



ENERGY DIALOGUES SUMMARY

Final report prepared by

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June 2021

The Energy Dialogues are made possible through the generous support of Schlumberger and Boston Consulting Group.

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"Houston Energy Dialogues: Executive Summary"

This executive summary was prepared from multiple sets of meeting notes by scholars from the Center for Energy Studies at Rice University's Baker Institute, who participated in the event.

Introduction

On August 18, 2020, Energy Dialogues and the Center for Energy Studies (CES) at Rice University's Baker Institute for Public Policy hosted the Houston Energy Dialogues (HED) for the fourth consecutive year. Co-sponsors of this event were Boston Consulting Group and Schlumberger. Given the ongoing COVID-19 pandemic, the HED was held virtually for the first time. Despite the change of format, the HED continued to provide a platform for open, groundbreaking conversations about the energy industry and involved representatives from government, industry, academia, and NGOs. The 2020 HED focused on four topics: (1) the short-term and expected long-term impacts of COVID-19 on global energy demand and the Texas energy sector, (2) resiliency in the energy industry, (3) net-zero aspirations, and (4) policies and pathways for transitioning to a lower-carbon future.

- (1) The armchair discussion on the impacts of COVID-19 on global energy demand and the Texas energy sector highlighted the severe stress the pandemic wrought on the energy industry, both directly through market disruption and indirectly through broader macroeconomic channels. Lower oil prices, uncertain prospects for demand recovery, evolving investor preferences that reflect broad environmental, social, and governance (ESG) priorities, potential shifts in regulation, and future technical innovations were discussed as pivotal variables for the design of strategies to increase sector resiliency.
- (2) The first breakout session focused on the response of industry to the massive and unprecedented destruction of oil demand. The conversations during the various breakout sessions explored strategies adopted by industry players to heighten resiliency and survive the extreme market stress. Participants from the oil and gas (O&G) industry also shared concerns about shifts in regulation and public policy, and expressed uncertainty about the pace at which energy transitions could occur given shifting government and investor sentiments. Permitting and siting issues as well as other regulatory roadblocks were broadly discussed as hinderances to the deployment of new infrastructures that are vital for bolstering resilience in transitioning energy systems.
- (3) The panel on net-zero aspirations began by recognizing that there are no “one-size-fits-all” solutions, yet there are some actions that will generally shape net-zero strategies, such as (a) limiting new O&G investments, (b) favoring the deployment of non-fossil energy technologies, (c) diversifying economic systems while creating new growth opportunities, and (d) adopting pathways to capture and sequester (or use) greenhouse gas (GHG) emissions. It was also expressed that natural gas is pivotal for net-zero strategies, but increased regulation to reduce and eliminate flaring is a priority for ensuring sustainable gas development.
- (4) The second breakout session on policies and pathways to a lower-carbon economy (LCE) centered on the potential regulation of carbon emissions along the energy value chain, consumer behavior, and energy efficiency. It was noted that the outlook for an LCE presents significant risks for some and substantial opportunities for others. Participants discussed underlying uncertainties, such as the scale and scope of the cost

of transitioning energy systems and the resultant impacts on the price of energy. Participants also recognized the role that hydrogen is likely to play in achieving net-zero GHG emissions, as well as the importance of connecting stakeholders through increased communication and collaboration to facilitate effective, economically viable solutions.

Armchair: How Can the Energy Industry Weather the Storm?

The question of how well the energy industry is prepared to weather the storm and an unprecedented “twisty and turning” year opened the armchair discussion. The speakers reflected on the current state of the energy industry in a world that has been going through a series of shocks—most notably the COVID-19 pandemic.

Following an unforeseen rapid drop in oil demand by an estimated 15% and a brief price war between the largest OPEC+ members, Saudi Arabi and Russia, global energy markets were thrown into a state of turmoil. To say the least, the heightened uncertainty has put the industry in a position where rethinking and reshuffling are necessary. The need for a strategic shift has been exacerbated by a broad failure of the O&G industry to deliver a satisfactory return to capital for the last decade. Altogether, the long-term health of the O&G industry and its ability to recover will depend on how successful it can be in presenting a more attractive case for investment to attain capital that is desperately needed.

Declining oil prices and new energy policy constructs that will impact the global energy mix and overall energy demand were recognized as areas of concern. It was noted that O&G companies are adjusting their medium-term strategies to focus on what will be needed to remain resilient, while becoming appealing to investors who evaluate capital allocations using an ESG lens. Strategies at the start of 2020 were designed under the assumption of a robust oil industry, but the market shocks in the early months of 2020 pushed national and international oil companies to adapt to lower-than-expected demand, a lower oil price scenario, and challenges to growing—or even replacing—reserves.

When asked about the future of the energy industry, the speakers noted that with demand flattening in developed countries of the Organization for Economic Cooperation and Development (OECD), developing non-OECD countries will become promising markets for the future of oil and gas demand, especially given their large populations and relative lack of access to modern energy services. They also noted how this shift from OECD to non-OECD countries will affect US O&G production in a national and global context.

The rapidly changing conditions of regional and global energy markets are driving heightened uncertainty, which, in turn, is pushing the O&G industry to pursue strategies that highlight increased resiliency. Corporations are in a position in which flexibility and resiliency, as well as embracing technological change, will be deciding factors for survival. It was argued that near-term, pandemic-related pressures have driven a need for quick adaptation and continued innovation. Meanwhile, longer-term pressures from investors and consumers to demonstrate more sustainable business practices have collectively signaled a

sea change in corporate planning that is high-grading technological innovations to improve sustainability and resiliency. It was also recognized that technological innovation will likely increase competition across energy services through cost reduction—a development that should sit well with consumers.

The speakers then focused their remarks on Texas. They noted that the pandemic has severely affected the state’s critical economic sectors, including services, travel, transportation, shipping, manufacturing, and energy. Yet, among these shocks, the speakers also noted opportunities for Texas. In particular, as the global economy slowed and energy demand slipped, the industry was afforded time to reevaluate diversification possibilities to adapt to the changing energy landscape—thus creating the business environment for the next generation of companies, while leveraging existing assets. For instance, Texas could attract new companies with its abundant talent in engineering, manufacturing, and other STEM fields, with an aim toward making the O&G industry sustainable.

Looking at ESG drivers of change in the energy industry, a strong investor-driven sentiment to reduce GHG emissions will push the Texas O&G industry to embrace demands to reduce GHG intensity. It was argued that the industry has the opportunity to improve the management of GHG emissions by increasing internal scrutiny while also supporting formal regulation that creates a level playing field—for instance, by regulating flaring and methane emissions. In turn, this could create a paradigm that helps individual companies improve their environmental footprint ahead of pressure from investors.

One solution that was discussed was the creation of a “blue” hydrogen economy that could become the leader in a carbon value chain. Texas has the assets necessary to lead in hydrogen efforts, but such endeavors can only proceed if they are economically attractive. It was generally agreed that Texas has the potential to be the ideal environment to test and grow economic models and pilot projects for hydrogen and carbon capture. The Carbon Hub, an initiative at Rice University, was mentioned as a hydrogen effort that has implications for advanced carbon materials. This and other similar initiatives could promote a “carbon-to-value” proposition that could be game-changing for the commercial prospects of decarbonization. In particular, solid carbon residual from the pyrolysis production of hydrogen from a hydrocarbon feedstock could potentially be used to produce advanced materials. It was also noted that the Carbon Hub is an example of the types of collaborations necessary to increase resiliency and find solutions through shared ideas from academia, industry, and government.

Breakout I: Demand Destruction and Pathways Forward

After surviving many shocks in the past, the O&G industry is currently faced with a different set of challenges. In particular, a drastic and lasting drop in demand coupled with an expected faster pace of adoption of new energy technologies present unprecedented challenges of survivability for many O&G corporations. Although the industry was already facing difficulties prior to COVID-19 due to poor financial performance and increasing debt, some participants argued that the acceleration of financial stress associated with the

pandemic has revealed a need for the industry to reinvent itself. Positive cash availability, controlling costs, emphasizing returns, and improving environmental records were all named as critical for demonstrating resiliency and attracting capital.

While competition of energy sources will lead to different risks and strategies, repurposing the existing infrastructure is instrumental for the energy transition (ET). Furthermore, a sensitivity analysis of codependent energy systems is necessary to ensure diversification in sources of energy. For example, deep electrification creates a demand for new materials such as batteries and raises questions about long-term resiliency when considering sourcing, life-cycle aspects, and the sustainability of these materials. Permitting issues are another challenge for the manufacture and wide adaption of infrastructure for new energy systems. Interstate lines and existing regulations pose challenges and raise concerns about the resiliency of the permitting system in the US for all types of energy. Uncertainty about public reaction and future regulations were mentioned as other major challenges for building new energy systems and infrastructure.

At the same time, these challenges represent an opportunity for the US to become a critical player along the new supply chain. This begged the question of how the US will advance in the future energy system and what domestic and international role it could play. Some participants wondered if the US would become a central player in the production and export of key components for new energy systems.

This was extrapolated to the shared opinion that the ET will experience a diversity of challenges and advantages in different regions of the world. At the same time, advancing toward new energy systems will not have the same priority everywhere. While the EU is pursuing stringent targets, it remains to be seen how the rest of the globe follows. In addition, resiliency and the ET have been looked at mostly through the lens of developed nations with little consideration of other countries' perspectives.

It was generally agreed that solutions and new energy systems need to be pragmatic and contemplate an interconnection of variables. The advancement of new energy systems demands a high understanding of local factors for the energy transition and continuous communication to connect existing and future systems. This explains the consensus that the world is unlikely to turn its back on fossil fuels anytime soon. One speaker mentioned that in order to turn away from something, society has to turn to something else. In this case, that "something else"—new energy systems—is not yet ready to be turned to. Advancements in technology will dictate the pace of the transition, show the path forward, and delineate the drivers for the ET.

Lastly, the speakers underlined that the ET will work differently in different regions of the world. Some regions might choose radical and unrealistic approaches that would lead to unforeseeable challenges, such as repeated outages or stranded assets. Each region also struggles with distinct climate vulnerabilities, which will be reflected by different infrastructure needs and risks. While Houston is focused on floods, other regions might be focused on wildfires, which means the resiliency strategies in each area will look different.

In summary, a pathway forward will demand a scrutinized analysis that acknowledges the interconnected nature of economic, climate, and resiliency measures.

Panel: Challenges and Opportunities in Net-Zero Carbon Aspirations

The first point emphasized by the panelists was that there is no predefined path to achieving net-zero carbon ambitions. Solutions will vary greatly by region and across firms, with different risks and opportunities defining each pathway. Nevertheless, one panelist pointed out that whatever strategy is chosen, some combination of these four actions will be central:

- (1) limiting new O&G investments;
- (2) favoring the deployment of non-fossil energy technologies;
- (3) diversifying economic systems while creating new growth opportunities; and
- (4) adopting pathways to capture and sequester (or use) GHG emissions.

Each of these four actions, it was argued, will be applied to different extents across regions and firms, thereby forming the basis for different net-zero strategies. As such, it was argued, policies based on these four actions could be powerful accelerators for a rapid transition. The same panelist made clear that the challenges associated with achieving net-zero carbon aspirations are so enormous that it is crucial for businesses and regulators to work together. In fact, all panelists agreed that any successful path forward requires collaboration between stakeholders and government to “get the rules right.”

Another topic that was raised in the context of net-zero aspirations was a shift by “O&G” companies to “energy” companies. A critical step for the O&G industry to remain relevant is to contribute to a positive trajectory for the energy transition. Industry participants shared insights into measures they are undertaking to contribute to such reductions:

- Some firms are increasing investments to support a “greening” of the liquefied natural gas (LNG) value chain by tracking sources of supply from wellhead to terminal in order to ensure a minimal GHG footprint. These firms are also engaging in offset markets to achieve “net” reductions in carbon emissions.
- Some firms are adopting necessary monitoring technology as well as data collection and evaluation practices to understand emissions along their entire O&G value chain.
- Other firms are using renewable electricity as a source of energy in their own operations, thereby helping to reduce the carbon intensity of local power grids.

There was also great interest expressed in collaborating to create the necessary policy frameworks for methane regulations and carbon emission reductions while enabling market responses. The panelists noted the importance of developing a carbon value chain

and associated carbon capture infrastructure along the Gulf Coast. It was noted that Texas is blessed with great potential in the carbon capture arena, with opportunities ranging from direct air capture to post-combustion capture in the massive Texas Gulf Coast industrial complex, alongside the tremendous geologic potential for long-term sequestration.

The panelists highlighted that net-zero targets have been announced by multiple O&G corporations, as well as corporations outside the O&G domain. One panelist mentioned four central goals to achieving net-zero GHG emissions, as adopted by the firm where she works. These were (1) a ten-fold investment increase in renewables—reaching \$5 billion—that aims to bring the company closer to pivoting from an O&G producer to an integrated power company, (2) partnering with multiple cities and core industries on decarbonization efforts, (3) reducing oil production, and (4) halting most new exploration and production activities.

It was generally agreed that natural gas is a critical energy source for a successful energy transition, but the industry still needs to take steps to reduce its GHG footprint. In the effort to decarbonize LNG, there is currently significant focus on minimizing flaring and methane leaks throughout the supply chain. It was stated that LNG producers are adapting to new demands of consumers, investors, and regulators and are making efforts to signal that their actions are sincere. Participants indicated that an appropriate policy framework will be critical for finding and implementing viable solutions.

Participants agreed that control of methane leaks and flaring is a solvable problem, critical to achieving any net-zero aspirations. There was also consensus about existing regulations being too limited and that more actions are needed from both industry and government. Of course, the devil is in the details, but participants generally agreed that concerted action is necessary and the most effective path forward.

Participants also shared a feeling of dismay when discussing the Environmental Protection Agency's elimination of direct regulation over methane emissions. Representatives from industry agreed that eliminating and minimizing methane emissions should be a key goal for energy transitions. The use of new technology, such as improved satellite and infrared imaging, and close collaboration with the government are already helping some firms to identify, measure, and reduce emissions across the value chain. While participants agreed that voluntary measures are beneficial, they expect more direct regulations at the government level. They noted, however, that any forthcoming regulations should not be too prescriptive to the point that they disincentivize the adoption of new technologies or penalize firms for doing the right thing. It was argued that government regulation should enable growth and create a regulatory paradigm for a positive market response.

Throughout this session, the panelists focused on the opportunities that come alongside the challenges presented by net-zero goals. The chance to capitalize on building a low-carbon value chain while finding new uses for existing physical assets, human capital and specialized skillsets, and natural resources is consequential. The panelists generally agreed on the potential for Texas and Houston to capture a leadership role in the new energy system ahead. There was also a shared understanding that the transfer of knowledge and experience

across energy applications will increase resiliency in the energy sector and reveal the potential for new integrated business models across existing and future energy systems.

Breakout II: Energy Transition in the Current Context

The last discussion focused on the policies required for a successful energy transition, the pathways to a low-carbon economy, and the uncertainties introduced by an ongoing pandemic-driven recession. There was a general consensus that there is no “cookie-cutter” solution and that collaboration between policymakers, NGOs, the energy industry, and other stakeholders is critical for success. Each group will look at the challenges associated with energy transitions differently, and each will express different priorities. For a successful transition, collaboration is essential, because the energy transition and addressing climate change are ultimately collective-action problems. In that light, many participants called for policies to incentivize changes in consumer behavior, promote energy efficiency, foster deep decarbonization, and enhance the transparency of GHG emissions across the value chain.

Finding and financing solutions that satisfy all stakeholders will be difficult. One participant lamented that “the industry does not seem to be fully aware that a big change is coming.” Considering that the majority of economic activity in the US continues to be fueled by O&G, it can be difficult to accept that a transition to a greener economy is already underway. But it was also recognized that the outlook for a greener economy is positive, and some industry participants are looking at energy transitions through the lens of opportunity. It was expressed that responsibly-sourced natural gas continues to play a role in this scenario, as it can provide reliability and help to reduce emissions by replacing more carbon-intensive energy sources.

Hydrogen was again raised as a potential energy source to aid in energy transitions pathways and was highlighted as an example to visualize the challenges and opportunities that may arise. Participants generally considered it to be a viable low-carbon energy source with great potential for power generation, energy storage, industrial energy applications, and heavy transportation. Several participants emphasized that hydrogen has been part of the energy system for many years, yet has never been used for such a wide range of applications due to the immaturity of various production technologies and its high-cost relative to other energy sources. It was also mentioned that for wide-scale adoption of hydrogen to occur, costs still need to come down, which could happen as various technologies are scaled up with government support.

Concerns were raised that while investments for a “green” economy should be focused on the long term, stimulus funds will be needed to boost economies out of the pandemic-driven recession in the short term. There is, of course, the notion of “building back better” by using stimulus money to promote green investments, but this ignores the reality of installed capital stocks and existing energy value chains, which are important for current economic activity. As such, short-term focused stimulus could delay action on energy transitions, as economies emphasize recovery in the near term. Indeed, several participants voiced concerns about realizing any real progress on energy transitions when the economy is in such dire straits.

There was some caution expressed about moving too fast, as there is tremendous uncertainty regarding various technologies, the development of supply chains, the full-scale cost of new energy solutions, and the evolving role of policy in driving change. Pushing for solutions too early at a cost too high does not seem reasonable if customers are ultimately unwilling to pay a premium for new energy services. Participants concluded that the pathways and policies designed for a lower-carbon economy must be economically viable. Accordingly, it was generally recognized that a rapid transition to a low-carbon economy is desired, but policies that provide explicit and implicit subsidies are necessary, at least currently. At the same time, understanding the implications of such policies for all stakeholders involved is critical to implementing solutions that are feasible and sustainable in the long term.

In Closing

The 2020 HED built upon discussion of previous years by highlighting the need for sustainable development practices throughout the energy value chain and recognizing the tremendous uncertainties (wrought by COVID-19 and an accelerating pace of energy transitions) that confront the O&G sector specifically and the energy industry more generally. Years 2021 and beyond are sure to unveil a host of new challenges and opportunities, and the need for continuous dialogue among stakeholders will remain in order to achieve collective success. We look forward to continuing the conversation.