



Wright & Company, Inc.
Petroleum Consultants

Is Shale's Story Still Being Written? Appalachia – Past, Present, and Future

*Evaluating unconventional
resources & serving the
petroleum industry for over*

30 Years

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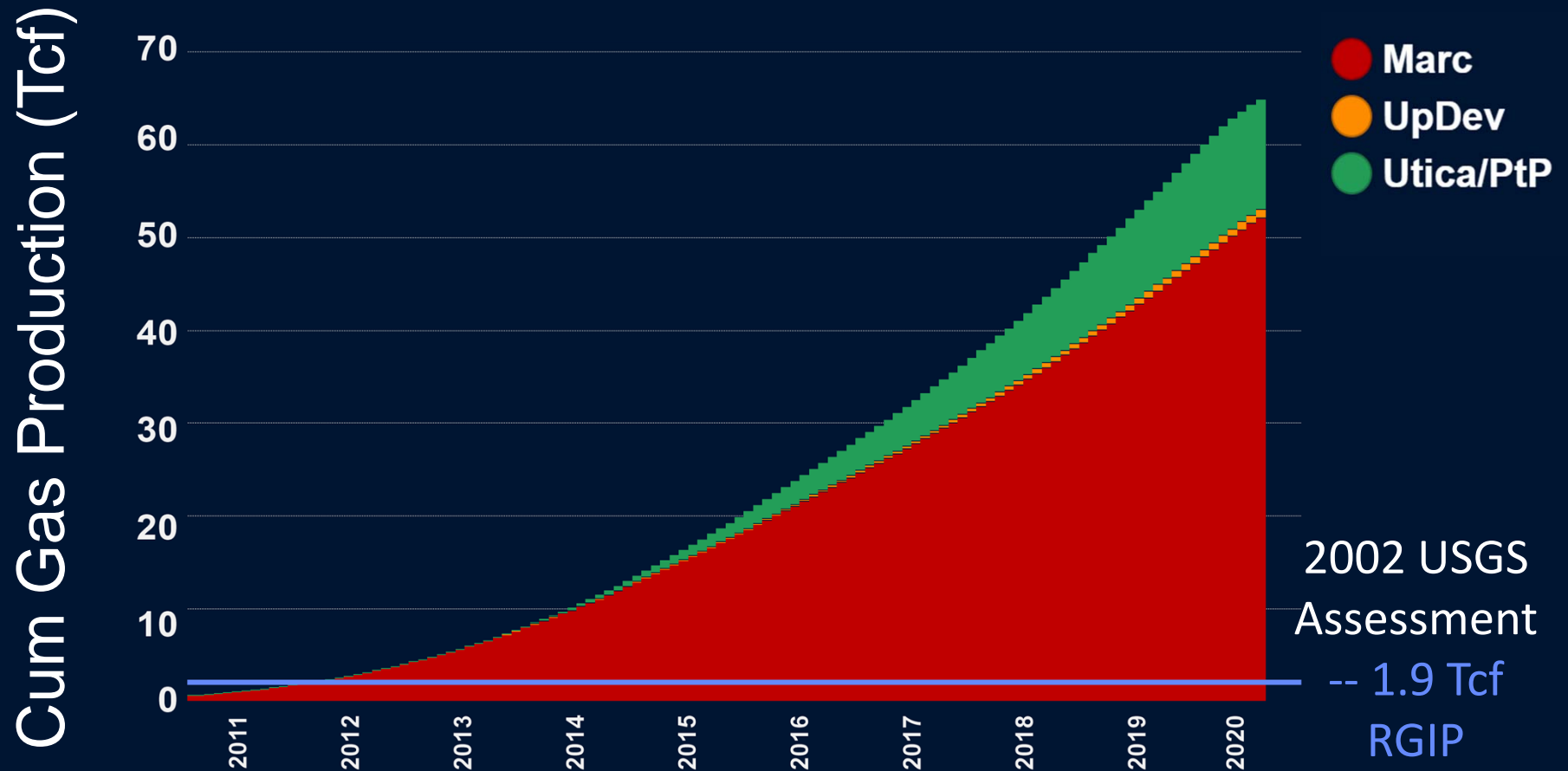
Appalachia's Shale Story

————→ **2020** ————→

- Past – Growth of the Marcellus, then Utica/Point Pleasant
- Present – Compilation of Experience and Wisdom
- Future – Continued Contribution Supplying Energy to the Nation

Cumulative Gas Production Over Time

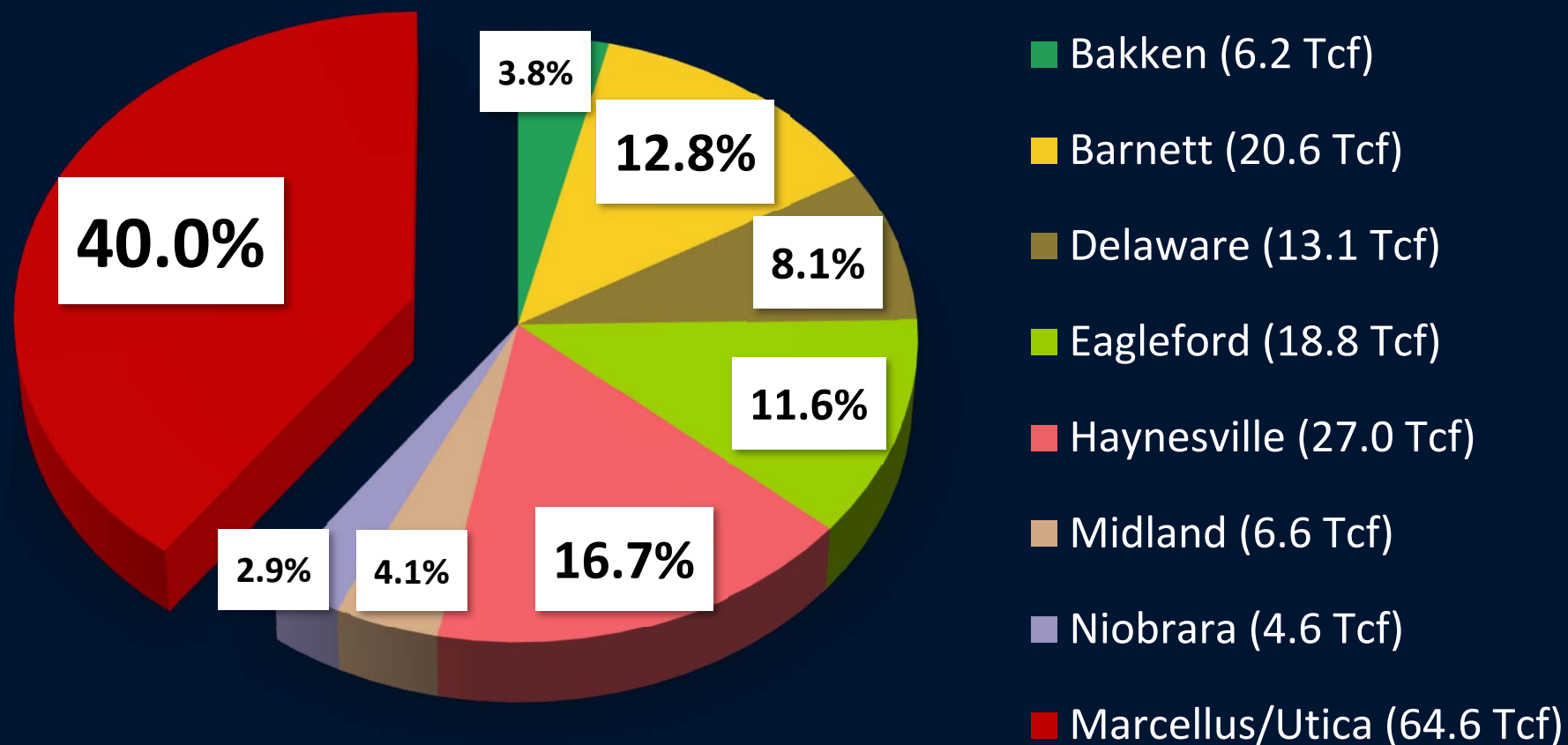
Marcellus, Upper Devonian, and Utica/Point Pleasant



Source Data: Enverus Oct. 2020

Cumulative Gas Production By Play

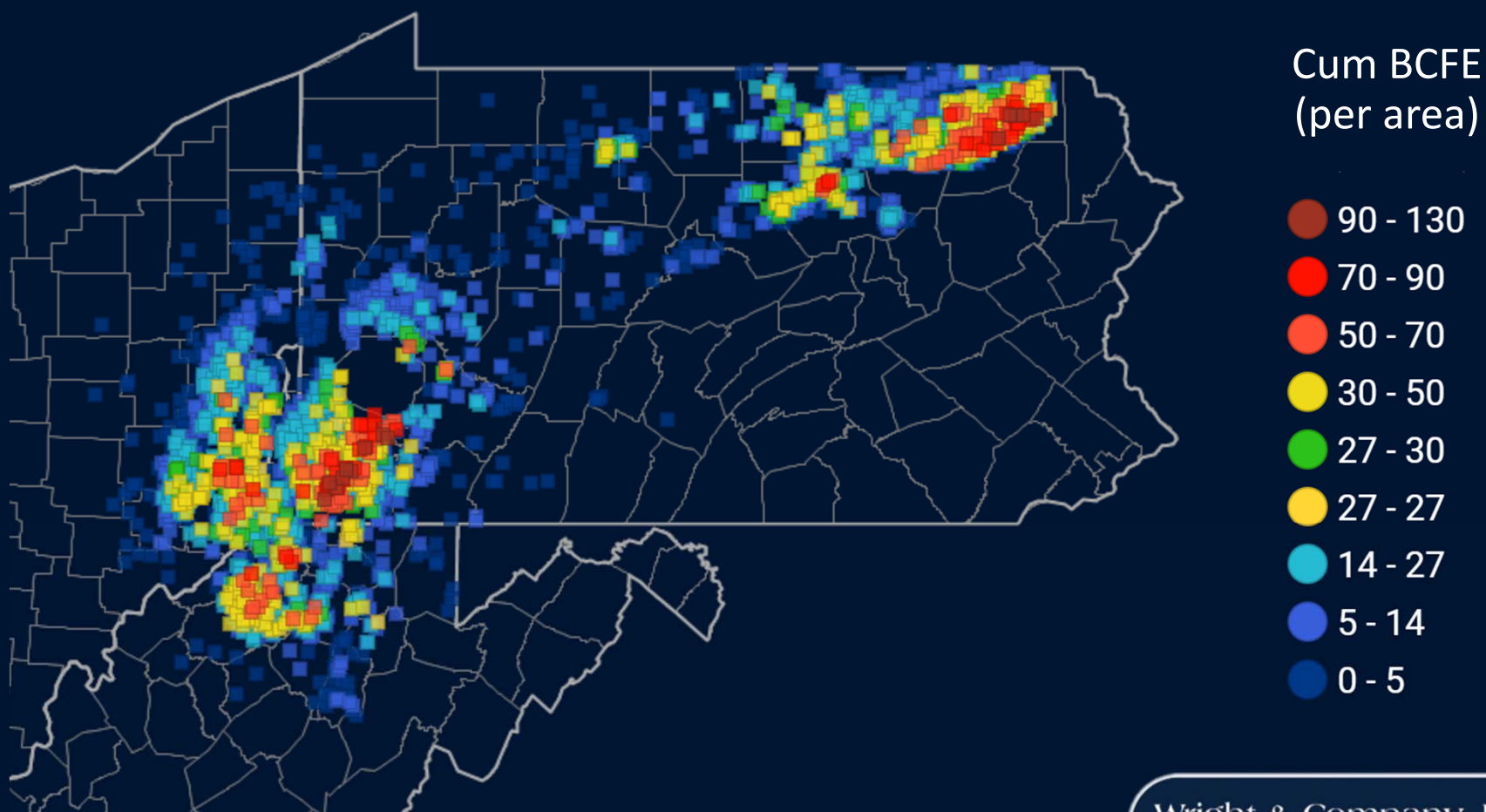
Marcellus/Utica vs Other Major US Plays



Source Data: Enverus Oct. 2020

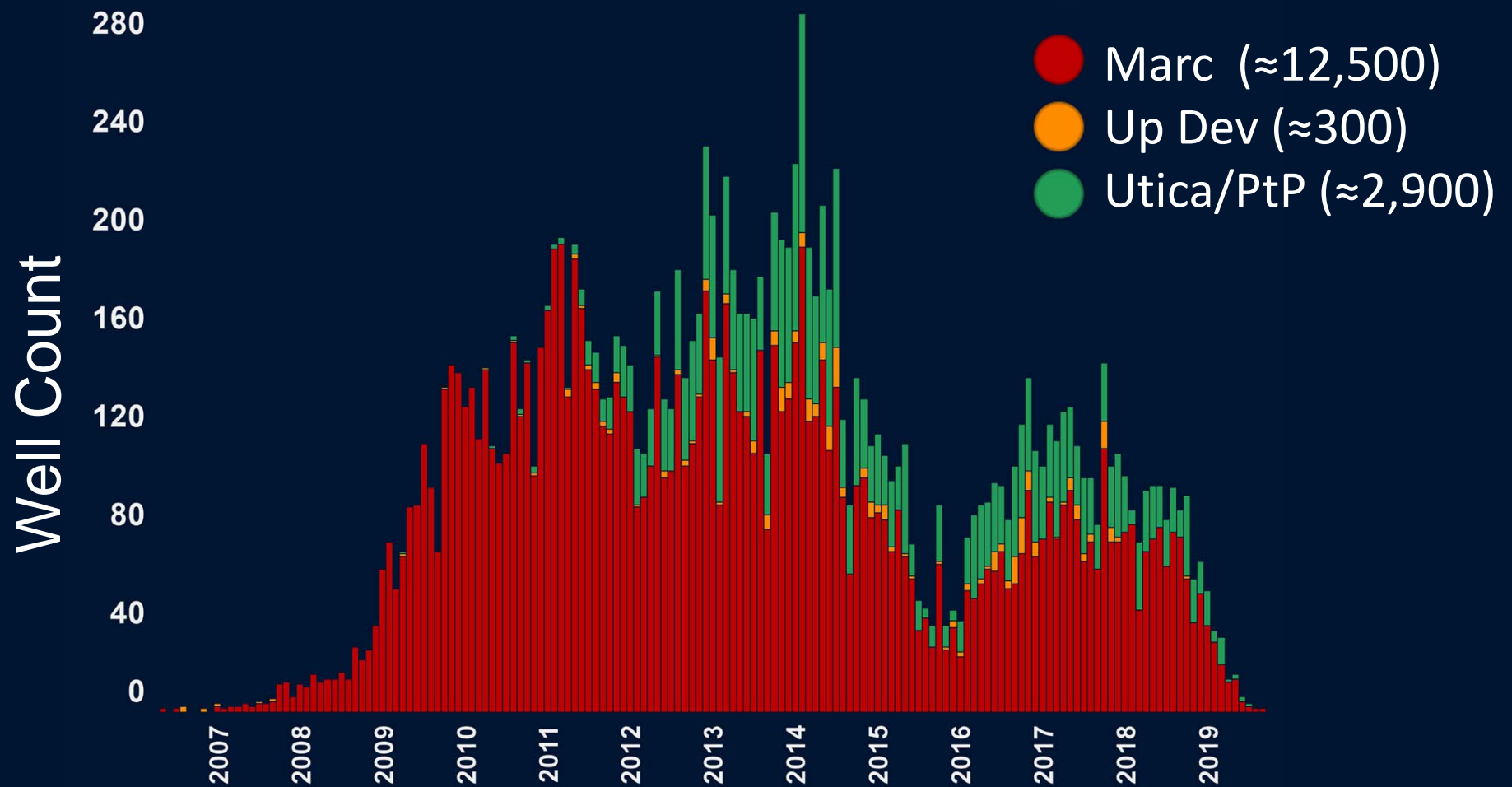
Cumulative Gas Production By Area

Marcellus, Upper Devonian, and Utica/Point Pleasant



Source Data: Enverus Oct. 2020

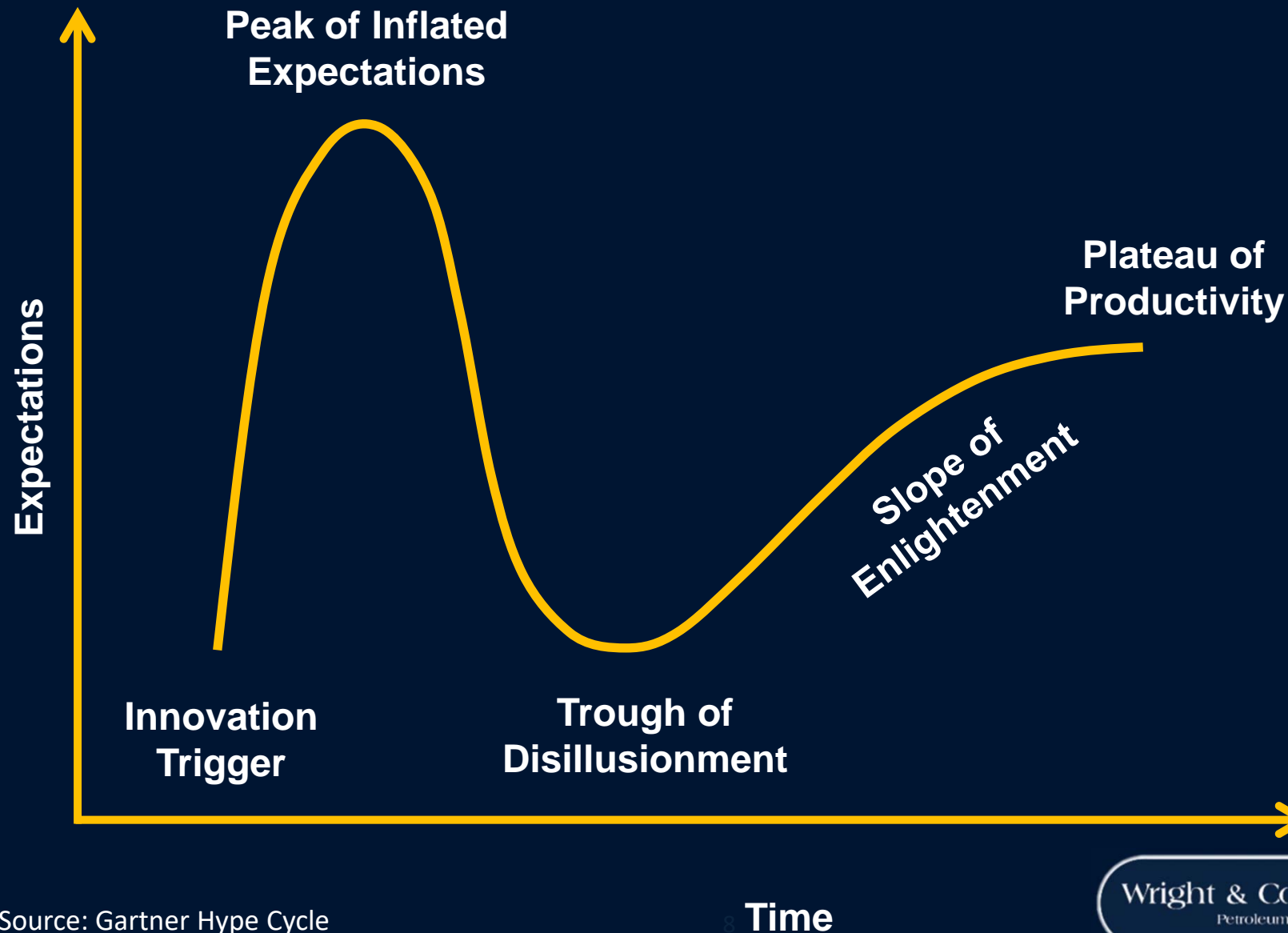
Development Over Time



Source Data: Enverus Oct. 2020

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Interesting Comparison – Hype Cycle

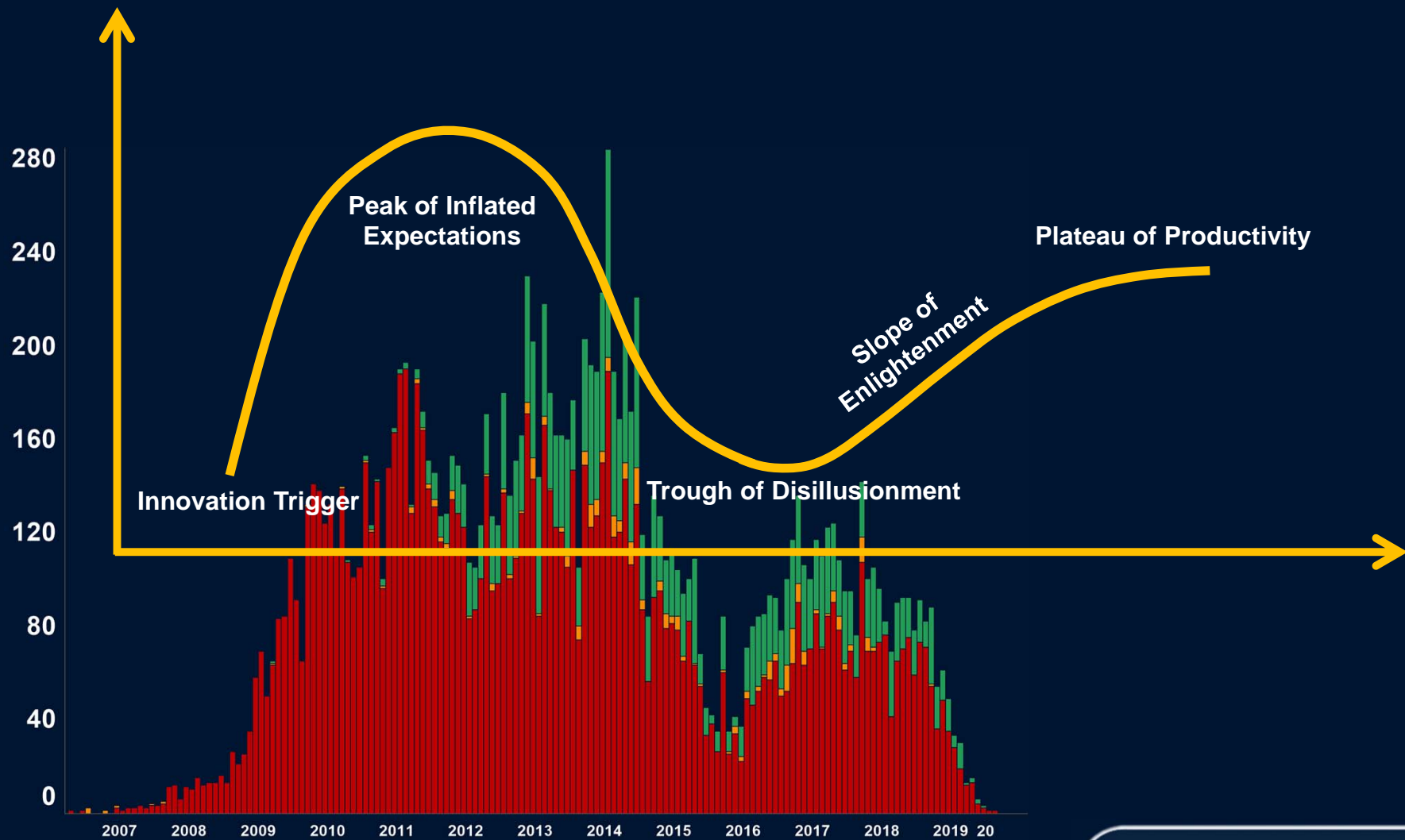


Source: Gartner Hype Cycle

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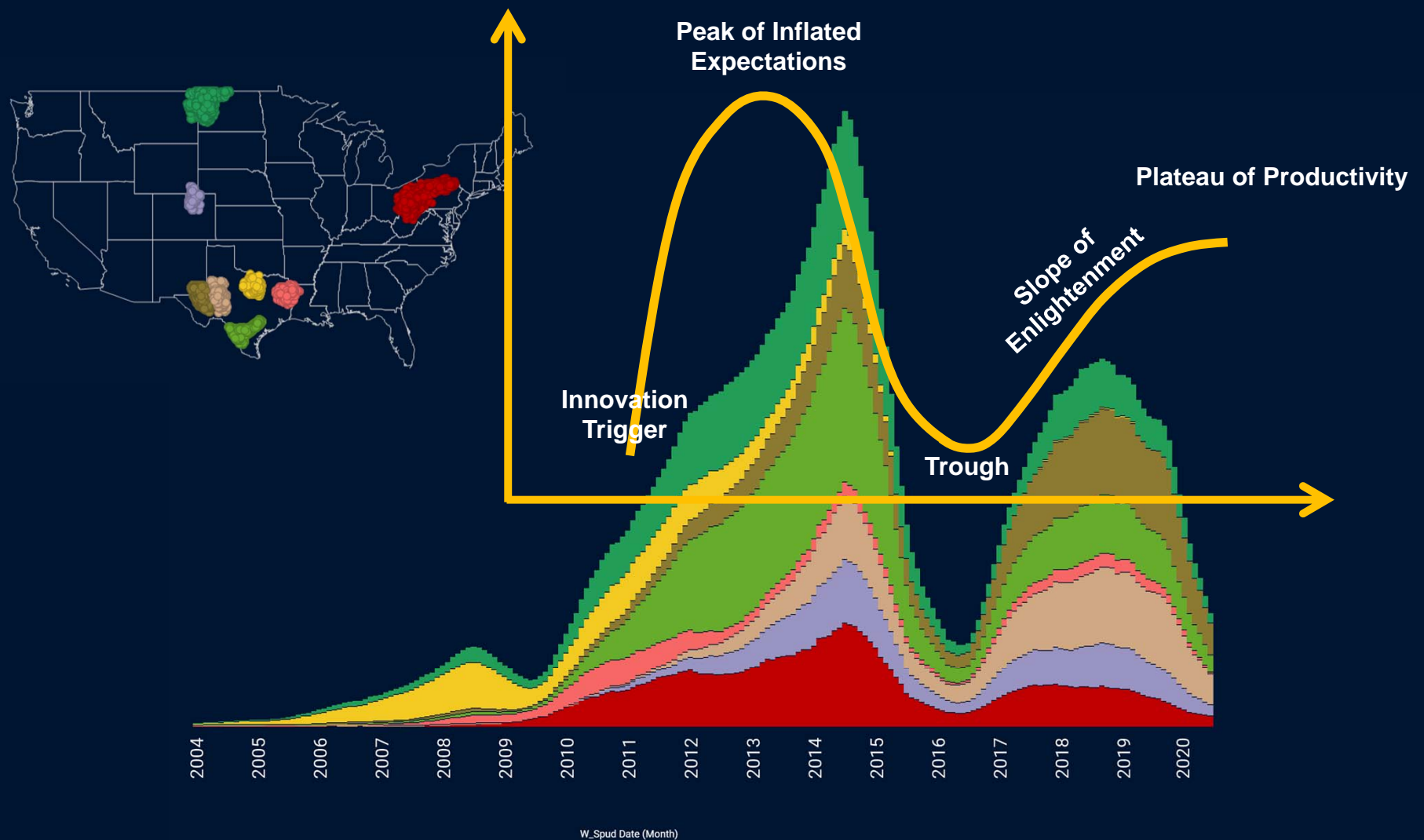
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Development Over Time – Hype Cycle



Source Data: Enverus Oct. 2020

Development Over Time – Hype Cycle



Source Data: Enverus Oct. 2020

Challenges in the Industry – *Past*

Supply/Demand
Pricing Volatility

Investors/Confidence
Access to Capital



**Oil & Gas
Industry**

Social/Political
“Fracking”

Resource Shortages
Services (drilling rigs)
Supplies (proppant, water)

Midstream
Access
Capacity

Regulatory
Permitting (Drilling)
Environmental
Asset Retirement

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Our Past

Addressing Challenges –
Our Industry Has Been

Resilient

Innovative

Committed

Challenges in the Industry – *Present*

**Supply/Demand
Pricing Volatility**

**Oil Plays
Associated Gas**

OPEC

**Resource Shortages
Services (drilling rigs)
Supplies (proppant, water)**

**Contracts/Commitments
Firm Transport
Drilling**

COVID-19

**Oil & Gas
Industry**

**Midstream
Access
Capacity**

**Investors/Confidence
Access to Capital**

**Financial
Dividends
Debt Retirement**

**Social/Political
“Fracking”**

ESG

**Regulatory
Permitting (Drilling)
Environmental
Asset Retirement**

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Compilation of Experience Applying Wisdom and Expertise

Observations

Borrowing from a few common phrases...

Habits of Highly Successful Operators

***I Know a Thing or Two,
Because I've Seen A Thing or Two***

Only Pay for What You Need

Compilation of Experience Applying Wisdom and Expertise

Science and Technology

Geology

Engineering

Technology/Equipment

Fine-Tuning, such as

Geosteering

Landing Target

Completion Designs



Compilation of Experience Applying Wisdom and Expertise

Science and Technology

Financial

Consolidations

Hedging

Low-Cost Operating

Capital Efficiency

Better Infrastructure

Water Sourcing/Disposal



Compilation of Experience Applying Wisdom and Expertise

Science and Technology

Financial

Philosophy/Mindset

Measures of Success:

IPs, Drilling Days, \$/ft
Lateral Lengths,
Reserves, # of Wells
Production Volumes

Growth – Sustainable

Acquisitions Evaluations –
Consider Pros and Cons

Retain Knowledge/Experience

Responsible – ESG

Refocus Objectives

Returns to Investors



Compilation of Experience Applying Wisdom and Expertise

Science and Technology

Financial

Philosophy/Mindset

Growth – Sustainable

Acquisitions Evaluations –
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Refocus Objectives

Returns to Investors

Realistic Expectations



Compilation of Experience Applying Wisdom and Expertise

Science and Technology

Financial

Philosophy/Mindset

Analytics Applied to All

Gain Valuable Insights

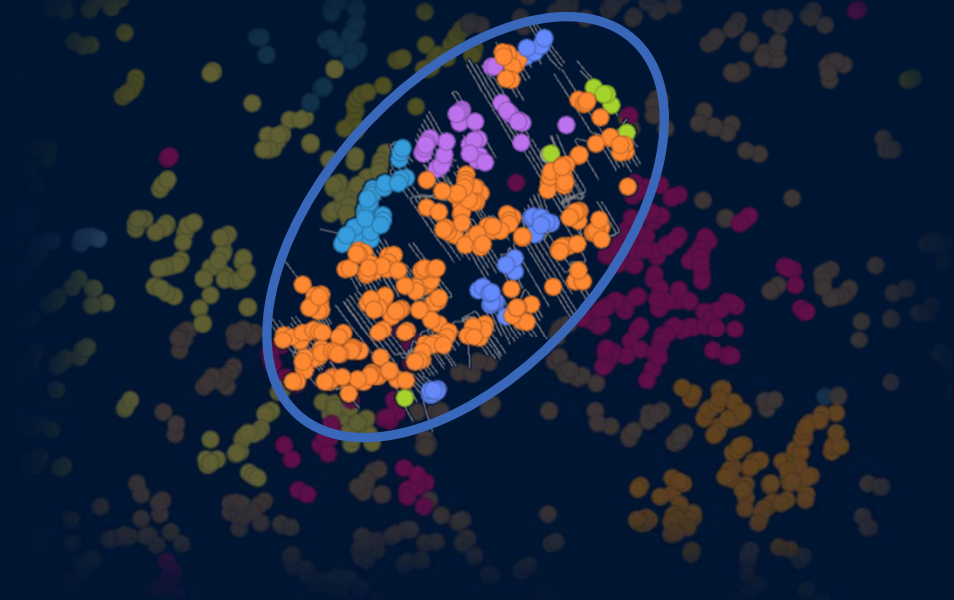
**Intelligent Future
Projections**

Quality, Curated Data



Example: SW PA Marcellus Dry Gas

Realistic Expectations,
Focusing on Returns (ROR),
Using Analytics



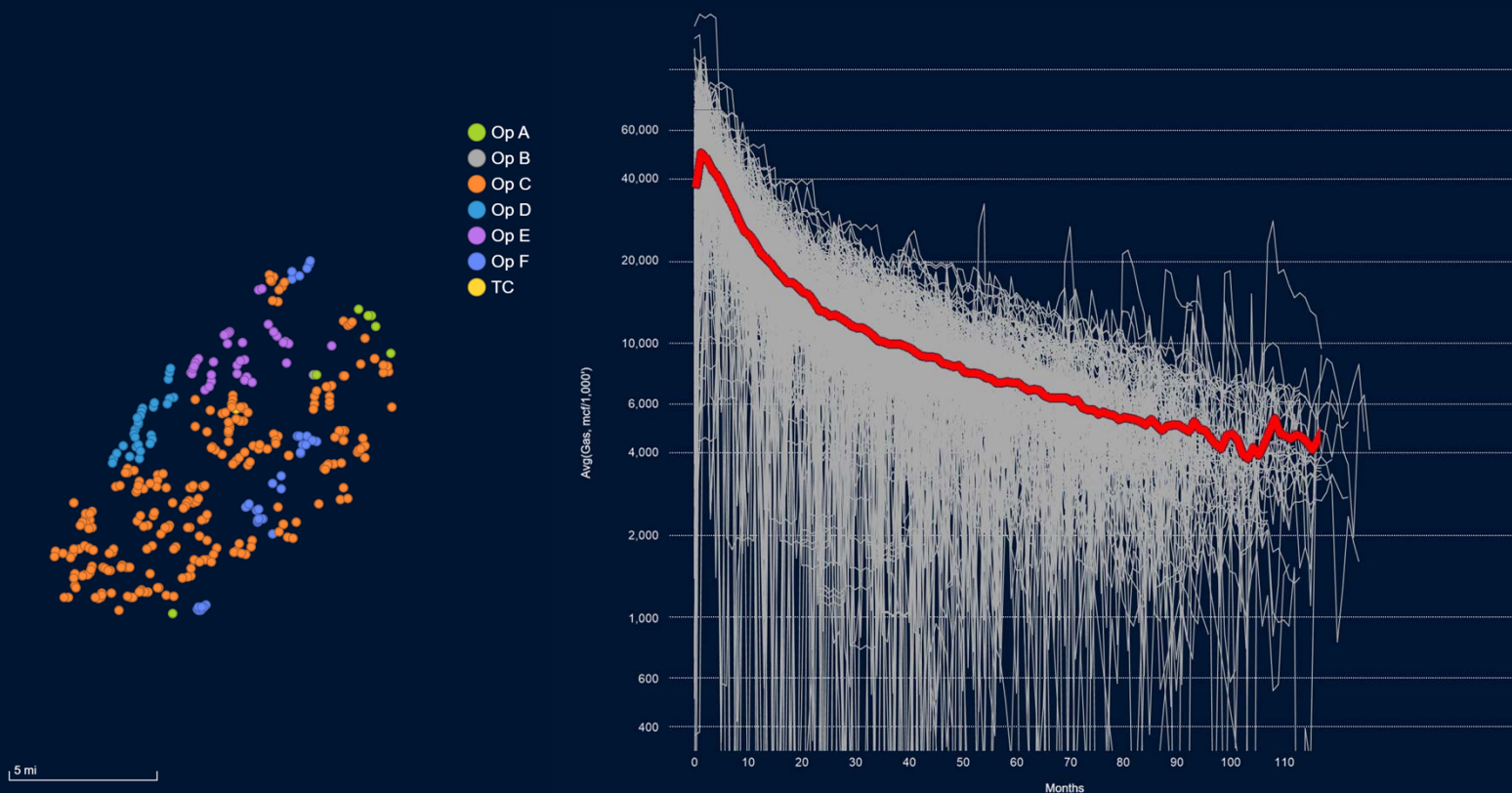
Source Data: Enverus Oct. 2020

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Example: SW PA Marcellus Dry Gas

Base Type Curve

Lateral Length Normalized Production vs. Months Online



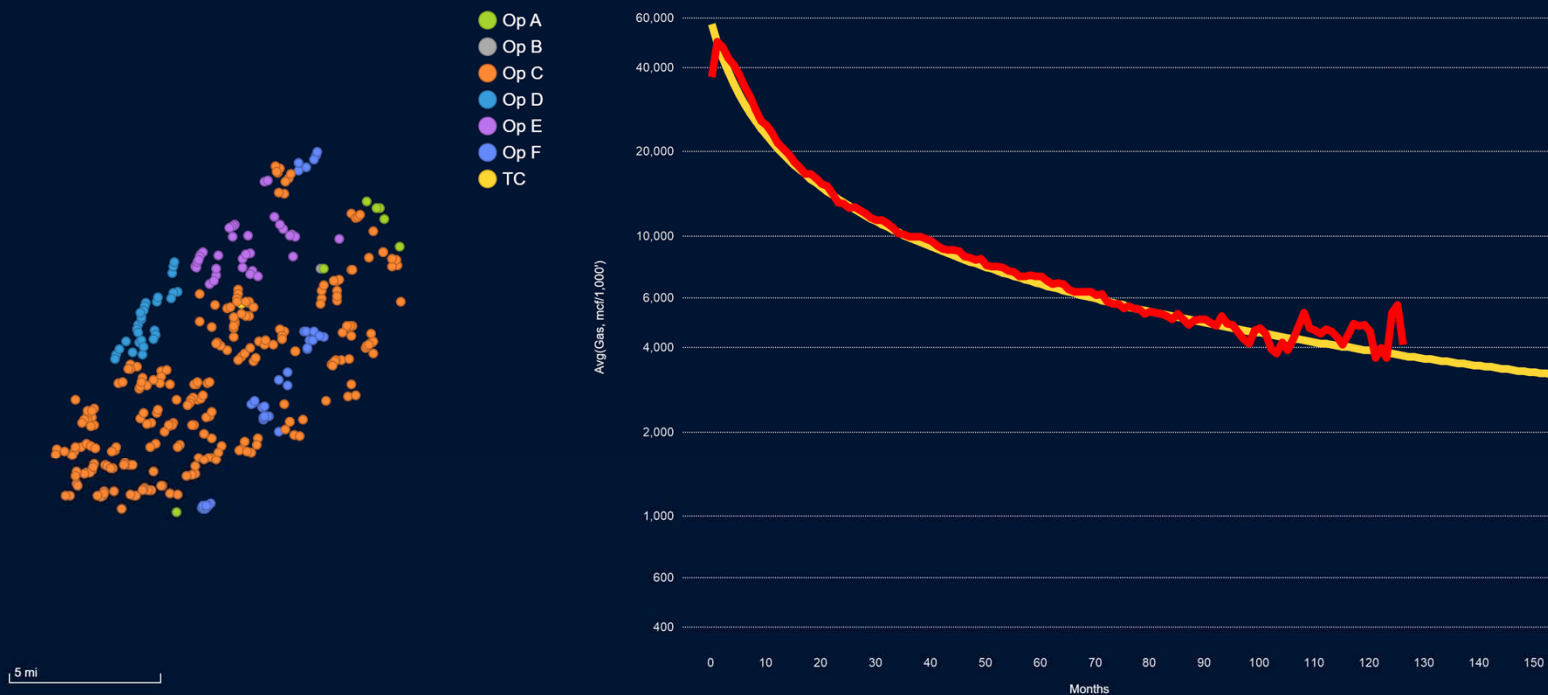
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Example: SW PA Marcellus Dry Gas

Base Type Curve

Type Curve for Average Production (Mcf/1,000')



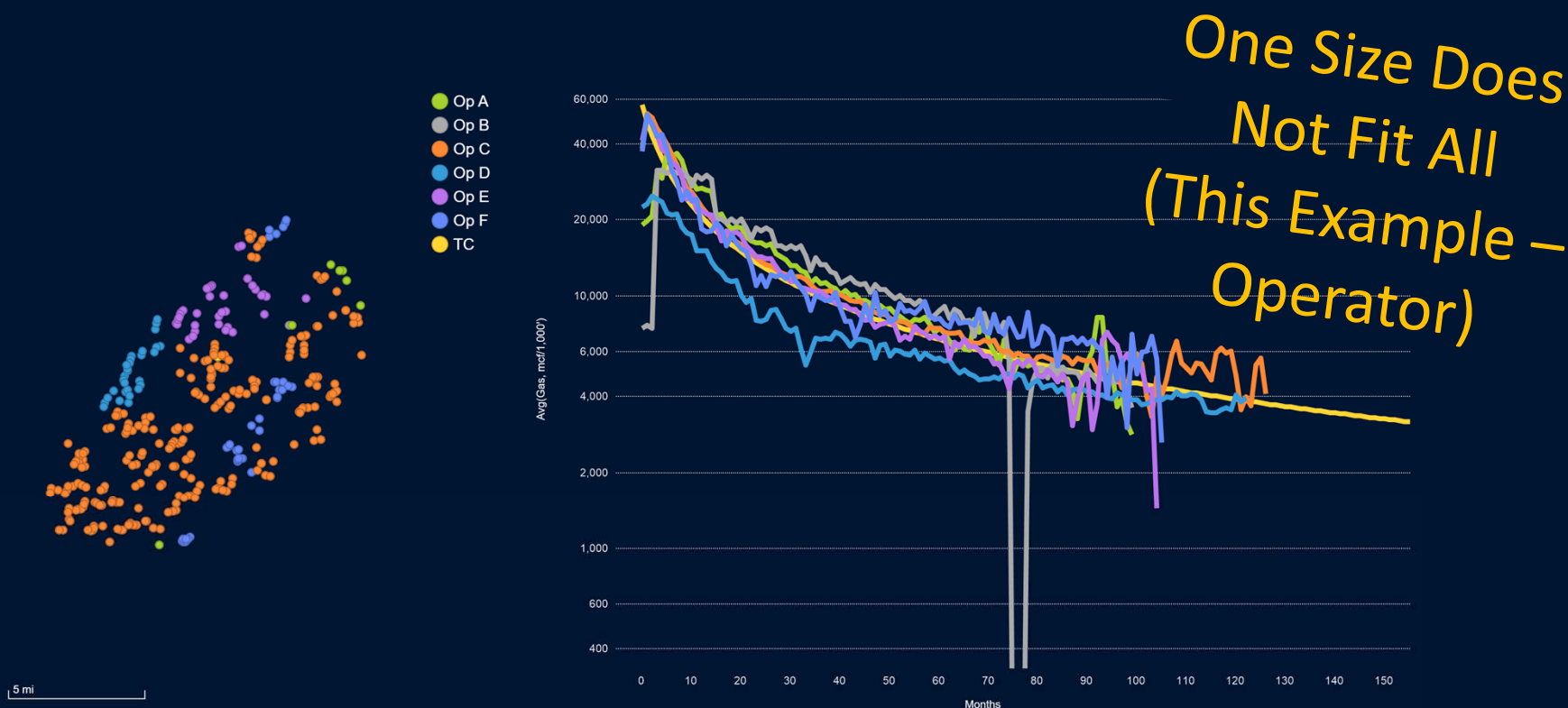
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Example: SW PA Marcellus Dry Gas

Refine Type Curve for Go-Forward Design

Completion Design, Lateral Spacing, Phase-Window, etc.



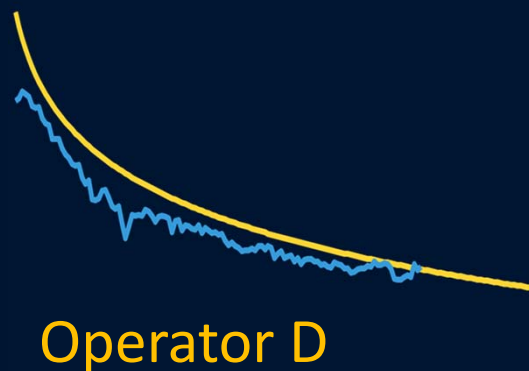
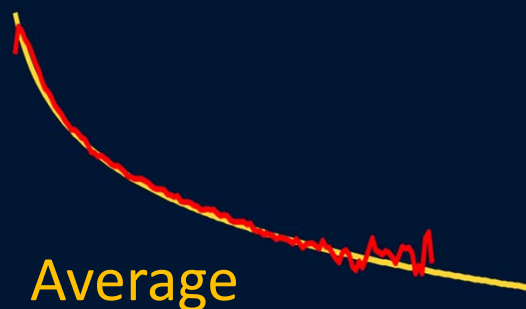
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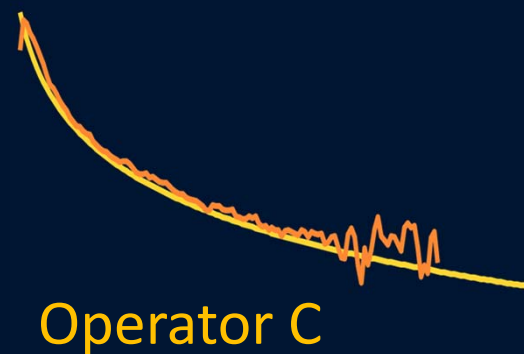
Example: SW PA Marcellus Dry Gas

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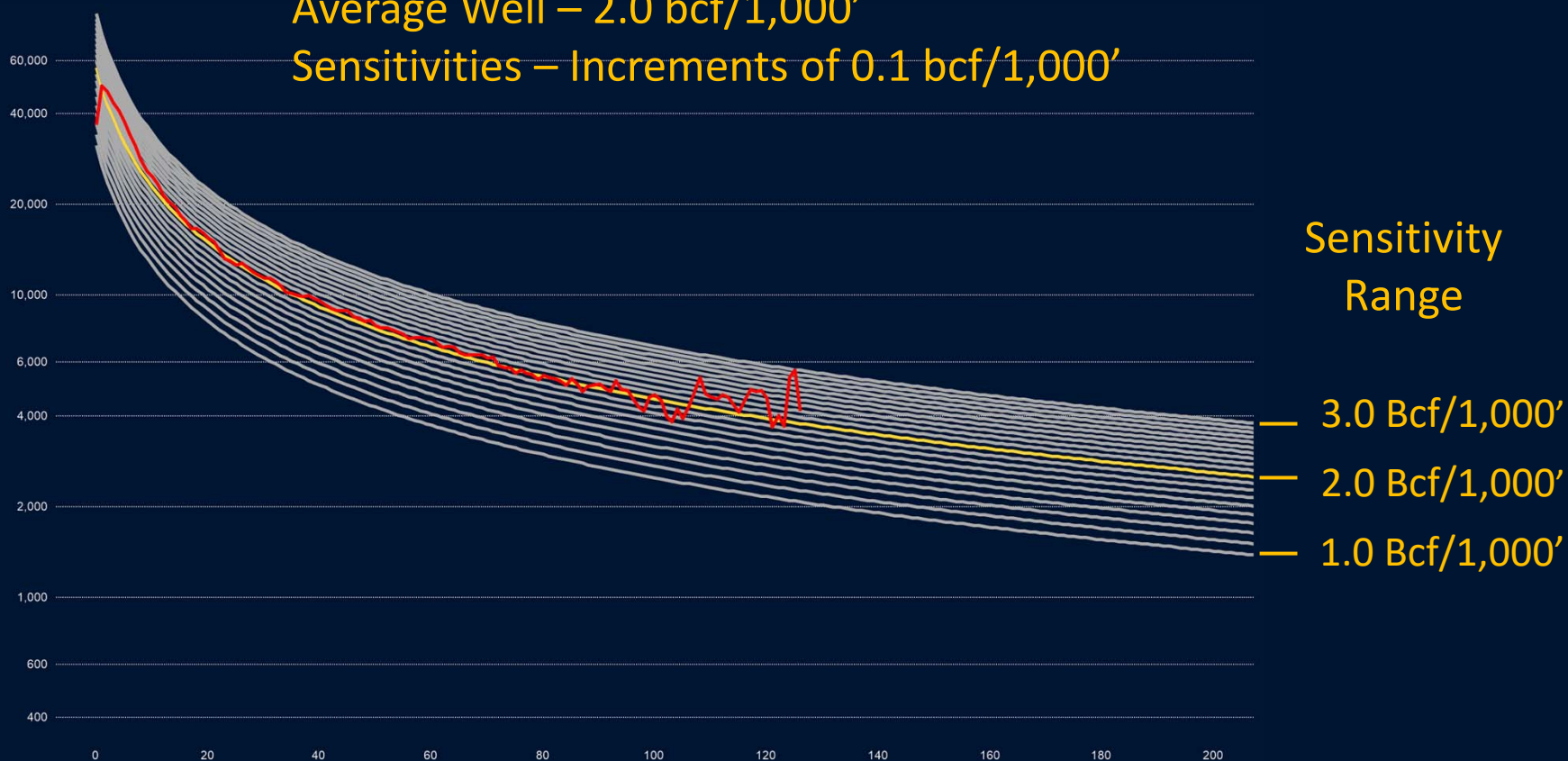
*One Size Does
Not Fit All
(This Example –
Operator)*



Example: SW PA Marcellus Dry Gas

ROR Sensitivity

Type Curve for Example Set - Dry Gas Marcellus
Average Well – 2.0 bcf/1,000'
Sensitivities – Increments of 0.1 bcf/1,000'

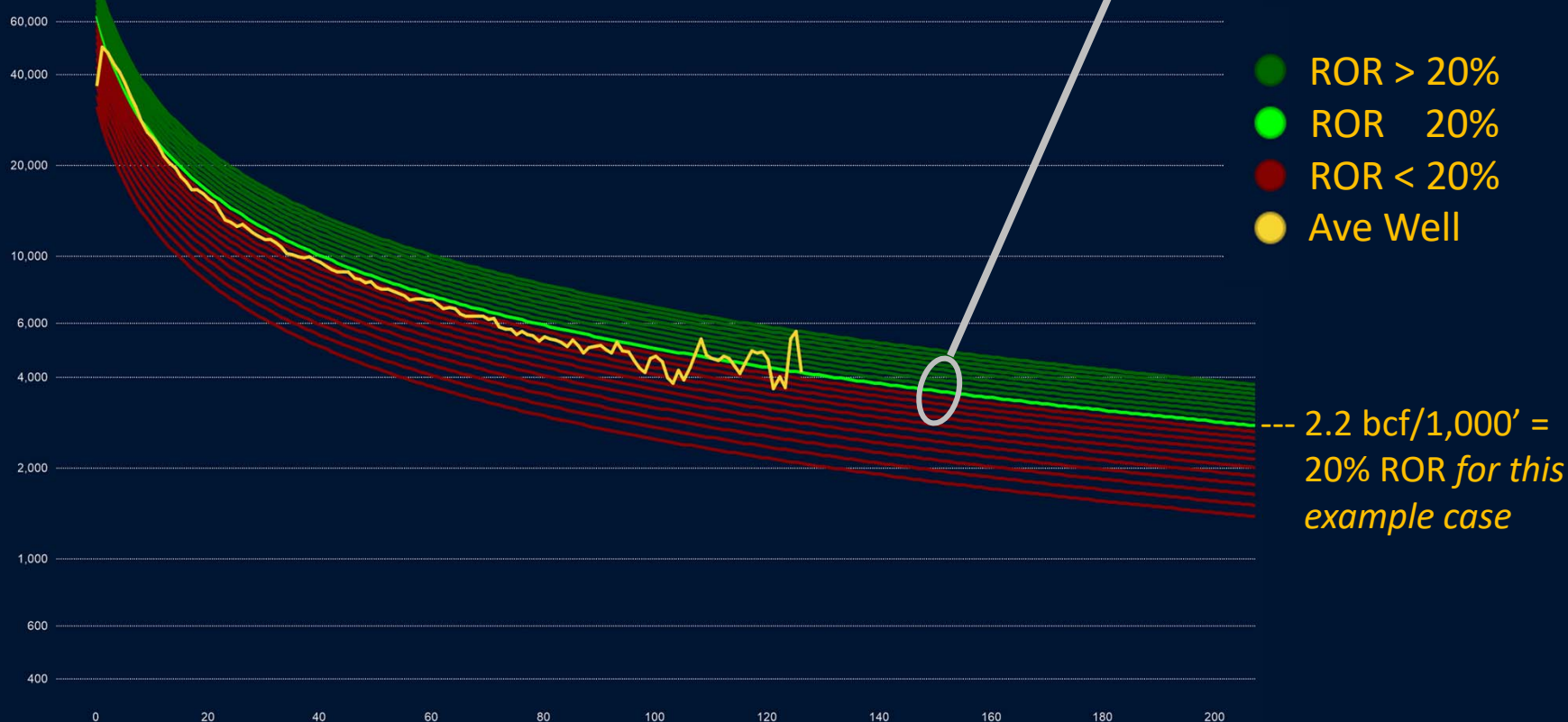


Example: SW PA Marcellus Dry Gas

ROR Sensitivity

Economics Applied to All Sensitivities
Average Well below ROR 20%

*Margins are very close at
this pricing,
0.1 bcf/1,000'
can make a difference....*



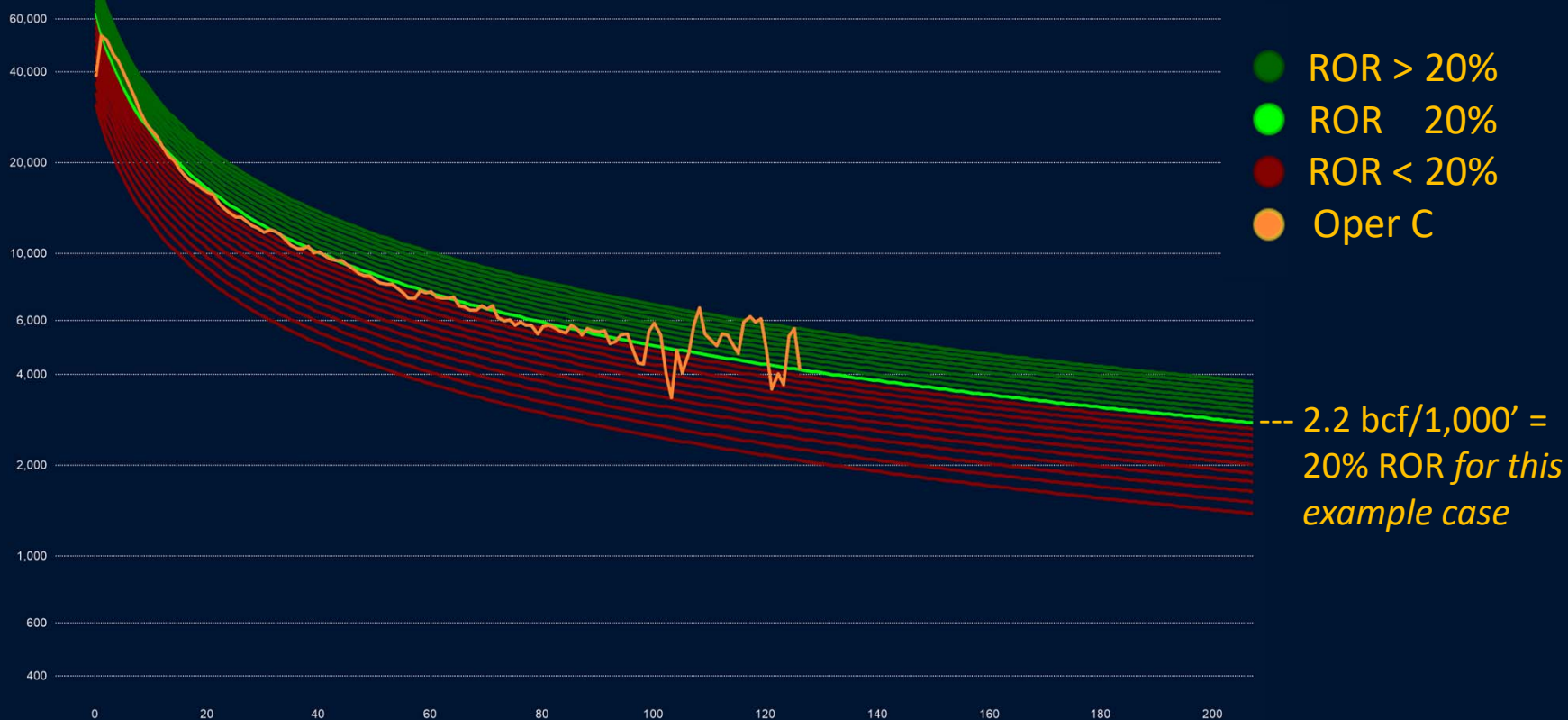
Economics based on: \$1.75 Realized Gas Price,
OpEx \$2,000/mo, \$0.50/mcf; CapEx \$800/ft

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Example: SW PA Marcellus Dry Gas

ROR Sensitivity

Economics Applied to All Sensitivities
Operator C



Economics based on: \$1.75 Realized Gas Price,
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Example: SW PA Marcellus Dry Gas

ROR Sensitivity

Economics Applied to All Sensitivities
Operator D



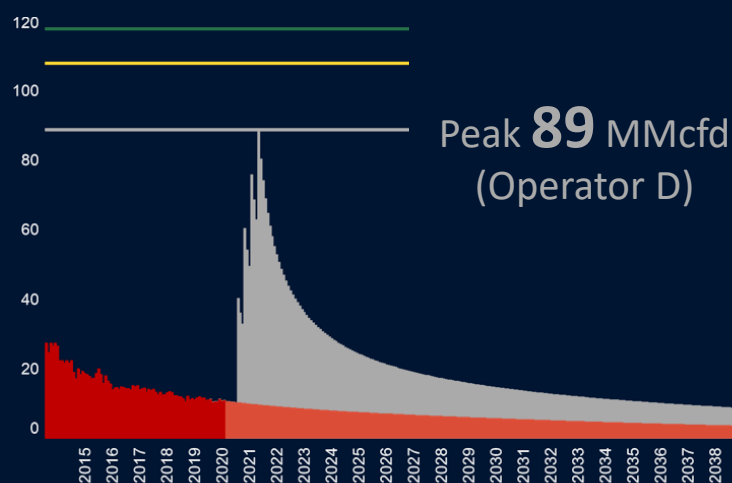
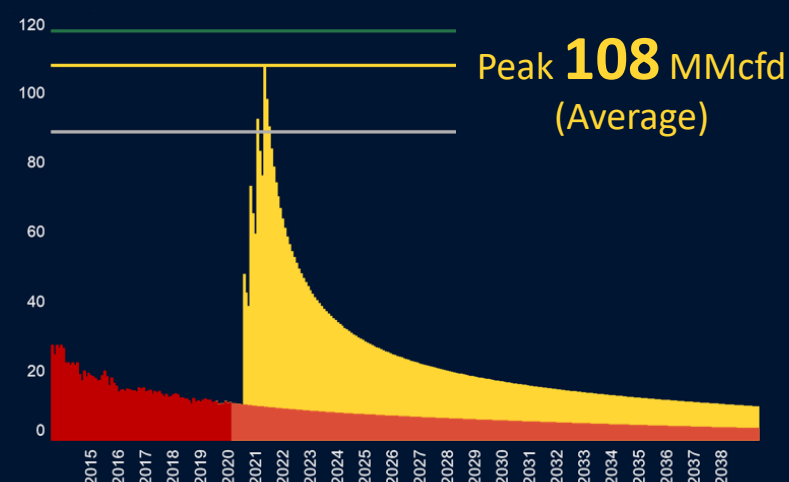
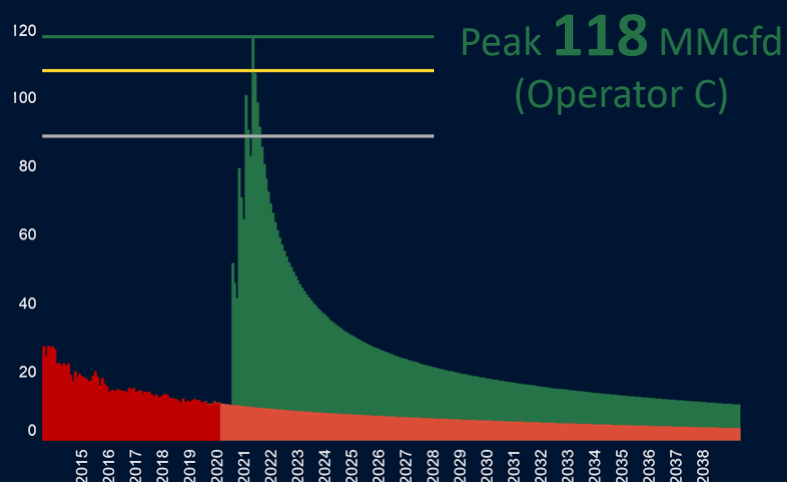
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Example: SW PA Marcellus Dry Gas

Midstream Application

Development Schedule = 2 x 10,000' wells per Quarter in 2021

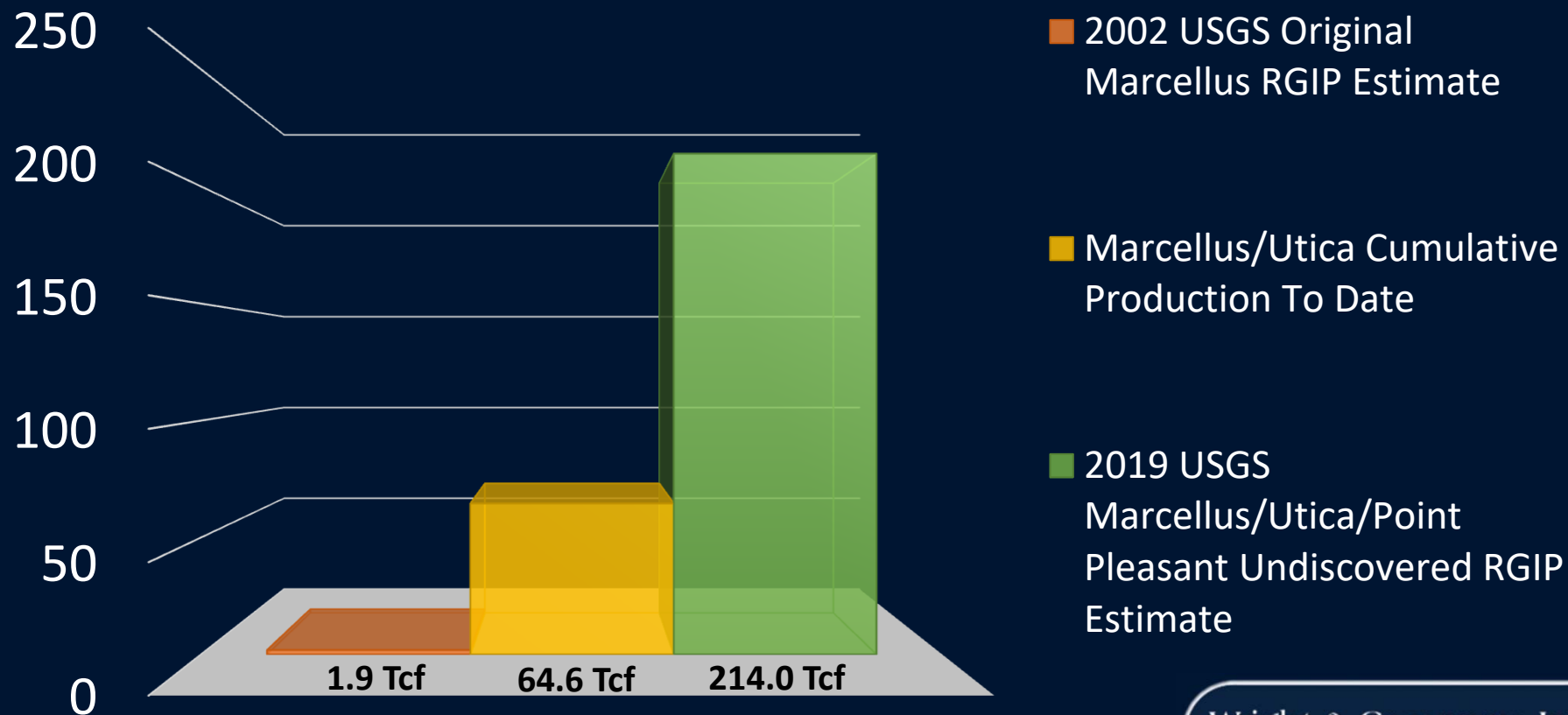


PDP Production
PDP Forecast
Undeveloped Cases

Looking into the Future...

Reserves and Inventory

- Still plenty of gas, plenty of locations, even in well-developed areas



Source Data: Enverus Oct. 2020, USGS

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Looking into the Future...

Demand

- Though Alternative Energy expands
- Natural Gas remains

Clean

Affordable

Reliable

- US and Global Markets (LNG)

Looking into the Future...

Challenges Remain

Challenges in the Industry – *Future*

Supply/Demand
Pricing Volatility

Oil Plays
Associated Gas

OPEC

Alternative Fuels

Resource Shortages
Services (drilling rigs)
Supplies (proppant, water)

Contracts/Commitments
Firm Transport
Drilling

COVID-19
Recovery



Oil & Gas
Industry

Midstream
Access
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Investors/Confidence
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Financial
Dividends
Debt Retirement

Social/Political
"Fracking"

ESG

Regulatory
Permitting (Drilling)
Environmental
Asset Retirement

Challenges Will be
Met, *Again...*

Summary...

The Past – Growth, Challenges, Adversity
Met with Resiliency, Innovation,
and Commitment

The Present – Armed with Experience
Expertise and Wisdom accumulated along the way....

The Future – World Class Shale Play
Appalachia WILL continue to be an important
supplier of natural gas

Special Thanks to the Wright Team including

Adam D. Null, P.E.
General Manager

Susan D. Christians, P.E.
Sr. Petroleum Consultant – Special Studies Manager

Shawn M. Janzen, C.E.T.
Petroleum Engineering Technologist

Wright Serves a Variety of Clients Throughout Industry

Operators

- ***Majors, Independents***

Non-Op Interest Owners

- ***Royalty, Mineral Interest***

Midstream

Financial Institutions

- ***Banks, Private-Equity Venture Capital***

Law Firms





THANK YOU!

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