# Megaprojects in Canada: Learning from Success

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# Megaprojects have a mixed reputation these days

▸ Conventional wisdom is skeptical about megaprojects in general, including in the electricity sector
   ▸ Media focus on projects with financial and technical difficulties
      □ Hydro-electricity projects (e.g. Muskrat Falls)
      □ Rail, roads, IT systems, energy
   ▸ Surveys of megaprojects report large *average* cost over-runs and delays
      □ Hydro: +96% average cost over-run, +42% average schedule delay
      □ Rail: +41%, +48%

▸ Academic research has dug into the causes of problems
   ▸ Political 'rapture' motivates project approval (Flyvbjerg)
   ▸ Under-estimation of costs, over-estimation of benefits
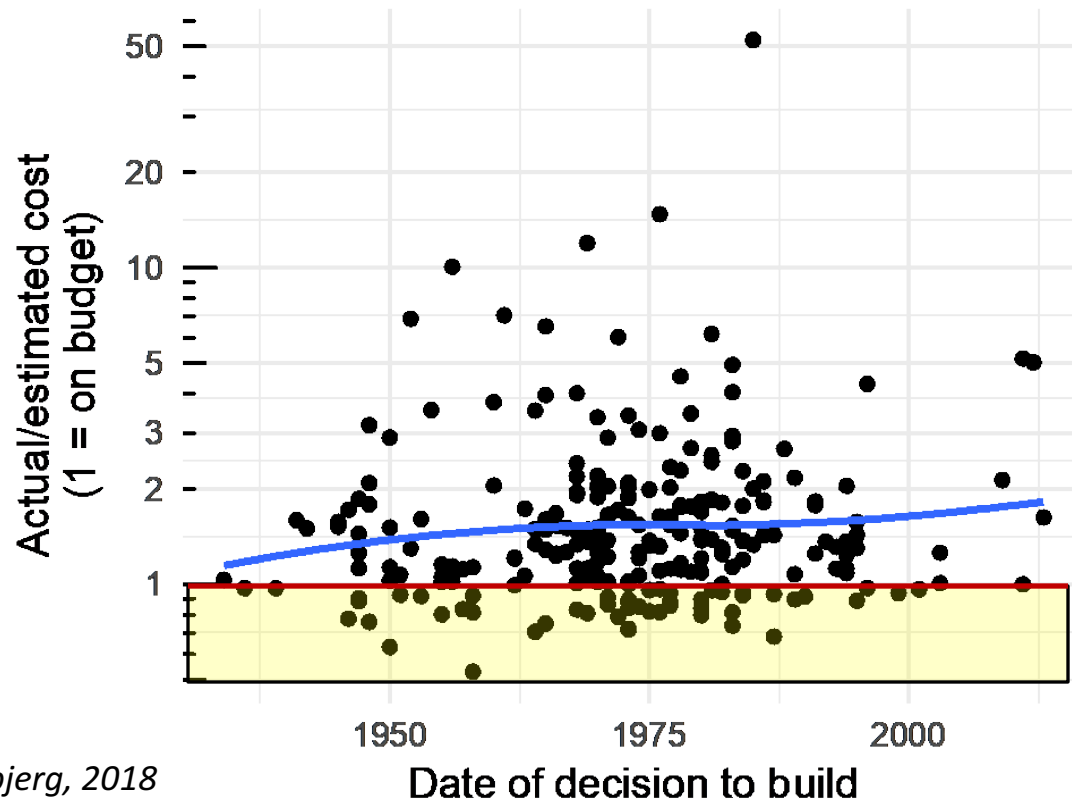
# The so-called "Iron law of megaprojects"

"Over budget, over time, under benefits, over and over again"

*(Flyvbjerg, 2017)*

# An alternative perspective: learning from success

▸ Conventional focus on megaprojects with poor outcomes ignores the lessons from successful – but less newsworthy – examples

  ▸ E.g. 23% of hydro projects are completed on or below budget



*Source: Flyvbjerg, 2018*

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# Insights from a representative sample of megaprojects

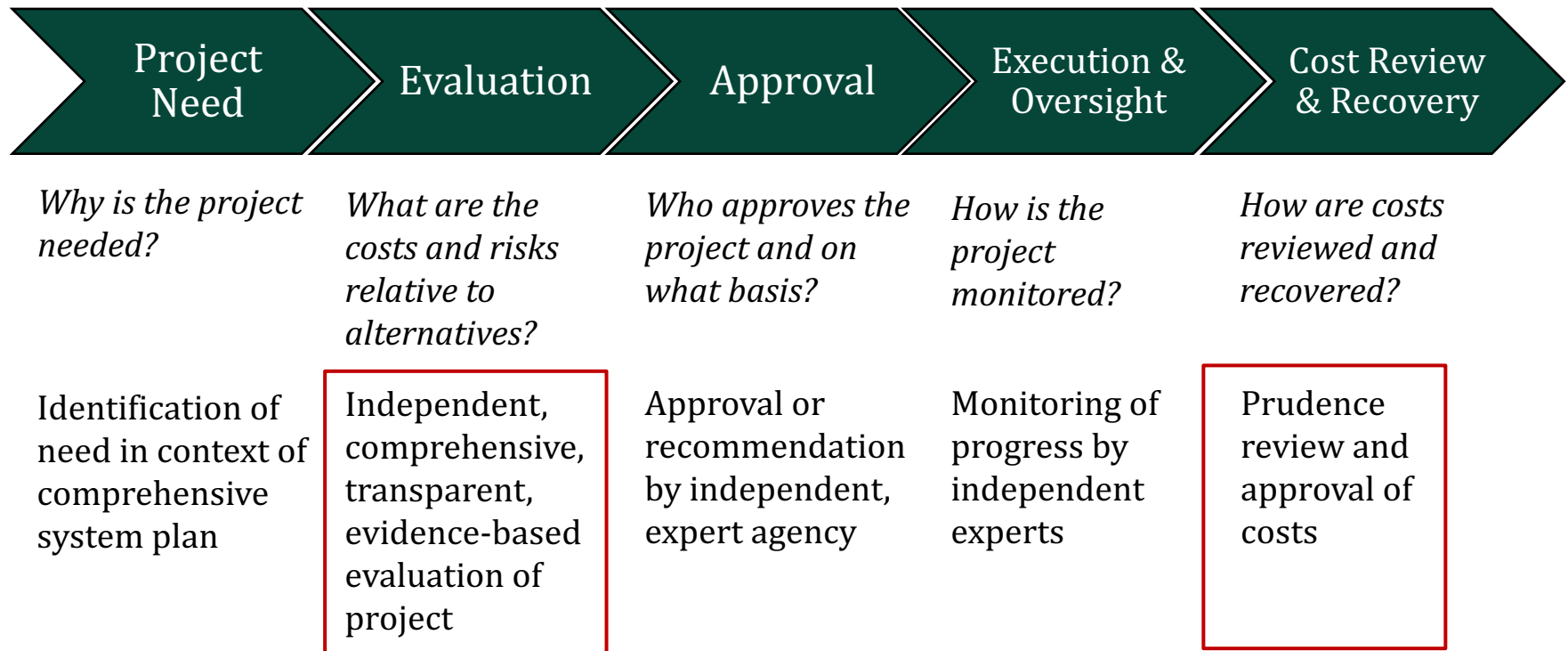▸ Detailed case studies of five electricity megaprojects in Canada with varying performance outcomes

| Project | Original Cost | Cost Overrun | Schedule Overrun |
|---|---|---|---|
| Maritime Link, NS (2018) | $1.7 bn | 0% | On time |
| Darlington Nuclear Refurbishment, ON (2026e) | $12.8 bn | | On time |
| Western Alberta Transmission Line (2015) | $1.4 bn | +21% | |
| Keeyask Generating Station, MB (2022e) | $6.5 bn | +61% e | +3 yrs |
| Muskrat Falls, NL (2021e) | $7.4 bn | +76% e | +3 yrs |

*Source: Holburn and Fremeth, 2018*

▸ Regulation and governance are key differentiators of project performance

# Best practice regulation of electricity (mega)projects

▸ Well designed regulatory institutions and practices can ameliorate inherent informational and incentive challenges in utility investment – including megaprojects

| Project Need | Evaluation | Approval | Execution & Oversight | Cost Review & Recovery |
|---|---|---|---|---|
| *Why is the project needed?* | *What are the costs and risks relative to alternatives?* | *Who approves the project and on what basis?* | *How is the project monitored?* | *How are costs reviewed and recovered?* |
| Identification of need in context of comprehensive system plan | Independent, comprehensive, transparent, evidence-based evaluation of project | Approval or recommendation by independent, expert agency | Monitoring of progress by independent experts | Prudence review and approval of costs |

*Source: Holburn, 2018*

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# Regulation of Maritime Link versus Muskrat Falls

**Maritime Link (+0%)**

- UARB conducted hearings to determine whether ML was (i) lowest-cost alternative and (ii) consistent with NS environ. goals.

- UARB approved ML, with expected (P97) cost of $1.7bn, subject to conditions.

- UARB declined NSPML's 2017 application to recover full costs since ML was not "used and useful". Temporary interim assessment.

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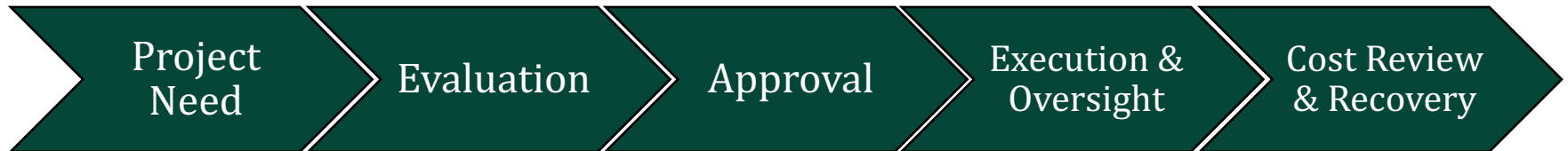
**Muskrat Falls (+76%)**

- Government asked PUB to conduct a restricted review of MF in comparison to one specific alternative.
- PUB could not determine whether it was the least cost option.

- Government sanctioned project, citing support from selected consultant reports.

- PUB prohibited by legislation from reviewing MF costs and prudency of expenditures.
- PUB required by legislation to incorporate all MF costs in electricity rates.

# Concluding thoughts

- Canada has deep expertise with electricity megaprojects, and there are likely to be more development opportunities

- Successful megaprojects are more frequent than commonly believed

  - We should pay greater attention to the success stories to learn how to improve future financial and technical performance

- Regulatory oversight and accountability throughout the project lifecycle are key ingredients in limiting the risk of approving uneconomic projects and of experiencing cost/schedule over-runs