it uses only 200 m³/s → according to 5% rule Imatra should let 20 m³/s which is a small river. But in a small run-off-river-hydropower plant rakennusvirtaama and flow may be only 5 m³/s – and in this case water is discharged aside the turbines during flooding periods, and during dry periods the turbines are stopped (vettä vähemmän kuin rakennusvirtaama vaatii → katkokäyttö). This is the case for example in river Mustionjoki. The point is to ensure a continuous flow even during dry seasons and minor flows. During wintertime less may do, but not during upstream migration. E.g. in Kymijoki river, in Koivukoski the old reach would deserve more water because it is a reproduction area for fish. Flow needs are to be estimated case by case and can vary between 1%-10% and sometimes it is higher than the hydropower company can stand. In Imatra case it would be more relevant (than letting 5%) to develop regulations so that the water level would not jump up and down. In Kymijoki river the regulation includes dividing water to sub-reaches according to the profitability, i.e. to the reaches where the hydropower plants are located. Waters originate from Päijänne lake and the annual regulation cycle is operated from Kalkkistenkoski (more examples in the interview material in Finnish). To sum up, the criteria development and communication would be more fruitful if 10 different examples could be presented: looking at them from different angles such as capacity of the plant, regulation logistics, owner, fish stocks.

- Too vague. The existing laws and legislation are not good enough and loop holes and exemptions are becoming the norm. In the balance of economics vs the environment an ecolabel should always side with the environment. With regards to the 5 % - most national laws would prevent a hydropower plant to take more anyway! And according to the WFD 5% flow would count as degrading to most environments. Also there is no criteria for hydropеaking - that's a definite 'no go' for most people.

- Minimum residual flow: This criterion is important for sites with withdrawal of water. For the river the residual flow is important and the discharge is a parameter with a direct and strong influence. But: At run-off-rivers There is no strong relation between the ecologic discharge in fish-passage systems and the efficiency of these. So, there is a danger that a high discharge is used to cover the bad function of fish passes.

- The fact that CH2OICE and Naturemade Start power plants are automatically certified is good. But in terms of criteria, there really are not any. The only guarantee is the view of the stakeholders, but who looks for them? Ecological/minimal flow sounds strange.

debate in the community is to ban minimal flow and use ecological flow instead. Annual flow average is downgrading the concept, so remove this criteria if you cannot provide a more complex criteria.

2.2.7. Monitoring of environmental performance

Of the people interviewed, majority (6) had no comments or did not discuss the topic of environmental monitoring. Of those that did answer, four suggested a new strategy is needed, and two participants suggested amendments to the current method were needed. No one suggested that the monitoring of the environmental performance was working well.

Problems:

- How is the ecological flow defined/measured?
- How much time can the Secretariat use for the ecolabel?
- The measures currently presented in the criteria are probably neither carried out nor audited
- How would the measure performance be guaranteed (2)?
- Lacks a third-party audit
- Greenwashing
- Producing information on environmental performance includes variable amounts of costs and expenses
- Environmental analysis is extra work that requires consultants and off-site experts, and need time
- The environmental performance of a hydropower plant is not objectively assessed
- The stakeholder consultation dominates

Suggestions:

- The original state of the river must be used as a reference – how much the measure can restore the original function of the ecosystem?
- The measure list must be erased if it cannot be monitored
- Coaching/improvement programmes for the hydropower companies should be provided
- Operations with negative impacts on the environment that are purposefully continued should not be accepted
- The current environmental performance of the power plant should be studied (3)
- For small producers one incentive to join could be the expert support for environmental monitoring

Amendments needed:

- *How is the ecological flow defined/measured? How much can the administration*

use time for the label? By now, the reasoning for natural by-pass channels have been too weak and the companies have got what they wanted, i.e. technical fish passes with minimum water flows wasted from energy production. When assessing the environmental performance, the original state of the river must be used as reference: how much the measures can restore the original function of the ecosystem? In hectares of reproduction sites, road map for next positive steps in river restoration such as rehabilitation of salmon in first place and fresh water pearl mussel as a second step.

- In addition to measures in the future, scanning of environmental performance of the hydropower plant now should be done, including 1) migratory fish 2) regulation 3) flow (see "measures"). Producing information on environmental performance includes variable amount of costs. Easiest is to estimate the cost of water flow, then the cost of regulation. The hardest is the cost estimate of a fish way since it includes permit and construction processes. A hydropower plant possibly possess data for environmental analyses, but they are not reported without a specific project, e.g. Pamilo is participating in the Environmental Product Declaration within Wattenfall (energy producer). Environmental analysis is extra work requiring consultations and off-site experts, and need time also. For small producers one incentive to join the label would be the expert support for environmental monitoring.

New strategy needed:

- The measures, indicated in the present criteria, are probably neither carried out nor audited. Another principal problem is that if they were, how would their permanence be guaranteed (the labelling is valid for 5 years). The measurement list must be erased if it cannot be monitored.

- Presently the process lacks a third-party-audit – have you considered it? (This concerns both fulfilling the criteria and implementing the measures). One possibility to both monitor and increase the environmental performance is to establish a coaching/improvement programme for companies, including mapping of development needs, action programme, new level of performance and reaching the label.

- Concern on greenwashing and the permanency of the positive results, if reached once.

- The environmental performance of a hydropower plant, according to the examples discussed, is not objectively assessed. Instead, the consultation of stakeholders is dominative.

2.2.8. Environmental fund

Of the people interviewed, majority (6) believe that the Environmental Fund works well, 5 participants suggested that some amendments are needed, and one participant gave answers that indicated that a new, better strategy is needed.

Positives:

- Good that the idea of ecological compensation is included in the EKOenergy ecolabel (3)
- Good that it raises funds for river restoration (4)
- The Environmental Fund is the clearest and less problematic strength of EKOenergy (4)
- Directs funding according to the environmental performance achieved
- It is legitimate to use funds for a project in a country where the customers are ready to pay added electricity price for environmental benefits
- Indicates clear flow of money
- Good selection process for the river restoration projects (independent jury of experts)
- It is acceptable to spend fund raised in Norway on compensation projects in Finland
- The fee of 10 cents/MWh is realistic with the present electricity prices

Problems:

- Weird that compensation happens in Finland whereas energy is produced in Norway
- Approving plants of different capacities (megawatts) gives hugely variable financial result in terms of license fees and payments to the Funds (2)
- On the Finnish scene, an intermediary who could carry out the compensatory measures is absent
- Ecological compensation in another water basin could rouse feelings with the locals from the affected water basin (2)
- Not clear where the project come from
- Risky in less environmentally conscious countries

Suggestions:

- Could also finance communication projects
- Projects that are carried out to fulfil the legal obligations of a power plant should not be funded
- Could also fund fish passage/by-pass channel/dam removal
- Other means of funding would be confusing
- In the project selection jury all parties (NGOs, administration and electricity sellers/producers) should be represented
- FANC regional actors should take part in the project selection
- In compensation projects a distinction must be made – is it for the people or for the nature

- Studies on ecological compensation deserve attention
- Cost-effectiveness should be considered
- Could one acceptable measure be additional funding to the Environmental Fund?
- Would be nice to have the pricing of the a labelled electricity product (including Environmental Fund fees) publicly available
- Can the producer also apply for funding from the Fund, for measures?
- Should always focus on restoration measures – who manages them and how efficient they would be
- The decision maker on the funding should be independent from the industry/EKOenergy
- The money should also be used to fund research projects

Working well:

- *The clearest and less problematic added value of EKOenergy labelled hydropower is the compensation mechanism. It allows to estimate what is the significance of a measure for the ecosystem. Presently an intermediary is absent in the Finnish scene, to carry out compensatory measures. In present situation (according to the Water Act) the fisheries payments that the hydropower plants are paying according to the law should be used in the area affected by the hydropower plant (which is not always practical, e.g. Oulujoki). Also, saving collected payments over years under this scheme is not possible. In general, 90% of the Finnish hydroelectricity production takes place in 7 large rivers. Other plants could be removed and ecological restoration could be targeted to these rivers. To sum up, the real ecological effectivity (positive impact on ecosystems) should be applied as main criteria when evaluating any “good” measures.*

- *Environmental fund is presently a clear strength of EKOenergy. It channels funding according to the environmental performance achieved. If compared to mechanisms according to the Water Act, this is an added value. E.g. fisheries payments from small plants should rather be gathered and used for fixing one spot after another. It is legitimate to use funds (e.g. from Norway) in a country where customers are ready to pay added electricity price for environmental benefits. A strength of the Environmental fund is also the clear flow of money: the electricity producer/seller pays (or the consumer), other ways of fundraising could be confusing. For the EKOenergy secretariat it is important to notice good practises such as the selection process (jury process run by Virpi Sahi) in 2017 which was really confirming. In the jury both NGOs, administration, electricity sellers/producers must be represented, also taking into account geography, relationships and knowledge. In addition of FANC board, also FANC regional actors could take part.*

- *In any compensation, a distinction must be made: for nature, e.g. fish population of for people e.g. resentment for lost fish. From a nature point of view, it is ok to spent money raised in Norway to compensation projects in Finland. Actual studies on ecological compensation deserve attention when further developing the Environmental fund. Sometimes compensation could offer an exit from an impossible situation, e.g. if a*

hydropower plant is located in a river where mitigation measures would not be ecologically effective, or necessary cooperation between company and stakeholders is not possible. In case of river Oulujoki, compensation in river Iijoki could work. Present fisheries fees that are invested in the affected river compensate resentment for people but do not always rehabilitate fish populations. Thus, an additional compensation fee in the framework of EKOenergy could be used in case where the situation in own river is impossible e.g. Oulujoki and Imatra rivers. In Iijoki river restoration of drainage basin area or reproduction areas are possible. The river route can also be located inland, e.g. the Hyrynsalmi route that runs to lake Oulujärvi.

- Environmental fund is good. Cost-effectiveness is important. Regarding constructed rivers, the possibility for ecological compensation often comes to mind. What can be reached in the target watercourse or in other locations. No net loss thinking. But would the compensation in other locations be acceptable for local people although it might be good for the nature? The fee of 10 cents/MWh is realistic with the present electricity prices. Could one acceptable measure be additional fee for the Fund? Compared with the Fund, the use of fisheries fees according to the Water Act is more restricted in terms of location and annual cycle.

- A super idea. It is increasingly difficult to fund restoration projects. Should always focus on the restoration measures – who manages it and how efficient it would be. Also the decision maker on which project gets funding should be independent from the industry/EKOenergy.

- Probably the best part of the whole ecolabel. Allows to collect funds for environmental enhancement projects, and a good way to fund river restoration. Could be risky in less environmentally conscious countries.

Amendments needed:

- The idea of ecological compensation must be included in the EKOenergy label. It is somewhat weird that compensation happens in Finland whereas energy is produced in Norway.

- In Finland, there are only 3 labelled plants whereas the EKOenergy labelled hydropower sold in Finland originates in Norway. Despite this the river restoration projects are carried out in Finland. Labelling plants with different capacities (megawatts) gives strongly variable financial result in terms of license fees and payments to Environmental Fund and Climate Fund. The system is very positive since it raises funds for river restoration and must not be resisted, but it includes "bombs". The Environmental Fund could also finance communication projects. On the contrary, projects that are carried out for fulfilling legal obligations of a power plant should not be financed. In addition of funding river restoration, would it be possible to fund a fish pass/by-pass channel/dam removal?

- *See the Excel table on possible funds raised in Finnish hydropower plants if they joined – thus the volume of fundraising for Environmental Fund per hydropower plant is important. I.e. compensating the negative impacts in river Oulujoki in Iijoki is morally acceptable. Finnish Water Act is inflexible here – however, sometimes fisheries fees have been used in such a way if the stakeholders have agreed on it.*
- *The pricing of a labelled electricity product (including Environmental Fund fee) would be nice to be available - the seller defines the price. Can the producer also apply for money from the fund, for measures? E.g. for fish passes. Ecological compensation in another water basin is in principle positive, but can also rouse feelings with the locals. Producers usually have enough problems (fish problems) in their own water basins. But e.g. supporting studies in Ala-Koitajoki is welcome.*
- *This fund is very good and helpful. The money should also be used to fund research projects on fish protection and fish passage because there are a lot of unsolved problems in this field.*

New strategy needed:

- *It is not perfectly clear from where do the projects come from (Virpi told about the process). Earlier the company made restorations in river Vuoksi with the funds of Norppasähkö. It seemed to function well, in similar manner as Bra Miljöval in Sweden. Presently the funds of EKOenergy environmental fund go more “anywhere” - what if the funding goes to competitor producers for a project of their own? In this case they have to be understood as ecological compensation. The more distant is the location from the hydropower plant, the broader we must think about all possible measures that benefit the environment – how about water purification in St. Petersburg.*

2.2.9. List of labelled hydropower plants

Of the participants interviewed, majority (6) had no comments on the current list of approved hydropower plants. Of those that commented, three suggested new strategy was needed, two participants suggested some amendments were needed and one participant thought it works well.

Positive:

- So far EKOenergy has been lucky
- Several plants from Norway (an eco-conscious, aware community, therefore most of their plants should be built with environment in mind)

Problems:

- Few Finnish plants (4)
- Weak conspicuousness of the label
- Criteria need amendment
- Few approved plants in general – indicated the complication of pursuit
- A strong producer/seller division
- Is it easier for small scale hydropower to get approved?
- Easier to approve plants outside of Finland (“not in my back yard” phenomena)
- The fish protection and fish passage issues are not resolved

Suggestions:

- The label should include incentives for the producers, not only punishment
- An additional value for a producer could be the reputation, and support to carry out amended measures
- The role of the producer cannot be dismissed

Works well:

- *So far EKOenergy has been lucky. Several Norwegian plants – an aware, social community, so most plants should be sustainable.*

Amendments needed:

- *Surprisingly few plants listed in Finland, too few.*
- *Only a couple of minor plants labelled in Finland. Excel on Finnish power plants.*

New strategy needed:

- *Very few labelled plants in Finland and not very many elsewhere either. That speaks about the complications of the pursuit. Within hydropower a strong producer-seller division exists. Wind power is easier – producers have something to win, within hydropower they only have something to lose. The label should include incentives for producers, not only punishments. An additional value for a producer is the reputation, and support for carrying out amendment measures. The role of a producer cannot be dismissed.*
- *In Finland Pyhännäkoski plant, located in Emäjoki sub reach, has the EKOenergy label. Actually, the hydropower plant called Ämmä and located in the outlet of lake Kiantajärvi is a similar case. Water level in a lake is regulated, but the hydropower company applies stricter regulation control than is required in the concession. But we would not be issued the label since we are Fortum. Is it easier for small-scale hydropower to get the label? Why there are so few labelled plants in Finland compared to Norway,*

although there the fish passes and compensatory reaches do not exist? Is this a NIMBY-phenomena (not in my back yard)?