

Williams, Ted

From: Williams, Ted
Sent: Wednesday, May 14, 2014 10:07 PM
To: 'max.m.kofod@shell.com'; 'O.senina@econom.gazprom.ru' (O.senina@econom.gazprom.ru); 'Jukka.kajiansinkko@gasum.fi' (Jukka.kajiansinkko@gasum.fi); 'cmigliorec@repsol.com' (cmigliorec@repsol.com); 'sandeep.singla@shell.com' (sandeep.singla@shell.com); 'emma.ritter@total.com' (emma.ritter@total.com); Ritter, Karin; Lopac Andreja Ana (ANDREJAANA.LOPAC@ina.hr); 'sharifi@nigc.ir' (sharifi@nigc.ir); 'xavier.riera-palou@shell.com' (xavier.riera-palou@shell.com); 'rob.kleinnagelvoort@planet.nl' (rob.kleinnagelvoort@planet.nl); 'amegherbi@avl.sonatrach.dz' (amegherbi@avl.sonatrach.dz); 'PFreens@qatargas.com.qa'; 'deyuan.fan@shell.com'; 'al.sakharov@adm.gazprom.ru'
Subject: RE: IGU PGC D.4 Meeting,Osaka
Attachments: Expanded Outline for PGC D4 Report.docx

To: Members of IGU PGC D.4 Study Group, "Life Cycle Assessment of LNG"

At the Osaka meeting this week, the following detailed outline was developed and initial writing assignments for outline sections were volunteered and assigned. Sections receiving active attention for development are shown in **red**; the other sections will require LCA data development (discussed further below). The base document for these written sections will be maintained under "Study Group Report" on the IGU website collaboration pages for our Study Group. The first version of the base document (incomplete) should be posted by 30 May 2014. The base document will be in Microsoft Word format. Study Group members should regularly review the base document and add and modify text using the "Review" features of Word, including strike-throughs for proposed text deletions and underscored text for new text. In doing so, Study Group members should also provide a comment justifying his/her proposed revisions using Word's "Comment" functionality.

You will notice that the detailed outline emphasizes natural gas advocacy in Background and Introduction sections. This focus is in keeping with IGU's increased efforts on natural gas advocacy generally. The participants in the Osaka meeting do not believe that this emphasis will diminish the technical quality, utility, or justification of the Study Group report. It will improve the readability of the report in delivering IGU's advocacy message and should substantially reduce the dryness of the technical discussion of LCA emission factors, which will be the principal technical contribution of the Study Group report.

As you can see from the attached detailed outline, volunteers for these initial writing assignments represent a very narrow slice of the PGC D.4 Study Group membership. Other Study Group members are expected to step up to volunteer for other report development activities from now until the completion of the report development through January 2015. Additionally, Study Group members are expected to participate in conference calls, which will now be regularly scheduled on a monthly basis.

In addition, assignments for development of graphical images (diagrams, photos, schematics) have been delegated to Sharifi and Olga. Development of a data template for spreadsheet archiving of data and simple LCA modeling has been delegated to Jukka and Max (Max, I will follow up with you separately).

As an update of prior information, we have received assurances that funding of contractor support for data development will be forthcoming. Details on this arrangement need to be worked out before I can share them with you. We have reached a critical milestone where development of the module-based, emission factor-driven analysis can

only proceed with this additional support. If for some reason this support does not materialize, a substantially-altered work effort will have to be implemented. I am confident that this will not become an issue, however.

Please look for upcoming notices of conference calls (which will be shown on the IGU website calendar as well as in direct email notices) and posting of the base document.

Ted

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Subject: IGU PGC D.4 Meeting,Osaka

To: Members of IGU Study Group PGC D.4

In preparing for next week's meeting in Osaka, you should be aware of the following:

- The Center for LNG (U.S.) is having a Board of Directors meeting today to consider the recommendation of its Technical Committee to fund data analysis for our life cycle assessment (LCA) data gathering activity. The meeting is in Houston, Texas, and I cannot attend. I requested to receive news of the Board's decision, so that I can announce it at next week's meeting of our Study Group. I have responded to a number of good questions concerning our request that lead me to believe that we will receive a favorable answer to our request. However, that is only an impression I received. I will pass along information on this to Study Group members who cannot attend the Osaka meeting as soon as information becomes available.
- According to the PGC D leadership, the focus of the Osaka meeting is to be on development of study group reports. In response to that emphasis, I have highlighted sections of the report outline developed in Barcelona (which includes some minor changes) that expect to begin working on in Osaka. The following is that highlighted outline (areas to be addressed shown in red):
 - Executive Summary (not to be addressed until report is completed)
 - Introduction
 - Background
 - Purpose and Scope of the Study

- Overview Discussion of LNG Chains
- Technical Approach
 - Use of Chain Modules and Assumptions
 - System Boundaries
 - Data Quality Characterizations
 - Examples of Chain Descriptions and Study Applications
- Modules (not fully addressed until data development proceeds)
 - Liquefaction (including feed gas to plant boundary)
 - LNG Transport (marine carrier and overland transport)
 - Regasification and LNG End User Delivery (e.g. bunkering, vehicle refueling)
- Case Study Illustrations (to await data development, for the most part)
 - Three to 4 case studies
 - General Recommendations for Report Use (Initial text based on Study Group expertise)
 - Potential Technology Roadmapping Applications (Initial text based on Study Group expertise)
- Study Conclusions (to await completion of the work referred to above)
 - Potential mitigation opportunities and “hot spots,” operational changes, process efficiencies, power sources and their emissions streams, CO2 management)
- Recommendations for Future LCA Studies (to await completion of the work referred to above, for the most part; initial text based on Study Group expertise)
- Appendices (to await completion of the work referred to above)
 - Data sets
 - Others to be decided.

Since data has not been compiled for the demonstration of LCAs and other data-related topics can be address in written sections at this time, all major sections where discussion or use of data would be required will not be addressed at the Osaka meeting, Instead, qualitative discussion topics are emphasized in the outline above.

Writing will proceed with development of high-level “topic sentence” development building on the outline to help ensure that logical flow of the document will follow. The principal activity at the Osaka meeting will be formulation of complete, well supported topic sentence statements and supporting subtopic statements. Major topic sentences will be followed by multiple levels of supporting subtopic statements to fill out the narrative. Where more information or Study Group consensus is needed to support a topic statement, that topic statement will be highlighted for further study beyond the Osaka meeting. In final form, the topic sentence structure can be used and reviewed by all Study Group members for agreement or further discussion, most immediately within conference calls on the project. Since we have gone away from the task group approach (as of the Barcelona meeting) and have essentially a smaller group and narrower scope, the topic sentence approach to writing a report is a very practical means for formulating group consensus while putting together a logically organized report.

- I am assuming that Study Group members will have collected various source of information on LCA studies related to LNG generally or have developed the facility to review information that we have posted on the Study Group websites (starting with the AGA SharePoint website and now

transferred to the IGU website). Beyond the “brainstorming” of topic sentences during the meeting sessions, I expect that a significant amount of time will need to be devoted to reviewing information sources on hand from these documents and researching other information sources. Study Group members should come to the meeting with a mindset to “mine the information” available and conduct some web-based research to look for additional information. Also, if you have other sources of valuable information on hand but not on the IGU website, please bring it to the meeting, preferably in electronic form.

I propose that these activities go forward at the Osaka meeting, regardless of the outcome of the Center for LNG decision on providing financial support for data collection. However, if the decision is unfavorable to hiring a support contractor (that is, if Center for LNG decides not to provide funding this calendar year), we will have to devote some discussion to alternative means of compiling LCA data.

I look forward to seeing you in Osaka.

Ted

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Subject: RE: IGU PGC D.4 Study Group Conference Call - Additional Materials

To: Members of IGU Study Group PGC D.4

The Study Group conference call tentatively scheduled for tomorrow, Tuesday, 29 April is cancelled. We did not achieve a reasonable level of potential participants to go forward with the call. Given the scarcity of additional available dates, we should plan on going forward with the Osaka meeting without a preliminary conference call.

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From: Williams, Ted

Sent: Tuesday, April 22, 2014 9:45 AM

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Subject: RE: IGU PGC D.4 Study Group Conference Call - Additional Materials

To: Members of IGU Study Group PGC D.4

Due to lack of sufficient participation, today's conference call was terminated early. At this stage in advance of the Osaka meeting, I would like the following information from Study Group members:

- Do you plan to attend the Osaka meeting on May 13-16? Some of you have already answered this question and need not reply to me. I would like an email communication from others. I can check the PGC D registration materials, but a simple email message would reduce efforts to tabulate who from PGC D.4 will attend.
- What dates are available for a conference call in advance of the Osaka meetings? Looking at my calendar, I have only the following dates available: April 25, 28, and 29; May 8. Of course, another Study Group member might have more flexibility to host a call. I am strongly in support of a conference call going forward without my participation if necessary. Additionally, attendance of the Osaka meeting is not essential for participating on this call since guidance from the overall Study Group will be very useful in how the Osaka meeting goes forward. ***Please do not let your attendance or unavailability to attend the Osaka meetings determine your participation on a conference call.***
- Since the objective of all Study Group meetings in Osaka is to work on Study Group reports (emphasizing report writing, in particular), we need to have all relevant LCA materials available at this time provided for the use of members in attendance to support our work. If you have key reports, data sources, or other materials to contribute, please post these on the IGU website, so they are available for our work in Osaka.

I look forward to hearing from you regarding your availability for one conference call prior to the Osaka meeting. Please "reply to all" with your available dates.

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From: Williams, Ted

Sent: Tuesday, April 22, 2014 7:33 AM

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Subject: RE: IGU PGC D.4 Study Group Conference Call - Additional Materials

To: Members of IGU Study Group PGC D.4

For today's conference call, I am providing the following additional materials collected from the IGU website and Study Group correspondence:

- The updated Study Group calendar
- The prospectus for funding LCA data collection provided to the Center for LNG (CLNG) and to be discussed by the CLNG Technical Committee this Thursday
- The Study Group report outline, as revised at the Barcelona meeting (October 2013)
- Notes from the Barcelona meeting
- Final LCA module description outline based on Barcelona meeting discussion
- Working Group correspondence from 2013 and Houston meeting notes (April 2013)

We may refer to these materials during our discussion today. It is not necessary to review these materials prior to our call, however.

I look forward to your participation.

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Sent: Saturday, April 19, 2014 1:06 PM

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Subject: RE: IGU PGC D.4 Study Group Conference Call

To: Members of IGU Study Group PGC D.4

Based on responses I have received to the email below, we will hold our conference call next week on Tuesday, 22 April at 1300 (1:00 p.m.) GMT. The call will not exceed one hour. Attached is a preliminary agenda for the conference call. The call-in telephone number and access code are shown at the top of the preliminary agenda. If you have additional topics to discuss on the call, please email me (reply to this email), and I will add them to the agenda. The conference call will be extremely important in preparing for our Osaka meeting in May 2014, but even if you cannot attend this meeting, it will be important to reengage in Study Group activities and discussion of strategy toward the completion of our work.

Study Group materials will continue to be posted on the IGU website. I have updated the website with information from the previously-used AGA SharePoint site. Working Groups covering Liquefaction, LNG Transport, and Regas should be posting information to the IGU website. For those who have not used the website and do not have information on how to gain access to the website, please follow the following directions:

- From your web browser, use the address: www.igu.org
- Log on to the website using:
 - Username: MPGC_D
 - Password: LNG is good
- From the homepage, click on the link "About IGU" at the top of the page, followed in sequence by the following links on the left-hand side of the page: "IGU Organization," "Committees 12-15," "Programme Committees," "PGC D." "Collaboration," and finally "PGC D Study Group 4 – LNG Life Cycle Analysis"
- From the PGC D 4 list, you will find a list of folders where you can select and post files relevant to Study Group work activities. The tool bar at the top of the page provides the necessary options for adding and deleting files. Clicking on the file names is the simplest way to open the files for viewing.

On a related topic and as you are aware, IGU PGC A.3 is in parallel with our study developing LCA analysis across the entire natural gas chain. I am a member of this Study Group, although I have been focusing on our work in PGC D.4 as well as PGC D.5, the "World LNG Report." PGC A.3 has developed a questionnaire to support its data development for its LCA study. The following correspondence has been produced to solicit contributions from IGU members:

Dear Colleagues,

I hope things are all well.

PGCA SG A.3 (LCA) is conducting simple questionnaires on LCA in Growing Together homepage.

Its basic a multiple choice question and will take only a short time.

I hope you will help us understand how LCA is used in your region or company. Please forward this mail to your fellow group members for obtaining diverse answers from every region.

Thank you, in advance, for your kind support.

<http://ccmembers.wgc2015.org/feedbacks/129781-survey-level-knowledge-life-cycle-assessment-within-gas-industr>

Best,
Satoshi Yoshida
Chair, PGCA

Please provide your contributions to this survey, or refer it to an appropriate representative of your organization to do so. As we all know, data development for supporting LCA is our most pressing need.

Finally, I would like to welcome Messrs. Fan Deyuan of Shell and Alexej Sakharov of Gazprom to the Study Group. We look forward to working with you on our Study Group activities. I must apologize for late inclusion of you in correspondence of the Study Group, beginning with this email. I had not included your email addresses in prior correspondence. As it turns out, the only issue you have missed since you were added to the roster is the scheduling of the upcoming conference call. I apologize for not including you in the email distribution so that you could participate in that exchange, and I hope that you can participate in the Tuesday conference call. In any case,, I might ask you to review some of the background information on the Study Group activities and consider which of the three Working Groups you would like to be a member. Among the choices are: Liquefaction, LNG Transport, and Regasification. Materials on the website discuss in detail the decisions to date on Working Group scopes and activities. Again, welcome.

Ted

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Subject: RE: IGU PGC D.4 Study Group Conference Call

To: Members of IGU Study Group PGC D.4

I was informed by Study Group members this morning that the Doodle survey for times for our conference call next week was "closed." Therefore, I am requesting you to reply to this email concerning your availability next week for a conference call. Those of you who have already informed me about your availability, there is no need to reply to this email.

The proposed dates and times next week are as follows (all times in GMT), and the conference call will not exceed one hour:

Monday, 21 April: 1000, 1100, 1200, or 1300

Tuesday, 22 April: 1000, 1100, 1200, or 1300

Thursday, 24 April: 1000, 1100, 1200, or 1300

Details for the call will be provided separately. Please reply by the end of your workday tomorrow, Friday, if possible and if you have not already informed me.

I apologize for the difficulties with the survey. I have used the software for scheduling other calls (including Study Group calls), but rather than trying to fix the survey at this time, email will be more efficient.

Ted

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From: Williams, Ted
Sent: Wednesday, April 16, 2014 1:47 PM
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Subject: RE: IGU PGC D.4 Study Group Conference Call

To: Members of IGU Study Group PGC D.4

Please respond to the Doodle survey available through the following link for your availability in participating in a Study Group conference call next week:

<http://doodle.com/r26qcqkvtfv7tpka>

The call should not exceed one hour. **Times are in GMT.** Details on the conference call will be sent separately once a date and time are selected. If possible, please respond by close of business (your time) on 18 April.

I look forward to your participation.

Ted

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From: Williams, Ted
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Subject: RE: IGU PGC D.4 Study Group Conference Call

To: Members of IGU Study Group PGC D.4

Based on problems of Study Group members in participating in tomorrow's conference call, I am going to cancel the call and try to reschedule it for next week. I will be sending out a survey later today with suggested days and times next week for the call.

It is extremely important that we conduct the call before more time elapses before the Osaka meeting. The call is needed to develop a work plan for the additional time set aside for Study Group working sessions. Please reply to the survey for scheduling the call as soon as possible and by the end of the work week at the latest.

I look forward to our discussion and our meeting in Osaka.

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Subject: RE: IGU PGC D.4 Study Group Conference Call

To: Members of IGU Study Group PGC D.4

After a period of inactivity since the end of 2013, we need to reestablished Study Group activity and prepare for the PGC D meetings in May in Osaka. I recommend that we hold a conference call next Thursday, 17 April. I anticipate the call to last no more than one hour, and as before, beginning at 1400 GMT (please keep in mind Summer time changes in relation to GMT in your scheduling). In addition to preparations for Osaka, I will report on important recent changes to the Study Group roster and progress on securing funding for consultant support of LCA data collection.

Call-in information will be the same as for previous conference calls. However, I will provide that information again early next week for all members and especially new members.

Please confirm whether or not you plan to participate on this call, and alert me to scheduling conflicts and alternatives if next Thursday is not acceptable.

Ted

Ted A. Williams, M.En., M.M.

Director, Codes & Standards

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From: Williams, Ted

Sent: Wednesday, December 18, 2013 2:52 PM

To: 'Jupiter Ramirez' (JRamirez@qatargas.com.qa); 'Vaclav.Chrz@Chart-Ind.com' (Vaclav.Chrz@Chart-Ind.com);

'max.m.kofod@shell.com'; 'O.senina@econom.gazprom.ru' (O.senina@econom.gazprom.ru);

'Jukka.kajjansinkko@gasum.fi' (Jukka.kajjansinkko@gasum.fi); 'cmigliorec@repsol.com' (cmigliorec@repsol.com);

'sandeep.singla@shell.com' (sandeep.singla@shell.com); 'emma.ritter@total.com' (emma.ritter@total.com); Ritter, Karin;

Lopac Andreja Ana (ANDREJAANA.LOPAC@ina.hr); "sharifi@nigc.ir" (sharifi@nigc.ir); 'xavier.riera-palou@shell.com'

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'amegherbi@avl.sonatrach.dz' (amegherbi@avl.sonatrach.dz)

Subject: RE: IGU PGC D.4 Study Group Conference Call

To: Members of IGU Study Group PGC D.4

Due to the low response to the Doodle survey for scheduling a conference call this month and before the end of year holidays, we need to suspect scheduling until after 1 January 2014. I do not expect many Study Group members to be available through the remainder of 2013, so success in scheduling in December is unlikely. I will be sending out another survey to explore dates for a conference call in January.

Several of us on the Study Group have had correspondence concerning funding strategy for consulting support and preliminary data templates for LCA data. We will continue efforts on these topics as member availability permits. As for my schedule, I will be in the office for working days through the rest of December, except for Wednesday, 25 December and can most easily be reached via email during that time.

Ted

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From: Williams, Ted

Sent: Saturday, December 07, 2013 12:29 PM

To: 'Jupiter Ramirez' (JRamirez@qatargas.com.qa); 'Vaclav.Chrz@Chart-Ind.com' (Vaclav.Chrz@Chart-Ind.com); 'max.m.kofod@shell.com'; 'O.senina@econom.gazprom.ru' (O.senina@econom.gazprom.ru); 'Jukka.kajjansinkko@gasum.fi' (Jukka.kajjansinkko@gasum.fi); 'cmigliorec@repsol.com' (cmigliorec@repsol.com); 'sandeep.singla@shell.com' (sandeep.singla@shell.com); 'emma.ritter@total.com' (emma.ritter@total.com); Ritter, Karin; Lopac Andreja Ana (ANDREJAANA.LOPAC@ina.hr); 'sharifi@nigc.ir' (sharifi@nigc.ir); 'xavier.riera-palou@shell.com' (xavier.riera-palou@shell.com); 'rob.kleinnagelvoort@planet.nl' (rob.kleinnagelvoort@planet.nl); Assing, Nneka; 'amegherbi@avl.sonatrach.dz' (amegherbi@avl.sonatrach.dz)

Subject: IGU PGC D.4 Study Group Conference Call

I would like to invite you to the Doodle poll "IGU PGC D.4 Study Group Conference Call."

Please follow the link in order to participate in the poll:

<http://doodle.com/syw5ffqz5grnhk6i>