

# Muskrat Falls Project Value and Cost Update

June 24, 2014

Boundless Energy



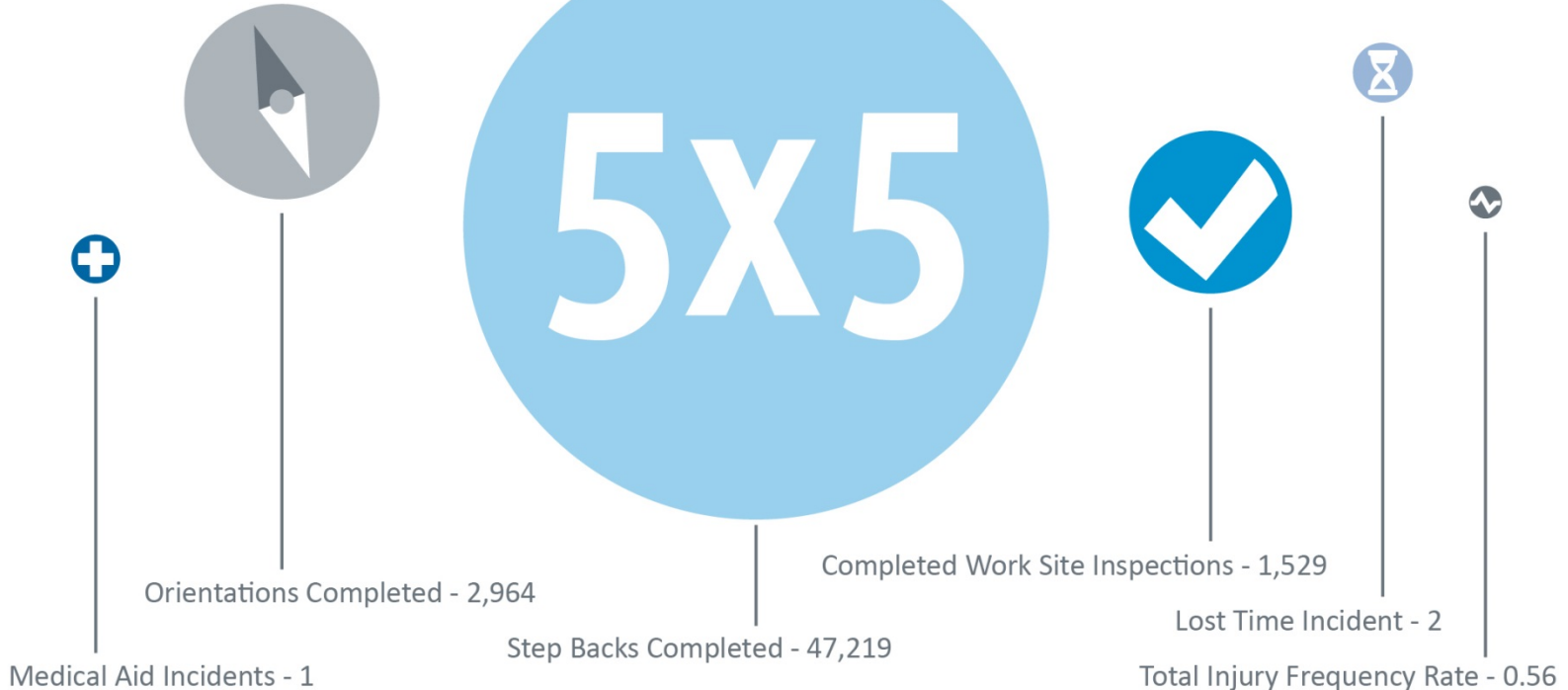
# Agenda

- Safety Moment
- Our Project, Our Benefits
- Muskrat Falls Project Update
- Long-term Value for Newfoundland and Labrador
  - Project Value
  - Capital Cost Drivers and Forecast
- Project Oversight
- Summary

# Safety on the Muskrat Falls Project

## Muskrat Falls Safety Performance Statistics - 2014

1.1 Million Hours Worked



# Our Project, Our Benefits





# Investing in Muskrat Falls

- Focus is on providing the greatest long-term value to the province
- Significant value and cash flows will be generated from the Muskrat Falls Project returning substantial revenue to the Province of Newfoundland and Labrador
- Nalcor has made additional strategic and prudent investments in the project to enhance system reliability and increase project productivity
- Market conditions are increasing some project costs
- Total value of project provides opportunity to offset net cost changes
- Nalcor will continue to look for opportunities that enhance project productivity and reliability to ensure long-term value to the project and the province

# Investing in Muskrat Falls

- Meeting our growing electricity needs
- Long-term rate stability
- Enhanced system reliability
- Eliminating our reliance on foreign oil for electricity
- Practically eliminating greenhouse gas emissions from electricity sector
- Employment & economic benefits
- Significant, long-term revenue for NL
- Controlling our energy future



# Muskrat Falls Project Update



# Project Progress

- Project Engineering >98% complete
  - Detailed engineering completed as planned
- Procurement
  - Contracts awarded/substantially advanced for >90% of project costs
- Environment
  - Environmental assessment release for generation and transmission
- Construction
  - Commenced work on all major sites as per construction plan and project construction progressing as per schedule

# Project Progress

- Financing
  - Federal loan guarantee & project financing completed
- Excess sales
  - Maritime Link sanctioned
  - Emera power sales agreement in place
- Schedule
  - First power – 2017

# 2014 Major Activities

- Activity will ramp up in all project areas:
  - Concrete placement at Muskrat Falls
  - Transmission line construction between Muskrat Falls & Churchill Falls
  - Award final major contracts
  - Complete drilling program in Straits
  - Continue site preparation and development at Soldiers Pond
  - Complete site work at Churchill Falls
  - Construction work on Labrador-Island Link



# Realizing Benefits Today

- Employment Benefits (as of April 2014)
  - Total project workforce is 1,785
  - 1,527 of project workforce are NL residents
  - 321 females working on the project (91% are NLers)
  - 164 Innu working on site
  - 52% of Labrador workforce are Aboriginal workers
- Employment expected to reach 2,500 by end of 2014

**WOMEN ARE PART OF SOMETHING BIG**

**AT MUSKRAT FALLS**





**WOMEN  
IN RESOURCE  
DEVELOPMENT CORPORATION**

Learn more about  
employment opportunities  
with the Muskrat Falls Project at  
[muskratfallsjobs.com](http://muskratfallsjobs.com)



**nalcor  
energy**  
LOWER CHURCHILL PROJECT



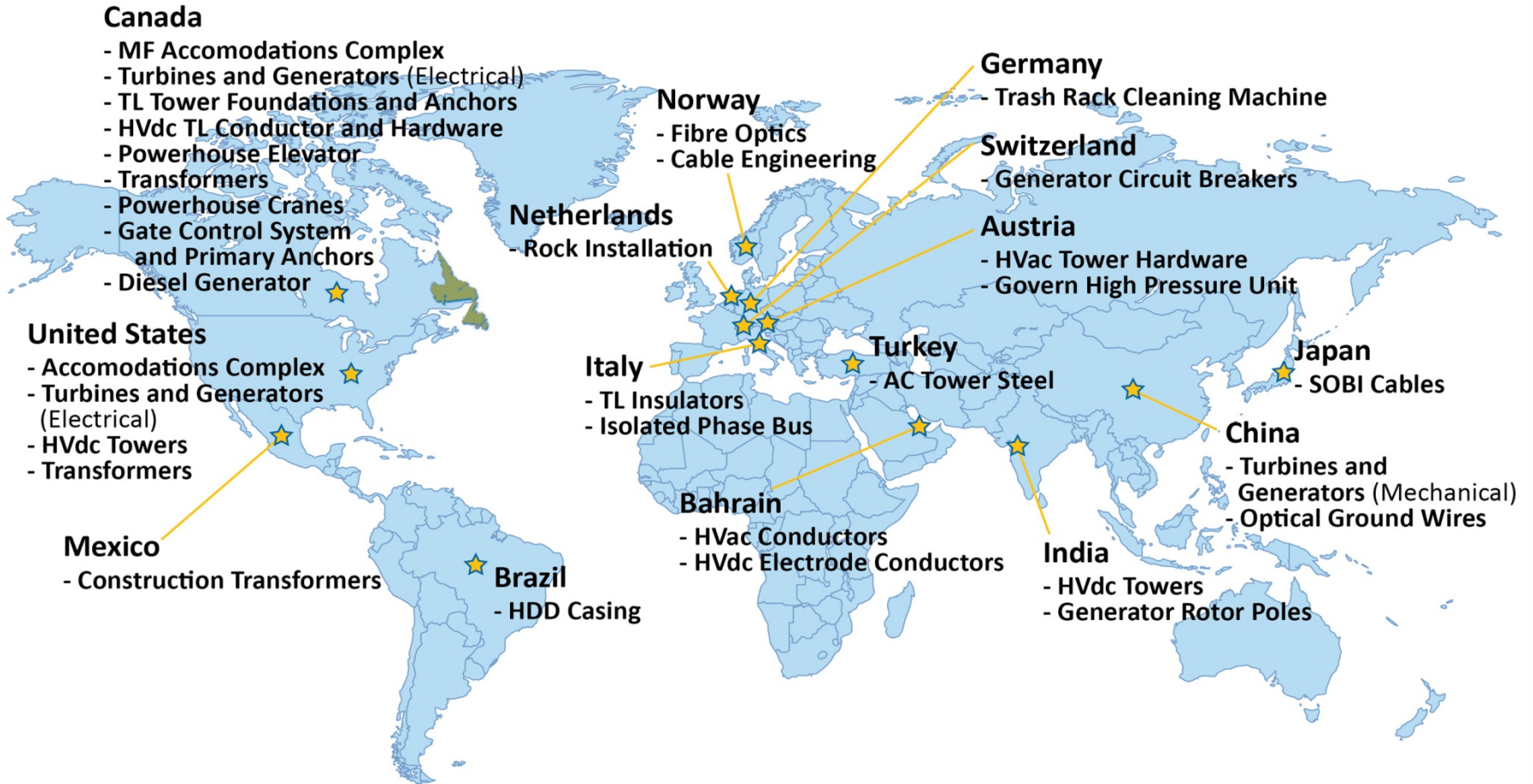
# Realizing Benefits Today

- Economic & Income Benefits (Jan'13 to April'14):
  - >\$457 million invested in NL businesses
  - >\$105 million in salaries paid to NL residents
  - Total direct benefits to NLers and NL-based businesses >\$562 million
  - IBA procurement commitments exceeded - ~\$450 million in contracts awarded to Innu businesses
- Total incurred costs to April'14 - >\$1.2 billion





# Lower Churchill Project Global Reach



# Long-term Value for Newfoundland & Labrador



# Components of Project Value

- Overall project value is a function of revenue, cost, quality/reliability and schedule
- Revenue comprised of:
  - Domestic electricity sales
    - Includes return on equity
  - Water rentals
  - Value from excess power sales and other storage/transmission opportunities
- Costs are comprised of three main categories:
  - Capital (facilities), financing and operating costs
- Quality and reliability

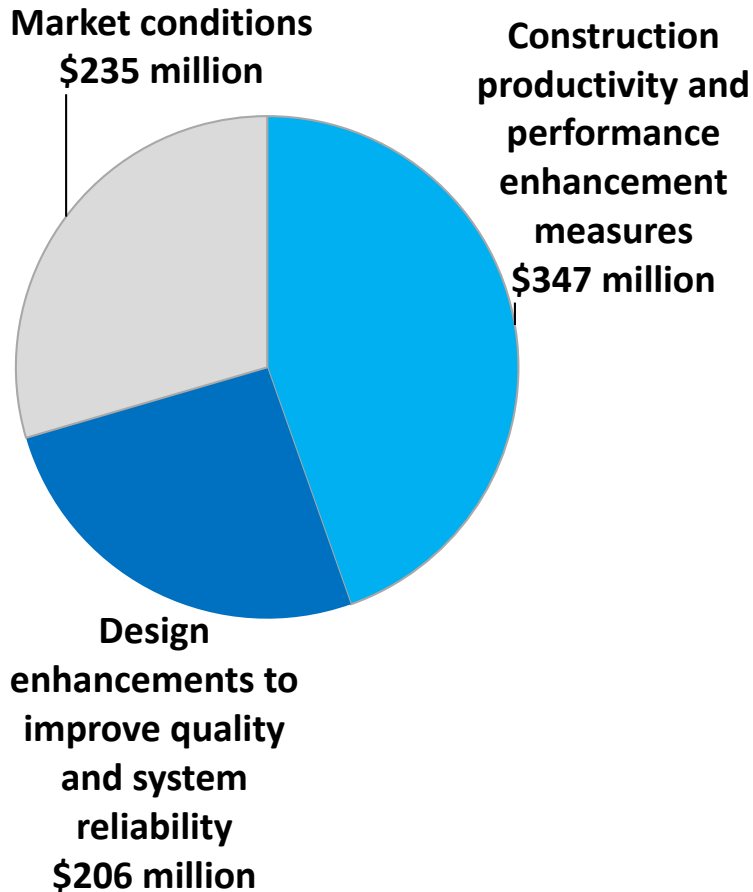
# Capital Cost Update



# Key Changes Since Sanction (Dec'12)

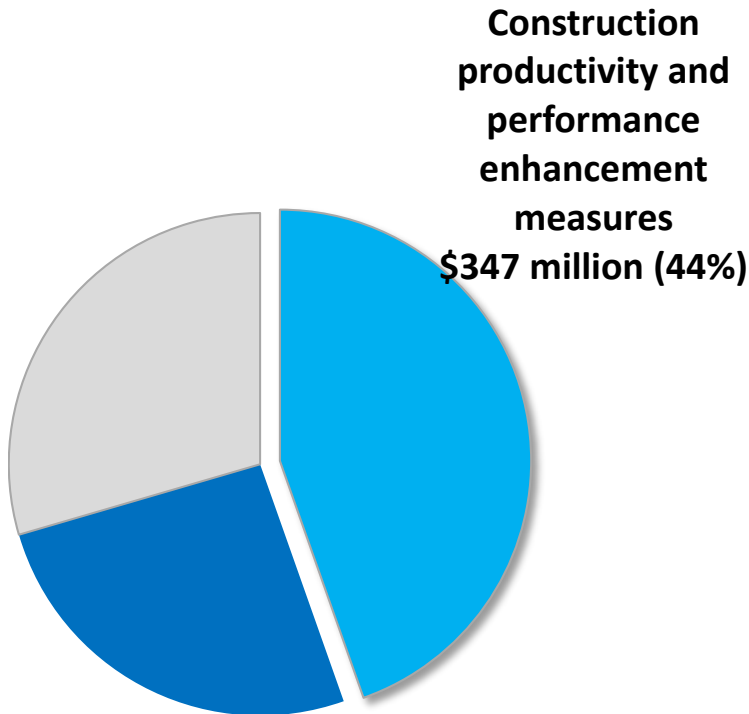
- Cost components:
  - Capital (facilities) costs
    - \$553 million investment in planned project enhancements (accounts for ~9% of cost changes)
    - \$235 million from market influences (accounts for ~4% of cost changes)
  - Financing costs - decrease of additional ~\$300 million on NPV basis
  - Operating costs – no change
- Revenue:
  - Increase \$100 million from ML and Emera excess energy agreement

# Capital Cost Changes



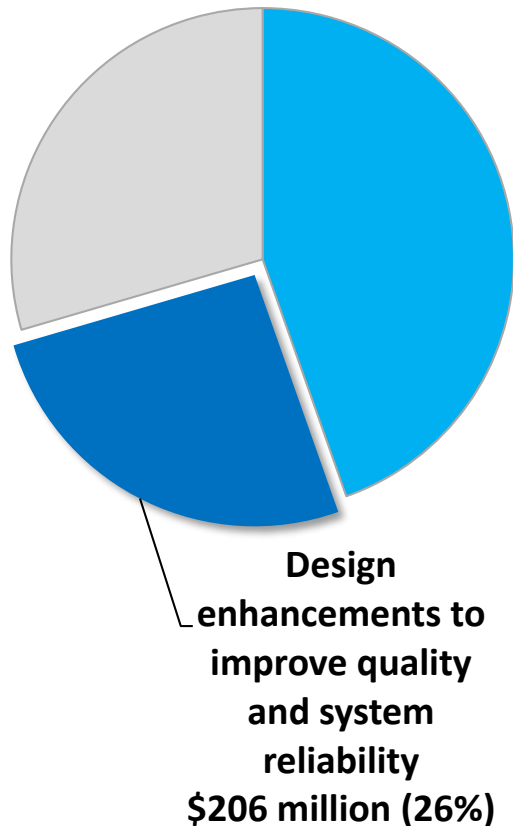
- \$553 million invested in productivity and reliability enhancements
  - Accounts for 70% of changes in capital costs
  - Decisions to enhance long-term value of the project
- Pressures in the market have increased capital costs by \$235 million
  - Accounts for 30% of increase in capital costs
  - Competitive market factors in NL and world wide

# Productivity and Performance Enhancements



- Strategic investments include:
  - Enclosure of powerhouse to provide safer working conditions, increased productivity, year-round employment opportunities for workforce
  - Enhanced camp & recreational complex, and catering to increase worker attraction and retention
  - Significant site infrastructure upgrades to promote work face efficiencies – e.g., laydown area expansion
  - Change in river diversion window from 2015 to 2016 to reduce weather window risk on spillway construction

# Quality & System Reliability Improvements

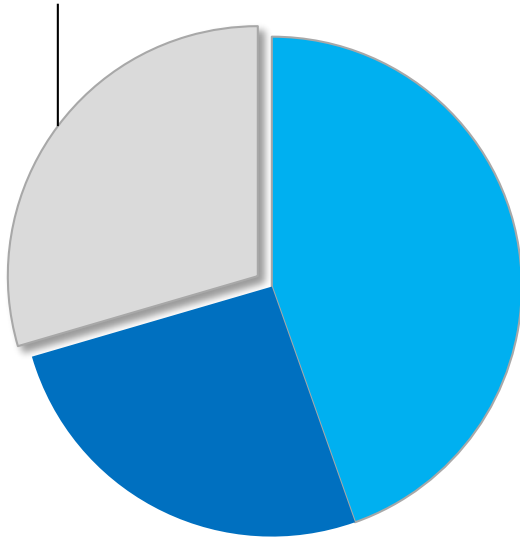


- Substantive design enhancements:
  - Spillway discharge channel concrete liner to remove risk of potential erosion
  - Use of 5 low-level vertical gates in spillway to improve winter operation reliability
  - Increase reliability in transmission lines beyond initial design return period expectations:
    - Higher utilization factor for AC towers
    - Use of low temperature steel for HVdc line
    - Additional foundation corrosion protection
    - Increased number of accesses providing flexibility for long-term operations
    - Increased hardware quantities and tower weight, etc.) for HVdc line



# Market Conditions

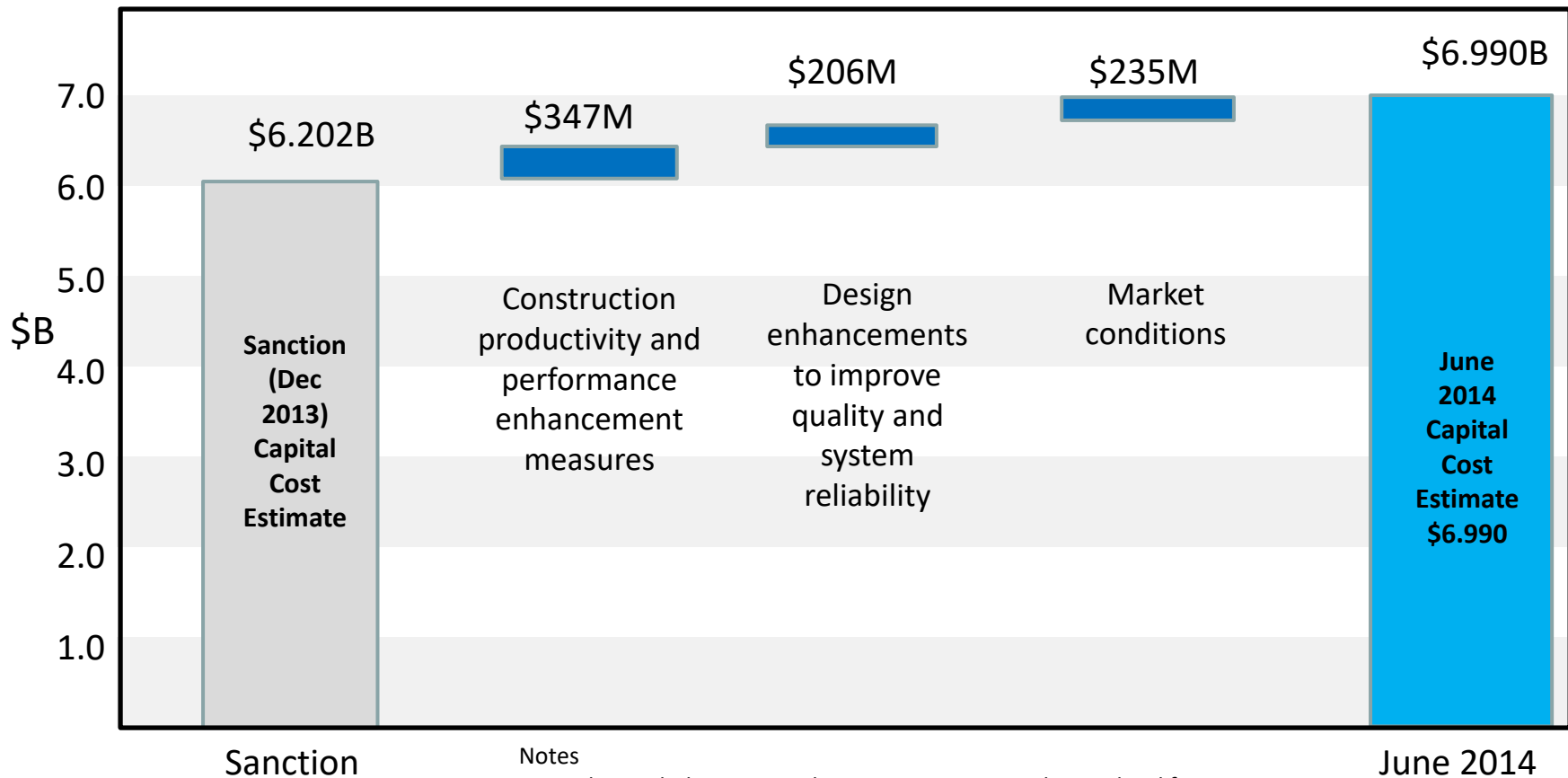
Market conditions  
\$235 million (30%)



- Market condition drivers:
  - Perception of low labour productivity in NL by contractors is resulting in risk premiums which are driving up bids
  - Highly competitive labour market with significant construction activity ongoing in NL, North America and globally

# Capital Cost Outlook (Sanction to June'14)

Cost growth contributors since Sanction



Notes

1. Value excludes interest during construction and capitalized financing costs
2. June 2014 cost outlook includes contingency of \$224 million
3. Additions may vary due to rounding

# Cost Changes by Project Component

- From Sanction to June 2014

Project Component	Increase
Muskrat Falls	\$471M
LTA	\$140M
LIL	\$177M
Total	\$788M

# Project Oversight

# Project Oversight

- Government of NL (GNL) - Muskrat Falls Oversight Committee established
  - Purpose is to strengthen and formalize the existing oversight for the construction phase of the project
  - First report to be published in July 2014
- Independent engineer's oversight is part of GNL Oversight
- Auditor General has open access to Nalcor

# Project Oversight

- GNL, on behalf of the people of the province, holds Nalcor accountable for project management and establishing oversight practices and procedures
- Nalcor reports to the public and GNL through:
  - annual reports and audited financial statements
  - public AGM
  - requests for information, open houses & presentations
- Monthly Muskrat Falls Project public reports
- Nalcor public quarterly financial statements starting in fall 2014
- Nalcor presents its capital and operating budgets to GNL for review and approval

# Internal Approach

- Best practice project management processes
- Internal audit
- Internal quality control
- Board of Directors of project subsidiaries providing oversight and governance

# Our Project, Our Benefits

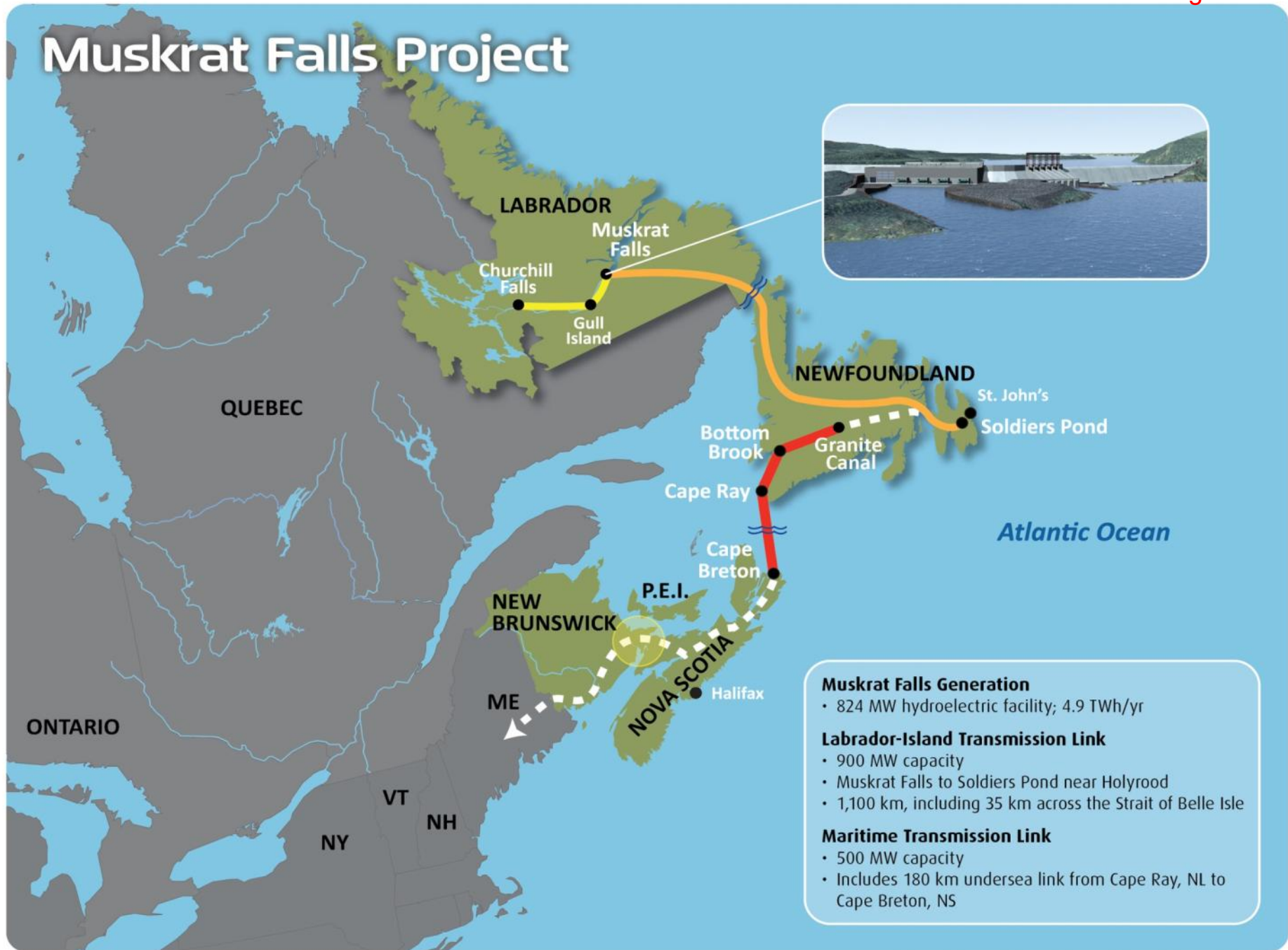




# Summary

- The Muskrat Falls Project will return significant value and revenue to the Province of Newfoundland and Labrador
- Total value of project provides opportunity to offset net cost changes
- The majority of cost changes on the Muskrat Falls Project are a result of additional, strategic and prudent investments made to enhance and increase project productivity and reliability
- Market conditions have increased some project costs
- Our focus is on providing the greatest benefits to the province
- People of our province will be the owners of a valuable, long-term power-producing asset that they can take pride in
- We'll continue to look for opportunities that enhance project productivity and reliability to ensure long-term value to the project and the province

# Muskrat Falls Project



# Project Status Muskrat Falls



# Muskrat Falls – Recent Activity

- Astaldi, contractor for construction of Powerhouse, Intake, Spillway mobilizing in Labrador (workforce ~800). Readiness assessment completed by LCP
- Erected tower cranes and commenced formwork/concrete placement in Spillway. Preparing for major concrete placement in base slab
- Constructing formwork for Powerhouse cover system
- Continuing installation of main camp, assembly of site infrastructure eg. Sports complex, admin. bldg; new Kitchen/Dining Room opened in May

# Muskrat Falls – Upcoming Activities

- Complete assembly of Astaldi batch plant
- Complete formwork assembly and commence major concrete work in Spillway – July
- Continue installation of enclosure over Powerhouse
- Finalize bid evaluations and award CH-0008 North Spur package
- Finalize and issue RFP for CH-0009 North and South Dams
- Prepare first package of Turbine/Generator material for shipment



# MF Site Layout



# Powerhouse – ICS preparations





# Spillway





# Spillway



# Spillway activities





# Assembly of Astaldi Batch Plant



# Aggregate Preparations & Crushing



# Turbines/Generator Manufacturing





# Runner Hubs



# Hub Internal Parts

Casting of links, levers and bushing for hub in progress



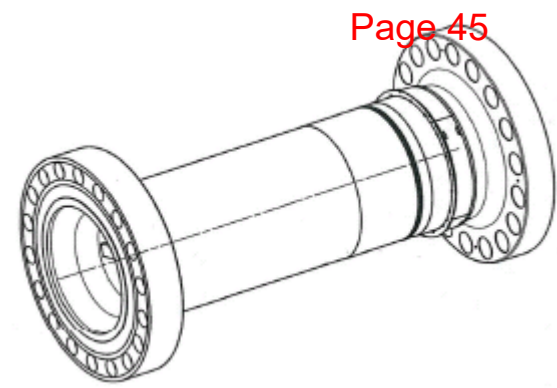
# Runner Blades





# Shaft Forgings

- 4 turbine shafts forged, heat treatment complete.
- Ingots for 2 generator shafts have been cast.



# Turbine Shafts



# Project Status Labrador Transmission Asset



# Labrador Transmission Assets – Recent Activities

- Valard (HVac transmission construction contractor) opened camp on North Spur, continues to mobilize
- First shipment of tower steel from marshalling yard sent to transmission line early June
- Assembly of towers & grillage foundations underway; test anchor installation successfully completed
- Right of Way clearing approx. 75% complete
- Commenced earthworks program at Churchill Falls
- Labrador Aboriginal Training Program - tower assembly training underway

# Labrador Transmission Assets – Upcoming Activities

- Continue with ROW Clearing in advance of transmission construction
- Continue tower assembly
- Commence installation of tower foundations
- Commence installation of tower anchors late June/July
- Commence tower erection Q3 2014
- Final shipment of material due in Labrador June/July
- Conclude site preparation at MF Switchyard
- Award MF Switchyard EPC: Q3 2014



# Vallard Camp – North Spur



# Tower Assembly





# Tower Assembly





# Labrador Aboriginal Training Program





# Labrador Marshalling Yard



# AC Transmission Line Clearing



# Project Status Labrador Island Link





# Labrador Island Transmission Link – Recent Activities

- Commenced earthworks program at Soldiers Pond
- Issued LNTP for HVdc construction
- Awarded contract for first 30km of HVdc ROW clearing
- Completed horizontal directional drilling program at Shoal Cove, moved rig to Forteau in heavy ice conditions and commenced drilling first bore hole
- Commenced work on Forteau Quay and Quarry for subsea rock installation contract
- Completed manufacturing of first of three batches of subsea cable; commenced impregnation process

# Labrador Island Transmission Link – Upcoming Activities

- Commence ROW clearing - June
- Complete SOBI 2014 horizontal directional drilling program - Q3
- Continue subsea cable manufacturing
- Issue LNTP for of Synchronous Condensers
- Finalize contract Converters and Transition Compounds
- Finalize contract for HVdc construction
- First shipment of materials for LITL expected to arrive in Argentina in Q3 – Insulators

# Soldiers Pond





# Soldiers Pond



# Soldiers Pond



# Soldiers Pond





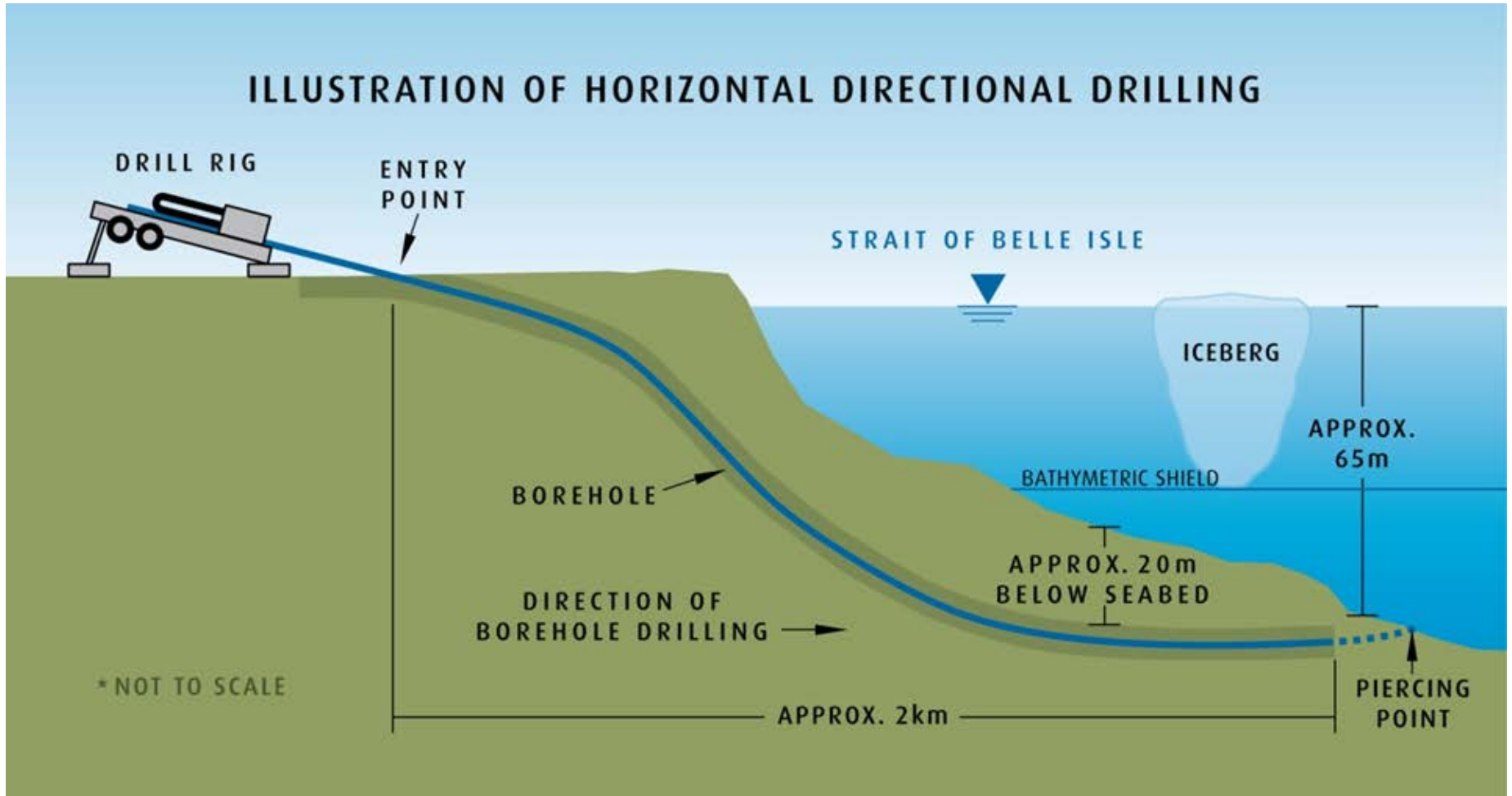
# SOBI – Forteau Site Preparations



# SOBI – Forteau Site Preparations



# SOBI – Horizontal Directional Drilling



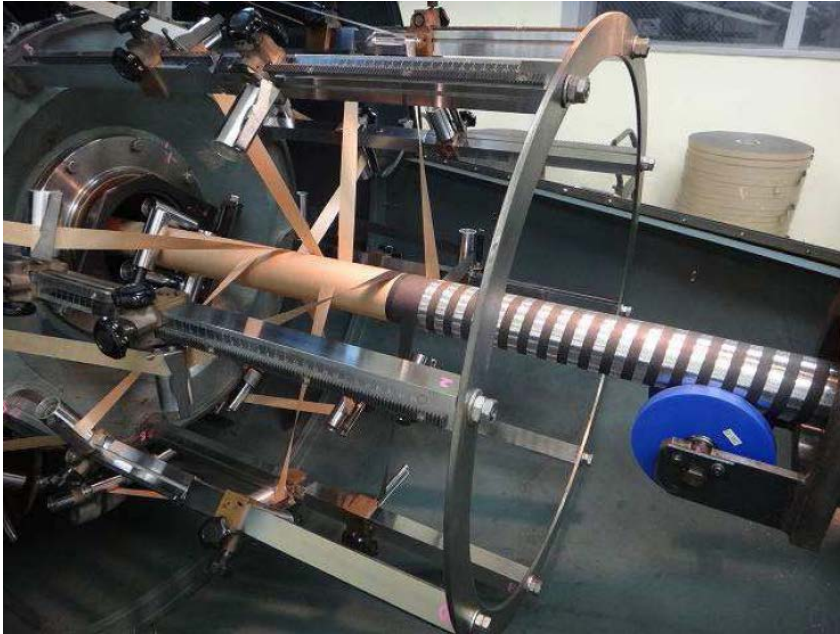


# SOBI – HDD Drilling Program





# Production of Submarine Cable



# Immersion of Submarine Cable

