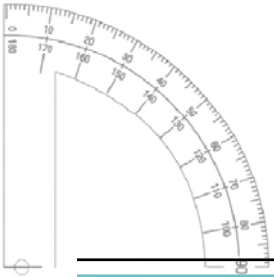




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• **Research**
• **Partnership to**
• **Secure Energy**
• **for America**
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Ultra-Deepwater Program
2009 Annual Plan Overview
Christopher Haver
RPSEA Member Meeting
November, 2008

Secure Energy for America



2009 UDW Annual Plan

- **Strategies:**
 - Show integrated nature of 2007 & 2008 and future programs.
 - Provide overview of each 2007 & 2008 project.
 - High level view of 2009 program direction.
 - Fewer, more general and integrated RFPs.
 - Include Environmental Issues

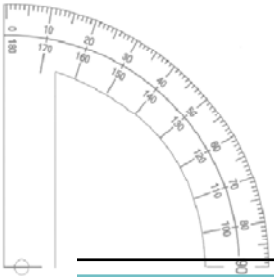
Ultra Deepwater Needs

- Drilling, completion and intervention breakthroughs
- Appraisal & development geoscience and reservoir engineering
- Significantly extend subsea tieback distances & surface host elimination
- Dry trees/direct well intervention and risers in 10,000' wd
- Continuous improvement / optimize field development
 - Per wellbore recovery
 - Cost reduction
 - Reliability improvements
 - Efficiency improvements
- Associated safety and environmental trade-offs



2009 UDW Plan Strategy

- 4 to 7 Initiative-based RFPs (5 to 10 project awards)
- Unlike 2007 and 2008, however, the UDW TACs have not voted for individual projects. Rather, the TACs prioritized project ideas by initiatives.
- This input was evaluated by the PAC to decide the appropriate balance for the 2009 UDW program.



2009 Anticipated Initiatives

Need 1: Drilling, Completion and Intervention Breakthroughs

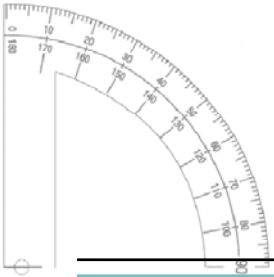
- Proposals will be requested identifying novel ideas to reduce well construction and completion costs.

Need 2: Appraisal and Development Geoscience and Reservoir Engineering

- Proposals will be requested in the area of production and reservoir surveillance.

Need 3: Significantly Extend Subsea Tieback Distances/Surface Host Elimination

- Proposals may be requested in one or more of the following areas:
 - Ultra-deepwater flow assurance especially for the areas of solids (asphaltenes, hydrates, waxes, and scale) deposition and plug formation management
 - Pressure boosting
 - Autonomous underwater vehicles and intervention
 - Subsea processing/produced water treatment



2009 Anticipated Initiatives, cont'd

Need 4: Dry Trees/Direct Well Intervention and Risers in 10,000' Water Depth

- Proposals in this area to be determined.

Need 5: Continuous Improvement/Optimize Field Development

- Proposals in this need area may include:
 - Advancing industry understanding of phenomena impacting ultra-deepwater operations such as vortex-induced vibration
 - Improvements in integrity management and reliability
 - Additional graduate student project funding
 - High risk, high reward 'long-shot' R&D opportunities

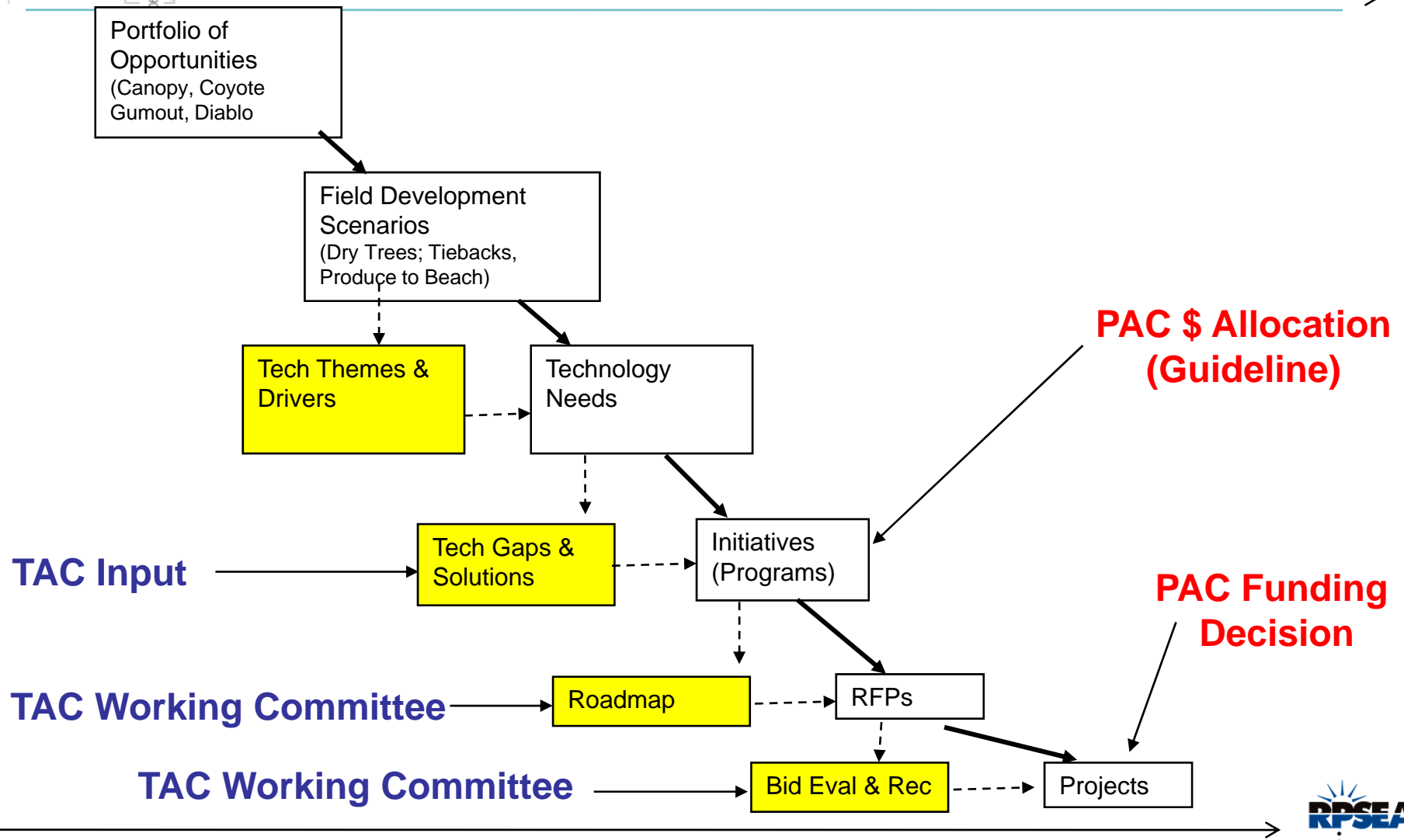
Need 6: Associated Safety and Environmental Concerns

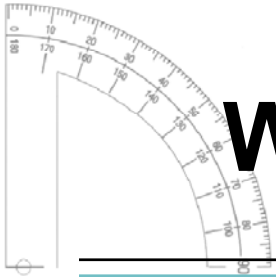
- Ultra-deepwater efforts in this need area will involve the assessment of environmental and safety impact of RPSEA UDW funded technology development projects. This effort may take the form of individual solicitations or elements of more extensive project based solicitations. Areas of study may include:
 - Improved Metocean understanding
 - Discharge of produced water subsea – technology and regulatory aspects

2009 UDW PAC Recommended Funding

RPSEA YR3 Funding Allocation (2009)		Funding Distribution (\$k)		
	Title / Description	Low	High	Average
Need #1	Drilling Completion and Intervention Breakthroughs			
1	Drilling	2,000	5,000	3,500
2	Completions	1,000	3,000	2,000
3	Intervention (Downhole Services)			-
4	Intervention (In-Water IMR)	500	1,000	750
5	Extended Well Testing			-
Need #2	Appraisal & development geosciences and reservoir engineering			
6	Reservoir Surveillance	1,000	2,000	1,500
Need #3	Significantly extend subsea tieback distances / surface host elimination			
7	Stabilized Flow	750	1,500	1,125
8	Subsea Power			-
9	Subsea Processing, Pressure Boosting, Instrumentation and Controls	2,000	3,000	2,500
Need #4	Dry trees / Direct well intervention and risers in 10,000' wd.			-
10	Riser Systems			-
11	Dry Tree Structures			-
Need #5	Continuous Improvement / Optimize field development			
12	Long Term Research and Development and Graduate Student Program	1,000	2,000	1,500
13	Sensors, tools and Inspection Processes	1,000	2,000	1,500
	Bridging and Contingency	500	750	625
Need #6	Associated Safety and Environmental Concerns			
14	Environmental Issues	250	750	500
		10,000	21,000	14,875

2009 Annual Plan Process and Path Forward





What Questions Can I Answer?

Christopher Haver
DeepStar Director, Chevron ETC
RPSEA Offshore VP

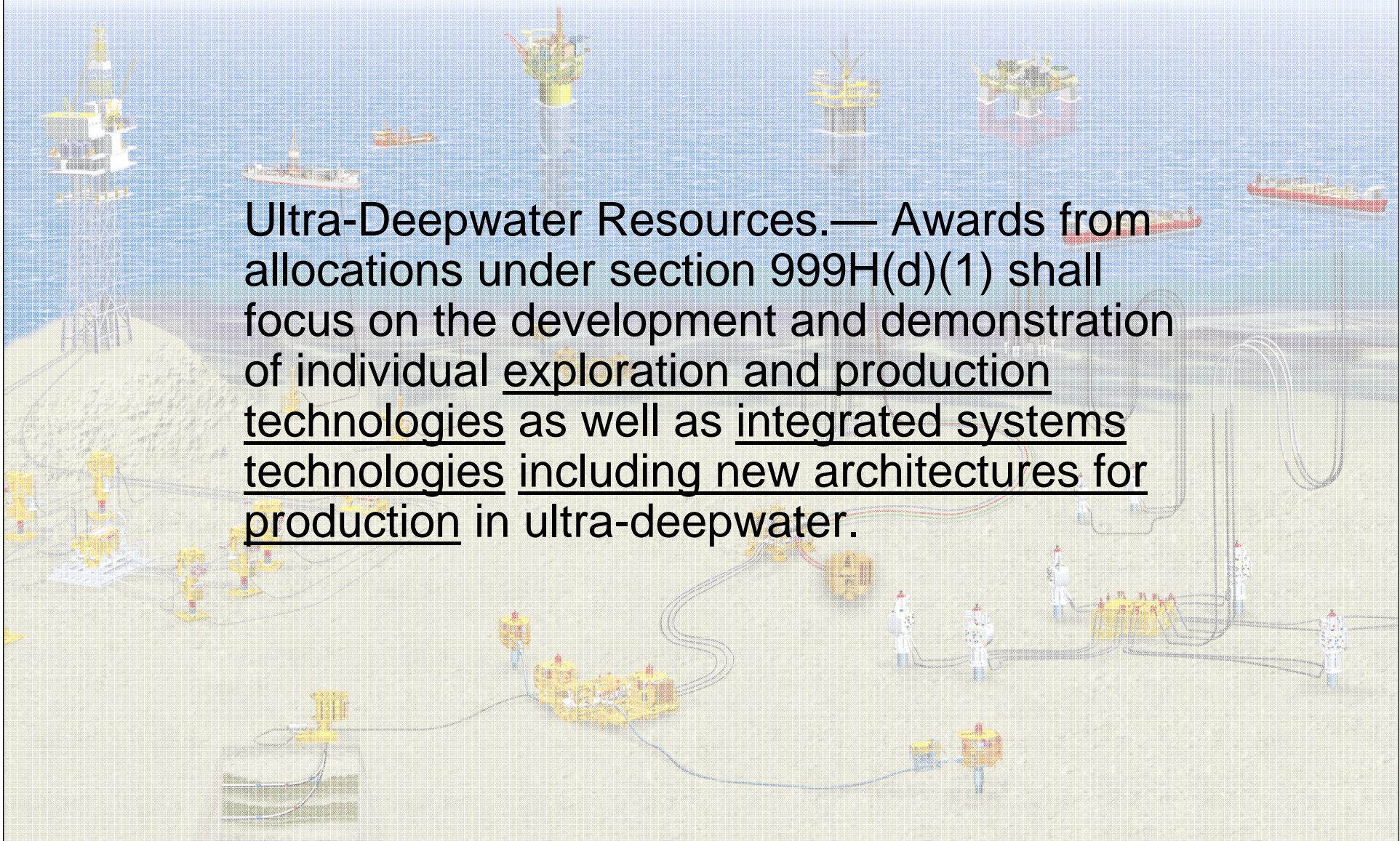
chaver@chevron.com

www.rpsea.org

www.deepstar.org

“Technology and Architecture Focus”

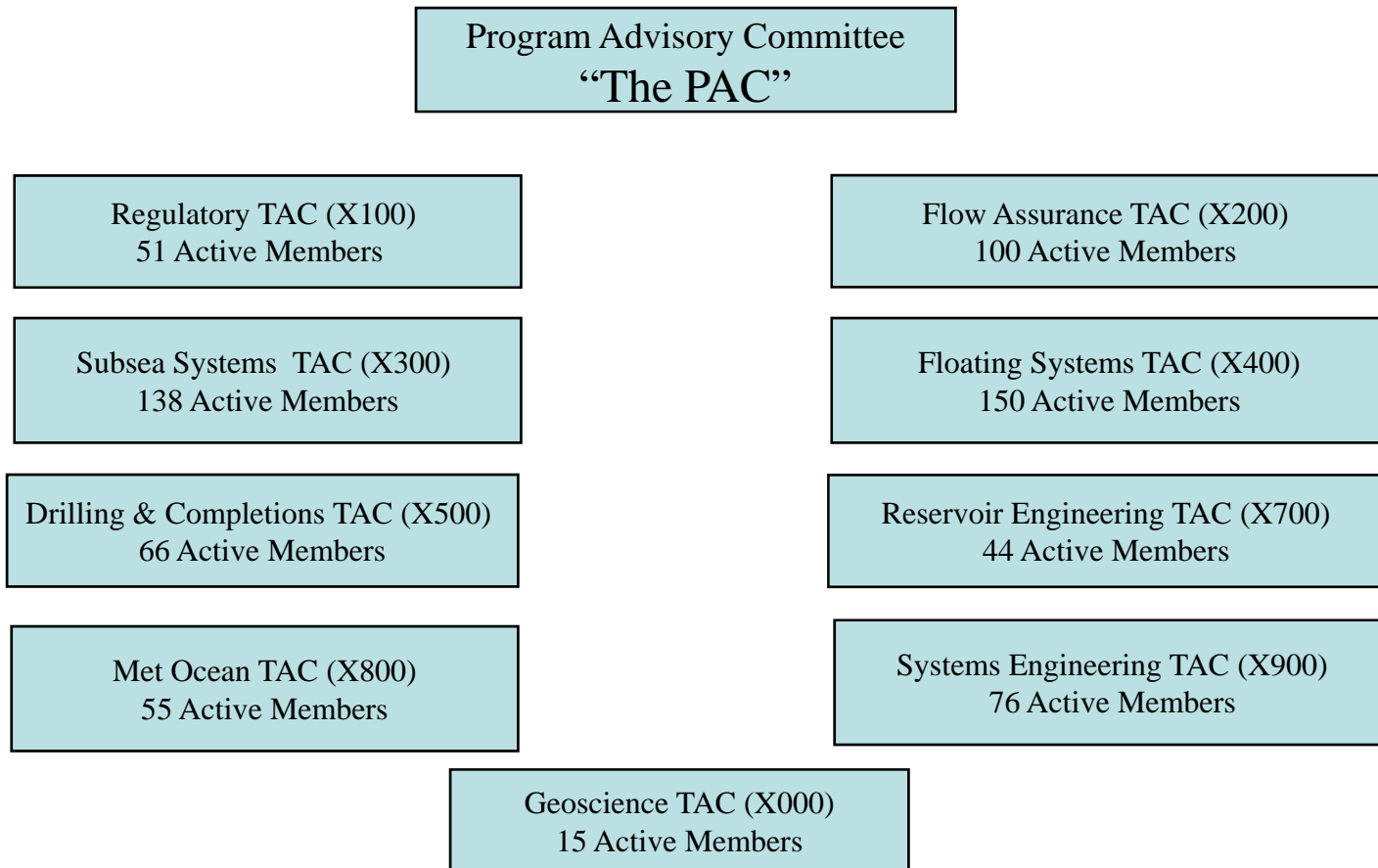
Ultra-Deepwater Resources.— Awards from allocations under section 999H(d)(1) shall focus on the development and demonstration of individual exploration and production technologies as well as integrated systems technologies including new architectures for production in ultra-deepwater.

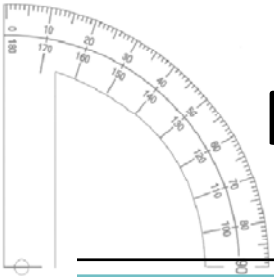




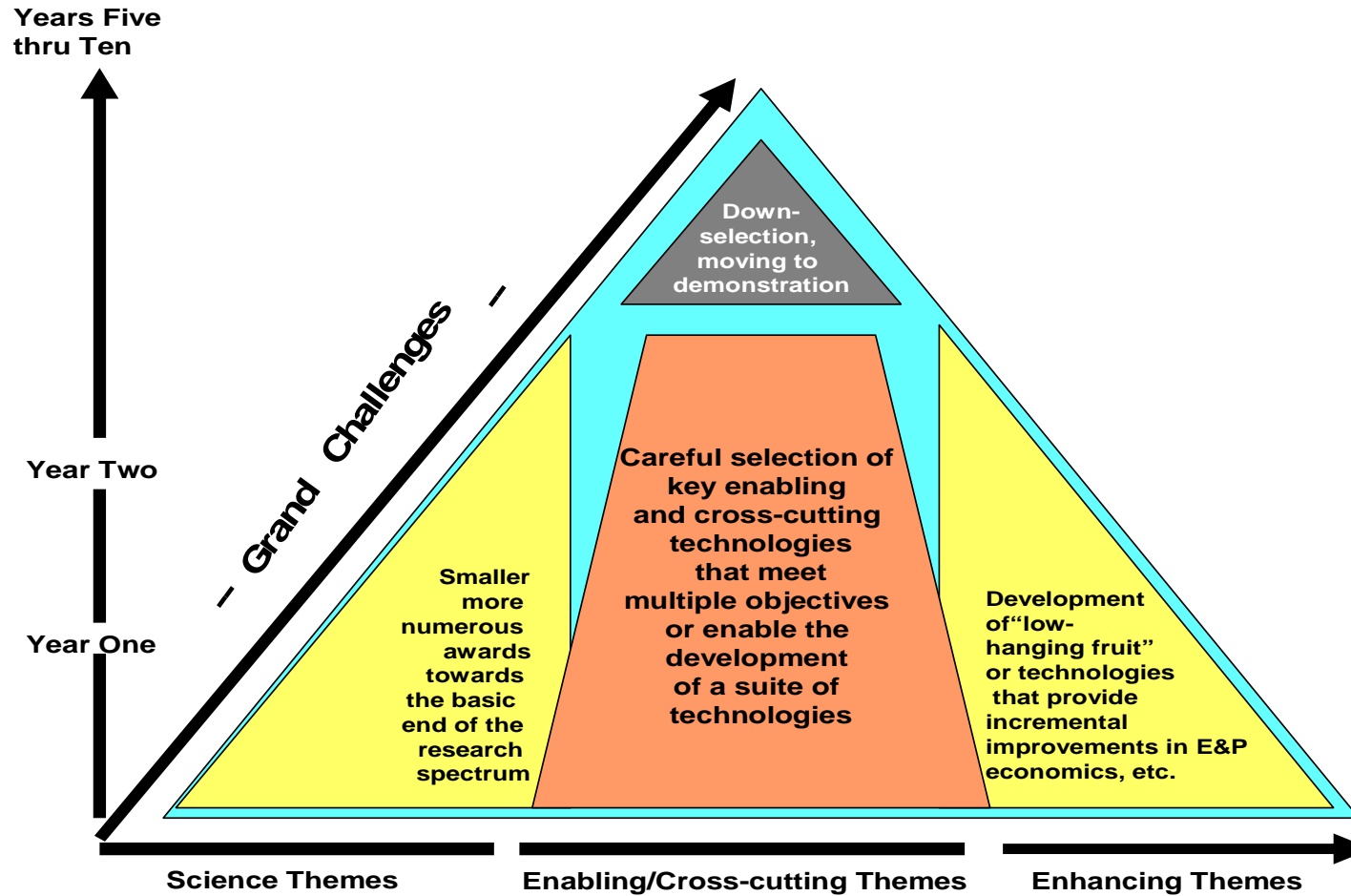
RPSEA UDW Structure PAC and TACs

Resource of >700 SMEs from industry, academia and government!





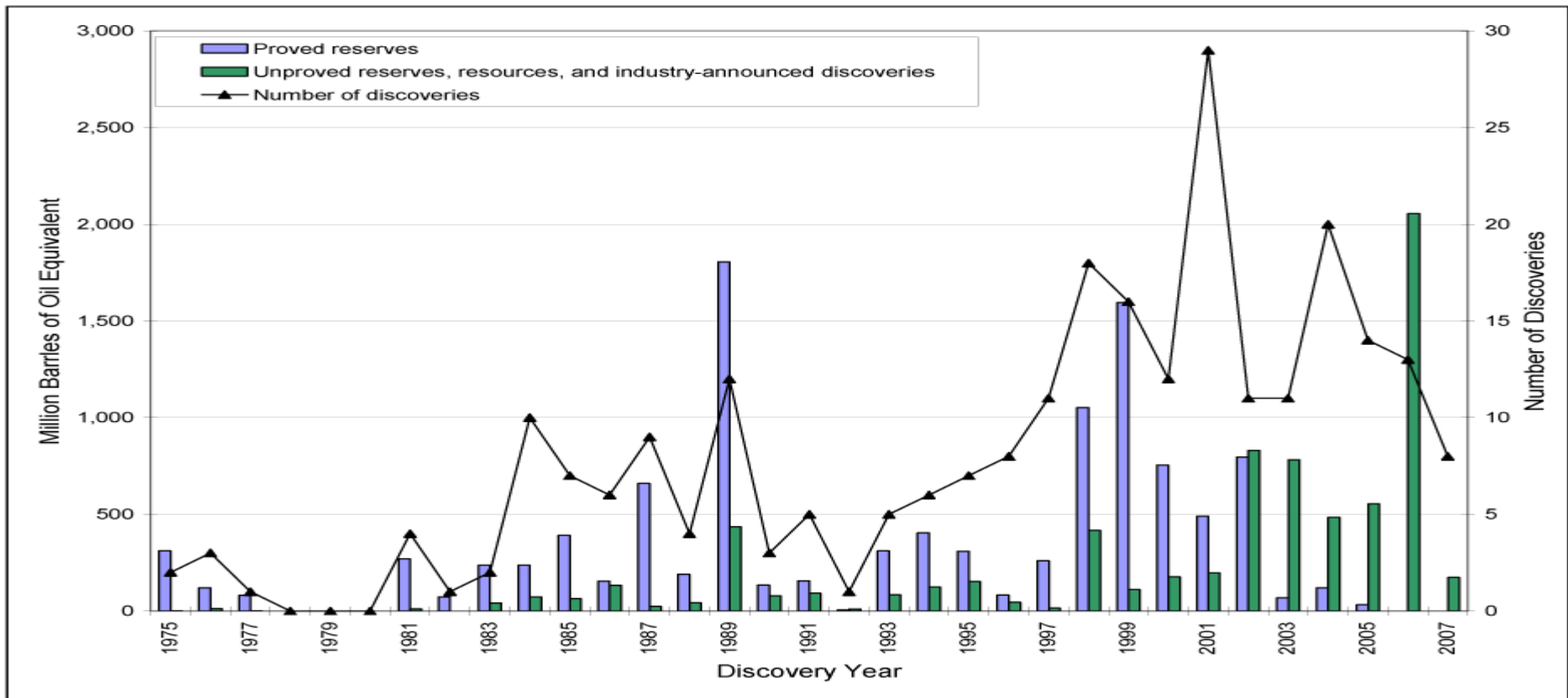
RPSEA Program Development Strategy





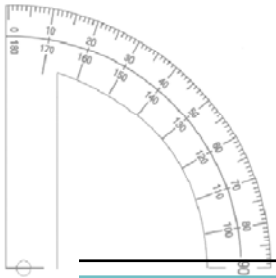
Increasing Lag Between Discovery and Development

Proven Reserves Add Value



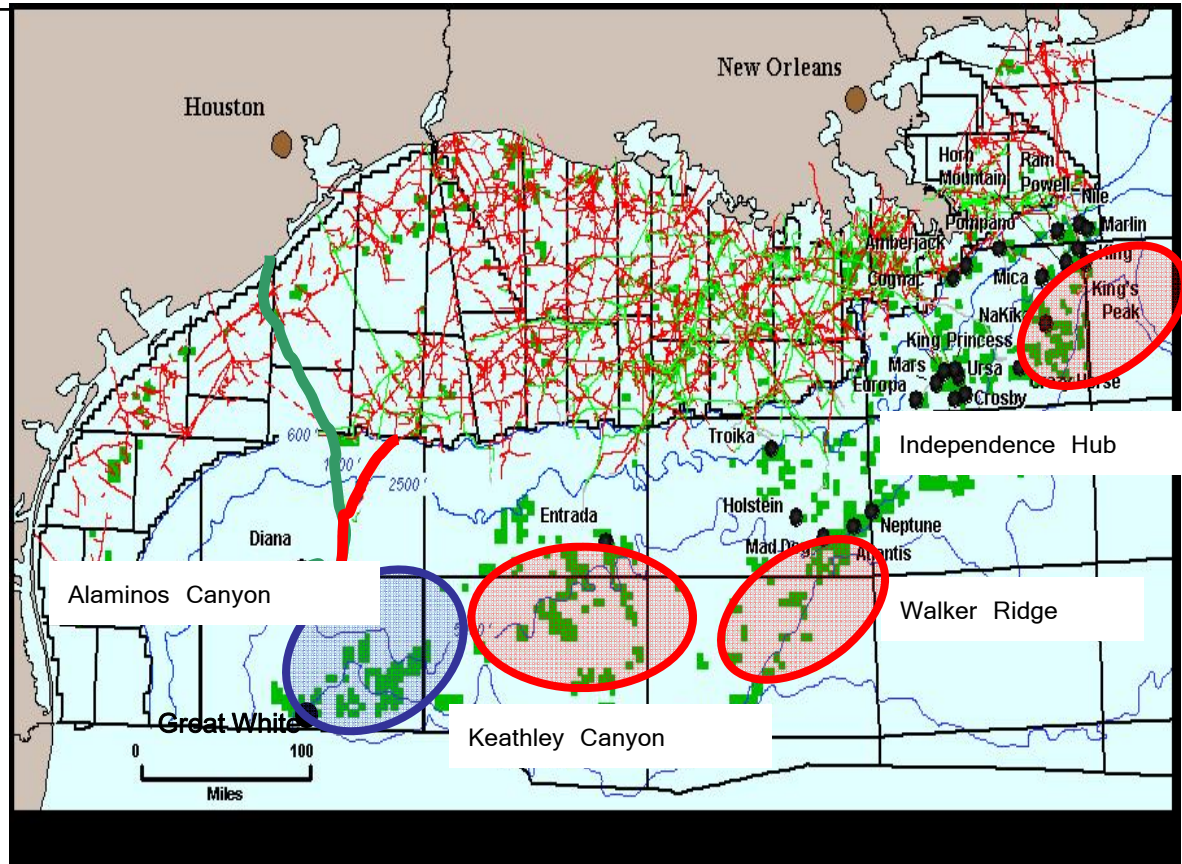
Number of deepwater field discoveries and new hydrocarbons found (MMS reserves, MMS resources, and industry-announced discoveries).

MMS Report 2008-013: Deepwater Gulf of Mexico 2008, America's Offshore Energy Future



GOM Ultra-deepwater Activity

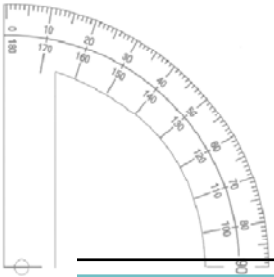
- **Walker Ridge /Keathley Canyon**
 - Sub-salt
 - Deeper wells
 - Tight formations
 - **Alaminos Canyon**
 - Viscous crude
 - Lacking infrastructure
 - **Eastern Gulf – Gas Independence Hub**
 - Higher pressure
 - Higher Temperature
 - CO₂ / H₂S
- Higher Drilling Costs**
Challenging Economics





Ongoing Needs and Initiatives

- Need 1: Drilling, Completion and Intervention Breakthroughs
 - Initiative 1: Drilling and Completions
 - Initiative 2: Intervention (Downhole Services)
- Need 2: Appraisal and Development Geoscience and Reservoir Engineering
 - Initiative 1: Exploration and Appraisal
 - Initiative 2: Field Development
- Need 3: Significantly Extend Subsea Tieback Distances/Surface Host Elimination
 - Initiative 1: Stabilized Flow
 - Initiative 2: Subsea Power
 - Initiative 3: Subsea Processing



Ongoing Needs and Initiatives

- Need 4: Dry Trees/Direct Well Intervention and Risers in 10,000 foot Water Depths
 - Initiative 1: Dry Trees/Direct Well Intervention and Risers
- Need 5: Continuous Improvement/Optimize Field Development
 - Initiative 1: Improve Operating and Inspection Processes
 - Initiative 2: Graduate Student and Long Term Research and Development
- Need 6: Associated Safety and Environmental Concerns