Potential Changes and Impact on Contingency

Review with LCP Gatekeeper, 18-Jul-2011

Presented to EJ Martin, P. Harrington, L. Clarke, B. Crawley, R. Power, G. Bennett, and M. Bradbury at Hydro Place, 18-July (10AM - 12PM)

nalcor energy
LOWER CHURCHILL PROJECT

Purpose

- Provide an overview of current and potential Project Changes and their impact on DG2 contingency.

Anchoring Back – DG2 Estimate

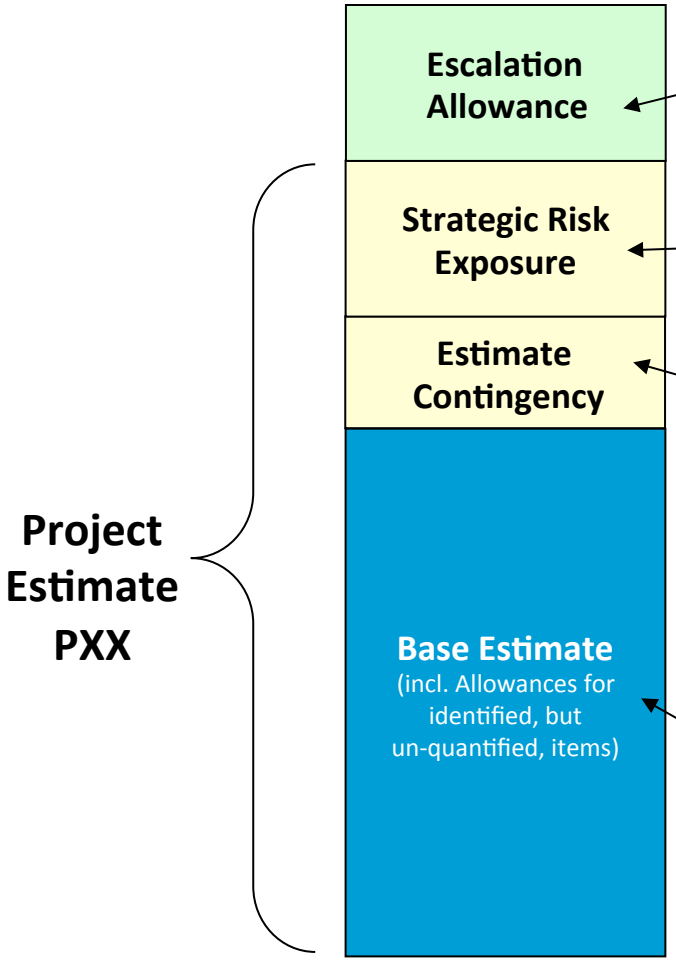
Rounded to $6.2B for public-number

			Breakdown by Components				
			Base Estimate		Estimate Contingency		Escalation Allowance
Muskrat Falls Generating Facility	2.89	=	2.23	+	0.33	+	0.34
Labrador - Island Transmission Link	2.06	=	1.62	+	0.24	+	0.21
Maritime Link	1.19	=	0.90	+	0.13	+	0.16
Total (excl. IDC)	**6.14**		4.74		0.70		0.70

Notes:

1. Each Project has its own Estimate Contingency.
2. Contingency adjusted from 21% to 15% during Emera negotiations to remove Project's recommended allowance for Strategic Risk Exposure.
3. All cost in 2010 CDN $ (billions)

Terminology Recap



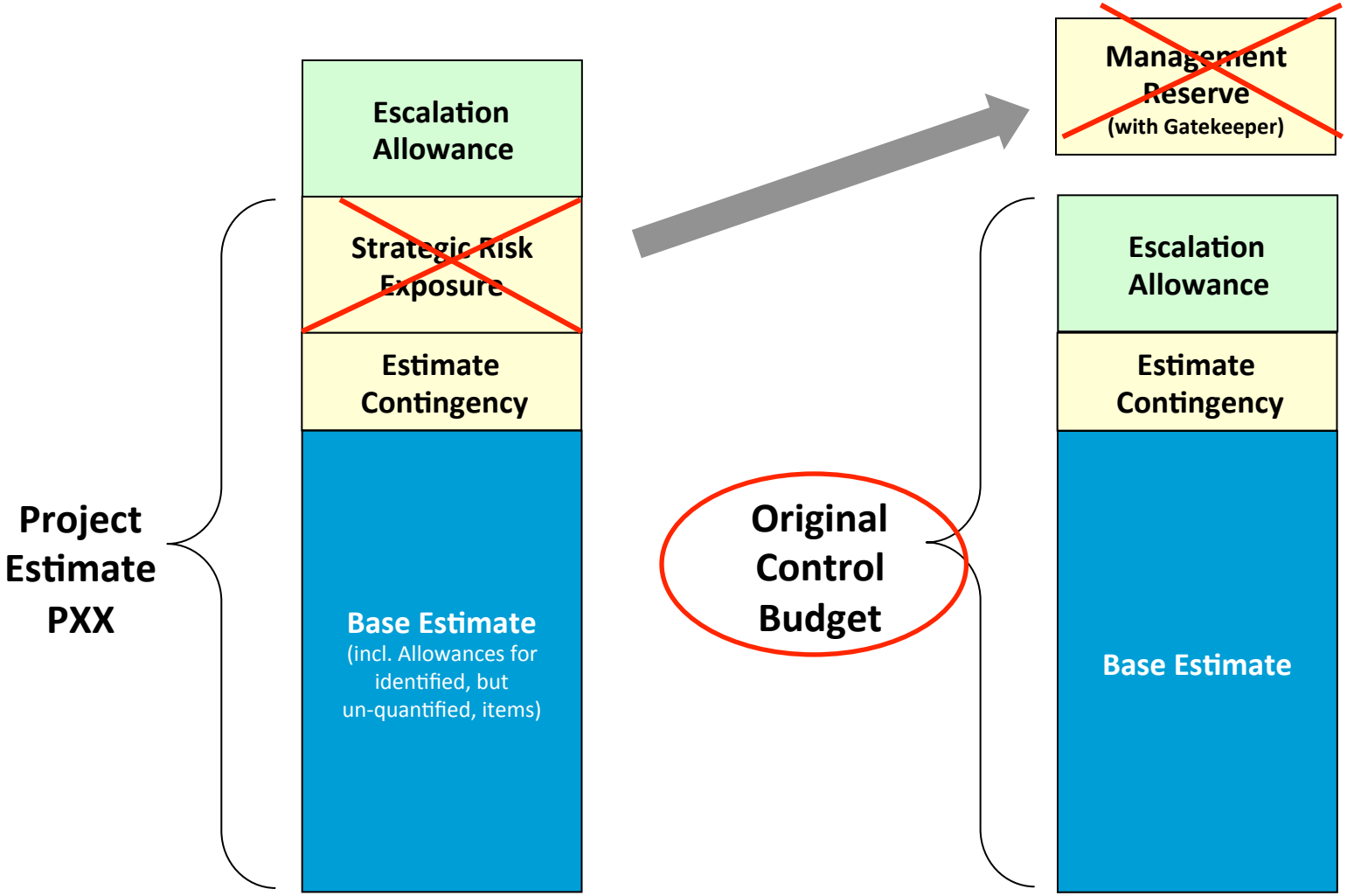
Escalation Allowance
Provision for changes in price levels driven by economic conditions. Includes inflation. Estimated using economic indices weighted against base estimate components.

Strategic Risk Exposure
Probabilistic impact of strategic risk that is quantified.
Strategic Risks are identified background risks that are outside of the controllable scope of the project team, typically pertaining to external issues such as enterprise-level issues, governance, financial markets, stakeholders, hyperinflation, and regulatory approvals. Managing these risks requires significant effort and influence by the Gatekeeper with external stakeholders. Strategic risk is also referred to as the risk of failure of the general execution plan.

Estimate Contingency
Provision made for variations to the basis of an estimate of time or cost that are likely to occur, that cannot be specifically identified at the time the estimate is prepared but, experience shows, will likely occur. It is not meant to cover scope changes outside the Project's parameters, events such as strikes or natural disasters, escalation or foreign currency impact, or changes that alter the basis upon which the control point for management of change as been established as captured in key project documents (e.g. basis of design, project execution plan).

Base Estimate
Reflects most likely costs for known and defined scope associated with project's specifications and execution plan.

Stewarding against DG2 Estimate

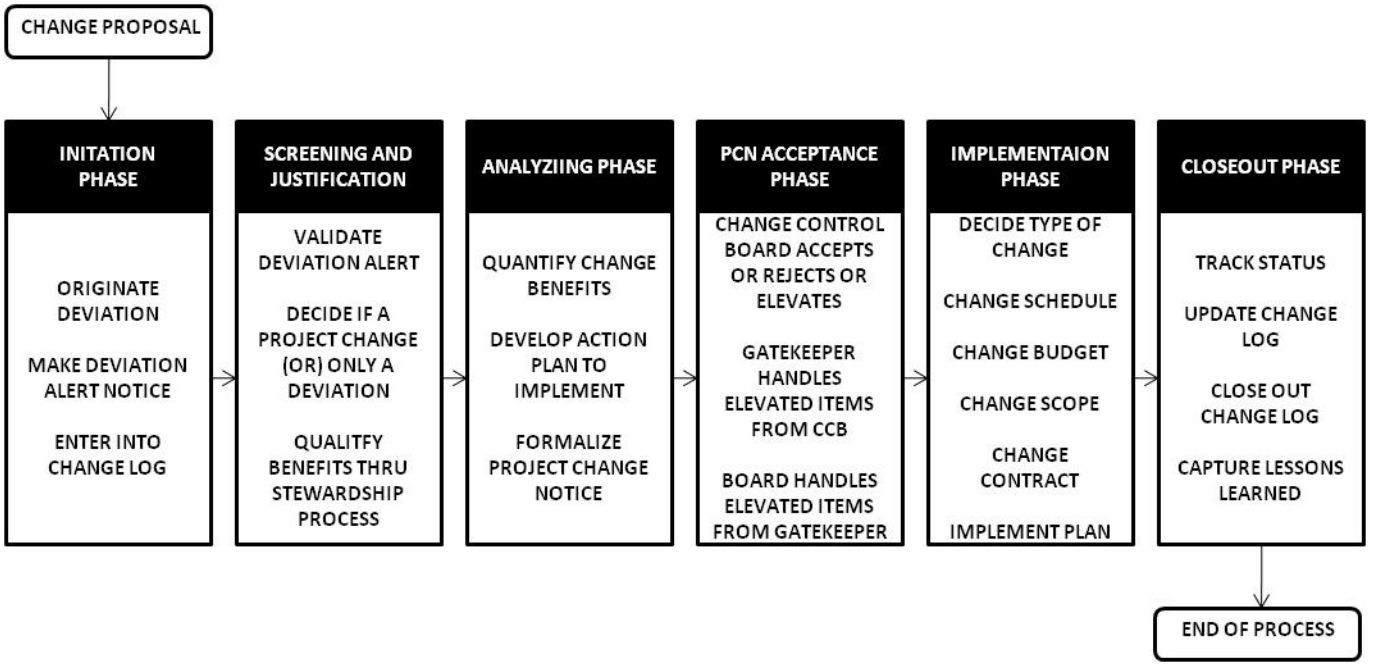


Management of Change

- MoC Process established and active
  - Anchored in discipline, proactive approach to anticipating and managing change.
- Change is assessed against the DG2 Baseline (i.e. a change baseline) as captured in “Controlled Project Documents”.
- Maturing definition of the Project identifying a number of Potential Project Changes
  - All proposed Changes are scrutinized for benefit to Project
  - Focus is Scope Tracking and Management

MoC Process Mechanics

- MOC Process begins with the identification of a potential change via a Deviation Alert Notice.
- Proposed changes must be justified by benefit and will be risk screened.



Evolution of Controlled Project Documents

Scope Tracking & Management

Management of Change

Control Documents

- Basis of Design (Rev B1)
- Gate 2 PEP
- PM & Contracting Strategy
- Gate 2 Estimate
- Gate 2 PCS
- Master Contract Package List
- Gate 2 Org. Design

Control Documents

- Basis of Design (Rev B1)
- Gate 3 Project Execution Plan
- Gate 3 Estimate and Basis of Estimate
- Gate 3 Integrated Project Schedule (IPS)
- Design Philosophies

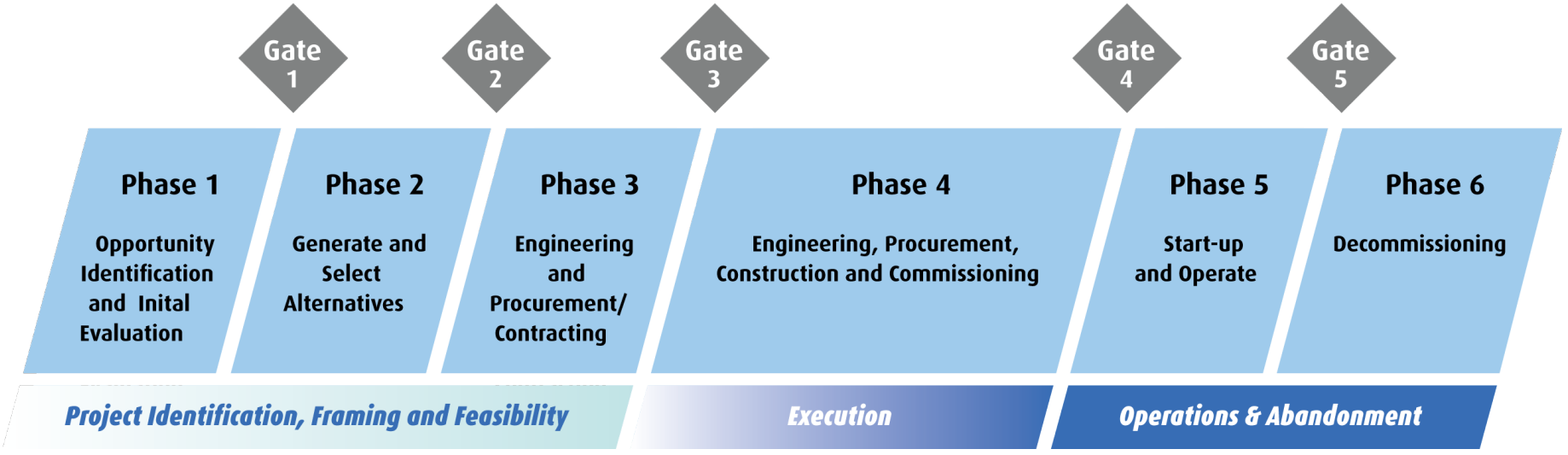
- Technical Specifications and Standards
- Design Criteria
- Contract Package Listing
- EPCM Execution and Select Mgmt Plans
- Construction Execution Plan
- Regulatory Compliance Plan
- Environmental Protection Plan
- Single Line Diagram
- Plot Plants (TL routing & Facility Layout)

Document Origin

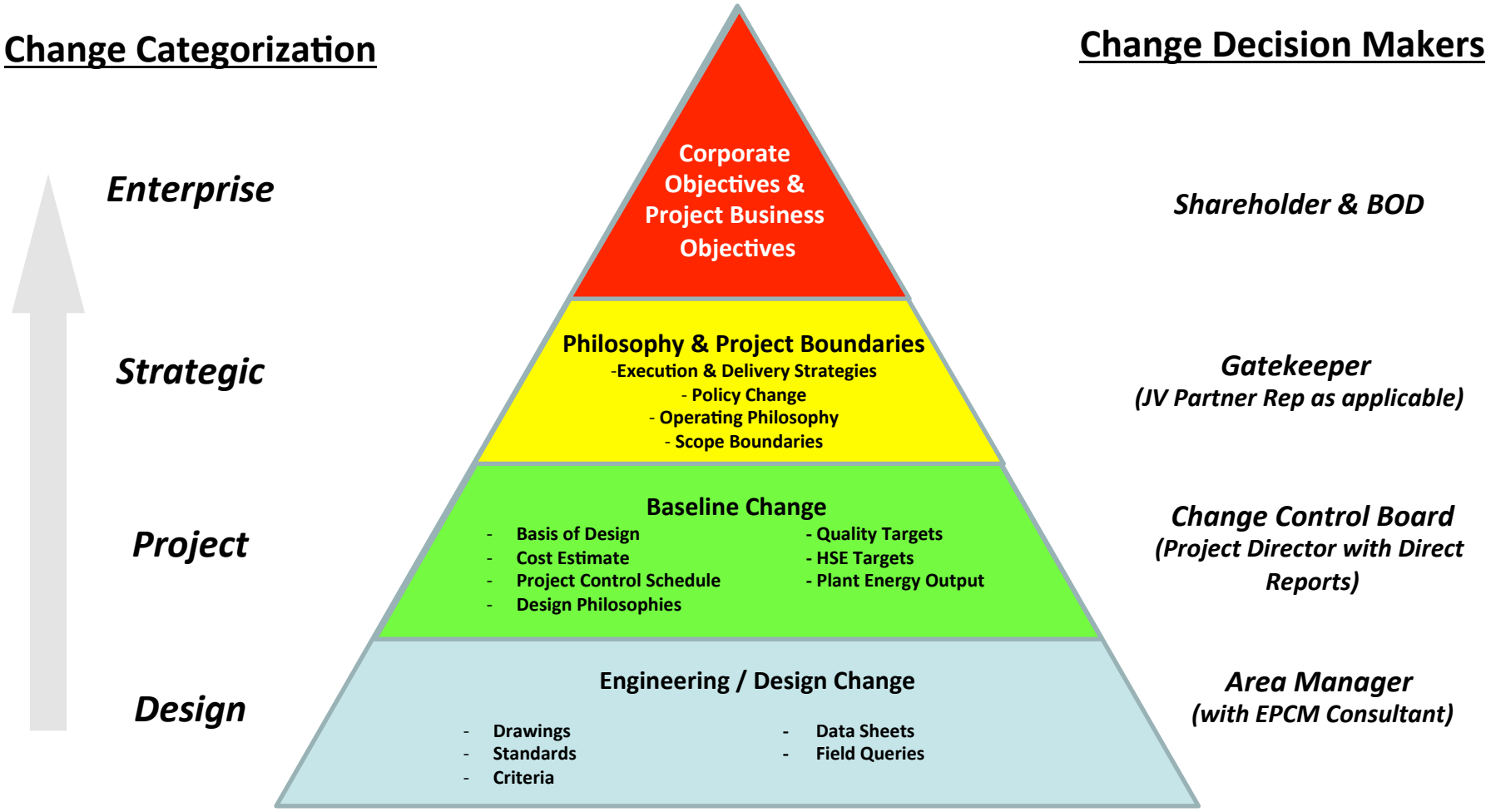
NE-LCP PT

SNC-Lavalin Inc.

Project Sanction



Project Change Approval Hierarchy



We have Significant MoC Activity

	Total	Cancelled	Closed or Approved	Active or Open
Deviation Alert Notices	41	1	9	30
Project Changes	19	-	4	15

Major Changes Since DG2

DAN /PCN	Title	Cost Impact
Potential Changes		
DAN-0022	Cost for EPCM Services	+$135 million
DAN-0037	Upper Churchill Redress Payments	+$39 million
DAN-0018, 19 & 20	Muskrat Falls Layout Changes / Optimization	+$150 million
DAN-0003	LIL Overland TL Construction Cost	+$120 to $140 million
DAN-0035	MF to CF HVac TL Cost Allocation	- X% of $230 million
Confirmed Changes		
PCN-0007	Financing & Commercial Structures	+$33 million
PCN-0008	Independent Reviews of Supply Decision	+$2 million
PCN-0015	LIL Operating Voltage – 320 to 350 kV	+$30 to $100 million
PCN-0016	LIL Overload Capacity – SOBI Cable	TBD

PCN-0007: Financing & Commercial Structures

- **Proposed Change**:
  - Adding New Scope: Project Finance Raising Process and Commercial Structures
- **Why this is a Change**:
  - Lack of clarity on financing and commercial work stream at DG2, hence gap in estimate for Owner's cost
- **Rationale:**
  - Funding necessary to move forward the following work activities:
    - Debt and equity financing

PCN-0007: Financing and Commercial Structure (cont'd)

- Negotiation of numerous commercial agreements
- Resolution of structural issues including tax implications
- Certain regulatory matters

- **Impact**:
  - Cost : $33.0 million (2011: $13.9 million + 2012: ~$18 million)
- **Way forward**:
  - PCN to be prepared for approval by Gatekeeper
  - AFE LCP-2011-02 for $3.7M for 2011 costs pending approval
  - Decision required on Funding Allocation
    - Gull Island versus Muskrat falls versus Island Link versus Maritime Link
    - Financing costs in the model versus contingency versus contingent equity

PCN-0007: Additional Details (cont'd)

Cost Details	Total	MF/LIL	ML	Financing Cost
3RD Party Advisory – Financing & Commercial	12.1	7.2	0.6	4.3
Internal non-LCP staff – Financing & Commercial	0.8	0.3	0.2	0.3
Independent Reviews	2.0	2.0		
2011 Budget remaining	(1.0)	(0.5)		(0.5)
Total – (2011 Only)	13.9	9.0	0.8	4.1

3rd Party Advisory	Total	MF/LIL	ML	Financing Cost
Financial Advice – PWC	2.0	2.0		
Commercial Agreements Support – McInnes Cooper	3.4	2.7	0.6	
Financing Agreements Support – Faskens	2.3			2.3
Rating Agency Reports – Moody's/DBRS/S&P	1.3			1.3
Other	3.1	2.5		0.7
Total – (2011 Only)	12.1	7.2	0.6	4.3

PCN-0008: Independent Reviews of Supply Decision

- **Proposed Change**:
  - Adding New Scope: Independent Reviews of Supply Reviews to validate DG2 decision.
  - Encompasses both PUB review and Navigant review
- **Why this is a Change**:
  - Clearly outside of Project Scope
  - DG2 had passed - issue not expected to arise
- **Rationale:**
  - Mandated by Province with costs to be born by Nalcor

PCN-0008: Independent Reviews of Supply Decision (cont'd)

- **Impact**:
  - Cost : $2.0 million (early estimate)
  - Schedule: Uncertain – draw upon team resources to be monitored
- **Way forward**:
  - PCN to be prepared for approval by Gatekeeper
  - AFE LCP-2011-03 for $1.5M for PUB review pending approval

DAN-0037: Upper Churchill Redress

- **Potential Change**:
  - Adding New Scope: Funding necessary to address Upper Churchill agreement
- **Why this is a Change**:
  - Not assumed as Project scope or cost at DG2.
- **Rationale:**
  - Nalcor Controllers now suggest that these cost should be capitalized as LCP cost.

DAN-0037: Upper Churchill Redress (cont'd)

- **Impact**:
  - Cost : $39.0 million ($30 million discounted at 7.5% not to go past 2041)
- **Way forward**:
  - PCN to be prepared for approval by Gatekeeper
  - Allocation Plan to be Agreed
    - Upper Churchill versus Lower Churchill
    - Government versus Nalcor
    - Gull Island versus Muskrat Falls
    - Capital cost versus Operating

DAN-0022: Cost for EPCM Services

- **Potential Change**:
  - Increase in cost for EPCM services execution
- **Why this is a Change**:
  - Base estimate did not full quantify EPCM model cost, additional funds covered as risk funds
- **Rationale:**
  - Benefits Agreement Compliance
  - Securing A-Team from EPCM
  - Maintaining Strong Owner's Team oversight role

DAN-0022: Cost for EPCM Services (cont'd)

- **Impact**:
  - Cost: $135 million (early estimate)
  - Schedule: None
- **Way-forward:**
  - Continue monitoring, re-assess at DG3.
  - PCN will be prepared to address Benefits Plan Compliance

DAN-0022: Supporting Info.

- Compensation scheme designed to address key Strategic Risks for the Project
  - Uplift incentive to secure A-Team
  - Negotiated rate escalator
- Cost premium for NL Benefits Commitments
  - Assignment conditions for personnel
  - Office facilities & overhead

Owner PMT + EPCM Services Cost Review

Muskrat Falls	2,231.0
Labrador - Island Transmission Link	1,616.0
Total Estimated Base Cost	**3,847.0**
Less Spend to Dec 31-10	91.8
Remaining To-Go	3,755.2
Owner, Eng. / Design & Construction Mgmt Allowance	435.3
Less Planned Activities	
Future E&AA Expenditures	12.4
SOBI Design	15.0
Other Owner Scope	5.0
Balance Available for Owner PMT + EPCM	**402.9**
Estimated Requirements	
Owner PMT	195.7
EPCM Contractor (SNC-Lavalin)	350.0
Current Cost Estimate	**545.7**
Delta / Forecasted Contingency Allocation	**(142.8)**

Cost Drivers

1.) Premium for EPCM Execution Model & Schedule Delay	75.0
2.) NL Benefits Strategy Compliance	35.0
3.) Strategic Risk Mitigation - Securing EPCM A-Team	25.0
4.) Generation EA Process and Aboriginal Affairs	5.0
5.) Island Link Financing Process	2.5
Total	**142.5**

PCN-0015: LIL Operating Voltage

- **Potential Change**:
  - Increase in operating voltage from 320 to 350 kV
- **Why this is a Change**:
  - Basis of Design includes for 320 kV operating voltage for the LIL
- **Rationale:**
  - 320 kV was based on preliminary analysis performed in 2010
  - Subsequent detailed analysis / refinement has resulted in recommendation that minimum +/- 350 kV LIL operating voltage is required to meet system operational needs while meeting Emera capacity delivery requirements

PCN-0015: LIL Operating Voltage (cont'd)

- **Impact**:
  - Cost: $30 to $100 million (order of magnitude)
  - Schedule: Significant engineering schedule risk if decision is delayed
- **Way-forward:**
  - Change BoD and instruct SLI to design 350 kV system
  - Cost impact will be understood at DG3
  - PCN-0015 requires Gatekeeper endorsement

PCN-0016: LIL Overload Capacity

- **Potential Change**:
  - Requirement for Overload Capacity on SOBI Cable to support energy transfer during a pole outage.
- **Why this is a Change**:
  - DG2 planning assumption was that Maritime Link could support Island in event of pole outage on LIL.
- **Rationale:**
  - Inability to maintain commitment for Under Load Frequency Shedding with Overload Capacity – large impact on customer
  - System will be more robust – security of supply

PCN-0016: LIL Overload Capacity

- **Impact**:
  - Limited to SOBI cable only. Converters planned with O/L
  - Cost: TBD
  - Schedule: Decision req'd to support issue of SOBI Cable RFP
- **Way-forward:**
  - Determine whether Cable Switching option vs. 150% continuous current option is lease-cost
  - SOBI Cable RFP issued with both options
  - SLI to lead system evaluation, including switching option
  - PCN-0016 approved – cost impact will be understood at DG3

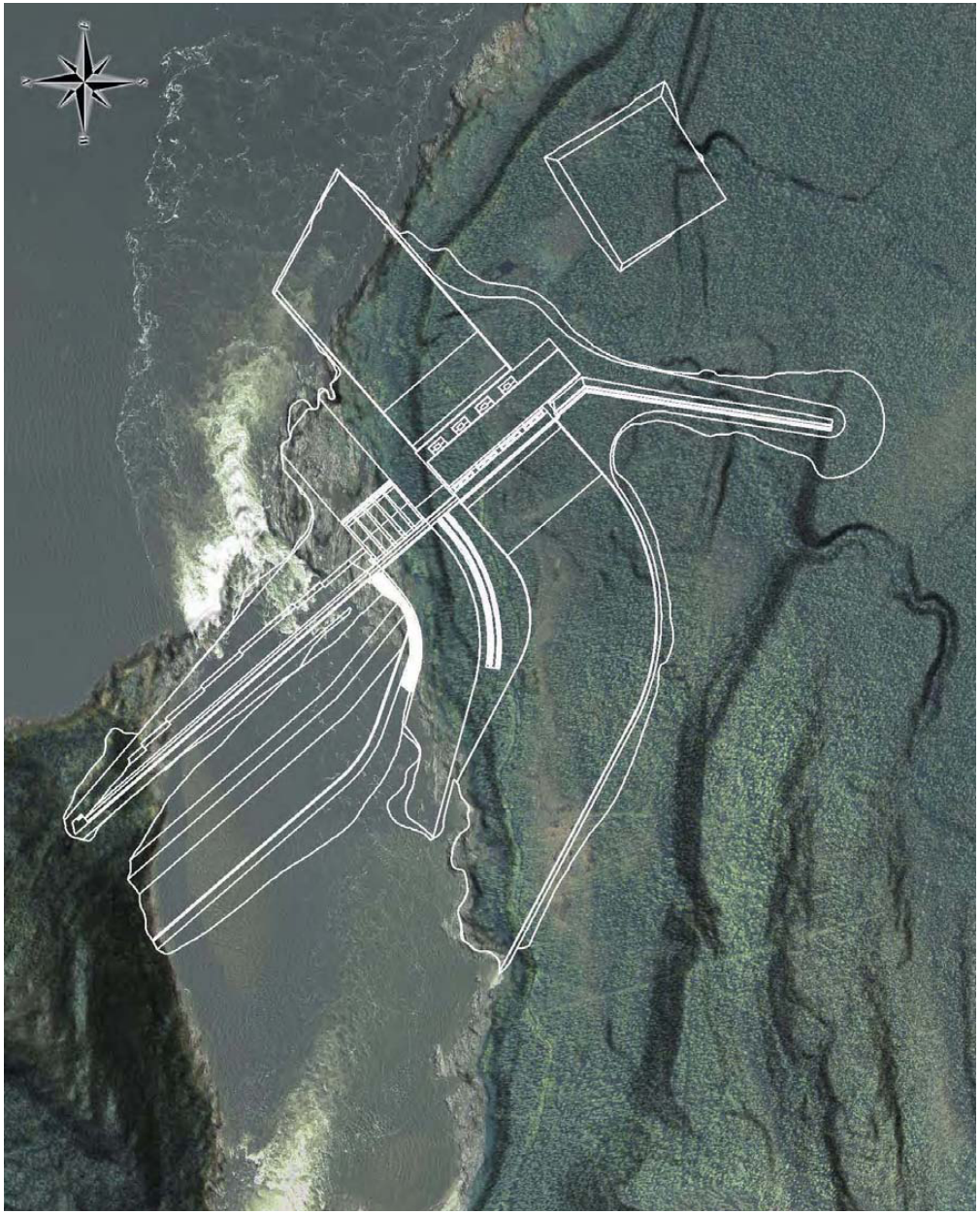
Muskrat Falls Layout

- DG2 estimate prepared based on plant layout and quantities in-hand at end of 2009
  - Key estimate uncertainty for DG2 related to “quality” of key quantities – original 1998 calculations could not be located
- MF1340 “Review and Confirmation of MF Layout, Structures and Interfaces” recently concluded
- Result is feasibility-level plant layout now with attendant “Bill of Quantities”
  - 3D modeling employed providing certainty wrt major quantities

Muskrat Falls Layout (cont'd)

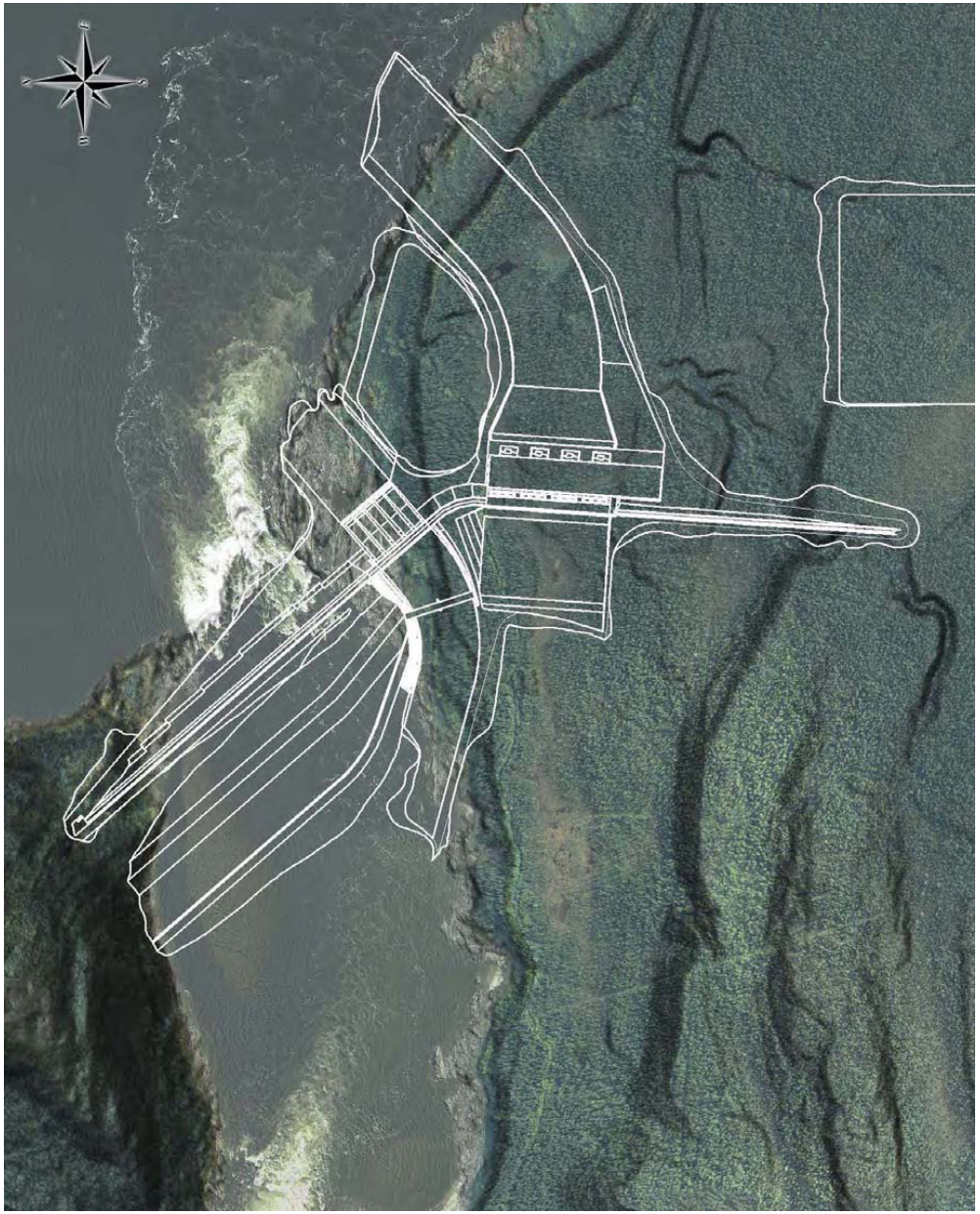
- Finalization of plant layout / design maturity considering:
  - data from 2010 field program
  - hydraulic modeling results
  - impacts of constructing MF before GI
  - refined spillway configuration and operation
- Total cost impact near $150 million
  - To be optimized
- Results in 3 distinct Project Changes
  - DAN-0018, 19 & 20

General Arrangement (2007)

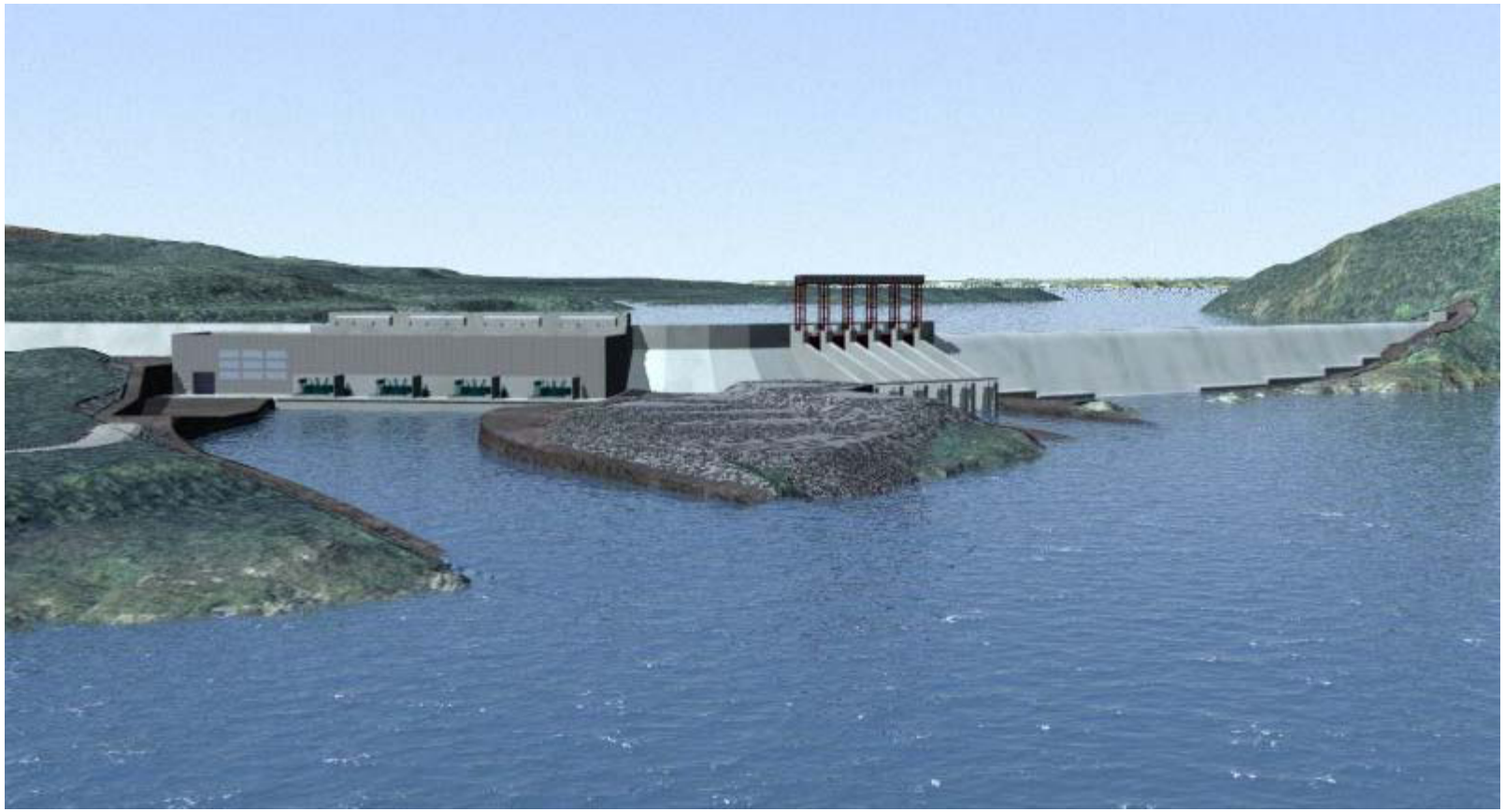


General Arrangement (2011)

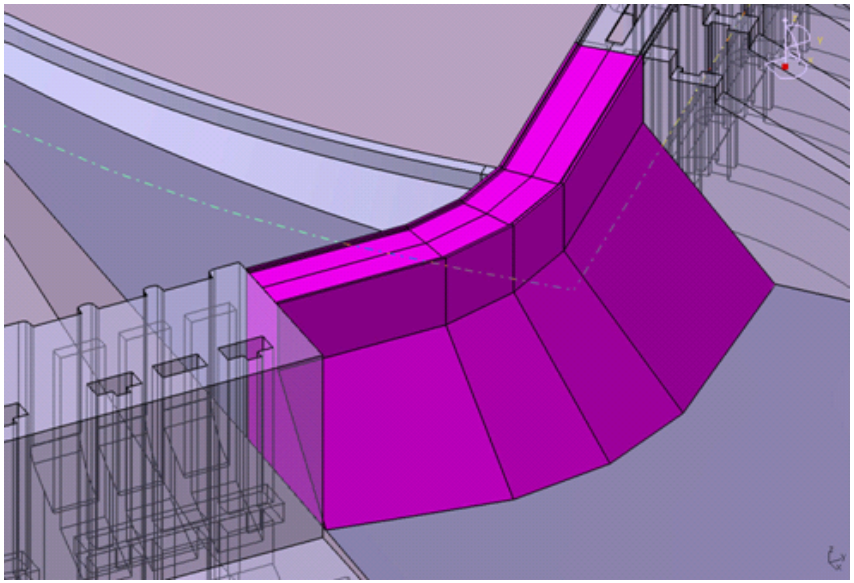
With 45° rotation



Muskrat Falls Layout – With 45° Rotation

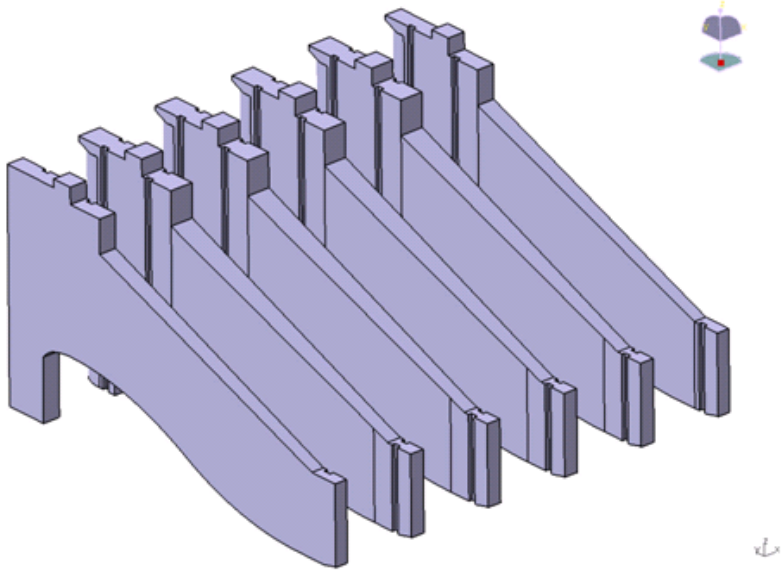


Primary Structures Modeled in 3D



Center Transition Dam (between Spillway & Intake) - Concrete

Spillway - Piers & End Walls - Concrete



DAN-0018: Powerhouse Re-Orientation

- **Potential Change**:
  - Re-orientation of MF Powerhouse / Intake by 45^{o} to improve hydraulic conditions at Unit 1 Intake
  - Results in change in key quantities
- **Why this is a Change**:
  - DG2 based upon Variant 11, Scheme 3b layout and quantities
- **Rationale:**
  - Hydraulic conditions with existing provide inoperability conditions for T/G Unit 1 and high risk of cavitation

DAN-0018: Powerhouse Re-Orientation

- **Impact**:
  - Powerhouse pushed further into south side bank increasing bulk excavation quantities. Also lengthened tailrace, shorten approach channel, requirement for intermediate transition dams.
  - Cost: $50 to $60 million
  - Schedule: No impact to construction schedule
- **Way-forward:**
  - Have agreed for SLI to move forward with the proposed layout in an effort to progress design
  - PCN will be prepared to address Change

DAN-0019: Spillway Configuration & Operating Philosophy

- **Potential Change**:
  - Primary spillway recommended as 5 Vertical Gates in lieu of 4 Radial gates
- **Why this is a Change**:
  - Physical layout and configuration change
- **Rationale:**
  - Significant risk associated with in-operability of radial gates in winter as well as risk of clogging with wood from new reservoir
  - Increased flow capacity with MF before Gull Island development sequence

DAN-0019: Spillway Configuration & Operating Philosophy

- **Impact:**
  - More concrete, steel, construction risk, but less operability risk
  - Cost: ~$10 to $15 million
  - Schedule: None
- **Way-forward:**
  - Have agreed for SLI to move forward with the proposed layout in an effort to progress design
  - SLI finalizing preferred layout at part of current work
  - PCN will be prepared to address Change

DAN-0020: MF Intake Structure

- **Potential Change**:
  - Larger, most robust intake structure that envisioned in 1998 studies resulting in 60,000 m3+ (+70%) increase in primary concrete quantities.
- **Why this is a Change**:
  - DG2 estimate based upon 1998 powerhouse layout.
- **Rationale:**
  - 1998 conceptual design has significant stability concerns
  - Maturity of design

DAN-0020: MF Intake Structure

- **Impact:**
  - Cost: ~$70 to 90 million
  - Schedule: Uncertain – large increase in concrete, hence labor.
- **Way-forward:**
  - Have agreed for SLI to move forward with the proposed layout in an effort to progress design
  - Will be worked into the overall DG 3 construction schedule
  - PCN will be prepared to address Change

DAN-0003: LIL Overland TL Cost

- **Potential Change**:
  - Increase in the construction cost for the LIL overland TL
  - Final corridor selection has increased line length by 30km
- **Why this is a Change**:
  - Significant change in estimated cost from DG 2 basis
- **Rationale:**
  - In the absent of having any preliminary design for the overland portion of the 320 kV TL, agreement to benchmark against NLH 230 KV TL construction norms, thus $385k per km
  - Preliminary engineering and bottom-up feasibility-level cost estimate effort have indicated that $490 to $500k per km

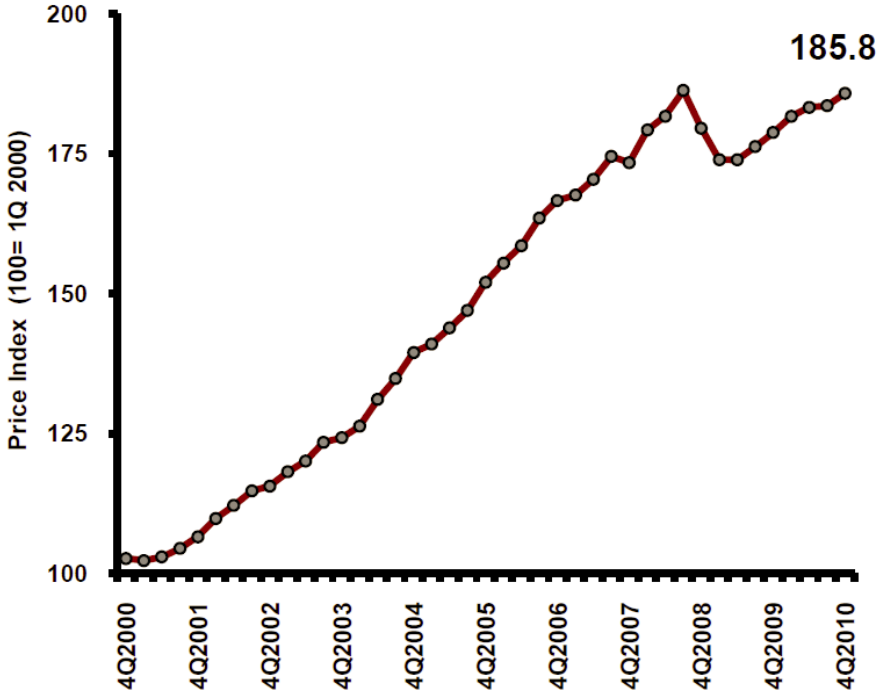
DAN-0003: LIL Overland TL Cost

- **Impact**:
  - Cost: $120 to $140 million
  - Schedule: No impact to construction schedule
- **Way-forward:**
  - SLI now proceeding with 350 kV system design and construction planning
  - DG 3 will include Class 3 estimate
  - Monitoring trends in material cost

TL Construction Costs – Market Trends

- Cost growth more than forecasted at DG2
  - Driven by strong demand for commodities
- PowerAdocate reports:
  - All-in Cost = +3.3% (over past 12 months)
  - Tower Steel = +15.2% (Q4-09 to Q1-11)

PowerAdvocate's TL Construction Cost Index



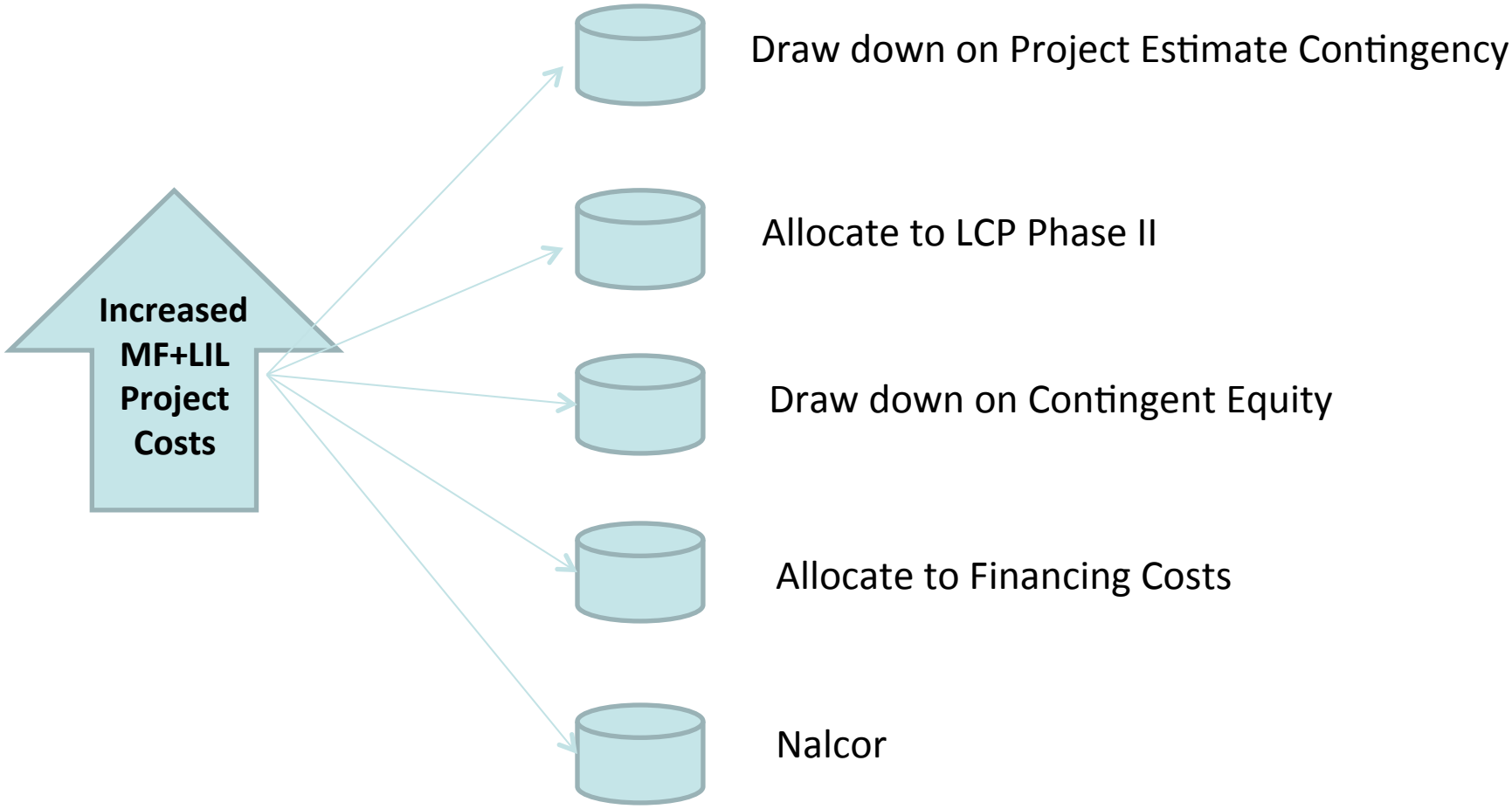
DAN-0035: MF to CF HVac TL Allocation

- **Potential Change**:
  - Propose that cost of CF AC Line be allocated between Gull Island and Muskrat Falls
- **Why this is a Change**:
  - DG2 basis allocated total cost to MF
- **Rationale:**
  - Gull Island will receive significant benefit from this asset
  - Similar approach has been adopted for costs associated Generation EA and IBA with Innu Nation
  - Reduces investment burden on Muskrat Falls

DAN-0035: MF to CF HVac TL Allocation

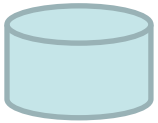
- **Impact**:
  - Cost: X% of $233 million
- **Way-forward:**
  - Strategic decision on allocation required by Sr. Management

Potential Cost Allocations for Changes



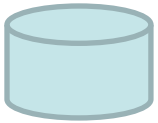
Basis for Allocation

Draw down on Project Estimate Contingency
- No change to Basis of Design
- Within Project Scope



Allocate to LCP Phase II
- Associated with Gull Island
- Market access for Gull power

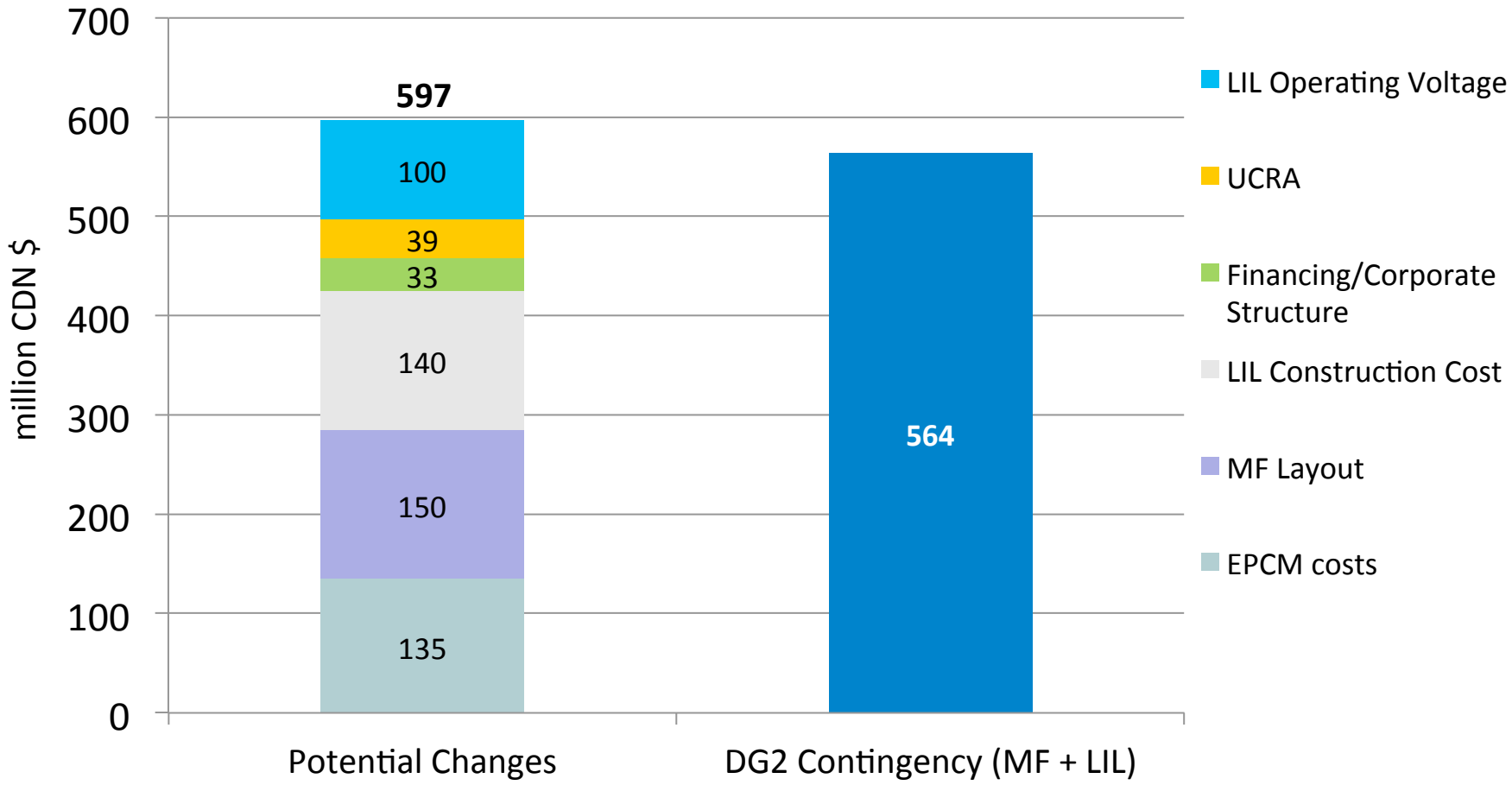
Draw down on Contingent Equity
- Change to Basis of Design
- Outside Project Scope



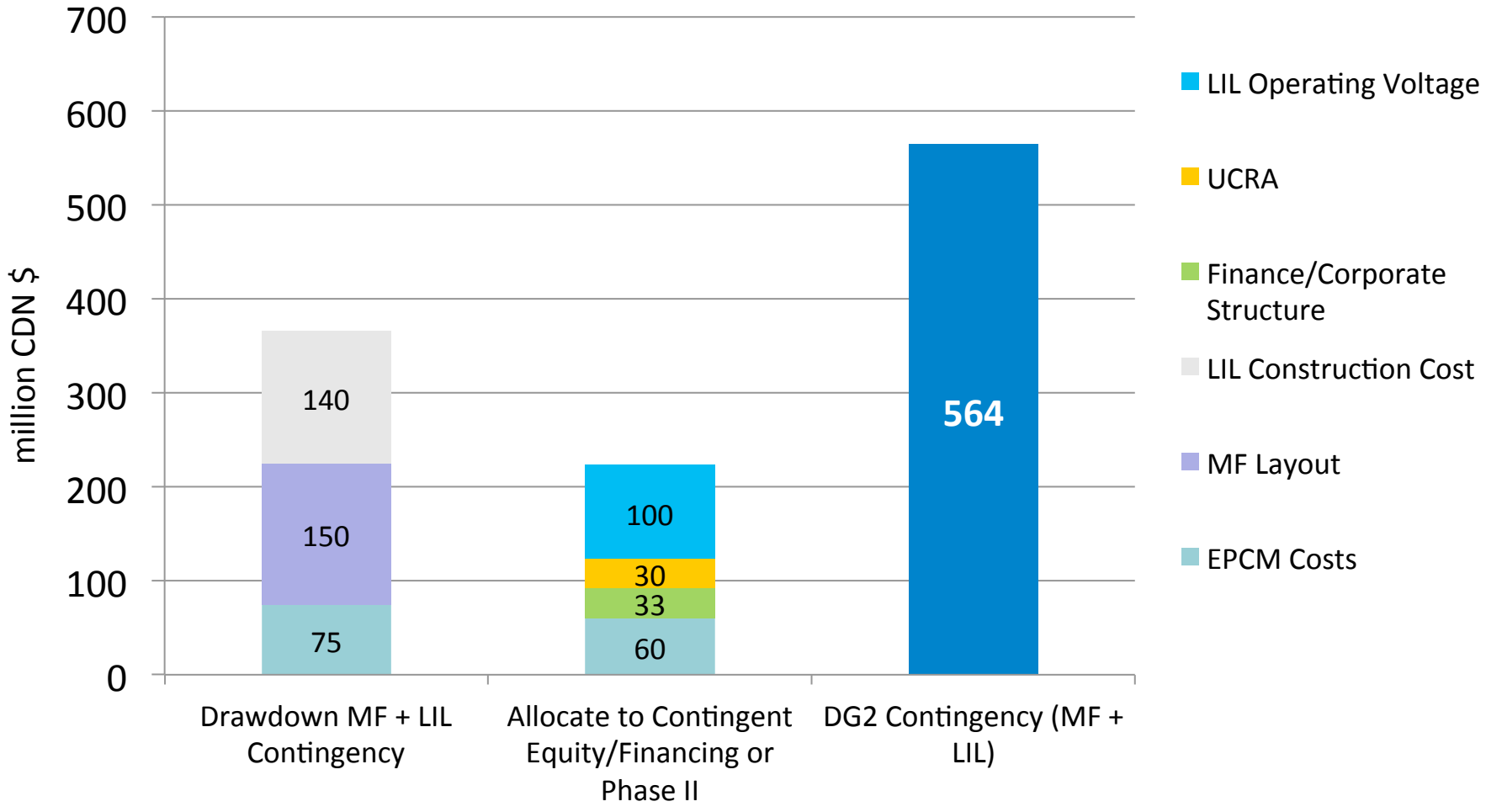
Allocate to Financing Costs
- Associated with finance raising
- Corporate structure change for financing or other purposes

Other Nalcor
- Change to Project requested by Operations and Maintenance
- Other

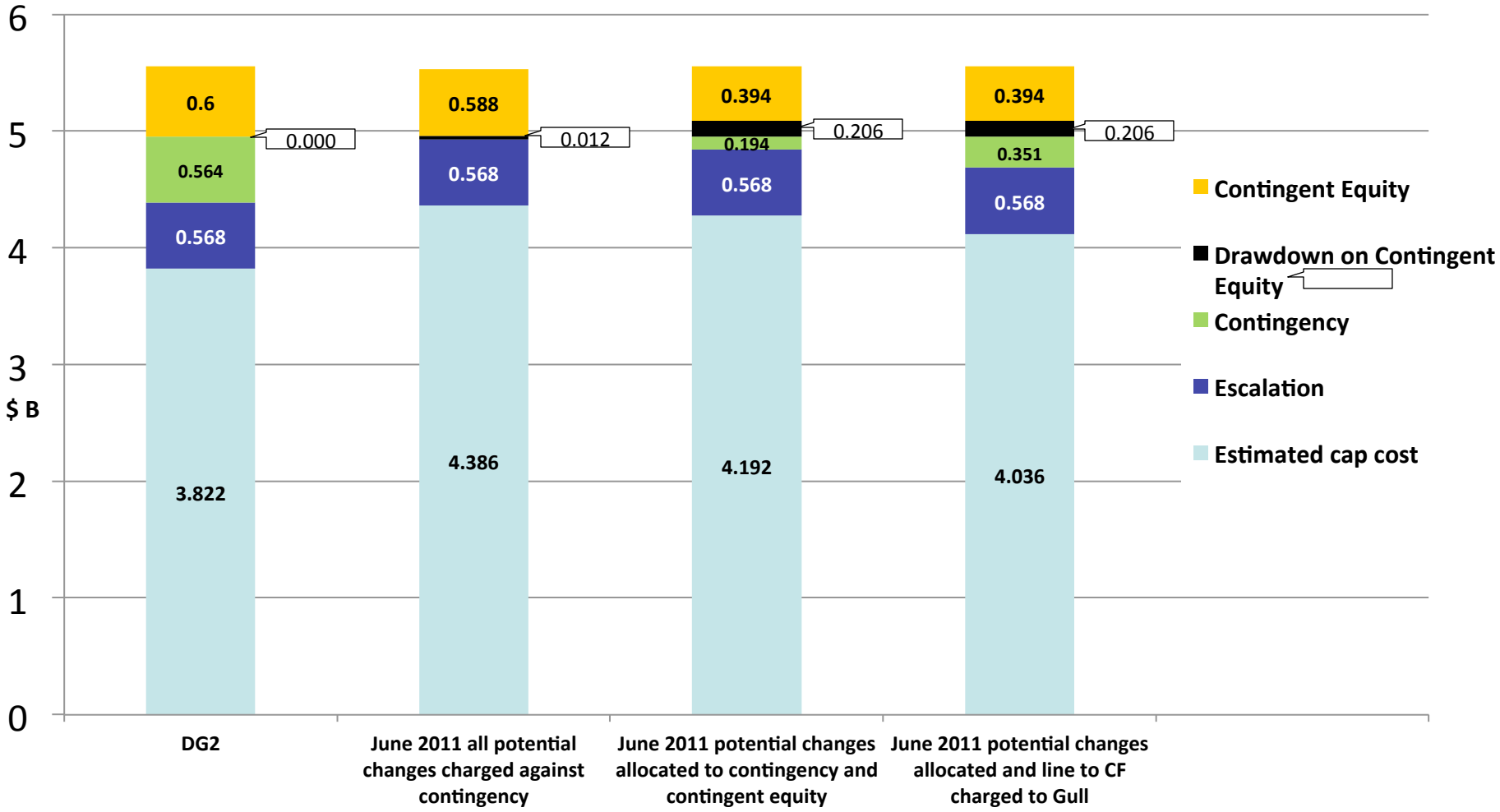
Major Changes Liquidate DG2 Contingency



Potential Allocation of Major Changes



MF+LIL Potential Changes and Options



Contingency Summary

- Organization is focused on $6.2 B. However, costs are increasing and contingency is being impacted.
- Issue is that costs that are outside of Scope of Work are being included.
- Management of Change and Cost Controls are working well. DAN's/PCN's are being issued and challenged.