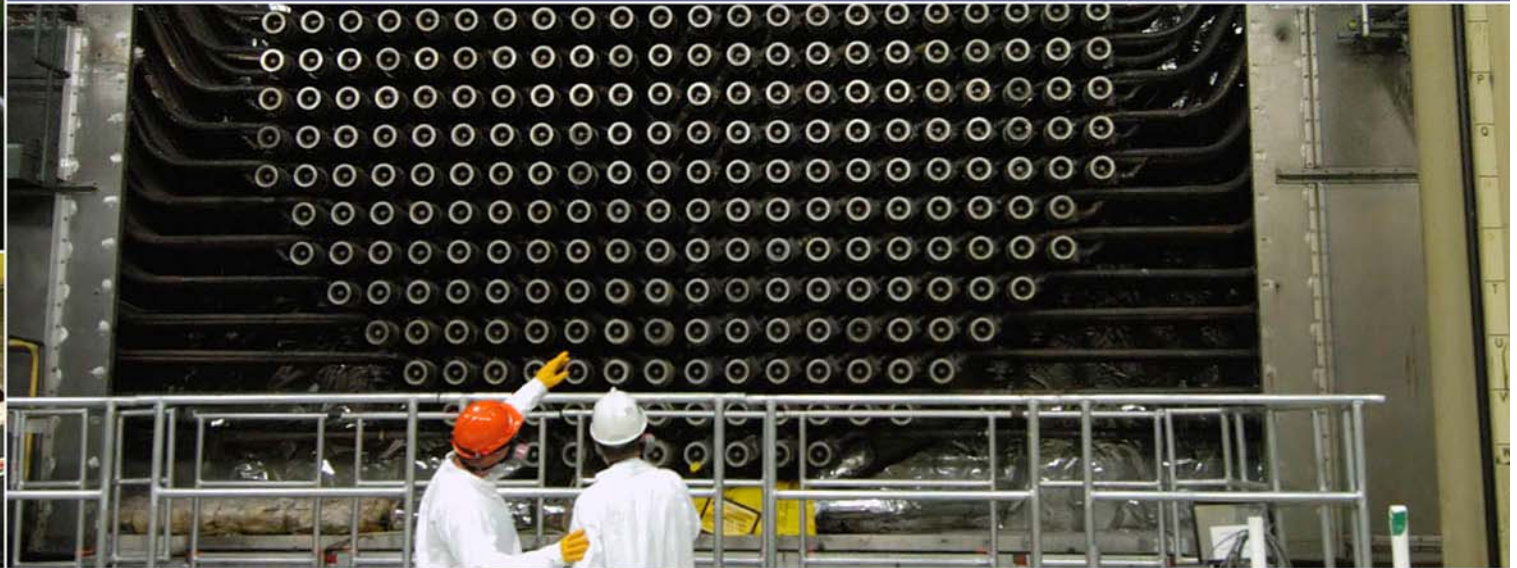


The Application of Value Engineering within Ontario Power Generation



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Agenda







- Ontario Power Generation (OPG)
- OPG Nuclear Projects & Modifications
- Problems with Projects
- Front End Planning Integrates Best Practices
- Role of Value Engineering in the Solution
- Lessons from Experience

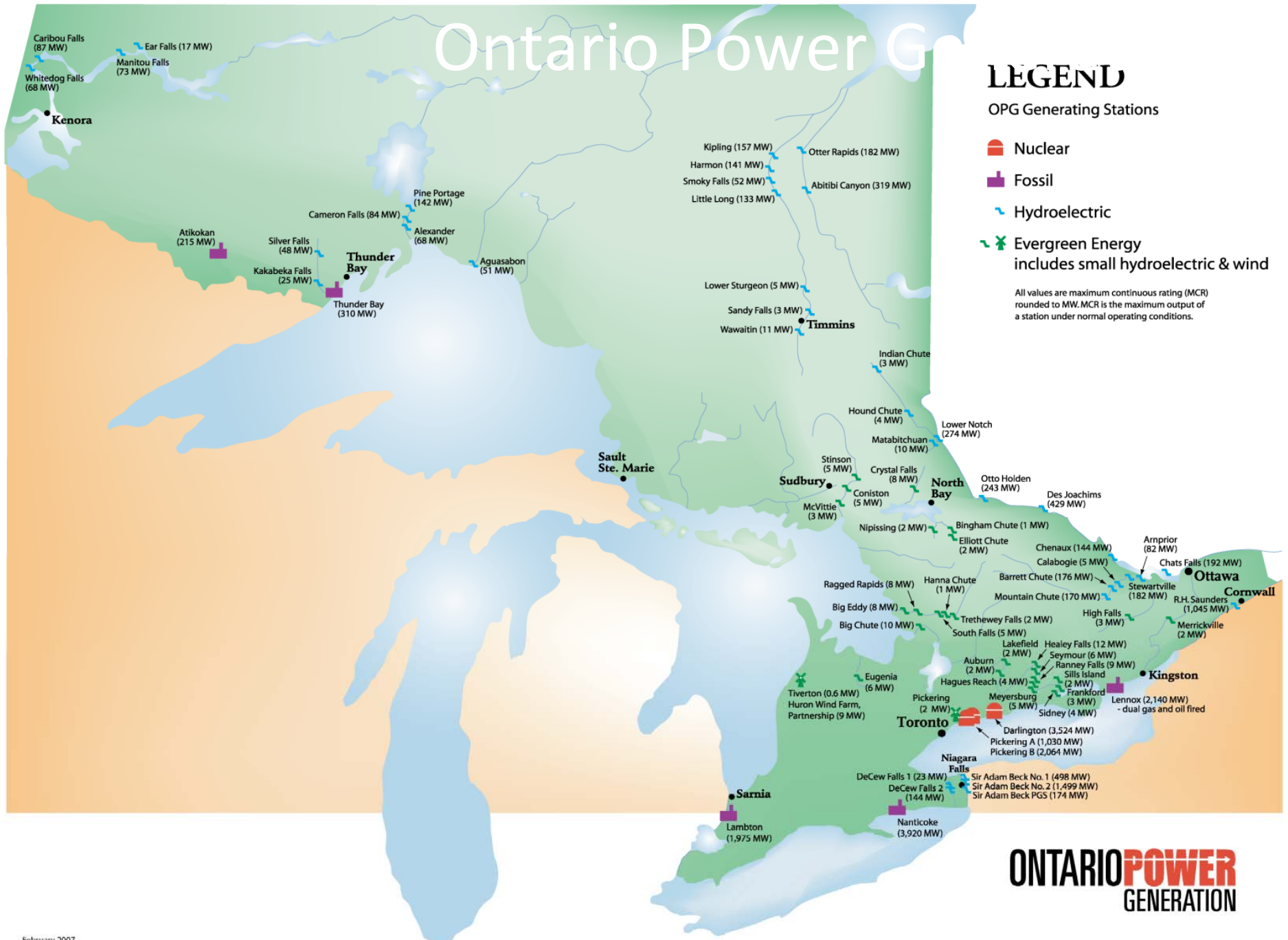
Ontario Power Generation

LEGEND

OPG Generating Stations

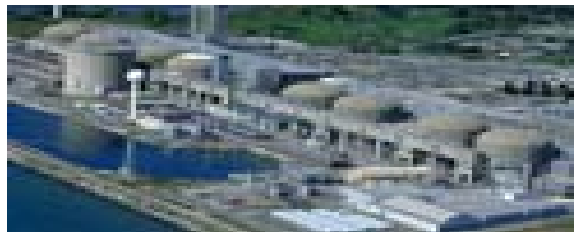
-  Nuclear
-  Fossil
-  Hydroelectric
-  Evergreen Energy includes small hydroelectric & wind

All values are maximum continuous rating (MCR) rounded to MW. MCR is the maximum output of a station under normal operating conditions.



ONTARIO POWER
GENERATION

Ontario Power Generation



Hydroelectric Fleet

Generating Capacity: 6,963 MW

Stations: 65

2008 Output: 36.4 TWh

Currently Generating: **4570 MW**

Fossil-Fuelled Fleet

Generating Capacity: 8,177 MW

Stations: 5

2008 Output: 23.2 TWh

Currently Generating: **3550 MW**

Nuclear Fleet

Generating Capacity: 6,600 MW

Stations: 3

2008 Output: 48.2 TWh

Currently Generating: **6476 MW**

Nuclear

Pickering A & B

Capacity: 3,100 MW

P. A: 1971, 2 CANDU

P. B: 1983, 4 CANDU



Darlington Nuclear

Capacity: 3,500 MW

1990, 4 CANDU



OPG Nuclear Projects & Modifications

~\$300M CDN annual spend

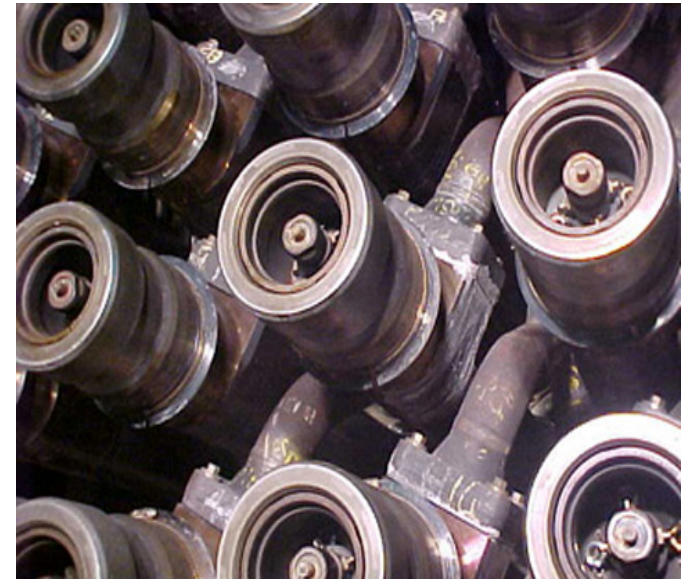
~100 active projects

Typical project:

- \$5M - \$10M
- 3 year duration

Delivered through:

- 25 project managers
- 500 engineering/technical staff
- Construction services vendors
- Engineering services vendors



Project Environment



- Highly regulated
- Complex scope
- Primarily retrofit/revamp
- One of a kind
- Critical because of implementing in an operating nuclear power plant

Problems with Projects



- High cost and schedule deviances
- Frequent scope changes
- Inefficient processes to track contractor performance
- Inconsistent processes to manage risks

Value For Money

- Identify and utilize Industry Best Practices
- Use advanced tools to support improved performance
- Find the balance between business needs and technology offerings



Business Goals

- Zero cost growth
- Control scope
- Add value
- Meet authorization commitments
- Apply project management best practice

Projects and Modifications Division
GOAL: ELIMINATE PROJECT COST GROWTH



Our three year plan

- ✓ Meet BCS Commitments
- ✓ Control Scope
- ✓ Add Value
- ✓ Implement Best Practices

Nuclear Cornerstone: **Value for money**

"Delivers solutions that are the best combination of cost, quality and performance"
Tom Mitchell - Chief Nuclear Officer



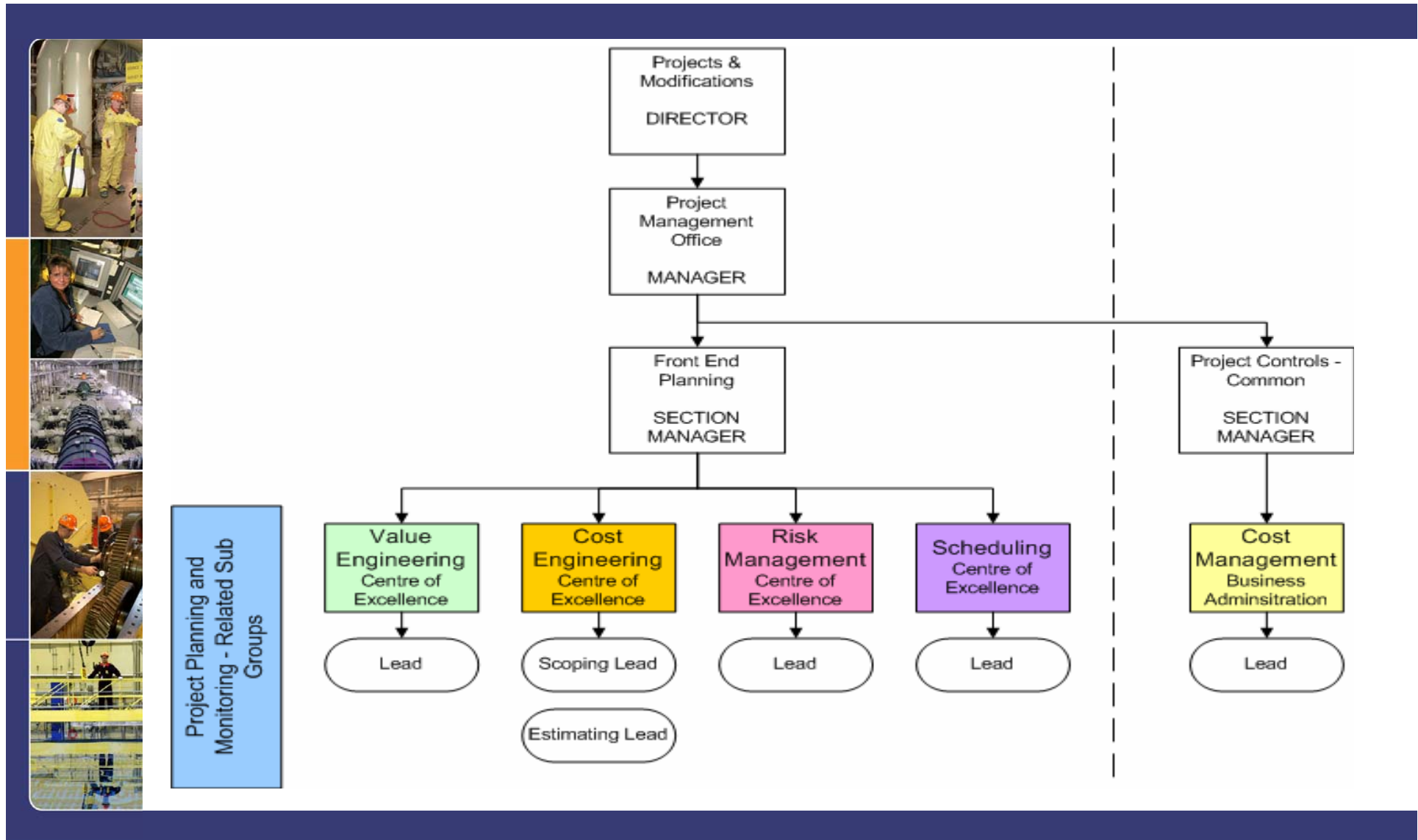
The Solution

The solution lay in utilizing tools such as:

- **Value Engineering**
- **Risk Management**
- **Cost Management**
- **Contract management**
- **Portfolio Optimization**
- **Time Management (Scheduling)**



Front End Planning Integrates Best Practices



The Challenges



- Change management
- Senior Management leadership and support was needed
- No single system solution met the needs
- Integration across multiple systems
- Difficulty in acceptance of new tools

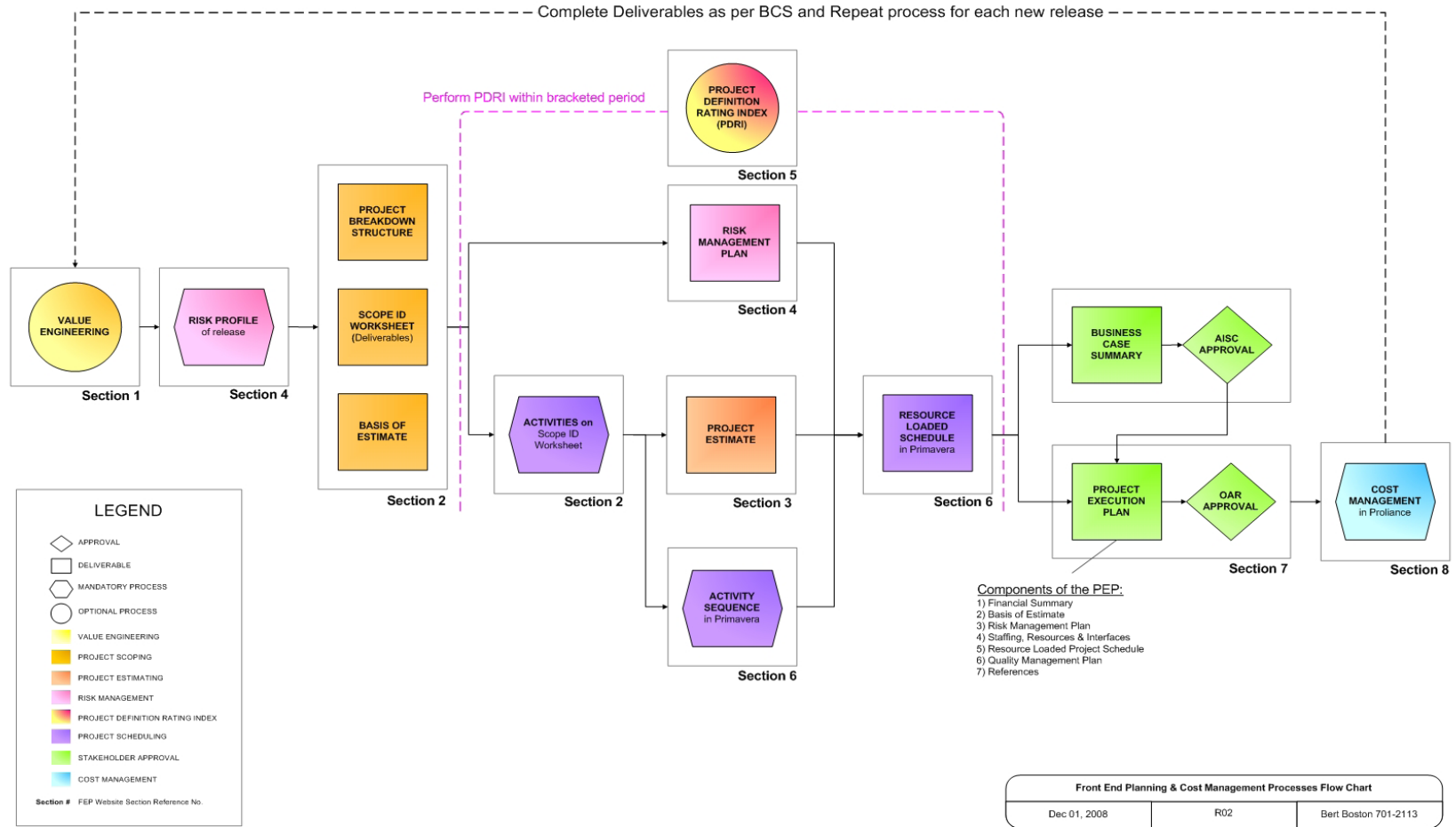
Role of Value Engineering in the Solution **ONTARIO POWER** GENERATION



- Builds confidence in design solution and scope
- Guarantees stake holders buy in of the project scope
- Makes end user involved in making decisions
- Minimizes scope changes
- Lowers the cost
- Lowers the risk

Front End Planning Process

Front End Planning & Cost Management Processes - Flow Chart

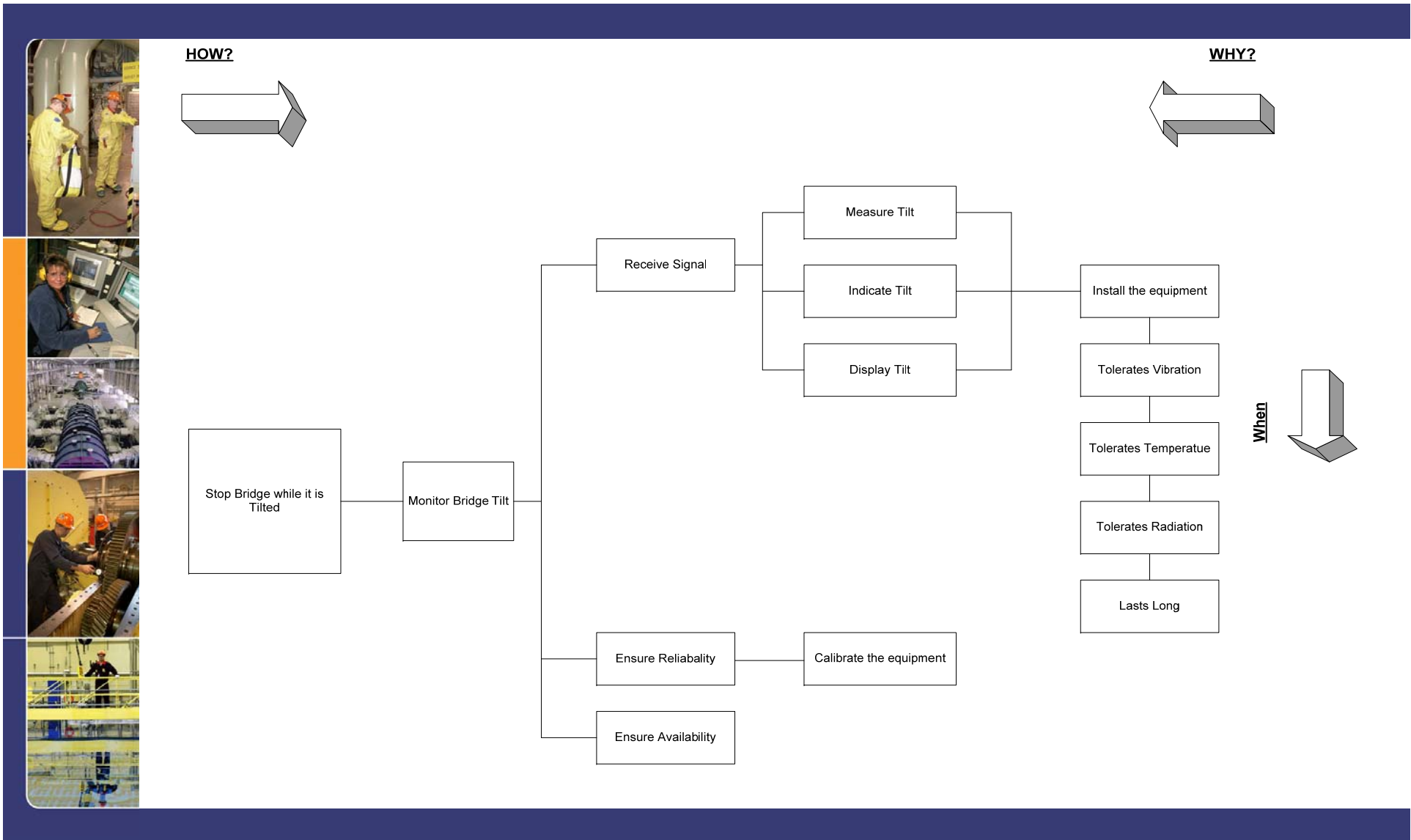


How VE crawled in



- A half day introduction to VE was provided to nuclear staff.
- A position for a VE specialist was created.
- VE application started on some large projects using external consultant.
- Procedures, guidelines, and instructions specific to our company and industry were generated.
- More training got provided to project related employees.

Bridge Tilt Sensor FAST Diagram



Lessons from Experience



- Upper management support is essential.
- Shift from external consultant should be gradual.
- Long workshops do not serve project needs.
- Retaining seminars protect VE from deviating from standard.
- Increase in demand for implementing non mandatory VE workshops indicates the degree of success.
- VE can be used in many diverse areas.
- VE must work as an integrated part of the best practices.
- The community of practice provides valuable support.

Where VE is now



- VE is the first step of FEP.
- VE Center of Excellence is within PMO.
- VE is mandatory for projects with budget over \$ 5M.
- VE has its own governance in the projects management process.
- VE is applied to nuclear projects.

What VE has done so far



- Improved scope definition and increased quality of project plans
- More confidence in funding requests
- Welcome new ideas
- A culture shift through Value Engineering
- Project management and planning improvement

What dreams VE has



- To be applicable to all OPG sectors
- To be used for the improvement of the processes
- To be used for strategic planning
- To be a culture within OPG

Questions?

