



•  
• **Research**  
• **Partnership to**  
• **Secure Energy**  
• **for America**  
•

**Idaho National Laboratory  
RPSEA Member Forum**

**C. Michael Ming  
Idaho Falls, ID  
May 12, 2009**

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**SECURE ENERGY FOR AMERICA**

# The Energy Policy Act of 2005 And Section 999:

A Industry led Public/Private Partnership for R&D in the Ultra-Deepwater in the Gulf of Mexico and in Unconventional Onshore Natural Gas and Other Petroleum Resources of the United States.

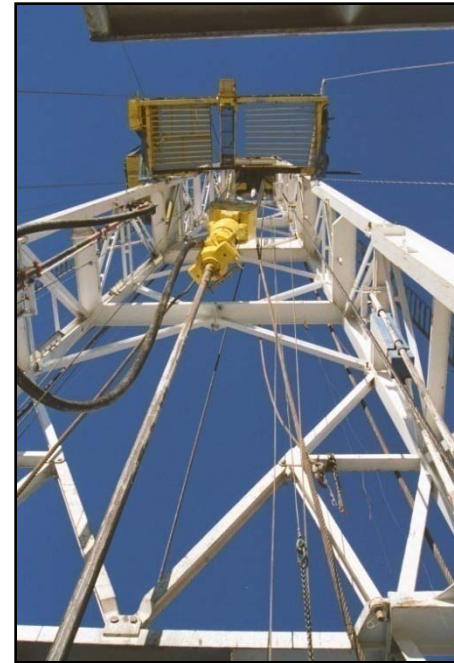


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# What is Section 999?

## Specifically, the law directs --

- Research, development, demonstration, and commercial application of technologies for ultra-deepwater and unconventional natural gas and other petroleum resource
- Maximize the U.S resource value by:
  - Increasing supply
  - Reducing the cost
  - Increasing E&P efficiency
  - Improving safety and minimizing environmental impacts



# RPSEA Members

Centre for Marine CNG  
- Newfoundland, Canada



Current Members



Pending Members



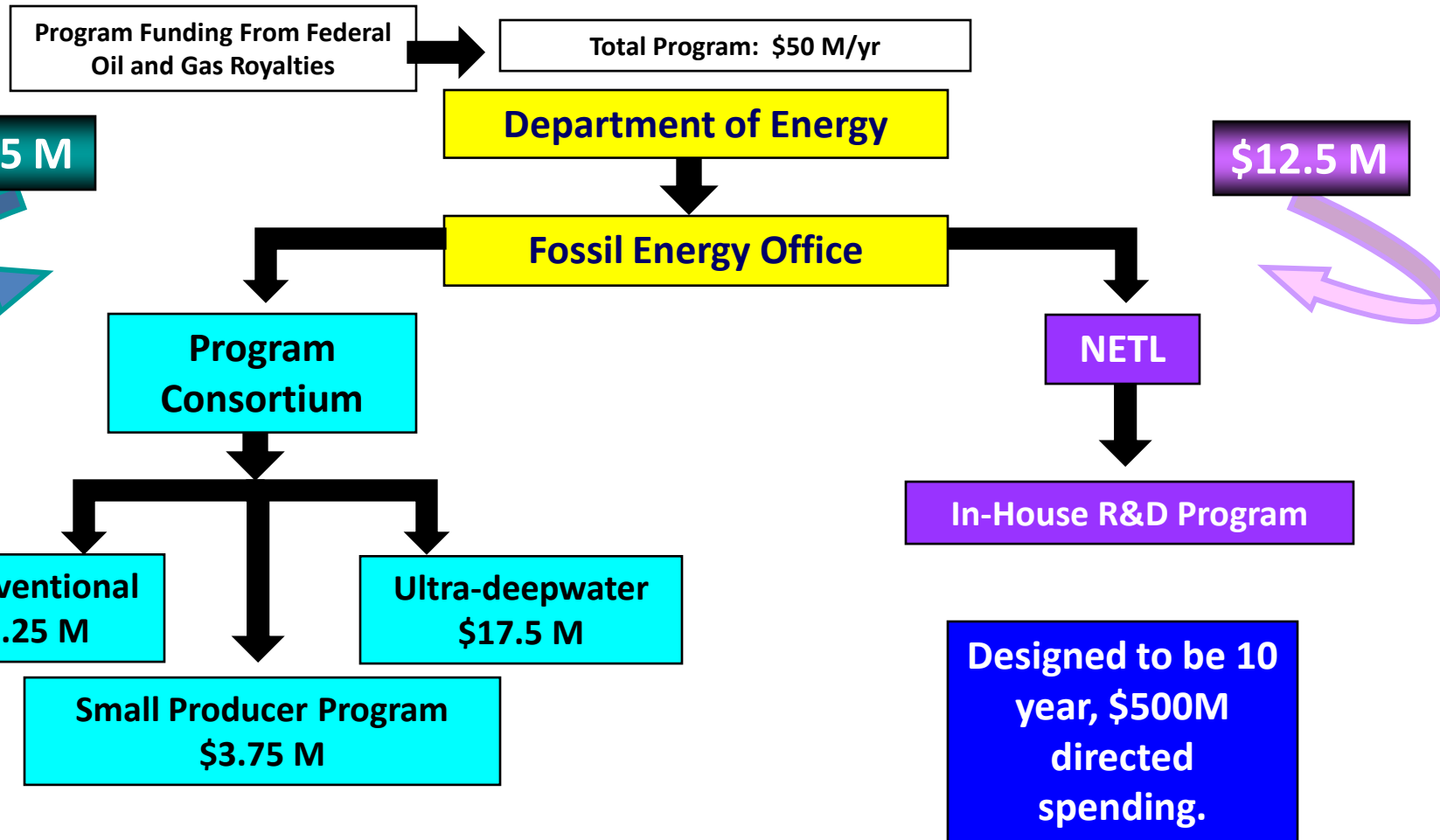
Acergy US  
Acute Technology Services  
Anadarko  
Apache  
Apex Spectral  
B P America  
Baker Hughes  
BJ Services  
Cameron/Curtiss-Wright EMD  
Capstone Turbine  
Carbo Ceramics  
City of Sugar Land  
ConocoPhillips  
CSI Technologies  
Deepwater Structures  
Det Norske Veritas (USA)

Energy Valley  
GE/Vetco  
Greater Fort Bend Cnty EDC  
Groundwater Services  
Halliburton  
HARC  
Houston Offshore Engineering  
Houston Technology Center  
Knowledge Reservoir  
Marathon  
Merrick Systems

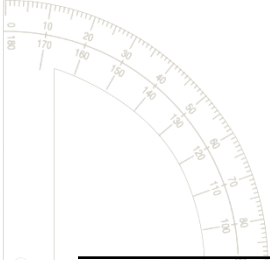
Nalco  
NanoRidge Materials  
Nautilus International  
Noble Energy  
OTM Consulting  
Oxane Materials  
Petris Technology  
Petrobras America  
Quanelle  
Rice University  
Rock Solid Images  
RTI Energy Systems  
Schlumberger  
Shell Exploration & Production  
Simmons and Co.  
StatoilHydro

Stress Engineering  
Technip  
Technology Intl.  
Tejas Research  
Tenaris  
Texas Energy Center  
Titanium Engineers  
Total USA  
University of Houston  
VersaMarine Engineering  
Weatherford

# Current Program Structure/Funding



# Building a Relevant Portfolio

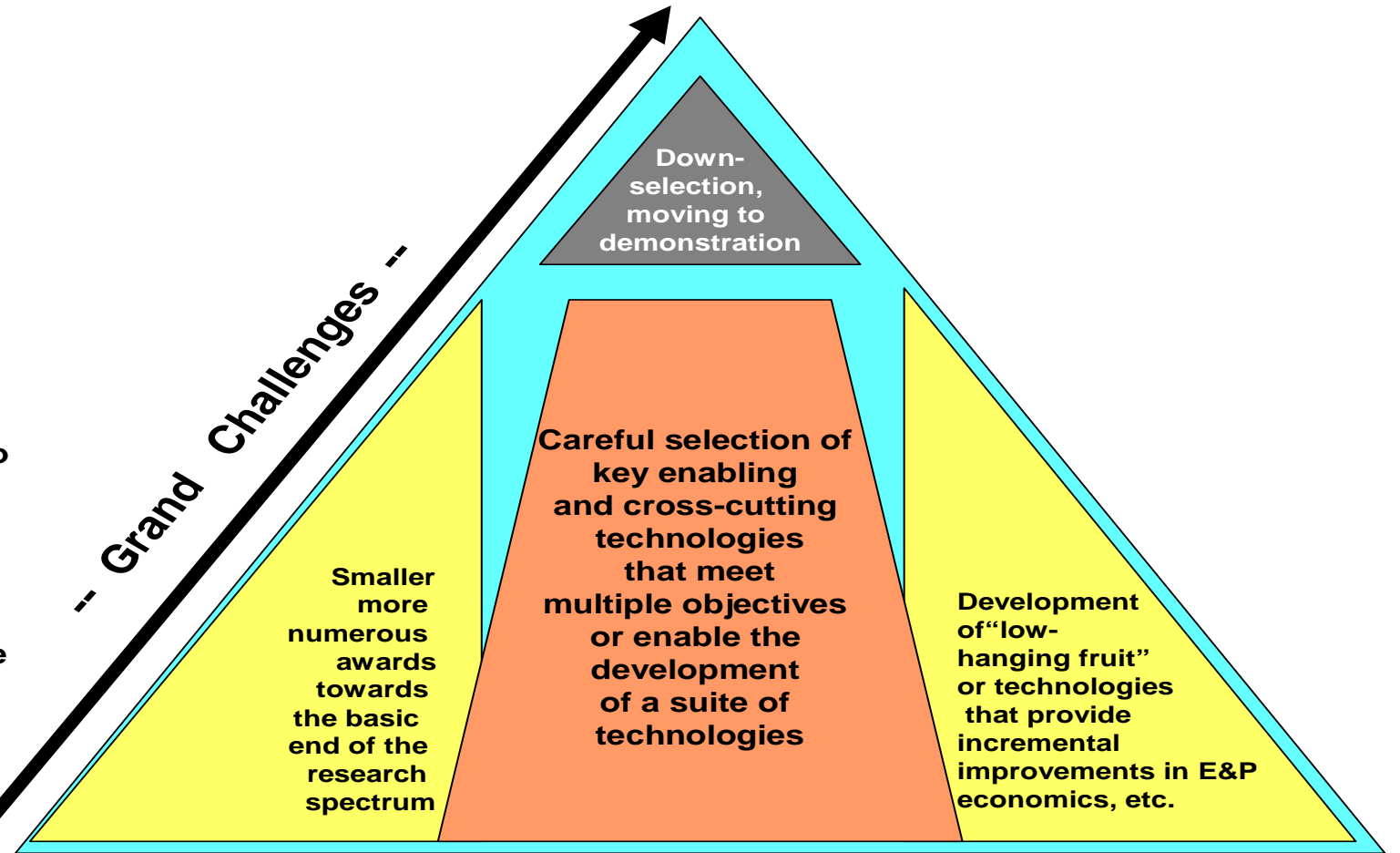


Years Five  
thru Ten

Year Two

Year One

-- Grand Challenges --



Science Themes

Enabling/Cross-cutting Themes

Enhancing Themes

Smaller more numerous awards towards the basic end of the research spectrum

Careful selection of key enabling and cross-cutting technologies that meet multiple objectives or enable the development of a suite of technologies

Down-selection, moving to demonstration

Development of "low-hanging fruit" or technologies that provide incremental improvements in E&P economics, etc.

# Unconventional Onshore Themes

## ■ Gas Shales

- Rock properties/Formation Evaluation
- Fluid flow and storage
- Stimulation
- Water management

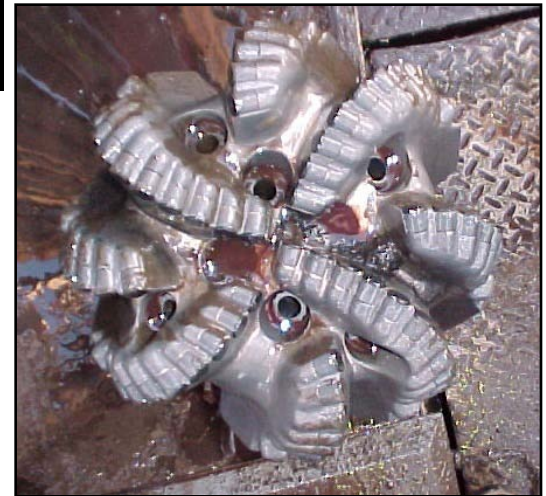
## ■ Coalbed Methane

- Produced water management

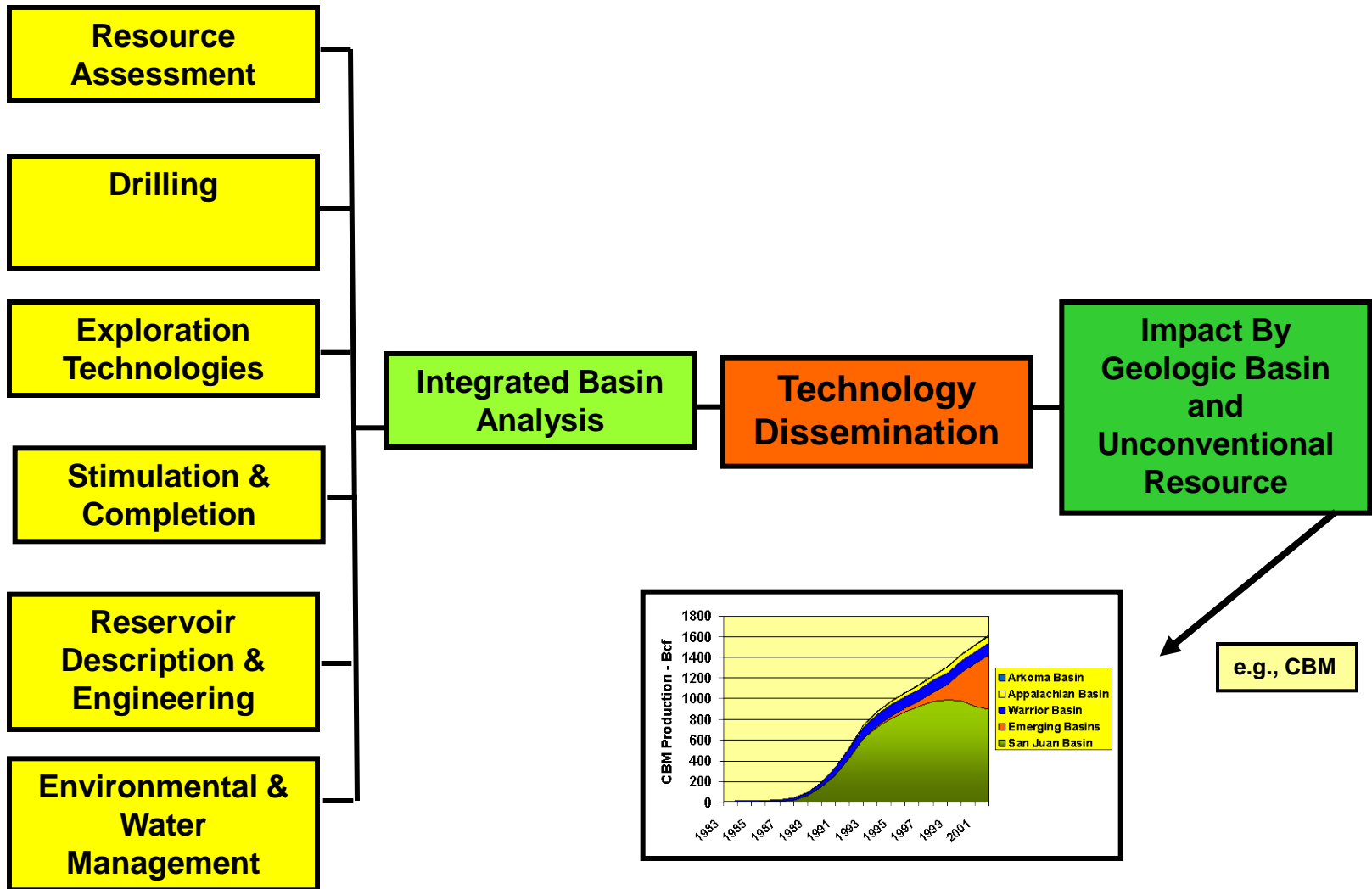
## ■ Tight Sands

- Natural fractures
- Sweet spots
- Formation Evaluation
- Wellbore-reservoir connectivity
- Surface footprint

**Cost Reduction  
in All Aspects of  
Operations**



# RPSEA Unconventional Gas Program Components



	CBM 10%	Gas Shales 45%	Tight Sands 45%
<b>Integrated Basin Analysis</b>		\$3.4M (GTI) New Albany	\$2.9M(CSM) - Piceance
<b>Drilling</b>			
<b>Stimulation and Completion</b>	\$.08M (Penn St.) Microwave CBM	\$.09M - Carter -Cutters \$.69M (U.Houston) \$.95M UT-Refrac ★	\$1.05M (TEES) Gel Damage \$.22M (Tulsa) Frac Damage
<b>Water Management</b>	\$1.56M (CSM) Intergrated Treatment Framework	★	★
<b>Environmental</b>	★	★	★
<b>Reservoir Description &amp; Management</b>		\$1.07M (LBNL) High Resolution Imaging ★	\$1.7M (LBNL) Expert Teaching System Tgas ★
<b>Reservoir Engineering</b>		\$.31M (TEES) Dev. Strategy/Decision Model ★	\$.44M (Tulsa) Wamsutter \$1.07M (UofUtah) Forecasting TGas \$.52M (Stanford) Condensate
<b>Resource Assessment</b>		\$.50M (Geo Surv)Alabama Shales \$.43M (Utah Geo)Manning Shales	\$.67M (CSM) Gas Comp. Rockies
<b>Exploration Technologies</b>	\$.86M (CSM) Coal &Bugs	★	★

<b>H</b>
<b>M</b>
<b>L</b>

High Priority

Medium Priority

Low Priority

Resource Focus

Technology Focus

**Current Portfolio**

# RPSEA Unconventional Gas

## Projects

### Cross Cutting Technical Projects

- UH – Fracturing (UT)
- LBL – Self Teaching Expert System
- UT – Refracturing
- TEES – Fracturing Gels
- LBL – High Resolution Imaging
- PSU – Microwave Coals
- Carter – Saws
- Tulsa – Novel Fracturing Fluids
- Stanford – Condensate

- CSM - Coal Bugs
- Utah - Paleo Shales
- Tulsa – Wamsutter
- CSM – Gas Quality
- U of Utah – TGS
- CSM – Produced Wtr.
- CSM – Piceance TGS

GTI – New Albany

Alabama - Shales



**Integrated Basin Project**



**Technical/Resource Projects**

Significant Producer and Service Industry Involvement

# - Crucial for Program Relevancy

- Anadarko
- Chevron
- Pioneer Natural Gas
- Williams E&P
- ConocoPhillips
- ExxonMobil
- Newfield Exploration
- Encana
- BP
- Bill Barrett Corp.
- Pinnacle Gas Resources
- Coleman Oil & Gas
- Ciris Energy

- Devon Energy
- Unconventional Gas Resources Canada
- Whiting Petroleum
- CNX Gas
- Trendwell
- Diversified Operating Corp
- Noble Energy
- Jones Energy
- Aurora Oil & Gas

- Schlumberger
- Halliburton
- Pinnacle Technologies
- BJ Services
- Carbo Ceramics



# The Technology Challenges of Small Producers

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## Focus Area – Advancing Technology for Mature Fields

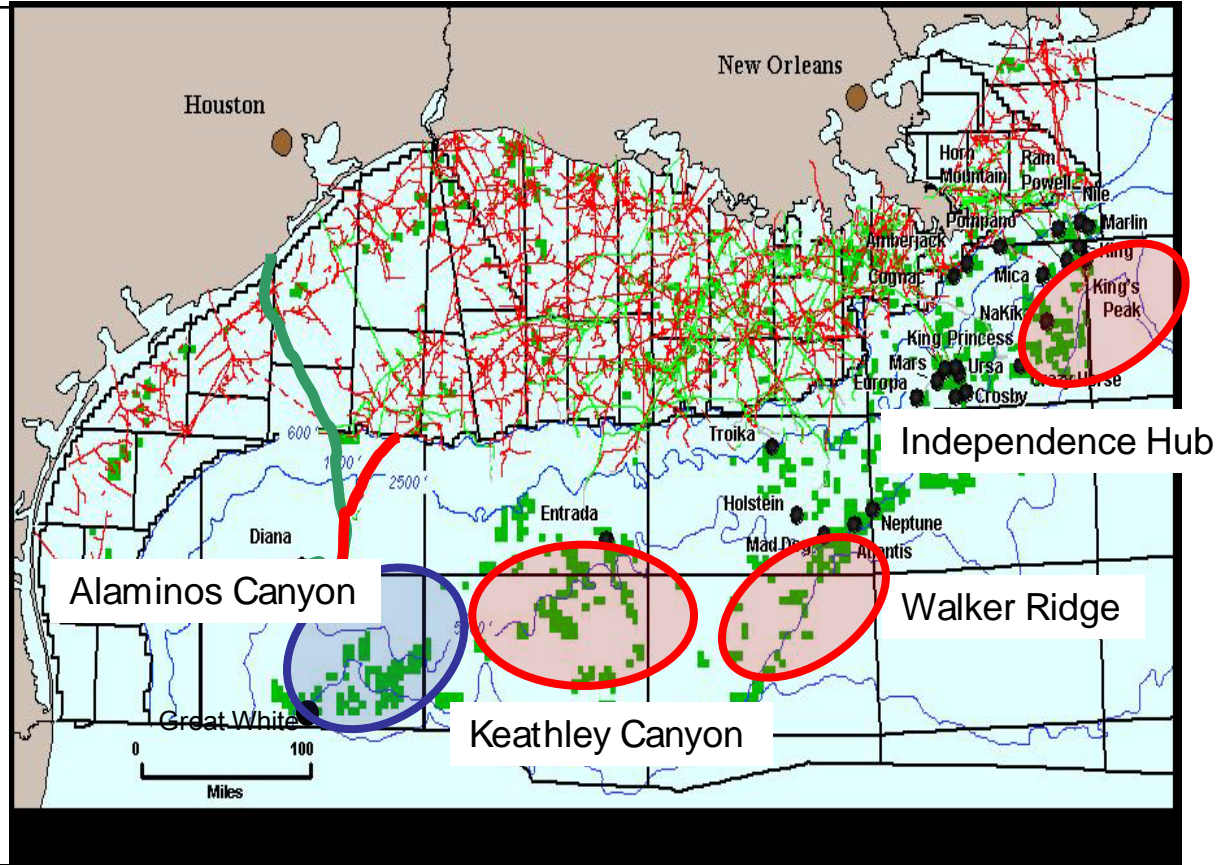
### ■ Target – Existing/Mature Oil & Gas Accumulations

- Maximize the value of small producers' existing asset base
- Leverage existing infrastructure
- Return to production of older assets
- Minimal additional surface impact
- Minimize and reduce the existing environmental impact
- Lower cost and maximize production




# 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
    - CO<sub>2</sub> / H<sub>2</sub>S
- Higher Drilling Costs**  
**Challenging Economics**



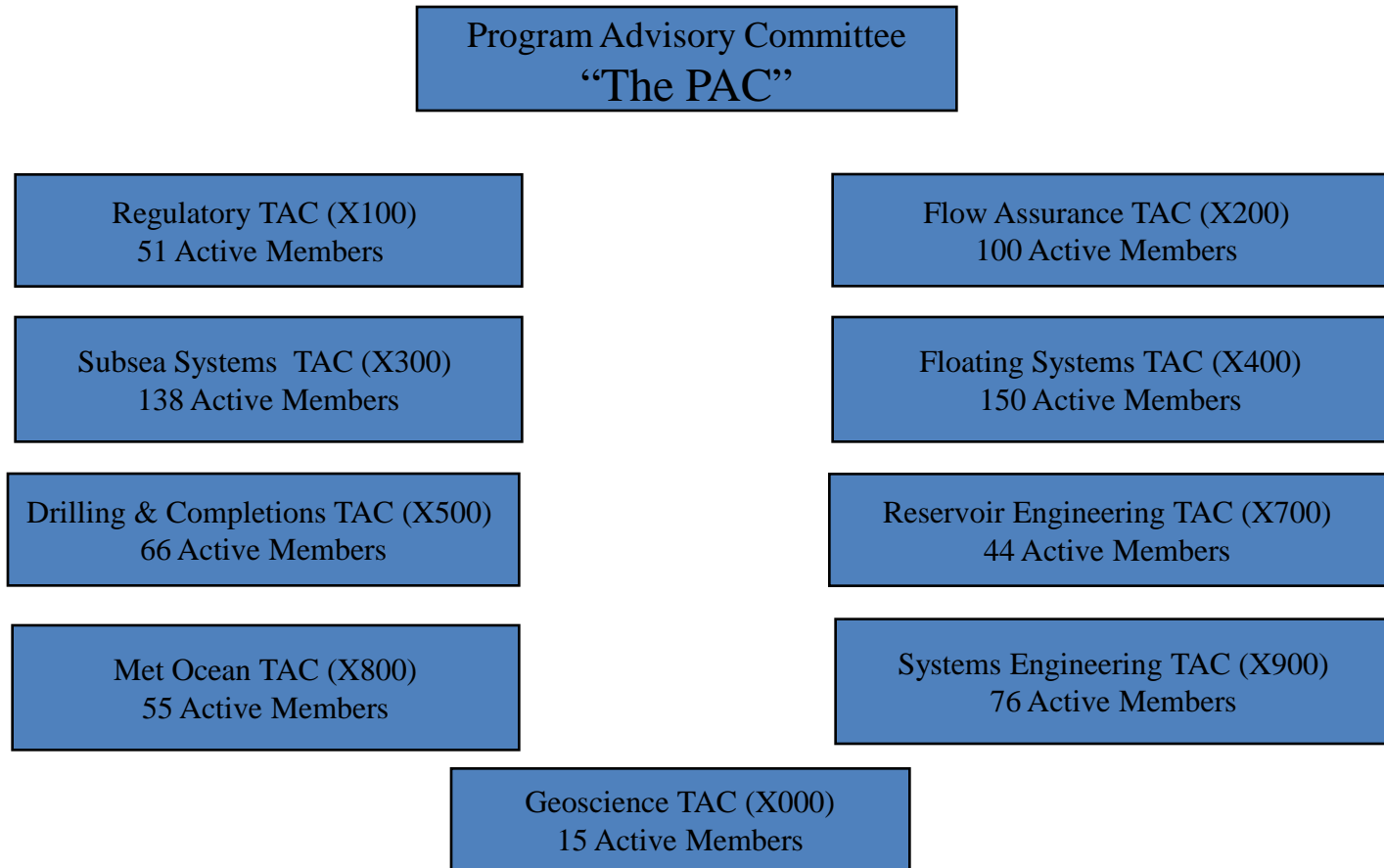
# Ultra Deepwater Needs

- 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
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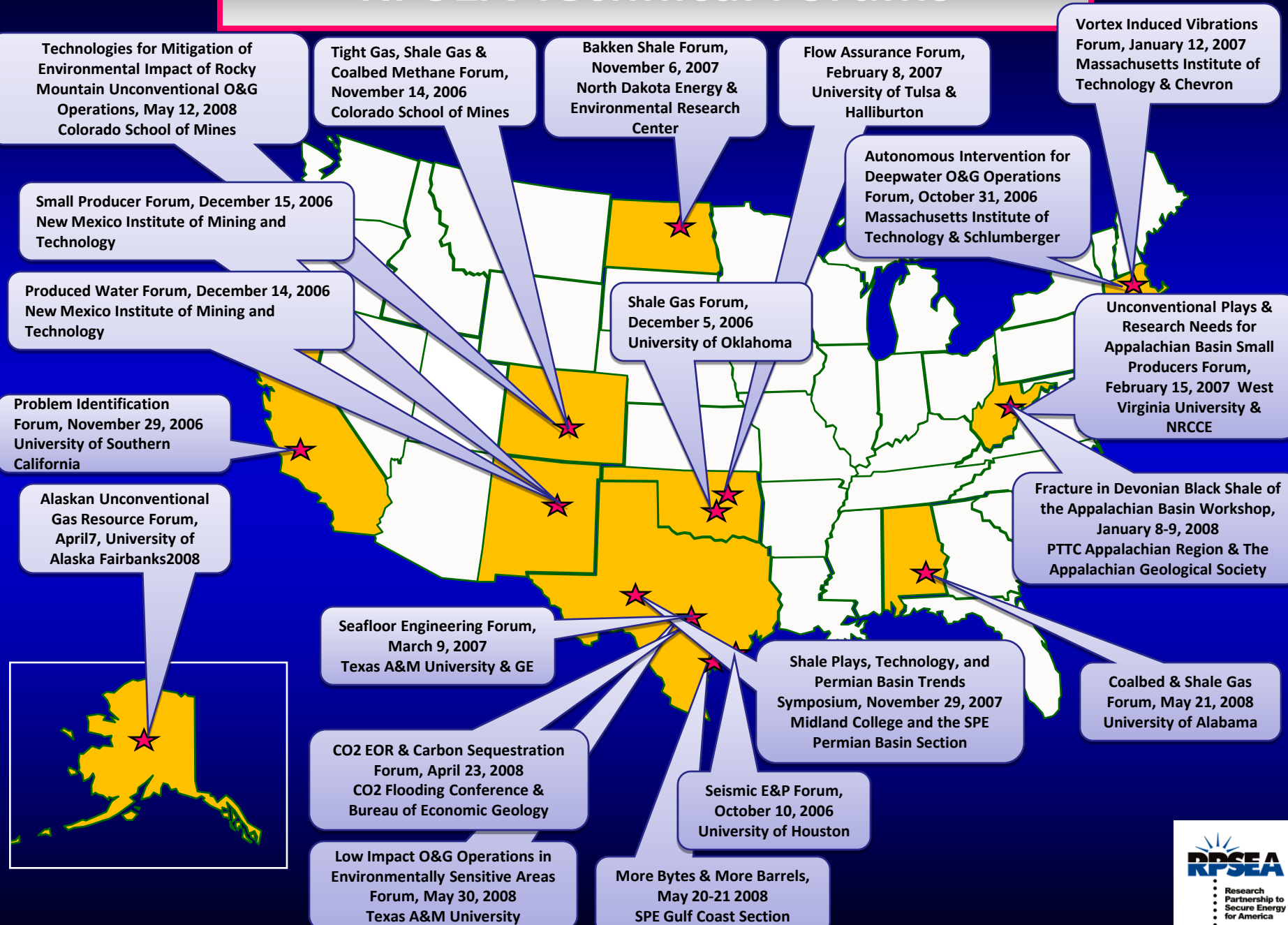
# RPSEA UDW Structure

## PAC and TACs

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



# RPSEA Technical Forums

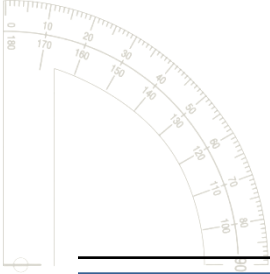




# Award Composition - 2007 Program

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	Small Producer	On Shore	Ultra Deepwater	Total
Universities	6	13	5	24
For Profits	0	1	8	9
Non-Profits	0	1	4	5
National Labs	1	2	0	3
State Agencies	0	2	0	2
Total Selected	7	19	17	43



# Award Value – 2007 Program

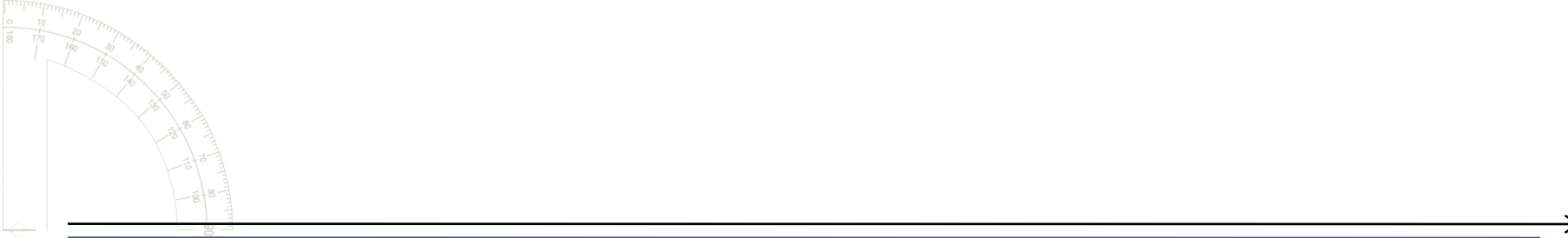
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	<b>Total Value (000)</b>	<b>RPSEA Share (000)</b>	<b>Cost Share (000)</b>	<b>Cost Share %</b>
<b>Small Producer</b>	\$ 5,334	\$ 2,981	\$ 2,353	44
<b>On Shore</b>	\$33,620	\$17,938	\$15,682	47
<b>Ultra Deepwater</b>	\$20,311	\$15,317	\$ 4,994	25
<b>Total Program</b>	\$59,265	\$36,236	\$23,029	39

# 2008 Awards

	Small Producer	On Shore	Total
Universities	4	5	9
For Profits	2	1	3
Non-Profits		2	2
National Labs		1	1
State Agencies			
<b>Total Selected</b>	<b>6</b>	<b>9</b>	<b>15</b>

	Total Value (000)	RPSEA share (000)	Cost Share (000)	Cost Share %
Small Producer	\$6,836	\$3,140	\$3,695	54
On Shore	\$17,182	\$13,746	\$6,836	40
<b>Total Program</b>	<b>\$24,019</b>	<b>\$16,886</b>	<b>\$10,532</b>	<b>44</b>



“You miss 100% of the shots  
you don’t take.”

Wayne Gretzky

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