Methane Hydrate Advisory Committee Meeting with Assistant Secretary for Fossil Energy (ASFE) Steven Winberg

DOE HQ, Washington DC, Friday 15 November 2019

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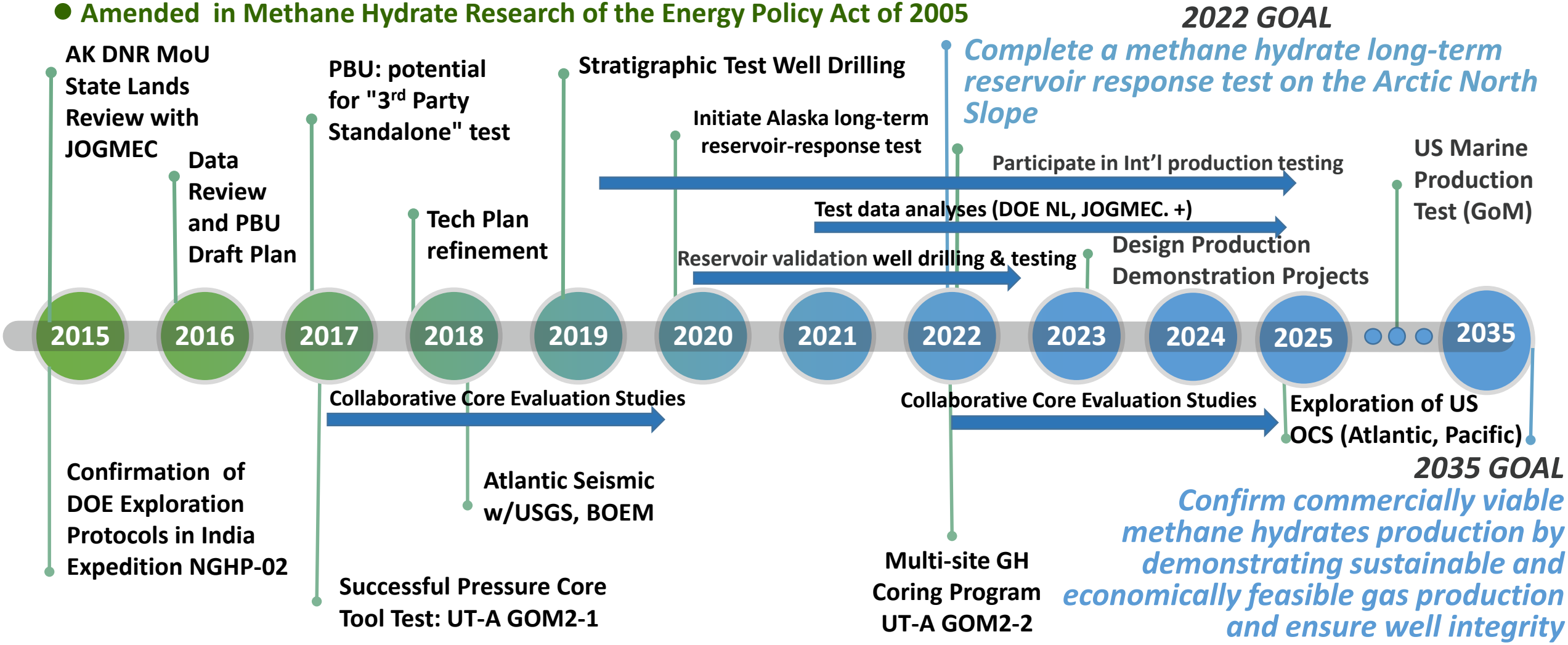
Gas Hydrates R&D Program Recommendations '20-'35

Key Drivers

- Methane Hydrate Research and Development Act of 2000
- Amended in Methane Hydrate Research of the Energy Policy Act of 2005



Gas Hydrates R&D Program: Near-Term

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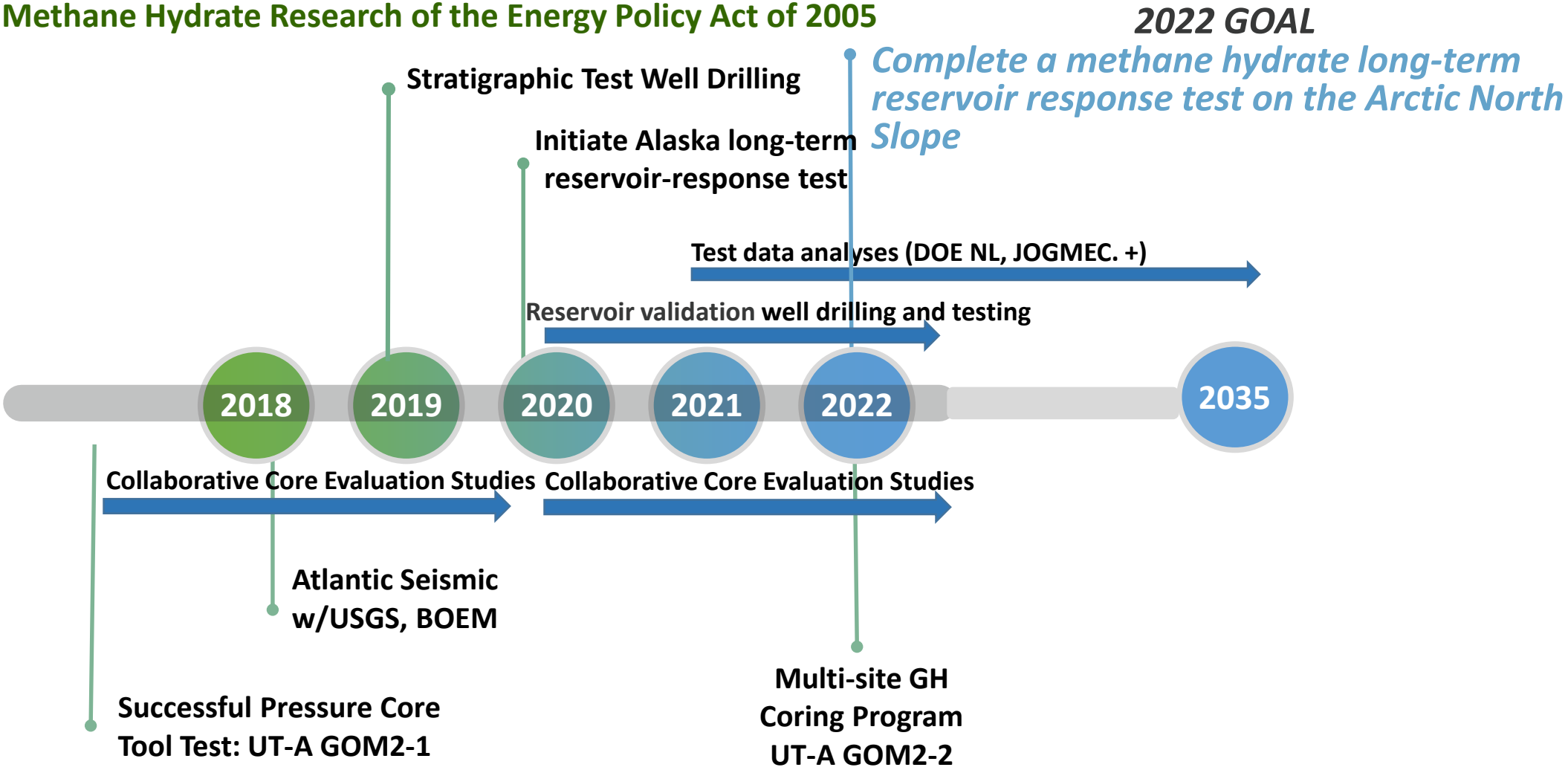


U.S. Leader or "Fast-Follower"

U.S. Gas Hydrate Global Position at a Cross Roads

U.S. was the early leader in gas hydrate science (e.g., numerical simulation, resource characterization and assessment, and geophysical prospecting).

To Reassert Leadership **— in both science and technology, we need substantial budget increases (at levels consistent with the original Act Authorization and with FACA recommendations)**

To be an Effective Fast Follower **— we need to make consistent and modest investments (at level of recent Appropriations)**

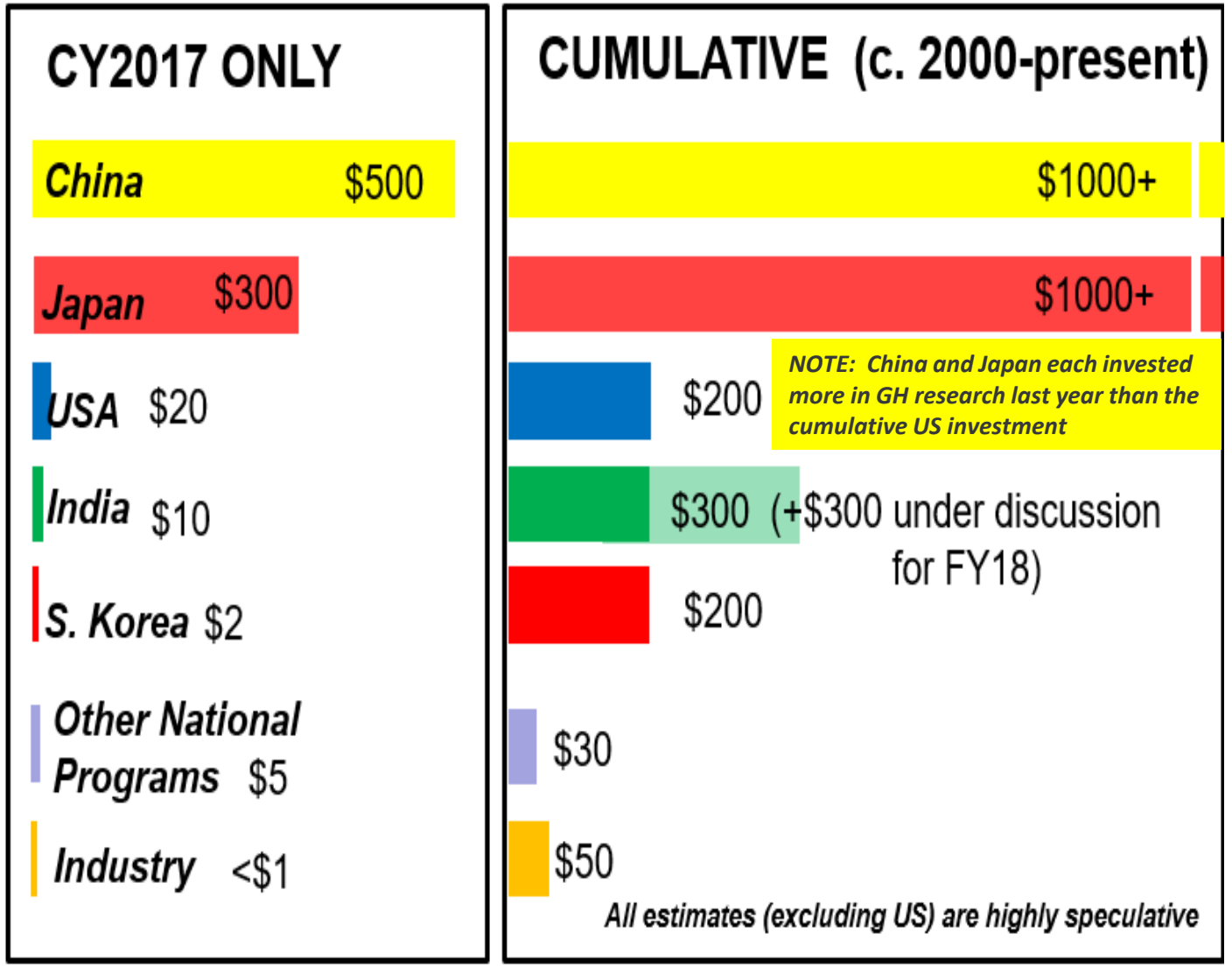
To go on the Path of Increasing Irrelevance **— subsistence-level budgets (at levels consistent with recent Administrative Requests)**

Methane Hydrate Advisory Committee

Discussion Points:

- US is a recognized leader in hydrate science & technology.
- At historical funding levels, US will not maintain this position.
- Industry spending is minimal.
- Science is needed now, to enable commercial production later…
  (***gas hydrates are a long-term investment, therefore need federal support***)
- Doing nothing is unacceptable.

Estimated Spending on Gas Hydrate
($ in millions)



2019 *Recommendations* (*MHAC*)

- Reservoir response experiment on the North Slope of Alaska.
- Evaluate hydrate reservoir quality in offshore sites in the US EEZ.
- Maintain U.S. leadership in fundamental and applied R&D for gas hydrates.
- Continue to support fundamental academic & national lab research, incl. US field programs.
- Leverage international partnerships on gas hydrates.
- Funding recommendations given in the table below:

	Activity/Location	Estimated Cost in $million						
		2018	2019	2020	2021	2022	2023	2024
1	North Slope of Alaska Production	14	18	20	20	20	30	30
2	Gulf of Mexico Characterization	1	0	20	20	5	15	15
3	Other U.S. Margins Screening	0	0	5	5	20	20	20
4	Foundational R&D	5	2	5	5	5	5	5
5	International Collaborations & Outreach	0	0	3	5	5	5	5
	Total	$20M	$20M	$53M	$55M	$55M	$75M	$75M

Alaska Gas Hydrate Productivity Testing and Demonstration (2020-2035)

Goal 1: *First long-term reservoir response test to help determine if hydrate accumulations can produce at sustainable rates over the long term.*

Goal 2: *Second long-term reservoir response test to substantiate (sustainable & sufficient rates) simulations and semi-commercial production.*

GOM Hydrate Bearing Reservoir Characterization Goals (2020-2035)

Goal 1: *Understand heterogeneity and gas hydrate distribution with logging & coring data.*

Goal 2: *Describe and predict the behavior of the gas hydrate bearing reservoir during production and validate the numerical reservoir simulators.*

Goal 3: *Establish fundamental understanding of the relationship between geomechanical behavior and gas hydrate saturation*

Gas Hydrate Potential in U.S. Onshore & Offshore (2020-2035)

Goal 1: *Complete the existing, full systems approach, focused studies on the Alaska North Slope and in the Gulf of Mexico.*

Goal 2: *Identify significant gas hydrate systems on non-Gulf of Mexico and Alaska North Slope margins through exploratory geophysical surveying/drilling/coring.*

Goals 3 & 4: *Advance the knowledge of the mechanisms of gas hydrate systems formation/loss in different tectonic settings (global methane carbon cycling).*

Goal 5: *Continue coordination role with U.S. interagency activities in resource assessments, carbon cycle studies and seafloor mapping efforts both on U.S. margins and abroad.*

Methane Hydrate Advisory Committee Key "Take-Home" Messages

Must Have's:

- **An initial "controlled field experiment" on land in the Arctic (> 12 to 18 months production)**
  - **Recommend experiment be designed to enable progression to future industrial-style tests by addressing key flow and geomechanical unknowns**
- **Scientific Drilling in the Gulf of Mexico and Atlantic margins**
  - **Constrain potential US natural gas resources**
  - **Recommend science focus on the geologic systems that produce resource-grade hydrate**
- **Continued (and full) participation in international hydrate research initiatives (examples)**
  - **Continue Japanese cooperation (leverage funding & insights from their investments)**
  - **High priority engagement with India on future production tests**
  - **Pursue avenues to expand engagement with other International programs**
- **Increase funding to be consistent with a field-based program**
  - **Do not concede US leadership in this emerging industry!**
  - **Seek industry engagement as possible**
  - **Expand engagement with research and academic institutions**
  - **Continue/expand support for education and training**
  - **Continue strong interagency coordination (USGS, BOEM, NSF (IODP), others)**

Key Outcomes of Meeting with AFSE Steven Winberg – C. Koh, M. Kastner, G. Moridis, T. Blasingame, M. Myers

- **Overall strong support for the DOE MH program and confidence in the current leadership team**
- **Funding and support confirmed for ANS next production test term test & GoM expedition**
- **Value of the international programs activities was recognized**
- **No issues with the MHAC roadmap and recommendations**

Next Steps: Scientific Advances & Research Needs in Methane Hydrate?

From brainstorm with Gabby Intihar (2/24/20) – MHAC could lead production of "Scientific Advances & Research Needs in MH" document

- Focus on U.S. DOE MH program, but also include global perspective
- Subsequent MHAC meetings will include invited key U.S. and global experts/workshop to present advances & outstanding Q's/needs in their areas
- MHAC will prepare the document based on the above in the identified key areas of MH in nature?
  - MH resource assessment & global carbon cycle; MH characterization & geophysical detection; MH production & modelling; MH geohazards; thermodynamics & kinetics
- Document can be used to set science priorities for the next 10 years and the basis of future RFPs, etc.