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Sent: 6/19/2012 4:50:03 PM

To: Allen, Meredith (/O=PG&E/OU=Corporate/cn=Recipients/cn=MEAE); Jayne Battey (jayne@miramarenv.com); Ross-leech, Diane (/O=PG&E/OU=CORPORATE/CN=RECIPIENTS/CN=DPR5); Cherry, Brian K (/O=PG&E/OU=CORPORATE/CN=RECIPIENTS/CN=BKC7); Loduca, Janet C. (/O=PG&E/OU=CORPORATE/CN=RECIPIENTS/CN=J1LC); McDonald, Brian (/O=PG&E/OU=CORPORATE/CN=RECIPIENTS/CN=BMMN); Johnson, Aaron (/O=PG&E/OU=Corporate/cn=Recipients/cn=AJJ9); Carlos A. Garcia (cagarcia@siliconvalleycf.org); Ann Marie Johnson (ajohnson@chevron.com); Craig Tighe (craig.tighe@dlapiper.com); Bell, Des (/O=PG&E/OU=CORPORATE/CN=RECIPIENTS/CN=D4BA); Kraska, David (Law) (/O=PG&E/OU=Corporate/cn=Recipients/cn=DTK5); Redacted
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Subject: RE: Notes from the Energy Conference: A Hamilton Project Forum at Stanford

Thanks Jayne. We at EPRI have a research project underway to review the potential environmental impacts of shale gas production (including produced water but also air emissions, induced seismicity, and habitat fragmentation among others) and our early work is showing them to be non-trivial, but responsive to mitigation actions. Your concern about the smaller producers is spot-on, but thankfully low gas prices and oversupply due to full storage and a mild winter is driving most of them out of the market. Those with critical mass are being snapped up by the larger oil/gas producers (e.g. XTO Energy is now a subsidiary of ExxonMobil) who are much more visible and therefore more proper in their environmental practices. So I'm less worried about the small firms.

On energy efficiency and the smart grid, there is indeed a lot of conversation but relatively little construction. There are a number of demonstration projects of various sizes and shapes (including potentially at Moffett Field) but none really approach the "net-zero" energy, waste and water consumption footprint that will truly be needed in a sustainable world. We are tracking most of the known projects at <http://smartgrid.epri.com>. As the CA Council on Science and Technology wrote in its report last year on "California's Energy Future", a step-change improvement in energy efficiency is an absolute prerequisite if we are to enable the State to grow as projected while simultaneously reducing our GHG emissions by 80% or more from today's levels by 2050. Lots of opportunity here!

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From: Jayne Battey [mailto:jayne@miramarenv.com]

Sent: Monday, June 18, 2012 6:00 PM

To: Meredith Allen; Ann Marie Johnson; Brian Cherry; Loduca, Janet; Brian McDonald; Aaron Johnson; Ross-leech, Diane; Hannegan, Bryan; Craig Tighe; Carlos A. Garcia; Christopher Carr; Susan Bragagnolo; [Redacted] Kraska, David (Law); Bell, Des; Paul Clanon; Nancy Ryan; Lynette Curthoys; Art Geis

Subject: Notes from the Energy Conference: A Hamilton Project Forum at Stanford

Hi everyone. I hope this email finds you well. I wanted to take a moment to send you my notes from the energy conference at Stanford last week. It was an amazing group of speakers and panelists--including George Schultz, Vinod Khosla (Tesla), Jim Rogers (Duke), David O'Reilly (Chevron), and many other academic, public, and technology leaders. I took away three major themes:

- The discovery of new domestic gas supplies is a game changer. While there are significant environmental challenges to address, the domestic gas reserves could be a major disruption in terms of both the domestic energy supply mix (note: there were a lot of side conversations that the price of natural gas is "killing" the renewables market) and international relationships. This is fairly astounding given that it was less than 10 years ago that we were concerned that the supply of North American gas was drying up. It sounded like there was a lot of upside, but I remain very concerned about the environmental issues related to recovering shale gas, and I hope we don't swing further to natural gas at the risk of not continuing to diversify our generation mix.
- Repeatedly, the panelists commented that energy efficiency and furthering of smart grid/micro grid/smart building technology was the number one tool in reducing energy consumption. There was also a lot of conversation about conversion to natural gas for transportation (another big swing from contrary sentiment just a year or so ago). I felt very optimistic about the technology development underway in Silicon Valley on various energy efficiency products; it remains a significant hurdle to bring these products to market and have the capital required to rebuild or retrofit existing infrastructure (not to mention aligning the transportation industry).
- And last, the final panel focused a fair amount of time on climate change. I think it is fair

to say that the tone of the panel (and the room) was pretty somber. The general sentiment was that climate change/global warming is upon us and that we (particularly in the USA) are not willing or able to grasp this. There was substantial discussion about the inability to come to any consensus at a national level ("the states and grassroots democracy will need to lead"), but overall a fairly bleak sense that it will take a pivotal event (e.g. the analogy was Pearl Harbor getting us engaged with WWII) to see real action in regard to climate change.

I hope this is helpful; don't hesitate to call if you have questions or want to discuss. You can learn more and get copies of the white papers at www.hamiltonproject.org.

Best Regards, Jayne

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