The Society of Petroleum Evaluation Engineers

SPEE Denver Chapter announces its February Meeting
It will be a Virtual Chapter Meeting

(Members and Guests are cordially invited to attend)

Wednesday, February 2, 2022

Sherif Abdelrahman

Technical Client Services, Omnira Software

Will be speaking on:
"Minimize Bias using Consistent Corporate Processes"

When: Wednesday, February 2, 2022
Platform: TBD either Zoom or MS Teams
Start Time: 11:30 AM MST
Duration: About 90 minutes with a little chapter business on the front end
Cost: Free to register and participate
RSVP by 12:00 PM on Feb 1, 2022

Abstract: We are all prone to bias. Different types of bias can drastically affect technical and economic outcomes. A unified set of tools and processes and a central data repository can make assumptions transparent so that decisions are made using consistent criteria. All facets of the project can benefit from these consistent workflows. At the outset, type curves need to be generated consistently within a company taking into account the area-specific expertise. When generating economic evaluations, price estimates and economic parameters need to be specified centrally. Additionally, information from prior projects needs to be accessible to inform future decision making. In this presentation, we will explore the impact of bias and how it can be reduced using technology and a defined corporate process.

Speaker Bio.: **Sherif Abdelrahman** MSc, EIT, has ten years of international industry experience spanning both Reservoir and Production Engineering. Sherif's relevant industry experience includes classical Reservoir Engineering, Reservoir Simulation, Field Development Planning and Petroleum Economics acquired throughout his career working for a different number of multinational companies. Sherif currently works for Omnira Software as a Solution Architect where he uses his domain expertise to showcase the ability of MOSAIC to meet customer requirements when it comes to reserves management, economic evaluation, forecasting, and planning workflows.

MOSAIC™
by Omnira Software

Minimize Bias using Consistent Corporate Processes

MOSAIC™ by Omnira Software

Agenda

- Introduction
- Bias
  - Availability Bias
  - Confirmation Bias
  - Anchoring Bias
  - Motivational Bias
- Bias in the E&P Industry Evaluations
- Standardized Workflow
  - General Characteristics
  - Benefits
  - Standardized Workflow vs Bias
- Conclusion

MOSAIC™ by Omnira Software

Introduction

- Are we getting any better at economic evaluations with technology?
- Did technology eliminate bias completely already?
- Is there room for improvement?

MOSAIC™ by Omnira Software

Quick Quiz!

- A bat and a ball cost $1.1
- The ball costs $1 more than the bat
- How much does the bat cost?

A. $0.2
B. $0.05
C. $0.1
D. None of the above

MOSAIC™ by Omnira Software

Quiz Answer

Bat = x Ball = y

x + y = 1.1 …. *Eq 1*

y – x = 1 ……. *Eq 2*

Rearranging Eq 2

y = 1 + x

Substituting into Eq 1

x + 1 + x = 1.1

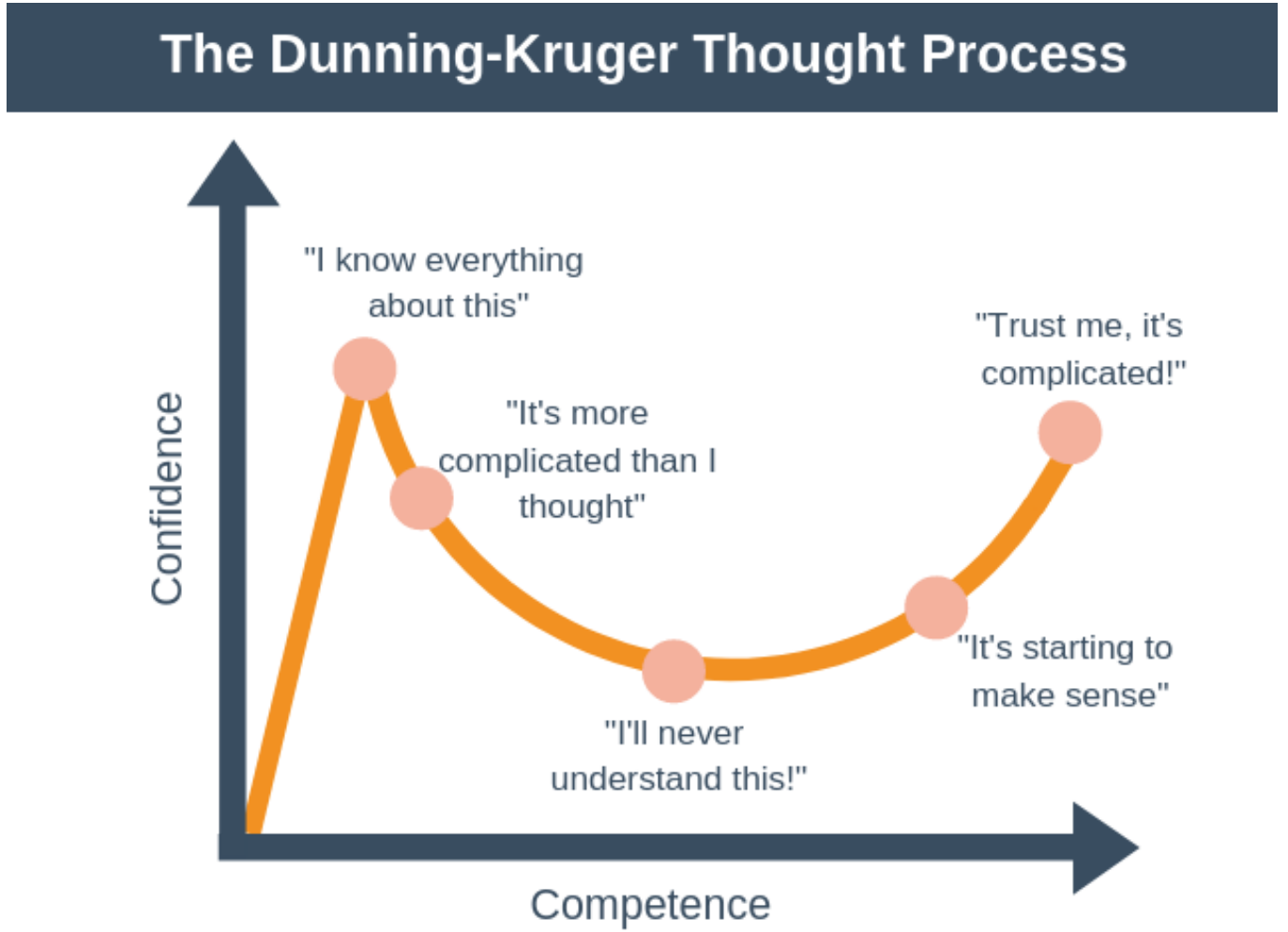
2x = 0.1

x = $0.05

MOSAIC™ by Omnira Software

Bias

- What is bias?
  - *A bias is a tendency, inclination, or prejudice toward or against something or someone*
- Everyone is prone to bias
- Inborn trait
- With experience, we learn how to recognize bias
  - Still a big challenge



MOSAIC™ by Omnira Software

Types of Bias

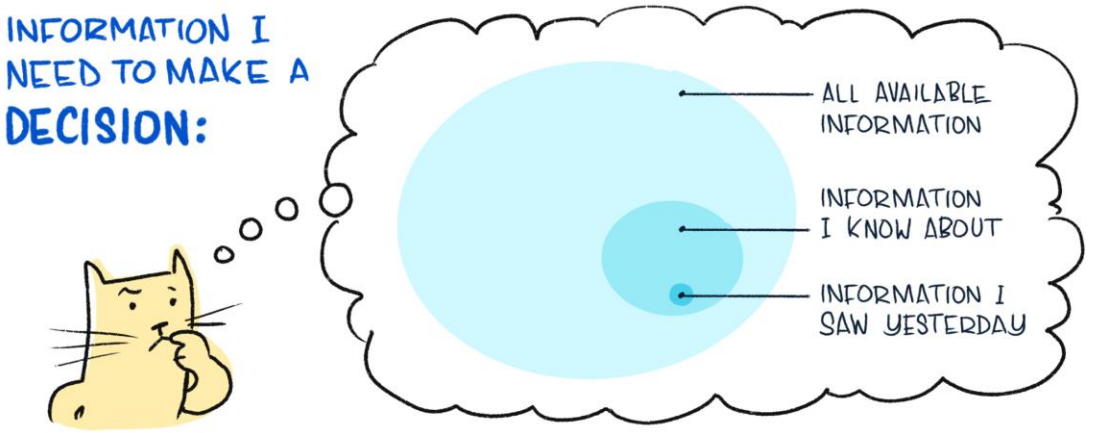
- Cognitive
- Main drivers:
  - What should we remember?
  - Too much Information
  - Need to act fast
  - Not enough meaning

- Statistical
  - Selection Bias
  - Observer Bias
  - Omitted Variable Bias

MOSAIC™ by Omnira Software

Availability Bias

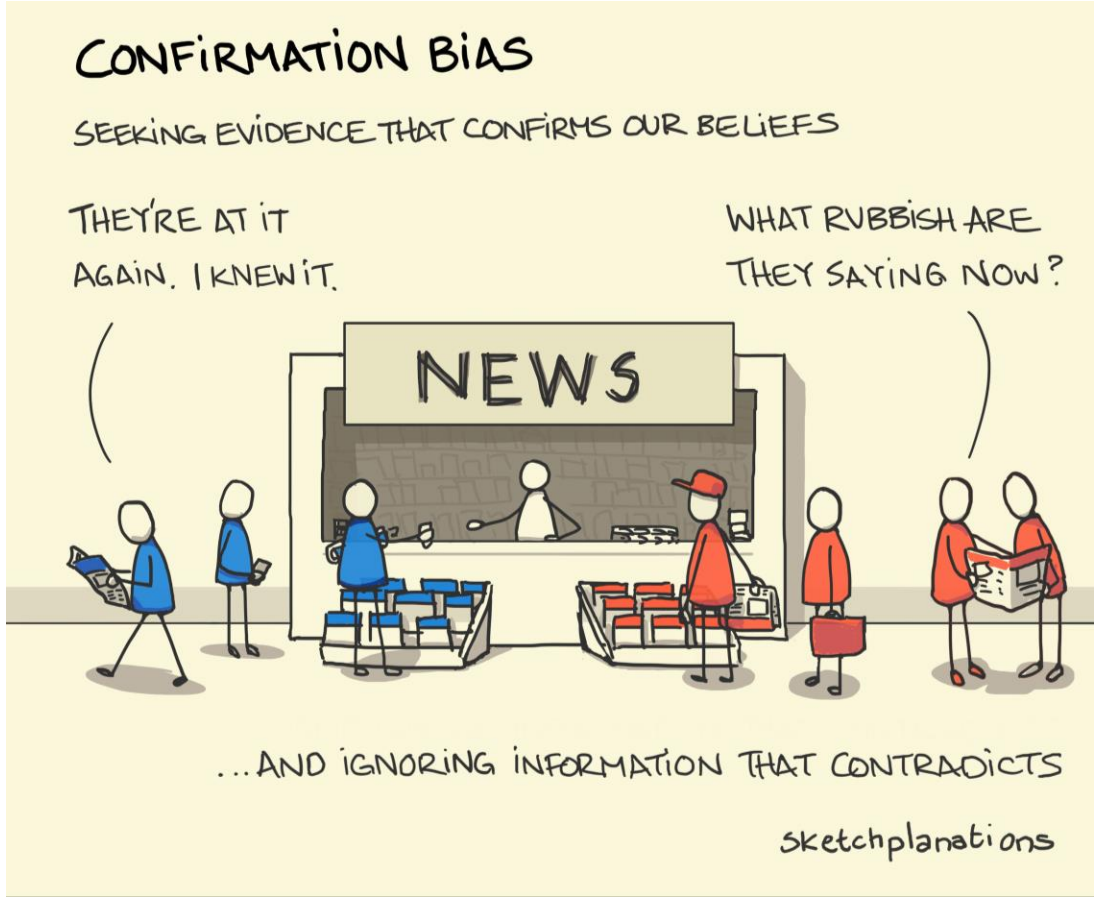
- What is Availability Bias?
  - *A distortion that arises from the use of information which is most readily available, rather than that which is necessarily most representative.*



MOSAIC™ by Omnira Software

Confirmation Bias

- What is Confirmation Bias?
  - *Confirmation Bias is the tendency to look for information that supports one's preconceptions, typically by interpreting evidence to confirm existing beliefs while rejecting or ignoring any conflicting data.*



MOSAIC™ by Omnira Software

Anchoring Bias

- What is Anchoring Bias?
  - *The anchoring effect is a cognitive bias that describes the common human tendency to rely too heavily on the first piece of information offered (the "anchor") when making decisions.*

MOSAIC™ by Omnira Software

Motivational Bias

- What is Motivational Bias?
  - *Motivational biases, sometimes referred to as 'self-serving' biases, result from being invested in a specific outcome.*

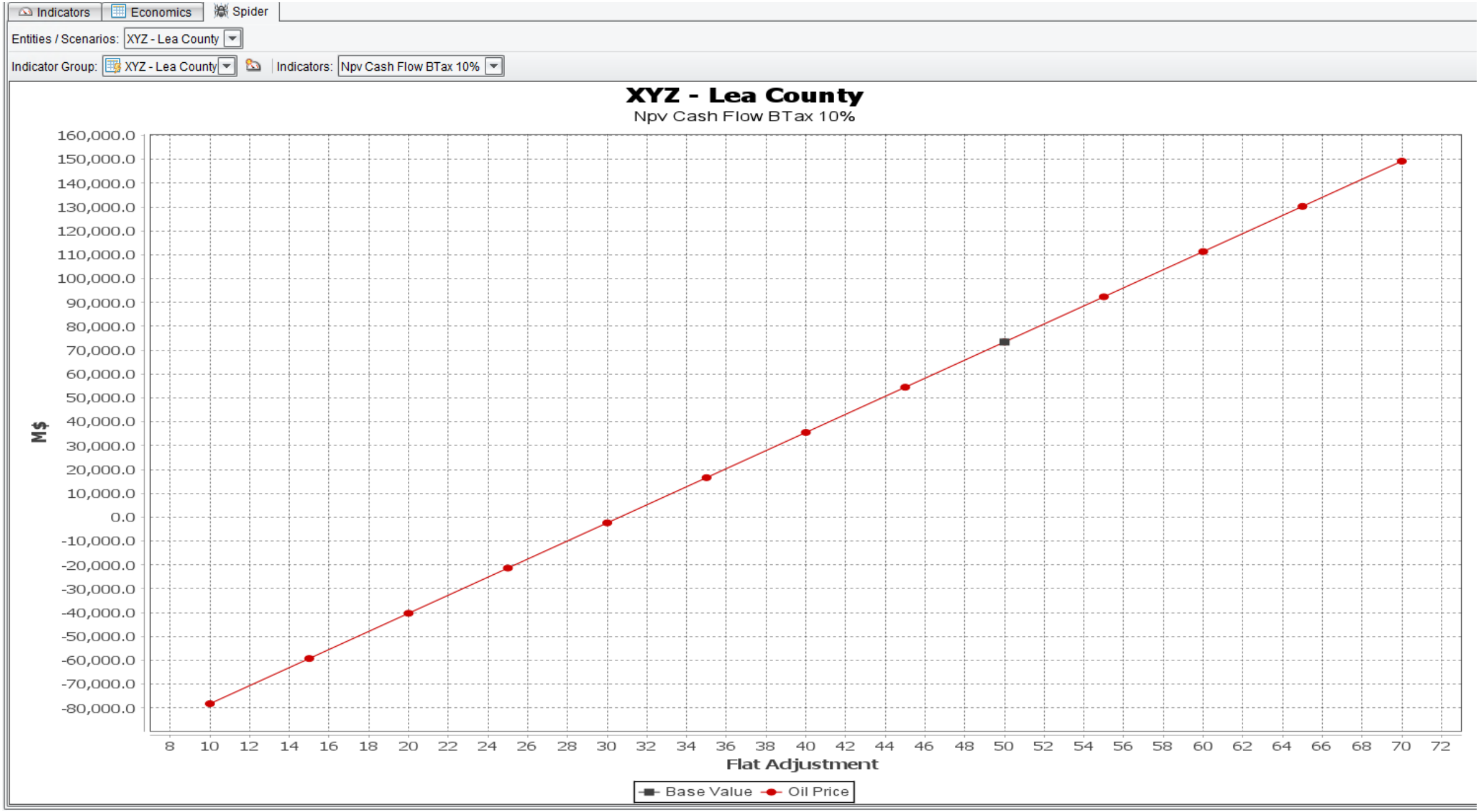
MOSAIC™ by Omnira Software

How biased is my Technical Evaluation?




Availability Confirmation Anchoring Motivation

- **Availability Bias –**
  - No one is immune to press releases of successful results.
  - Subconsciously raised value of that area/field/basin.


Indicators
Economics
Spider
Entities / Scenarios: XYZ - Lea County
Indicator Group: XYZ - Lea County
Indicators: Npv Cash Flow BTax 10%
XYZ - Lea County
Npv Cash Flow BTax 10%
M$
160,000.0
150,000.0
140,000.0
130,000.0
120,000.0
110,000.0
100,000.0
90,000.0
80,000.0
70,000.0
60,000.0
50,000.0
40,000.0
30,000.0
20,000.0
10,000.0
0.0
-10,000.0
-20,000.0
-30,000.0
-40,000.0
-50,000.0
-60,000.0
-70,000.0
-80,000.0
8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72
Flat Adjustment
Base Value
Oil Price

MOSAIC™ by Omnira Software

How biased is my Technical Evaluation?

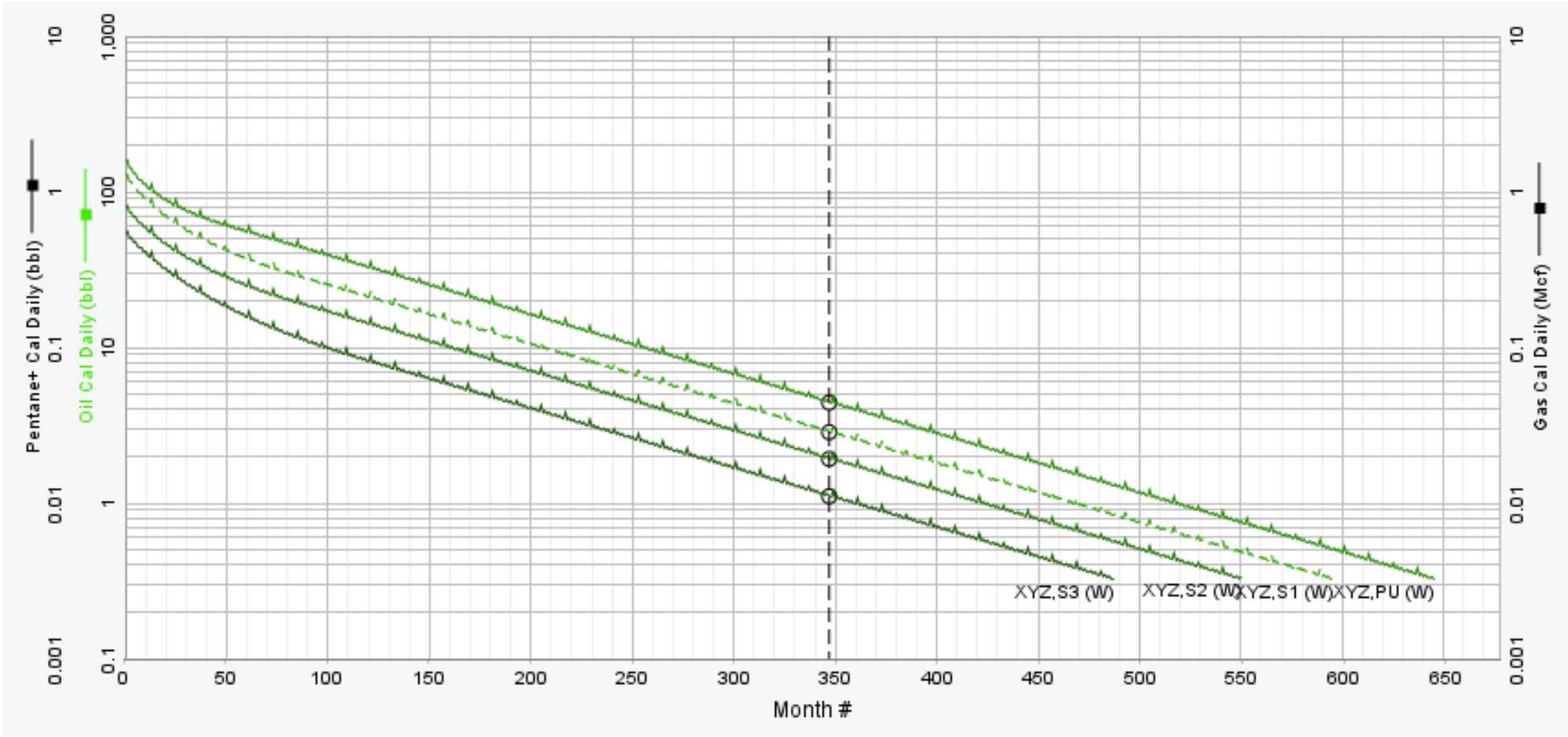



Availability Confirmation Anchoring Motivation

- **Confirmation Bias –**
  - Looking at well results to confirm your claim

MOSAIC™ by Omnira Software

How biased is my Technical Evaluation?



MOSAIC™ by Omnira Software

How biased is my Technical Evaluation?




Availability Confirmation Anchoring Motivation

- **Anchoring Bias –**
  - Bias lingers as you analyze the data

MOSAIC™ by Omnira Software

How biased is my Technical Evaluation?




Availability Confirmation Anchoring Motivation

- **Motivation Bias –**
- Competition for Capital (Reservoir Engineer)
  - 2022 Drilling Budget -> $15 MM
  - IRR needs to be above IRR Hurdle of 20%

MOSAIC™ by Omnira Software

How biased is my Technical Evaluation?

Availability

Confirmation

Anchoring

Motivation

Entity Type	Entity State	Entity Name	Category	Oil Cumf bbl	Npv Cash Flow BTax 10% M$	BTax Disc. CF. ROR	Payout BTax years	On Prod Date
		XYZ	P10	712,322.87	4,157.26	60.40	1.75	2021-Apr.-01
		XYZ	P50	462,856.50	484.68	17.90	3.72	2021-Apr.-01
		XYZ	P90	435,756.55	107.36	12.30	4.24	2021-Apr.-01

MOSAIC™ by Omnira Software

Standardized Workflow

Why do we need it?

Bias can be minimized using technology and a defined corporate process.

Reserves estimation for capital projects is critical for successful use of capital within a company

	GOOD OUTCOME	BAD OUTCOME
GOOD PROCESS	Deserved Success	Bad Break
BAD PROCESS	Dumb Luck	Justice

MOSAIC™ by Omnira Software

Traits of a Standardized Workflow

- Different from company to company
- Common data repository
- Central Economic Parameters
- Defined Processes
- Capital Management

MOSAIC™ by Omnira Software

Benefits of a Standardized Workflow

- Capital Discipline
- Cross-Company Learning
- Consistent evaluations (apple to apples)
- Transparency
- Succession Planning
- Inform decision making in future projects

MOSAIC™ by Omnira Software

Mitigating Bias with Standardized Workflows

Type Curves and Forecasts

Confirmation Bias

Selection Process of Analog Wells
Bias-Buster!
Lookbacks (Central Data Repository)

MOSAIC™ by Omnira Software

Mitigating Bias with Standardized Workflows

Type Curves and Forecasts	Confirmation Bias	Selection Process of Analog Wells Bias-Buster! Lookbacks (Central Data Repository)
Economic Parameters	Availability Bias	Central Price Deck Central Inflation Deck Central Foreign Exchange Deck Capital & Op. Cost Lookbacks for overspend

MOSAIC™ by Omnira Software

Mitigating Bias with Standardized Workflows

Type Curves and Forecasts	Confirmation Bias	Selection Process of Analog Wells Bias-Buster! Lookbacks (Central Data Repository)
Economic Parameters	Availability Bias	Central Price Deck Central Inflation Deck Central Foreign Exchange Deck Capital & Op. Cost Lookbacks for overspend
Economic Hurdles & Corporate Goals	Motivation Bias	IRR; NPV (10); IP30

MOSAIC™ by Omnira Software

Mitigating Bias with Standardized Workflows

Type Curves and Forecasts	Confirmation Bias	Selection Process of Analog Wells Bias-Buster! Lookbacks (Central Data Repository)
Economic Parameters	Availability Bias	Central Price Deck Central Inflation Deck Central Foreign Exchange Deck Capital & Op. Cost Lookbacks for overspend
Economic Hurdles & Corporate Goals	Motivation Bias	IRR; NPV (10); IP30
Project Selection	Anchoring Bias	Project Assessment

MOSAIC™ by Omnira Software

Mitigating Bias with Standardized Workflows

Type Curves and Forecasts

Confirmation Bias

Selection Process of Analog Wells
Bias-Buster!
Lookbacks (Central Data Repository)

Economic Parameters

Availability Bias

Central Price Deck
Central Inflation Deck
Central Foreign Exchange Deck
Capital & Op. Cost
Locks for overspend

Economic Hurdles & Corporate Goals

PV (10); IP30

Project Selection

Anchoring Bias

Project Assessment

Entity Type	Entity State	Entity Name	Category	Oil Lease Volumes bbl	Npv Cash Flow BTax 10% M$	BTax Disc. CF. ROR	Payout BTax years	On Prod Date
		Project 1	P50	509,142.15	1,218.77	26.50	3.04	2021-Apr.-01
		Project 2	P50	453,599.37	337.86	16.00	3.91	2021-Apr.-01
		Project 3	P50	555,427.80	1,952.86	34.30	2.58	2021-Apr.-01
		Project 4	P50	672,265.78	3,319.20	49.70	2.03	2021-Apr.-01

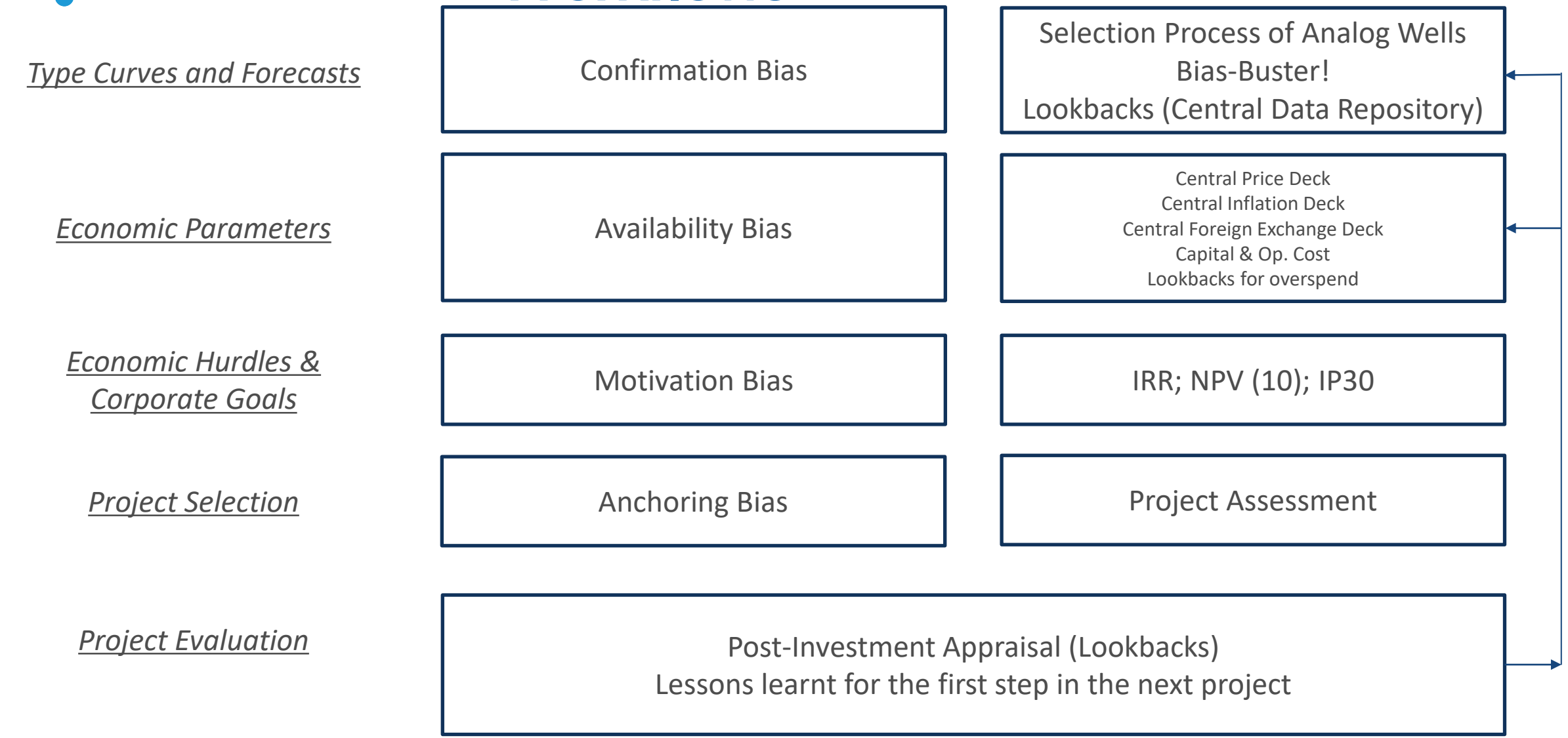
MOSAIC™ by Omnira Software

Mitigating Bias with Standardized Workflows

Type Curves and Forecasts	Confirmation Bias	Selection Process of Analog Wells Bias-Buster! Lookbacks (Central Data Repository)
Economic Parameters	Availability Bias	Central Price Deck Central Inflation Deck Central Foreign Exchange Deck Capital & Op. Cost Lookbacks for overspend
Economic Hurdles & Corporate Goals	Motivation Bias	IRR; NPV (10); IP30
Project Selection	Anchoring Bias	Project Assessment
Project Evaluation	Post-Investment Appraisal (Lookbacks) Lessons learnt for the first step in the next project	

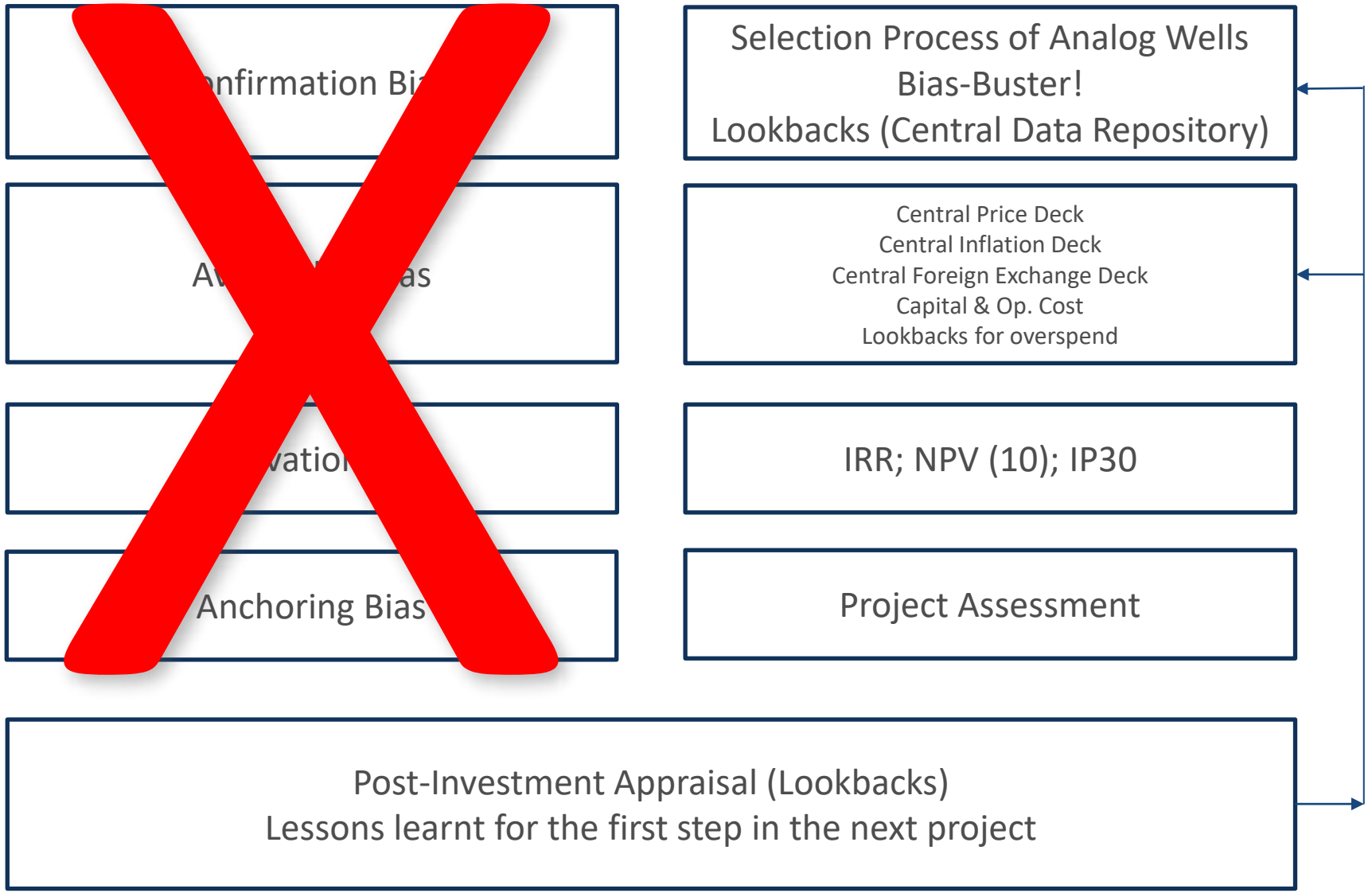
MOSAIC™ by Omnira Software

Mitigating Bias with Standardized Workflows



MOSAIC™ by Omnira Software

Mitigating Bias with Standardized Workflows



MOSAIC™ by Omnira Software

Conclusion

- We are humans, bias will always live with us.
- We need to stay cognizant of impact of bias on oil and gas evaluations.
- Technology tools that facilitate access to central data repository and allow a consistent standardized workflow across the organization can minimize bias.
- There is no magical workflow solution, it varies from a company to a company.
  - Speak to the true bandwidth of your project and what are the important factors that have the biggest impact and their distribution range.

Acknowledgment

- Brenda Kurtz, Senior Manager Omnira Software, P.Eng, SPEE

MOSAIC™ by Omnira Software

Resources

1. https://www.psychologytoday.com/us/basics/bias
2. https://expertprogrammanagement.com/2019/02/dunning-kruger-effect/
3. https://www.simplypsychology.org/cognitive-bias.html
4. https://towardsdatascience.com/what-is-statistical-bias-and-why-is-it-so-important-in-data-science-80e02bf7a88d
5. https://online.hbs.edu/blog/post/types-of-statistical-bias
6. https://catalogofbias.org/biases/availability-bias/
7. https://www.atlassian.com/blog/productivity/cognitive-bias-examples
8. https://www.simplypsychology.org/confirmation-bias.html
9. https://sketchplanations.com/confirmation-bias
10. https://www.pon.harvard.edu/daily/negotiation-skills-daily/the-drawbacks-of-goals/
11. https://www.prioritysystem.com/reasons1bb.html
12. https://knowledgeone.ca/motivation-a-driving-force-for-learning-engagement/
13. https://blog.markgrowth.com/5-ways-to-use-the-anchoring-bias-to-boost-conversions-da6caf4f1c69
14. https://www.ncbi.nlm.nih.gov/books/NBK571047/

MOSAIC™ by Omnira Software

Thank you

Q&A