

## STATUS REPORT ON THE UNESCO-IHA GHG PROJECT – JULY 2009

### Summary of the project:

The **GHG Status of Freshwater Reservoirs Research Project**, hosted by the International Hydropower Association (IHA), in collaboration with the International Hydrological Programme of UNESCO, aims to improve understanding on the impact of reservoirs on natural GHG emissions, obtaining a better comprehension on the processes involved and helping to overcome knowledge gaps.

The overall goals of the Project are the evaluation of changes in GHG emissions due to the construction of a freshwater reservoir in a river basin, as well as potential mitigation measures which may reduce the GHG footprint at vulnerable sites. In this way, the four main objectives of the Project are to:

- develop, through a consensus-based, scientific approach, detailed **measurement guidance**;
- promote scientifically rigorous **field measurement campaigns**, evaluating net emissions from a representative set of freshwater reservoirs;
- **develop predictive modelling** tools to assess the GHG status of unmonitored reservoirs and potential new reservoir sites;
- develop guidance and assessment **tools for GHG mitigation** when necessary.

The deliverables from the Project include:

- a **measurement specification** to be applied to a representative set of reservoirs
- a **standardized, credible set of data from representative reservoirs throughout the world** (particularly covering the tropical climates, where the natural carbon cycle is most active);
- a **methodology and set of tools for predicting reservoir-induced emissions**; and, guidance on **mitigation options for vulnerable sites**.

The Project is divided into two steps:

**Step one**, to be developed on a two/three-year period, encompasses the development of a **measurement specification** to be **applied on a representative set of reservoirs** in order to build a **database of results**, with emphasis on filling knowledge gaps and leading to the **development of an empirical predictive model** and to the definition of the **main concepts for a process-based model**.

In **step two**, the activities include the development of a **process-based predictive model**, proposal of **mitigation measures for vulnerable sites** and the validation of the models and mitigation measures.

The scope of the Project includes data and methodologies to be applied to a representative set of reservoirs throughout the world. Special interest is given to the tropical climates, where the natural carbon cycle is most active. This includes field measurements in several countries, including, but not limited to, sites in Africa, Asia and Latin America.

## Current Status

- The Scoping Paper “The GHG Status of Freshwater Reservoirs” has been completed, after a thorough consultation process engaging the scientific Peer-Review Group, and was published as a bulletin of UNESCO’s International Hydrological Programme
- UNESCO has issued a letter of support for the Project, confirming its involvement and supporting IHA’s role as coordinator of the Project.
- A Workshop on Measurement Guidance was convened in London in November 2008. The Summary of the Measurement Specification Workshop has been finished and it has been published at the UNESCO website and at IHA’s website. The following professionals were present at the meeting:
  - *Management Team*: Dr Tucci, C.E.M. (UNESCO-IHP Brazilian National Committee + Chair), Mr Fink, M. (IHA), Dr Goldenfum, J.A. (IHA), Dr Harby, A. (SINTEF, Norway), Mr Taylor, R.M. (IHA).
  - *Panel of Experts (Governance) and Sponsor Committee*: Dr Doria, M. (UNESCO), Ms Kjelaas, K. (SN Power, Norway), Mr Odeguard, L. (World Bank, Energy, Transport and Water), Mr Petitjean, A. (EDF, France), Dr Pinguelli Rosa, L. (COPPE – UFRJ, Brazil), Mr Schei, T. (Statkraft, Norway), Mr Solnørdal, K. (Norsk Hydro, Norway), Mr Wagner, C. (IAI).
  - *Expert Working Group (Field measurement)*: Dr Assireu, A.T. (INPE, Brazil), Mr Descloux, S. (EDF, France), Dr Guðmundsson, J. (Agricultural University of Iceland), Dr Guérin, F. (Laboratoire des Mécanismes et Transferts en Géologie, France), Dr Huttunen, J.T. (University of Kuopio, Finland), Dr Prairie, Y. (UQAM, Canada), Dr Roland, F. (UFJF, Brazil), Dr Santos, M.A. (COPPE – UFRJ, Brazil), Dr Sundt, H. (SINTEF, Norway), Dr Tremblay, A. (Hydro Québec, Canada).
- The article entitled “Filling the Knowledge Gap: Greenhouse Gas Research” was published at the HRW (Hydro Review Worldwide, a leading publication in the hydropower field, with a comprehensive coverage of the hydroelectric industry worldwide) issue of March 2009.
- The article entitled “THE UNESCO/IHA MEASUREMENT SPECIFICATION GUIDANCE FOR EVALUATING THE GHG STATUS OF FRESHWATER RESERVOIRS: a new tool to evaluate the impact of freshwater reservoirs on natural GHG emissions”, was presented at the AWMA’s First International Greenhouse Gas Measurement Symposium, in San Francisco, California, in March 2009.
- As result of the Workshop on Measurement Guidance, and with the support from the World Bank, the first version of the Measurement Specification Guidance was produced by the end of April/2009.
- A Workshop on Site Selection and Database was convened in Sao Paulo, Brazil, in May 2009. The discussions embraced issues related to the basic structure of the database, data to be included, confidentiality, intellectual property reservoir site selection criteria and representativeness and other related issues. The Summary of

the Site Selection and Database Workshop is being prepared and it will be published at the UNESCO website and at IHA's website.

- Dialogue is established with IPCC (IHA is represented in the relevant Expert Groups: 'GHG Inventories' and 'Renewables and Climate Change')
- Dialogue is established with UNFCCC/CDM (IHA is represented as an Observer Organization and is in direct contact with the CDM Methodologies Panel).
- Dialogue is established with key governments, including Brazil and Canada, together with organizations that are interested to contribute to the budget.
- Dialogue with the Brazilian Ministries of Mining and Energy (MME) and Science and Technology (MCT) was established during the development of the Terms of Reference for a National Research Programme on Evaluation of GHG Emissions on Hydropower reservoirs.
- Discussions with Oak Ridge National Laboratory (a US federally-funded research and development centre, currently sponsored by the Electric Power Research Institute - EPRI) are being performed for collaboration on a Research Project to assess the vulnerabilities of US hydropower asset owners to the greenhouse gas issue.
- A Seminar on "Hydropower and GHG Emissions" and a "Strategic Meeting on the UNESCO/IHA GHG Research Project" have been organised as part of the "IHA World Congress - Advancing Sustainable Hydropower", which was held in Reykjavik, Iceland, in June 2009. The Seminar encompassed presentations and panel discussions on the issue of GHG emissions from freshwater reservoirs, the progress made so far in assessing net GHG emissions and the UNESCO/IHA GHG Research Project. This was followed by a poster session and brief presentations with additional information about specific projects.

### **Schedule for Forward Work:**

The overall work schedule for the UNESCO/IHA GHG Research Project is presented in Table 1, detailing the main project activities, from the beginning of April/2008 to the end of March/2011.

**Table 1 – Overall work schedule for the UNESCO/IHA GHG Research Project**

Work schedule (quarters of each fiscal year to 31 March)	Year to 31.03.2009				Year to 31.03.2010				Year to 31.03.2011			
	APR/08 JUN/08	JUL/08 SEP/08	OCT/08 DEC/08	JAN/09 MAR09	APR/09 JUN/09	JUL/09 SEP/09	OCT/09 DEC/09	JAN/10 MAR10	APR/10 JUN/10	JUL/10 SEP/10	OCT/10 DEC/10	JAN/11 MAR11
Project management	X	X	X	X	X	X	X	X	X	X	X	X
Assessment methodology	X	X	X	X	X	X	X	X	X			
Measurement specification		X	X	X	X	X	X	X	X	X	X	X
Site selection & supervision		X	X	X	X	X	X	X	X	X	X	X
Model development							X	X	X	X	X	X
Model assessment								X	X	X	X	X
Mitigation guidance									X	X	X	X
Reporting and Publications	X	X	X	X	X	X	X	X	X	X	X	X
Governance	X	X	X	X	X	X	X	X	X	X	X	X

The Project proposal includes several products to be delivered. The next deliverables of this project are expected at the following dates:

- Measurement Specification Guidance – Version 1 (by the end of April/2009)
- Measurement Specification Guidance – Version 2 (by the end of 2009)
- Measurement Specification Guidance – Version 3 (by mid-2010)
- Measurement Specification Guidance – Version 4 (first quarter of 2011)
- Database Guidelines (by May 2009)
- Database – Version 1 (by mid-2009)
- Site Selection – Group 1 (by May 2009)
- Site Selection – Group 2 (by the end of 2009)
- Empirical Predictive Modelling Tool – Version 1 (by the end of 2009)
- Empirical Predictive Modelling Tool – Version 2 (by mid-2010)
- Empirical Predictive Modelling Tool – Version 3 (first quarter of 2011)
- Process-based Predictive Modelling Tool – Main Concepts (first quarter of 2011)
- Mitigation Guidance – Main Concepts (first quarter of 2011)

Table 2 presents a complete schedule for the main deliverables of this project and Table 3 shows the planned Workshops, for discussion and establishment of the main concepts related to these products.

