From: Huma Abedin [Huma@clintonemail.com]
Sent: Wednesday, October 14, 2009 12:18:30 AM
To: mmoore[redacted]
Subject: RE: Hey Huma

RELEASE IN PART
B6

strange i just did a search and found nothing but will get right on it

---

From: Minyon Moore[redacted]
Sent: Wednesday, October 14, 2009 12:09 AM
To: Huma Abedin; Minyon Moore; Huma Abedin
Subject: Re: Hey Huma

Sorry I cc'd you on email where Madam secretary indicated she wanted to send a letter.

From: "Abedin, Huma" <AbedinH@state.gov>
Date: Tue, 13 Oct 2009 23:26:01 -0400
To: Minyon Moore<[redacted]; Huma Abedin<Huma@clintonemail.com>
Subject: RE: Hey Huma

What are you talking about

Bakewell?

I don't know anything about a letter

From: Minyon Moore [mailto:[redacted] B6
Sent: Wednesday, October 14, 2009 2:31 AM
To: Huma Abedin
Cc: Abedin, Huma
Subject: Hey Huma
Importance: High

Hope you are well.... Do you know if the letter HRC will be sending Danny will be ready in time to be read at the Funeral on Friday. Will be lots of whose who attending.

From: Jiloty, Lauren C [JilotyLC@state.gov]
Sent: Wednesday, October 14, 2009 2:41:08 PM
To: Iris_Anaya[redacted] habedin[redacted].com
CC: Valmoro, Lona J
Subject: Re: Pls acknowledge receipt of my e-mail from yesterday re setting up a meeting between Secretary Clinton and Alfonso Fanjul. Thank you.

RELEASE IN PART
B6

B6

We have been overseas and out of email range. Please talk to lona valmoro copied on this email about setting up a meeting

---

From: Iris Anaya [redacted]
To: Huma Abedin [redacted] Jiloty, Lauren C
Sent: Wed Oct 14 13:34:12 2009
Subject: Pls acknowledge receipt of my e-mail from yesterday re setting up a meeting between Secretary Clinton and Alfonso Fanjul. Thank you..

Iris Anaya

Personal Assistant

to Alfonso Fanjul

Chairman and CEO

Fanjul Corp.

[redacted] Direct

(561) 655-6303, Main

(561) 835-4795, Fax

[redacted]

From: Valmoro, Lona J [ValmoroLJ@state.gov]
Sent: Wednesday, October 14, 2009 3:26:21 PM
To: Iris_Anaya
CC: Jiloty, Lauren C; habedin
Subject: Re: Setting up a meeting between Secretary Clinton and Alfonso Fanjul

RELEASE IN PART
B6

B6

Thanks Iris, I will be back in touch.

From: Iris Anaya
To: Valmoro, Lona J
Cc: Jiloty, Lauren C; Huma Abedin
Sent: Wed Oct 14 15:02:14 2009
Subject: Setting up a meeting between Secretary Clinton and Alfonso Fanjul

Hello Lona:

At Lauren Jiloty's suggestion, I am contacting you to set up a meeting between Secretary Clinton and Alfonso Fanjul--

Mr. Alfonso Fanjul plans to be in DC on **Tuesday, October 20**, and would be able to meet at a time convenient to the Secretary if she were available. If it cannot happen on the mentioned date, please suggest a couple of dates that might be convenient for Secretary Clinton to meet with Mr. Fanjul, and he would try to arrange his schedule accordingly.

Thank you for your kind assistance with this matter and we look forward to hearing from you.

Sincerely,

Iris

Iris Anaya

Personal Assistant

to Alfonso Fanjul

Direct

HA 09/01/2015

(561) 655-6303, Main

(561) 835-4795, Fax

[redacted] B6

From: Jiloty, Lauren C [mailto:JilotyLC@state.gov]
Sent: Wednesday, October 14, 2009 2:41 PM
To: Iris Anaya; habedin [redacted]
Cc: Valmoro, Lona J
Subject: Re: Pls acknowledge receipt of my e-mail from yesterday re setting up a meeting between Secretary Clinton and Alfonso Fanjul. Thank you.

We have been overseas and out of email range. Please talk to lona valmoro copied on this email about setting up a meeting

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From: Iris Anaya <[redacted]
To: Huma Abedin <[redacted] Jiloty, Lauren C
Sent: Wed Oct 14 13:34:12 2009
Subject: Pls acknowledge receipt of my e-mail from yesterday re setting up a meeting between Secretary Clinton and Alfonso Fanjul. Thank you.

Iris Anaya

Personal Assistant

to Alfonso Fanjul

Chairman and CEO

Fanjul Corp.

[redacted] Direct

HA 09/01/2015

(561) 655-6303, Main

(561) 835-4795, Fax

[redacted]

B6

From: Abedin, Huma <AbedinH@state.gov>
Sent: Thursday, October 15, 2009 5:56 PM
To: humamabedin
Subject: Fw: Final Schedule, Friday October 16th
Attach: October.16.09.final.doc

RELEASE IN PART
B5,B6

B6

From: Valmoro, Lona J
To: Valmoro, Lona J; S_S-FinalSchedule
Cc: 'tkrinvic <tkrinvic ; 'justin <justin ; 'Jon <Jon ; 'doug <doug ; 'laura <laura 'hannah <hannah ' 'jschlichter ' <jschlichter 'bhall <bhall ; 'msteenburg <msteenburg ; 'jzimmerebner <jzimmerebner Balderston, Kris M; Adler, Caroline E; Kanick, Elizabeth L; Schwerin, Dan B (PACE); Crowley, Philip J; Stern, Todd D (S/SECC); 'oscar <oscar ; ; Rooney, Megan; Rubin, Ali M; Marshall, Capricia P; Klevorick, Caitlin B; Otero, Mildred (LAC/AA); Barnard, Thomas A; Colon, Ricardo; Cheng, Dennis W; Jeffress, Michael B; Tillemann, Tomicah S; Peña, Laura; Verveer, Melanne S; Merrill, Nicholas S (PACE); Merrill, Nicholas S; Schwerin, Daniel B
Sent: Thu Oct 15 17:41:59 2009
Subject: Final Schedule, Friday October 16th

PREV RON Washington, DC

8:15 am **DEPART** Private Residence
En route State Department
[drive time: 10 minutes]

8:25 am **ARRIVE** State Department

8:25 am **PRESIDENTIAL DAILY BRIEFING**
8:30 am Secretary's Office

8:30 am **DAILY SMALL STAFF MEETING**
8:45 am Secretary's Office
Participants: Cheryl, Huma, Jake, Joe and Lona

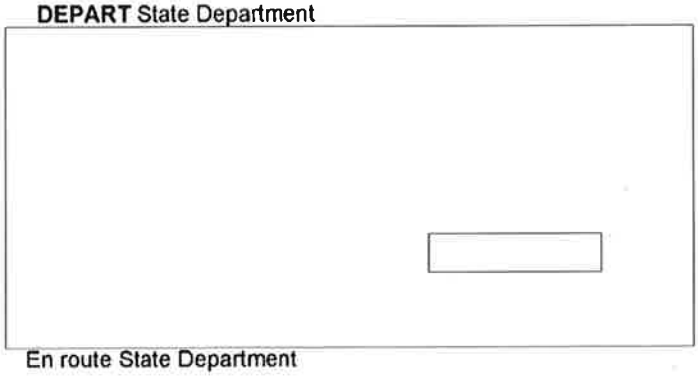
8:45 am **DAILY MEETING w/SENIOR STAFF**
9:15 am Secretary's Conference Room
Participants: Jim Steinberg, Jack Lew, P.J. Crowley, Dan Smith, Cheryl Mills, Harold Koh, Anne-Marie Slaughter, Ian Kelly, Rich Verma, and Joe Macmanus

9:30 am **VIDEO TAPINGS**
9:45 am Studio Room 2404
Staff/Contact: Dan Schwerin

- Alliance for Youth
- UNESCO Video
- US/China Clean Energy Partnership
- Italian Earthquake Relief

9:50 am **TAPED TELEVISION INTERVIEW w/JILL DOUGHERTY, CNN**
10:00 am Studio Room 2404
Staff/Contact: Philippe

10:10 am **DEPART** State Department



B5

10:15 am

10:15 am
11:15 am

B6

11:20 am

En route State Department
[drive time: 5 minutes]

11:25 am **ARRIVE** State Department

11:45 am **VIP RECEPTION FOR MARSHALL LUNCHEON**
12:00 pm James Monroe Room, 8th Floor
Staff: Lauren

Note: 20 people attending, mix and mingle.

12:00 pm **LUNCHEON HOSTED BY U/S PATRICK KENNEDY FOR 50TH**
12:40 pm **ANNIVERSARY OF THE DEATH OF GEORGE C. MARSHALL, FORMER SECRETARY OF STATE**
Benjamin Franklin Room, 8th Floor
Contact: M Kathleen Helton-Floyd x71500
Staff: Lauren
OPEN PRESS

Note: Approximately 220 guests attending.

- HRC escorted to 8th floor to join Defense Secretary Gates and Lt. General Brent Scowcroft in James Monroe Room.
- HRC escorted into Benjamin Franklin Room and seated at table.
- Welcome remarks by Brian Shaw, President of George C. Marshall Foundation.
- U/S Patrick Kennedy gives remarks and introduces HRC.
- HRC gives remarks (6 minutes) and introduces Lt. General Brent Scowcroft.
- Lt. General Brent Scowcroft gives remarks including a tribute to Defense Secretary Gates.
- Lt. General Scowcroft and John Adams present Marshall Medal to Secretary Gates followed by a photo with previous award recipients.
- Secretary Gates gives remarks.
- Brian Shaw invites guests to enjoy lunch, HRC and Gates depart.

12:45 pm **OFFICE TIME**
2:30 pm Secretary's Office

2:30 pm **CONFERENCE CALL w/AGRICULTURE SECRETARY**
2:50 pm **TOM VILSACK AND MEDIA TBD**
Secretary's Office
Call in Number: 888-673-9789
Passcode: Foodsecurity
Contact: Cheryl Benton, PA

3:00 pm **REMARKS TO THE GLOBAL PUBLIC AFFAIRS OFFICERS**
3:30 pm **(PAO) CONFERENCE**
Location: George C. Marshall Center
Contact: R Joseph Witters x79160, Cell [redacted] B6
Staff: Lauren
CLOSED PRESS

Note: Approximately 250 people attending.

- U/S Judith McHale meets HRC in her office and escorts down to the Marshall Center Auditroium.
- U/S gives brief remarks and introduces HRC.
- HRC gives brief remarks (3-5 minutes) and takes questions, moderated by U/S McHale.

3:30 pm **BRIEFING ON SUDAN ROLL-OUT OVERVIEW**
4:30 pm Secretary's Office

4:30 pm (t) **MEETING w/JIM STEINBERG**
5:00 pm (t) Secretary's Office

5:00 pm **OFFICE TIME**
6:15 pm Secretary's Office

6:20 pm **DEPART** State Department
En route Washington Reagan National Airport
[drive time: 20 minutes]

6:40 pm **ARRIVE** Washington National Airport

7:00 pm **DEPART** Washington National Airport via US Airways Shuttle #2184
En route New York, NY
[flight time: 1 hour, 20 minutes]

8:20 pm **ARRIVE** LaGuardia Airport

8:30 pm **DEPART** LaGuardia Airport
En route Private Residence
[drive time: 50 minutes]

9:20 pm **ARRIVE** Private Residence

HRC RON Chappaqua, NY
WJC RON Little Rock, Arkansas

Weather:
Washington, DC: Rain, 48/42.
Chappaqua, NY: Rain, 48/37.

HA 09/01/2015

RELEASE IN PART
B5,B6

SCHEDULE FOR SECRETARY HILLARY RODHAM CLINTON
FRIDAY, OCTOBER 16, 2009/WORLD FOOD DAY

FINAL

WASHINGTON, DC/CHAPPAQUA, NY

SPECIAL ASSISTANT: **LONA VALMORO**
OFFICE **(202) 647-9071**
CELL [redacted] B6

STAFF ASSISTANT: **LINDA DEWAN**
OFFICE **(202) 647-5733**
CELL [redacted]

PREV RON Washington, DC

8:15 am **DEPART** Private Residence
En route State Department
[drive time: 10 minutes]

8:25 am **ARRIVE** State Department

8:25 am **PRESIDENTIAL DAILY BRIEFING**
8:30 am Secretary's Office

8:30 am **DAILY SMALL STAFF MEETING**
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9:30 am **VIDEO TAPINGS**
9:45 am Studio Room 2404
Staff/Contact: Dan Schwerin

- Alliance for Youth
- UNESCO Video
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FRIDAY, OCTOBER 16, 2009/WORLD FOOD DAY

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10:00 am Studio Room 2404
Staff/Contact: Philippe

10:10 am **DEPART** State Department

B5

10:15 am

10:15 am
11:15 am

B6

11:20 am

En route State Department
[drive time: 5 minutes]

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OPEN PRESS

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- HRC escorted into Benjamin Franklin Room and seated at table.
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SCHEDULE FOR SECRETARY HILLARY RODHAM CLINTON
FRIDAY, OCTOBER 16, 2009/WORLD FOOD DAY

- U/S Patrick Kennedy gives remarks and introduces HRC.
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3:30 pm **(PAO) CONFERENCE**
Location: George C. Marshall Center
Contact. R Joseph Witters x79160, Cell [redacted] B6
Staff: Lauren
CLOSED PRESS

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- U/S Judith McHale meets HRC in her office and escorts down to the Marshall Center Auditroium.
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4:30 pm Secretary's Office

SCHEDULE FOR SECRETARY HILLARY RODHAM CLINTON
FRIDAY, OCTOBER 16, 2009/WORLD FOOD DAY

4:30 pm (t)	**MEETING w/JIM STEINBERG**
5:00 pm (t)	Secretary's Office
5:00 pm	**OFFICE TIME**
6:15 pm	Secretary's Office
6:20 pm	**DEPART** State Department En route Washington Reagan National Airport [drive time: 20 minutes]
6:40 pm	**ARRIVE** Washington National Airport
7:00 pm	**DEPART** Washington National Airport via US Airways Shuttle #2184 En route New York, NY [flight time: 1 hour, 20 minutes]
8:20 pm	**ARRIVE** LaGuardia Airport
8:30 pm	**DEPART** LaGuardia Airport En route Private Residence [drive time: 50 minutes]
9:20 pm	**ARRIVE** Private Residence
HRC RON	Chappaqua, NY
WJC RON	Little Rock, Arkansas

Weather:
Washington, DC: Rain, 48/42
Chappaqua, NY: Rain, 48/37.

From: Huma Abedin [Huma@clintonemail.com]
Sent: Thursday, October 15, 2009 6:52:43 PM
To: 'reinesp@state.gov'
Subject: Re: HRC re Lili Smith

RELEASE IN PART
B6

I have to find it from her email

----- Original Message -----
From: Reines, Philippe I <reinesp@state.gov>
To: Huma Abedin
Sent: Thu Oct 15 15:52:53 2009
Subject: RE: HRC re Lili Smith

Can you send me the note she sent Ace

From: Huma Abedin [mailto:Huma@clintonemail.com]
Sent: Tuesday, October 13, 2009 2:20 PM
To: Reines, Philippe I
Subject: FW: HRC re Lili Smith

can we discuss? what do you think?

From: Dan Newman [redacted] B6
Sent: Monday, October 12, 2009 9:29 PM
To: HAbedin@hillaryclinton.com
Subject: HRC re Lili Smith

Hi Huma,

This is Dan Newman – Ace Smith's partner. [redacted]

Carla Marinucci, the SF Chronicle political reporter is writing a news obit about Lili. Do you think HRC would be willing to contribute a comment or talk to Carla for her piece? Can send via me or directly to Carla - cmarinucci@sfchronicle.com, (415) 777-6064.

Thank you so much.

Best,

Dan

From: Huma Abedin [Huma@clintonemail.com]
Sent: Thursday, October 15, 2009 7:27:49 PM
To: H
Subject: Re: Troops

RELEASE IN PART
B6

Ok

----- Original Message -----
From: H
To: Huma Abedin
Sent: Thu Oct 15 19:26:43 2009
Subject: Fw: Troops

Pls print for me.

----- Original Message -----
From: Mark J. Penn [redacted] B6
To: H
Sent: Thu Oct 08 03:26:41 2009
Subject: Troops

I have to say that this argument that the Taliban are ok to ignore is dangerous morally and politically.

The argument at the time was that harboring terrorism was the same as launching terrorism and that those who harbored would be held responsible. This also had long term deterrence value against regimes that would outsource the dirty work.

To now even consider giving the Taliban a pass after harboring terrorists who committed direct attacks on new York and Washington defies the imagination. This wasn't some embassy bombing but a strike right at our country. The white house or congress barely escaped destruction. Saddam Hussein wasn't connected to al Qaeda but the Taliban surely were without question.

And Teheran and north Korea are watching carefully, gauging how much resolve the us has in stopping their plans. If the us lets the Taliban off the hook then they certainly can conclude it will do nothing beyond sanctions with them. And essentially letting karzai twist in the wind also suggests the us does not live up to it's commitments, giving pause to those who would help the us.

Politically, this is also quite dangerous. Obama maintained througout the campaign and the start of his presidency that this is the one to fight and backing down here makes him and the administration vulnerable to losing moderate support and seeming weak and indecisive. A single terrorist incident would be blamed on the admin. failing to do the job right.

I could go on and on with other negative ramifications but of all the options it appears to me any strategy that says fighting the taliban are not in the strategic interests of the us should be doa.

From: Huma Abedin [Huma@clintonemail.com]
Sent: Thursday, October 15, 2009 7:27:55 PM
To: 'humamabedin [redacted]
Subject: Fw: Troops

RELEASE IN PART
B6

B6

----- Original Message -----
From: H
To: Huma Abedin
Sent: Thu Oct 15 19:26:43 2009
Subject: Fw: Troops

Pls print for me.

----- Original Message -----
From: Mark J. Penn [redacted]
To: H
Sent: Thu Oct 08 03:26:41 2009
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I could go on and on with other negative ramifications but of all the options it appears to me any strategy that says fighting the taliban are not in the strategic interests of the us should be doa.

RELEASE IN PART
B6

From:	Abedin, Huma <AbedinH@state.gov>
Sent:	Friday, October 16, 2009 7:59 PM
To:	humamabedin[redacted]
Subject:	Fw: draft pak schedule
Attach:	S TRIP PAK.docx

B6

From: Bommer, Ashley F
To: Abedin, Huma; Sullivan, John L; Reines, Philippe I; Mills, Cheryl D
Cc: Wohlers, Paul; Lukens, Lewis A; Chollet, Derek H; Goodman, Mary Beth; Pauli, Rosemarie; Nasr, S Vali R; Gandhi, Sajit J
Sent: Fri Oct 16 18:58:16 2009
Subject: draft pak schedule

Draft Schedule per meeting. This is just the shell. Will continue to add once we get concept approved/times worked out. Please email any comments back, and will revise and send again. Thanks, Ashley

HA 09/01/2015

SCHEDULE FOR SECRETARY HILLARY RODHAM CLINTON
SUNDAY, OCTOBER 18, 2009

RELEASE IN PART
B6

FINAL

CHAPPAQUA, NY/WASHINGTON, DC

SPECIAL ASSISTANT: **LONA VALMORO**
OFFICE **(202) 647-9071**
CELL [redacted]

STAFF ASSISTANT: **LINDA DEWAN**
OFFICE **(202) 647-5733**
CELL [redacted]

B6

PREV RON Chappaqua, New York

NO PUBLIC SCHEDULE

7:55 pm (t) **DEPART** Private Residence
En route LaGuardia Airport
[drive time: 45 minutes]

8:40 pm (t) **ARRIVE** LaGuardia Airport (LGA)

9:00 pm (t) **DEPART** LaGuardia Airport (LGA) via US Airways Shuttle #2191
En route Reagan National Airport (DCA)
[flight time: 1 hour, 20 minutes]

10:20 pm (t) **ARRIVE** Reagan National Airport

10:25 pm (t) **DEPART** Reagan National Airport
En route Private Residence
[drive time: 15 minutes]

10:40 pm (t) **ARRIVE** Private Residence

HRC RON Washington, DC (T)
[redacted]

Weather:
Chappaqua, NY: Mostly cloudy, 46/38.
Washington, DC: Mostly cloudy, 49/40.

FYI:
6:30pm [redacted]'s 50th Birthday Party
Location: Wallace Hall, Church of St. Ignatius of Loyola
980 Park Avenue at 84th Street, NYC

From: Huma Abedin [Huma@clintonemail.com]
Sent: Saturday, October 17, 2009 6:23:44 PM
To: Doug Band
Subject: Re: Final Schedule, Sunday October 18th

RELEASE IN PART
B6

She's gone back and forth.

----- Original Message -----
From: Doug Band
To: Huma Abedin
Sent: Sat Oct 17 17:51:49 2009
Subject: Fw: Final Schedule, Sunday October 18th

She going to paul farmer

----- Original Message -----
From: Valmoro, Lona J <ValmoroLJ@state.gov>
To: Valmoro, Lona J <ValmoroLJ@state.gov>; S_S-FinalSchedule <S_S-FinalSchedule@state.gov>
Cc: tkrinvic <tkrinvic; Justin Cooper; Jon Davidson; Doug Band; Laura Graham; Hannah Richert; ; jschlichter <jschlichter; bhal <bhall(msteenburg <msteenburg(>; jzimmerebner <jzimmerebner(Balderston, Kris M <BalderstonKM@state.gov>; Adler, Caroline E <AdlerCE@state.gov>; Kanick, Elizabeth L <KanickEL@state.gov>; Crowley, Philip J <CrowleyPJ@state.gov>; Stern, Todd D (S/SECC) <SternTD@state.gov>; Oscar Flores; Rooney, Megan <RooneyM@state.gov>; Rubin, Ali M <RubinAM@state.gov>; Marshall, Capricia P <MarshallCP@state.gov>; Klevorick, Caitlin B <KlevorickCB@state.gov>; Otero, Mildred (LAC/AA) <motero@usaid.gov>; Barnard, Thomas A <BarnardTA@state.gov>; Colon, Ricardo <colonr@state.gov>; Cheng, Dennis W <ChengDW@state.gov>; Jeffress, Michael B <JeffressMB@state.gov>; Tillemann, Tomicah S <TillemannTS@state.gov>; Peña, Laura <PenaL@state.gov>; Verveer, Melanne S <VerveerMS@state.gov>; Merrill, Nicholas S (PACE) <MerrillNS@state.gov>; Merrill, Nicholas S <MerrillNS2@state.gov>; Schwerin, Daniel B <SchwerinDB@state.gov>
Sent: Sat Oct 17 15:28:36 2009
Subject: Final Schedule, Sunday October 18th

B6

PREV RON Chappaqua, New York

NO PUBLIC SCHEDULE

7:55 pm (t) DEPART Private Residence

En route LaGuardia Airport

[drive time: 45 minutes]

8:40 pm (t) ARRIVE LaGuardia Airport (LGA)

9:00 pm (t) DEPART LaGuardia Airport (LGA) via US Airways Shuttle #2191

En route Reagan National Airport (DCA)

[flight time: 1 hour, 20 minutes]

10:20 pm (t) ARRIVE Reagan National Airport

10:25 pm (t) DEPART Reagan National Airport

En route Private Residence

[drive time: 15 minutes]

10:40 pm (t) ARRIVE Private Residence

HRC RON Washington, DC (T)

[redacted] B6

Weather:

Chappaqua, NY: Mostly cloudy, 46/38.

Washington, DC: Mostly cloudy, 49/40..

From: H [HDR22@clintonemail.com]
Sent: Saturday, October 17, 2009 11:58:38 PM
To: 'ValmoroLJ@state.gov'; Huma Abedin
Subject: Schedule

RELEASE IN FULL

I need copies of schedules for 6/1 thru 6/4, 7/16-7/20

Pls schedule call for me w South African FM this week

From: Valmoro, Lona J [ValmoroLJ@state.gov]
Sent: Sunday, October 18, 2009 6:39:42 AM
To: H; Huma Abedin
Subject: Re: Schedule

RELEASE IN FULL

Sounds good – will have copies for you tomorrow morning of those schedules.

----- Original Message -----
From: H <HDR22@clintonemail.com>
To: Valmoro, Lona J; Huma Abedin <Huma@clintonemail.com>
Sent: Sat Oct 17 23:58:38 2009
Subject: Schedule

I need copies of schedules for 6/1 thru 6/4, 7/16-7/20

Pls schedule call for me w South African FM this week

From: Huma Abedin [Huma@clintonemail.com]
Sent: Sunday, October 18, 2009 10:16:00 AM
To: H; 'ValmoroLJ@state.gov'
Subject: Re: Return to DC

RELEASE IN FULL

Left him a message
I don't think it will be a problem today but will doublecheck.

----- Original Message -----
From: H
To: 'ValmoroLJ@state.gov' <ValmoroLJ@state.gov>; Huma Abedin
Sent: Sun Oct 18 09:38:09 2009
Subject: Return to DC

I'm worried about the weather and taking the 9pm shuttle. Can we check w Mario and find out if I should leave earlier or take the train?

From: Huma Abedin [Huma@clintonemail.com]
Sent: Sunday, October 18, 2009 2:32:00 PM
To: 'ValmoroLJ@state.gov'
Subject: Re: seats 3A and 3C tonight on the 9pm

RELEASE IN FULL

Thx.

----- Original Message -----
From: Valmoro, Lona J <ValmoroLJ@state.gov>
To: Huma Abedin
Sent: Sun Oct 18 12:41:03 2009
Subject: seats 3A and 3C tonight on the 9pm

-----Original Message-----
From: Huma Abedin [mailto:Huma@clintonemail.com]
Sent: Sunday, October 18, 2009 11:55 AM
To: Valmoro, Lona J
Subject: Re: Return to DC

No wp

----- Original Message -----
From: Valmoro, Lona J <ValmoroLJ@state.gov>
To: Huma Abedin
Sent: Sun Oct 18 11:44:32 2009
Subject: Re: Return to DC

Should I tell folks we are definitely planning on the 9pm? Any chance of White Plains tomorrow?

----- Original Message -----
From: Huma Abedin <Huma@clintonemail.com>
To: H <HDR22@clintonemail.com>; Valmoro, Lona J
Sent: Sun Oct 18 11:38:48 2009
Subject: Re: Return to DC

Confirmed with mario. Weather supposed to improve throughout the day. In fact he said, the later the better so we are ok for the 9.

----- Original Message -----
From: H
To: 'ValmoroLJ@state.gov' <ValmoroLJ@state.gov>; Huma Abedin
Sent: Sun Oct 18 09:38:09 2009
Subject: Return to DC

I'm worried about the weather and taking the 9pm shuttle. Can we check w Mario and find out if I should leave earlier or take the train?

From: Abedin, Huma <AbedinH@state.gov>
Sent: Sunday, October 18, 2009 5:12 PM
To: humamabedin
Subject: Print Fw: Guest List, Seating and Menu for Women of the Senate Dinner
Attach: Guest List as of October 16.docx, Menu.docx; Seating .docx

RELEASE IN PART
B6

B6

From: Beale, Courtney A Kramer
To: Abedin, Huma
Sent: Sun Oct 18 16:32:59 2009
Subject: FW: Guest List, Seating and Menu for Women of the Senate Dinner

Hi Huma,

If you'd like for me to include this menu and seating information in the book for tomorrow, can you confirm that you approved the seating?

Thanks,

Courtney

From: Dewan, Linda L
Sent: Friday, October 16, 2009 2:24 PM
To: Valmoro, Lona J; S_SpecialAssistants
Cc: Dewan, Linda L
Subject: FW: Guest List, Seating and Menu for Women of the Senate Dinner

---

From: Guice, April J
Sent: Friday, October 16, 2009 2:08 PM
To: Abedin, Huma
Cc: Jones, Natalie R; Jiloty, Lauren C; Dewan, Linda L; Marshall, Capricia P
Subject: Guest List, Seating and Menu for Women of the Senate Dinner

Please let me know if you have any questions.

Thank you

April

<<Guest List as of October 16 docx>> <<Menu.docx>> <<Seating docx>>

(DATE \l)

Guest List for Dinner by Secretary of State
in honor of the
Women of the Senate
Monday, October 19, 2009
from 18:30 to 21:00 o'clock
James Monroe Room

RELEASE IN FULL

GUEST LIST

	HOSTESS
accept	The Honorable Hillary Rodham Clinton Secretary of State
	CONGRESS
accept	The Honorable Barbara Boxer Senator (D-CA)
accept	The Honorable Maria Cantwell Senator (D-WA)
accept	The Honorable Susan M. Collins Senator (R-ME)
accept	The Honorable Dianne Feinstein Senator (D-CA)
accept	The Honorable Kristen E. Gillibrand Senator (D-NY)
accept	The Honorable Kay Hagan Senator (D-NC)
accept	The Honorable Amy Klobuchar Senator (D-MN)
accept	The Honorable Blanche L. Lincoln Senator (D-AR)
accept	The Honorable Claire McCaskill Senator (D-MO)
accept	The Honorable Patty Murray Senator (D-WA)
accept	The Honorable Jeanne Shaheen Senator (D-NH)
accept	The Honorable Olympia J. Snowe Senator (R-ME)
accept	The Honorable Debbie Stabenow Senator (D-MI)

HA 09/01/2015

{ DATE \l }

DEPARTMENT OF STATE

accept	Dr. Anne-Marie Slaughter Director, Office of Policy Planning
accept	Ms. Cheryl D. Mills Chief of Staff to the Secretary of State
accept	The Honorable Richard Verma Assistant Secretary of State for Legislative Affairs
accept	Ms. Anita Botti Deputy Director, Global Women's Issues

{ DATE \l }

DECLINED INVITATIONS

CONGRESS

regret — The Honorable Kay Hutchison
Senator (R-TX)

regret — The Honorable Mary L. Landrieu
Senator (D-LA)

regret — The Honorable Barbara Mikulski
Senator (D-MD)

regret — The Honorable Lisa Murkowski
Senator (R-AK)

DEPARTMENT OF STATE

regret — The Honorable Melanne Verveer
Ambassador-at-Large for Global Women's Issues

HA 09/01/2015

MENU

Orange Carpaccio with Fennel
Red Cabbage Slaw, Hearts of Palm and Olives
Citrus Orange Vinaigrette

Filet of Rockfish
Tomatoes and Basil

Broccolini and Roasted Red Pepper Timbale

Grilled Asparagus

Cinnamon Poached Pear

Women of the Vine Cellars Sauvignon Blanc 2007
Women of the Vine Cellars Tempranillo 2004

HA 09/01/2015

From: H [HDR22@clintonemail.com]
Sent: Sunday, October 18, 2009 7:59:50 PM
To: 'ValmoroLJ@state.gov'; Huma Abedin
Subject: Meetings

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I need to start a weekly mtg w the Undersecretaries. Could we do it at 9 on Wednesdays?

HA 09/01/2015

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From: Verma, Richard R [VermaRR@state.gov]
Sent: Sunday, October 18, 2009 8:00:09 PM
To: H
CC: Huma Abedin
Subject: Re: Sudan calls

Susan called Payne today. We have also sent paper to Payne's africa subcommittee staff director.

----- Original Message -----
From: H <HDR22@clintonemail.com>
To: Verma, Richard R
Cc: Huma Abedin <Huma@clintonemail.com>
Sent: Sun Oct 18 19:58:12 2009
Subject: Sudan calls

I spoke w Berman who asked that someone call Payne. Do you know if that is happening?

From: Valmoro, Lona J [ValmoroLJ@state.gov]
Sent: Monday, October 19, 2009 6:44:31 AM
To: H; Huma Abedin
Subject: Re: Allida Black's Eleanor Roosevelt human rights event

RELEASE IN FULL

She actually moved the event to Geneva in December. Melanne feels we should just send a video, it is not worth factoring into our travel overseas. I will show you the invite today.

----- Original Message -----
From: H <HDR22@clintonemail.com>
To: Valmoro, Lona J; Huma Abedin <Huma@clintonemail.com>
Sent: Mon Oct 19 06:41:30 2009
Subject: Allida Black's Eleanor Roosevelt human rights event

I thought there was an event this Fall (maybe even honoring me?) But, did it not happen or did I not go? What happened?

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B6

From: Bird, Peter A [BirdPA@state.gov]
Sent: Monday, October 19, 2009 4:23:24 PM
To: habedin@hillaryclinton.com; Paul3A1 asutton alterology ntanden; Anders, Jaroslaw Z; kanders wantholis aberger aschers catk john.barker Diana.h.beinar peter.beinart Benjamin, Daniel S; sbiddle; Bisdee, Sharon C; kbledowski mbrzezinski
CC: Glantz, Mary E; Schamber, Maria D
Subject: Ambassador Lee Feinstein Swearing-In Ceremony

Attachments: Feinstein Swearing In.doc

Attached is an invitation to attend Ambassador Lee A. Feinstein's official Swearing-In Ceremony. The Ceremony will be held on Friday, October 30 in the Benjamin Franklin Room at the Department of State.

Please RSVP with your full name, date of birth, and either your Social Security Number or Drivers License Number.

Many thanks,

Pete Bird

Department of State

Office of Central European Affairs

RELEASE IN FULL

You are cordially invited to attend
the Swearing-in Ceremony of
Lee A. Feinstein
as Ambassador of the United States of America
to the Republic of Poland

Friday, October 30, 2009
At Four o'clock

Benjamin Franklin Room
Department of State
2201 C Street, NW
Washington, DC 20006

RSVP to Peter Bird
E-mail: BirdPA@state.gov
Tel: 202-647-0460
Please provide date of birth and identification number
(either social security number or driver's license number)

Please arrive by 3:30 p.m.
Photo identification is required for admittance

HA 09/01/2015

From: cheryl.mills
Sent: Monday, October 19, 2009 10:43:55 PM
To: Philippe Reines
CC: Maggie Williams; Evelyn Lieberman; Jake Sullivan; Nora Toiv; Huma Abedin; Cheryl Mills; Capricia Marshall
Subject: Fw: more...gatekeeper crap (ben smith)

RELEASE IN PART B5,B6

B6

B5
B6

Cdm

Sent via BlackBerry by AT&T

From: Nora Toiv <
Date: Mon, 19 Oct 2009 21:52:56 -0400
To: Cheryl Mills
Subject: more...gatekeeper crap (ben smith)

B6

Clinton's gatekeeper

Al Kamen channels some Foggy Bottom grumbling blaming Cheryl Mills, Hillary Clinton's chief of staff for making Clinton inaccessible to career diplomats.

(Laura has the counter-argument.)

Across town, Mills has also gotten some backs up in the White House during her tenure, as I

mentioned in passing a while ago. A top lawyer in the Clinton White House, Mills was been a hard-liner during the Clinton campaign, pushing for sharper-edged attacks on Obama. She brought some of that stance to State, where she fought tooth and nail in the early days of the administration to control mid-level staff jobs, like the agency's White House liaison, and to ensure that those jobs went to "Hillary people" rather than "Obama people," people on both sides has told me.

Mills has shaped a State-Department-as-Hillaryland, where political staffers are loyal to the Secretary, and where I can't think of a single appointee who supported Obama during the campaign. But the power remains in the White House, and the result has been, some Clinton backers worry, a certain marginalization.

Posted by Ben Smith 12:22 PM

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B6

B6

From: Huma Abedin [Huma@clintonemail.com]
Sent: Monday, October 19, 2009 11:13:21 PM
To: 'Iris_Anaya
Subject: Re: Please reply

Did u get me email about 1pm mtg?

----- Original Message -----
From: Iris Anaya <
To: Jiloty, Lauren C <JilotyLC@state.gov>
Cc: Huma Abedin <habedin
Sent: Mon Oct 19 16:44:23 2009
Subject: FW: Please reply

Have tried to contact Huma but she has not replied. Please help.

Also, Huma had asked the reason why Mr. Fanjul wanted to meet with Hillary. I sent her an e-mail telling her to call Mr. Fanjul that he would explain the reason to her by phone

Mr. Fanjul is here in the office now if you or Huma want to call—

Thank you and please reply.

Warm regards,

Iris

From: Iris Anaya
Sent: Monday, October 19, 2009 3:05 PM
To: 'Huma Abedin'
Subject: Please reply

Need to know if Secretary Clinton will have the time tomorrow to meet with Mr. Alfonso (Alfy) Fanjul. Please advise.

Iris Anaya

Personal Assistant

to Alfonso Fanjul

Chairman and CEO

Fanjul Corp.

Direct

(561) 655-6303, Main

(561) 835-4795, Fax

B6

From: Abedin, Huma <AbedinH@state.gov>
Sent: Tuesday, October 20, 2009 12:14 AM
To: humamabedin[redacted]
Subject: Print Fw: Fwd: Asia Society-CAP _4-China Collboration on CCS report draft
Attach: Asia Society DRAFT CCS report 10-9-09.pdf; ATT473625.htm

RELEASE IN PART
B6

B6

From: Muscatine Lissa <[redacted]
To: Abedin, Huma; Jiloty, Lauren C
Sent: Mon Oct 12 20:03:55 2009
Subject: Fwd: Asia Society-CAP _4-China Collboration on CCS report draft

Huma and Lauren:

This is for HRC from Orville Schell. Obviously she won't be ale to look at it on the trip, but can we make sure she gets it once she is back in the office?

Thanks.

Lissa

Begin forwarded message:

> **From:** "Orville Schell" <oschell@asiasociety.org>
> **Date:** October 10, 2009 12:01:52 AM EDT
> **To:** <lmuscatine[redacted]>, <MuscatineL@state.gov>, "Orville Schell" <oschell@asiasociety.org>
> **Subject: Fw: Asia Society-CAP _4-China Collboration on CCS report draft**
>
> Lissa:
> Don't know what the best way is to get this to Sec Clinton. But, at last, here is the Asia Society/CAP's "road-map" for Sino-US cooperation on carbon capture and sequestration.
> When I saw her after the S@ED, she said they needed some "concrete" plans for cooperation, especially as the summit in Beijing looms and she wanted to see this as soon as it was ready. So, here it is.
>
> I am in Copenhagen at a big climate summit for global editors. Do hope the world will rise to this occasion!
>
> Will keep trying on a joint coffee. In fact, I'll probably be in DC on the 26th. If late afternoon can work, let me know
>
> All best, Orville
>
> ----- Original Message -----
> From: Laura Chang
> To: Orville Schell
> Sent: Fri Oct 09 23:01:41 2009
> Subject: Asia Society CCS report draft

HA 09/01/2015

A Roadmap for U.S.-China Collaboration on Carbon Capture and Sequestration

October 2009

A PARTNERSHIP BETWEEN:

Asia Society

Center for American Progress

MONITOR

A Roadmap for U.S.-China Collaboration on Carbon Capture and Sequestration

With Contributions By

Asia Society Center on U.S.-China Relations
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Fellow
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Lawrence Livermore National Laboratory
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Carbon Management Program Leader, Energy & Environmental Directorate

This is the second report in the Initiative for U.S.-China Cooperation on Energy and Climate
http://www.asiasociety.org/climate/

Asia Society

Vishakha N. Desai, President

Center for American Progress

John Podesta, President and CEO

HA 09/01/2015

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The views expressed in this report are those of the primary authors only and do not necessarily represent those of the above contributors and reviewers.

HA 09/01/2015

Contents

I. Executive Summary

Global greenhouse gas emissions are fast approaching unsustainable and alarming levels. There is broad consensus that these emissions, caused primarily from the burning of fossil fuels, have led to global warming. It is increasingly evident that maintaining the current trajectory of greenhouse gas emissions poses wide-ranging and potentially catastrophic risks to natural systems and human welfare. It is also clear that an unprecedented level of global cooperation will be necessary to successfully confront the immense challenge of reversing the effects of climate change.

The United States and China are the world's largest greenhouse gas emitters. Collaboration between the two nations, therefore, offers the greatest opportunity for achieving meaningful reductions in global greenhouse gas emissions. The time is ripe for such collaboration. The two countries have participated in various global commitments on technology cooperation, including the 2007 Bali Action Plan and the Major Economies Forum declarations on Energy and Climate after the G-8 summit in Italy this July. The United States and China also made joint commitments at the July 2009 U.S.-China Strategic and Economic Dialogue in the form of a "Memorandum of Understanding to Enhance Cooperation on Climate Change, Energy and the Environment," and during U.S. Energy Secretary Steven Chu's recent trip to China.

The United States can translate this political goodwill into concrete action, but it will need to begin laying out a roadmap for progress on areas of mutual concern. U.S. leadership in this critical area would strengthen bilateral relations between the United States and China, while building momentum towards a successful outcome at the United Nations multilateral climate change negotiations in Copenhagen this December.

One critical pathway for collaboration specifically identified in the United States and China's recent joint commitments is carbon capture and sequestration technology, or CCS, which has the potential to mitigate emissions from coal-fired power plants. The United States and China's continued reliance on coal-fired power to generate electricity is a reality that must be addressed in any comprehensive climate change policy.

CCS is a process that separates and captures carbon dioxide, or CO_2, from industrial and power plant flue streams, then compresses the gas and stores it underground, most likely in geological formations. The process essentially captures the greenhouse gas emissions before they enter the atmosphere and stores them underground. The technology has advanced significantly over the past decade and components of CCS have already proven successful in projects around the world.

While CCS still faces considerable technological, financial, and regulatory hurdles, it offers a potential pathway for helping achieve the scientifically-required reductions in global greenhouse gas emissions that energy efficiency, conservation and renewable energies are unlikely to meet on their own. Nothing in our report should be interpreted as suggesting that any one carbon abatement option is more important than any other. It

is clear, however, that neither country can achieve the emissions reductions it needs to make without addressing its heavy reliance on coal. CCS should therefore be included in a portfolio of climate change mitigation efforts, if it is demonstrated to offer effective and meaningful reductions in carbon emissions.

While the general purpose of this report is to help bring about a new partnership between the U.S. and China, the immediate aim is to help catalyze U.S. leadership to action by sketching out a concrete, collaborative new plan of action on carbon capture and sequestration that the United States government can adopt as it confronts the twin challenges of addressing climate change and strengthening Sino-U.S. relations.

A three-pronged approach to CCS collaboration

A successful partnership on CCS should advance long-term research, development, and deployment of commercial-scale CCS, while at the same time laying the foundation for potential emissions reductions. The three-pronged recommendation below identifies near term opportunities where collaboration can begin immediately and produce early milestones, while simultaneously advancing the longer-term goals of retrofitting existing plants and developing new financing architecture for wider CCS deployment.

1. Sequester the pure CO_2 streams on existing commercial plants

China has installed more than 100 coal gasifiers that produce as a byproduct pure streams of CO_2 that are currently vented directly into the atmosphere. Emissions from these gasifier plants are more straightforward and less costly to capture than emissions from combustion plants and should therefore be the immediate focus of collaboration. The United States and China should work together during the first phase of CCS collaboration on developing rapid, large-scale demonstrations of geological sequestration for these pure streams of CO_2 that exist today in China. These existing streams are relatively easier to capture and should provide an early successful collaboration between the United States and China.

The United States and China should identify a set of projects at multiple sites in China, and the United States should make substantial contributions to those projects in practice, equipment, and science. Such collaboration could test and compare various sequestration technologies while building the regulatory and financial infrastructure and protocols needed for widespread deployment.

Building up these technologies in China would allow the projects to be completed at less cost than would be possible independently, and such experience could be brought back to the United States to accelerate domestic implementation. Each project would cost $50-$100 million total, with a potential U.S. contribution of $20-$40 million. The timeframe would likely be two to five years from planning to implementation, upon agreement.

2. Invest in research and development on retrofitting older power plants

The second prong should focus on spearheading research, development, and demonstration for post-combustion CCS technologies that can be used to retrofit older coal-fired plants

HA 09/01/2015

over the medium and long term. While opportunities exist for collaboration on new coal-fired plants (and China has demonstrated interest in outfitting its new plants with pre-combustion capture capabilities, mostly through Integrated Gasification Combined Cycle technologies), collaborating on new plants alone will not be sufficient to meet global abatement targets because it does nothing to "clean" existing plants. Both countries must ultimately deal with their existing fleet of coal-fired conventional plants in order to meet global targets, either by shutting these down or retrofitting them for CCS.

This effort would identify plants in both countries for large-scale retrofit demonstrations that would help develop and test different new capture technologies to improve effectiveness and lower costs. It would also outline a long-term strategy for retrofitting coal-fired power plants in both the United States and China that respects the political, industrial, and financial dispositions of each.

The research and development center (which might be set up within existing U.S. Department of Energy calls for a collaborative research center) should begin operation immediately. Retrofit demonstration projects would take longer to begin—likely five years from inception to breaking ground (three years for identifying a project and two additional years of preparation).

3. Catalyze markets for CCS

In the absence of a market mechanism for carbon reduction in China, the United States and China will have to provide financial incentives for private capital to invest in carbon capture and sequestration projects. Motivating such private capital will require catalytic public funding as long as there is no private market for carbon abatement or an international structure that can be used to monetize such investments with sufficient offsets.

The United States should consider developing government-backed public finance structures, such as risk insurance or guarantees of CO_2 prices for a set amount of successfully abated carbon similar to those proposed by the American Clean Energy and Security Act of 2009, H.R. 2454. Such support could serve as an initial bridge to market mechanisms.

The United States can in parallel move for the inclusion of CCS-abated carbon in future regimes such as the Clean Development Mechanism (the Kyoto Protocol's carbon offset system that allows developed countries to offset their emissions by paying for clean-energy projects in developing countries.) This would help establish a medium-term path for private capital to seek returns on investments in first generation CCS projects. This can also help liquidate the initial U.S. government-backed public finance measures.

This initial groundwork can form the basis for a domestic or regional market for abated CO_2 to support longer-term capital investments and the commercialization of U.S. and developed world technologies. Nonetheless, one thing is self-evident: the United States and China will have to eventually build an international mechanism to reduce the costs of second and third generation technologies aimed at meeting global 2020 and 2050 CO_2 output targets.

HA 09/01/2015

The benefits of collaboration on CCS

This roadmap has been undertaken with the assumption that the United States and China both stand to gain more through collaboration than through independent pursuit of CCS. The practical benefits of a bilateral collaboration will include more rapid deployment, job creation, and lower costs.

1. Accelerate U.S. technology

American expertise in sequestration technology and research is well developed and ready to be immediately applied in China as part of a new program. Cooperation between the two countries would accelerate the market penetration of this technology. Conducting initial sequestration projects using the high-purity CO_2 streams more readily available in China will allow both sides to benefit from the faster execution and lower costs that China offers.

Proving technologies as quickly as possible is critical to accelerate development of cost assessments, technical findings, risk profiles, and regulatory frameworks. The working knowledge of CCS practices and protocols gained from initial demonstrations in China would also be available to the United States and would help to accelerate the deployment of CCS facilities in the United States by five to 10 years, with benefits to utility, energy, and technology companies.

2. Create U.S. jobs

By taking advantage of U.S. technology and heavy equipment purchases and testing, projects in both the United States and in China would help to improve the competitiveness of U.S. firms in a global market, while also supporting industry and creating jobs in the United States. Although China is developing much cutting-edge technology of its own in this field, a significant amount of the most advanced technology and research and development in the world would logically end up being exported to China to supply its new CCS market. Such collaborative projects would also spur U.S. domestic job growth again through acceleration of wide-scale deployment of CCS technology. Our estimates show that in a baseline scenario, the CCS sector would create 127,000 direct and indirect net-new jobs in the United States by 2022. A five-year acceleration increases that to 430,000 in 2022, and a 10-year acceleration gets us 943,000 in 2022.

3. Lower U.S. electricity prices

As CCS is increasingly viewed as a critical part of global carbon abatement efforts, the acceleration of the development of this technology could yield significant reductions in the ensuing electricity rates. Some of the costs of abatement will be borne by utility companies, and some of those costs could be passed on to ratepayers depending on the structure of the pricing mechanism on carbon. CCS collaboration would add value by reducing CCS costs and thus ensuring electricity rates remain lower than might otherwise be the case. McKinsey & Company estimates the global potential of scalable CCS by 2030 to be 3.65 gigatons per year of CO_2-equivalent abatement, which we estimate will cost $959 billion

globally to achieve over the 20 year period. If we are able to accelerate CCS initiatives by five years through cooperation with China, we estimate that the same abatement could be achieved at a cost of $934 billion, saving $25 billion. If the collaboration accelerated CCS deployment by 10 years, we estimate the same abatement could be achieved for $859 billion, saving $100 billion. The U.S. share of the cost savings is approximately $5 billion in the scenario with a five-year acceleration, and $18 billion with a 10-year acceleration.

4. Increase Chinese CCS expertise

U.S.-China cooperation will provide China with access to new advanced CCS technology, so it too stands to gain the requisite expertise to become even more competitive in a burgeoning future green tech market.

5. Facilitate additional collaboration in preferred Chinese areas

Collaborating with the United States on CCS will give China more political capital to press for collaborative efforts in other preferred areas, such as technology transfer and investment in the fields of renewable energy and energy efficiency.

6. Direct cost savings

Several key components of CCS are cheaper in China than in the United States. These include steel, cement, labor, and the savings from more rapid project completion. Focused joint effort could therefore reduce the cost of individual retrofit projects and construction time by as much as 50 percent.

7. Risk sharing

By combining resources, the United States and China share the risks of CCS failure instead of each country bearing such risks separately.

8. Financial sureness in the market

Creating standards for safe, effective projects will give the financial community the confidence and tools for investments in ongoing emissions reduction projects in both countries.

9. Rapid emissions reductions

If this roadmap is implemented, the first phase could result in the indefinite storage of nearly 10 million tons of CO_2 (which would otherwise enter the atmosphere) each year beginning two to five years after project initiation. This reduction in emissions would be the equivalent of taking 2.5 million cars off the road or shutting down three 500 megawatt coal-fired power plants every year.

The global climate crisis demands bold leadership, new partnerships, and the transition to a low-carbon economy. Whatever the outcome of Copenhagen, the solution to global climate change will most likely be borne as much from myriad national and bilateral efforts as from any grand, multinational agreement. It is in recognition of this likelihood that we offer this roadmap.

HA 09/01/2015

II. The case for U.S.-China collaboration on climate solutions

"If the two goliaths on the world stage can join hands and commit each other—at the highest levels—to a long-term, vigorous climate and energy partnership, it will truly change the world."

—Todd Stern, U.S. Envoy for Climate Change, in prepared remarks at the Center for American Progress on June 3, 2009

The dangers of global climate change

Global greenhouse gas emissions are fast approaching unsustainable and alarming levels. Unless we alter our current trajectory, we may soon cross a dangerous threshold leaving us with ever fewer options for remedy.

Scientific consensus leaves little doubt as to the causes of global climate change or the gravity of its consequences. Broad and overwhelming evidence demonstrates that the increased concentrations of heat-trapping greenhouse gas in the atmosphere since the industrial age are attributable to human activity—particularly the combustion of fossil fuels—and have led to an increasingly rapid rise in global temperatures.

Indeed, the most recent Assessment Report by the Intergovernmental Panel on Climate Change affirms this correlation with its highest level of certainty yet. It finds a 35 percent increase in atmospheric concentration of CO_2 from preindustrial levels to 2005, which, at 379 parts per million, "by far" exceed the natural range over the last 650,000 years.[1] Global temperatures rose an average of 0.8 degrees Celsius over the last century, with the past three decades alone accounting for a 0.6 degrees Celsius increase.[2] Mid-range estimates by the IPCC predict a temperature increase between 1.8 and 4.0 degrees Celsius by the end of the century.[3]

Abrupt and potentially catastrophic disruptions to human and natural systems loom. Researchers are documenting increased droughts and floods, ocean acidification, loss in snow cover and sea ice, rise in sea level, and loss of biodiversity.[4] Climate change is increasingly discussed in national security terms, as food and water scarcity trigger migration, conflict, and political instability.[5]

Researchers are forecasting costly setbacks for the U.S. economy and national security, including rising property damage from storm surges and wildfires, loss in agricultural output from heat waves and droughts, disruptions to U.S. and Arctic infrastructure and pipelines, threats to clean air and water, and new and destabilizing immigration flows from resource-scarce regions.[6] Moreover, climate-induced humanitarian crises around the world have the potential to strain U.S. resources even further.[7]

The problems for China are expected to be no less severe. China's spectacular economic growth over the past several decades has come with a price. According to the United Nations

Development Program, China is home to 16 of the world's 20 most polluted cities, with one-third of the urban population breathing heavily polluted air.[8] Conservative estimates show that environmental degradation costs China 8 percent of GDP per year.[9] Confronting climate change in China is increasingly understood to be critical not only for environmental protection, but also for the maintenance of China's economic, political, and social stability.

Worldwide CO_2 emissions are projected to increase by 39 percent from 2006 to 2030 without a major change in global energy policies and practices that directly address coal.[10] Given this scenario, scientists argue that the world could reach a dangerous "tipping point" in two to three decades, if not sooner, whereby a relatively slight temperature increase triggers disproportionate and irreversible damages.[11]

The need for U.S.-China cooperation

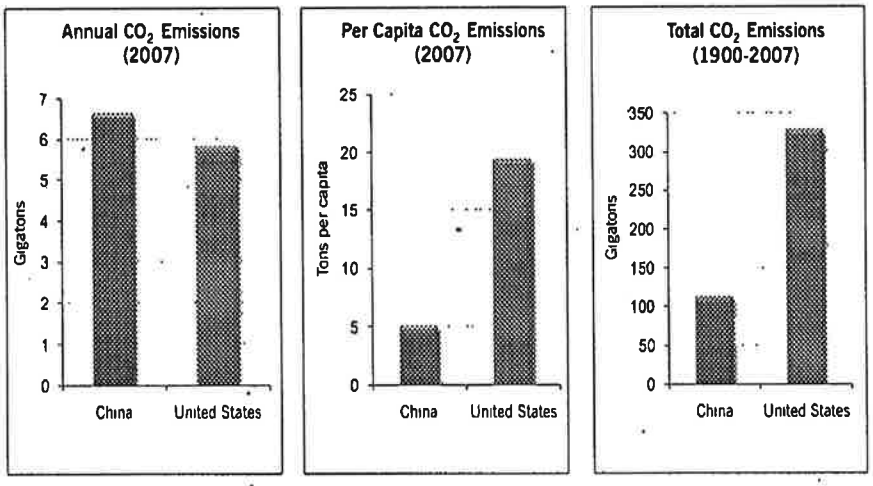
The world has long needed the United States to demonstrate bold leadership on anthropogenic climate change. This report seeks to illuminate one pathway to catalyze United States leadership through a bilateral framework. The simple reality is that for any remedy for global climate change to be meaningful, the United States and China—the world's two largest emitters of greenhouse gasses—must find a way to stand together, collaboratively, at the center of a global effort. As previous reports from both the Asia Society and Center for American Progress have articulated, elevating energy and climate in the U.S.-China agenda would not only demonstrate leadership in addressing the climate imperative, but has the potential to fundamentally reshape the dynamics between the two countries in a positive and comprehensive way.[12]

Yet these two countries still find themselves in a state of paralysis on this critical issue. Many U.S. stakeholders worry that the United States will be at a disadvantage if it signs any domestic legislation or international agreements committing to limits on greenhouse gas emissions unless developing countries such as China agree to similar measures. The Chinese government, on the other hand, firmly opposes placing an absolute limit on its own emissions, pointing to developed countries' responsibility to remedy the effects of their historic cumulative emissions that have led to global warming.

Meanwhile, the United States and China continue to rely heavily on coal to produce energy; it accounts for 50 percent and 80 percent of current electricity generation, respectively. If these two countries cannot find a way to come together to jointly address the problems caused by these emissions, it is highly unlikely that the world will be able to agree on a strategy for effective mitigation any time soon or that the UNFCCC negotiations in Copenhagen this December will arrive at any meaningful outcome.

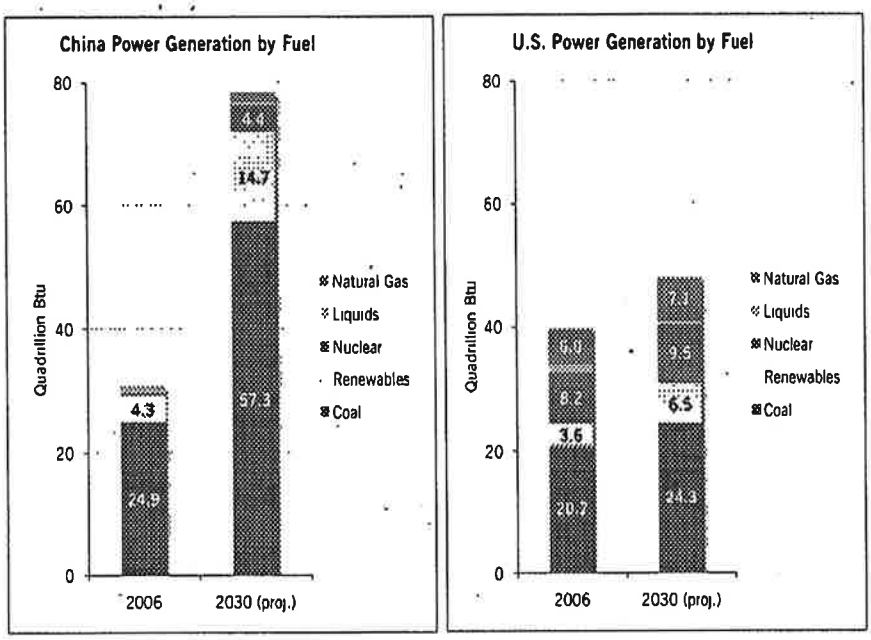
Thus, cooperation between the United States and China is a critical and requisite step to gain the kind of confidence and trust needed to spearhead progress toward an effective global solution. Fortunately, with a new U.S. presidential administration and an increasingly environmentally-conscious Chinese government, this moment is replete with possibility for these two countries to jointly alter the current state of reluctance that has prevailed until now.

U.S. and China: Annual, Cumulative and Per Capita CO_2 Emissions



Sources: Oak Ridge National Laboratory, Carbon Dioxide Information Analysis Center (CDIAC), 2007; the Netherlands Environmental Assessment Agency (MNP), 2007; Population Reference Bureau 2007 World Population Data Sheet

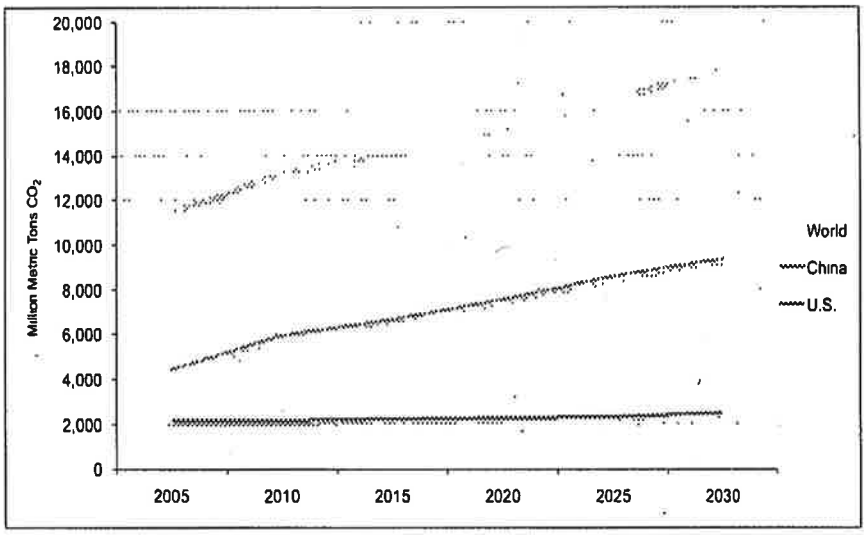
Power Generation by Fuel



Source: "International Energy Outlook 2009", Energy Information Administration, May 2009

HA 09/01/2015

Carbon Dioxide Emissions from Coal Use (2005-2030)



Note: 2005 data is actual; 2010-2030 data is projected
Source: "International Energy Outlook 2009", Energy Information Administration, May 2009

HA 09/01/2015

III. A focus on carbon capture and sequestration

"When people in America say, or people in Europe say, 'Well, we can turn our back on coal. Why bother with carbon capture and storage?' I would say we have to develop the technologies first, because otherwise we would turn our back on 25 percent of the coal reserves in the world, which are in our borders."

–Steven Chu, U.S. Energy Secretary, September 22, 2009[13]

Carbon capture and sequestration offers a way to neutralize the harmful emissions that come from the United States and China's heavy reliance on coal. Both countries will continue to depend on burning large amounts of coal for the foreseeable future, and thus, if this technology can be proven at sufficient levels of scale and safety, the deployment of CCS technologies is an essential element in any effort to stabilize global greenhouse gas emissions.[14]

While CCS still faces considerable technological, financial, and regulatory hurdles, it offers a potential pathway for helping achieve the scientifically-required reductions in global greenhouse gas emissions that energy efficiency, conservation and renewable energies are unlikely to meet on their own. Nothing in our report should be interpreted as suggesting that any one carbon abatement option is more important than any other. There is a compelling argument, however, that neither country can achieve the emissions reductions it needs to make without addressing its heavy reliance on coal. CCS should therefore be included in a portfolio of climate change mitigation efforts if it is demonstrated to offer effective and meaningful reductions in carbon emissions.

The July 2009 U.S.-China Strategic and Economic Dialogue in Washington D.C. resulted not only in more friendly relations, but in a groundbreaking Memorandum of Understanding committing both parties to create, among other things, active channels for CCS cooperation.[15] The newly established U.S.-China Clean Energy Research Center has clean coal, including CCS, as one of three listed areas of research.[16] These bilateral pledges follow the G8's ambitious goal of establishing 20 commercial CCS projects by 2020, with China playing an integral role.[17]

This roadmap for moving forward on CCS collaboration arrives at an opportune time to help translate some of this recently generated goodwill into concrete and active cooperation by suggesting practical ways of galvanizing the efforts of the two into an equitable and effective partnership. Cooperation on CCS, while only one of many areas of necessary cooperation on clean energy and low-carbon technologies, can bring about a win-win partnership.

What can carbon capture and sequestration do?

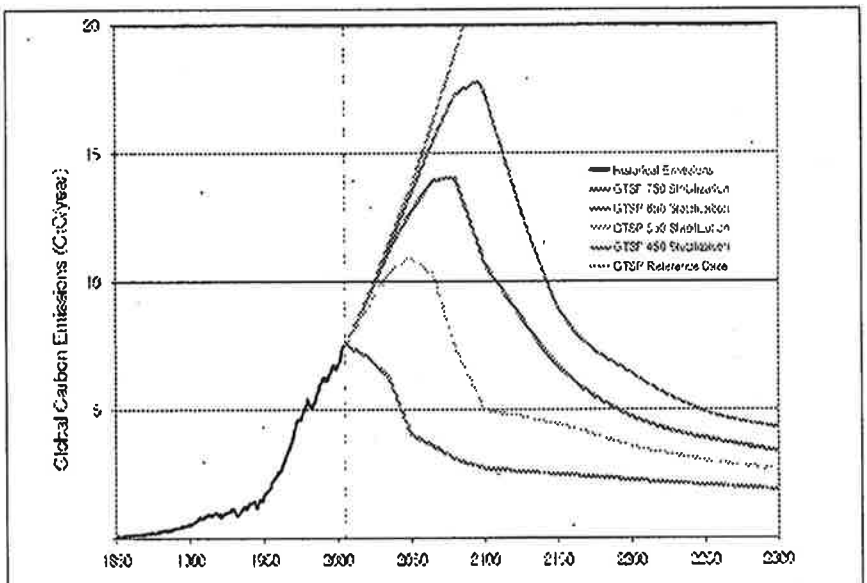
CCS technology has been gaining ground as an important potential element in remedying climate change. Several institutions have recently carried out studies examining the technical viability and abatement potential of CCS, including the Intergovernmental Panel on Climate Change, the International Energy Agency, the U.S. Department of Energy, the Massachusetts Institute of Technology, Stanford University, and the Electric Power Research Institute. Their findings have led to a number of conclusions:

1. CCS appears technically sound and feasible, as demonstrated by analogous long-lived industrial processes, as well as a handful of successful projects already implemented in different parts of the world.

2. Deploying CCS will decrease the cost of achieving stabilization of atmospheric concentrations of carbon in a range of scenarios by 50 percent to 80 percent.

3. It is highly unlikely that stabilization below 550 parts per million (ppm) of CO_2-equivalent in the atmosphere can be achieved without CCS.[18] Energy efficiency efforts, while low in cost, achieve roughly a quarter of the global need required for emissions reductions. CCS and renewable energy efforts, on the other hand, can address roughly three-quarters of the global need for emissions reductions.[19]

Rapid action is required of both the U.S. and China in the coal sector for climate stabilization



A 450 ppm stabilization required steep emissions reduction more than 5 years ago.

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How does carbon capture and sequestration work?

Steps Involved in Carbon Capture and Sequestration
1. Separate and capture CO_2 from industrial and power plant flue streams after combustion or prior to combustion through new generation technologies.
2. Compress and transport the captured CO_2 to storage sites at high concentrations.
3. Inject the captured CO_2 into suitable deep geological formations, where it remains sequestered indefinitely.

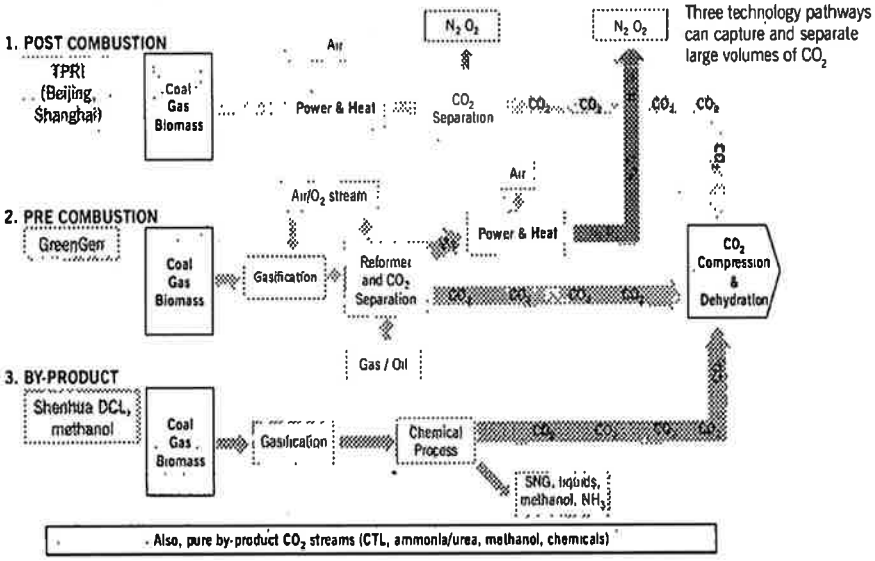
While CCS technology is applicable to a number of contexts—such as natural gas and biomass power generation, petroleum refining, biofuels production, cement making and chemical manufacturing—it is considered a critical technology for reducing CO_2 emissions in coal-fired power generation and can refer to either post-combustion or pre-combustion capture from such plants.[20]

Pre-combustion capture involves the removal of CO_2 prior to combustion to produce hydrogen. CO_2 can be captured from the synthesis gas that emerges from the coal gasification reactor before it is mixed with air in a combustion turbine. Pre-combustion CO_2 capture is applicable to coal power plants, with much of the focus on Integrated Coal Gasification Combined Cycle technology. Pre-combustion capture technology requires significant modifications of the power plant, and is therefore only viable for new power plants, not existing plants.

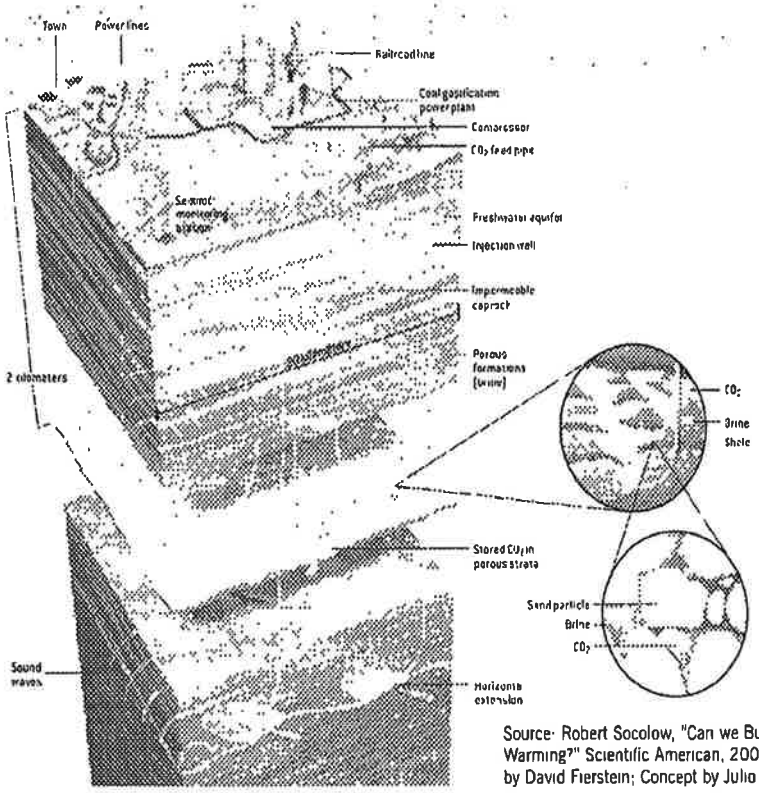
Post-combustion capture refers to the removal of the dilute CO_2 from flue gases after hydrocarbon combustion. Existing industrial plants and power stations can be retrofitted with post-combustion capture technology without significant modifications to the original plant. This roadmap focuses primarily on post-combustion capture applications.

The most promising reservoirs for carbon sequestration are porous and permeable rock bodies, generally at depths of roughly one kilometer, where the proper pressure and temperature conditions enable CO_2 to enter a "supercritical phase" in which its viscosity and density become similar to that of oil. A substantial number of these underground geological reservoirs appear to have the potential to store hundreds to thousands of gigatons of CO_2. For example, saline formations that contain brine in their pore volumes (salinities greater than 10,000 ppm) are particularly suited for storage and are widely distributed geographically. The U.S. Department of Energy has estimated that saline formations in North America can hold between 1,300 and 3,000 gigatons of CO_2,[21] with comparable volume estimates for mainland China, as well.[22]

China's three pathways for CCS in research, demonstration, and deployment



CCS Cross section



Source: Robert Socolow, "Can we Bury Global Warming?" Scientific American, 2005. Illustration by David Fierstein; Concept by Julio Friedmann

HA 09/01/2015

What needs to be done to improve carbon capture and sequestration technology?

CCS collaboration should focus on advancing three areas:

1. Demonstration plants: Accelerate the deployment of post-combustion CO_2 flue-gas capture and geological storage demonstrations for a coal-fired power plant at full commercial scale.

While each of the recommended CCS technologies and courses of action have been individually tested in real-world conditions, in the case of post-combustion flue-gas capture of CO_2 and its storage underground, there has yet to be a full commercial scale demonstration at a coal-fired power plant.[23]

Without greater certainty of the cost effectiveness and technical feasibility of large-scale capture and sequestration, few will risk investing sufficient private capital in CCS to sustain a meaningful level of deployment.

It is thus critical to lower these financial risks by conducting multiple real-world demonstration projects that entail capture of CO_2 at large power plants, the transportation of CO_2 via pipelines to storage sites, its injection into a range of geological formations, the long-term monitoring of those storage sites for safety, and the formulation of new funding models.

2. Cost: Generate an accurate estimate of the costs of CCS, engage in concerted efforts to reduce these costs and develop workable funding models.

It is important to generate an accurate estimate of the costs of CCS and potential scale, timelines, and pathways to cost reductions as soon as possible. Initial costs will be high, but to make abatement affordable and thus achievable, the cost of CCS needs to be brought down through actual experience in CCS demonstration projects.[24]

3. Commercial deployment: Accelerate research, development, and deployment of CCS technologies across new and existing coal-fired power plants.

In order to make a significant impact on global emissions, both the United States and China will need to scale up the deployment of CCS technologies across a large percentage of both new and existing power plants and start capturing and sequestering many millions of tons of CO_2.

This raises questions about regulatory policy, legal frameworks, and operational practice that must be informed by the field by technical findings, providing businesses with the kinds of economic and regulatory certainty they require to make investment decisions in CCS technologies.

HA 09/01/2015

IV. A roadmap for U.S.-China Collaboration

A successful U.S.-China program of collaboration must be built on mutual respect and recognition of both countries' expertise and incentives. But it must also lay the track for substantial emissions abatement and be able to evolve and grow over time. While the general purpose of this roadmap is to help bring about a new partnership between the United States and China, the immediate aim is to catalyze U.S. leadership by sketching out a concrete, collaborative new plan of action on CCS that the United States government could consider adopting as it confronts the twin challenges of remedying climate change and strengthening U.S.-China relations. This roadmap is also intended to complement, and not substitute, other ongoing bilateral and multilateral collaborations on CCS that China has with other countries.[45] By working in parallel, the hope is that the collective efforts will yield lessons that help accelerate CCS deployment globally.

The three-prong program below outlines a process that can start immediately to produce early milestones while working toward the longer-term goals of retrofitting existing plants and developing critical new financing structures.

1. Sequestration of available pure streams of CO_2

- Rapidly implement demonstrations of geological carbon sequestration for existing low-cost, pure streams of CO_2 in China.

2. Retrofit research, development, and deployment

- Spearhead a major new collaborative research and development project on both the capture and the sequestration aspects of CO_2 produced by conventional coal-fired plants in both the United States and China.
- Identify potential large-scale pulverized coal combustion projects that are ready for retrofits in China and the United States.
- Outline a strategy to begin retrofitting plants in both countries, while at the same time continuing to find comprehensive ways to lower costs, improve effectiveness, and advance scale-up.

3. Catalyze markets for CCS

- Establish mechanisms to guarantee that companies that store carbon now will be paid a certain amount per ton at a point in the future, either by the private market for carbon or by the government in the event that market has not developed sufficiently.

The central elements of this roadmap help address many of the concerns and hurdles that have impeded the use of CCS as a meaningful technological answer to a crucial climate change challenge.

First, beginning relatively low-cost, concrete actions should allow both countries to start demonstrating new leadership in the near term.

HA 09/01/2015

Second, accelerating the development of CCS practices, protocols, and standards should help provide businesses and governments the information they need to invest in and deploy CCS more confidently and swiftly in the future. Successful deployment can also help to keep energy costs low and accelerate the development of green-collar CCS jobs in key U.S. and Chinese regions and markets.

Third, the roadmap will lead to the creation of financial mechanisms to support large-scale projects at relatively low cost.

Finally, the roadmap will accelerate the reduction of cost and provide the performance experience needed to scale up the mass deployment of CCS rapidly enough to make a meaningful impact on emissions worldwide.

1. Sequestration of available pure streams of CO_2

China is currently a global leader in coal gasification development and deployment, having already installed well over 100 large gasifiers of different designs for a variety of uses. These gasifiers are outside the power sector and are used to make chemical feedstocks or hydrogen for fertilizer, chemicals, and other related products. What makes these gasifiers relevant to this project is that they also create byproduct streams of CO_2 that are very pure. In essence, they produce "pre-captured" CO_2 that is relatively easier to capture and could provide an early success for collaboration between the United States and China.[26]

Cooperation between the United States and China could begin almost immediately at several sites where China has already completed feasibility studies and is planning some actual sequestration projects.

These "pre-captured" streams of CO_2 provide opportunities that are not available in the United States to store carbon at a relatively low cost of $5-$10 per ton of sequestered CO_2, including the cost of compression, drilling, and monitoring. Over a five-year period, the total cost for each project would be approximately $50-$100 million.[27] The Chinese could cover the main costs of the energy penalty, compressors, drilling, geophysical survey, assessment, injection, and operation and maintenance—roughly 60 percent of each project.[28]

The United States could contribute $20-$40 million per year for science and technology, demonstration, and implementation of sequestration practices; advanced technical support; heavy equipment through support from U.S. technical and service companies; and input from universities and national labs. Five such projects, each sequestering 2 to 3 million tons of CO_2 per year, would not only provide a path-breaking test, but also reduce global emissions by roughly 10 to 15 million tons of CO_2 each year. The United States' share of costs for the five projects would be between $100 to $200 million in total. The cost for each such sequestration project is far lower than the $1 to $3 billion price tag of a single post-combustion carbon capture retrofit project in China.[29]

Moreover, collaboration could begin almost immediately at several sites, most of which are located near key sequestration targets such as the Bohai, Songliao, and Ordos Basins and which are geologically similar to many U.S. basins.[30]

HA 09/01/2015

For instance, Shenhua's direct coal-to-liquids plant in Ordos, Inner Mongolia produces about 3.6 million tons of CO_2 per year and has been designated by the Chinese government to be the site for China's first large scale CO_2 sequestration project.[31] If the Ordos sequestration project were to be undertaken in collaboration with U.S. experts and companies that have experience in this kind of operation, it could become a world-class project that showcases U.S.-China cooperation on CCS technology.

The synergies inherent in such a project would benefit both countries as well as the world at large. Collaboration would not only increase the probability of success and lower the cost of such projects, but would build shared knowledge of how to design, monitor, operate, and maintain these operations.[32] It would also demonstrate that large-scale sequestration is possible in China, sending an encouraging message to interested public and private entities elsewhere in the world. And such a collaborative platform would allow the United States and China to build practices, protocols, and new intellectual property rights agreements that could help catalyze the CCS industry in both countries and allow for the collection of scientific knowledge that would speed up the deployment of CCS worldwide.[33]

Since China already intends to carry out sequestration projects on its own, particularly in the field of enhanced oil recovery, it makes sense for China to collaborate with the United States to reduce costs and share risks. Collaboration would also accelerate opportunities to showcase commercial viability to the world by leveraging Chinese capabilities and leadership. And since these sequestration projects focus chiefly on practice, know-how and experience rather than specific technology and hardware, it is likely that the two countries could largely sidestep major intellectual property rights issues.

But most importantly, such collaborative sequestration projects would allow for a new kind of partnership that would not require overly burdensome new investment, and thus allow the United States and China to begin cooperating immediately.

2. Retrofit research, development, and deployment

The predicted trajectory of global emissions makes it evident that the planet will never meet global abatement targets unless something is done about the way we burn coal. China has shown interest in outfitting its new coal plants with pre-combustion capture capabilities, mostly through Integrated Gasification Combined Cycle technologies. United States and China collaboration on this front could support a number of public and private partnerships to accelerate such IGCC demonstrations.[34]

Yet collaborating on new plants alone will not be sufficient to meet global abatement targets because it does nothing to "clean" existing plants. Both countries must ultimately deal with their existing fleet of conventional coal-fired plants in order to meet global targets, either by shutting down these plants or retrofitting them for CCS. Both countries have acknowledged this necessity and have begun strategic investments in research and development that would enable retrofits on existing plants.

Department of Energy Secretary Steven Chu's recent announcement that the United States will engage in joint research with China offers a timely opportunity. As part of this

venture, Washington and Beijing should jointly pursue an aggressive new series of intensive research and development projects centered on retrofitting coal-fired plants with low-cost, effective CCS technology. This R&D stage should begin immediately so that deployment of the technology can begin shortly after phase one is complete.

It is true that China has expressed reluctance to deploy CCS retrofits rapidly within its existing coal fleet.[35] Recent papers have pointed out that China's overriding interest in economic growth and energy security make CCS deployment not the first order of priority.[36]

This roadmap focuses on laying the groundwork for eventual broad-scale retrofitting by setting up the preconditions for future CCS deployment that is not inimical to China's present priorities. CCS has yet to be proven feasible and cost effective on a large scale. So, the goal is to enable research that attempts to reduce the cost of retrofitting and make CCS more efficient in order to create an environment over time in which both countries can determine, on the basis of the results of their collaborative R&D, whether broad-scale CCS deployment is a realistic course of action.

Incentives may change as key advances make the technology more or less appealing. It is also possible that the devastating costs of global warming will escalate to such a level that the cost of not mitigating emissions from burning coal will become so great for China to bear that options will need to be reassessed.

Determining project viability alone would require two to three years of front-end engineering design studies alone. Several years of planning and analysis would also then be needed to select potential retrofit projects likely to succeed in each country. It is also important to note that only about half of U.S. plants have sufficient heat rate and efficiency to warrant consideration.[37]

Given all of these factors, the first several years of discussion and experimentation on coal-fired plant retrofits should focus on three goals:

1. Engage in a wide array of research and development initiatives on both the capture and sequestration sides of retrofitting coal-fired plants as soon as possible to lower costs, improve effectiveness, and scale up these technologies for global application.

- Both countries should build upon the multidisciplinary research centers already announced by the U.S. Department of Energy and Chinese Ministry of Science and Technology. Such centers should gather and disseminate the lessons learned on technology, regulation, business models, financing, plant operations, and demonstration projects. This will enable the two countries to deploy CCS more rapidly when political and financial conditions permit.
- China and the United States should establish large-scale research and education campaigns that focus on the devastating long-term costs of climate change, the need for CCS to combat climate change, and the technical feasibility and safety of CO_2 sequestration.

- On the capture side, key research is necessary in post-combustion capture (e.g., solvents, sorbents, membranes, ionic liquids) and oxy-fired retrofit technologies (e.g., solid-fuel combustion research, flame-shape design, flue-gas recirculation, O2 separations) that focuses on reducing capital and operational costs in retrofitting existing plants.
- On the sequestration side, research should focus on developing and demonstrating techniques for long-term monitoring of sequestered CO_2, identifying potential hazards, protecting groundwater quality, and developing broad expertise in the relevant management practice.
- Research should also include design, drilling, and technology transfer efforts as they pertain to CCS deployment.[28]

2. Identify plants in China and the United States that are strong candidates for large-scale retrofit demonstrations.

- Screen the existing fleet of coal-fired plants to identify those in both countries that are strong candidates for retrofit demonstrations. Such plants would include subcritical pulverized coal plants (400 megawatts or larger, or about 2 million tons per year) that have space, designs suitable for retrofitting, and sequestration resources nearby.
- Project selection would be followed by preliminary front-end engineering design studies to determine technical viability, possible failure modes, and likely cost. Such an effort would require access to plant engineering information and geotechnical information, and a transparent process to share results from studies.
- Plants selected for retrofit (and alternates) would be announced after two to three years of collaborative analysis. Researchers would have assessed potential retrofit technologies during this time and developed preliminary designs, leading to the development of formal plant retrofit designs and procurement estimations of heavy equipment needs.
- Groundbreaking and retrofit would begin at key sites within five years, with the goal of CO_2 injection commencing one to three years later.

3. Outline a broad, medium- to long-term strategy for retrofitting power-sector coal plants in China and the United States in a way that embraces the countries' respective political, industrial, and financial conditions and needs.

- Devise a strategy for mutually establishing targets for growth, emission abatement, energy intensity, and price.
- Focus working groups on both technical and nontechnical aspects—political, regulatory, and legal—concerns in each country to develop mutually agreeable standards and best practices for power sector retrofits, geological sequestration, power plant management, and regulatory frameworks.

A careful structure will have to be crafted to protect the intellectual property rights associated with this type of cross-border sharing. Private companies should be allowed to negotiate their own intellectual property terms. They are in the best position to know how

to protect their rights, assess the value of their intellectual property and understand the cost of not entering the collaborative market.

As an example, it might be possible for U.S. companies to set up a licensing fee for use of their technologies. The Jupiter Oxygen project in India solved the IPR problem by partnering with a local company and giving that company exclusive rights to a particular technology in exchange for a licensing fee.[39] Such a strategy effectively incents local companies to guard against rights infringements themselves, thus adding an additional layer of defense with eyes and ears on the ground.

It might also be possible to develop an insurance fund jointly backed by the United States and Chinese governments that insures U.S. companies who share their intellectual property in this critical area with China, much the way the Overseas Private Investment Corporation insures risky trade deals.

Both parties can likely generate a wide range of other creative solutions. But it may be that this challenge is not as inhibiting as some fear. After all, China may become a vast market for CCS. U.S. companies that want to be major players in this market will see the benefits of early collaboration with major Chinese players. Intellectual property risks will therefore be tempered by the marketplace's growing economic potential. Market allure will be sufficient in many cases to drive companies to formulate their own case-specific arrangements.

The United States and China will have to examine a broad range of issues relevant to their regulatory governance. It will be important as the collaboration becomes more concrete to discuss issues of liability, safety, measurement, and verification; project design and management; channels of communication; and eventual site closure. It will be important to negotiate these issues in detail down the road.

3. Catalyze markets for CCS deployment

Lack of an economic return, and uncertainty around the timing and level of that return, are the key financing barriers that slow the advancement of CCS projects. Unlike many other technologies that help reduce greenhouse gas emissions such as nuclear, hydroelectric, wind, solar, biofuels, waste recycling, and energy efficiency, there is no established market—no body of paying customers—for companies that offer CCS equipment and services beyond some secondary sources such as oil production.

Our assumption is that such a market will eventually come into being through various cap-and-trade systems or a tax on carbon. So, the key financing challenge is building a bridge between today and a point in time when such a market for sequestered CO_2 exists. Without this bridge, private sector investment will flow into CCS projects slowly and tentatively at best. A bridge would enable the flow of private investments to grow stronger over time. Experience and innovation will lower the cost of sequestered CO_2, resulting in an increased rate of supply at any given price. There are short- and medium-term solutions for building this bridge.

Short-term (Year 0 to 5): Use public funds to support U.S. companies to participate in sequestration projects in China while simultaneously providing a guaranteed return for private capital investments in CCS that could be redeemed at a future point.

U.S. tax dollars would be allocated primarily to U.S. companies, constituting a form of economic stimulus—albeit one without great multiples since much of the work would take place in China. It would also be an investment in the competitiveness of U.S. companies pursing a potentially lucrative global CCS market. Industry might "co-invest" in these projects because they would gain an advantage over competitors in the form of early experience in large-scale sequestration.

One strategy to simulate a market value for abated carbon ahead of its actual formation might entail provisions similar to those laid out in the American Clean Energy and Security Act. In this scenario, the U.S. would provide a guaranteed payment (perhaps $60 per ton) for an initial fixed volume of CO_2 successfully sequestered, in China or elsewhere. Like in the Waxman-Markey legislation, the price per ton would vary depending on the fraction of carbon captured (i.e. higher support for 85% capture and lower support for lower capture rates). This guarantee could be structured as a time-triggered insurance payout, so that there would be no outlay of U.S. capital until 2020, for example, and then only if a market instrument were not yet available to monetize the successfully abated carbon. The U.S. government would essentially promise to pay in the future, if the market has not yet come into existence.

The number of tons of sequestered carbon could be limited to an amount large enough to encourage several demonstration projects over the next five years, but small enough so as not to "break-the-bank" in the unlikely event that there was no functioning market for sequestered carbon. We would suggest the funding be offered over a five year period for up to 1,500 MW of capacity.[40] Since this much capacity generates about 9 million tons per year, the maximum exposure (assuming a 100 percent capture and sequestration rate) would be about $540 million per year ($60 per ton multiplied by 9 million tons), in the event that no private market for abated carbon had developed by the specified time for payout.

In addition to mechanisms encouraging CCS in the power sector, we would also suggest an analogous mechanism for the industrial sector. There are numerous industrial operations in China that produce CO_2 as a by-product of their normal operations, and are now venting this carbon into the atmosphere. That CO_2 should be captured and stored underground in order to accelerate learning and develop capabilities in this area. Since the capture is already happening, the price to encourage storage can be much lower. We suggest funds for $20 per ton of CO_2 stored up to the first 30 million tons. This represents a maximum exposure of $600 million ($20 per ton multiplied by 30 million tons) in the event there is no private market available.

Such a mechanism could also serve as a platform to eventually include a broader set of international stakeholders to participate in the stimulation and evolution of successful public-private partnerships around CCS deployment.

HA 09/01/2015

Medium-term (Year 6 to 10): Push for the inclusion of sequestered carbon in a new Clean Development Mechanism-type offset regime to create access to other capital pools

The Clean Development Mechanism is the Kyoto Protocol's carbon offset system that allows developed countries to offset their emissions by paying for clean-energy projects in developing countries. CCS is not currently eligible for the CDM credits, but it should be leveraged to provide revenue to companies sequestering carbon. As of now, a wind farm built in a developing country might count as a carbon offset for a European emitter of greenhouse gases, but a CCS project does not.

CCS was excluded from CDM funding in part because of significant opposition to coal-based sources of energy.[41] Changing these requirements to include CCS will not be simple. But the United States and China should actively push for such inclusion in a new post-Kyoto CDM-like mechanism over the medium-term.

Long-term (Year 11 and beyond): Global market for abated carbon

The basic challenge to create a revenue source to pay for sequestered carbon is clear, as is the short-term solution: building a financing bridge between now and the day a functioning market for CO_2 comes into being. Once there is a value for carbon, the capital markets can then structure mechanisms to aggregate, apportion, and manage capital flows according to supply and demand.

The long-term solution to the financing challenge posed by CCS is, of course, a global market for abated carbon, whether that abatement happens in the United States, China, or elsewhere. This subject is being addressed elsewhere, so we confine our comments here to simply noting that a global market must eventually be realized; the financing bridge proposed herein must lead to something in the end.[42]

A group of experts would need to study and formulate the details of such a new financing infrastructure—answering how much to pay per ton of sequestered CO_2; how many tons will be covered; when will the money be paid; and what requirements will be needed to monitor the sites to make sure the CO_2 stays underground. One such group, the World Economic Forum Business-Expert Task Force on Low-Carbon Prosperity, has offered several specific proposals for public-private investment models to catalyze investment from institutional investors that we summarize in Box A.

HA 09/01/2015

BOX A

Accelerating Investment in Low-Carbon Technologies in Developing Countries
Proposals from the World Economic Forum Business-Expert Task Force on Low-Carbon Prosperity
For the full recommendations: www.weforum.org/climate

Institutional investors, such as public and private pension funds, insurance companies, sovereign wealth funds, endowments and private banks offer the largest potential source of necessary long-term private investment in low-carbon technologies in developing countries.

Public-private investment models in which public credit enhancement and regulatory capacity building is combined with private institutional capital has the potential to unlock significant investment flows for low-carbon energy systems in developing countries.

Proposals:

Multilateral Development Bank Low-carbon Challenge Funds:
Public-private, low-carbon infrastructure investment funds in each developing country region which draw in equity from institutional end-investors such as pension and sovereign wealth funds and use a new generation of public finance (risk mitigation) mechanisms from multilateral and bilateral development finance institutions. Multilateral and bilateral development finance institutions would bid out preferential access to regional packages of their public finance mechanisms to leading global (or regional) fund management firms, who would tender for the bids. Such a model could catalyze up to US$ 10 billion per region per three-year cycle, ready for business by 2011.

Regional Low-Carbon Cornerstone Funds:
Regional cornerstone funds for low-carbon infrastructure would be created and administered by the IADB, AfDB, AsDB, EBRD and EIB or through establishment of specialized institutions modeled on the US Overseas Private Investment Corporation. They would raise anchor equity (e.g. US$ 5 billion) from major institutional investors as well as official and philanthropic donors and then invite leading global and regional fund management firms to establish low-carbon energy funds, clean infrastructure funds, low-carbon building funds, green-tech funds, etc. by bidding for a distribution of part (e.g. US$ 1 billion) of the anchor equity. This model could catalyze US$ 50 to 75 billion per region each three years and could be ready for business before the start of the second commitment period in early 2013.

HA 09/01/2015

A note on enhanced oil recovery

CO_2 can, and has long been, used for enhancing oil extraction from fields by displacing oil through the injection of pressurized CO_2 gas. CO_2 has other limited industrial uses that carry a positive secondary economic benefit. But demand from all of these potential CO_2 sinks is nowhere near enough to sequester the carbon dioxide emissions that must be mitigated to slow down the rate of climate change.

Some analysts in China believe that enhanced oil recovery, or EOR, has the potential to create and improve initial commercial opportunities for CCS in China. However, the market potential for EOR will likely be limited. China's seven largest oil fields can likely store only between 10-20 million tons CO_2 per year. This volume could be met in the near term with pure CO_2 streams from coal-to-chemical plants in a handful of locations. Such sources could be captured, transported, and used for EOR for $5-10 per ton—mainly the cost of compression and pipelines—and might be suitable for near-term purchase agreements between PetroChina and CO_2 suppliers. But EOR cannot be counted on for large annual emissions reductions and will not incent more than a limited number of projects.

Yet the Chinese are very interested in EOR, in large part because of the incremental oil production that results. Thus, it might therefore be of tactical importance in initiating U.S.-Chinese collaboration to embrace some such projects.

The GreenGen project in Tianjin provides an example of that kind of platform, wherein real technical and economic findings and gains are likely within an enhanced oil recovery platform. Initial support could be used to provide funding for the start-up phase of collaborative projects.

These are only a few financing ideas. It has become increasingly clear through the process of writing this report that there is no ready-made solution to this issue; it is a challenge that will necessitate ongoing exploration. And since finance lays at the center of the CCS question, there is an urgent need to have a specialized working group tasked to focus specifically on the question of financing, which will be able to dig deeper and generate even more innovative options.

V. Clearing political hurdles in the United States and China

The global nature of climate change demands new forms of partnerships. These partnerships are necessary to accelerate CO_2 emissions reductions and the transition to a low-carbon economy, and do so while producing tangible and near-term benefits for all parties involved. There are political challenges to CCS collaboration despite the fact that both the United States and China ultimately stand to profit more through collaboration than through pursuing independent pathways.

Obstacles in the United States

While support for action on climate change is growing in the United States, substantial obstacles still persist.[43] A complicating factor in the CCS debate is the United States' relationship with the major carbon emitting countries in the developing world, especially those with whom it has a competitive trade relationship.[44] Many Americans and their representatives refuse to support a price on carbon or mandatory emissions reductions for fear of creating a competitive disadvantage for the United States. Given the existing political climate in the United States, any collaboration with China will have to navigate a number of barriers to overcome such fears.

Congress will most likely oppose the use of U.S. tax dollars to fund collaborative projects in China unless they bring substantial co-benefits to American workers.
The United States trade deficit with China and its continued reliance on Beijing to finance U.S. budget deficits are topics that tend to dominate the bilateral economic relationship. The fact that the Chinese economy appears to be recovering more quickly from the global financial crisis than that of the United States reinforces a perception of those imbalances and creates further resistance against funding collaborations.[45]

Congress's historic relationship with developing nations on climate change has been competitive and apprehensive.

When the Clinton administration brought the Kyoto Protocol back to the United States, the Senate responded with the 1997 Byrd-Hagel Resolution (passing 95-0), which defiantly proclaimed that there would be no ratification of any international climate treaty that failed to include defined emissions commitments from developing countries, something not called for in the Protocol itself.

The House more recently passed this year's Foreign Relations Authorization bill (H.R. 2410), which included a specific provision requiring the State Department to ensure that international treaties do not weaken U.S. companies' intellectual property rights. It also made reference to both climate treaties and low-carbon technologies.[46]

What's more, the Waxman-Markey American Clean Energy and Security Act of 2009, now passed by the House (but not the Senate), includes provisions that would essentially enact border tax adjustments on imports from countries that fail to implement legally binding controls on their greenhouse gas emissions. The bill would also require the EPA administrator to "annually prepare and certify a report to Congress regarding whether China and India have adopted greenhouse gas emissions standards at least as strict as those standards required under this Act."

The federal government must address public concerns surrounding CCS.
Although "clean coal" is being widely hailed by many industry groups,[47] some environmentalists doubt the viability of large-scale sequestration, citing CCS's high cost and the lack of proven technology.[48] Sequestering carbon also raises potential environmental concerns—such as leakage, earthquakes, and negative interactions with groundwater—that have led to a recent upsurge in activism in other parts of the world and even protests against early sequestration projects in Europe.[49] The United States can expect similar opposition at home as sequestration projects begin. Yet it is also true that the public's attitude cannot evolve from suspicion to support unless and until there are U.S. CCS demonstrations greater than 300,000 tons per year.

Overcoming obstacles in the United States

Any collaboration with China on CCS must address the concerns outlined above. Fortunately, despite these concerns, CCS has nonetheless managed to win substantial initial support among key U.S. stakeholders.

Public sector

The Department of Energy has begun substantial work cleaning up coal pollution by addressing both conventional pollutants and carbon emissions. Along with several utility companies, the DOE has invested in a number of CCS demonstration plants.[50] And the Obama administration has begun actively encouraging more domestic CCS deployment. The American Recovery and Reinvestment Act of 2009 allocates $3.4 billion to CCS pilot projects, including $1 billion to the FutureGen project in Illinois. ACES also supports CCS, providing financial incentives to eligible projects for the sequestration of CO_2 in the form of emissions allowances under the proposed economy-wide cap-and-trade scheme.[51]

Commercial sector

The commercial sector has substantial potential to develop, fund, and deploy CCS technology. Despite a sagging fourth quarter, private companies invested $8.4 billion in "clean-tech" industries in 2008. Although relatively little went into CCS, this number is expected to grow as the recession ends.[52]

U.S. companies working in electric power technology, such as General Electric and American Electric Power, are generally supportive of CCS technologies. The U.S. Climate

Action Partnership—an alliance of businesses and leading environmental non-governmental organizations including the Natural Resources Defense Council and Environmental Defense Fund—endorses policies furthering the development and deployment of CCS. And sensing which way political winds are blowing, many U.S. utilities are beginning to show an interest in investing in CCS retrofits because there may soon be substantial export opportunities for CCS technology.

Labor unions

Large unions (such as the United Mine Workers of American and the International Brotherhood of Electrical Workers), as well as labor union federations (such as the AFL-CIO), have strong interest in seeing coal-fired power generation and related technologies to help gain a new life for coal-dependent jobs in a carbon-constrained world. There are approximately 397,000 permanent, full-time jobs in electric power generation and distribution in the United States and an additional 78,800 jobs in the coal mining sector.[53] Approximately 19 percent of workers in the mining industry were unionized in 2006.[54]

Moreover, a study completed by BBC Research and Consulting found that constructing one CCS plant would directly create between 13,000 and 14,000 job-years and 36,000 to 38,000 subsidiary job-years. Ongoing operation and maintenance functions promise to create an additional 1,200 to 1,300 more job-years throughout the economy.

And a study completed by the National Energy Technology Laboratory calculates that the development and deployment of advanced coal technologies would create up to 75,000 new job-years, primarily in manufacturing—growing to 200,000 per year by 2020. Given the effects of the recent recession, the promise of clean coal as a new technology understandably garners significant support from multiple sectors. This support is augmented by environmental groups such as the Clean Air Task Force and Natural Resources Defense Council and commerce groups such as the Apollo Alliance and the Council for American Competitiveness.

Benefits of CCS collaboration to the United States

CCS collaboration could help accelerate eventual CCS deployment in the United States.

American expertise in sequestration technology and research and development is well developed and ready to be immediately exported to China as part of a new program. Rapid Chinese deployment times and relatively fewer regulatory obstacles should enable the United States and China to explore CCS far more rapidly than they could independently. Our estimate is that, in the long run, knowledge gained from such collaboration can be applied to accelerate the deployment of CCS facilities in the United States by 5 to 10 years. This would follow from reduced timelines for several key enabling framework components: Accelerated development of protocols and practices in the United States and China on sequestration deployment; accelerated documentation of site criteria required for financial

market engagement; demonstration of CCS deployment in key Chinese basins with a high degree of transparency and documentation; increased investment in cost-reducing capture technologies and an early start at resolving potential intellectual property concerns; identification of new sources for investment in projects in power-sector retrofits and new-builds; and increased trust and relationship building between the two key nations in a globally manifested CCS industry.

This acceleration of CCS development will require sustained investments over the research and development period, platforms to share results, and a scientific program that can deliver the key geological and engineering information to all stakeholders quickly and conclusively.

And it is only by demonstrating sequestration technology on a large scale that we can definitively allay safety concerns in both countries.[55] At the same time, collaboration will help develop regulatory frameworks, risk profiles, technical findings, practices, and protocols that will encourage new potential operators, regulators, investors, and public stakeholders.

CCS collaboration could create U.S. jobs.

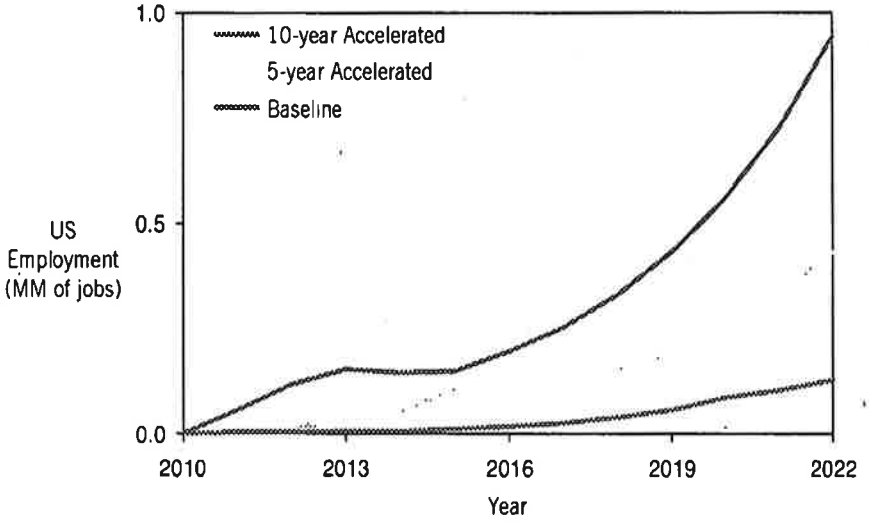
Collaboration would facilitate the entry of many U.S. stakeholders in a potentially massive CCS market in China. This would benefit U.S. labor markets by stimulating new opportunities at utility companies, energy companies and high-tech companies, thereby creating more U.S. jobs.

More importantly, CCS initiatives stand to create millions of new jobs in both skilled and unskilled areas during the construction and retrofit phase, as well as during ongoing operation. Our model makes working assumptions about how U.S.-China cooperation on CCS could accelerate the development and deployment of CCS technology and has considered each of these types of jobs as well as indirect jobs associated with CCS initiatives, based on industry data.[56] The acceleration of CCS efforts greatly improves the jobs picture when we examine the current baseline, five-year accelerated, and 10-year accelerated scenarios.

In the baseline scenario, we project CCS-related employment increasing slowly as new builds and retrofits take off, growing to 243,000 direct jobs and 473,000 indirect jobs globally in 2022. A five-year acceleration of CCS efforts drastically increases the amount of employment driven by CCS to approximately 819,000 direct jobs and 1.6 million indirect jobs globally in 2022. The more aggressive 10-year acceleration scenario results in over 1.8 million direct jobs and 3.5 million indirect jobs in 2022.[57]

We expect the U.S. share of these jobs to increase from a 2022 baseline scenario of 43,000 direct jobs and 84,000 indirect jobs to 145,000 direct and 285,000 indirect jobs with a five-year acceleration, and 318,000 direct and 625,000 indirect jobs with a 10-year acceleration.[58]

Total U.S. Employment Associated with CCS, by Year



Source: Monitor analysis; BBC Research & Consulting "Employment and Other Economic Benefits from Advanced Coal Electric Generation with Carbon Capture and Storage (preliminary results)" Feburary 2009 (http://www.americaspower.org/content/download/1459/10428/file/BBC%20FINAL%20020709.pdf.); McKinsey & Co. "Pathways to a Low-Carbon Economy" Version 2 (http://www.mckinsey.com/clientservice/ccsi/pathways_low_carbon_economy.asp)

CCS collaboration could reduce U.S. electricity prices.

If the U.S. Congress passes a final climate bill that creates a price for carbon, and CCS is deemed to be an inevitable carbon abatement solution, ratepayers also stand to benefit from reduced electricity bills when CCS deployment is able to scale faster than it otherwise could without collaboration. CCS is increasingly viewed as a critical part of any eventual global carbon abatement effort, and the acceleration of CCS development could yield significant reductions in the electricity rates that would unsue ender such a program. Some of the costs of abatement will be borne by utility companies, and some of those costs could be passed on to ratepayers depending on the structure of the pricing mechanism on carbon. The United States and China will almost certainly achieve CCS cost reductions more quickly by collaborating than by working independently. Our estimate of a five to 10 year acceleration of CCS deployment through cooperation shows that cost savings would be significant.

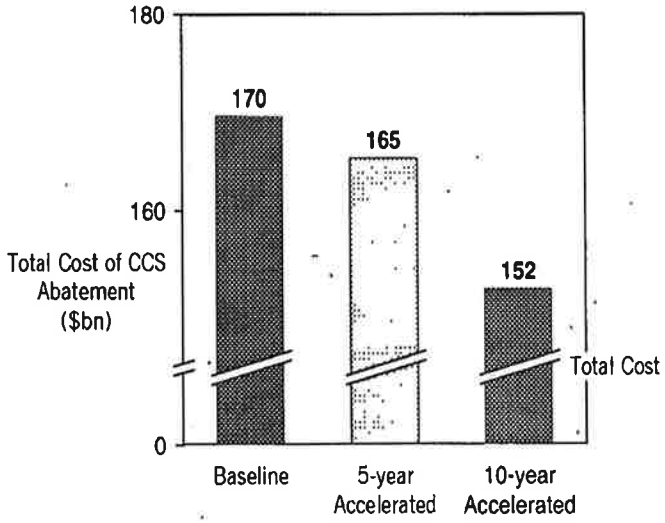
Current baseline estimates project the cost of CCS abatement to drop to $95.58 per tCO_2e by 2015, and drop further to $55.14 per tCO_2e by 2030.[59] Accelerating this cost curve will allow the overall CCS abatement effort to be achieved at lower cost.

In the baseline scenario, using the costs noted above, we project achieving a total global abatement of 3.65 Gt CO_2-equivalent per year in 20 years at a total cost of $959 billion. By accelerating the cost curve five years, the same total abatement can be achieved at a total cost of $934 billion, saving $25 billion.[60] A more aggressive 10-year acceleration results in a total cost of $859 billion, $100 billion.[61] The U.S. share of cost savings is approximately $5 billion

in the scenario with a five-year acceleration, and $18 billion with a 10-year acceleration.[62]

The accelerated cost curve both lowers total costs, and hence electricity prices, and reduces the time needed to achieve a given level of abatement. This results in greater emissions reductions beyond baseline estimates, which suggests that if we undertake efforts to accelerate the cost curve, CCS could form a larger portion of the overall abatement effort than currently assumed in the baseline estimates.

CCS Abatement Cost (U.S. Share)
for a total abatement of 3.65 Gt CO2e/yr



Source: McKinsey & Co "Pathways to a Low-Carbon Economy" Version 2 (http://www.mckinsey.com/clientservice/ccsi/pathways_low_carbon_economy.asp)

CCS collaboration could reduce costs for the United States.
Because several key components of CCS are cheaper in China than in the United States—including steel, cement, labor, and the savings from more rapid project completions—a focused joint effort could therefore reduce the cost of individual retrofit projects and construction time by as much as 50 percent. Moreover, by fostering a mutually beneficial, trusting relationship, the United States will also gain a better chance to learn from future Chinese developments and thus accelerate cost reductions in deployment at home.

Collaboration could allow the U.S. to share the risks.
Combining resources will allow the United States and China to share not only the benefits, but also the risks of failure, which will internationalize these risks. Some American companies have already weighed their business risks in the advanced coal sector and have come out in favor of being early movers in collaborating with China. Recent partnerships announced between Duke Energy Corp. and ENN Group and between Duke Energy and China

HA 09/01/2015

Huaneng Group highlight the opportunities being seized for risk-sharing and cost reduction through collaboration.[63] Additionally, KBR and Southern Company recently announced a deal with Beijing Guoneng Yinghui Clean Energy Engineering Co., Ltd. to license IGCC technology for use at Dongguan IGCC Power Plant in Guandong Province. This deal will be the first commercial implementation of the TRIG technology for IGCC.[64]

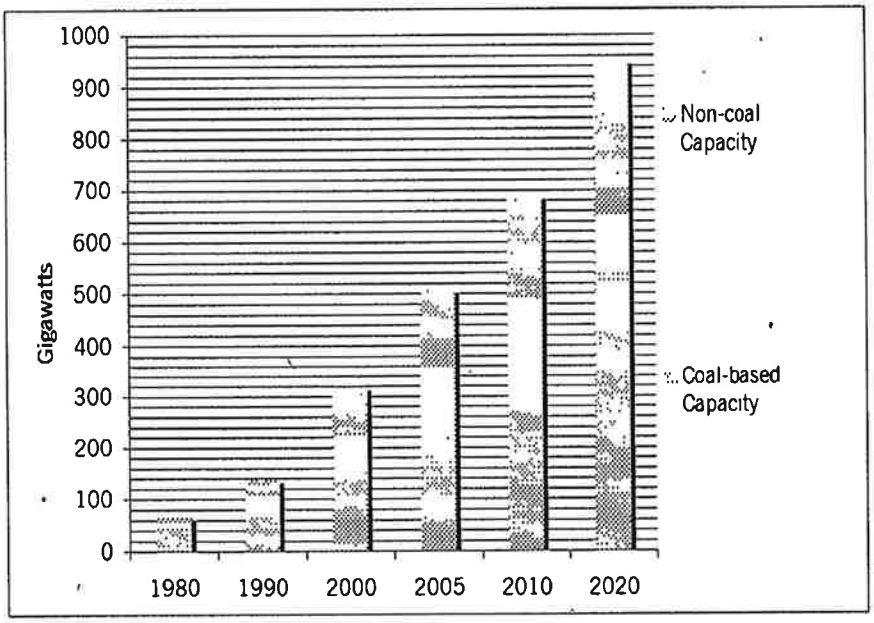
Obstacles in China

China's primary commitment will continue to be to economic development and political stability, and it is depending on scientific innovation to reduce the environmental costs of its growth. However, the extreme pace of China's economic rise is making those costs prohibitive.

China became the world's largest annual emitter of greenhouse gases in 2007. While its emissions are only one-fourth those of the United States on a per capita basis and its cumulative historical emissions are similarly unequal,[65] due to rising urbanization and per capita incomes, China's energy demands will more than double from 2005 levels by 2030.[66] China has rich coal reserves and it will choose to burn even more coal to meet these new demands despite the fact that coal already contributes 80 percent of China's aggregate CO_2 emissions.[67] Indeed, China has been adding coal-fired power production capacity at an increasingly rapid rate.[68] Conservative studies estimate that China is now bringing online two 500 megawatt, coal-fired power plants every week, or an annual increase equal to the UK's entire power grid.[69]

China power and coal builds

China has installed more than 500,000 Megawatts of coal capacity in the past 10 years



HA 09/01/2015

Given this context, there are several obstacles CCS faces in China:

China's core interests are in energy security and economic development. Beijing recognizes the dangers of CO_2 emissions, but its overriding interest lies in maintaining continued rapid economic growth and energy security. Lacking sufficient oil and natural gas reserves of its own, China has become highly dependent on domestic coal and foreign oil imports.[70] But it has also devoted an impressive amount of economic resources to developing renewable energy and energy efficiency technologies to reduce its dependence on foreign oil.[71] Most joint U.S.-China energy projects to date have therefore focused on limiting greenhouse gasses indirectly by promoting energy efficiency and renewable energy.

Given China's overriding concern of economic development, it is not surprising that CCS projects are viewed with a certain skepticism. After all, it is expensive to retrofit a plant with CCS technology and CCS plants require more coal to produce the same amount of electricity.[72] Understandably, China has also been far more concerned with sulfur dioxide, nitrogen oxide, and mercury pollution from coal-fired electricity generation—pollution with immediate health consequences—than with carbon emissions, which have long-term effects.[73] Therefore, because CCS is expensive, fails to diversify China's energy sources, focuses on global rather than immediate and local environmental problems, and comes with technical uncertainties and an onerous "energy penalty," Beijing has been cautious in committing to an aggressive program in this field.

Chinese climate negotiators expect developed countries to take the primary responsibility for emissions reductions.

Speaking on behalf of the G77, a consortium of developing countries, China often argues that since developed nations created the problem of climate change, they should inherit the primary responsibility for remedying it.[74] Indeed, China has even gone so far as to call on developed countries to reduce their emissions by 40 percent from 1990 levels by 2020, as well as to contribute 0.5 percent to 1 percent of their GDP to helping developing nations reduce their emissions, both of which are unlikely to happen.[75] Because China is wary of being singled out from other developing countries for heightened criticism and having a heavier burden imposed on it because of its dynamic growth, it has rejected the imposition of emissions caps.[76] Instead, China has preferred to set the bar low and overperform, lest it become hobbled by a "defined limit" that it may be unable to meet and that limit its growth.[77]

Overcoming obstacles in China

Any prospective CCS collaboration must recognize China's underlying priorities of economic development and energy security, and successfully address the challenges of costs and other uncertainties in deployment. However, there are reasons to believe that various Chinese stakeholders would be receptive to collaborative overtures in the field of CCS, especially if these overtures are made with the right incentives and with the U.S. explicitly

taking responsibility for its fair share of the historic burden. Opportunities for China include transfers of cutting-edge technology and technical expertise in a future market, external financial support, future green collaboration in other preferred areas,[78] as well as improved U.S.-China relations. Demonstrating and developing CCS technology could also help establish China as a leader in innovation, technology and climate change mitigation efforts.

China has become increasingly proactive in addressing climate change and greenhouse gas emissions.

Across the political, academic, and civic spectrums, Chinese leaders have begun to acknowledge both publicly and privately that climate change is a problem that must be taken seriously.[79] China has set aggressive targets for renewable energy, energy efficiency, nuclear power and transportation, and has been working to meet many of these domestic targets.[80] Although precise allocations of China's 4 trillion yuan stimulus package announced last year have been difficult to determine, one government source says roughly 580 billion yuan (just under $100 billion) was allocated for climate change mitigation projects.[81]

What's more, China has been rapidly pioneering new technologies in solar, wind, and hydro power, and has become the world's largest user of hydro power and solar thermal heating and the fourth largest user of wind power in the world.[82] Indeed, China is moving at a remarkable pace in becoming a world leader in low-carbon power, all the while creating a large number of new green jobs.[83] These national priorities have at last begun influencing decision making at regional levels, as Beijing has begun to change the metrics by which it evaluates local leaders—mixing economic growth indices with environmental ones—thus incubating a new kind of environmental local leadership.[84]

A recent and quite hopeful report commissioned by China's National Development and Reform Commission and the State Council suggests that CO_2 emissions in China could slow by 2020 and peak by 2030 rather than 2050 with the right energy policies in place. The report also shows that this goal does not have to come at the cost of lowered economic growth. In fact, the report suggests that requisite investments to make China a global leader in low-carbon technologies could simultaneously help remedy climate change and boost domestic economic growth.[85] Such reports are only some of many examples of Chinese officials' willingness to address CO_2 emissions more proactively,[86] even while global conversations often remain quite politicized and polarized.

The 10th Standing Committee of China's Eleventh National People's Congress on August 27, 2009 confirmed a new call to arms on greenhouse gas emissions. The Standing Committee recognized that a response to climate change is "vital to human survival," and called on "the whole society to participate in a wide range of actions to address climate change."[87] Most recently on September 22, 2009, President Hu Jintao pledged at the United Nations General Assembly to reduce CO_2 emissions per unit of GDP from 2005 to 2020, one of the clearest indications to date of China's willingness to assume greater responsibility in global emissions reductions.[88]

The Chinese government and commercial sector are making investments in CCS

China has already made commitments to build large CCS demonstration plants and has explicitly acknowledged that the deployment of CCS in China's power sector is something that needs to happen in the future.[89] The Standing Committee of China's National People's Congress just recently proposed that now is the time to "encourage and support the use of clean coal technologies," including the use of CCS.[90] Investments in CCS have been made by NDRC, the Ministry of Science and Technology, and the Chinese Academy of Sciences. These include GreenGen in Tianjin, the sequestration component of Shenhua's direct coal-to-liquid plant in Ordos, Inner Mongolia, and the Thermal Power Research Institute/Huaneng post-combustion capture demonstrations in Beijing and Shanghai.[91]

NDRC and MOST investments in gasifier technology developments at TPRI and East China University have led to the licensing, construction, and deployment of large commercial gasifiers in China and the United States, and to the development of PCC technology at TPRI. China has used these investments to establish itself as an active player in the CCS field and a potential global competitor in advanced clean coal technology.[92]

The commercial sector in China has also begun to show interest in CCS, especially among the large state-run power and oil companies. The right incentives would help make these companies even more interested in obtaining and developing CCS technology and becoming more globally competitive in a future CCS market. After all, Chinese entrepreneurs have been extremely successful in capitalizing on China's transition to a low-carbon economy, specifically with regard to renewable energy and energy efficiency.

These public and private sector trends reflect the fact that attitudes toward CCS in China are neither homogenous nor immutable and that some experts and key decision makers in China are very supportive of CCS. The primary concerns relate to the energy penalty and the cost of CCS given that there is no price for carbon.[93] But this reluctance might eventually wane if the cost of CCS drops over time, if some form of price support for carbon develops in the foreseeable future, and if the U.S. is willing to play a more active leadership role.[94]

China aspires to enhance its global reputation as a responsible and peaceful rising power.

Collaborating with the United States as an equal partner to help solve one of the world's most ominous crises would give China an unparalleled opportunity to assume global leadership.

Indeed, a new chapter is opening both in China's own development and U.S.-China relations with the 60th anniversary of the People's Republic of China and its three decades of "reform and opening" just passed. A joint project on CCS provides a logical and meaningful place to begin weaving a new narrative for Sino-U.S. relations over the next decade.

HA 09/01/2015

VI. Conclusion

This year marked the 30th anniversary of U.S.-China rapprochement. The two counties find themselves once again at a tipping point moment in history. While this important relationship will most certainly evolve in dramatic ways over the next few years, what is uncertain is how it will evolve.

At the same time that the United States and China are reaching to reformat their relations, the world is being confronted by an unprecedented challenge: global climate change. Our immediate short-term interests on the issue may not always seem to be in complete accord, but our long-term interests are unalterably aligned toward the need to collectively solve this daunting global problem.

One area that now presents itself as a logical starting point for collaboration is in carbon capture and sequestration for coal-fired power plants, which make up a structural part of both nations' energy systems. If United States President Barack Obama and Chinese President Hu Jintao could forge a partnership on this issue at their summit meeting in November, it would be an unprecedented step forward not only in the world's efforts to come to terms with climate change, but also in U.S.-China relations. We hope the roadmap outlined in this report can help enable leaders on both sides to seize this opportunity to bring their respective countries together in a meaningful new program of collaboration in this critical area of clean energy technology. Not only would such a step help test CCS as a workable answer to CO_2 mitigation and improve bilateral relations, but it would give a signal at the U.N. climate summit in Copenhagen this December that the U.S. and China are fully engaged in seeking a solution.

Now is the time to start the arduous, but not unhopeful, journey toward closer U.S.-China collaboration, and climate change is an important area for concerted joint effort. There will doubtless be many areas of disagreement that will have to be researched and negotiated, but the immediate challenge is to begin. Such a beginning could catalyze the United States and China to move forward in a convincingly collaborative way.

Acknowledgments

The challenge of undertaking a project such as this roadmap—the successor to the Asia Society and Pew Center on Global Climate Change's "A Roadmap for US-China Cooperation on Energy and Climate Change"—has not only been to help formulate new and effective policy, but to also bring together a collegium of interested and well-informed specialists from civil society, business, science, academia, and government who will henceforth be able be continue collaborating. Those who have worked long and hard on this report share a deep concern about the effects of climate change on our planet and were thus willing to participate in a project aimed at sketching out a concrete course of action to address the emissions from coal-fired plants.

The project was started by the Asia Society's Center on U.S.-China Relations and the Center for American Progress. Thanks are due to Asia Society President Vishakha Desai. Laura Chang and Albert G. Chang, who did much of the heavy lifting at the Asia Society, are due special thanks. They were assisted by John Delury, Leah Thompson, Andrew Smeall, Michael Zhao and Ariane Wu.

At the Center for American Progress, thanks are due to President and CEO John Podesta, who traveled to Beijing to participate in Asia Society's kick-off conference with Peking and Tsinghua Universities on climate change remedies in April 2009. And special thanks are due Julian L. Wong and Dan Sanchez who worked long and hard with Asia Society colleagues to research and write this report.

Without the input of our collegium of experts, it would have been very difficult to get this project "right." This cadre of specialists came from almost every relevant field, and we thank them for all their help along the way. But a very special note of appreciation must be accorded S. Julio Friedmann, from Lawrence Livermore National Laboratory. Dr. Friedmann was extraordinarily generous in sharing his time and expertise, and in drafting key elements of this roadmap.

This report would have had a far less likely prospect of reaching completion without the extraordinary generosity of the Monitor Group who, through the good offices of Peter Schwartz at the Global Business Network, Monitor's sister organization, worked tirelessly and pro bono to galvanize this effort to completion. Scott Daniels and Kurt Dassel headed the very committed and well-informed Monitor team and were ably assisted by Vivek Sekhar and John Benjamin Woo.

We do hope the recommendations of this roadmap will provide a starting point for the governments of both the U.S. and China—as well as all the other stakeholders who are essential to the success of any such public/private partnership—to begin effecting a meaningful collaboration in CCS.

Finally, projects like this cannot begin, much less come to successful fruition, without the financial wherewithal to undertake them. We were underwritten by some very generous support from Jon Anda, the Open Society Institute, the 11th Hour Project and Climate Works, which enabled us to carry out this venture. We are deeply grateful to them.

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Appendices

List of Acronyms

ACES	American Clean Energy and Security Act of 2009 (H.R. 2454)
AFL-CIO	American Federation of Labor and Congress of Industrial Organizations
CDM	Clean Development Mechanism
CCS	Carbon Capture and Sequestration
CO2	Carbon Dioxide
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
GDP	Gross Domestic Product
IEA	International Energy Agency
IGCC	Integrated Gasification Combined Cycle
IPCC	Intergovernmental Panel on Climate Change
MIT	Massachusetts Institute of Technology
NDRC	China's National Development and Reform Commission
MOST	China's Ministry of Science and Technology
PCC	Post-Combustion Capture
ppm	Parts per Million
OPIC	Overseas Private Investment Corporation
TPRI	Thermal Power Research Institute
UMWA	United Mine Workers of American
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change

HA 09/01/2015

Appendix A: Profiles of Selected CCS Projects in the U.S.

CO2 Capture Commercial Projects

Source: IEA Greenhouse Gas R&D Programme

Shady Point, Warrior Run, and Bellingham Cogeneration Power Plants

Project Overview: These plants generate electricity and produce food-grade CO2 from flue gases

Goals:

- Commercial-scale, economical and environmentally-acceptable power generation coupled with CO2 production

Great Plains Synfuels Plant (GPSP) CO2 Capture and Compression

Project Overview: The GPSP is the only commercial-scale coal gasification plant in the United States that manufactures natural gas

Goals:

- To deliver CO2 to the Weyburn unit in Canada

CO2 Capture R&D Projects

Source: IEA Greenhouse Gas R&D Programme

CANMET Energy Technology Centre (CETC) R&D Oxyfuel Combustion for CO2 Capture

Project Overview: The CETC's pre-competitive collaborative R&D program in Ottawa, tackles the development of combustion and pollution abatement technologies for fossil fuels in oxygen (O2) and recycled flue gas (RFG) atmospheres for the purpose of producing high purity CO2 streams that are capture ready for transport and storage

Goals:

- To develop energy-efficient integrated multi-pollutant control, waste management and CO2 capture technologies for combustion-based applications
- To provide information for the scale-up, design and operation of large scale industrial and utility plants based on the oxy-fuel concept

HA 09/01/2015

Physics and Chemistry of Coal-Seam CO2 Sequestration and Coalbed Methane Production

Project Overview: The research will ultimately provide guidelines for drilling of new CBM production wells and enable field engineers to determine if cases of poor CO2 sequestration and/or low methane productivity can be attributed to non-ideal coal bed temperatures/ depths or, perhaps, to other factors

Goals:

- To determine the temperature dependence of CO2 sequestration and methane production.
- To determine adsorption isotherms for pure gases in a static system for coals of NETL interest.
- To develop a flow system to generate adsorption isotherms via numerical techniques established for data analysis

CO2 Geological Storage R&D Projects

Source: IEA Greenhouse Gas R&D Programme

American Electrical Power (AEP) Mountaineer Plant Research Project

Project Overview: In November 2002, the U.S. Department of Energy (US DOE) announced a major new research project to begin studying the potential for geological storage of CO2 at AEP's Mountaineer plant in New Haven, West Virginia, USA

Goals:

- To answer the question of whether the rocks above the possible storage areas are sturdy enough and sufficiently free of interconnected fractures to assure that the CO2 cannot gradually escape

Large scale CO2 Transportation and Deep Ocean Sequestration

Project Overview: Assessing technical and economic viability of large-scale CO2 transportation and deep ocean storage

Goals:

- To assess technical and economic viability of ocean storage using enhanced pipe-laying technology
- To resolve engineering challenges to oceanic tanker transport
- To develop appropriate offshore floating platform/barge for vertical CO2 injection

Laboratory Investigations in Support of Carbon Dioxide-Limestone Sequestration in the Ocean

Project Overview: The project will carry our investigations into the preparation and characteristics of CO2/water/limestone mixtures for the ocean sequestration of CO2

Goals:

- To produce a series of emulsions comprising mixtures of liquid CO2, water and ground limestone
- To test and analyze such emulsions in terms of their chemical and structural characteristics
- To carry out modeling studies of behavior of emulsions after discharge into the ocean
- To produce the optimal mix of reagents such that a stable emulsion is formed with a density greater than that of seawater

CCS Power Generation Projects

Source: Stephen Wittrig, Director of Advanced Technologies for BP

AEP Alstom Mountaineer (W.VA)
Developer: AEP w/Alstom, RWE, NETL and BMI
Size MW: 30 MW
Capture Process: Post-combustion capture
CO2 Fate: Sequestration (saline aquifer)
Start-up: 2009

AEP Alstom Northeastern (OK)
Developer: AEPl Alstom
Size MW: 200 MW
Capture Process: Post-combustion capture
CO2 Fate: EOR
Start-up: 2011

Antelope Valley (ND)
Developer: Basin Electric; Powerspan (USDA loan)
Size MW: 120 MW
Capture Process: Post-combustion capture
CO2 Fate: EOR (Pipe to Canada)
Start-up: 2012

HA 09/01/2015

W A Parish (TX)
Developer: NRG Energy with Powerspan
Size MW: Hueneng 125 MW
Capture Process: Post-combustion capture
CO2 Fate: EOR
Start-up: 2012

Appalachian Power
Developer: AEP
Combustion: IGCC
Size MW: 629 MW
Capture Process: Pre-combustion capture
CO2 Fate: Undecided
Start-up: 2012

FutureGen (IL)
Developer: FutureGen Alliance, 9 international participants remain
Combustion: IGCC
Size MW: 275 MW
Capture Process: Pre-combustion capture
CO2 Fate: Sequestration
Start-up: 2012

AMPGS (OH)
Developer: American Municipal Power-Ohio, Inc. ; Bechtel Power Corporation; Powerspan
Combustion: IGCC
Size MW: 1000 MW
Capture Process: Post-combustion capture
CO2 Fate: EOR
Start-up: 2015

HA 09/01/2015

Appendix B: Profiles of Selected CCS Projects in China

CO2 Capture R&D Projects

Source: IEA Greenhouse Gas R&D Programme

Near Zero Emissions Coal for China (NZEC)

Project Overview: The Phase 1 assessment will explore options for demonstrating CCS for coal-fired power generation in China

Goals:

- To explore options for the demonstration of CCS applied to a coal power plant in China
- To build knowledge and capacity on CCS in China

CO2 Geological Storage R&D Projects

Source: IEA Greenhouse Gas R&D Programme

Development of Coal bed Methane Technology/Carbon Dioxide Sequestration Project (CCCDP)

Project Overview: The project is addressing a number of issues leading to an ECBM/CO2 sequestration demonstration project in China via transfer of Canadian technology

Goals:

- To undertake a programme of work leading to a demonstration project in China
- To produce an inventory of suitable coal beds
- To produce a detailed site selection process
- To carry out micro-pilot and large scale testing in selected areas
- To carry out evaluation and training exercises

EOR Application at Liaohe Oil Field in China

Project Overview: The project is examining the injection of boiler flue gas for enhanced oil recovery coupled with CO2 sequestration in a Chinese oil field

Goals:

- To carry out injection trials using steam and/or flue gases in order to boost oil output and sequester CO2
- To develop the next phase of the project investigating CO2 separation via membrane technology and enriching CO2 levels in combustion flue gas through the use of recirculation technology

CCS Power Generation Projects

Source: Stephen Wittrig, Director of Advanced Technologies for BP

CSIRO PCC Program
Developer: Thermal Power Research Institute (China); Huaneng Group and CSIRO (Australia)
Combustion: Coal Steam Power
Size MW: Hueneng Beijing host plant is 845 MW
Capture Process: Post-combustion capture retrofit
CO2 Fate: Carbonated beverages
Start-up: 2008

Shanghai Shidongkou Second Power Plant
Developer: Huaneng Power International (project in Shanghai for Shanghai 2010 EXPO)
Combustion: Coal Steam Power
Capture Process: Post-combustion capture retrofit
CO2 Fate: Local sales, food and industry, possibly eventual offshore EOR
Start-up: Early 2010

GreenGen
Developer: China Huaneng Group (51%) plus the other 4 State Power companies, Shenhua, China Coal, Peabody has applied to join
Combustion: IGCC
Size MW: 250 MW expanding to 650MW
Capture Process: Pre-combustion
CO2 Fate: Sequestration / EOR
Start-up: 250 MW IGCC plant in 2011, 650 MW IGCC with PC capture in 2013; add EOR CCS in approx 2015

Shenhua CtL
Developer: Shenhua Group
Capture Process: Probably Rectisol (Coal conversion processes such as this plant capture the CO2 as part of the process and emit practically pure CO2)
CO2 Fate: Sequestration (saline aquifer and depleted oil fields)
Start-up: CtL operational CCS 2011

[20] See Scottish Centre for Carbon Storage,"Post-Combustion Capture," October 27, 2007, at http://www.geos.ed.ac.uk/sccs/capture/postcombustion.html and National Energy Technology Laboratory, U.S. Department of Energy, "Carbon Sequestration: CO2 Capture," accessed October 1, 2009, at http://www.netl.doe.gov/technologies/carbon_seq/core_rd/co2capture.html

[21] U.S. Department of Energy, National Energy Technology Laboratory, Carbon Sequestration Atlas of the United States and Canada, 2nd ed., 2008, at http://www.netl.doe.gov/technologies/carbon_seq/refshelf/atlasII/atlasII.pdf.

[22] Casie Davidson, "The Potential for CCS Deployment in China," Pacific Northwest National Laboratory, May 29, 2008, at http://www.pnl.gov/gtsp/docs/2008/GTSP3_China.pdf.

[23] This is an important distinction, because the concentrations of CO2 in a power plant's flue are lower and therefore harder and more expensive to capture. CO2 has been transported and successfully stored underground (e.g., in Sleipner, Norway, and Weyburn, Canada), but at about 1/3 the volumes that would be generated by a single large power plant. Demonstrations involving the injection of 10 times that amount (that is, the CO2 from several power plants) are needed.

[24] This can be done by identifying the most efficient current technologies, developing more efficient technologies for the future, identifying best practices in operations and integration, and so forth

[25] The joint UK-China Near Zero Emissions Coal initiative (see http://www.nzec.info/) and the Australia-China collaboration on post-combustion capture between Australian government research organization CSIRO and China's Thermal Power Research Institute (see http://www.csiro.au/news/newsletters/Energy/0408_energy/HTML/PCC.htm) are examples of bilateral CCS projects involving China. The Asia Pacific Partnership on Clean Development and Climate (see http://www.asiapacificpartnership.org) and Global Carbon Capture and Storage Institute in Australia (see http://www.globalccsinstitute.com) are examples of multilateral efforts in CCS that China is involved in

[26] For further recommendations on U.S. international sequestration collaboration, See Friedmann, S.J., and Newmark, R.L., "Ch 4 Commercial Deployment of Geologic Carbon Sequestration" in Clean Air Task Force, Coal Without Carbon: An Investment Plan for Federal Action, September 2009, at http://www.coaltransition.org/filebin/pdf/Coal_Without_Carbon_Final_High-Resolution.pdf

[27] Friedmann, S.J., 2006, The scientific case for large CO2 storage projects worldwide: Where they should go, what they should look like, and how much they should cost, 8th Greenhouse Gas Technology Conference, Trondheim, Norway

[28] Chinese entities will likely over 60 to 80 percent of the project costs in local expenses, such as drilling, site characterization, geophysical surveys, pipelines, and compressors. The US would likely cover 20 to 40 percent, which would include field scientific and technical support, travel, simulation and analysis, injection planning support, and CO2 injection monitoring and verification. For Chinese participation in a comparable US project, the costs would be reversed

[29] Most of the cost for projects is capital costs, and are reflected in the estimates printed here. There would be a non-zero operating cost as well – roughly $5 to 10 million per year for "pre-captured" pure stream projects and $40 to 200 million per year for retrofit projects. These are costs to be born by the operator, but could potentially be covered through one of the financial mechanisms discussed herein.

[30] I. K. Newlands and R. Langford, CO2 Storage Prospectivity of Selected Sedimentary Basins in the Region of China and South East Asia (Australian Government, Geoscience Australia, Record 2005/13)

[31] Qingyun Sun, "CTL Development in China," U.S. China Energy Center, West Virginia University, April 24, 2008, at http://files.asme.org/asmeorg/Communities/Technical/Energy/16089.pdf

[32] A U.S.-China sequestration collaboration at Ordos could draw lessons from similar collaborative projects around the world, such as the In Salah (Algeria) sequestration project which is injecting around one million tons of CO2 per year into gas reservoirs. In Salah began sequestering CO2 in 2004 through a public/private partnership including BP (32%), Sontrach (35%) and Statoil (32%) and has set precedents for regulations and verification of CO2 storage.

[33] Umbrella organizations such as the Carbon Sequestration Leadership Forum (CSLF) might help facilitate collaborative research, information exchanges and networking. In particular, the policy group of the CSLF conducts research into legal, regulatory, and intellectual property rights issues that could help inform proposed U.S.-China sequestration collaboration. See http://www.cslforum.org/index.html

[34] These projects could include collaboration over Now Gen (Duke Energy's new Edwardsport IGCC-CCS plant) and Green Gen in China (Huaneng's near-zero emission coal-fired plant).Such cooperation between the world's first two demonstration plants with near-zero emission would help accelerate further deployment, ensure a low-carbon success, create new jobs and demonstrate leadership in both Washington and Beijing.

[35] Heads of major government agencies in China (NDRC, NEA, and Ministry of Commerce) and Vice-Premier Wang Qishan have argued that the additional heat, energy, and coal requirements for PCC will reduce power output, lower the rate of economic growth, and reduce coal availability for future generations.

HA 09/01/2015

[57] Indirect jobs are jobs created due to the purchase of goods and services by directly affected industries from other firms as well as purchases by employees of directly and indirectly affected businesses.

[58] The U.S. share of the jobs created is estimated by multiplying the global job figures by 17.69 percent, which is the U.S. share of emissions resulting from coal consumption in 2006 based on data derived from Energy Information Administration, International Energy Annual 2006, at http://www.eia.doe.gov/pub/international/iealf/tableh4co2.xls We expect that our calculations of the U.S share of global jobs in the five-year and 10-year acceleration scenarios may be an underestimate To the extent that the United States, as a result of this collaboration and other efforts is seen to be an early mover of CCS development and deployment, the United States may expect to create a larger share of global CCS jobs than other coal consuming countries

[59] See McKinsey & Co., "Pathways to a Low Carbon Economy," 2009, at http://www mckinsey.com/clientservice/ccsi/pathways_low_carbon_economy.asp.

[60] Over a 15-year period

[61] Over a 12-year period (ramping up plant construction is assumed to require an additional 2 years)

[62] Like the global job figures (see footnote [57] and accompanying text), the U.S share of the cost savings is estimated by multiplying the global cost saving figures by 17.69 percent, which is the U.S. share of emissions resulting from coal consumption in 2006 Again, as in the job analysis, this may be low estimate as a result of the United States' early movement in developing and deploying CCS technology compared to other coal consuming countries.

[63] See "Duke Energy and China-based ENN Group Sign Clean Technology Agreement," press release, September 23 2009, at http://www.duke-energy.com/news/releases/2009092301.asp; and "Duke Energy Signs MOU with China Huaneng Group to Pursue Renewable and Other Clean-Energy Technologies," press release, August 10 2009, at http://www.duke-energy.com/news/releases/2009081001.asp

[64] See "KBR Awarded Clean Coal Contract by Beijing Guoneng Yinghui Clean Energy Engineering Co., Ltd. for First Commercial TRIG™ Implementation Worldwide,"press release, September 18, 2009, at http://www.kbr.com/news/press_releases/2009/09/18/KBR-Awarded-Clean-Coal-Contract-by-Beijing-Guoneng-Yinghui-Clean-Energy-Engineering-Co-Ltd-for-First-Commercial-TRIG-Implementation-Worldwide.aspx

[65] See U.S. Senate Committee on Foreign Relations, Broadening the Bilateral: Seizing the Opportunity for Meaningful Collaboration on Climate Change (Senate Report 111-24, 2009), http://foreign.senate.gov/China pdf.

[66] 70 percent of China's emissions currently come from industry, and by 2030, 350 million Chinese, or 1 25 million per month, will move to urban areas, each requiring 3.5 times more energy to sustain than his or rural counterpart. This rise in China's energy demand would account for one-third of the worldwide increases in energy demand from 2005 to 2030. See U.S. Senate Committee, Broadening; see also Jerald J. Fletcher and Qingyun Sun, "CO2 Sequestration Options for the Shenhua DCL Plant· A Pre-Feasibility Study," West Virginia University, Natural Resource Analysis Center, April 1, 2007, at http://www.nrac.wvu.edu/projects/sheia/publications/CarbonSequestration/WVU/Shenhua_Sequestration_Options_AnnexIIactivity_01Apr2007.doc.

[67] China has been the world's largest coal user since 1986; see Fletcher and Sun, CO2 Sequestration Options.

[68] To meet the demand for electricity that is expected to accompany China's rapid growth, an additional 600 gigawatts of coal-fired capacity (net of retirements) is projected to be brought online in China by 2030 In the near term, the IEO2009 projections show a substantial amount of new coal builds, with 192 gigawatts of capacity additions between 2006 and 2010. See "Chapter 4—Coal," in DOE/EIA, IEO2009, 2009, at http://www.eia.doe.gov/oiaf/ieo/coal html

[69] If by 2050 every country in the world were to cut its emissions by 80%, China's projected emissions alone—driven primarily by coal—would increase average global temperatures by a dangerous 2 7%. See Massachusetts Institute of Technology, "The Future of Coal: Summary Report," 2007, at http://web mit.edu/coal/The_Future_of_Coal_Summary_Report pdf

[70] China has 1.4% of the world's oil reserves and 1.2% of the world's gas reserves; see Fletcher and Sun. CO2 Sequestration Options.

[71] In 2008, sustainable energy investment in China grew to $15.6 billion, an 18% increase. See Sustainable Energy Finance Initiative (SEFI), "Global Trends In Sustainable Energy Investment 2009 Report" 2009, at http://sefi.unep.org/english/globaltrends2009.html In 2008, sustainable energy investment in China grew to $15 6 billion, an 18% increase.

[72] See MIT, Retro-Fitting.

[73] See Gov.cn, The 11th Five-Year, 2006, at http://www.gov.cn/english/special/115y_index.htm, which calls for a 10% reduction in chemical oxygen demand (COD) and SO2 from 2005 levels by 2010.

HA 09/01/2015

[74] People's Republic of China, National Development and Reform Commission, Implementation of the Bali Roadmap: China's Position on the Copenhagen Climate Conference, 2009), http://en.ndrc.gov.cn/newsrelease/t20090521_280382 htm ("Developed countries shall take responsibility for their historical cumulative emissions and current high per capita emissions to change their unsustainable way of life and to substantially reduce their emissions and, at the same time, to provide financial support and transfer technology to developing countries")

[75] See U.S. Senate Committee, Broadening.

[76] Ibid.

[77] Science and International Affairs, Georgetown University, interview by Monitor Group, July 30, 2009.

[78] Energy Technology Innovation Policy (ETIP) Research Group, Tufts University, telephone interview by Monitor Group, August 13, 2009"

[79] See U.S Senate Committee, Broadening. The report notes the agreement among political and military leaders, energy executives, scientists, students, and environmental experts.

[80] Ibid.

[81] GOV.cn, "China calls for more efforts to tackle climate change," July 10, 2009, at http://www.gov cn/english/2009-07/10/content_1361669.htm.

[82] Julian L. Wong and Andrew Light, "China Begins its Transition to a Clean Energy Economy: China's Climate Progress by the Numbers," Center for American Progress, June 4, 2009, at http://www.americanprogress.org/issues/2009/06/china_energy_numbers.html

[83] Xinhua, "China injects "green power" into economy," August 18, 2008, at http://www.chinadaily com.cn/bizchina/2009-08/18/content_8583270.htm

[84] See U.S. Senate Committee, Broadening.

[85] Fu Jing, "Emissions to Peak at 2030: Report," China Daily, August 18, 2009, http://www.chinadaily com cn/china/2009-08/18/content_8580379.htm.

[86] See Wong and Light, China Begins.

[87] Gov.cn. China Legislature Ends Session, Adopts Armed Police Law, Climate Change Resolution (Gov.cn, 2009), http://english.gov.cn/2009-08/28/content_1403439.htm

[88] Julian L. Wong and Isabel Hilton. "Hu Speaks- What Next?" Chinadialogue, Sept 24, 2009 http://www.chinadialogue.net/article/show/single/en/3262-Hu-speaks-what-next

[89] In 2005, CCS was integrated into China's "National Medium and Long-term Science and Technology Development Plan towards 2020." In China's 11th Five-Year Plan (2006-2010), the National High Tech Program ("863" Program) also includes support for CCS

[90] See Standing Committee of the National People's Congress—Climate Change Resolution, August 27, 2009 at http://www npc gov cn/huiyi/cwh/1110/2009-08/27/content_1516122.htm ("..... ....." [English: To accelerate the research, development and deployment of major climate technologies particularly in the fields of energy conservation and energy efficiency, clean coal, renewable energy, nuclear energy and related low carbon technologies; to explore the development of carbon capture and sequestration....])

[91] The following Web sites provide information about these projects· GreenGen Project, http://www greengen.com.cn/en/index.asp; TPRI, Key R&D Programs Funded by Government Authorities in Recent Years, http://www.tpri.com.cn/eng/important.htm; Shenhua Group Corporation Limited, http//www.shenhuagroup.com.cn/english/kjyf_2.html

[92] See Friedman, "Sea Change."

[93] Remarks by David B. Sandalow, U.S. Assistant Secretary of Energy for Policy and International Affairs, at the Center for American Progress, July 22, 2009.

[94] Unless developed countries set up some sort of new multilateral offset fund to begin paying for those industries that capture and sequester CO2, an eventuality which is not soon likely on a meaningful scale.

RELEASE IN PART B6

From: Iris Anaya
Sent: Tuesday, October 20, 2009 9:08:43 AM
To: Huma Abedin
Subject: RE: Please reply B6

No - I have not received the e-mail. Should I tell Alfy his meeting is at 1:00 PM? Also, please forward meeting address. Thank you SO MUCH for all your help.

By the way, did you receive the 19-page fax?

-----Original Message-----
From: Huma Abedin [mailto:Huma@clintonemail.com]
Sent: Monday, October 19, 2009 11:13 PM
To: Iris Anaya
Subject: Re: Please reply

Did u get me email about 1pm mtg?

----- Original Message -----
From: Iris Anaya B6
To: Jiloty, Lauren C <JilotyLC@state.gov>
Cc: Huma Abedin <habedin
Sent: Mon Oct 19 16:44:23 2009
Subject: FW: Please reply

Have tried to contact Huma but she has not replied. Please help.

Also, Huma had asked the reason why Mr. Fanjul wanted to meet with Hillary. I sent her an e-mail telling her to call Mr. Fanjul that he would explain the reason to her by phone.

Mr. Fanjul is here in the office now if you or Huma want to call- B6

Thank you and please reply.

Warm regards,

Iris

From: Iris Anaya
Sent: Monday, October 19, 2009 3:05 PM
To: 'Huma Abedin'
Subject: Please reply

Need to know if Secretary Clinton will have the time tomorrow to meet with Mr. Alfonso (Alfy) Fanjul. Please advise.

Iris Anaya

Personal Assistant

to Alfonso Fanjul

Chairman and CEO

Fanjul Corp.

[redacted]

(561) 655-6303, Main

(561) 835-4795, Fax

[redacted]

B6

RELEASE IN PART B5,B6

From: capriciamarshall
Sent: Tuesday, October 20, 2009 10:43:34 AM
To: Jake Sullivan; Philippe Reines
CC: CDM; Maggie Williams; Evelyn & Ed Lieberman; Nora Toiv; Huma Abedin
Subject: Re: more...gatekeeper crap (ben smith)

B6

I discussed with cdm a few events I would like her to host - B5

Sent via BlackBerry by AT&T

From: Jake Sullivan B6
Date: Tue, 20 Oct 2009 10:08:56 -0400
To: <preines
Cc: CDM<cheryl.mills; Maggie Williams Evelyn Lieberman<; Nora Toiv< Huma Abedin<Huma@clintonemail.com>; CPM<capriciamarshall
Subject: Re: more...gatekeeper crap (ben smith)

i really like the idea pir, call me when you have a sec. B5

On Tue, Oct 20, 2009 at 6:34 AM, PIR <preines> wrote: B6

Cheryl,

B5

I'd rather expend our energy there - it will have more of an impact.

B6

From: cheryl.mills
Date: Tue, 20 Oct 2009 02:43:55 +0000
To: Philippe Reines<
Cc: Maggie Williams<; Evelyn Lieberman<; Jake Sullivan< Nora Toiv<; Huma Abedin- personal email<huma@clintonemail.com>; Cheryl Mills<; Capricia Marshall-
Subject: Fw: more...gatekeeper crap (ben smith)

B5
B6

Cdm

Sent via BlackBerry by AT&T

B6

From: Nora Toiv
Date: Mon, 19 Oct 2009 21:52:56 -0400
To: Cheryl Mills<
Subject: more...gatekeeper crap (ben smith)

Clinton's gatekeeper

Al Kamen channels some Foggy Bottom grumbling blaming Cheryl Mills, Hillary Clinton's chief of staff for making Clinton inaccessible to career diplomats.

(Laura has the counter-argument.)

HA 09/01/2015

Across town, Mills has also gotten some backs up in the White House during her tenure, as I mentioned in passing a while ago. A top lawyer in the Clinton White House, Mills was been a hard-liner during the Clinton campaign, pushing for sharper-edged attacks on Obama. She brought some of that stance to State, where she fought tooth and nail in the early days of the administration to control mid-level staff jobs, like the agency's White House liaison, and to ensure that those jobs went to "Hillary people" rather than "Obama people," people on both sides has told me.

Mills has shaped a State-Department-as-Hillaryland, where political staffers are loyal to the Secretary, and where I can't think of a single appointee who supported Obama during the campaign. But the power remains in the White House, and the result has been, some Clinton backers worry, a certain marginalization.

Posted by Ben Smith 12:22 PM

From: Huma Abedin [Huma@clintonemail.com]
Sent: Tuesday, October 20, 2009 11:10:51 AM
To: 'capriciamarshall
Subject: Re: - résumé

RELEASE IN PART B6

B6

Tell them to do talking points
And we will sign

----- Original Message -----
From: capriciamarshall
To: Huma Abedin; H
Sent: Tue Oct 20 09:25:13 2009
Subject: Re: - résumé

Yes - and it is.
-----Original Message-----
From: Huma Abedin
To: 'capriciamarshall
To: Clinton
Sent: Oct 20, 2009 8:29 AM
Subject: Re: Fwd: - résumé

A recommendation letter?
This must be the young daughter.

----- Original Message -----
From: Capricia Marshall
To: Huma Abedin; H
Sent: Tue Oct 20 08:12:18 2009
Subject: Fwd: - résumé

This is - who is interested in attending Georgetown next year. She is clearly a good student. She is hoping for your support.

-------- Forwarded message --------
From:
Date: 2009/10/18
Subject: - résumé
To: capriciamarshal

Dear Ambassador Marshall,

Thank you very much for helping me with my college admissions process.
As per our conversation I have attached my résumé in this e-mail.

Thanks again for taking the time to help me, please let me know if you need any additional information.

Respectfully,

Sent via BlackBerry by AT&T

From: Abedin, Huma <AbedinH@state.gov>
Sent: Thursday, October 22, 2009 10:32 PM
To: humamabedin
Subject: Fw: Final Memo for S Development Session tomorrow -- pse make sure you give her this one rather than the one i just sent to development group
Attach: S_Development_Memo_10_22_09 final.docx

RELEASE IN PART B6

B6

From: Slaughter, Anne-Marie
To: Abedin, Huma; Mills, Cheryl D
Sent: Thu Oct 22 21:04:05 2009
Subject: Final Memo for S Development Session tomorrow -- pse make sure you give her this one rather than the one i just sent to development group

Pse get it to her asap. Thanks.

Anne-Marie Slaughter
Director of Policy Planning
U.S. Department of State
(202) 647-2972

HA 09/01/2015

RELEASE IN PART B6

From: PIR [preines[redacted]
Sent: Saturday, October 24, 2009 10:50:29 AM
To: Jake Sullivan; H; Huma Abedin
Subject: Re: Parade

B6

Plus - I made a new friend in Les Gelb - we have connected on our love of cats (he has 3)

-----Original Message-----
From: "Sullivan, Jacob J" <SullivanJJ@state.gov>
Date: Sat, 24 Oct 2009 10:49:20
To: <preines[redacted]<HDR22@clintonemail.com>; <Huma@clintonemail.com>
Subject: Re: Parade

I second Philippe's take, on all counts.

----- Original Message -----
From: PIR <preines[redacted]
To: Evergreen <HDR22@clintonemail.com>; Huma Abedin <Huma@clintonemail.com>; Sullivan, Jacob J
Sent: Sat Oct 24 10:26:17 2009
Subject: Re: Parade

Photo is gorgeous (and there are 20 more online, some are really great)

The article is good, just way too short, so it became very matter of fact, didn't include a lot of the great stuff he saw that day. They cut what he turned in in half.

But for this readership, that length is probably perfect. It supposedly gets seen by 70 million people. 69 million probably never open it up and just see it in their Sunday paper, so the cover is the ballgame. Story is basically an excuse for the cover. And the cover is a homerun.

In the end, I firmly believe it will be the totality all these in-depth projects like Vogue, National Geographic, Nightline, Time - which I know are annoying - that are going to create a collage documenting your success, especially in terms of style and work ethic, which I believe is what people are most interested when it comes to their perception and approval of you.

------Original Message------
From: Evergreen
To: PIR
To: Huma Abedin
To: 'sullivanjj@state.gov'
Subject: Parade
Sent: Oct 24, 2009 10:17 AM

What did you think of the photo and article?

From: Huma Abedin [Huma@clintonemail.com]
Sent: Saturday, October 24, 2009 1:45:31 PM
To: 'preines [redacted] H; 'SullivanJJ@state.gov'
Subject: Re: Parade

RELEASE IN PART B6

B6

Love it!!

----- Original Message -----
From: PIR [redacted]
To: H; Huma Abedin; 'sullivanjj@state.gov' <sullivanjj@state.gov>
Sent: Sat Oct 24 10:26:17 2009
Subject: Re: Parade

Photo is gorgeous (and there are 20 more online, some are really great)

The article is good, just way too short, so it became very matter of fact, didn't include a lot of the great stuff he saw that day. They cut what he turned in in half.

But for this readership, that length is probably perfect. It supposedly gets seen by 70 million people. 69 million probably never open it up and just see it in their Sunday paper, so the cover is the ballgame. Story is basically an excuse for the cover. And the cover is a homerun.

In the end, I firmly believe it will be the totality all these in-depth projects like Vogue, National Geographic, Nightline, Time - which I know are annoying - that are going to create a collage documenting your success, especially in terms of style and work ethic, which I believe is what people are most interested when it comes to their perception and approval of you.

------Original Message------
From: Evergreen
To: PIR
To: Huma Abedin
To: 'sullivanjj@state.gov'
Subject: Parade
Sent: Oct 24, 2009 10:17 AM

What did you think of the photo and article?

RELEASE IN PART B6

From: Abedin, Huma <AbedinH@state.gov>
Sent: Saturday, October 24, 2009 3:48 PM
To: humamabedin
Subject: Fw: Coming to a doorstep near you...

B6

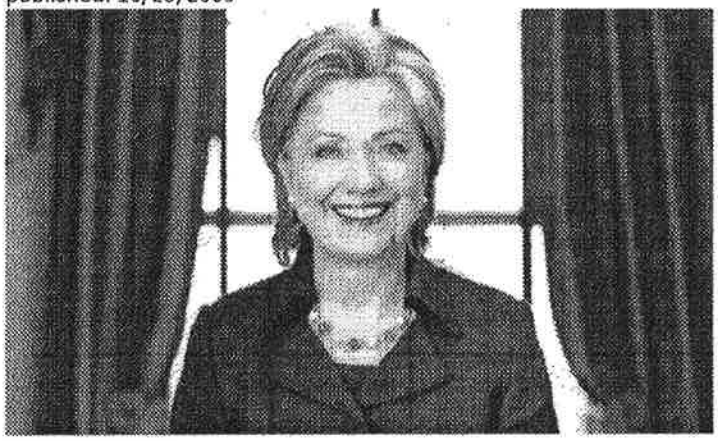
From: Adler, Caroline E
To: Reines, Philippe I; Merrill, Nicholas S; Schwerin, Daniel B; Yehl, Ashley C (PACE); Connell, Ellen K; Abedin, Huma; Sullivan, Jacob J; Valmoro, Lona J; Jiloty, Lauren C; Coleman, Claire L; Hanley, Monica R; S_SpecialAssistants; Toiv, Nora F; Mills, Cheryl D; Dewan, Linda L; Rubin, Ali M
Sent: Fri Oct 23 15:21:20 2009
Subject: Coming to a doorstep near you...

(Parade has a circulation of 32 million and a readership of 71 million)

http://www.parade.com/news/2009/10/25-24-hours-with-secretary-of-state-hillary-clinton.html

Parade Magazine: 24 Hours With Secretary of State Hillary Clinton

by Leslie H. Gelb
published: 10/25/2009



Related Features
1. A Day in the Life of Hillary Clinton
2. 'We Are Prepared and Resilient'
3. 'We Are Prepared and Resilient'

"We're going to work you to death," Hillary Clinton promised me with a laugh. She was taking me—and PARADE's readers—along on a typical day in the life of the U.S. Secretary of State. Our 24 hours together would prove both grueling and inspirational, full of diplomatic pageantry, big meetings with policy brainiacs, small sessions with trusted aides, a stream of time-consuming formal duties, and, of course, phone calls and more phone calls. The Secretary allowed me to be a fly on the wall for almost every minute, under the constantly watchful eyes of the Diplomatic Security Service. Having known her since her husband began his first run for the White House in 1991, I couldn't stop myself from calling her Hillary. To everyone else, however, she was always Madame Secretary.

See Our Exclusive Photo Essay: A Day in the Life of Madame Secretary

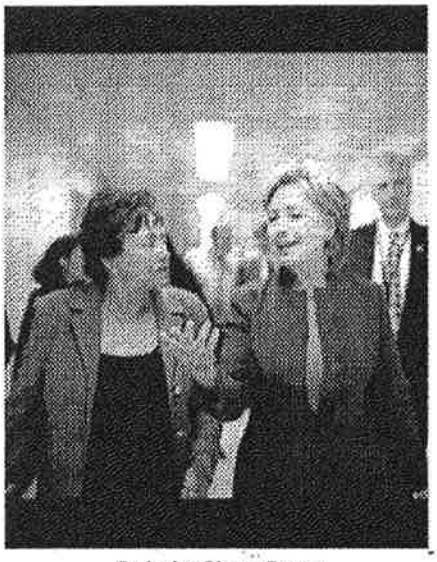
September 15
6:45 p.m. *Iftar* Dinner
Two hundred prominent Muslim-American leaders gather at the State Department for *iftar*, the evening meal when

Muslims break their daily fast during the holy month of Ramadan. All enter the glittering Benjamin Franklin State Dining Room for an evening of low-key politicking. Muslims have been seeking a position in American politics commensurate with their roughly 6 million in numbers. Clinton is looking for support in upcoming talks between deadlocked Palestinians and Israelis. The evening's big surprise: After Clinton's brief talk, a rabbi strolls about introducing the Arab kingdom of Bahrain's ambassador to the U.S.—w ho is both a woman and a Jew.

September 16

8:30 a.m. Daily Small Staff Meeting

The Secretary and six of her closest aides, including Chief of Staff Cheryl Mills and Deputy Chief Huma Abedin, both of whom worked on her Presidential campaign, review the day's schedule, looking for trouble and opportunities. They meet in Clinton's small, personal office just behind her larger, formal quarters. Practically every day begins this way. They touch on various explosive international hot spots: Pakistan, Afghanistan, Iran, Iraq, Israel, North Korea. Though they don't talk about it, they seem ever aware of President Barack Obama's iron-handed control of decisions. One worry today: the President's decision to cancel the U.S. missile shield in Eastern Europe—a move bound to displease Poles, Czechs, and Republicans.



Exclusive Photo Essay:
A Day in the Life of Hillary Clinton

8:45 a.m. Daily Senior Staff Meeting

The State Department's top 15 officials gather in Clinton's formal conference room to expand on matters discussed at the preceding meeting. Deputy Secretary Jack Lew talks about helping Pakistan with its severe energy shortages. Clinton says she wants to find "a signature project" that catches Pakistani attention and demonstrates American assistance. Then she comes back to stalemated Israeli-Palestinian negotiations, telling key aides to "get the Jordanians and Egyptians to talk to the Palestinians." Whatever subject comes up, Clinton calls on her practical instinct: " We've got to do a better job explaining to people around the world what we're doing."

9 a.m. Breakfast With Rep. Nita Lowey

Down from the seventh floor to the first for a session with Representative Lowey (D., N.Y.), Clinton's friend and a key House leader on Afghanistan and Pakistan. They have a frank discussion of growing opposition on Capitol Hill to the war in Afghanistan—and what to do about it.

9:30 a.m. Energy-Security Briefing

State Department energy czar David Goldwyn briefs Clinton on two key Obama priorities: finding alternatives to importing foreign oil and reducing greenhouse-gas emissions. Clinton listens carefully, then urges Goldwyn to "identify people we need to hire" and press forward.

10:50 a.m. Recording Videos

Clinton records four thank-you videos to various people and groups.

11:05 a.m. Visit to the White House

Clinton's new bomb-proof limo slips through the side entrance of the White House so she can meet with President Obama and Canadian Prime Minister Stephen Harper. They discuss trade issues and Canada's shift away from a combat role in the war in Afghanistan. I'm not allowed into this meeting.

12:10 p.m. Ceremony for Senegalese Diplomats

For any who doubt the continuing majesty and importance of America in the world, this event is a stunning curative. The U.S. is giving $540 million in aid to Senegal. While that's no big deal to the few Americans in attendance, the 250 Senegalese and African leaders present brim with pride. Clinton sticks to no-nonsense themes: "We want to be partners, not a patron." And: "Senegal's government and people have to make sure we deliver to your country what we both

promise." In diplomacy, this counts as blunt talk, but her audience likes it anyway.

24 Hours With Secretary of State Hillary Clinton

by Leslie H. Gelb
published: 10/25/2009
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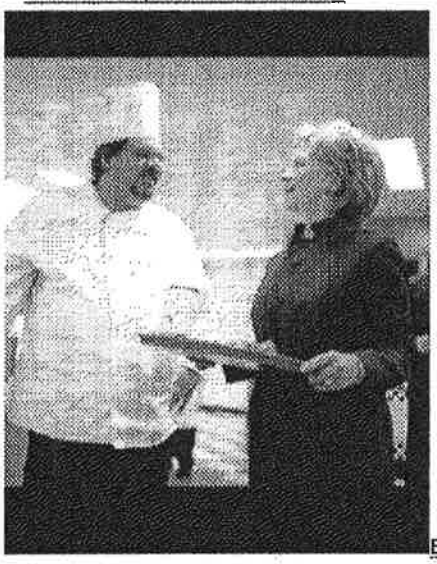

Exclusive Photo Essay: A Day in the Life of Hillary Clinton

1 p.m. Lunch With Leslie Gelb
We eat in the courtyard adjoining the State Department's first-floor employee cafeteria. Diners gape as Clinton goes through the line, although she does this—most unusually for the nation's top diplomat—nearly once a month. Many burst into applause.

We sit at a table away from the crowd. Clinton has a hard edge to her foreign-policy views and generally positions herself to the right of her colleagues in national security. Yet she staunchly defends President Obama and his prerogatives. While she's "not satisfied that we're executing as we should" in Afghanistan, Pakistan, and elsewhere, she nonetheless argues for continuing "present directions" in most areas. When I question whether the U.S. really has vital interests in Afghanistan, she shoots back that if we simply leave and allow the Taliban to return, al-Qaeda "would come right back, and we'd be worse off in Pakistan." She continues: "Despite how hard Afghanistan is, we have to make progress. And what we do and what happens in Afghanistan will affect Pakistan." Regarding Iran, she says, "We can't choose negotiating partners in countries like Iran. So we've got to look for ways to change the perceptions of those we have to negotiate with."

And what of the rumors, I venture, that she's unhappy and may step down to run for governor of New York or her old Senate seat? She guffaws. "What nonsense! I love this job and working for President Obama and trying to do something about the critical problems we face in the world—and that's what I'm going to do."

2:15 p.m. U.S.-India Strategy Dialogue
Some 60 Executive Branch officials assemble to discuss strategy toward India—one of the new major powers in the world. Clinton stays briefly to bless the effort.

3 p.m. Meeting With Bangladeshi Foreign Minister
The new Bangladeshi foreign minister, Dipu Moni, a woman with perfect British-accented diction, regales Clinton about the positive changes under way in her country, which is led by a female prime minister. Clinton advises: "You need to continue to strengthen your middle class, continue to engage with your political opposition, help women in your society—and we'll help you." She adds, "Democracy has to deliver, or people will turn away." Before they leave for a joint press conference, Clinton suggests a limit of "only one question for each of us, because otherwise they'll just ask me questions on every subject except Bangladesh." Clinton proves right, but Moni departs happy nonetheless. She would be on television throughout her part of the world, alongside the U.S. Secretary of State. There is no American coverage of the event.

4 p.m. Swearing-in of Maria Otero, Undersecretary of State for Democracy and Global Affairs
Again in the Franklin room, a couple of hundred people, including Senators and Congressmen, stand for a historic

occasion: the swearing-in of the first Hispanic undersecretary of state—who is a woman to boot. Clinton allows her sly sense of humor to peek through. She teases Otero about the hundreds of uncles, aunts, and cousins in attendance, much to the delight of the crowd. The Hispanic vote matters to Democrats, andOtero has a fine reputation.

4:30 p.m. Meeting With Undersecretary for Public Diplomacy and Public Affairs Judith McHale and Special Representative Richard Holbrooke

McHale and Holbrooke describe a practical way to counter Taliban propaganda and enhance America's image in Pakistan. Their approach turns on two key facts: that 50% of Pakistanis are illiterate and that 60% of them are under age 30. The idea: reach them through radio, cellphones, and cable TV. Clinton approves and orders swift action.

See Our Exclusive Photo Essay: A Day in the Life of Madame Secretary

5:30 p.m. Swearing-in of James Smith, U.S.Ambassador to Saudi Arabia

Clinton doesn't do every swearing-in, but this one is for Saudi Arabia, an important country, and the new ambassador is a former Air Force general who represents a constituency where Democrats don't have much support. After giving short, personal remarks and spending an hour hobnobbing, Clinton departs to begin a battery of telephone calls.

On a line electronically secured from eavesdroppers, she converses with George Mitchell, the Middle East envoy (twice); National Security Advisor James Jones (twice); U.S. Ambassador to Afghanistan Karl Eikenberry (from Kabul); Dennis Blair, the director of national intelligence; and Sen. John Kerry, chairman of the Senate Foreign Relations Committee.

7:30 p.m. Policy Dinner on Iran

Some 30 Iran experts from inside and outside the government assemble for a dinner and discussion that lasts until 9 p.m. Clinton loves to stir the pot, so she tells the assembled guests about our lunch. "Les Gelb," she says, "told me today that in the next five to 10 years, Iran would be our closest ally in that region of the world, that the two countries have common interests, and that America has genuine public support in Iran." Few agree, but Clinton gets a good argument going.

I scurry to catch the last flight back to New York. The Secretary, with her unfailing smile, repairs to her office for more calls and reading. It's hard to read the mind of someone frozen in the public spotlight like Hillary Clinton. She has to be perpetually onstage. But what I think I glimpse beneath the unflagging smile and constant concentration is a very tired person—tense, frustrated, but absolutely determined to make her tenure as Secretary of State a success and to accomplish important things.

Leslie H. Gelb is president emeritus of the Council on Foreign Relations and has served in senior positions in the Departments of State and Defense. He is the author of the book "Power Rules: How Common Sense Can Rescue American Foreign Policy."

EXECUTIVE SUMMARY

The Annual Report

The *Annual Report on International Religious Freedom* records the status of respect for religious freedom in all countries during the period from July 1, 2008 to June 30, 2009. The *Annual Report*'s primary focus is on the actions of governments, including those that contribute to religious repression or tolerate violence against religious minorities as well as those that protect and promote religious freedom. Each country report contains sections covering the country's religious demography; government respect for religious freedom (including the legal and policy framework, restrictions on religious freedom, abuses of religious freedom, and improvements and positive developments); societal respect for religious freedom; and U.S. Government policy and actions. We strive to report fairly and accurately, with sensitivity to the complexity of religious freedom in varied settings.

The International Religious Freedom Act of 1998 (IRF Act) designates the promotion of religious freedom for all persons as a core objective of U.S. foreign policy. U.S. advocacy for religious freedom is grounded in our commitment to advance respect for human rights and fundamental freedoms worldwide. The vast majority of the world's population professes some religious belief or identification. The right to believe or not to believe, without fear of government interference or restriction, provides an essential foundation for human dignity, robust civil society, and sustainable democracy. This principle holds a central place in American culture, values, and history. It is also a global concern; both the Universal Declaration of Human Rights and the International Covenant on Civil and Political Rights articulate the right to freedom of thought, conscience, and religion or belief.

The IRF Act also provides the mandate for this report and prescribes the principal topics for this Executive Summary: following an introductory overview of challenges to religious freedom, Part I outlines the religious freedom situations in selected countries, Part II addresses U.S. actions in designated countries of particular concern (CPCs), and Part III discusses improvements and positive developments, with a special section on efforts to promote interfaith dialogue and understanding.

State-Sponsored Challenges to Religious Freedom

Religious freedom can be restricted in a variety of ways, from the overt to the subtle. The five categories below provide an analytic framework for recognizing the range of limitations on religious freedom.

1) Authoritarian Governments. The most severe abuses take place in certain strict authoritarian regimes that seek to control all religious thought and expression as part of a more comprehensive state control of expression and civic life. These regimes regard some groups as enemies of the state because of their religious beliefs or because they undermine unquestioned loyalty to the state. Some governments cite political security concerns as a pretext to repress peaceful religious practice. This report distinguishes between expression of legitimate political grievances by groups of religious believers and misuse of religion to advocate and undertake violence against other groups or the state.

2) Hostility toward minorities. Serious abuses occur where there is state hostility toward minority or non-approved religious groups. While not exerting full control over these groups, some governments intimidate and harass religious minorities and tolerate societal abuses against them. In severe cases, governments may demand that minority adherents renounce their faith or force them to relocate or even flee the country. This report takes careful note of the relationships between religious identity and ethnicity, especially in cases in which a government dominated by a majority ethno-religious group suppressed the religious expression of minority groups. Also detailed in this report are instances in which governments were hostile to a minority religious group because of the group's real or perceived political ideology or affiliation.

3) Failure to address societal intolerance. Some states fail to address forces of intolerance against certain religious groups. In these countries, laws may discourage religious discrimination or persecution, but officials fail to prevent attacks, harassment, or other harmful acts against certain individuals or religious groups. Protecting religious freedom requires more than having good laws and policies in place. Governments also have the responsibility to work at all levels to prevent abuses, to bring abusers to justice, to provide redress to victims when appropriate, and to proactively foster an environment of respect and tolerance for all people.

4) Institutionalized bias. Governments sometimes restrict religious freedom by enacting discriminatory legislation or taking concrete action to favor majority religions. These circumstances often result from historical dominance by a majority religious group and can result in institutionalized bias against new or

historic minority religious communities. This report highlights instances in which government endorsement of a particular interpretation of the majority religion resulted in restrictions on adherents of that religion who follow a different interpretation.

5) Illegitimacy. Some governments discriminate against specific groups by identifying them as dangerous or illegitimate because they are regarded as dangerous to individuals or societal order, describing the groups with terms such as "cults" or "sects," thereby perpetuating the stigmatization of the groups and encouraging or implicitly condoning acts of violence against them. This practice is relatively common even in countries where religious freedom is otherwise respected.

Multilateral, Global, and Regional Challenges to Religious Freedom

In addition to these country-by-country concerns, the wide spectrum of efforts to undermine the right to religious freedom extends to multilateral, regional, and global fora. For instance, over the past decade, the Organization of the Islamic Conference (OIC), an inter-governmental organization comprising 57 states with majority or significant Muslim populations, has worked through the United Nations (UN) to advance the concept of "defamation of religions" by introducing annual resolutions on this subject at the UN Human Rights Council and UN General Assembly. While the United States deplores actions that exhibit disrespect for particular religious traditions, including Islam, we do not agree with the "defamation of religions" concept because it is inconsistent with the freedoms of religion and expression.

The United States understands the primary concern of the resolution to be the negative stereotyping of members of religious groups, particularly minority groups, and the contribution of such stereotypes to disrespect and discrimination. The United States shares concerns about the impact of negative stereotypes and believes that such stereotyping, particularly when promoted by community, religious, or government leaders, contributes to disrespect, discrimination, and in some cases, to violence. The United States, however, believes the best way for governments to address these issues is to develop robust legal regimes to address acts of discrimination and bias-inspired crime; to condemn hateful ideology and proactively reach out to all religious communities, especially minority groups; and to defend vigorously the rights of individuals to practice their religion freely and to exercise their freedom of expression.

The forcible return of individuals from another country to face persecution or abuse in their home country in retribution for their religious activism is also of grave concern to the United States. During the reporting period, the Government of China reportedly sought the forcible return of several Muslims living in other countries, including Syria; during previous periods it had done so with Muslims living in Saudi Arabia and Pakistan. Some had reportedly protested restrictions on the Hajj and encouraged other Muslims to pray and fast during Ramadan. There were credible reports that the Government of China tortured and, in some cases, executed individuals who had been forcibly returned, including some who advocated for religious freedom. Similarly, the Government of Uzbekistan continued to pursue the extradition of suspected Uzbek religious extremists from third countries, particularly from Kyrgyzstan, Russia, and Ukraine, including those who had sought asylum. During the reporting period, at least two individuals seeking political asylum in Kyrgyzstan were forcibly extradited to Uzbekistan and imprisoned on religious extremism charges.

PART I: RESTRICTIONS, ABUSES AND CONCERNS

This section summarizes overall conditions during the reporting period in some countries where violations of religious freedom have been noteworthy. Some of these countries have also seen some positive developments, and these are highlighted in Part III. Additional information can be found in the country reports.

Afghanistan

The Constitution states that Islam is the "religion of the state" and that "no law can be contrary to the beliefs and provisions of the sacred religion of Islam." In 2004, the Constitution accorded Shi'a and Sunni Islam equal recognition. It proclaims that "followers of other religions are free to exercise their faith and perform their religious rites within the limits of the provisions of law." The Government took limited steps to increase religious freedom; however, serious problems remained. In April 2009 President Karzai signed a controversial law limiting the rights of women from the Shi'a minority. International partners of Afghanistan objected strongly to the law. The President agreed to suspend enactment of the law until the Ministry of Justice had reviewed and amended it. The review process was ongoing at the end of the reporting period. Although the Government and political leaders aspire to a national environment that respects the right to religious freedom, the residual effects of years of jihad against the former Soviet Union, Taliban rule, civil strife, popular suspicion regarding outside influence of foreigners, and still weak democratic institutions hindered the realization of this aspiration. Intolerance was manifested in harassment and occasional violence against religious minorities

and Muslims perceived as not respecting Islamic strictures. Within the Muslim population, relations among the different sects continued to be difficult. Non-Muslim minority groups, including Christians, Hindus, and Sikhs, continued to face incidents of discrimination and persecution. Many citizens understand conversion as contravening the tenets of Islam and Shari'a, and most local Christians do not publicly state their beliefs or gather openly to worship.

Azerbaijan

The Constitution provides for freedom of religion. There were changes to the Constitution approved during the reporting period, however, that undermined religious freedom. On March 18, 2009, a national referendum approved a series of amendments to the Constitution; two amendments limit the spreading and propagandizing of religion. On May 8, the Milli Majlis (Parliament) passed an amended Law on Freedom of Religion, signed by the President on May 29, which could result in a more restrictive system of registration for religious groups. In spite of these developments, the Government continued to respect the religious freedom of the majority of citizens, with some notable exceptions for members of religions considered non-traditional. Both Muslim and non-traditional Christian groups reportedly experienced monitoring as well as instances of harassment and detention. There were mosque closures as well as State and locally sponsored raids on evangelical Protestant religious groups.

Brunei

Government respect for religious freedom deteriorated during the reporting period as the Government restricted religious freedom for non-Muslims. Non-Muslims were prohibited from receiving religious education in private religious schools, which had previously been allowed. Non-Muslims also faced social and, at times, official pressure to conform to Islamic guidelines on behavior. The Government maintained a ban on a number of groups it considered "deviant." Government policies generally discouraged the population from being exposed to religions besides Islam. Across denominational lines, non-Muslim religious leaders stated that they were subject to undue influence and duress and some were threatened with fines and/or imprisonment. Active monitoring of churches and disruption of supply shipments and mail were reported. Laws and regulations generally limited access to religious literature, places of worship, and public religious gatherings for non-Muslims. The Government continued to favor the propagation of Shafi'i beliefs and practices, as well as the Malay Islamic Monarchy belief system, particularly through public events and the education system. Muslims remained subject to the Government's interpretation of Shari'a (Islamic law).

Burma

The 2008 Constitution provides for freedom of religion; however, it also grants broad exceptions that allow the regime to restrict those rights at will. Most adherents of registered religions were permitted to worship as they chose, but the Government continued to infiltrate and monitor activities of virtually all organizations, including religious ones. It systematically restricted efforts by Buddhist clergy to promote human rights and political freedom. Many of the Buddhist monks arrested in the violent crackdown that followed the pro-democracy demonstrations of September 2007, including prominent activist monk U Gambira, remained in prison serving long sentences. The Government actively promoted Theravada Buddhism, particularly among minority ethnic groups. Although there were no new reports of forced conversions of non-Buddhists, the Government applied pressure on students and poor youth to convert to Buddhism. Adherence to Buddhism remains generally a prerequisite for promotion to senior government and military ranks. Anti-Muslim violence continued, as did the close monitoring of Muslims' activities. Restrictions on Christians and other non-Buddhist minority groups also continued throughout the country.

China

The Constitution protects only "normal religious activities," and officials have wide latitude to interpret the meaning of "normal." Citizens do not have the ability to bring legal action based on the Constitution's guarantees of religious freedom. The Government officially restricts legal religious practice to the five (Buddhist, Taoist, Muslim, Catholic, and Protestant) state-sanctioned "patriotic religious associations." The treatment of religious groups varied significantly among different religions and different locations. During the reporting period, officials continued to scrutinize and in some cases interfere with the activities of religious and spiritual groups. In some areas government officials violated the rights of members of unregistered Protestant and Catholic groups, Uighur Muslims, Tibetan Buddhists, and members of groups the Government determined to be "evil religions," especially the Falun Gong. The Government strongly opposed the profession of loyalty to religious leadership outside the country, most notably the Pope and the Dalai Lama. Government officials asked some unregistered Protestant house churches in Beijing to stop meeting during the 2008 Olympic Games.

China - Tibetan Autonomous Region and Xinjiang Uighur Autonomous Region

The Government's repression of religious freedom remained severe in Tibetan areas and in the Xinjiang Uighur Autonomous Region (XUAR). Religious adherents in the XUAR, the Tibetan Autonomous Region (TAR), and other

Tibetan areas suffered severe restrictions on religious activity, as a consequence of the Government's tendency to conflate concerns about separatism and religious extremism with peaceful expressions of religious beliefs and political views. In the XUAR, the Government's concerns also included terrorism. After the March 2008 protests in the TAR and other Tibetan regions, the Government harshly criticized the Dalai Lama and accused him of instigating the protests. Ethnic Tibetans and Uighurs had difficulty obtaining passports from the Government, limiting their ability to travel abroad for religious purposes. Tibetan Buddhist monks and nuns also reported that they were frequently denied registration at hotels, particularly during sensitive times, including the period around the Beijing Olympics.

Cuba

The Constitution recognizes the right of citizens to practice any religious belief within the framework of respect for the law; however, the Government continued to assert itself over all aspects of social life, including religious expression. Religious groups complained about widespread surveillance and infiltration by state security agents. Various religious groups reported fewer restrictions on politically sensitive expression, the ability to hold religious activities, increased capacity to conduct charitable and community service projects, fewer import and travel restrictions, permission to repair buildings, and significant increases in membership. The Government continued to maintain strict controls on the construction of new buildings for religious purposes, and permission was difficult to obtain. The Government does not permit private schools, including religious schools.

Egypt

The Constitution provides for freedom of belief and the practice of religious rites, although the Government places restrictions on these rights in practice. Islam is the official state religion, and the principles of Shari'a (Islamic law) are the primary source for legislation. The status of respect for religious freedom by the Government declined somewhat during the reporting period, based on the failure to investigate and prosecute perpetrators of increased incidents of sectarian violence. There were some positive developments, however, including actions by the courts and the Ministry of Interior that opened the door for the possibility that all of the country's Baha'is would eventually be issued national identification documents that contain a dash or the term "other" in the religious affiliation field. The Government continued to sponsor "reconciliation sessions" following sectarian attacks, which generally precluded the prosecution of perpetrators of crimes against Copts and prevented their recourse to the judicial system for restitution. This practice contributed to a climate of impunity that encouraged repetition of the