**Testimony of**

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**in the**
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**at the**
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**HOUSE FOREIGN AFFAIRS COMMITTEE**

**on**
**"ENERGY REVOLUTION IN THE WESTERN HEMISPHERE:**
**OPPORTUNITIES AND CHALLENGES FOR THE U.S."**

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**Introduction**

Good afternoon, Chairman Duncan, Ranking Member Sires, and esteemed members of the House Foreign Affairs Subcommittee on the Western Hemisphere. It is my great pleasure and high honor to be here today, and I thank each of you, both for your continued dedicated service to our country as members of Congress, as well as this opportunity to appear before you. For the record, I am James H. Knapp, Professor in the Department of Earth and Ocean Sciences in the School of the Earth, Ocean, and Environment at the University of South Carolina, and I currently serve as Chair of the Faculty Senate at the University of South Carolina Columbia campus. I will be summarizing my written testimony in these opening comments.

**Educational and Professional Background**

By way of background, I was born and raised in California, have lived in six and traveled to 49 states, and through my profession as an Earth scientist, have worked in or visited more than 40 countries. I hold a Bachelor of Science degree with distinction in geological sciences from Stanford University, and a Ph.D. in geology from the Massachusetts Institute of Technology. From 1988 to 1991 I worked with Shell Oil, where I participated directly in oil and gas exploration in the Gulf of Mexico. For more than twenty years since then, my research team and I have carried out both fundamental and applied research in the Earth sciences, including the design, acquisition, processing, and interpretation of seismic surveys, both onshore and offshore, and many of my former students are now gainfully employed in the energy industry.

Access to energy is, and will for future generations continue to be, an essential foundation upon which modern society operates. On a personal level, one need only experience a prolonged power outage to be poignantly reminded of the ways in which we, on a daily basis, depend on energy to illuminate, heat, and cool our homes and businesses, preserve and prepare our food, and of critical importance in this digital age, power our numerous IT devices. As many have come to appreciate in recent years, we simply cannot turn off the power switch overnight, regardless of the perceived societal imperatives. Safe, efficient, and environmentally responsible development of energy resources is critical for the long-term energy security of this country and the Western Hemisphere. An all-of-the-above energy strategy, which includes continued exploration for and development of conventional and unconventional hydrocarbon resources as we develop economically viable technologies for alternative and renewable energy resources, is clearly the best path forward. Much of the future promise of renewable and alternative energy sources awaits the capacity for efficient storage through research and development.

**Western Hemisphere Energy Overview**

The title of this hearing is most appropriate; for the better part of the last decade, we have witnessed a global energy revolution, led by the United States, which few, if any could have predicted. Harnessing the oil and gas potential of shale reservoirs

through American technological innovation has practically doubled the estimated volume of undiscovered technically recoverable oil resources in the United States.

The most recent estimates from the Energy Information Administration for proven crude oil reserves in the Western Hemisphere amount to approximately 550 BBOE, with well more than half of those in Venezuela, a member of the Organization of the Petroleum Exporting Countries (Figure 2.) The countries of the western hemisphere combined represent approximately one third of the proven global reserves. Clearly, the major players in terms of conventional production have been and will continue to be the United States and Canada, with growing contributions from Brazil, Mexico, and Argentina.

Shale oil and shale gas potential is abundant throughout the Western Hemisphere, from the North Slope of Alaska to the tip of Tierra del Fuego (Figure 3), and the offshore potential of such unconventional resources has yet to be evaluated in any significant way. The presence of this resource potential represents an opportunity to engage our hemispheric neighbors through both the public and private sector.

Methane hydrates, or deposits of natural gas frozen into sedimentary deposits, represent a significant future resource potential. Recent estimates from the Bureau of Ocean Energy Management suggest that more than 20,000 TCF, or as much as 35 times the inventory of conventional gas resources on the entire U.S. Outer Continental Shelf are present on the Atlantic margin alone (Figure 4.) Similar reserve potential has been estimated for the U.S. waters of the Gulf of Mexico.

We need look no further than the Atlantic continental shelf of the U.S. The Bureau of Ocean Energy Management is charged with periodic evaluation of the energy and mineral resource potential of the Outer Continental Shelf. Their most recent (2001) estimate of undiscovered technically recoverable resources for the Atlantic OCS was 8.87 Bboe, revised a year ago to 11.4 Bboe. Too often such reserves are dismissed as unworthy of the investment required to produce them, or the anticipated environmental disruption involved, however, such volumes represent as much as a tenth of the combined estimated petroleum resource base of the United States. As much as 80% of the Atlantic OCS territory currently under consideration for exploration leasing by the BOEM has never been evaluated with commercial seismic surveys (Figure 5), yet the entire remainder of the Atlantic Basin is currently exploration (Figure 6.)

**Conclusion**

In conclusion, I believe the U.S. can and must play a leading role in promoting energy security for our own citizens and for the hemisphere at large. In most cases, the biggest opportunities appear to be here close to home. New opportunities exist to bring U.S. deepwater technology and experience to Mexico in Gulf of Mexico. Additional steps should be taken to (1) deepen our engagement with Canada by completing the Keystone-XL pipeline, bringing crude petroleum to excess refining capacity in the Gulf Coast region, and (2) remove the ban on crude oil exports from the U.S., helping to bring reliable energy to our neighbors from a stable economic and political base.

**Figures**

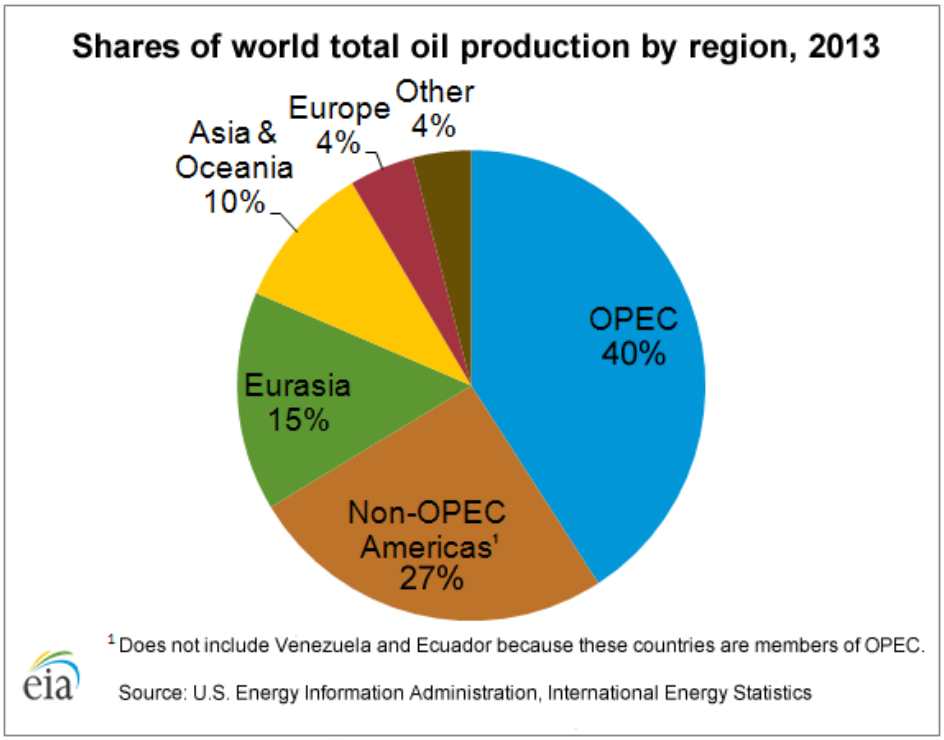



Figure 1. Global oil production by region (U.S. Energy Information Administration, 2013.)

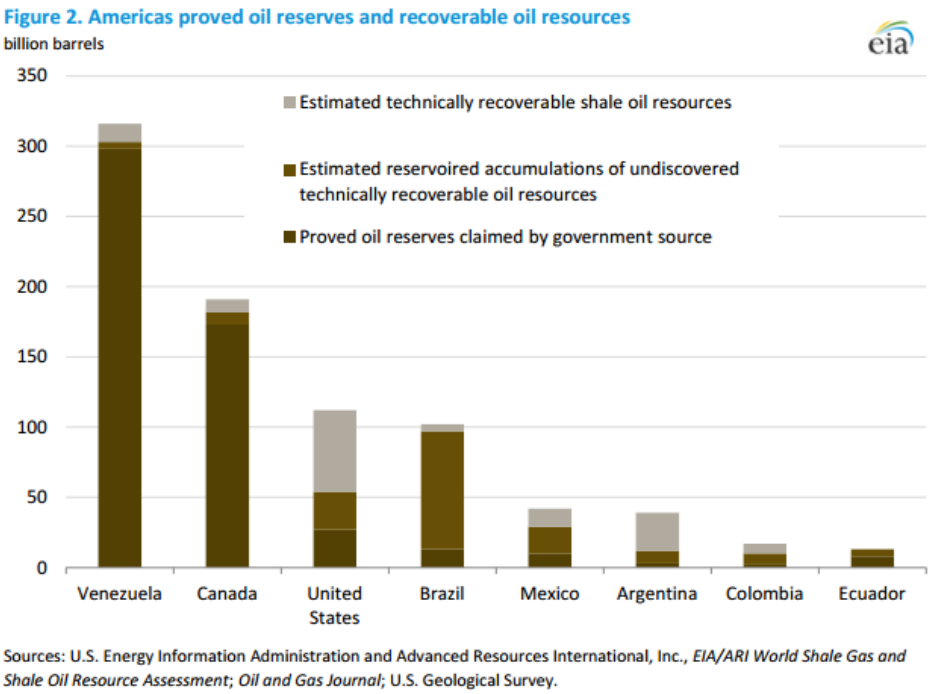
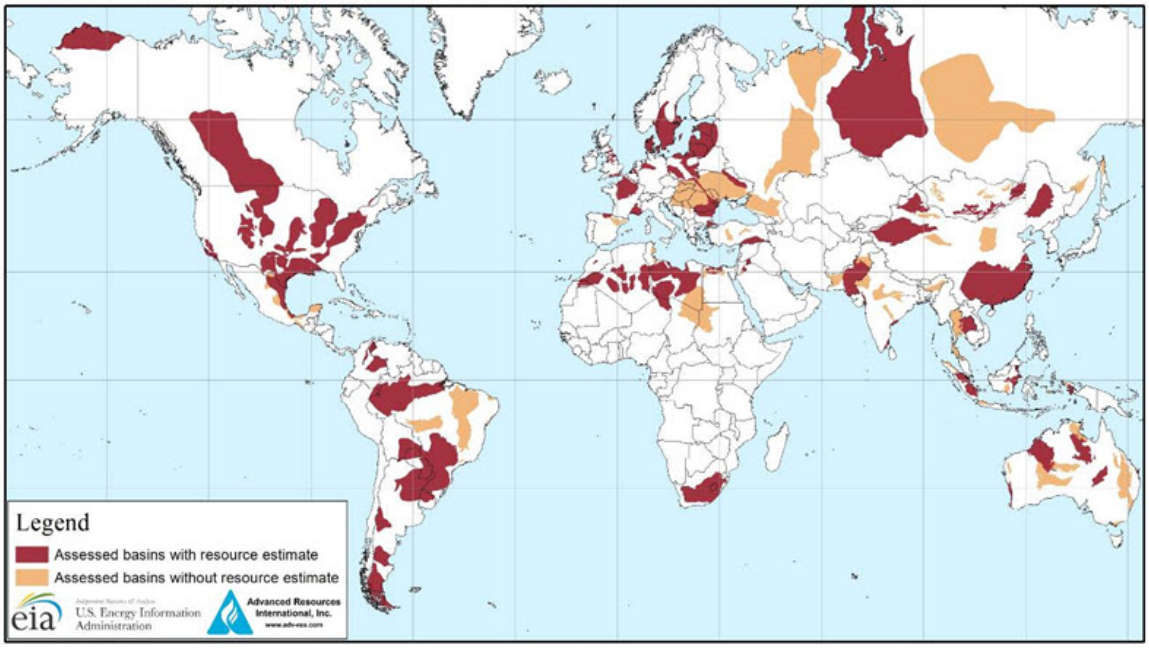



Figure 2. Summary of proven, and estimated technically recoverable resources for the top eight petroleum-endowed countries in the Western Hemisphere.

Figure 1. Map of basins with assessed shale oil and shale gas formations, as of May 2013




Source: United States basins from U.S. Energy Information Administration and United States Geological Survey; other basins from ARI based on data from various published studies.

Figure 3. Global map of onshore shale oil and shale gas potential (2013).

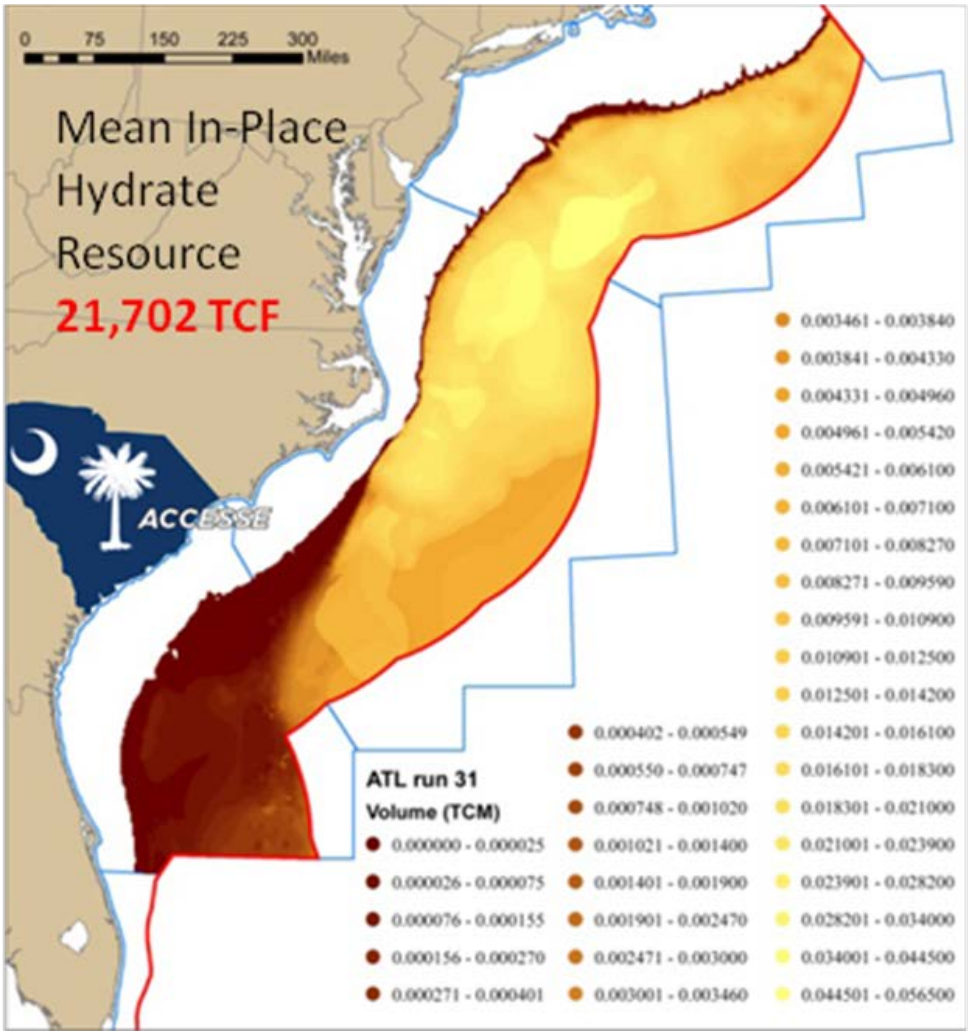



Figure 4. BOEM estimate of methane hydrate resources on the Atlantic margin (2013).

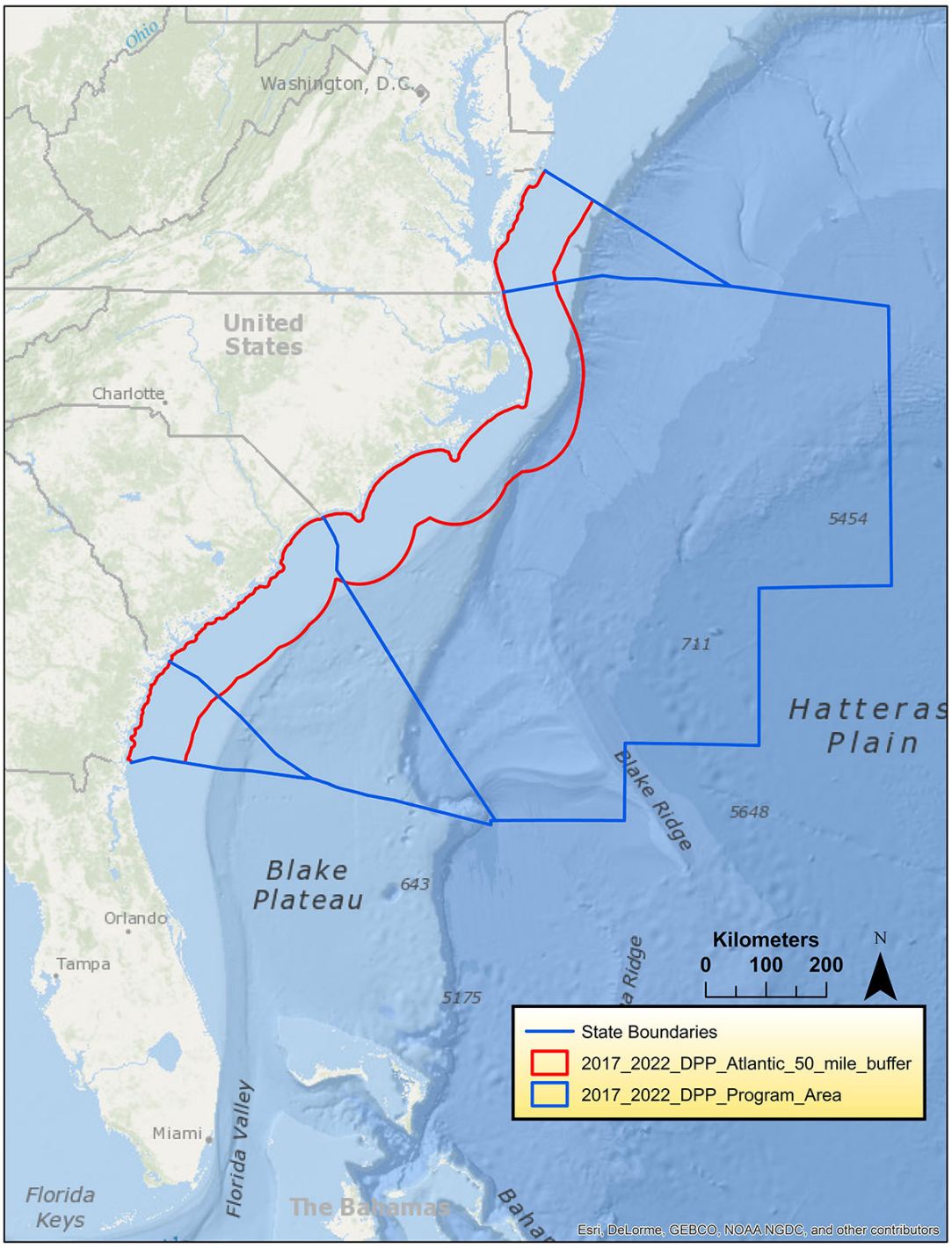



Figure 5. Area within Mid- and South Atlantic OCS Planning Areas currently included in the BOEM Draft Proposed Plan for 2017-2022. Red boundary represents 50 mile buffer zone from state waters. Fully 80% of area under consideration for exploration leases has never been the subject of commercial seismic surveys.

Figure 6. Map showing current offshore exploration efforts in the Atlantic Basin. Conspicuously absent are the Atlantic continental margin and Eastern Gulf of Mexico of the United States. (Courtesy of G. Steffens, Shell Oil Co.)