



Natural Gas Climate Action Working Group Meeting

12:00pm to 3:00pm, August 10, 2011

Boardroom A

2100, 350-7th Ave SW, Calgary, AB

Conf call #: s.15 , access code: s.15

Attendees

Graeme McLaren
David Pryce
Steve Dunk
Jenna Dunlop
Richard Dunn
Bill Tubbs
Wayne Hillier
Jim Hughes
Wayne Hillier

Nadia Luciuk
Wishart Robson
Brian Ross
Gerry Ertel
Christa Seaman
Sarah McCullough
Gordon Goodman
Bill Claperton

Regrets

Staff

Tim Lesiuk,
Jessica Verhagen
Hurrian Peyman

Agenda

1. Welcome and overview Co-Chairs
2. Economic Analysis Project overview Tim Lesiuk
 - Project purpose, connection to past work
 - Project milestones
 - Questions and discussion
3. Economic Modelling Jessica Verhagen
 - Overview and discussion of
 - the macro model outputs,
 - competitiveness findings,
 - investment analysis (CAPP model)
 - Input on draft assumptions and draft sector profile
 - Forecast 2012 emissions
 - Expected growth to 2020
 - Cost structure
 - Market competitiveness

4. Action Items

Tim Lesiuk

- Working group action items (i.e. compile written input for draft sector profile and modelling)
- CAS and ministry staff action items
- Scheduling next meeting

5. Adjourn

**Natural Gas Climate Action Working Group Meeting
August 10, 2011
Minutes**

In attendance:

Graeme McLaren	Bill Clapperton
David Pryce	Neil Symington
Gordon Goodman	Richard Dunn
Brian Ross	Nadia Luciuk
Tim Lesiuk	Jon Remmer
Jessica Verhagen	* Participated by teleconference
Hurrian Peyman	Linda Beltrano
Steve Dunk	Bill Tubbs
Christa Seaman	Chris Gilmore
Shannon Hiebert	Stuart Young

Meeting Summary

Discussion:

s.13

Tim Lesiuk discussed the economic analysis project scope, objectives and the roles of different ministries.

Jessica Verhagen introduced the Sector Profile and the Draft Model Inputs documents and outlined how the modeling would be conducted.

Nadia Luciuk presented Encana's investment analysis of the impacts of carbon pricing on the natural gas sector. The group discussed how the economic model and investment analysis each had strengths and weaknesses and determined that the economic team to be formed should discuss how to best integrate the products from each in the sector profile.

Action Items

Item	Details	Who	Timeline
1.	Jessica to send the list of climate action and energy policies modelled for phase 1.	Jessica	Week of August 15
2.	A team will be set up to discuss the economic modeling and investment analysis in more detail. The list of industry representatives will be provided by CAPP. Government representatives include Jessica Verhagen, Ines Piccinino, Stuart Young, Chris Gilmore	Nadia/Jessica	First meeting Aug 22. Written comments on assumptions due week of Aug 22.

3.	A team will be set up to provide input on the Sector Profile. The list of industry representatives will be provided by CAPP. Government representatives include Linda Beltrano, Laura Lapp, Hurrian Peyman, Stuart Young and Chris Gilmore.	Hurrian	First meeting in Aug.
4.	A team will be set up to gather emissions forecast information. CAPP will provide a list of industry representatives. The government representative will be Laura Guzman	Steve/Laura Guzman	First meeting in Aug.
5.	Steve Dunk to finalize industry membership in each team, including reaching out to other companies on CAS' emissions forecast list.	Steve	By Aug 15
6.	Next meeting will take place in Calgary on Sept 29 (date and time to be confirmed). Agenda item to be included on roles of JTI and Finance including JTI's Accelerate BC.	Hoda to schedule	Invite and agenda sent week of Aug 15.

From: Dunlop, Jenna
To: Peyman, Hurrian ENV:EX; Verhagen, Jessica ENV:EX;
cc: Dunk, Steve; Lapp, Laura; Jackson, Teresa;
Subject: RE: Natural Gas Sector Profile sub-committee
Date: Thursday, August 18, 2011 9:23:09 AM

I just wanted to ensure that everyone knows I will be attending monday's meeting in Vancouver in Steve's place.

cheers, Jenna

From: Dunk, Steve
Sent: Tuesday, August 16, 2011 3:30 PM
To: 'Peyman, Hurrian ENV:EX'
Cc: Verhagen, Jessica ENV:EX; Lapp, Laura ENV:EX; Dunlop, Jenna; Tate, Shirley
Subject: RE: Natural Gas Sector Profile sub-committee

Hi Hurrian and Jessica,

s.22 so I have been catching up to emails and phone messages.

We will be having a short CAPP meeting next week to confirm individual participation for the profile sub-committee and to bounce around a few ideas on how to proceed. I haven't set the date, but it will likely be early next week, and then we will be ready to engage with you folks - a phone conference may be the easiest. especially for the first meeting.

I won't be at the reporting meeting on Monday, as I have a commitment with Fort Nelson First Nations in Fort Nelson on the same day.

Steve

 Please do not print unless necessary

From: Peyman, Hurrian ENV:EX [mailto:Hurrian.Peyman@gov.bc.ca]
Sent: Monday, August 15, 2011 9:56 AM
To: Dunk, Steve
Cc: Verhagen, Jessica ENV:EX; Lapp, Laura ENV:EX

Subject: Natural Gas Sector Profile sub-committee

Hello Steve,

I wanted to touch base with you about the natural gas sector profile (attached) and the people who had volunteered to take a role in providing industry feedback on the document.

Industry and Government Members:

Steve Dunk, Christa Seaman, Laura Lapp, Hurrian Peyman, Linda Beltrano

How would you like to proceed with this? I can arrange a phone conference meeting if you feel that would be the most effective forum

Hurrian Peyman
Climate Change Analyst
Climate Action Secretariat
395 Waterfront Crescent
Victoria, BC
(250) 356-7015

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Subject: Natural Gas Climate Action Working Group Economic Team workshop
Location: Boardroom, Suite 1100, 1055 West Georgia Street, Vancouver BC or Call-in
Number: s.15 **password:** s.15

Start: Mon 2011-08-22 9:00 AM
End: Mon 2011-08-22 4:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Verhagen, Jessica ENV:EX

-----Original Appointment-----

From: Verhagen, Jessica ENV:EX
Sent: Friday, August 12, 2011 9:35 AM
To: Verhagen, Jessica ENV:EX; Rahbar, Hoda ENV:EX; Gilmore, Christopher JTI:EX; Young, Stewart FIN:EX; Piccinino, Ines MEM:EX; 'Jotham Peters'; Nadia Luciuk (nadia.luciuk@encana.com); Jon Remmer (jon.remmer@encana.com); Brian Ross M. Sc., P. Eng. (brian_ross@nexeninc.com); 'Christa.Seaman@Shell.Com'; 'nsymington@suncor.com'; Dunk, Steve; 'Dunlop, Jenna'; 'james.a.hughes@esso.ca'; Peyman, Hurrian ENV:EX
Cc: Carroll, Sandra JTI:EX; Martinez, Cristina FIN:EX
Subject: Natural Gas Climate Action Working Group Economic Team workshop
When: Monday, August 22, 2011 9:00 AM-4:00 PM (GMT-08:00) Pacific Time (US & Canada).
Where: Boardroom, Suite 1100, 1055 West Georgia Street, Vancouver BC or Call-in Number: s.15
s.15 password: s.15

When: Monday, August 22, 2011 9:00 AM-4:00 PM (GMT-08:00) Pacific Time (US & Canada).

Where: Boardroom, Suite 1100, 1055 West Georgia Street, Vancouver BC or Call-in Number: s.15
s.15 , password: s.15

Note: The GMT offset above does not reflect daylight saving time adjustments.

~~*~*~*~*~*~*~*~*

Following the Aug 10 NGCAWG meeting, an action item was to form an Economic Modeling Team that would review the modeling assumptions, scenarios and results.

Our first meeting is a full day workshop to walk through the investment analysis and the macro-economic model. Attendance in person is preferred though we also have a call-in option. We're seeking three outcomes:

- 1) Understanding of the models/analysis.
- 2) Input on the macro-economic modeling Assumptions document attached (written input may be provided by Aug 26).

3) Input on how to integrate results from the investment analysis and the macro-economic model into the draft Sector Profile attached. A separate Team was formed to review the full Sector Profile.

Materials:

- Economic Analysis Project Charter (for reference/background)
- Investment Analysis results of the carbon tax
- Macro-economic Modeling Assumptions
- Natural Gas and Oil Sector Profile

Thanks,

Jessica

<<Natural Gas and Oil Sector Profile.docx>> <<Natural Gas WG 110809 - Explanation of model assumptions.docx>>

<<Impact of CTax on NG Industry.doc>> <<Economic Analysis Charter.doc>>



Natural Gas and
Oil SectorPro...



Natural Gas WG
110809 - Explan...



Impact of CTax
on NG Industry...



Economic
analysis Charter.do



**Natural Gas Climate Action Economic Modeling Subgroup Meeting
August 22, 2011 (9:00am to 3:00pm)**

Minutes

Attendees:

Jenna Dunlop, CAPP
Neil Symington, Suncor (by phone)
Nadia Luciuk, EnCana
Jessica Verhagen, CAS
Hurrian Peyman, CAS
Jotham Peters, consultant
Ines Piccinino, MEM
Charles Slagorsky, Shell
Jon Remmer, EnCana
Bill Tubbs, Spectra

Jessica Verhagen reviewed the action items from August 9th meeting and the Project Charter.

Encana's modelling of carbon policy impact on Natural Gas Investment: Nadia presented the PEEP investment analysis of the effect of carbon pricing on investment decisions. The data is from a survey of BC's natural gas producers. The lognormal graph provides production levels of all the wells drilled over the lifespan of a play.

She outlined the assumptions that went into the model, including:

s.21

The results of the model were that:

s.21



GEEM Macro-economic model: Jotham presented GEEM (General Equilibrium Ecosystem Model) , which uses input-output analysis with the interplay the flows of capital, goods and services to model the macro level effects of climate and energy policies.

The model is best used for:

- Assessing macro level results, such as GDP, jobs, revenues to government and emissions levels, of different carbon tax rates and allocations scenarios.
- Showing trade-offs between sectors.

The model is not intended for:

- Detailed analysis within a sector.
- Investment decision-making.

Sector profile: Jessica discussed the sector profile, which is the compendium of the Working Group's analysis, and how the GEEM and PEEP assumptions and the results could be integrated. The sub-group concluded that PEEP results can be used as inputs to GEEM as well as to inform sections of the sector profile, such as the cost structure.

Action Items:

- The following information will be shared amongst the group. Please email the documents to Hurrian or Jessica to compile and send out in one package to subgroup members.
 - List of producers in BC (Ines)
 - Primer on BC's royalty rates (Ines)
 - List of existing climate and energy policies in phase 1 of modeling (Jessica)
 - Information and the contact for the BC Hydro modeling on electrification costs (Nadia and Bill)
 - National Energy Board cost study (Jotham)
 - EIA update (Jessica)
 - 2000 CAPP report (Jotham)
 - MEM's 2010 report on fuel consumption data (Ines)
 - Excel sheet on 'Emissions for all Production' from the Investment Analysis (Nadia)
 - Transportation cost assumptions (Bill)
- For the next subgroup meeting, Jotham will to present further detail on the assumptions as well as preliminary results, including:
 - Commodity price forecasts (e.g. natural gas, carbon)
 - Production forecast numbers
 - Industry cost curves and 'breaking points' where the curve may not necessarily be smooth



- Where current elasticities come from (e.g. price elasticity of supply of .6 for Montney and 1.4 for Horn River)
 - Return to capital and amount invested in the natural gas sector
- Based on subgroup discussions, Jessica and Jotham will examine the following updates to GEEM and report back to the subgroup next meeting:
 - Reflect 20% royalty rate on liquids. Ines to confirm royalty rate assumption for the Montney
 - Consider 2011 EIA price forecasts.
 - Refine the elasticities using the Investment Analysis input
 - Add a scenario to capture the effect on royalties of a potential shift in the GCA with CCS
 - Add a scenario to capture the Asian LNG market, starting with .9 Bcf/day in 2015, up to 1.6 Bcf/day by 2020. The assumptions for this scenario, the impact of a BC LNG terminal and electrification will be further discussed in a conference call with interested Electricity WG members (Hoda Rahbar to set up).
- Nadia and Jon to be invited to the Electricity Climate Action Working Group.
- The next sub-group meeting is scheduled for September 13th, in Calgary (Hoda)

Subject: LNG and Electrification modeling assumptions
Location: Conf Call: s.15

Start: Mon 2011-09-12 2:00 PM
End: Mon 2011-09-12 3:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Rahbar, Hoda ENV:EX

-----Original Appointment-----

From: Rahbar, Hoda ENV:EX

Sent: Thursday, September 1, 2011 4:56 PM

To: Rahbar, Hoda ENV:EX; 'A Idriss'; 'Avis Wendy'; 'B Themens'; 'B Tubbs'; 'Brenda Goehring'; 'Brian Moghadam'; Buchanan, Barbara MSD:EX; Buchanan, Jack MEM:EX; 'CHDL'; 'Christina Lemire'; Ciccateri, Jim JTI:EX; 'David Ince'; 'David Owen'; Davies, Heather J MEM:EX; 'Douglas Stout'; Fisher, Peter JTI:EX; 'G Stainton'; 'Gerald Chan'; Guzman, Laura ENV:EX; 'Ian Gigington'; 'Ian Wigington'; 'J Wolfe'; 'Jeff Carmichael'; 'Ken Carrusca'; 'Ken Ross'; Kennedy, Hilary ENV:EX; Lapp, Laura ENV:EX; Lesiuk, Tim ENV:EX; 'Lisa Seppala'; MacLaren, Les MEM:EX; 'Maria Furberg'; 'Mark Thompson'; 'Nancy Knight'; 'Orion Henderson'; 'R Watson'; 'Richard Deane'; 'Rob Campbell'; 'Ron Zeilstra'; Turner, Geoff J MEM:EX; Verhagen, Jessica ENV:EX; 'Wakey'; Wood, Heather FIN:EX; Young, Stewart FIN:EX; 'Brian Ross'; Burnes, Jane I JTI:EX; 'Charles Slagorsky'; ChaseWilde, Linda JTI:EX; 'Christa Seaman'; 'J.A. (Jim) Hughes'; 'Jenna Dunlop'; 'Jon Remmer'; Li, Laura H FLNR:EX; Martinez, Cristina FIN:EX; 'Nadia Luciuk'; 'Neil Symington'; Peyman, Hurrian ENV:EX; Piccinino, Ines MEM:EX; 'Steve Dunk'; Dawkins, Christina FIN:EX
Cc: Foy, Anne FIN:EX; Ianniciello, Christina MEM:EX; Clark, Nick MEM:EX; Mercer, Andrea ENV:EX; 'Knight, Nancy'; Beltrano, Linda MEM:EX; Strauss, Ingrid MEM:EX

Subject: LNG and Electrification modeling assumptions

When: Monday, September 12, 2011 2:00 PM-3:00 PM (GMT-08:00) Pacific Time (US & Canada).

Where: Conf Call: s.15

Update:

Date: September 12th, 2011

Time: 2:00pm-3:00pm (local Vancouver time)

Teleconference **Call-in Number:** s.15

Conference ID: s.15

Moderator: Jessica Verhagen

Dear All,

This is a short conference call set up to discuss LNG and electrification modeling assumptions.

Participants: Electricity Climate Action Working Group

Natural Gas Climate Action Working Group

Date: September 7th, 2011

Time: 9:00am-10:00am (local Vancouver time)

Teleconference Call-in Number: s.15

Conference ID: s.15

Moderator: Jessica Verhagen

Please contact me if you have any questions.

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

From: Piccinino, Ines FLNR:EX
To: Verhagen, Jessica ENV:EX; "btubbs@spectraenergy.com";
Rahbar, Hoda ENV:EX;
cc: Peyman, Hurrian ENV:EX; "Dunk, Steve";
Subject: RE: Natural Gas Climate Action Economic Modeling Subgroup Meeting
Date: Wednesday, September 14, 2011 9:15:29 AM

Somebody has to signed in as chairperson...

From: Verhagen, Jessica ENV:EX
Sent: Wednesday, September 14, 2011 9:15 AM
To: 'btubbs@spectraenergy.com'; Rahbar, Hoda ENV:EX
Cc: Piccinino, Ines MEM:EX; Peyman, Hurrian ENV:EX
Subject: Re: Natural Gas Climate Action Economic Modeling Subgroup Meeting

We are waiting as well. We are on the conference line and were just disconnected as the chair has not yet arrived. Should we call back in? Or use a different #?

From: Tubbs, Bill [mailto:btubbs@spectraenergy.com]
Sent: Wednesday, September 14, 2011 09:08 AM
To: Rahbar, Hoda ENV:EX
Cc: Verhagen, Jessica ENV:EX
Subject: Re: Natural Gas Climate Action Economic Modeling Subgroup Meeting

Has the call started? We at CAPP are on the call waiting.

Bill.

Bill Tubbs
Climate Change and Energy Efficiency Specialist
Spectra Energy Transmission
Suite 1100, 1055 West Georgia Street
Vancouver, BC V6E 3R5
Office: +1 (604) 691 5202
Mobile: +1 (604) 314 8317
Email: btubbs@spectraenergy.com

From: Rahbar, Hoda ENV:EX [mailto:Hoda.Rahbar@gov.bc.ca]
Sent: Wednesday, September 14, 2011 09:54 AM
To: Tubbs, Bill; 'Brian Ross' <brian_ross@nexeninc.com>; Burnes, Jane I JTI:EX <Jane.Burnes@gov.bc.ca>; 'Charles Slagorsky' <Charles.slagorsky@shell.com>;

Date: September 14th, 2011

Time: 10:00am-12:00pm Calgary Time/9:00am-11:00am Victoria Time

Teleconference **Call-in Number:** s.15

Access code: s.15

In-Person: Boardroom B, 2100, 350-7th Ave SW,
Calgary, AB

Lunch will be provided.

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

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From: Remmer, Jon
To: Rahbar, Hoda ENV:EX; jotham@peterssharp.com; Peyman, Hurrian ENV:EX; Verhagen, Jessica ENV:EX;
Subject: Re: Documents for Natural Gas Climate Action Working SubGroup
Date: Wednesday, September 14, 2011 9:17:09 AM

We are in the calgary office and are logged into the teleconference. Is there an issue with it?

Jon

From: Rahbar, Hoda ENV:EX [mailto:Hoda.Rahbar@gov.bc.ca]
Sent: Wednesday, September 14, 2011 10:01 AM
To: Rahbar, Hoda ENV:EX <Hoda.Rahbar@gov.bc.ca>; 'Jotham Peters' <jotham@peterssharp.com>; 'Bill Tubbs' <btubbs@spectraenergy.com>; Ross, Brian; Burnes, Jane I JTI:EX <Jane.Burnes@gov.bc.ca>; 'Charles Slagorsky' <Charles.slagorsky@shell.com>; ChaseWilde, Linda JTI:EX <Linda.ChaseWilde@gov.bc.ca>; 'Christa Seaman' <Christa.Seaman@shell.com>; 'J.A. (Jim) Hughes' <james.a.hughes@esso.ca>; 'Jenna Dunlop' <jenna.dunlop@capp.ca>; Remmer, Jon; Lapp, Laura ENV:EX <Laura.Lapp@gov.bc.ca>; Lesluk, Tim ENV:EX <Tim.Lesluk@gov.bc.ca>; Martinez, Cristina FIN:EX <Cristina.Martinez@gov.bc.ca>; Luciuk, Nadia; 'Neil Symington' <nsymington@suncor.com>; Peyman, Hurrian ENV:EX <Hurrian.Peyman@gov.bc.ca>; Piccinino, Ines MEM:EX <Ines.Piccinino@gov.bc.ca>; 'Steve Dunk' <steve.dunk@capp.ca>; Verhagen, Jessica ENV:EX <Jessica.Verhagen@gov.bc.ca>; Young, Stewart FIN:EX <Stewart.Young@gov.bc.ca>
Subject: RE: Documents for Natural Gas Climate Action Working SubGroup

Dear All,

Please see the attached two documents for your review.

1. Presentation that provides an update on the Montney area opportunity
2. Word document summarizing the HRB electrification opportunity

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

From: Rahbar, Hoda ENV:EX
Sent: Tuesday, September 13, 2011 9:25 AM
To: Rahbar, Hoda ENV:EX; 'Jotham Peters'; 'Bill Tubbs'; 'Brian Ross'; Burnes, Jane I JTI:EX; 'Charles Slagorsky'; ChaseWilde, Linda JTI:EX; 'Christa Seaman'; 'J.A. (Jim) Hughes'; 'Jenna Dunlop'; 'Jon Remmer'; Lapp, Laura ENV:EX; Lesluk, Tim ENV:EX; Martinez, Cristina FIN:EX; 'Nadia Luciuk'; 'Neil Symington'; Peyman, Hurrian ENV:EX; Piccinino, Ines MEM:EX; 'Steve Dunk'; Verhagen, Jessica ENV:EX; Young, Stewart FIN:EX
Subject: RE: Documents for Natural Gas Climate Action Working SubGroup

Dear All,

Please see attached the documents from the meeting minutes action item that were to be shared amongst the group.

Attachment	Description	Document Name
1	Minutes from August 22 nd meeting	August 22 Natural Gas modeling subgroup meeting notes.docx
2	List of producers in BC	List of producers in BC.docx
3	Primer on BC's royalty rates	Royalties 101 for CAS.pptx
4	List of existing climate and energy policies in phase 1 of modeling	BC Climate Action Modeling Assumptions phase I Comparison 2008 vs current.doc
5	National Energy Board cost study	Ntrlqsspplcstwstrncnd2009-eng.pdf
6	EIA update	AEO2011-Natural Gas Imports and Exports-Reference case.xls
7	2000 CAPP report	200 CAPP report.docx
8	MEM's 2010 report on fuel consumption data	Fuel consumption data.docx

We will be sending the below documents shortly.

Attachment	Description	Document Name
	Information and the contact for the BC Hydro modeling on electrification costs	
	Excel sheet on 'Emissions for all Production' from the Investment Analysis	
	Transportation cost assumptions	

Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

From: Rahbar, Hoda ENV:EX

Sent: Friday, August 26, 2011 9:26 AM

To: 'Jotham Peters'; 'Bill Tubbs'; 'Brian Ross'; Burnes, Jane I JTI:EX; 'Charles Slagorsky'; ChaseWilde, Linda JTI:EX; 'Christa Seaman'; 'J.A. (Jim) Hughes'; 'Jenna Dunlop'; 'Jon Remmer'; Lapp, Laura ENV:EX; Lesiuk, Tim ENV:EX; Martinez, Cristina FIN:EX; 'Nadia Luciuk'; 'Neil Symington'; Peyman, Hurrian ENV:EX; Piccinino, Ines MEM:EX; 'Steve Dunk'; Verhagen, Jessica ENV:EX; Young, Stewart FIN:EX

Subject: Natural Gas Climate Action Working SubGroup Meeting minutes

Dear Natural Gas Climate Action Economic Modeling Subgroup,

Please find attached the minutes from our last meeting on August 22nd.

The next Economic Modeling Subgroup meeting will be held on September 13th in Calgary. You will be receiving an invitation for this shortly.

Please feel free to contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

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<http://www.encana.com>

From: Dunk, Steve
To: Verhagen, Jessica; Piccinino, Ines FLNR:EX; Peyman, Hurrian ENV:EX; Rahbar, Hoda ENV:EX; Dunk, Steve; Dunlop, Jenna; Luciuk, Nadia; Remmer, Jon; Hughes, Jim; Ross, Brian; Seaman, Christa; Tubbs, Bill; Symington, Neil; smccullough@spectraenergy.com; Lapp, Laura; Linda. Beltrano@gov.bc.ca.; Tate, Shirley; Kanten, Roy SCAN-UAS/E/C;
cc: Pryce, David;
Subject: Draft Natural Gas Profile
Date: Wednesday, September 14, 2011 2:45:35 PM
Attachments: CAPP EDMS-#195707-v1-
Draft Natural Gas and Oil Sector Profile with comments.DOC

Thank you to Ines and the industry participants who attended our meeting today.

As discussed at the meeting, we were hoping to better understand from CAS what the purpose of the profile was, as well as understand what feedback was required. In the absence of this feedback, we have assigned sections of the report to be edited for distribution. Please look at the comments to see which section that we have asked you to edit. Thanks Ines for offering to have MEM take on the appropriate sections.

I edited a couple of sections using the "Insert Comment" function from Word. For long sections, it may be better not to use that function but to prepare a separate document.

s.22 My Inbox gets pretty full when I am away, and sometimes rejects mail.

Therefore, can I ask folks to send comments on this draft to **Shirley Tate at CAPP by Friday, September 23.**

Thanks

Steve Dunk
Manager, BC Operations
CAPP
403-267-1184

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Subject: Natural Gas Climate Action Economic Modeling Subgroup Meeting
Location: CAPP's office, Boardroom B, 2100, 350-7th Ave SW, Calgary, AB; s.15
s.15

Start: Wed 2011-09-14 9:00 AM
End: Wed 2011-09-14 11:00 AM

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Rahbar, Hoda ENV:EX
Required Attendees: 'Bill Tubbs'; 'Brian Ross'; Burnes, Jane I JTI:EX; 'Charles Slagorsky'; ChaseWilde, Linda JTI:EX; 'Christa Seaman'; 'J.A. (Jim) Hughes'; 'Jenna Dunlop'; 'Jon Remmer'; Lapp, Laura ENV:EX; Lesiuk, Tim ENV:EX; Martinez, Cristina FIN:EX; 'Nadia Luciuk'; 'Neil Symington'; Peyman, Hurrian ENV:EX; Piccinino, Ines MEM:EX; 'Steve Dunk'; Verhagen, Jessica ENV:EX; Young, Stewart FIN:EX; 'jotham@naviusresearch.com'; Wood, Heather FIN:EX; 'Tate, Shirley'; Li, Laura H FLNR:EX
Optional Attendees: Fisher, Peter JTI:EX; Pantella, Dan JTI:EX; Kelly, Josie L MEM:EX

Update: Please see the below 2 documents for this meeting

Materials:

- Memo Natural Gas Calibration
- Natural gas presentation



11-09-14 Memo

Natural Gas Cali...



BC NG

Natural Gas presentation (Sept 13)

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Please see below the new updated details for the Natural Gas Climate Action Economic Modeling Subgroup Meeting.

**Date:** September 14<sup>th</sup>, 2011

**Time:** 10:00am-12:00pm Calgary Time/9:00am-11:00am Victoria Time

**Teleconference** **Call-in Number:** s.15  
**Access code:** s.15

**In-Person:** Boardroom B, 2100, 350-7th Ave SW,  
Calgary, AB



Lunch will be provided.

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar  
Climate Action Secretariat | Ministry of Environment | T (250) 953-4882



**Natural Gas Climate Action Economic Modeling Subgroup Meeting  
September 14, 2011 (10:00am to 12:00pm)**

**Minutes**

**Attendees:**

Bill Tubbs, Spectra  
Heather Wood, FIN  
Hurrian Peyman, CAS  
Ines Piccinino, MEM  
Jessica Verhagen, CAS  
Jon Remmer, EnCana  
Jotham Peters, consultant  
Nadia Luciuk, EnCana  
Steve Dunk, CAPP

**Minutes:**

Jessica reviewed the action items from the August 22<sup>nd</sup> meeting and the context for today's meeting. For the documents requested last time, please refer to Hoda Rahbar's September 13<sup>th</sup> e-mail.

The GEEM model and calibration memo were presented, including commodity price forecasts, production forecasts, industry cost curves and price elasticities of supply for Montney and Horn River.

**Discussion:**

Companies prefer that the Ministry of Finance provides aggregated corporate income tax information for the sector instead of extrapolating from income tax information from individual companies.

The Economic model does not prescribe technologies or policy decisions. It states whether, under different economic conditions and policies, CCS or other emission reduction technologies are economically viable.

s.13

The sector wanted to determine whether certain inputs yielded different results in the GEEM versus investment analysis.

Because the price and return on investment within the oil and natural gas sectors has diverged, there is competition to secure some services that are needed by the oil and natural gas sectors. Based on last year's feedback, these services have been disaggregated between the two sectors. Global movement of capital is not incorporated within the model. It is assumed that there is sufficient North American capital that including the rest of the world would have a negligible or nonexistent change to the model.



**Action Items:**

In advance of next meeting,

- Jotham to provide elasticities of substitution between value added (labour and capital) and energy. Jotham stated tentatively that this was .1. (Elasticities of supply for Horn River and Montney were already provided—1.4 and .6 respectively).
- Jotham to convert 2002 prices in nominal dollars.
- Jotham to provide some climate policy scenarios showing Horn River and Montney production levels
- Jotham to describe how currency exchange and inflation work in the model.
- Info to be provided by companies –
  - spreadsheet on GHG intensities of the Montney and Horn River plays,
  - Information about electrification options
  - Information on volumes of natural gas liquids in Horn River versus Montney (EnCana)
  - Excel sheet covering Encana's modeling of climate policy's effect on the sector

**From:** Piccinino, Ines FLNR:EX  
**To:** Verhagen, Jessica ENV:EX; Peyman, Hurrian ENV:EX;  
**cc:** Beltrano, Linda MEM:EX;  
**Subject:** FW: Draft Natural Gas Profile  
**Date:** Thursday, September 15, 2011 9:49:10 AM  
**Attachments:** CAPP EDMS-#195707-v1-  
Draft Natural Gas and Oil Sector Profile with comments.DOC

---

Hi Jessica, Hurrian,

Looks to me that the version of this document industry worked with is the OLD version. We provided comments to Hurrian already on many of these things. Do you have a more recent version? I wouldn't like to have to start from scratch.

Thanks!

Ines

---

**From:** Dunk, Steve [mailto:steve.dunk@capp.ca]  
**Sent:** Wednesday, September 14, 2011 2:45 PM  
**To:** Verhagen, Jessica; Piccinino, Ines MEM:EX; Peyman, Hurrian ENV:EX; Rahbar, Hoda ENV:EX; Dunk, Steve; Dunlop, Jenna; Luciuk, Nadia; Remmer, Jon; Hughes, Jim; Ross, Brian; Seaman, Christa; Tubbs, Bill; Symington, Neil; smccullough@spectraenergy.com; Lapp, Laura ENV:EX; Linda.Beltrano@gov.bc.ca;; Tate, Shirley; Kanten, Roy SCAN-UAS/E/C  
**Cc:** Pryce, David  
**Subject:** Draft Natural Gas Profile

Thank you to Ines and the industry participants who attended our meeting today.

As discussed at the meeting, we were hoping to better understand from CAS what the purpose of the profile was, as well as understand what feedback was required. In the absence of this feedback, we have assigned sections of the report to be edited for distribution. Please look at the comments to see which section that we have asked you to edit. Thanks Ines for offering to have MEM take on the appropriate sections.

I edited a couple of sections using the "Insert Comment" function from Word. For long sections, it may be better not to use that function but to prepare a separate document.

s.15 My Inbox gets pretty full when I am away, and sometimes rejects mail.

Therefore, can I ask folks to send comments on this draft to **Shirley Tate at CAPP by**



**Friday, September 23.**

Thanks

*Steve Dunk*

Manager, BC Operations

CAPP

403-267-1184



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-----

**From:** Piccinino, Ines FLNR:EX  
**To:** Peyman, Hurrian ENV:EX; Verhagen, Jessica ENV:EX;  
**cc:** Beltrano, Linda MEM:EX;  
**Subject:** RE: Draft Natural Gas Profile  
**Date:** Thursday, September 15, 2011 10:15:24 AM

---

Hi, Hurrian,

I saw some were there, but because I gave you my paper copy I have the feeling some others were missed (i.e. Peru is not an oil producer). In any case, if this is the LAST available version, then I don't have any concerns, I'll just include the edits as planned.

Thanks!!

Ines

---

**From:** Peyman, Hurrian ENV:EX  
**Sent:** Thursday, September 15, 2011 10:13 AM  
**To:** Piccinino, Ines MEM:EX; Verhagen, Jessica ENV:EX  
**Cc:** Beltrano, Linda MEM:EX  
**Subject:** RE: Draft Natural Gas Profile

Hi Ines,

The draft that was sent to CAPP had incorporated the valuable feedback that Linda and yourself had provided. Revisions that you had suggested in the meeting that had been incorporated include:

- Deleting the natural gas cost structure provided by previous modeling
- Age structure of inventory (we have your data on average ages that we opted not to use in the draft that we sent to CAPP)
- Focusing the history section on more recent occurrences
- Discussing Asia when mentioning LNG
- Separate the sections on oil and natural gas
- Mentioning inter-provincial trade with Alberta and Saskatchewan
- Utilizing your text about BC's royalty programs

If you feel there were items that didn't include from your feedback, let me know

Hurrian

---

**From:** Piccinino, Ines MEM:EX  
**Sent:** Thursday, September 15, 2011 9:49 AM  
**To:** Verhagen, Jessica ENV:EX; Peyman, Hurrian ENV:EX  
**Cc:** Beltrano, Linda MEM:EX  
**Subject:** FW: Draft Natural Gas Profile

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Thanks!

Ines

---

**From:** Dunk, Steve [mailto:steve.dunk@capp.ca]  
**Sent:** Wednesday, September 14, 2011 2:45 PM  
**To:** Verhagen, Jessica; Piccinino, Ines MEM:EX; Peyman, Hurrian ENV:EX; Rahbar, Hoda ENV:EX; Dunk, Steve; Dunlop, Jenna; Luciuk, Nadia; Remmer, Jon; Hughes, Jim; Ross, Brian; Seaman, Christa; Tubbs, Bill; Symington, Neil; smccullough@spectraenergy.com; Lapp, Laura ENV:EX; Linda.Beltrano@gov.bc.ca;; Tate, Shirley; Kanten, Roy SCAN-UAS/E/C  
**Cc:** Pryce, David  
**Subject:** Draft Natural Gas Profile

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**Friday, September 23.**

Thanks

*Steve Dunk*

Manager, BC Operations

CAPP

403-267-1184



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**Subject:** Optional: Meeting on co-generation  
**Location:** Conf Call: s.15

**Start:** Thu 2011-09-15 4:00 PM  
**End:** Thu 2011-09-15 5:00 PM  
**Show Time As:** Tentative

**Recurrence:** (none)

**Meeting Status:** Not yet responded

**Organizer:** Rahbar, Hoda ENV:EX

-----Original Appointment-----

**From:** Rahbar, Hoda ENV:EX

**Sent:** Friday, September 9, 2011 5:23 PM

**To:** Rahbar, Hoda ENV:EX; 'Ahmed Idriss'; 'Avis Wendy'; 'B Themens'; 'Bill Tubbs'; 'Brenda Goehring'; 'Brian Moghadam'; Buchanan, Jack MEM:EX; 'CHDL'; 'Christina Lemire'; Ciccateri, Jim JTI:EX; 'David Ince'; 'David Owen'; Davies, Heather J MEM:EX; 'Douglas Stout'; Fisher, Peter JTI:EX; 'G Stainton'; 'Gerald Chan'; Guzman, Laura ENV:EX; 'Ian Gigington'; 'Ian Wgington'; 'J Wolfe'; 'Jeff Carmichael'; 'Ken Carrusca'; 'Lisa Seppala'; Mack, James ENV:EX; MacLaren, Les MEM:EX; 'Maria Furberg'; 'Mark Thompson'; 'Nancy Knight'; 'Orion Henderson'; 'R Watson'; 'Randy Reimann'; 'Richard Deane'; 'Rob Campbell'; 'Ron Zeilstra'; Turner, Geoff J MEM:EX; 'Wakey Akey'; Wood, Heather FIN:EX; Young, Stewart FIN:EX; Beltrano, Linda MEM:EX; 'Bill Clapperton'; 'Brian Ross'; Burnes, Jane I JTI:EX; 'Charles Slagorsky'; ChaseWilde, Linda JTI:EX; 'Christa Seaman'; 'David Pryce'; 'Gerry Ertel'; Gilmore, Christopher JTI:EX; 'Gordon Goodman'; 'J.A. (Jim) Hughes'; 'Jenna Dunlop'; 'Jon Remmer'; Martinez, Cristina FIN:EX; McLaren, Graeme MEM:EX; 'Nadia Luciuk'; 'Neil Symington'; Peyman, Hurrian ENV:EX; Piccinino, Ines MEM:EX; 'Richard Dunn'; 'Sarah McCullough'; 'Shannon Hiebert'; 'Steve Dunk'; 'Wayne Hiller'; 'Wishart Robson'; 'Alden Anderson'; 'Allan Wright'; Amann-Blake, Nathaniel MEM:EX; 'Barb Riordan'; 'Ben Chalmers'; 'Byng Giraud'; 'Chris Adachi'; Currie, Anne MEM:EX; 'Ed Beswick'; 'Francis Ries'; 'Gavin Dirom'; Gibson, Alan ENV:EX; 'Kosta Sainis'; 'Mark Edwards'; Musgrove, Kate MEM:EX; 'Richard Prokopanko'; 'Rob Beleutz'; 'Ron Jones'; 'Sandy Mackintosh'; 'Sharon Singh'; Wakelin, Tony ENV:EX; 'Wayne Kenefick'; Woodhouse, Christine A ENV:EX; Peterson, Dave FLNR:EX; Beattie, Diane ENV:EX; Allan, John; Dangelmaier, Kristin; Gandossi, David; Ho, Anne; Jeffery, Rick FOR:IN; Ketchum, Jess; Konkin, Bob A ENV:EX; Lapp, Laura ENV:EX; Lesiuk, Tim ENV:EX; MacDonald, Cindy; Mauch, Anne; McCloskey, Kelly; Ric Slaco; Sandland, James FLNR:EX; Verhagen, Jessica ENV:EX; 'jotham@naviusresearch.com'  
**Cc:** 'Edwards Mark VANM'; 'Knight, Nancy'; Caesar, Richard E MEM:EX; 'De Zoysa, Sanjaya'; Li, Laura H FLNR:EX

**Subject:** Optional: Meeting on co-generation

**When:** Thursday, September 15, 2011 4:00 PM-5:00 PM (GMT-08:00) Pacific Time (US & Canada).

**Where:** Conf Call: s.15

Dear All,

Climate Action Working Group members are invited to participate in an optional teleconference to consider on how co-generation is reflected in BC's economic analysis of climate action. The discussion will include the cost structure and the potential expansion of co-generation in the future.

**Invitees:** Electricity Climate Action Working Group

**Forestry Climate Action Working Group**

**Mining Climate Action Working Group**

**Natural Gas Climate Action Working Group**

**Date:** September 15<sup>th</sup>, 2011

**Time:** 4:00pm-5:00pm (Pacific Standard Time)

**Teleconference Call-in Number:** s.15

**Conference ID:** s.15

**Moderator:** Jessica Verhagen

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

**From:** Tate, Shirley  
**To:** Verhagen, Jessica; Piccinino, Ines FLNR:EX; Peyman, Hurrian ENV:EX; Rahbar, Hoda ENV:EX; Dunlop, Jenna; Luciuk, Nadia; Remmer, Jon; Hughes, Jim; Ross, Brian; Seaman, Christa; Tubbs, Bill; Symington, Neil; smccullough@spectraenergy.com; Lapp, Laura; Linda.Beltrano@gov.bc.ca; Kanten, Roy SCAN-UAS/E/C;  
**cc:** Pryce, David; Dunk, Steve;  
**Subject:** Reminder: Review/Comments on Draft Natural Gas Profile  
**Date:** Friday, September 23, 2011 3:10:18 PM  
**Attachments:** CAPP EDMS-#195707-v1-  
Draft Natural Gas and Oil Sector Profile with comments.DOC

---

A reminder that comments/edits were due today (Sept 23). To date there has been limited feedback received.

Regards,  
Shirley Tate on behalf of

**Steve Dunk**

Manager, BC Operations

Canadian Association of Petroleum Producers (CAPP)

2100, 350 - 7th Ave. SW Calgary AB, T2P 3N9

ph: (403) 267-1184 | fax (403) 266-3214 | <mailto:steve.dunk@capp.ca>



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**From:** Dunk, Steve  
**Sent:** Wednesday, September 14, 2011 3:45 PM  
**To:** 'Verhagen, Jessica'; 'Piccinino, Ines'; 'Peyman, Hurrian'; 'Rahbar, Hoda'; Dunk, Steve; Dunlop, Jenna; 'Luciuk, Nadia'; 'Remmer, Jon'; 'Hughes, Jim'; 'Ross, Brian'; 'Seaman, Christa'; 'Tubbs, Bill'; 'Symington, Neil'; 'smccullough@spectraenergy.com'; 'laura.lapp@gov.bc.ca'; 'Linda.Beltrano@gov.bc.ca'; Tate, Shirley; 'Kanten, Roy SCAN-UAS/E/C'  
**Cc:** Pryce, David  
**Subject:** Draft Natural Gas Profile

Thank you to Ines and the industry participants who attended our meeting today.

As discussed at the meeting, we were hoping to better understand from CAS what the purpose of the profile was, as well as understand what feedback was required. In the absence of this feedback, we

have assigned sections of the report to be edited for distribution. Please look at the comments to see which section that we have asked you to edit. Thanks Ines for offering to have MEM take on the appropriate sections.

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s.22 My Inbox gets pretty full when I am away, and sometimes rejects mail.

Therefore, can I ask folks to send comments on this draft to **Shirley Tate at CAPP by Friday, September 23.**

Thanks

*Steve Dunk*  
Manager, BC Operations  
CAPP  
403-267-1184



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**From:** Tubbs, Bill  
**To:** Peyman, Hurrian ENV:EX; "Remmer, Jon"; "Christa.Seaman@Shell.Com";  
**cc:** Guzman, Laura ENV:EX; Verhagen, Jessica ENV:EX;  
**Subject:** RE: Feedback on Co-generation  
**Date:** Friday, September 23, 2011 6:38:45 PM  
**Attachments:** Cogeneration Assumptions BTubbs 11 09 23.docx

---

Sorry for delay. It was a busy week.

Attached is my best attempt to provide useful data for the model.

I may have to review some of the assumptions once I have some feedback from others internally and I welcome comments from you if any of these numbers look wrong.

To protect the confidentiality of information on existing facilities I have only used publicly available data and standard/generic performance levels that are not based on actual or contractual information. Having said that none of these facilities are particularly unique or unusual.

thanks  
Bill.

---

**From:** Peyman, Hurrian ENV:EX [mailto:Hurrian.Peyman@gov.bc.ca]  
**Sent:** September 23, 2011 7:44 AM  
**To:** Tubbs, Bill; 'Remmer, Jon'; 'Christa.Seaman@Shell.Com'  
**Cc:** Guzman, Laura ENV:EX; Verhagen, Jessica ENV:EX  
**Subject:** Feedback on Co-generation

Hello Bill, Jon and Christa,

I'm following up on the co-generation meeting to see when is a realistic timeline to receive your response to the questions we discussed in the meeting. Specifically, the questions are:

- 1) Can you provide information to determine the potential of co-generation per unit of output?
- 2) What fuels will be consumed for co-generation?
- 3) Would the steam requirements be the same for any process plant?

- 4) How do co-generation and electrification technologies interact?
- 5) The model has already listed all of the cogeneration that was in effect in 2002. Confirm new facilities have since opened up.
- 6) At what point will facilities build a cogeneration plant, at what price per MWh of electricity?
- 7) What is your company's co-generation potential?

Thank you. I appreciate your input

Hurrian Peyman  
Climate Change Analyst  
Climate Action Secretariat  
395 Waterfront Crescent  
Victoria, BC  
(250) 356-7015

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**Subject:** Natural Gas Climate Action Working Group Meeting  
**Location:** CAPP's office, Boardroom A, 2100, 350-7th Ave SW, Calgary, AB  
  
**Start:** Thu 2011-09-29 9:30 AM  
**End:** Thu 2011-09-29 12:30 PM  
**Show Time As:** Tentative  
  
**Recurrence:** (none)  
  
**Meeting Status:** Not yet responded  
  
**Organizer:** Rahbar, Hoda ENV:EX

-----Original Appointment-----

**From:** Rahbar, Hoda ENV:EX

**Sent:** Thursday, September 1, 2011 10:42 AM

**To:** Beltrano, Linda MEM:EX; 'Bill Clapperton'; 'Bill Tubbs'; 'Brian Ross'; Burnes, Jane I JTI:EX; 'Charles Slagorsky'; ChaseWilde, Linda JTI:EX; 'Christa Seaman'; 'David Pryce'; Fisher, Peter JTI:EX; 'Gerry Ertel'; Gilmore, Christopher JTI:EX; 'Gordon Goodman'; Guzman, Laura ENV:EX; 'J.A. (Jim) Hughes'; 'Jenna Dunlop'; 'Jon Remmer'; Lapp, Laura ENV:EX; Lesiuk, Tim ENV:EX; Mack, James ENV:EX; Martinez, Cristina FIN:EX; McLaren, Graeme MEM:EX; 'Nadia Luciuk'; 'Neil Symington'; Peyman, Hurrian ENV:EX; Piccinino, Ines MEM:EX; 'Richard Dunn'; 'Sarah McCullough'; 'Shannon Hiebert'; 'Steve Dunk'; Verhagen, Jessica ENV:EX; 'Wayne Hiller'; 'Wishart Robson'; Young, Stewart FIN:EX; 'Tate, Shirley'

**Cc:** 'Andrew Higgins'; 'Browne, Russell'; 'Ross, Ken'; Caesar, Richard E MEM:EX

**Subject:** Natural Gas Climate Action Working Group Meeting

**When:** Thursday, September 29, 2011 9:30 AM-12:30 PM (GMT-08:00) Pacific Time (US & Canada).

**Where:** CAPP's office, Boardroom A, 2100, 350-7th Ave SW, Calgary, AB

Update:

Please see attached the Agenda.

<<11-09-29\_Natural\_Gas\_WG\_Agenda.docx>>

~~~~~

Dear All,

This is a placeholder appointment for the Natural Gas Climate Action Working Group meeting.

Date: September 29th, 2011

Time: 10:30am-1:30pm Calgary Time/9:30am-12:30pm Victoria Time

Teleconference Call-in Number: s.15

Access code: s.15

In-Person: **Boardroom A, 2100, 350-7th Ave SW,**

Calgary, AB

Lunch will be provided.

I will be sending out the formal invitation and meeting materials closer to the date, this is just to give you sufficient notice for planning purposes.

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882



1.1-09-29_Natural
Gas_WG_Agenda..



Natural Gas Climate Action Working Group Meeting

10:30am-1:30am (MST), September 29, 2011

Boardroom A, 2100, 350-7th Ave SW, Calgary, AB

Call-in Number: s.15

Conference ID: s.15

Attendees

Graeme McLaren (Ministry of Energy and Mines)
David Pryce (Canadian Association of Petroleum Producers)
Andrew Higgins (Canadian Natural Resources Ltd.)
Bill Clapperton (Canadian Natural Resources Ltd.)
Bill Tubbs (Spectra Energy Group)
Brian Ross (Nexen)
Charles Slagorsky (Shell)
Christa Seaman (Shell)
Gerry Ertel (Shell)
Gordon Goodman (EOG Resources Canada Inc.)
Jenna Dunlop (Canadian Association of Petroleum Producers)

Jim Hughes (Husky Energy)
Jon Remmer (Encana Corporation)
Ken Ross (Fortis BC)
Neil Symington (Suncor Energy Inc.)
Richard Dunn (Encana Corporation)
Russell Browne (Apache Canada Ltd.)
Sarah McCullough (Spectra Energy Group)
Shannon Hiebert (Husky Energy)
Steve Dunk (Canadian Association of Petroleum Producers)
Wayne Hillier (Husky Energy)
Wishart Robson (Nexen Inc.)

Government Staff

Linda Beltrano (Ministry of Energy and Mines)
Stewart Young (Ministry of Finance)
Ines Piccinino (Ministry of Energy and Mines)
Peter Fisher (Ministry of Jobs, Tourism and Innovation)

Tim Lesiuk (Climate Action Secretariat)
Jessica Verhagen (Climate Action Secretariat)
Laura Lapp (Climate Action Secretariat)
Hurrian Peyman (Climate Action Secretariat)

Agenda

- | | | |
|----|--|------------------------------|
| 1. | Welcome and overview | Co-Chairs |
| 2. | Update on economic analysis project <ul style="list-style-type: none">• Status of action items• Overview of process | Tim Lesiuk |
| 3. | Sector Profile <ul style="list-style-type: none">• Progress on revisions to sector profile | Laura Lapp
Hurrian Peyman |
| 4. | Economic Modelling <ul style="list-style-type: none">• Summary of input from industry• Incorporating industry investment analysis• Examples of approaches taken by other sectors | Jessica Verhagen |
| 5. | Permit distribution <ul style="list-style-type: none">• Principles and competitiveness• Scenario 1 for 2013 operation-level distribution• Phase 2 of modelling | Tim Lesiuk |
| 6. | Next Steps <ul style="list-style-type: none">• Action items• Next meeting October 14th• Fourth meeting November 14th | Co-Chairs
Hurrian Peyman |
| 7. | Adjourn | |



**Natural Gas Climate Action Working Group Meeting
September 29, 2011 (10:30am to 1:30pm Mountain Standard Time)**

Minutes

Attendees

Graeme McLaren (Ministry of Energy and Mines)
David Pryce (Canadian Association of Petroleum Producers-CAPP)
Andrew Higgins (Canadian Natural Resources Ltd.)
Bill Tubbs (Spectra Energy Group)
Brian Ross (Nexen)
Charles Slagorsky (Shell)
Gerry Ertel (Shell)
Glynis Carling (Imperial Oil)
Jim Hughes (Husky Energy)
Jon Remmer (Encana Corporation)

Ken Ross (Fortis BC)
Neil Symington (Suncor Energy Inc.)
Richard Dunn (Encana Corporation)
Jenna Dunlop (CAPP)
Shannon Hiebert (Husky Energy)
Steve Dunk (CAPP)
Wayne Hillier (Husky Energy)
Jessica Verhagen (Climate Action Secretariat)*
Richard Caesar (Ministry of Energy and Mines)*
Tim Lesiuk (Climate Action Secretariat)
Laura Lapp (Climate Action Secretariat)
Hurrian Peyman (Climate Action Secretariat)

* Participated by teleconference

Meeting Summary

Welcome

David Pryce welcomed members to the meeting. He stated that industry would be interested in having more agenda items headed by industry members. They also wished to ensure that the sector's strategic questions were also considered by the working group.

Follow up on Action Items from Previous Meetings

- 1) The modeling sub-group met on September 12 and 15.
- 2) The sector profile group also met to discuss industry's feedback on the profile

Economic Analysis

Tim Lesiuk updated the progress of the economic analysis project and provided the timeline for future progress.

Sector Profile

The industry group provided their revisions to the sector profile. They sought clarification about what information CAS wanted for cost structure and sought CAS' feedback on their spreadsheet of emissions by source and "play".



Economic Modeling

Jessica Verhagen provided an update about economic modeling.

Permit Distribution

Tim Lesiuk provided the group with an overview of the baseline permit distribution scenario. He sought industry's feedback on this scenario and requested that industry provides alternative scenarios for economic modeling.

Action Items

Item	Details	Who	Timeline
1.	A list of members in the profile and modelling sub-groups and minutes from their meeting to be distributed to all working group members	Hoda Rahbar	October 5 th
2.	Meet to discuss industry's and CAS' revisions to the sector profile	Steve Dunk, Hurrian Peyman	October 10 th
3.	Meeting to discuss strategic questions that should be included in the sector profile (Jenna lead and invite Glynis, Bill/Sarah, Andrew, Jon/Nadia, Shannon/Wayne, Neil, MEM rep, Tim, Laura and Hurrian)	Jenna Dunlop lead; Hoda Rahbar send meeting invitations	October 12 th
4.	Industry provide input on the principles and scenarios for permit distribution to Jenna for consolidation in the sector profile	Jenna Dunlop	October 14 th
5.	Provide CAS with industry's alternative permit distribution scenarios (to be incorporated into the economic modeling)	Neil Symington lead	October 13 th (in time for modelling meeting)
6.	Meet to discuss results from phase 1 of modeling and to assess how a tech fund and/or intensity-based alternative scenario would be modelled	Economic modelling subgroup	October 14 th
7.	Next natural gas working group meeting planned for October 24 th in Calgary	Hoda Rahbar	October 24 th
8.	Fourth meeting of natural gas working group tentatively planned for November 14 th in Calgary	Hoda Rahbar	November 14 th

Subject: Natural Gas Climate Action Economic Modeling Meeting (open up appointment for complete details)
Location: CAPP's office, Boardroom C, 2100, 350-7th Ave SW, Calgary, AB; s.15
s.15
Start: Fri 2011-10-14 12:00 PM
End: Fri 2011-10-14 1:30 PM
Show Time As: Tentative
Recurrence: (none)
Meeting Status: Not yet responded
Organizer: Rahbar, Hoda ENV:EX

Please see attached the below documents for this meeting:

1. PowerPoint on the Preliminary Results
2. Excel Sheet on Preliminary Results

~~~~~

Please see below the new updated details for the Natural Gas Climate Action Economic Modeling Meeting.

**Date:** October 14<sup>th</sup>, 2011  
**Time:** 1:00pm-2:30pm Calgary Time/12:00pm-1:30pm Victoria Time  
**Teleconference Call-in Number:** s.15  
**Access code:** s.15

**In-Person:** Boardroom C, 2100, 350-7th Ave SW,  
Calgary, AB

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar  
Climate Action Secretariat | Ministry of Environment | T (250) 953-4882



Preliminary  
Modeling Results



Preliminary  
Results for CAS



**From:** Symington, Neil  
**To:** Verhagen, Jessica ENV:EX;  
**cc:** Peyman, Hurrian ENV:EX; Ross, Brian (Calgary); Ross, Brian (Calgary);  
Christa.Seaman@Shell.Com; Remmer, Jon; Dunlop, Jenna; Dunk, Steve;  
david.pryce@capp.ca;  
**Subject:** Recommendations for modeling an intensity-base system for BC  
**Date:** Thursday, October 13, 2011 2:11:38 PM  
**Attachments:** Scenarios for modeling BC intensity system recommendations.doc

---

Hi Jessica,

In preparation for the modeling meeting tomorrow, here are our sub-group's recommendations for modeling an intensity-base system for BC.

I intend to join the meeting, but will be en route to the airport to catch a flight. Both Jon and Bill will be on the call tomorrow and can answer any questions.

If you have any questions prior to the call, please contact me directly.

Best Regards,

Neil

Neil Symington  
Senior Advisor  
Energy and Climate Policy  
Suncor Energy Inc.  
403-296-6352 office  
403-850-2141 cell  
nsymington@suncor.com

Check out Suncor's 2011 Report on Sustainability

---

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**Natural Gas Climate Action Working Group Modeling Meeting  
October 14, 2011 (12pm to 1:30pm Pacific Standard Time)**

**Minutes**

**Attendees**

Andrew Higgins (Canadian Natural Resources Ltd.)  
Bill Tubbs (Spectra Energy Group)  
Glynis Carling (Imperial Oil)  
Gerry Ertel (Shell)  
Richard Caesar (Ministry of Energy and Mines)\*  
Nadia Luciuk, (Encana)  
Ines Piccinino (Ministry of Energy and Mines)\*

Jon Remmer (Encana Corporation)  
Neil Symington (Suncor Energy Inc.)\*  
Richard Dunn (Encana Corporation)  
Steve Dunk (CAPP)  
Jessica Verhagen (Climate Action Secretariat)\*  
Hurrian Peyman (Climate Action Secretariat)\*  
Stewart Young (Finance)\*  
Marshall King (Tax Policy)\*

\* Participated by teleconference

**Meeting Summary**

Jessica Verhagen and Jotham Peters presented the PowerPoint presentation and Excel Spreadsheets for the phase 1 modeling.

**Feedback:**

For the purposes of the analysis, the “climate policy” scenario includes all policies that affect emission reductions such as the Energy Plan commitment to decrease flaring.

Jotham noted that natural gas sector reductions would be 1.0 Mt greater in 2020 in the climate policy scenario than in the no policy scenario. For the next meeting Jotham will show what policies yielded the emission reductions.

Natural gas sector suggested to include land sales data in the sector profile.

The sector asked why obs were forecasted to increase under climate policy even though GDP grew less than under the “no policy” scenario. Jotham explained that the recycling of carbon tax revenue shifts capital to less carbon intensive sectors like services, which tend to have lower wage rates than carbon-intensive sectors like cement and natural gas.

**Action Items**

| Item | Details                                                                                      | Who            | Timeline                 |
|------|----------------------------------------------------------------------------------------------|----------------|--------------------------|
| 1.   | A PowerPoint presentation that focuses on climate policy's effects on the natural gas sector | Hurrian Peyman | October 24 <sup>th</sup> |



|    |                                                                                                                                             |               |                          |
|----|---------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------|
| 2. | Disaggregated emissions (combustion and process) under climate policy and no climate policy and what power supply is assumed for production | Jotham Peters | October 24 <sup>th</sup> |
| 3. | Production costs for the natural gas sector under climate policy and no climate policy                                                      | Jotham Peters | October 24 <sup>th</sup> |
| 4. | Industry feedback on phase 1 results of economic modeling                                                                                   | Steve Dunk    | October 24th             |
| 5. | Industry feedback on phase 2 alternative scenarios to model                                                                                 | Steve Dunk`   | October 21 <sup>st</sup> |
| 6. | Strategic Question Meeting Scheduled                                                                                                        | Hoda Rahbar   | October 20th             |



**From:** Tate, Shirley  
**To:** Verhagen, Jessica ENV:EX; Beltrano, Linda MEM:EX; Piccinino, Ines FLNR:EX; Young, Stewart FIN:EX; Carroll, Sandra HLTH:EX; Gilmore, Christopher JTST:EX; Martinez, Cristina FIN:EX; Luciuk, Nadia; Remmer, Jon; Hughes, Jim; Ross, Brian; Seaman, Christa; McCullough, Sarah; Tubbs, Bill; Symington, Neil;  
**cc:** Dunk, Steve; Dunlop, Jenna; Peyman, Hurrian ENV:EX; Rahbar, Hoda ENV:EX;  
**Subject:** For Review: Oct 20 Natural Gas Sector Profile Meeting background documents  
**Date:** Tuesday, October 18, 2011 10:42:39 AM  
**Attachments:** Natural Gas sector profile incorporating CAPP's and my revisions, 111006.doc  
CAPP EDMS-#195707-v2-  
Draft Natural Gas and Oil Sector Profile with comments.DOC  
CAPP EDMS-#196275-v1-BC GHG Emissions forcast.XLS

---

Please see the sector profile that was passed to CAS for comment (CAPP doc #195707), the revisions proposed by CAS, and the spreadsheet proposed by CAPP (CAPP doc #196275) for the emissions forecast. Thanks to Hurrian and the CAS team for providing comments.

Our meeting on Thursday (Oct 20, 2-3:00 pm (Mtn); 1-2:00 pm (Pacific) will be to discuss the document and the revisions, and to develop a penultimate sector profile.

Regards,  
Shirley Tate on behalf of

**Steve Dunk**

Manager, BC Operations

Canadian Association of Petroleum Producers (CAPP)

2100, 350 - 7th Ave. SW Calgary AB, T2P 3N9

ph: (403) 267-1184 | fax (403) 266-3214 | <mailto:steve.dunk@capp.ca>



Please consider the environment before printing this e-mail

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**From:** Peyman, Hurrian ENV:EX [<mailto:Hurrian.Peyman@gov.bc.ca>]  
**Sent:** Thursday, October 06, 2011 5:43 PM  
**To:** Dunk, Steve  
**Cc:** Lapp, Laura ENV:EX  
**Subject:** Natural Gas Sector Profile

Hello Steve,

I have attached the sector profile with my additions (highlighted in yellow for easier

reference). The sources for these additions are footnoted. Please let me know if you have any comments.

The majority of CAPP's additions have been incorporated with the exception of a couple that have become outdated

s.13 . There are a couple for which I need a source so it can be footnoted.

I've also addressed your question about the spreadsheet in a comment within the document. We are prepared to use 2010 facility level data (which will soon be public information) rather than 2012's within the sector profile to protect natural gas sector's future production information. This could be supplemented by CAPP's emissions by play and by source. We'd prefer if this provides production and emissions at a low and high natural gas price. I believe CAPP already has this data. I have a couple more questions about the spreadsheet and the risk costs that we can discuss further.

Although we won't need to include facility level 2012 emissions data in the profile, we will still require this information from each facility for allowance distribution purposes. We would be happy to sign confidential agreements with companies to ensure this companies' information remains private.

If you have any questions or comments about the document, please don't hesitate to contact me. I look forward to talking about this further.

Regards,

Hurrian Peyman  
Climate Change Analyst  
Climate Action Secretariat  
395 Waterfront Crescent  
Victoria, BC  
(250) 356-7015

---

*Please Note /  
Veuillez noter: This  
communication is  
intended for the  
person or entity to  
which it is addressed*

**Subject:** FW: NGCA - Sector Profile {open appointment for complete details}  
**Location:** CAPP Stewardship Room or DIAL-IN: s.15 access: s.15  
**Start:** Thu 2011-10-20 1:00 PM  
**End:** Thu 2011-10-20 2:00 PM  
**Recurrence:** (none)  
**Meeting Status:** Not yet responded  
**Organizer:** 'Tate, Shirley'

-----Original Appointment-----

**From:** Tate, Shirley [mailto:shirley.tate@capp.ca]

**Sent:** Tuesday, October 18, 2011 10:23 AM

**To:** 'Tate, Shirley'; Verhagen, Jessica; Beltrano, Linda MEM:EX; Piccinino, Ines MEM:EX; Peyman, Hurrian ENV:EX; Rahbar, Hoda ENV:EX; Young, Stewart FIN:EX; Carroll, Sandra JTI:EX; Gilmore, Christopher JTI:EX; Martinez, Cristina FIN:EX; Dunk, Steve; Dunlop, Jenna; Luciuk, Nadia; Remmer, Jon; Hughes, Jim; Ross, Brian; Seaman, Christa; McCullough, Sarah; Tubbs, Bill; Symington, Neil; Economic Analysis of Climate Action in BC ENV:EX; Lapp, Laura ENV:EX

**Subject:** NGCA - Sector Profile {open appointment for complete details}

**When:** Thursday, October 20, 2011 1:00 PM-2:00 PM (GMT-08:00) Pacific Time (US & Canada).

**Where:** CAPP Stewardship Room or DIAL-IN: s.15 access: s.15

2-3:00 pm Mtn; 1:00-2:00 pm Pacific

In person: CAPP Conference Room C

Dial-in: s.15 ; access s.15

Additional material to follow in a separate e-mail





**Natural Gas Climate Action Working Group Sector Profile and Strategic Questions Conference Calls  
October 20, 2011 (1pm to 3pm Pacific Standard Time)**

**DRAFT Minutes**

**Attendees**

Andrew Higgins (Canadian Natural Resources Ltd.)  
Bill Tubbs (Spectra Energy Group)  
Brian Ross, (Nexen)  
Glynis Carling (Imperial Oil)  
Gerry Ertel (Shell)  
Jenna Dunlop (CAPP)  
Jon Remmer (Encana Corporation)  
Neil Symington (Suncor Energy Inc.)  
Hurrian Peyman (Climate Action Secretariat)

Richard Dunn (Encana Corporation)  
Steve Dunk (CAPP)  
Laura Lapp (Climate Action Secretariat)  
Tim Lesiuk (Climate Action Secretariat)  
Jessica Verhagen (Climate Action Secretariat)  
Richard Caesar (Ministry of Energy and Mines)  
Nadia Luciuk, (Encana)  
Sarah McCullough (Spectra)

**Meetings Summary**

**Sector Profile Feedback:**

During the Sector Profile meeting, participants walked through the sector profile to provide feedback on the proposed revisions to the document.

The natural gas sector participants questioned the importance to have individual facilities' emission levels included within the sector profile rather than an aggregate figure by play. Laura Lapp clarified that these numbers were requested by the project's ADM Steering Committee for all sectors. As requested, Hurrian Peyman will add a line explaining that the companies listed do not include all producers—only those with emissions over 25,000 tonnes of emissions. It will also be clear that the emissions listed are those that would be covered under a cap and trade program. Hurrian will update the numbers to align with those that are to be published from 2010 emissions reports, and will group the companies by activity.

The sector participants requested that only the four key emissions mitigation opportunities that were generated through the development of the GHG management plan be included within the sector profile. CAS proposed that the profile clearly indicate these four opportunities, but also note that there may be additional opportunities to reduce emissions through leak, venting and fugitive emission reductions that could be assessed.

**Strategic Questions:**

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Tim Lesiuk invited the sector participants to provide text for inclusion within the profile, within already existing sections of the profile or as additional sections, that outlines the industry's interest in managing and supporting the growth of the natural gas sector and ensuring that BC remains competitive with other producing jurisdictions.

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The sector participants agreed that they would like to add additional content to the sector profile, given their understanding of its purpose from the discussion with Tim.

#### Action Items

| Item | Details                                                                                                                                                                                     | Who                              | Timeline                 |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------|
| 1.   | Hurrian will update and re-circulate the sector profile based on the feedback provided during the meeting.                                                                                  | Hurrian Peyman                   | October 24 <sup>th</sup> |
| 2.   | Jon will provide a chart appropriate for the profile that is based on projected sector emissions spreadsheets. They will also review emission totals to ensure accuracy.                    | Jon Renner                       | October 28 <sup>th</sup> |
| 3.   | The sector will provide alternate production cost data to be included in the sector profile. They will also provide data about production and development costs for the net profit section. | Stephen Rodriguez and Steve Dunk | October 28 <sup>th</sup> |
| 4.   | Steve will provide Hurrian with text on "underlying" considerations for inclusion in the sector profile (e.g. natural gas as a tool to lower global emissions).                             | Steve Dunk                       | October 28 <sup>th</sup> |
| 5.   | Steve will provide Hurrian and Jessica with any other carbon pricing scenarios that the sector would like modeled within the economic analysis.                                             | Steve Dunk                       | October 28 <sup>th</sup> |



**Subject:** Natural Gas Climate Action Working Group Meeting (open up appointment for complete details)  
**Location:** CAPP's office, Boardroom A, 2100, 350-7th Ave SW, Calgary, AB, Conf Call s.15

**Start:** Mon 2011-10-24 7:30 AM  
**End:** Mon 2011-10-24 10:30 AM  
**Show Time As:** Tentative

**Recurrence:** (none)

**Meeting Status:** Not yet responded

**Organizer:** Rahbar, Hoda ENV:EX

Please see attached the agenda:

<<11-10-24 Natural Gas WG Agenda.docx>>

Dear All,

Please see below the details for the third Natural Gas Climate Action Working Group meeting.

**Date:** October 24<sup>th</sup>, 2011

**Time:** 8:30am-11:30am Calgary Time/7:30am-10:30am Victoria Time

**Teleconference Call-in Number:** s.15

**Access code:** s.15

**In-Person:** Boardroom A, 2100, 350-7th Ave SW,  
Calgary, AB

Lunch will be provided.

I will be sending out the meeting materials closer to the date.

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882



11-10-24 Natural  
Gas WG Agenda..



## Natural Gas Climate Action Working Group Meeting

8:30am-11:30am (MST), October 24, 2011

Boardroom A, 2100, 350-7th Ave SW, Calgary, AB

Call-in Number: s.15

Conference ID: s.15

### Invite List

Graeme McLaren (Ministry of Energy and Mines)  
David Pryce (Canadian Association of Petroleum Producers)  
Andrew Higgins (Canadian Natural Resources Ltd.)  
Bill Clapperton (Canadian Natural Resources Ltd.)  
Bill Tubbs (Spectra Energy Group)  
Brian Ross (Nexen)  
Charles Slagorsky (Shell)  
Christa Seaman (Shell)  
Gerry Ertel (Shell)  
Glynis Carling (Imperial Oil)  
Gordon Goodman (EOG Resources Canada Inc.)  
Jenna Dunlop (Canadian Association of Petroleum Producers)

Jon Remmer (Encana Corporation)  
Ken Ross (Fortis BC)  
Nadia Luciuk (Encana Corporation)  
Neil Symington (Suncor Energy Inc.)  
Richard Dunn (Encana Corporation)  
Russell Browne (Apache Canada Ltd.)  
Sarah McCullough (Spectra Energy Group)  
Shannon Hiebert (Husky Energy)  
Steve Dunk (Canadian Association of Petroleum Producers)  
Wayne Hillier (Husky Energy)  
Wishart Robson (Nexen Inc.)

### Government Staff

Linda Beltrano (Ministry of Energy and Mines)  
Stewart Young (Ministry of Finance)  
Ines Piccinino (Ministry of Energy and Mines)  
Peter Fisher (Ministry of Jobs, Tourism and Innovation)

Tim Lesiuk (Climate Action Secretariat)  
Jessica Verhagen (Climate Action Secretariat)  
Laura Lapp (Climate Action Secretariat)  
Hurrian Peyman (Climate Action Secretariat)

## Agenda

- |    |                                                                                                                                                                                                                       |                              |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 1. | Welcome and overview                                                                                                                                                                                                  | Co-Chairs                    |
| 2. | Economic analysis project <ul style="list-style-type: none"><li>• Status of action items</li></ul>                                                                                                                    | Tim Lesiuk<br>Hurrian Peyman |
| 3. | Sector Profile <ul style="list-style-type: none"><li>• Final revisions to sector profile</li></ul>                                                                                                                    | Laura Lapp<br>Hurrian Peyman |
| 4. | Economic Modelling <ul style="list-style-type: none"><li>• Draft Phase 1 report and sector highlights</li><li>• Overview of key assumptions</li><li>• Discussion of results relative to investment analysis</li></ul> | Jessica Verhagen             |
| 5. | Permit distribution <ul style="list-style-type: none"><li>• Feedback on principles for permit distribution</li><li>• Industry-proposed alternatives to mitigate impacts</li></ul>                                     | Tim Lesiuk/all               |
| 6. | Next Steps <ul style="list-style-type: none"><li>• Action items</li><li>• Next meeting November 14<sup>th</sup></li></ul>                                                                                             | Co-Chairs<br>Hurrian Peyman  |
| 7. | Adjourn                                                                                                                                                                                                               |                              |



**Natural Gas Climate Action Working Group Meeting  
October 24, 2011 (8:30am to 11:30am Mountain Standard Time)**

**Minutes**

**Attendees**

Graeme McLaren (Ministry of Energy and Mines)  
David Pryce (Canadian Association of Petroleum Producers-CAPP)  
Andrew Higgins (Canadian Natural Resources Ltd.)  
Gordon Goodman (EOG)\*  
Charles Slagorsky (Shell)  
Glynis Carling (Imperial Oil)  
Tim Lesiuk (Climate Action Secretariat)  
Jessica Verhagen (Climate Action Secretariat)  
Laura Lapp (Climate Action Secretariat)  
Hurrian Peyman (Climate Action Secretariat)  
\* Participated by teleconference

Nadia Luciuk (Encana)  
Jon Remmer (Encana Corporation)  
Neil Symington (Suncor Energy Inc.)  
Richard Dunn (Encana Corporation)  
Jenna Dunlop (CAPP)  
Steve Dunk (CAPP)  
Wayne Hillier (Husky Energy)

Michelle Schwabe (Ministry of Energy and Mines)\*  
Richard Caesar (Ministry of Energy and Mines)\*

**Regrets**

Bill Clapperton (Canadian Natural Resources Ltd.)  
Bill Tubbs (Spectra Energy Group)  
Christa Seaman (Shell)  
Ken Ross (Fortis BC)  
Russell Browne (Apache Canada Ltd.)

Wishart Robson (Nexen Inc.)  
Linda Beltrano (Ministry of Energy and Mines)  
Stewart Young (Ministry of Finance)  
Ines Piccinino (Ministry of Energy and Mines)  
Peter Fisher (Ministry of Jobs, Tourism and Innovation)

**Meeting Summary**

**Welcome**

Graeme McLaren welcomed members to the meeting. David Pryce reiterated that he would like to see industry members with a larger role in heading agenda items.

**Strategic Questions**





### **Sector Profile and Project Report**

Steve Dunk stated that the sector profile team had met and had almost completed the descriptive and factual sections of the sector profile.

Tim Lesiuk stated that industry's strategic issues, its input and its proposed scenarios will be captured in the sector profile as a compendium of industry's input.

Tim Lesiuk explained that all of the sector profiles will be appended to a project report that will summarize the key findings. The drafts will be shared as part of a briefing on progress for the ADM Steering Committee on November 7<sup>th</sup>.

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### **Economic Modeling**

Nadia Luciuk and Jon Remmer noted differences between the GEEM model output and the sector's investment analysis output regarding the effects of carbon pricing on natural gas production. Tim Lesiuk explained that the two are expected to produce different results because of their difference in purpose and scope (macroeconomic model versus industry-focused investment decision-making tool), and he confirmed that the sector profile would present the outputs of both and focus on the investment analysis output if the sector feels it best portrays the natural gas sector's situation. Given tight timelines and our sector's confidence in the investment model, it was agreed that our focus will be on updating the investment model rather than expending much more effort on the GEEM model.

Richard Dunn requested that the output of the GEEM model be presented in terms of production cost per Mcf to 2020, which is a straight-forward, comparable unit and could be compared directly to the cost table in the sector profile. Jessica Verhagen noted that Bill Tubbs had listed a series of information requests to aid the modeling group provide feedback on the preliminary phase 1 results and highlight what was important to include in the sector profile. These will be discussed at the October 26<sup>th</sup> modeling call.

s.13

s.13

### **Permit Distribution**

Tim Lesiuk confirmed receipt of the permit distribution scenario prepared by Neil Symington based on Alberta's Specified Gas Emitters program. BC will run a scenario using the specification provided with some modifications to reflect BC conditions.

### **Next Steps – Timelines**

The sector expressed concerns that it will be challenging to have full industry feedback on the sector profile within the timeline provided due to the time when the sector is scheduled to receive the final copy for review



#### Action Items

| Item | Details                                                                                                                                                                                                                                   | Who                                                                       | Timeline                    |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------|
| 1.   | Modelling sub-group to hold regular weekly economic modelling calls. The first will be to review information requests from industry on phase 1 preliminary results to inform their feedback; and to review the list of phase 2 scenarios. | Jessica Verhagen and Modelling sub-group<br>Hoda Rahbar to schedule calls | October 26 <sup>th</sup>    |
| 2.   | CAS will provide a list of the cap and trade scenarios to be modeled in Phase 2. If the Modelling sub-group would like to run an output-based permit distribution scenario, they should submit one before the end of the week.            | Jessica Verhagen and Modelling sub-group                                  | October 26 <sup>th</sup>    |
| 3.   | CAS will provide a table of contents for the sector profile that helps identify where key findings will be summarized and content beyond the existing sector characterization can be added.                                               | Laura Lapp                                                                | October 28 <sup>th</sup>    |
| 4.   | CAS will provide the sector with a sample of how the case on competitiveness effects of being emissions intense, trade exposed may be structured.                                                                                         | Laura Lapp                                                                | October 28 <sup>th</sup>    |
| 5.   | CAS will translate the output of the Phase 2 runs into \$/Mcf and share it with the modelling sub-group and working group.                                                                                                                | Jessica Verhagen and Modelling sub-group, then all of working group       | November 2 <sup>nd</sup>    |
| 6.   | The sector will add additional estimates on production costs and other information into the sector profile.                                                                                                                               | Steve Dunk                                                                | November 2 <sup>nd</sup>    |
| 7.   | The sector sub-group will incorporate text about strategic issues into the sector profile.                                                                                                                                                | Richard Dunn, Jenna Dunlop                                                | November 4 <sup>th</sup>    |
| 8.   | CAS will provide the sector with the table of contents for the Phase 2 report.                                                                                                                                                            | Laura Lapp                                                                | November 7-11 <sup>th</sup> |
| 9.   | The Modelling sub-group will propose text on observations of the output of the Phase 2 runs to incorporate into the sector profile, including how it compares with the industry investment analysis results.                              | Nadia Luciuk                                                              | November 9 <sup>th</sup>    |
| 10.  | The sector will circulate the draft sector profile for industry review of the new information in the draft.                                                                                                                               | Steve Dunk and/or Jenna Dunlop                                            | November 11 <sup>th</sup>   |
| 11.  | Fourth meeting of natural gas working group in Calgary                                                                                                                                                                                    | Hoda Rahbar                                                               | November 14 <sup>th</sup>   |

**Subject:** Natural Gas Climate Action Modeling Meeting (open up appointment for complete details)  
**Location:** CAPP's office, Boardroom C, 2100, 350-7th Ave SW, Calgary, AB; Conf Call: s.15  
s.15  
**Start:** Wed 2011-10-26 2:00 PM  
**End:** Wed 2011-10-26 3:00 PM  
**Show Time As:** Tentative  
**Recurrence:** (none)  
**Meeting Status:** Not yet responded  
**Organizer:** Rahbar, Hoda ENV:EX

Dear All,

Please see below the details for the Natural Gas Climate Action Modeling Meeting.

**Agenda:**

- 1) Review work plan to end of November
- 2) Review industry questions on Phase 1
- 3) Review Phase 2 scenarios (document to follow)

**Date:** October 26<sup>th</sup>, 2011  
**Time:** 3:00am-4:00pm Calgary Time/2:00pm-3:00pm Victoria Time  
**Teleconference Call-in Number:** s.15

**Access code:** s.15

**Moderator:** Jessica Verhagen

**In-Person:** Boardroom C, 2100, 350-7th Ave SW,  
Calgary, AB

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882



Pages 59 through 60 redacted for the following reasons:

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**Natural Gas Climate Action Working Group Modeling Meeting  
October 26, 2011 (2pm to 3:00pm Pacific Standard Time)**

**Minutes**

**Attendees**

Charles Slagorsky (Shell)  
Jenna Dunlop (CAPP)  
Neil Symington (Suncor Energy Inc.)\*  
Richard Caesar (Ministry of Energy and Mines)\*  
Nadia Luciuk, (Encana)  
Ines Piccinino (Ministry of Energy and Mines)\*

Steve Dunk (CAPP)  
Jessica Verhagen (Climate Action Secretariat)\*  
Jotham Peters (Navius)\*  
Hurrian Peyman (Climate Action Secretariat)\*  
Dan Pantella (JTI)\*  
\* Participated by teleconference

**Regrets**

Stuart Young (Finance)  
Andrew Higgins (Nexen Inc.)  
Bill Tubbs (Spectra)  
Linda Chase-Wilde (JTI)  
Christa Seaman (Shell)

Cristina Martinez (Finance)  
Gerry Ertel (Shell)  
Jon Remmer (Encana)  
Sarah McCullough (Spectra)  
Heather Wood (Finance)

**Meeting Summary**

**Agenda and timeline:**

Jessica Verhagen summarized the agenda and the economic modeling timeline document.

**Industry Feedback on Model**

Nadia Luciuk confirmed that the sector was committed to updating the investment analysis with a target completion by Nov 25<sup>th</sup>) including revising it for a lower forecasted natural gas price

**Responses to Industry Questions**

Jessica reviewed the industry question received on the phase 1 modeling.

Jotham summarized the responses he provided in the Navius memo on production costs, emission breakdown by combustion/non-combustion, forecasted natural gas price and causes of emission reductions.

**Industry Feedback on questions**

Steve Dunk stated that industry preferred use of "non-combustion" rather than "fugitive" to classify non-combustion emissions.

Nadia questioned whether lower production would lower costs for industry. She stated that in fact the inverse is true. Industry is unable to "cherry pick" the lowest production cost wells as activity drops, rather, cost savings and efficiencies are realized as activity development progresses. Lower production levels also raise cost where there are loss of economies of scale.



Jotham Peters stated that his model used the same elasticities as the CAPP model. Nadia and Jotham determined that the two forecasts used different carbon cost burdens (\$.10/mcf (GEEM) vs. \$.16/mcf (investment analysis). Jotham, Nadia and Ines decided to work offline in separate meeting in order to compare differences in models, including production costs, elasticities, carbon price, and gas price.

#### Action Items

| Item | Details                                                                                                                   | Who              | Timeline                                           |
|------|---------------------------------------------------------------------------------------------------------------------------|------------------|----------------------------------------------------|
| 1.   | Modeling team will meet to discuss cap and trade scenarios for modeling                                                   | Jessica Verhagen | October 31 <sup>st</sup> /November 2 <sup>nd</sup> |
| 2.   | Nadia, Jotham and Ines will meet to examine models in order to identify differences and ways to address these differences | Jotham Peters    | November 2nd                                       |
| 3.   | Sector group to meet to discuss scenarios and differences between investment analysis and GEEM model                      | Neil Symington   | November 4th                                       |
| 4.   | Sector to deliver feedback on differences between the two forecasts                                                       | Nadia Luciuk     | November 4th                                       |
| 5.   | Modeling Group to meet                                                                                                    | Jessica Verhagen | November 16th                                      |

**Subject:** Natural Gas Climate Action Modeling Meeting (open up appointment for complete details)  
**Location:** Conf Call: [s.15](#) # Optional: CAPP's office, Boardroom C, 2100, 350-7th Ave SW, Calgary, AB  
**Start:** Mon 2011-10-31 1:00 PM  
**End:** Mon 2011-10-31 2:00 PM  
**Show Time As:** Tentative  
**Recurrence:** (none)  
**Meeting Status:** Not yet responded  
**Organizer:** Rahbar, Hoda ENV:EX

Dear All,

Please see below the details for the Natural Gas Climate Action Modeling Meeting.

**Agenda:**

- 1) Review the Phase 2 scenarios. Material: Jessica to send draft Phase 2 Scenarios list.
- 2) Discuss responses to industry information requests / Review Phase 1 results with Jotham / Industry feedback on Phase 2 scenarios. Material: Jessica to send memo summarizing responses.
- 3) Describe differences between GEEM's preliminary results and the investment analysis tool.

**Date:** October 31<sup>st</sup>, 2011

**Time:** 2:00pm-3:00pm Calgary Time/1:00pm-2:00pm Victoria Time

**Teleconference** **Call-in Number:** [s.15](#)

**Access code:** [s.15](#)

**Moderator:** Jessica Verhagen

**Optional In-Person:** Boardroom C, 2100, 350-7th Ave SW,  
Calgary, AB



---

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

**From:** Remmer, Jon  
**To:** Peyman, Hurrian ENV:EX;  
**Subject:** NG Sector Profile  
**Date:** Thursday, October 27, 2011 1:58:20 PM

---

Hey Hurrian,

Would you please send me the latest version of the Natural Gas sector profile? I'm looking to add a few things and want to make sure I'm working off of the latest version.

Thanks, Jon

**Jon Remmer P.Eng, MBA**  
**Environmental Engineer**  
**Encana Corporation**  
403.645.3988

Please note some Encana offices are closed the first and third Friday of each month.

---

**From:** Peyman, Hurrian ENV:EX [mailto:Hurrian.Peyman@gov.bc.ca]  
**Sent:** Friday, October 14, 2011 11:48 AM  
**To:** 'andrew.higgins@cnrl.com'; 'btubbs@spectraenergy.com'; 'brian.ross@nexeninc.com'; Caesar, Richard E MEM:EX; 'Charles.Slagorsky@shell.com'; ChaseWilde, Linda JTI:EX; 'christa.seaman@shell.com'; Fisher, Peter JTI:EX; 'glynis.a.carling@esso.ca'; 'jenna.dunlop@capp.com'; Remmer, Jon; Lapp, Laura ENV:EX; Lesiuk, Tim ENV:EX; Li, Laura H FLNR:EX; Martinez, Cristina FIN:EX; Luciuk, Nadia; 'NSymington@suncor.com'; Piccinino, Ines MEM:EX; 'Steve.Dunk@capp.com'; Verhagen, Jessica ENV:EX; Wood, Heather FIN:EX; Young, Stewart FIN:EX; 'smccullough@spectraenergy.com'  
**Subject:** Information for today's Natural gas meeting

Hello,

Attached are the results from the first phase of modeling. You will also find a powerpoint that summarizes these results.

If you have any questions, please don't hesitate to contact me.

Hurrian

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**Natural Gas Climate Action Working Group Modeling Meeting**  
**October 31, 2011 (1pm to 2:00pm PST) and November 2, 2011 (9am to 9:30am, PST)**

**Minutes**

**Attendees**

Bill Tubbs (Spectra)  
Jenna Dunlop (CAPP)  
Neil Symington (Suncor Energy Inc.)  
Andrew Higgins (CNRL)  
Christa Seaman (Shell)  
Jotham Peters (Navius)\*  
Richard Caesar (Ministry of Energy and Mines)\*  
Hurrian Peyman (Climate Action Secretariat)\*

Nadia Luciuk, (Encana)  
Ines Piccinino (Ministry of Energy and Mines)\*  
Glynis Carling (Imperial Oil)  
Tim Lesiuk, (Climate Action Secretariat)  
Jessica Verhagen (Climate Action Secretariat)\*  
Brian Ross (Nexen)  
Jon Remmer (Encana)

\* Participated by teleconference

**Meeting Summary**

**Responses to Industry Questions**

Jotham Peters reviewed the memo he prepared that responded to the sector's first set of questions. Since then, Andrew Higgins and Charles Slagorsky forwarded further questions. Jotham's memo will be updated with the responses to these questions and distributed.

**Differences between GEEM Model and Industry's Investment Analysis**

Jotham Peters and Nadia Luciuk met to determine how the GEEM model and the analysis differed and determined the following causes for differences.

s.13



Jessica Verhagen reviewed the permit distribution scenarios that will be modelled in Phase 2 of the economic analysis.

#### **Industry Questions and Feedback**

Industry stated that they would prefer "process" emissions to be labelled "non-combustion".

Jessica clarified that the forecast permit price increased in a linear fashion to 2020.

Tim Lesiuk confirmed that the economic analysis will use 2012 as the baseline from which the emission reduction target is calculated (vs 2007). Jessica stated that free allocations will be distributed based on industry 2012 emission forecasts. New facilities will be allocated allowances by the same method as existing facilities, with industry data used to inform the 2012 emission forecasts.

Bill Tubbs asked whether the tax rebates used in scenario 2.6 to ensure competitiveness against imports can also be used to protect the natural gas industry against competitors in the export market. Tim recommended that the sector provide their proposals about how the sector can improve competitiveness within the sector profile. Jessica confirmed that a carbon price can be placed on imports can be taxed under WTO rules, providing that BC businesses face the same tax burden.

Industry expressed that emissions intensity benchmarking was better suited to discrete rather than linear facilities. If benchmarking is done by linear facilities, a company could meet its compliance expectations simply by changing its asset mix. Tim stated that it was up to the sector whether or not they preferred to model a benchmark.

Industry also requested that individual facilities be permitted to meet 100% of its compliance expectations through offsets (as long as the sector wide use of offsets remains at 33%).

Jessica confirmed that an LNG module will be incorporated into Phase 2.

#### **Action Items**

| <b>Item</b> | <b>Details</b>                                                                                      | <b>Who</b>       | <b>Timeline</b> |
|-------------|-----------------------------------------------------------------------------------------------------|------------------|-----------------|
| 1.          | Modeling team to meet to discuss carbon pricing scenarios for phase 2 modeling                      | Hoda Rahbar      | November 2nd    |
| 2.          | CAS to provide updated memo responding to industry questions regarding preliminary modeling results | Hurrian Peyman   | November 2nd    |
| 3.          | CAS will provide additional written description of the scenario parameters.                         | Jessica Verhagen | November 14th   |



**Subject:** Natural Gas Climate Action Modeling Meeting (open up appointment for complete details)  
**Location:** Conf Call: s.15  
**Start:** Wed 2011-11-02 9:00 AM  
**End:** Wed 2011-11-02 9:30 AM  
**Show Time As:** Tentative  
**Recurrence:** (none)  
**Meeting Status:** Not yet responded  
**Organizer:** Rahbar, Hoda ENV:EX

Dear All,

Sincere apologies again that Jessica was unable to participate in the modeling meeting today. Please see below the details for the meeting to review the Phase 2 scenarios.

**Agenda:**

- 1) Review the Phase 2 scenarios.

**Date:** November 2<sup>nd</sup>, 2011

**Time:** 10:00am-10:30am Calgary Time/9:00am-9:30am Victoria Time/12:00pm-12:30pm Montreal Time

**Teleconference** **Call-in Number:** s.15

**Access code:** s.15

**Moderator:** Jessica Verhagen

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

**From:** Dunlop, Jenna  
**To:** Rahbar, Hoda ENV:EX; Andrew Higgins; Bill Tubbs; Brian Ross; Caesar, Richard E MEM:EX; Charles Slagorsky; Chase Wilde, Linda JTST:EX; Christa Seaman; Fisher, Peter JTST:EX; Gerry Ertel; Glynis Carling; Jon Remmer; Jotham Peters; Lapp, Laura; Lesluk, Tim ENV:EX; Li, Laura H FLNR:EX; Martinez, Cristina FIN:EX; Nadia Luciuk; Neil Symington; Peyman, Hurrian ENV:EX; Piccinino, Ines FLNR:EX; Russell Browne; Sarah McCullough; Dunk, Steve; Verhagen, Jessica ENV:EX; Wood, Heather FIN:EX; Young, Stewart FIN:EX; Economic Analysis of Climate Action in BC ENV:EX;  
**Subject:** RE: Natural Gas Climate Action Modeling Meeting (open up appointment for complete details)  
**Date:** Wednesday, November 2, 2011 8:20:01 AM

---

For those of us in Calgary, I have booked the CAPP Boardroom at 10 am Mountain.

Cheers Jenna

---

**From:** Rahbar, Hoda ENV:EX [mailto:Hoda.Rahbar@gov.bc.ca]  
**Sent:** Monday, October 31, 2011 4:45 PM  
**To:** 'Andrew Higgins'; 'Bill Tubbs'; 'Brian Ross'; Caesar, Richard E MEM:EX; 'Charles Slagorsky'; ChaseWilde, Linda JTI:EX; 'Christa Seaman'; Fisher, Peter JTI:EX; 'Gerry Ertel'; 'Glynis Carling'; Dunlop, Jenna; 'Jon Remmer'; 'Jotham Peters'; Lapp, Laura ENV:EX; Lesluk, Tim ENV:EX; Li, Laura H FLNR:EX; Martinez, Cristina FIN:EX; 'Nadia Luciuk'; 'Neil Symington'; Peyman, Hurrian ENV:EX; Piccinino, Ines MEM:EX; 'Russell Browne'; 'Sarah McCullough'; Dunk, Steve; Verhagen, Jessica ENV:EX; Wood, Heather FIN:EX; Young, Stewart FIN:EX; Economic Analysis of Climate Action in BC ENV:EX; Rahbar, Hoda ENV:EX

**Subject:** Natural Gas Climate Action Modeling Meeting (open up appointment for complete details)  
**When:** Wednesday, November 02, 2011 10:00 AM-10:30 AM (GMT-07:00) Mountain Time (US & Canada).  
**Where:** Conf Call: s.15

When: Wednesday, November 2, 2011 9:00 AM-9:30 AM (GMT-08:00) Pacific Time (US & Canada).  
Where: Conf Call: s.15

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*

Dear All,

Sincere apologies again that Jessica was unable to participate in the modeling meeting today. Please see below the details for the meeting to review the Phase 2 scenarios.

Agenda:

1. Review the Phase 2 scenarios.

Date: November 2nd, 2011

Time: 10:00am-10:30am Calgary Time/9:00am-9:30am Victoria Time/12:00pm-12:30pm  
Montreal Time

Teleconference Call-in Number: s.15  
Access code: s.15  
Moderator: Jessica Verhagen

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar  
Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

-----  
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l'information  
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**Subject:** Canceled: Natural Gas Climate Action Modeling Meeting (open up appointment for complete details)  
**Location:** Conf Call: s.15 Optional: CAPP's office, Boardroom C, 2100, 350-7th Ave SW, Calgary, AB  
**Start:** Wed 2011-11-09 10:30 AM  
**End:** Wed 2011-11-09 12:30 PM  
**Show Time As:** Free  
**Recurrence:** (none)  
**Meeting Status:** Not yet responded  
**Organizer:** Rahbar, Hoda ENV:EX  
**Importance:** High

Dear All,

This modeling meeting will be rescheduled for a later date. A new calendar invite will be sent out shortly.

Dear All,

Please see below the details for the Natural Gas Climate Action Modeling Meeting.

**Agenda:**

- 1) Update industry investment analysis - share updated results with working group.
- 2) Discuss industry input on Phase 1 preliminary results.
- 3) Finalize description of the differences between GEEM's preliminary results and the investment analysis tool. Material: Nadia will send description that will be added to the sector profile.
- 4) Review Phase 2 preliminary results, including the LNG and cogen modules. Material: Jessica will send output tables from Navius. (We'll try to do a PowerPoint summary for the sector, time permitting.)
  - a. Discuss what to incorporate into the sector profile.

b. Discuss how to present the Phase 2 preliminary results to the full Natural Gas Climate Action Working Group.

**Date:** November 9<sup>th</sup>, 2011

**Time:** 11:30am-1:30pm Calgary Time/10:30am-12:30pm Victoria Time

**Teleconference Call-in Number:** s.15

**Access code:** s.15

**Moderator:** Jessica Verhagen

**Optional In-Person:** Boardroom C, 2100, 350-7th Ave SW,  
Calgary, AB

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882



**From:** Luciuk, Nadia  
**To:** Rahbar, Hoda ENV:EX;  
**cc:** Verhagen, Jessica ENV:EX; Peyman, Hurrian ENV:EX;  
**Subject:** RE: 11-10-26 Natural Gas meeting action items  
**Date:** Monday, November 14, 2011 2:25:00 PM  
**Attachments:** 11-10-26 Natural Gas Climate Action Modeling minutes.docx

---

Hi,

Please see attached. I have offered a few comments. However, as these minutes are now going back at least 2 meetings ago and we have progressed since then, I didn't spend too much time getting them exact.

thanks  
Nadia

---

**From:** Rahbar, Hoda ENV:EX [mailto:Hoda.Rahbar@gov.bc.ca]  
**Sent:** Wednesday, November 09, 2011 4:45 PM  
**To:** Luciuk, Nadia  
**Cc:** Verhagen, Jessica ENV:EX; Peyman, Hurrian ENV:EX  
**Subject:** 11-10-26 Natural Gas meeting action items

Hi Nadia,

Hope this e-mail finds you well. Please see attached for your approval the Action Items from the Natural Gas Modeling meeting that was held on October 26<sup>th</sup>.

Please let me know if you have any comments or suggested edits before we send it out to all WG members.

Thank-you,

**Hoda Rahbar**  
Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

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**Subject:** Canceled: Natural Gas Climate Action Working Group Meeting  
**Location:** CAPP's office, Boardroom A, 2100, 350-7th Ave SW, Calgary, AB  
  
**Start:** Mon 2011-11-14 10:00 AM  
**End:** Mon 2011-11-14 1:00 PM  
**Show Time As:** Tentative  
  
**Recurrence:** (none)  
  
**Meeting Status:** Not yet responded  
  
**Organizer:** Rahbar, Hoda ENV:EX  
  
**Importance:** High

Dear working group members,

A problem that could not have been anticipated has arisen for the economic modelling contractor, Navius Research. As a result, we will not receive Phase 2 results until next week. We feel that it would not be a good use of everyone's time to meet until we have those results to discuss, so we will be rescheduling the meetings.

We are in the process of identifying new dates for the working group meetings.

Thank you for your patience,

**Tim Lesiuk**

Executive Director, Business Development and Chief Negotiator  
Climate Action Secretariat, Province of British Columbia  
Mobile: 250.216.5893 Phone: 250.387.9216 E-mail: [Tim.Lesiuk@gov.bc.ca](mailto:Tim.Lesiuk@gov.bc.ca)

~~~~~

Dear All,

This is a placeholder appointment for the fourth Natural Gas Climate Action Working Group meeting.

Date: November 14th, 2011

Time: 11:00am-2:00pm Calgary Time/10:00am-1:00pm Victoria Time

Teleconference **Call-in Number:** s.15

Access code: s.15

In-Person: Boardroom A, 2100, 350-7th Ave SW,

Calgary, AB

Lunch will be provided.

I will be sending out the agenda and meeting materials closer to the date, this is just to give you sufficient notice for planning purposes.

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

From: [Luciuk, Nadia](#)
To: [Rahbar, Hoda ENV:EX](#);
cc: [Verhagen, Jessica ENV:EX](#); [Peyman, Hurrian ENV:EX](#);
Subject: RE: 11-10-31 and 11-11-02 Natural Gas meeting action items
Date: Tuesday, November 15, 2011 2:36:04 PM
Attachments: [11-10-31 and 11-11-02 Natural Gas Climate Action Modeling minutes.docx](#)

Hi,

I have added some comments however I was only present at the Oct 31st meeting.

thanks,
Nadia

From: [Rahbar, Hoda ENV:EX \[mailto:Hoda.Rahbar@gov.bc.ca\]](#)
Sent: Monday, November 14, 2011 4:33 PM
To: [Luciuk, Nadia](#)
Cc: [Verhagen, Jessica ENV:EX](#); [Peyman, Hurrian ENV:EX](#)
Subject: 11-10-31 and 11-11-02 Natural Gas meeting action items

Thank-you Nadia.

Can you please also take a quick look at the minutes from the combined modeling meeting (October 31st and November 2nd) before we distribute them to WG members.

Hoda Rahbar
Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

From: [Luciuk, Nadia \[mailto:Nadia.Luciuk@encana.com\]](#)
Sent: Monday, November 14, 2011 2:24 PM
To: [Rahbar, Hoda ENV:EX](#)
Cc: [Verhagen, Jessica ENV:EX](#); [Peyman, Hurrian ENV:EX](#)
Subject: RE: 11-10-26 Natural Gas meeting action items

Hi,

Please see attached. I have offered a few comments. However, as these minutes are now going back at least 2 meetings ago and we have progressed since then, I didn't spend too much time getting them exact.

thanks
Nadia

From: [Rahbar, Hoda ENV:EX \[mailto:Hoda.Rahbar@gov.bc.ca\]](#)
Sent: Wednesday, November 09, 2011 4:45 PM
To: [Luciuk, Nadia](#)
Cc: [Verhagen, Jessica ENV:EX](#); [Peyman, Hurrian ENV:EX](#)
Subject: 11-10-26 Natural Gas meeting action items

Hi Nadia,

Hope this e-mail finds you well. Please see attached for your approval the Action Items from the Natural Gas Modeling meeting that was held on October 26th.

Please let me know if you have any comments or suggested edits before we send it out to all WG members.

Thank-you,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

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Subject: Natural Gas Climate Action Modeling Meeting (open up appointment for complete details)
Location: Conf Call: s.15 Optional: CAPP's office, Boardroom C, 2100, 350-7th Ave SW, Calgary, AB
Start: Wed 2011-11-16 10:30 AM
End: Wed 2011-11-16 12:30 PM
Show Time As: Tentative
Recurrence: (none)
Meeting Status: Not yet responded
Organizer: Rahbar, Hoda ENV:EX

Please see attached the output tables we are going to introduce at this meeting:

<<Preliminary Results for CAS - 2001-11-14.xls>>

~~~~~

Dear All,

Please see below the details for the Natural Gas Climate Action Modeling Meeting.

**Agenda:**

- 1) Discuss how industry input on Phase 1 preliminary results would be incorporated into next model run. Material: Jessica to send consolidated industry feedback on Phase 1 from all sectors.
- 2) Discuss industry input on Phase 2 preliminary results (industry input due November 25<sup>th</sup>).

**Date:** November 16<sup>th</sup>, 2011  
**Time:** 11:30am-1:30pm Calgary Time/10:30am-12:30pm Victoria Time  
**Teleconference** **Call-in Number:** s.15

**Access code:** s.15

**Moderator:** Jessica Verhagen

**Optional In-Person: Boardroom C, 2100, 350-7th Ave SW,  
Calgary, AB**

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882



**Preliminary  
Results for CAS - ...**



**Natural Gas Climate Action Working Group Modeling Meeting  
November 16, 2011 (10:30am to 11:30am PST)**

**Minutes**

**Attendees**

Andrew Higgins (CNRL)  
Christa Seaman (Shell)  
Jotham Peters (Navius)\*  
Richard Caesar (Ministry of Energy and Mines)\*  
Hurrian Peyman (Climate Action Secretariat)\*

Nadia Luciuk, (Encana)  
Glynis Carling (Imperial Oil)  
Jessica Verhagen (Climate Action Secretariat)\*  
Charles Slagorsky (Shell)

\* Participated by teleconference

**Meeting Summary**

**Economic Modeling timeline**

Jessica Verhagen reviewed the process for the economic modeling. The phase 2 results have been distributed to government, industry and the third party reviewer. Working Groups will meet next week to discuss the results. Feedback is requested by December 5<sup>th</sup>. A final run of the model will be completed for December 12<sup>th</sup>.

**Updating the GEEM model**

Jotham Peters outlined the assumptions and elements of the model that have been changed since the phase 1 results

s.13

**Key Findings**

Jotham reviewed some of the key findings from the phase 2 modeling

- The results are sensitive to electricity sector policies. The rising cost of new electricity supply affects sectors, like pulp and paper, that use large amounts of electricity
- Raising the carbon tax on uncapped sectors does not significantly reduce emissions (< 1 Mt) but it does increase GDP due the recycling of revenue.



- In scenarios where permits are allocated for free, GDP is higher than in those where permits are auctioned. However, government revenue is lower. In both scenarios emission reductions are approximately equal.
- Under cap and trade, BC businesses will likely purchase large amounts of offsets and permits from other jurisdictions (6 – 10 Mt)

#### Responses to Industry Feedback and Questions

Jessica clarified that BC's emission reductions would be achieved in the cap and trade scenarios through BC's purchase of offsets and permits from other jurisdictions.

Jotham explained that GDP increases with the use of the carbon tax because of the recycling (and over-recycling) of carbon tax revenue. He confirmed that the model assumes the natural gas sector does not benefit from revenue recycling.

Jotham confirmed that there was not double counting between LNG production and upstream natural gas.

Jotham stated that he continued to work with Nadia to harmonize the approaches to capital allocation and improvements in emissions intensity for the sector. He stated that the investment analysis and the GEEM model forecasts were converging with the shared information. Jotham clarified that the goal was to have consensus about the comparative advantages and disadvantages of different scenarios and their directional impact on emissions and production. If there are differences of opinion about the magnitude of different scenarios' impact, this can be noted in the sector profile.

#### Action Items

| Item | Details                                                                                                                  | Who              | Timeline      |
|------|--------------------------------------------------------------------------------------------------------------------------|------------------|---------------|
| 1.   | Responses to natural gas questions will be distributed                                                                   | Hoda Rahbar      | November 16th |
| 2.   | CAS will provide a PowerPoint presentation that summarizes scenarios impact upon the province and the natural gas sector | Jessica Verhagen | November 21st |
| 3.   | The next modeling meeting will be held to discuss how modeling results will be shared with natural gas working group     | Hoda Rahbar      | November 28th |
| 4.   | Natural gas sector to provide feedback on phase 2 results                                                                | CAPP             | December 5th  |



**Subject:** Canceled: Natural Gas Climate Action Modeling Meeting (open up appointment for complete details)  
**Location:** Conf Call: s.15 Optional: CAPP's office, Boardroom C, 2100, 350-7th Ave SW, Calgary, AB  
**Start:** Wed 2011-11-23 10:30 AM  
**End:** Wed 2011-11-23 12:30 PM  
**Show Time As:** Free  
**Recurrence:** (none)  
**Meeting Status:** Not yet responded  
**Organizer:** Rahbar, Hoda ENV:EX  
**Importance:** High

Update:

This Modeling meeting has been cancelled. The agenda items from this meeting will be covered during the full Natural Gas Working Group meeting on Nov 28<sup>th</sup>.

~~~~~

Dear All,

Please see below the details for the Natural Gas Climate Action Modeling Meeting.

Agenda:

- 1) Discuss any outstanding industry questions on Phase 2 preliminary results. Material: Nadia to send a draft of industry's input.
- 2) Draft comments on Phase 1 and Phase 2 results for report - work with Sector Profile group.

Date: November 23rd, 2011
Time: 11:30am-1:30pm Calgary Time/10:30am-12:30pm Victoria Time
Teleconference **Call-in Number:** s.15

Access code: s.15

Moderator: Jessica Verhagen

**Optional In-Person: Boardroom C, 2100, 350-7th Ave SW,
Calgary, AB**

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

Subject: OPTIONAL: conference call re Natural Gas Climate Action Working Group
(open up appointment for complete details)
Location: Conf Call: s.15
Start: Mon 2011-11-28 12:00 PM
End: Mon 2011-11-28 3:00 PM
Show Time As: Tentative
Recurrence: (none)
Meeting Status: Not yet responded
Organizer: Rahbar, Hoda ENV:EX

Dear working group members,

The co-chairs have requested that we delay the November 28th working group meeting until a later date when David and Graeme are available. We will set the revised meeting date as soon as they confirm availability.

In the meantime, given that the Economic Analysis of Climate Action in BC project is progressing, we have provided you with the same materials that the other working groups are receiving. We would like to offer the working group members optional conference calls to discuss modelling and Investment analysis progress in the interim.

Proposed optional conference call details:

s.15

1:00 - 2:30pm (MT): Investment analysis and economic modeling Phase 2 results

3:00 - 4:00 pm (MT): Sector profile and strategic issues description

Please RSVP so we know who is likely to attend.

Kind regards,

Tim Lesiuk and Laura Lapp



Natural Gas Climate Action Working Group Meeting
1:00pm-4:00pm (MST), November 28, 2011
Neilson 1 Room, Hyatt Regency Calgary, 700 Centre St SE, Calgary, ABC
Call-in Number: s.15 Conference ID: s.15

Invite List

Graeme McLaren (Ministry of Energy and Mines)
David Pryce (Canadian Association of Petroleum Producers)
Andrew Higgins (Canadian Natural Resources Ltd.)
Bill Clapperton (Canadian Natural Resources Ltd.)
Bill Tubbs (Spectra Energy Group)
Brian Ross (Nexen)
Charles Slagorsky (Shell)
Christa Seaman (Shell)
Gerry Ertel (Shell)
Glynis Carling (Imperial Oil)
Gordon Goodman (EOG Resources Canada Inc.)
J.A. (Jim) Hughes (Esso)

Jenna Dunlop (Canadian Association of Petroleum Producers)
Jon Remmer (Encana Corporation)
Kelly Campbell (Devon Energy)
Nadia Luciuk ((Encana Corporation)
Neil Symington (Suncor Energy Inc.)
Richard Dunn (Encana Corporation)
Sarah McCullough (Spectra Energy Group)
Shannon Hiebert (Husky Energy)
Steve Dunk (Canadian Association of Petroleum Producers)
Wayne Hillier (Husky Energy)
Wishart Robson (Nexen Inc.)

Government Staff

Ines Piccinino (Ministry of Energy and Mines)
Linda Beltrano (Ministry of Energy and Mines)
Stewart Young (Ministry of Finance)
Peter Fisher (Ministry of Jobs, Tourism and Innovation)

Hurrian Peyman (Climate Action Secretariat) Jessica Verhagen (Climate Action Secretariat)
Laura Lapp (Climate Action Secretariat)
Tim Lesiuk (Climate Action Secretariat)

Agenda

- | | |
|--|-----------------------------------|
| 1. Welcome and overview | David Pryce/Ines Piccinino |
| 2. Economic analysis project <ul style="list-style-type: none">• Status of action items | Tim Lesiuk/Hurrian Peyman |
| 3. Economic Modelling <ul style="list-style-type: none">• Review final Phase 1 report• Discuss draft Phase 2 results, with focus on sector highlights• Results of industry analysis | Jessica Verhagen/
Nadia Luciuk |
| 4. Permit distribution <ul style="list-style-type: none">• Discuss any sector-proposed permit distribution scenario alternatives or refinements to mitigate any impacts identified in economic modelling | Tim Lesiuk |
| 5. Sector Profile <ul style="list-style-type: none">• Discuss how to incorporate observations from Phase 2 and any proposals for permit distribution alternatives into the sector profile• Timeline for revisions to sector profile | Laura Lapp/Steve Dunk |
| 6. Next Steps <ul style="list-style-type: none">• Action items• Next meeting [December TBD] | David Pryce/Ines Piccinino |
| 7. Adjourn | |



**Natural Gas Climate Action Working Group Modeling and Sector Profile Conference Call
November 28, 2011 (1:00 to 4:00pm MT)**

Minutes

Attendees

Jenna Dunlop (CAPP)
Neil Symington (Suncor Energy Inc.)
Andrew Higgins (CNRL)
Christa Seaman (Shell)
Nadia Luciuk (Encana)
Glynis Carling (Imperial Oil)
Brian Ross (Nexen)
Jon Remmer (Encana)

Shannon Hiebert (Husky)
Richard Dunn (Encana)
Tim Lesiuk (Climate Action Secretariat)
Jessica Verhagen (Climate Action Secretariat)
Hurrian Peyman (Climate Action Secretariat)
Ines Piccinino (Ministry of Energy and Mines)
Laura Lapp (Climate Action Secretariat)
Jotham Peters (Navius)

Meeting Summary

Revised Project Overview and Timeline

Based on Jenna Dunlop's question of clarification, Tim Lesiuk confirmed that at the last working group meeting it was agreed that the natural gas sector would focus efforts on the investment analysis to capture the sector's capital investment decisions, and that work would continue on the macroeconomic model as it's required to inform the seven other industry sectors and to answer high-level questions about the economy asked by decision-makers. The natural gas sector would include rationale in the sector profile for the use of the investment analysis, given the differences from the macroeconomic model.

At Jenna Dunlop's request, Tim Lesiuk outlined the updated timelines for the project, given the contractor's one week delay delivering the preliminary Phase 2 modelling output tables. Feedback from all industry working groups on the economic modeling phase 2 results is due on **December 5th**. Another run of the model will be completed December 12th. The analysis will be presented at the ADM Steering Committee meeting on December 15th, for them to assess results and provide direction on next steps.

Investment Analysis

Jon Remmer confirmed that the investment analysis can be updated for circulation of preliminary results and discussion on the Monday, December 5th conference call. Jon will incorporate the lower forecasted natural gas price and scenarios 2.4 and 2.5.

GEEM Modeling

Jessica Verhagen outlined the results from the Phase 2 modeling. Jotham Peters of Navius Research discussed his work with the natural gas sector to harmonize the GEEM model with the investment analysis, including addressing how carbon costs and lower natural gas prices have different effects on natural gas profits. Jotham also stated that the elasticity assumptions used in GEEM, which were built upon and were higher than those provided by the sector,, should address the increased costs related to smaller economies of scale.



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Sector Profile

Jenna Dunlop stated that the sector had done significant work on the sector profile and that their comments would be completed by the end of the week.

Tim Lesiuk explained that CAS has contracted editorial assistance for the sector profiles to ensure that the style, flow and format are consistent across all of the sector profiles. The final cabinet submission will be based on a summation of the "key findings" within the sector profiles, which within the natural gas and oil sector profile is something CAS looks to the sector to help formulate.

Action Items

Item	Details	Who	Timeline
1.	Industry will provide their revisions to the sector profile	Jenna Dunlop/Steve Dunk	December 2nd
2.	Industry will provide their feedback on the Phase 2 results	Jon Remmer/Nadia Luciuk	December 5th
3.	Industry will provide their updated investment analysis	Jon Remmer	December 5th

Subject: Natural Gas Climate Action Modeling Meeting (open up appointment for complete details)
Location: Conf Call: s.15 Optional: CAPP's office, Boardroom C, 2100, 350-7th Ave SW, Calgary, AB
Start: Mon 2011-12-05 12:00 PM
End: Mon 2011-12-05 2:00 PM
Show Time As: Tentative
Recurrence: (none)
Meeting Status: Not yet responded
Organizer: Rahbar, Hoda ENV:EX

Update: This meeting date has been changed to December 5th

~~~~~

Dear All,

Please see below the updated details for the Natural Gas Climate Action Modeling Meeting.

**Agenda:**

- 1) Review Phase 2 revised results (also re-runs the two Phase 1 scenarios). **Material:** Jessica will send output tables from Navius.
- 2) Finalize comments on Phase 1 and Phase 2 results for report - work with Sector Profile group.

**Date:** December 5<sup>th</sup>, 2011

**Time:** 1:00pm-3:00pm Calgary Time/12:00pm-2:00pm Victoria Time

**Teleconference Call-in Number:** s.15

**Access code:** s.15

**Moderator:** Jessica Verhagen

**Optional In-Person:** Boardroom C, 2100, 350-7th Ave SW,

**Calgary, AB**

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

**From:** Remmer, Jon  
**To:** Rahbar, Hoda ENV:EX; Andrew Higgins; Bill Tubbs; Ross, Brian; Caesar, Richard E MEM:EX; Charles Slagorsky; Chase Wilde, Linda JTST:EX; Christa Seaman; Fisher, Peter JTST:EX; Gerry Ertel; Glynis Carling; Jenna Dunlop; Lapp, Laura; Lesiuk, Tim ENV:EX; Li, Laura H FLNR:EX; Martinez, Cristina FIN:EX; Monaghan, Nadia; Neil Symington; Peyman, Hurrian ENV:EX; Piccinino, Ines FLNR:EX; Russell Browne; Sarah McCullough; Steve Dunk; Verhagen, Jessica ENV:EX; Wood, Heather FIN:EX; Young, Stewart FIN:EX; Economic Analysis of Climate Action in BC ENV:EX; Mulcahy, Annie ENV:EX; Tate, Shirley;  
**Subject:** RE: Natural Gas Climate Action Modeling Meeting (open up appointment for complete details)  
**Date:** Monday, December 5, 2011 11:49:00 AM  
**Attachments:** Model Results.pdf

---

Hello,

Please find attached the preliminary results from the industry model that we will discuss in the meeting today.

Thanks, Jon

<<Model Results.pdf>>

**Jon Remmer P.Eng, MBA**  
**Environmental Engineer**  
**Encana Corporation**  
403.645.3988

Please note some Encana offices are closed the first and third Friday of each month.

---

**From:** Rahbar, Hoda ENV:EX [mailto:Hoda.Rahbar@gov.bc.ca]  
**Sent:** Thursday, October 27, 2011 6:31 PM  
**To:** Rahbar, Hoda ENV:EX; 'Andrew Higgins'; 'Bill Tubbs'; Ross, Brian; Caesar, Richard E MEM:EX; 'Charles Slagorsky'; ChaseWilde, Linda JTI:EX; 'Christa Seaman'; Fisher, Peter JTI:EX; 'Gerry Ertel'; 'Glynis Carling'; 'Jenna Dunlop'; Remmer, Jon; Lapp, Laura ENV:EX; Lesiuk, Tim ENV:EX; Li, Laura H FLNR:EX; Martinez, Cristina FIN:EX; Luciuk, Nadia; 'Neil Symington'; Peyman, Hurrian ENV:EX; Piccinino, Ines MEM:EX; 'Russell Browne'; 'Sarah McCullough'; 'Steve Dunk'; Verhagen, Jessica ENV:EX; Wood, Heather FIN:EX; Young, Stewart FIN:EX; Economic Analysis of Climate Action in BC ENV:EX; Mulcahy, Annie ENV:EX; 'Tate, Shirley'  
**Subject:** Natural Gas Climate Action Modeling Meeting (open up appointment for complete details)  
**When:** Monday, December 05, 2011 1:00 PM-3:00 PM (GMT-07:00) Mountain Time (US & Canada).  
**Where:** Conf Call: s.15 Optional: CAPP's office, Boardroom C, 2100, 350-7th Ave SW, Calgary, AB

Update: This meeting date has been changed to December 5<sup>th</sup>

~~~~~

Dear All,

Please see below the updated details for the Natural Gas Climate Action Modeling Meeting.

Agenda:

1. Review Phase 2 revised results (also re-runs the two Phase 1 scenarios). Material: Jessica will send output tables from Navius.
2. Finalize comments on Phase 1 and Phase 2 results for report - work with Sector Profile group.

Date: December 5th, 2011

Time: 1:00pm-3:00pm Calgary Time/12:00pm-2:00pm Victoria Time

Teleconference **Call-in Number:** s.15

Access code: s.15

Moderator: Jessica Verhagen

Optional In-Person: Boardroom C, 2100, 350-7th Ave SW,
Calgary, AB

Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882

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**Natural Gas Climate Action Working Group Modeling Meeting
December 5, 2011 (12:00pm to 2:00pm Pacific Standard Time)**

Minutes

Attendees

Bill Tubbs (Spectra)
Jenna Dunlop (CAPP)
Richard Dunn (Encana)
Jon Remmer (Encana)
Andrew Higgins (CNRL)
Nadia Luciuk, (Encana)

David Ince (B C Hydro)
Jotham Peters (Navius)
Tim Lesiuk (Climate Action Secretariat)
Jessica Verhagen (Climate Action Secretariat)
Hurrian Peyman (Climate Action Secretariat)
Richard Caesar (Ministry of Energy and Mines)

Meeting Summary

Investment Analysis:

Jon Remmer and Nadia Luciuk presented the update of the natural gas investment analysis.

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The model showed that natural gas production is more sensitive to changes in carbon pricing than it is to changes in natural gas price. A higher carbon price would be only on BC producers and would affect companies' investment decisions since it lowered the return from BC projects relative to those in other jurisdictions.

Within the analysis, production costs decreased when natural gas price decreased. With a lower natural gas price, production and demand for labour rigs and other services was reduced with a resulting lowering of price.

Tim Lesiuk requested historical documentation of changes in carbon pricing significantly affecting production levels.

Comparisons with the GEEM model

Significant differences in results exist between the GEEM model and the investment analysis. Jotham Peters stated that within the GEEM model, the sector was more sensitive to changes in natural gas price but less sensitive to changes in carbon price.

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Sector Profile

Jenna Dunlop stated that she would like to discuss the sector profile in tomorrow's natural gas meeting.

Action Items

Item	Details	Who	Timeline
1.	Industry to set date for sector profile's completion	Jenna Dunlop	December 6 th
2.	Natural gas sector to provide historical documentation of carbon pricing's impact on sector	Jon Remmer	December 9th

From: Dunlop, Jenna
To: Rahbar, Hoda ENV:EX; Andrew Higgins; Beltrano, Linda MEM:EX;
Bill Clapperton; Bill Tubbs; Brian Ross; Caesar, Richard E MEM:EX;
Charles Slagorsky; Chase Wilde, Linda JTST:EX; Christa Seaman;
Pryce, David; Gerry Ertel; Gilmore, Christopher JTST:EX; Glynis Carling;
Gordon Goodman; Guzman, Laura ENV:EX; Jon Remmer ; Kelly Campbell;
Ken Ross; Lapp, Laura; Lesiuk, Tim ENV:EX; Mack, James ENV:EX;
Martinez, Cristina FIN:EX; McLaren, Graeme MEM:EX; Nadia Luciuk;
Neil Symington; Pantella, Dan JTST:EX; Peyman, Hurrian ENV:EX;
Piccinino, Ines FLNR:EX; Richard Dunn; Russell Browne; Sarah McCullough;
Shannon Hiebert; Dunk, Steve; Verhagen, Jessica ENV:EX; Wayne Hiller;
Wishart Robson; Young, Stewart FIN:EX;
Subject: Natural Gas Sector Profile
Date: Tuesday, December 6, 2011 3:53:59 PM
Attachments: CAPP_EDMS-#199039-v2-Natural Gas Sector Profile Nov_29_Draft.doc

Hi All,

As agreed, please find the most recent sector profile.

I would appreciate if industry could focus on the key findings/strategic considerations section, and BC could focus on the body of text and then we'll swap out on Friday. It will avoid parallel work being done.

Cheers, Jenna

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Subject: Natural Gas Climate Action Working Group Meeting (open up appointment for complete details)
Location: CAPP's office, Boardroom A, 2100, 350-7th Ave SW, Calgary, AB, Conf Call:s.15
Start: Tue 2011-12-06 1:00 PM
End: Tue 2011-12-06 3:00 PM
Show Time As: Tentative
Recurrence: (none)
Meeting Status: Not yet responded
Organizer: Rahbar, Hoda ENV:EX

Please see attached:

1. The proposed Agenda
2. PowerPoint presentation on preliminary Phase 2 model results

<<11-11-28 Natural Gas WG Agenda.docx>> <<Natural Gas DRAFT Phase 2 Modeling Results - Nov.pdf>>

~~~~~

Dear All,

Please see below the details for the fourth Natural Gas Climate Action Working Group meeting.

**Date:** December 6<sup>th</sup>, 2011  
**Time:** 2:00pm-4:00pm Calgary Time/1:00pm-3:00pm Victoria Time  
**Teleconference Call-in Number:** s.15

**Access code:** s.15

**Moderator:** Jessica Verhagen

**In-Person:** Boardroom A, 2100, 350-7th Ave SW,  
Calgary, AB

I will be sending out the meeting materials closer to the date.



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Please contact me if you have any questions.

Kind Regards,

Hoda Rahbar

Climate Action Secretariat | Ministry of Environment | T (250) 953-4882



11-11-28 Natural Gas WG Agenda...  
Natural Gas AFT Phase 2 Mock



**Natural Gas Climate Action Working Group Meeting  
December 6, 2011 (2pm to 4pm Mountain Standard Time)**

**Minutes**

**Attendees**

Graeme McLaren (Ministry of Energy and Mines)  
David Pryce (Canadian Association of Petroleum Producers-CAPP)  
Andrew Higgins (Canadian Natural Resources Ltd.)  
Christa Seaman (Shell)  
Charles Slagorsky (Shell)  
Glynis Carling (Imperial Oil)  
Bill Tubbs (Spectra)\*  
Richard Dunn (Encana Corporation)  
Jenna Dunlop (CAPP)

\* Participated by teleconference

Steve Dunk (CAPP)  
Nadia Luciuk (Encana Corporation)  
Jon Remmer (Encana Corporation)  
Jessica Verhagen (Climate Action Secretariat)  
Laura Lapp (Climate Action Secretariat)  
Hurrian Peyman (Climate Action Secretariat)  
Ines Piccinino (Ministry of Energy and Mines)  
Dan Pantella (Jobs, Tourism and Innovation)\*  
Richard Caesar (Ministry of Energy and Mines)\*  
Tim Lesiuk (Climate Action Secretariat)\*  
David Molinski (Consultant)\*

**Regrets**

Bill Clapperton (Canadian Natural Resources Ltd.)  
Ken Ross (Fortis BC)  
Brian Ross (Nexen)  
Russell Browne (Apache Canada Ltd.)  
Wishart Robson (Nexen Inc.)  
Wayne Hillier (Husky)

Linda Beltrano (Ministry of Energy and Mines)  
Stewart Young (Ministry of Finance)  
Peter Fisher (Ministry of Jobs, Tourism and Innovation)  
Steve Carr (DM-Ministry of Energy and Mines)

**Meeting Summary**

**Welcome**

David Pryce welcomed working group members to the meeting.

**Action Items and Timelines**

Tim Lesiuk reviewed the status of action items from previous meetings and pointed the group to the timeline for deliverables.

**Investment Analysis and Economic Modeling**

Jessica Verhagen outlined the following revisions to the GEEM model based on industry feedback:

1) reducing the forecasted natural gas price to match EIA estimates; 2) changing the electricity price based on BC Hydro input; 3) removing international aviation from the model; 4) disaggregating transportation; 5) including an LNG module, which will be incorporated into the next modeling run; and, 6) modelling that capital not invested within BC natural gas remains within the sector rather than within the province.



Jessica Verhagen clarified that the rate of growth in the renewable energy sector within the model is set based on existing policy under BC's Clean Energy Act for electricity self-sufficiency, and the initial small size of the renewable energy sector. David Pryce recommended modeling the impact of generating electricity through natural gas in GEEM. Tim Lesiuk stated that this falls outside of the scope of the current economic analysis of climate action project but the sector may wish to consider including their interest in natural gas-fired electricity generation within the sector profile.

Nadia Luciuk and Jon Remmer presented Encana's investment analysis,

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#### Sector Profile and Strategic Issues

Steve Dunk stated that the sector has put a great deal of work into the sector profile and would provide CAS with a copy shortly after the meeting. The sector noted that the profile did not have the format that they would use to describe their industry. The sector has drafted key findings, but will do further work on them to specifically incorporate the investment analysis work.

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s.13 , Graeme McLaren will represent the findings of the working group at the ADM steering committee.

#### Action Items

| Item | Details                                                                                                                       | Who                             | Timeline                  |
|------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------|
| 1.   | The investment analysis will be updated to use common metrics with the GEEM model (production, jobs, GDP, government revenue) | Jon Remmer and Nadia Luciuk     | December 12 <sup>th</sup> |
| 2.   | Sector and CAS will edit the sector profile and the key findings for joint review on Monday, December 12 <sup>th</sup>        | Jenna Dunlop and Hurrian Peyman | December 12 <sup>th</sup> |
| 3.   | Natural Gas Working Group meeting                                                                                             | Hoda Rahbar                     | January 20 <sup>th</sup>  |

**From:** Dunlop, Jenna  
**To:** Peyman, Hurrian ENV:EX; Verhagen, Jessica ENV:EX; Lesiuk, Tim ENV:EX;  
Lapp, Laura; Symington, Neil; Christa.Seaman@Shell.Com; glynis.a.  
carling@esso.ca; Monaghan, Nadia; Remmer, Jon; Dunk, Steve;  
**Subject:** revised compiled sector profile  
**Date:** Monday, December 12, 2011 3:55:19 PM  
**Attachments:** Natural Gas and Oil Sector Profile Dec 2011\_compiled for final review.docx

---

For tomorrow.

And I was unable to gracefully append the ppt from Jon onto the back of this. We can manage that later...

Cheers, J

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**From:** Dunlop, Jenna  
**To:** Peyman, Hurrian ENV:EX;  
**Subject:** FW: Industry Model ppt - Dec 12th  
**Date:** Tuesday, December 13, 2011 2:54:54 PM  
**Attachments:** Model Results-Dec12.pdf

---

**From:** Remmer, Jon [mailto:Jon.Remmer@encana.com]  
**Sent:** December 12, 2011 9:16 AM  
**To:** Hoda.Rahbar@gov.bc.ca; Monaghan, Nadia; Ross, Brian; Seaman, Christa; Tubbs, Bill; Symington, Neil; Carling, Glynis A; Christa.Seaman@Shell.Com; Dunlop, Jenna; Monaghan, Nadia; Jessica. Verhagen@gov.bc.ca; Dunlop, Jenna; Dunk, Steve; Dunn, Richard  
**Subject:** Industry Model ppt - Dec 12th

Hello All,

Attached is the final version of the Industry model results. We are currently developing a document outlining the inputs and methodology of the model, as well a summary of results and high level differences between the GEEM and industry model. This should be out later today.

As mentioned in the meeting last week, we can attach this slide deck to the end of the sector profile to give justification to our key points and strategic considerations.

Hoda or Jessica, can you please distribute this to the greater group?

Thanks, Jon

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Pages 104 through 197 redacted for the following reasons:

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## **Summary of Alberta's Specified Gas Emitters Regulation (SGER)**

**Requirements:** All existing large facilities have a target to reduce their GHG intensity by 12% relative to baseline levels

**Threshold:** All large facilities emitting 100kt CO<sub>2</sub>e or greater (facilities emitting 50kt or greater must submit a report, as is also required by Environment Canada).

**Baseline for each facility** set at their average intensity of years 2003 – 2005, in tonnes CO<sub>2</sub>e per unit of production; it is meant to be representative of steady state, or normal, operating conditions. Producers are expected to improve upon that steady state baseline. All reports, including the 3 years for baseline determination, must be verified by an external auditor.

**New facilities** receive a grace period ("new" applies to a facility with startup post 2000): targets applied in 4th yr of operation, requiring a 2% reduction from intensity in 3rd year of operation, to a max of 12% over subsequent 5 yrs

**Compliance** is measured against the 12% reduction in emission intensity from the Verified Baseline; the gap in intensity between the actual and the target is multiplied by the production to come up with the number of tonnes that a facility is out of compliance (or better than their target, if that is the case).

**Emission Performance Credits (EPC's):** these are credits that are earned by a facility that improves their carbon intensity by more than the mandated 12%. These EPCs can be banked for use in future years, traded internally to another facility that the company operates, or sold to a company that did not make their target, or to a broker for re sale.

**Compliance Options:** the tonnes that a facility needs to 'true up' to achieve their 12% target can be achieved by any combination of the four available options:

1. Achieving internal reductions through implementation of emission reduction initiatives.
2. Purchase of EPC's from a broker, another company, or internally from another facility that exceeded their target.
3. Purchase of offset credits: the offsets market in Alberta currently recognizes 31 approved protocols. These projects all demonstrate real GHG reductions. Offset credits are a means of expanding the reach of the regulatory framework by incenting emission reductions outside of regulated facilities.
4. Payment into the Climate Change and Emissions Management Fund (the Tech Fund, or CCEMC at <http://ccemc.ca>): companies can pay on a per tonne basis for the number of tonnes they are over their target, at a current rate of \$15/ tonne.

Pages 199 through 233 redacted for the following reasons:

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s.21



Pages 1 through 174 redacted for the following reasons:

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