

Value Management at Enbridge

Value Analysis Canada Symposium
October 17-19th, 2018



Major Projects – Value Engineering
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1. Enbridge Overview
 2. Our VM Journey
 3. Delivering Results
 4. Road Map for the Future

Enbridge Overview

What We Do

We help fuel the quality of millions of people everyday by connecting them with the energy they need



Liquids Pipelines

- **17,000** miles of crude liquids pipelines
- Transporting **2.9 million** barrels/day



Natural Gas Pipelines

- **26,600** miles of natural gas pipelines
- Moving **22%** of natural gas consumed in the U.S.



Renewable Power

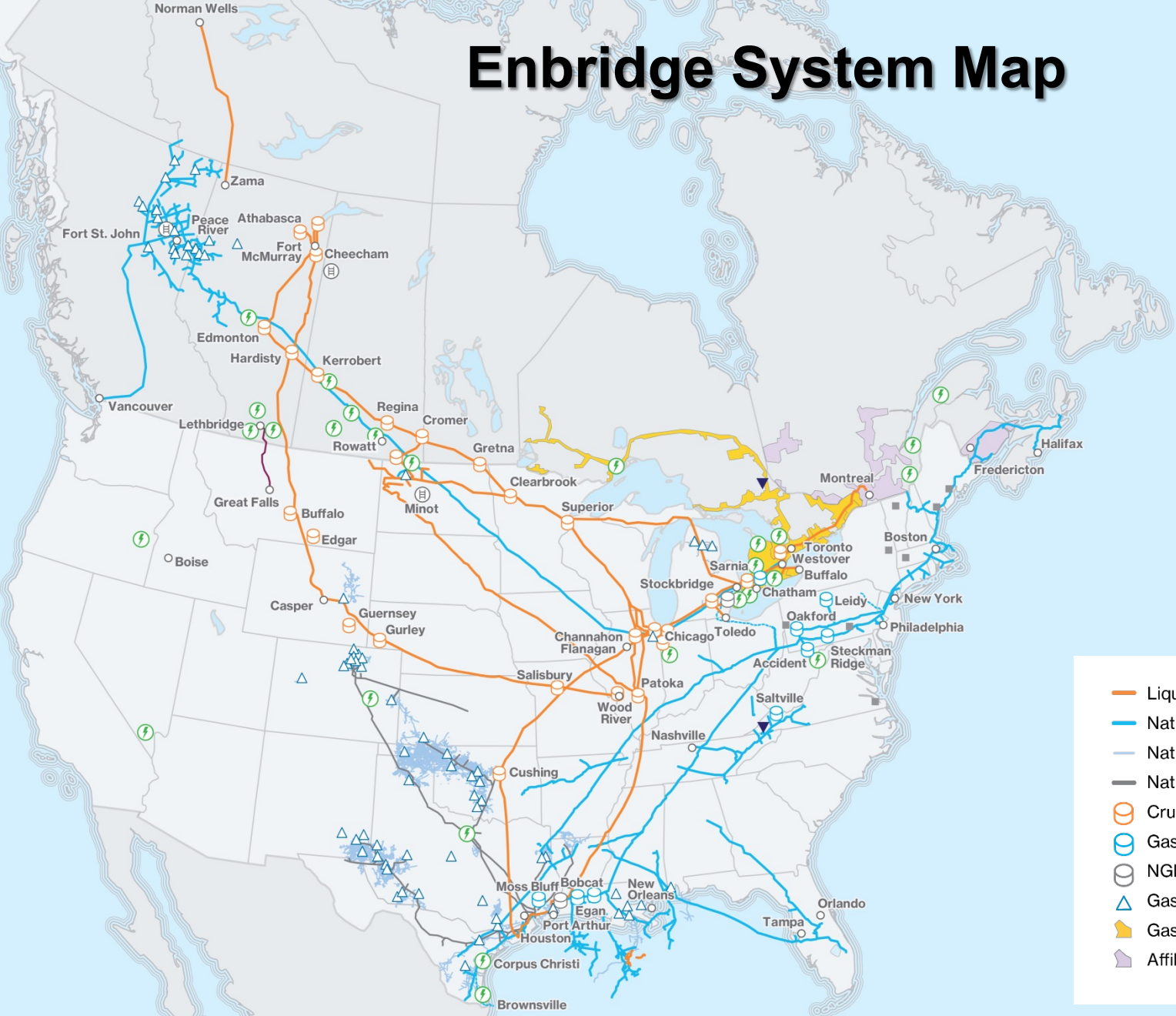
- **23** renewable power generating facilities
- **2,050** net megawatts of generating capacity



Gas Distribution

- **3.7 million** retail customers
- Serving **500+ communities** across Ontario, Quebec, New Brunswick, and New York State.

Enbridge System Map



Liquids Pipeline	LNG Facility
Natural Gas Transmission Pipeline	Rail
Natural Gas Gathering Pipeline	Trucking Facility
Natural Gas Liquids Pipeline	Propane Terminal
Crude Storage or Terminal	Power Transmission
Gas Storage Facility	Renewable Energy
NGL Storage Facility	
Gas Processing Plant	
Gas Distribution Service Territory	
Affiliated Gas Distribution Territory	

Our VM Journey

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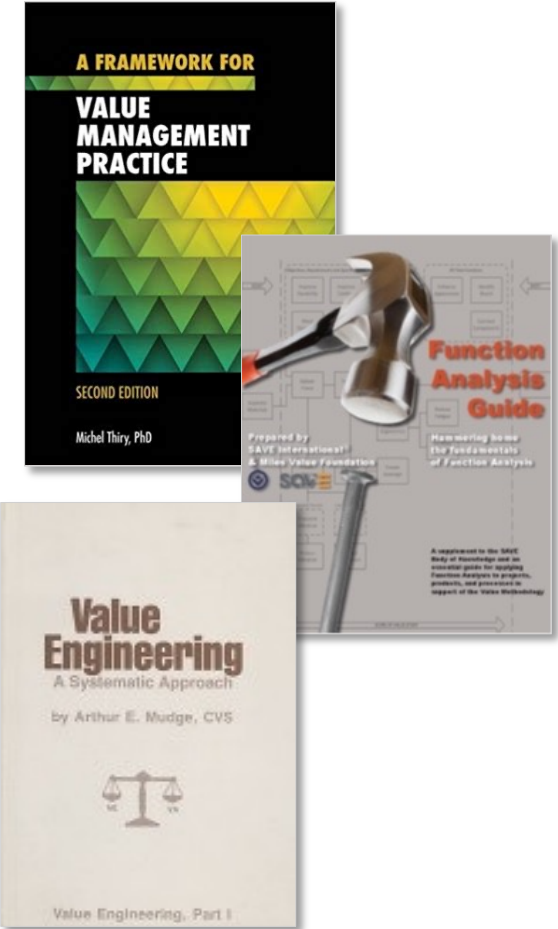
From The Beginning...

- VM team was formed in fall 2016
- Result of major company re-organization
- 6 members spread across Edmonton, Calgary and Duluth
- Minimal VM experience on the team
- New concept – blank canvas

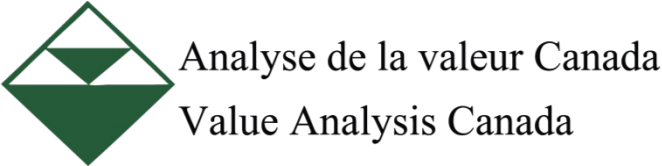


Learning Curve

Literature



Networking & Certification



Successful VM Programs

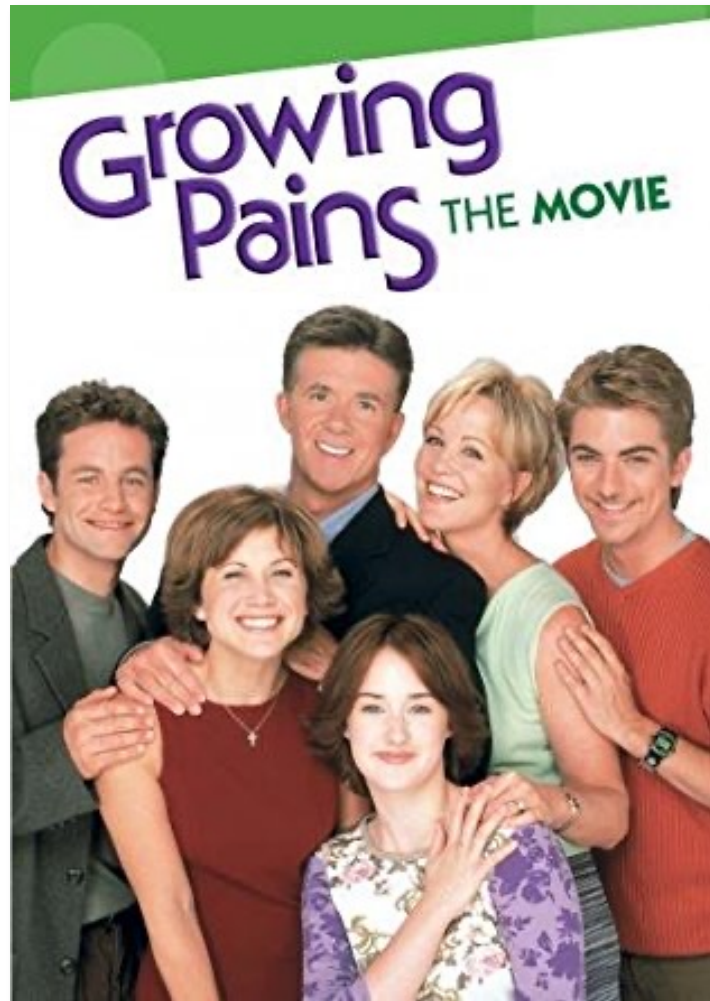


Key Takeaways

How Not to be the Next Flavour of the Month

- A successful VM program:
 - Has strong top-down support & internal ‘champions’
 - Promotes VM awareness in the organization
 - Provides VM training for employees
 - Measures and reports results
 - Recognizes success
 - Follows the SAVE International VM standard & guidelines
 - Leverages external consultants while developing internal expertise













- *“We already do Value Engineering”*
- *“The time commitment is too great”*
- *“We can’t fit into our schedule”*
- *“This will create too many changes”*
- *“Our last project was great!”*

Delivering Results

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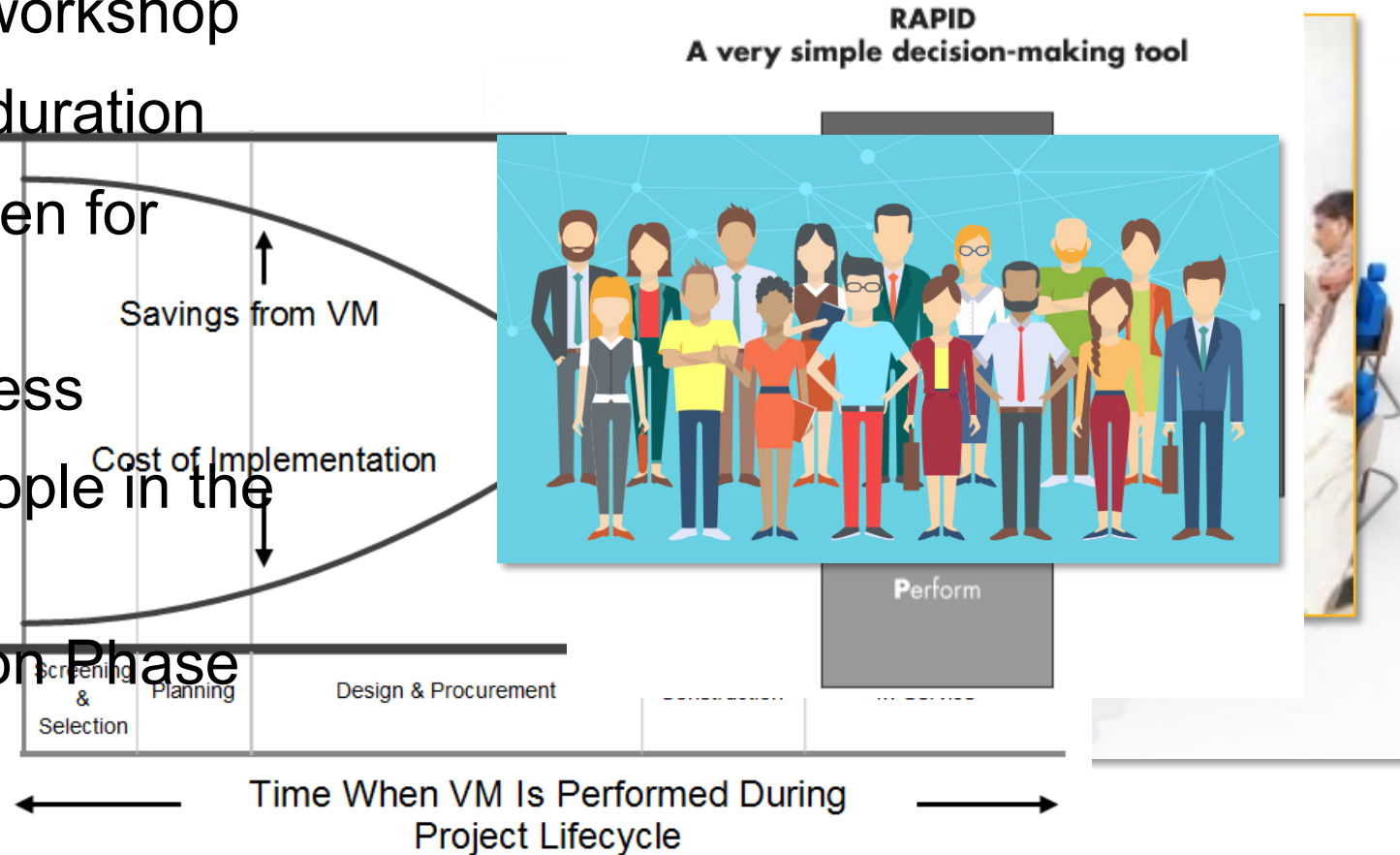
Workshop Results

Stage								
Pre-FEED	2 days	22	250	17	13	\$78k	\$240M	3100:1
FEED	3 days	14	150	26	9	\$100k	\$11.5M	115:1
Design	2 days	19	51	12	2	\$70k	\$3M	45:1
Ops Issue	1 day	20	70	N/A	20	\$27k	\$91M	3400:1

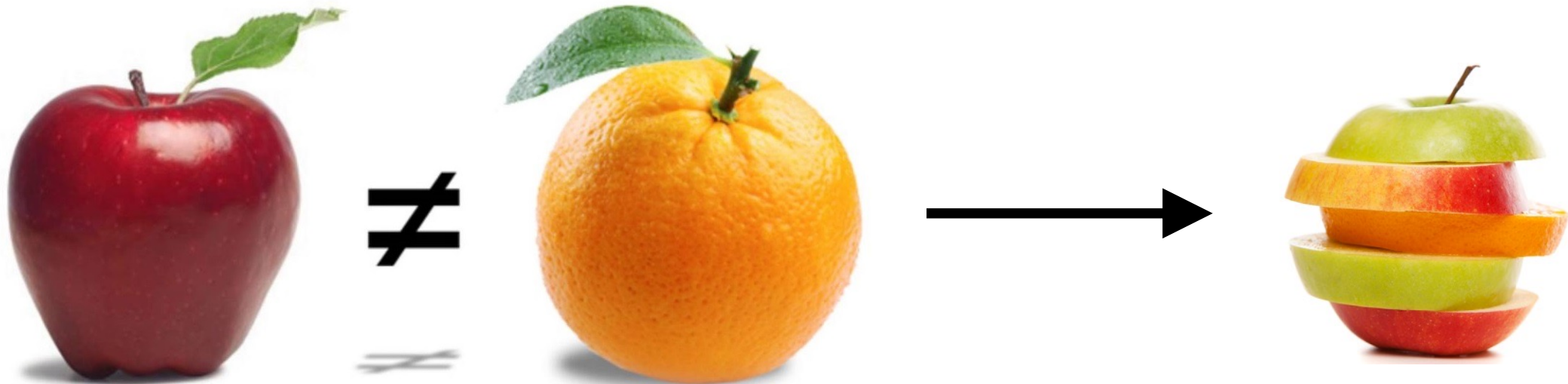
FEED = Front End Engineering & Design

Lessons Learned

- Optimal time for a workshop
- Optimal workshop duration
- Lightening the burden for project teams
- Decision effectiveness
- Having the right people in the room
- Separate Information Phase



- Options Evaluation / Value Analysis
 - Multiple 1-2 hour Meetings (eg. Skype)
 - Apply Analytical Hierarchy Process & Functional Performance Specification
 - Compare & Rank Options
 - Examples: *Field Data Software Tool Selection, Urban Pipeline Route Selection*



Other Benefits

- Increased Stakeholder Buy-in
- A Repository of Ideas
- Faster Resolution of Design Considerations
- Development of Ideas Post-Workshop
- Improved Visibility After Each VM Session



Road Map of the Future

What's Next?

“How to Grow VM at Enbridge”

- Develop VM Standard
- Project Gating Requirement
- Increase VM Awareness
- Expanding Our Reach
- Continuing VM Education



Questions?

