

# Assessing the Impact of High Resource Prices and Alternative Royalty Regimes on Offshore Gulf of Mexico Oil and Gas Activity

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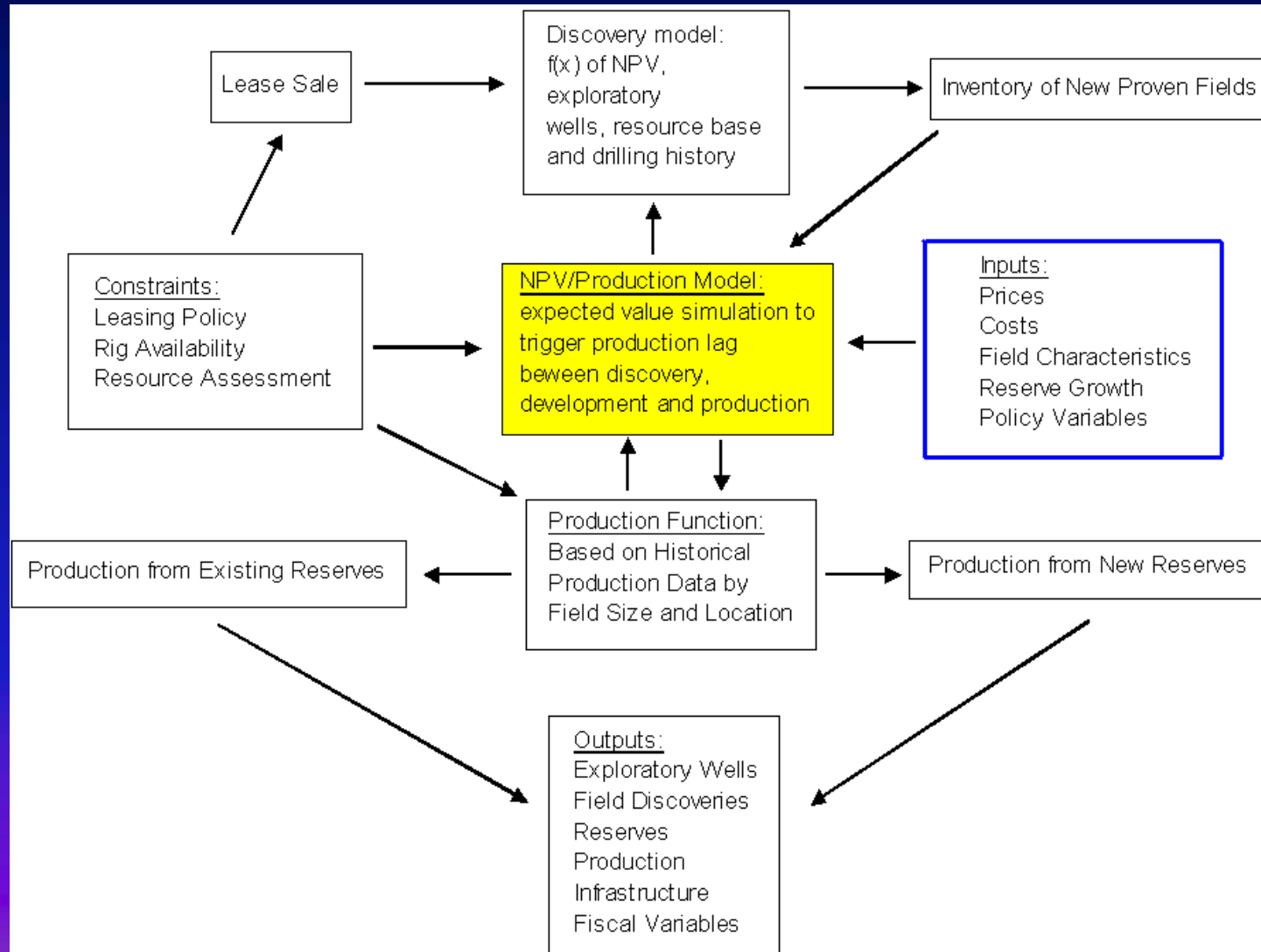
# Overview

- Research Objectives
- IIC EDP Model
- Field-Level Economics
- Research Methodology
- Key Modeling Levers
- Results
- Conclusion/Future Research

# Research Objectives

- Future of the Gulf of Mexico
- Key Assumptions
  - Resource Prices
  - Capital and Operating Costs
  - Royalty Initiatives
- What is the Impact on Offshore Activity?
- Importance: Public Policy, Industry, Research

# IIC EDP Model



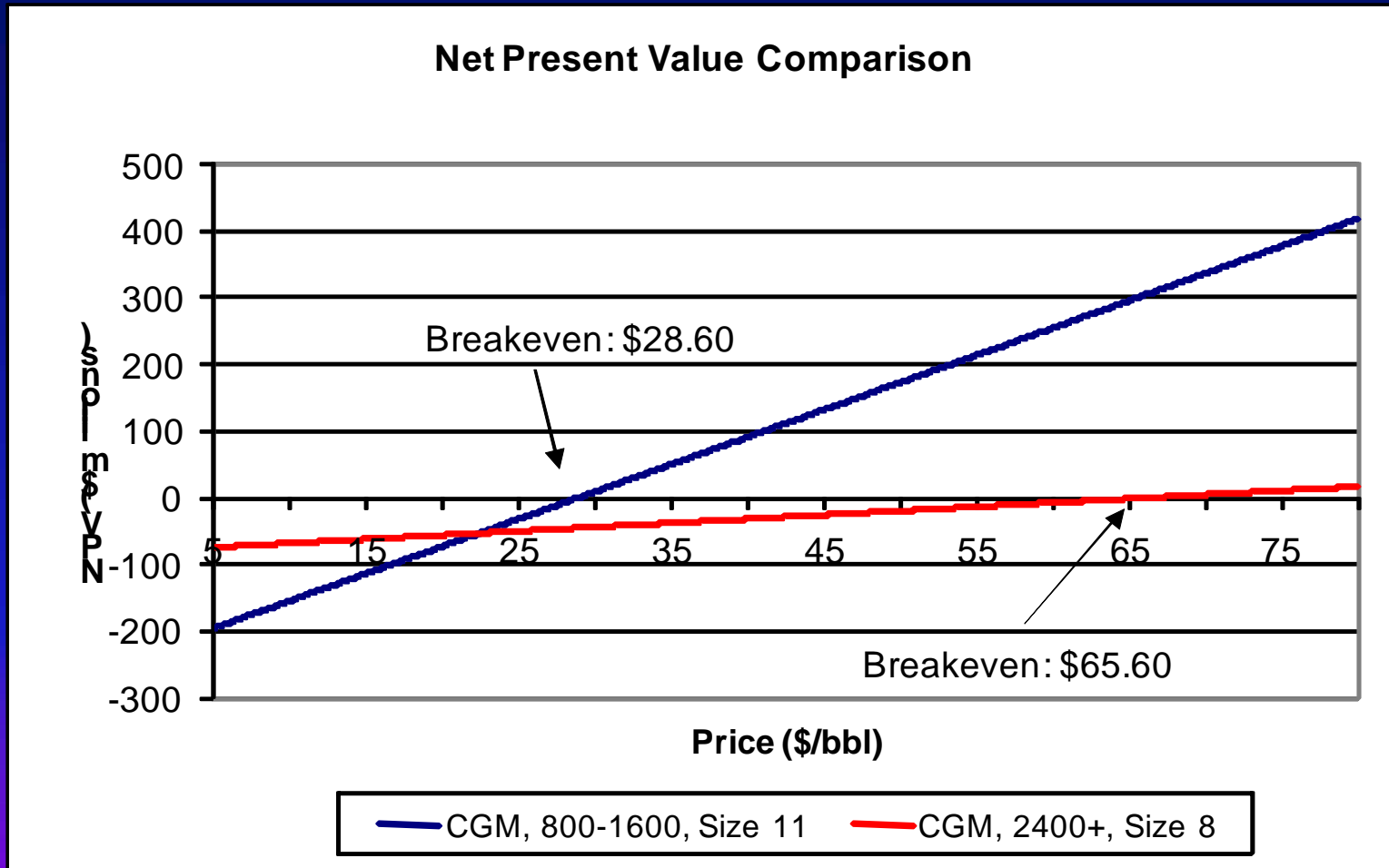
# Key Model Assumptions

- Resource Base (discovered/undiscovered)
- Economic Variables
  - Resource price (historical and future expectations)
  - Capital and operating costs
- Policy Variables
  - Leasing restrictions
  - Royalty Initiatives
- Segmentation (Planning Area, Water Depth, Field Size)

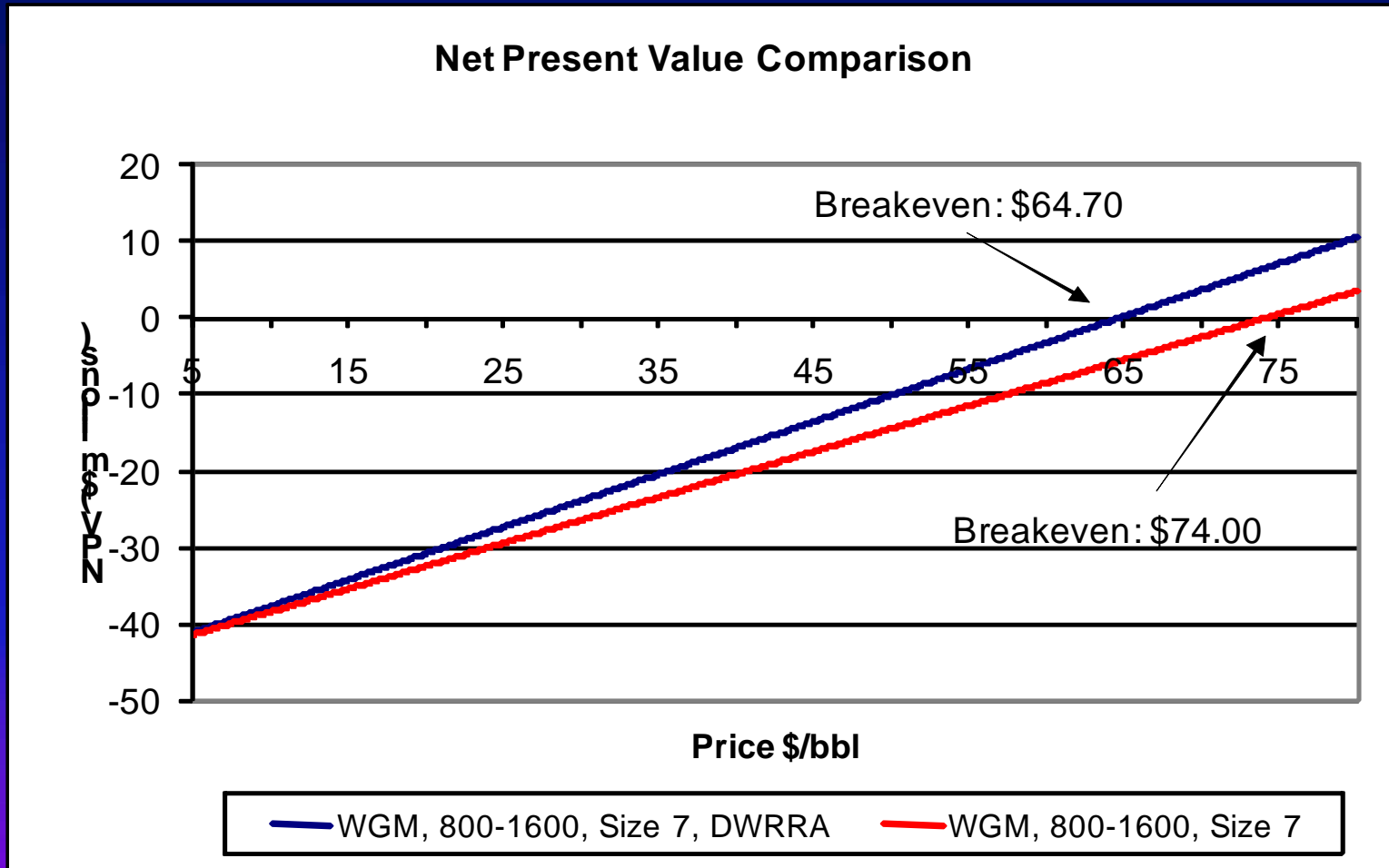
# Field Level Economics

- NPV/Economic Component decides...
  - Where/when to drill
  - Field development (is it profitable?)
- Traditional DCF Approach
  - Time series
  - Revenue component (price, quantity, policy)
  - Cost component (capital, operating)
- Starts with Exploration (Discovery Module)

# NPV Example – Field Type



# NPV Example – Policy



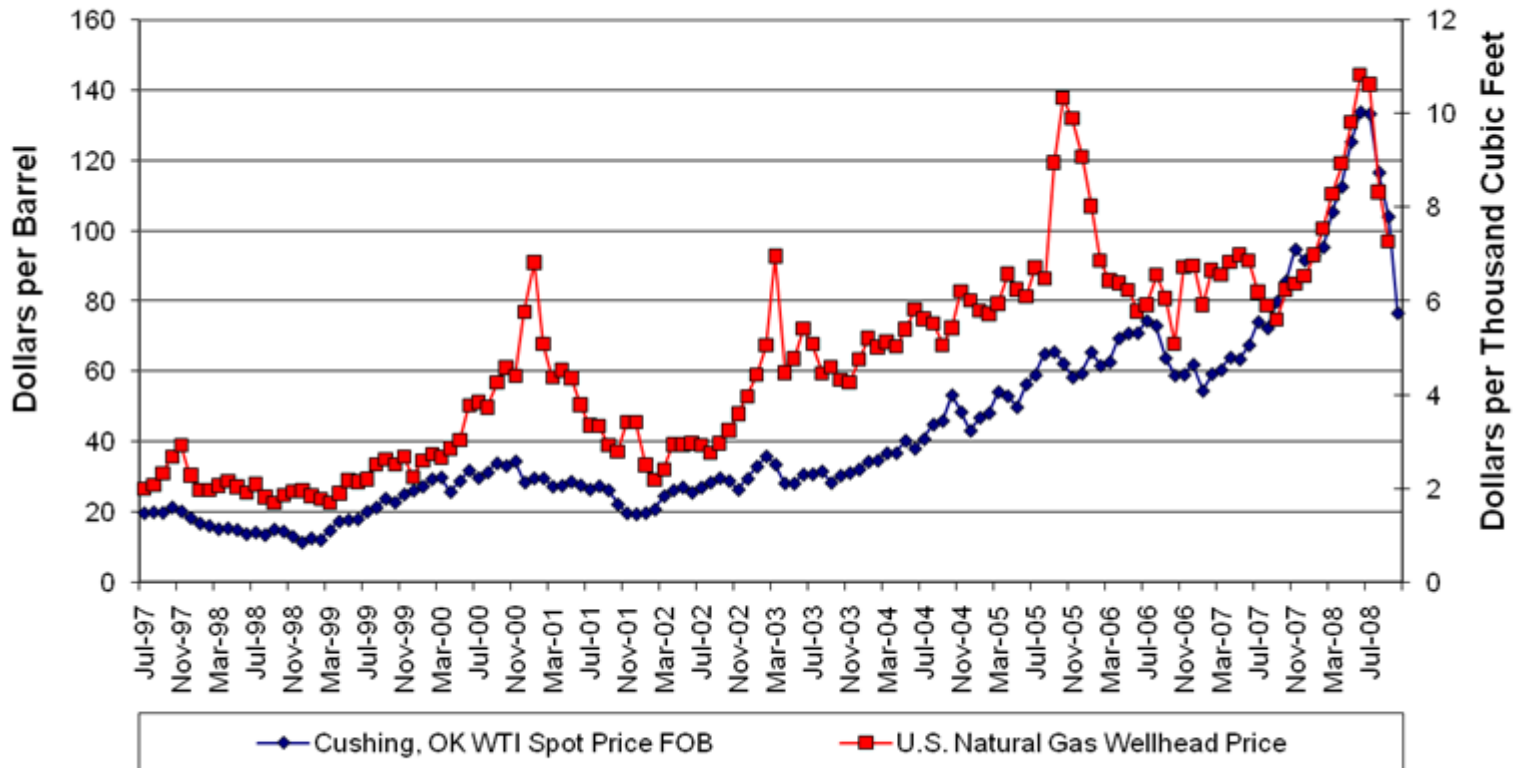
# Research Methodology

- Expected Value Simulation
- Differential Analysis
- Provides a Range of Forecast Outputs
  - Exploration wells
  - Fields/Reserves discovered
  - Infrastructure
  - Production
  - Financial variables

# Resource Prices

## What Does the Future Hold?

WTI Spot Price Versus Natural Gas Wellhead Price



Source: Energy Information Administration

# Capital/Operating Costs

## Will Costs Track Price?

### Annual Operating Cost Increases

	2002	2003	2004	2005	2006
12-slot 100 ft WD	4.6%	8.7%	6.6%	26.1%	39.1%
12-slot 300 ft WD	4.7%	8.8%	6.6%	25.6%	38.0%
18-slot 100 ft WD	5.2%	9.2%	7.3%	23.9%	36.8%
18-slot 300 ft WD	5.1%	9.2%	7.3%	23.7%	35.9%
18-slot 600 ft WD	6.5%	9.9%	7.8%	21.6%	34.6%
Average	5.2%	9.2%	7.1%	24.2%	36.9%

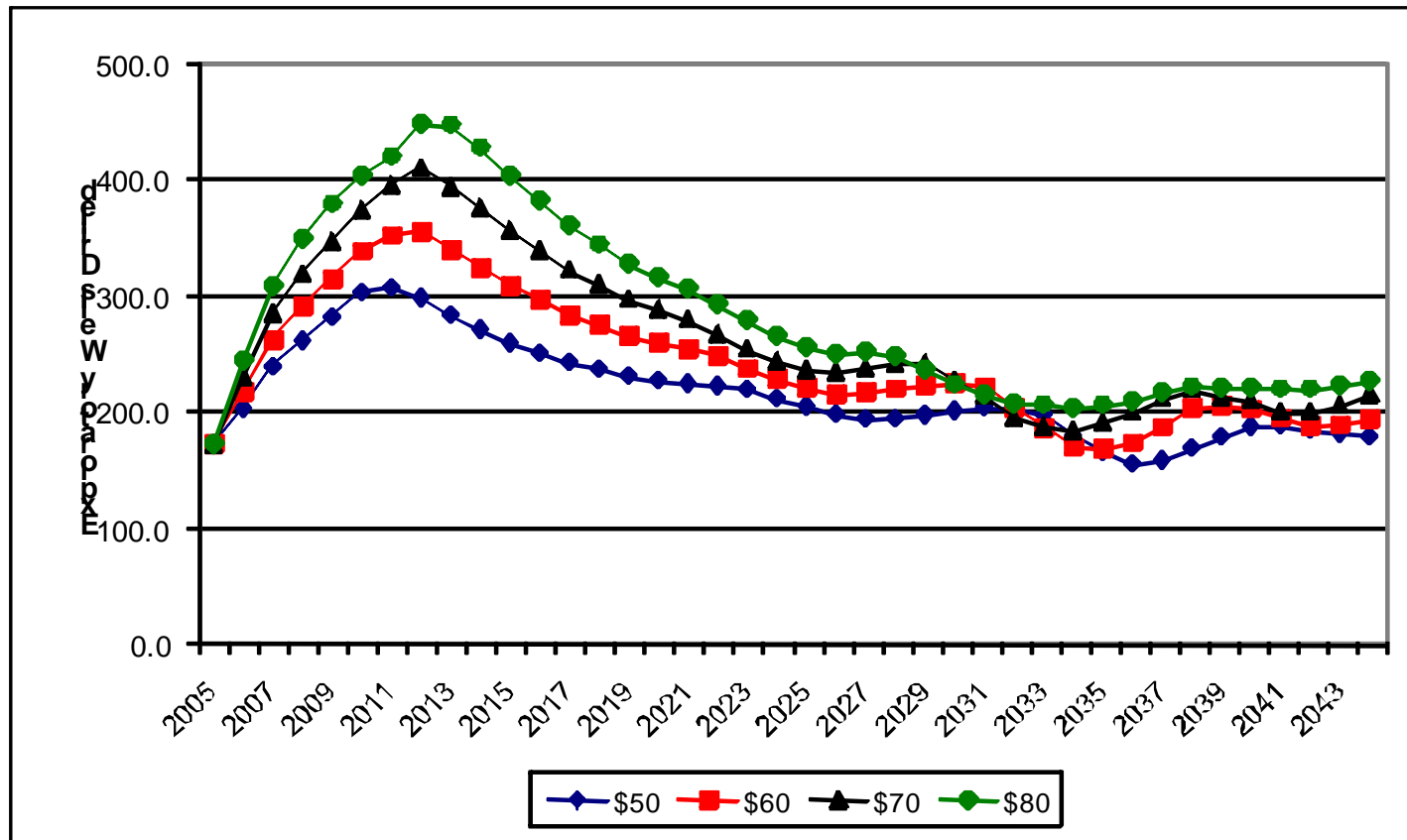
Source: Energy Information Administration, Office of Oil and Gas, Table 5 and IIC, Inc. calculations.

# Policy Initiatives – Royalty Relief

- DWRRA
  - Volumes by Field/Water Depth
  - 17.5/52.5/87.5 mmBOE per field
- Subsequent Sales
  - Lease Basis
  - 5/9/12/16 mmBOE per lease
  - Deep gas
- Litigation Issues

# Results – Price Sensitivity

Exploratory Well Drilling at Various Oil Resource Prices



# Results – Price Sensitivity

	\$50/bbl (Base Case)	\$70/bbl	4 Yr Actual - Decline	4 yr Actual - Increase
Exploratory Wells Drilled	8,696.4	10,549.4	7,087.8	10,308.5
% Change from Base Case		21.3%	-18.5%	18.5%
Fields Discovered	722.7	816.9	624.9	811.6
% Change from Base Case		13.0%	-13.5%	12.3%
Reserves Discovered (mmBOE)	51,884.0	57,840.5	46,644.9	59,083.3
% Change from Base Case		11.5%	-10.1%	13.9%
Oil Production from Forecasted Discoveries (mmBbl)	17,691.0	20,763.4	17,637.6	21,416.0
% Change from Base Case		17.4%	-0.3%	21.1%
Gas Production from Forecasted Discoveries (Bcf)	102,749.0	118,843.4	98,110.2	119,180.3
% Change from Base Case		15.7%	-4.5%	16.0%

*Notes:* Cumulative Impacts through 2044, No royalty relief initiatives

# Results – Cost Sensitivity

	Base Case	6% Constant	Spike Case
Exploratory Wells Drilled	10,549.4	10,001.4	10,176.0
% Change from Base Case		-5.2%	-3.5%
Fields Discovered	816.9	789.4	798.7
% Change from Base Case		-3.4%	-2.2%
Reserves Discovered (mmBOE)	57,840.5	55,895.4	56,557.8
% Change from Base Case		-3.4%	-2.2%
Oil Production from Forecasted Discoveries (mmBbl)	20,763.4	20,070.9	20,035.2
% Change from Base Case		-3.3%	-3.5%
Gas Production from Forecasted Discoveries (Bcf)	118,843.4	115,587.0	115,487.1
% Change from Base Case		-2.7%	-2.8%

*Notes:* Cumulative Impacts through 2044, No royalty relief regimes, \$70/bbl initial resource price

# Results – Royalty Relief Sensitivity

	No Relief	DWRRA - Field	DWRRA - Lease	Current Program
Grown Reserves Discovered	51,884.0	52,690.8	53,333.5	52,479.0
% Change from No Relief		1.6%	2.8%	1.1%
Total Production (new discoveries)	35,973.7	36,595.6	37,193.0	36,534.1
% Change from No Relief		1.7%	3.4%	1.6%
Present Value of Total Royalty Revenue (new discoveries)	37,327.6	30,689.0	25,969.7	33,250.5
% Change from No Relief		-17.8%	-30.4%	-10.9%

*Notes:* Cumulative Impacts through 2044, Initial resource price of \$50/bbl, royalty revenue amounts in \$millions

# Key Caveats/Future Research

- Price Thresholds
- Deep Gas Royalty Relief (“Vertical Leases”)
- Front-End Leasing Considerations
  - Bonus
  - Rentals
- Eastern Gulf of Mexico
- Resource Base
- Scalability / Applicability

# Conclusions

- Resource Prices
  - Lead to improved field level economics
  - Predominant driver of offshore oil and gas activity
- Capital Costs
  - Increases tend to offset some gains with high resource prices
  - Dampens offshore development activity
- Royalty Relief
  - Minor influence on long-term activity
  - Reduced royalty collection
  - Need to consider front-end benefits