ALTERNATIVE FINANCING AND PROCUREMENT FOR GRID MODERNIZATION IN ONTARIO

ONTARIO ENERGY BOARD | COMMISSION DE L'ÉNERGIE DE L'ONTARIO

INFRASTRUCTURE.ENERGY

SMART GRID AND GRID MODERNIZATION

Ontario

Executive Council
Conseil des ministres

Order in Council
Décret

On the recommendation of the undersigned, the Lieutenant Governor, by and with the advice and concurrence of the Executive Council, orders that:

Sur la recommandation du soussigné, le lieutenant-gouverneur, sur l'avis et avec le consentement du Conseil des ministres, décrète ce qui suit:

WHEREAS it is desirable that the Province and the Ontario Energy Board move forward together with a plan to implement the advanced information exchange systems and equipment that together comprise the Smart Grid ("Smart Grid"), as defined in the amendments to the *Electricity Act, 1998* made by the *Green Energy and Green Economy Act, 2009*;

AND WHEREAS in furtherance of this goal, it is desirable that the Province provide guidance and direction to the Board as to the principles and objectives which must be met in order to fully achieve the Province's objectives related to the Smart Grid in a cost-efficient manner;

AND WHEREAS the Minister of Energy has the authority, with the approval of the Lieutenant Governor in Council, to issue Directives pursuant to section 28.5 of the *Ontario Energy Board Act, 1998*, as amended by the *Green Energy and Green Economy Act, 2009*, in relation to the establishment, implementation or promotion of a Smart Grid for Ontario;

NOW THEREFORE the Directive attached hereto, is approved.

Recommended: _____ **Minister of Energy**

Concurred: _____ **Chair of Cabinet**

Approved and Ordered: NOV 2 3 2010 **Date**

_____ Administrator of the Government

O.C./Décret 1515/2010

MINISTERIAL DIRECTIVE 2010

Developing Guidance for the Implementation of Smart Grid in Ontario (EB-2011-0004)

The Board has initiated a consultation process to examine issues associated with the implementation of Smart Grid. This consultation is intended to assist the Board in gaining a better understanding of the technical issues associated with Smart Grid and in considering the need for and nature of policies or measures that could address those issues. This is in keeping with the Minister's Directive which requires the Board to provide guidance to licensed electricity transmitters and distributors and other regulated entities that propose to undertake smart grid initiatives/activities.

The Board has formed a working group to assist in developing guidance for the implementation of Smart Grid in Ontario. Materials from the working group can be found at the following link:

- Smart Grid Working Group
- Smart Grid Advisory Committee (EB-2013-0294)

"…move forward with a plan to implement the advanced information and exchange systems and equipment that together comprise the Smart Grid …"

SMART GRID AND GRID MODERNIZATION

NAVIGANT

Ontario Smart Grid Assessment and Roadmap

Prepared for:

Ontario
MINISTRY OF ENERGY

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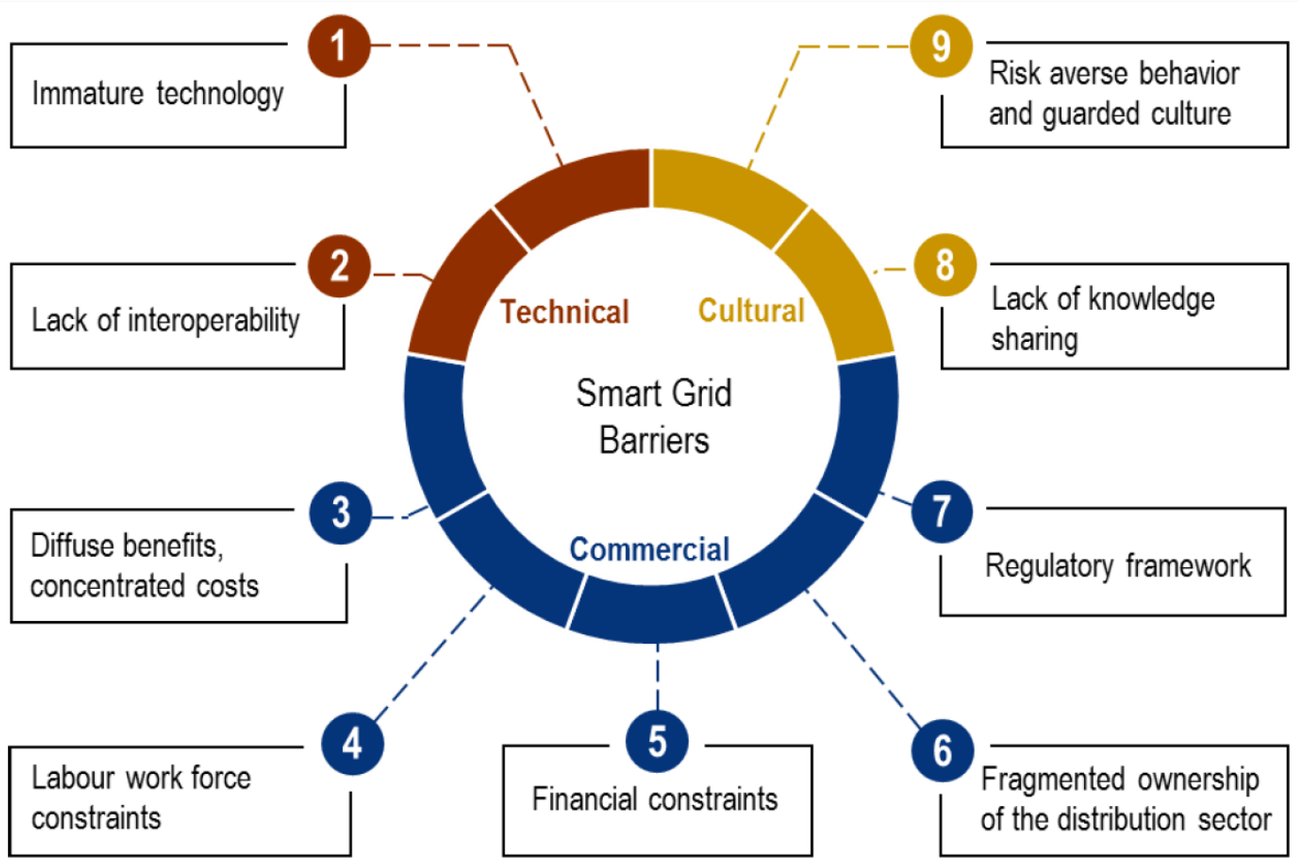
January 2015

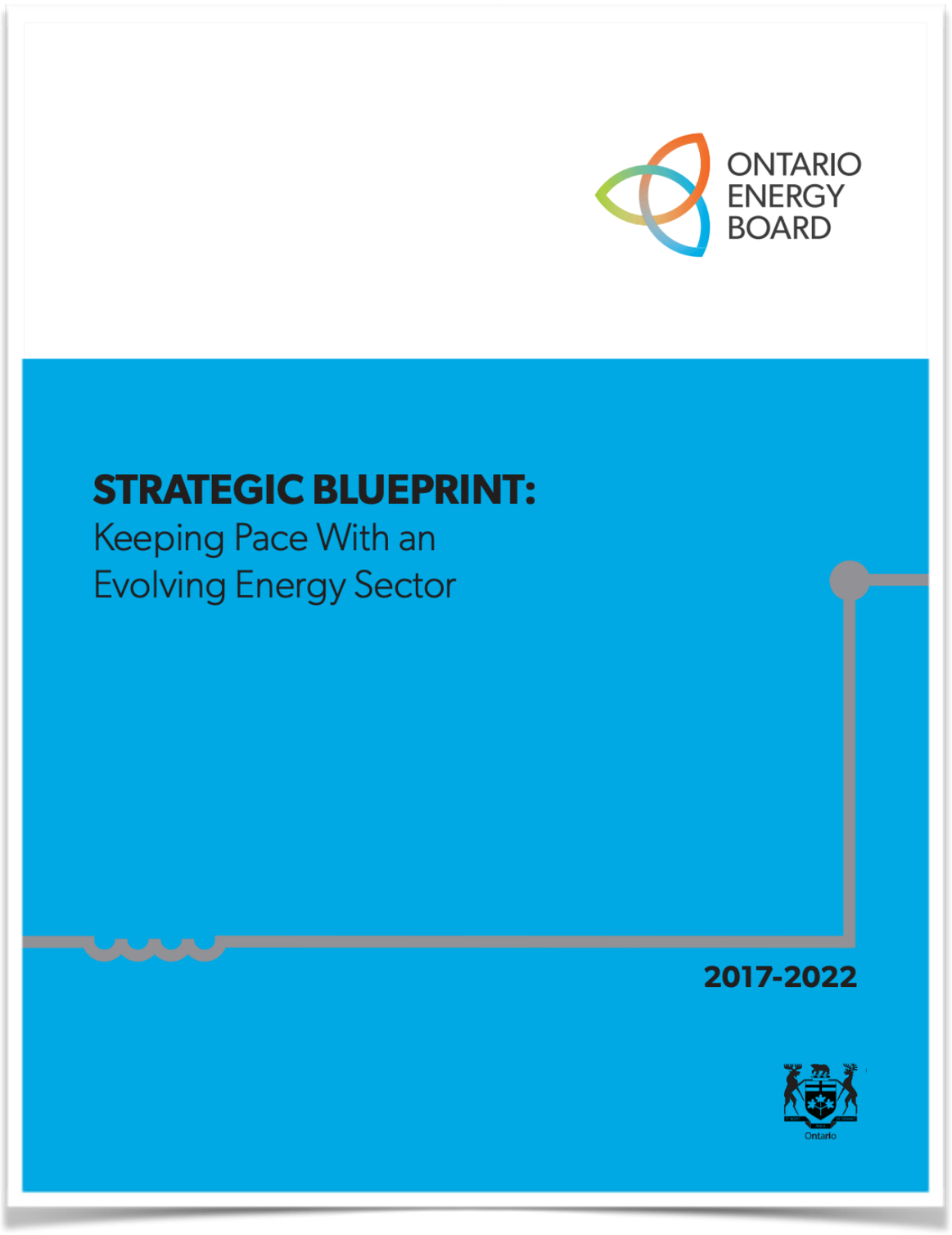
REGULATORY BARRIER IDENTIFIED 2015



Source: Navigant

"**Regulatory framework.** The current regulatory construct in Ontario, including the framework for assessing smart grid investments and the lack of strong incentives or penalties associated with performance or quality of service, can negatively impact some distributors' and stakeholders' perception of smart grid investments."

ADDRESSING REGULATORY BARRIERS



OEB STRATEGIC BLUPRINT 2017

"Regulators in other jurisdiction are considering new approaches to the remuneration of utilities, including ways of treating traditional capital investments versus non-capital expenditures, that might better encourage the adoption of innovative and least-cost solutions by utilities."

ADDRESSING REGULATORY BARRIERS

Ontario Energy Board | Commission de l'énergie de l'Ontario

BY EMAIL AND WEB POSTING

July 17, 2019

To: All Licensed Electricity Distributors and Transmitters and All Rate-regulated Natural Gas Distributors
All Participants in EB-2018-0287 and EB-2018-0288
All Other Interested Stakeholders

Re: Utility Remuneration and Responding to Distributed Energy Resources
Board File Numbers: EB-2018-0287 and EB-2018-0288

In a letter dated March 15, 2019 (March Letter), the Ontario Energy Board (OEB) initiated two integrated consultation processes to support the evolution of the sector: Utility Remuneration and Responding to Distributed Energy Resources (DERs). Among other things, the March Letter also identified initial steps for the integrated consultations, commencing with the issuance of an OEB staff scoping paper.

On June 19, 2019, the OEB issued a letter to all regulated entities and other interested stakeholders advising of the status of the OEB's policy initiatives during the transition to the new corporate governance structure that will be implemented when recent amendments to the *Ontario Energy Board Act, 1998* are proclaimed into force. In that letter, the OEB indicated that, in developing future stakeholder engagement activities for ongoing initiatives, it will be mindful of the Modernization Review Panel's emphasis on the importance of clear, open and transparent stakeholder processes in policy consultations.

In keeping with that commitment, the OEB has refreshed its approach to stakeholder engagement in respect of the integrated consultation processes on Utility Remuneration and Responding to DERs. Among other things, this will enhance the opportunity for stakeholder perspectives to inform subsequent steps in relation to these initiatives following the OEB's transition to its new structure.

This letter outlines the OEB's updated stakeholder engagement approach and how interested stakeholders may participate.

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F 416-440-7656 OEB.ca

UTILITY REMUNERATION 2019

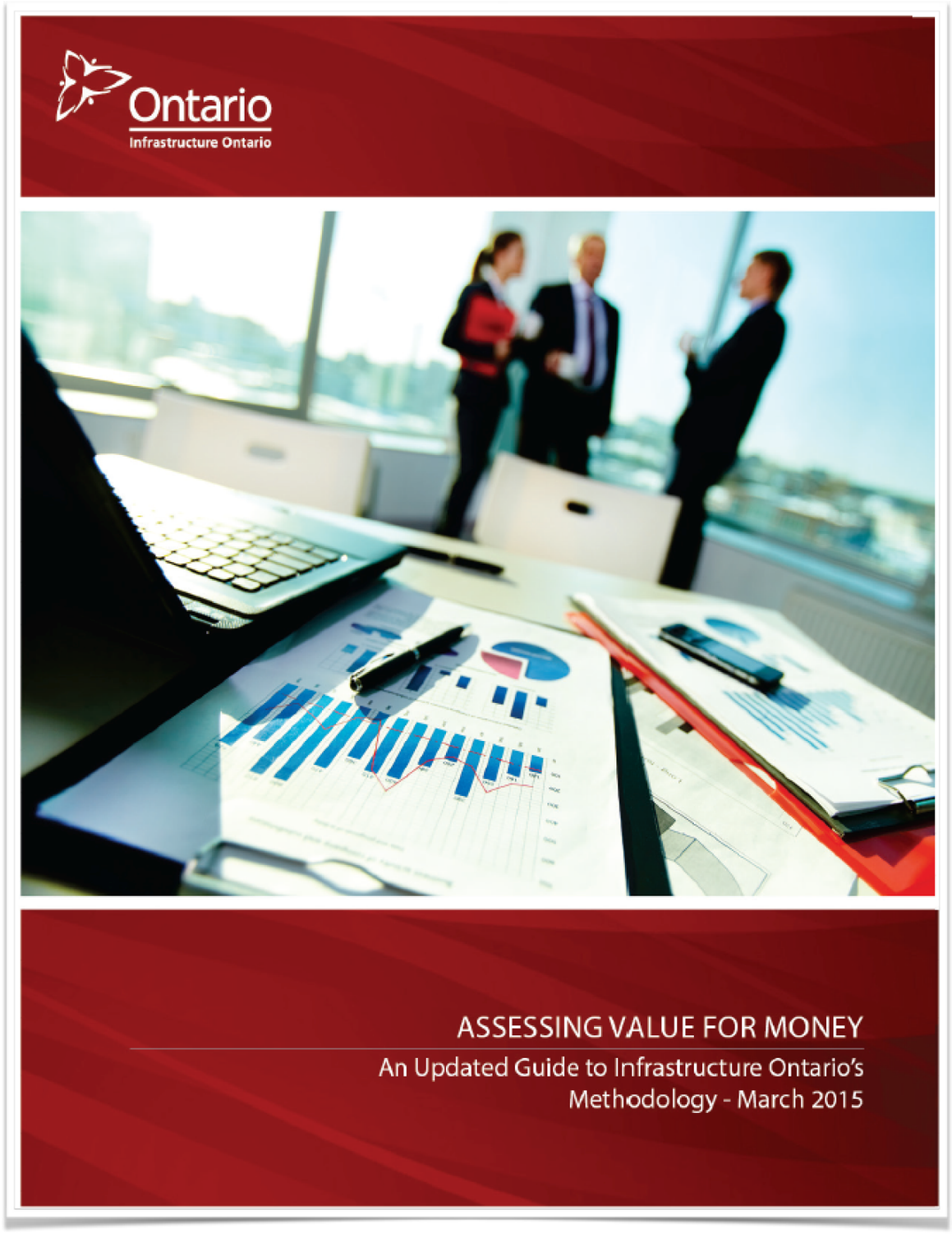
4. The Utility Business Model Needs to Evolve

Many stakeholders discussed the need for the traditional utility business model to evolve as new options for energy service emerge and new resources are deployed. Once again, views diverged on what new activities regulated utilities may appropriately engage in. Key issues include:

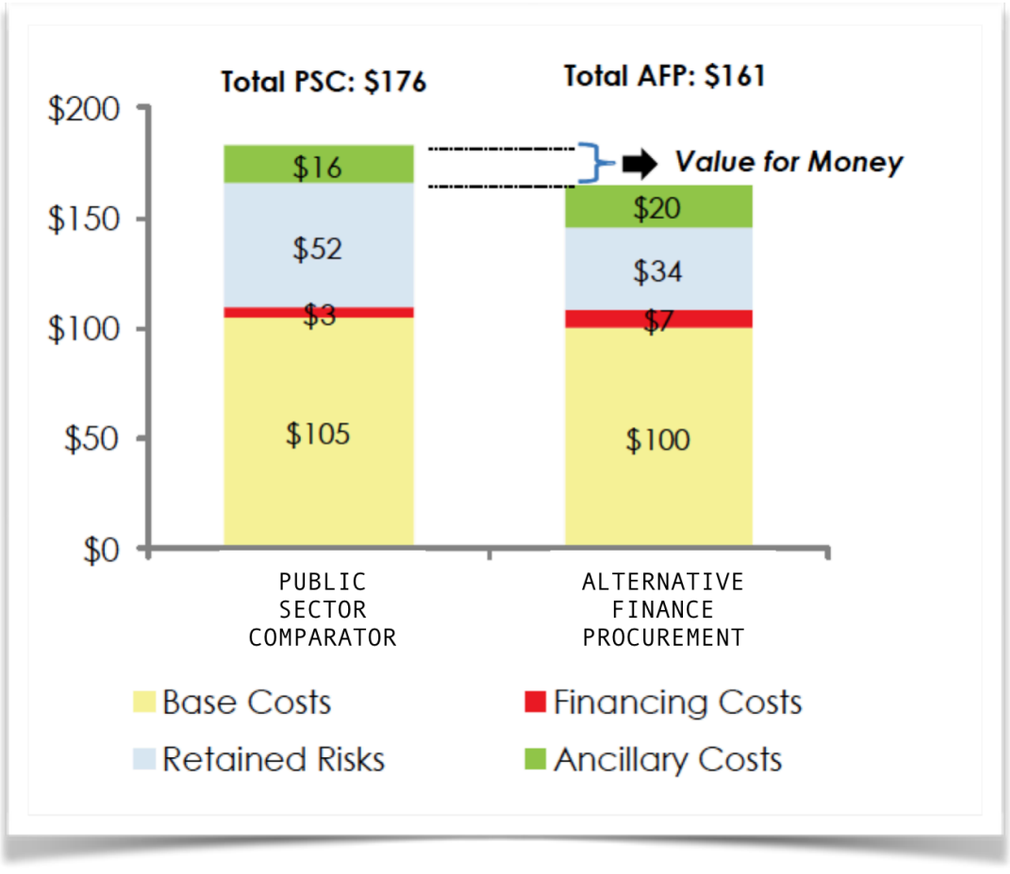
- Remunerating utilities in a manner that incents pursuit of the lowest cost solutions (while maintaining safety and reliability), including using market-sourced solutions
- Maintaining appropriate separation of monopoly and competitive activities

"Remunerating utilities in a manner that incents pursuit of the lowest cost solutions (while maintaining safety and reliability), including using market-sourced solutions."

USE OF AFP BY ONTARIO GOVERNMENT

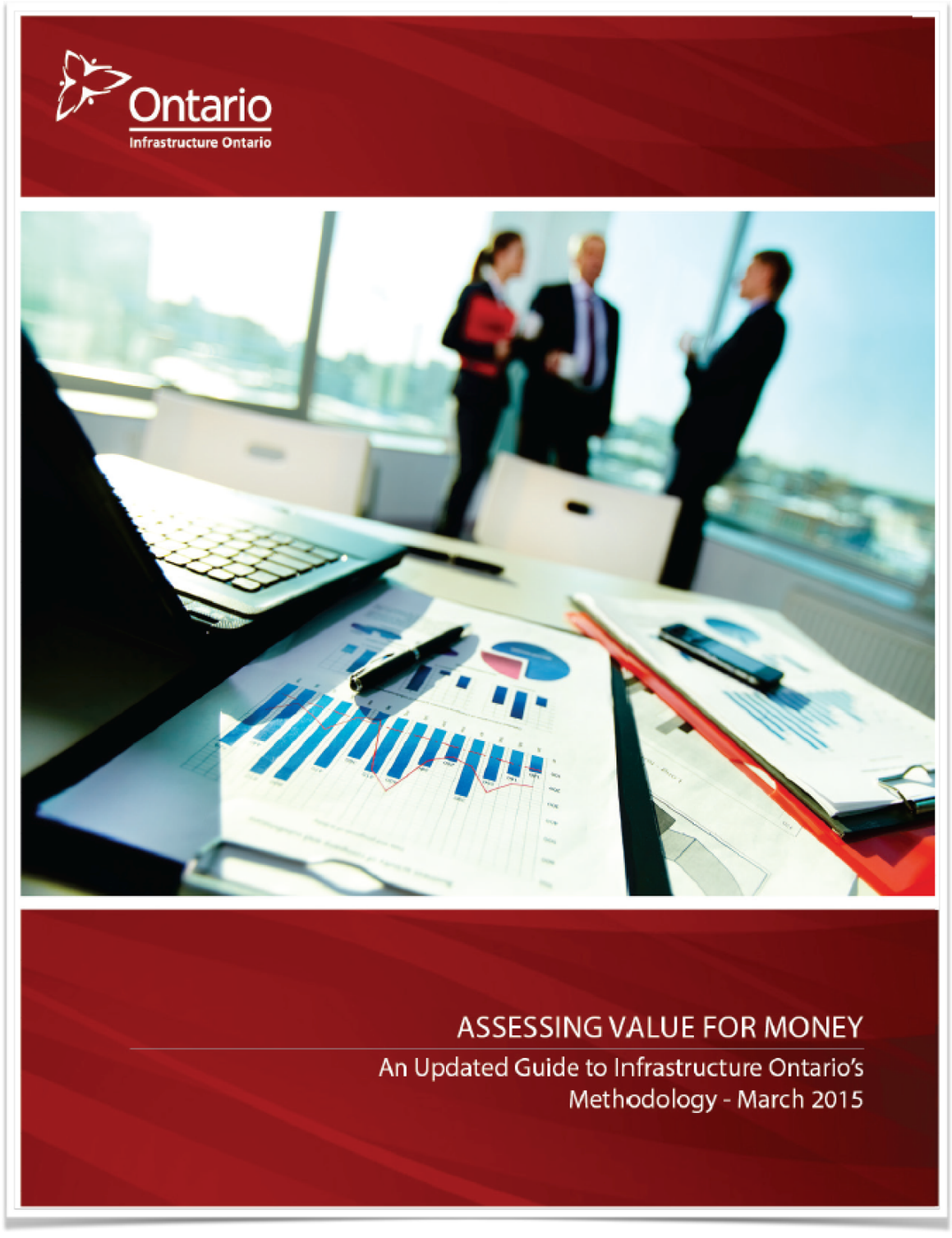


VfM PROJECTS OVER $50M 2015

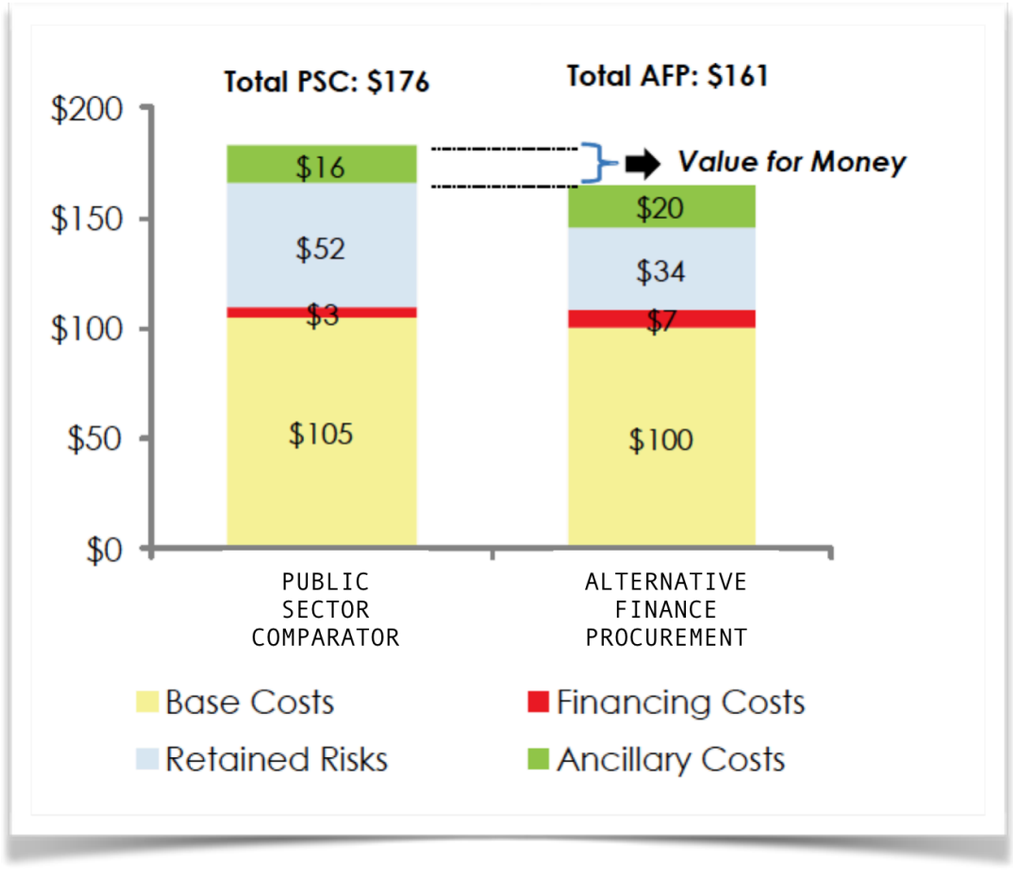


"The VFM assessment compares the total risk-adjusted cost borne by the public sector of delivery a project via AFP to a traditional design, bid, and build (DBB) process. At its core, VFM compares the higher financing and transaction costs inherent in the AFP model to the benefits of transferring risks to the private sector combined with the innovation that comes from an integrated, performance based approach to the project."

USE OF AFP BY ONTARIO GOVERNMENT

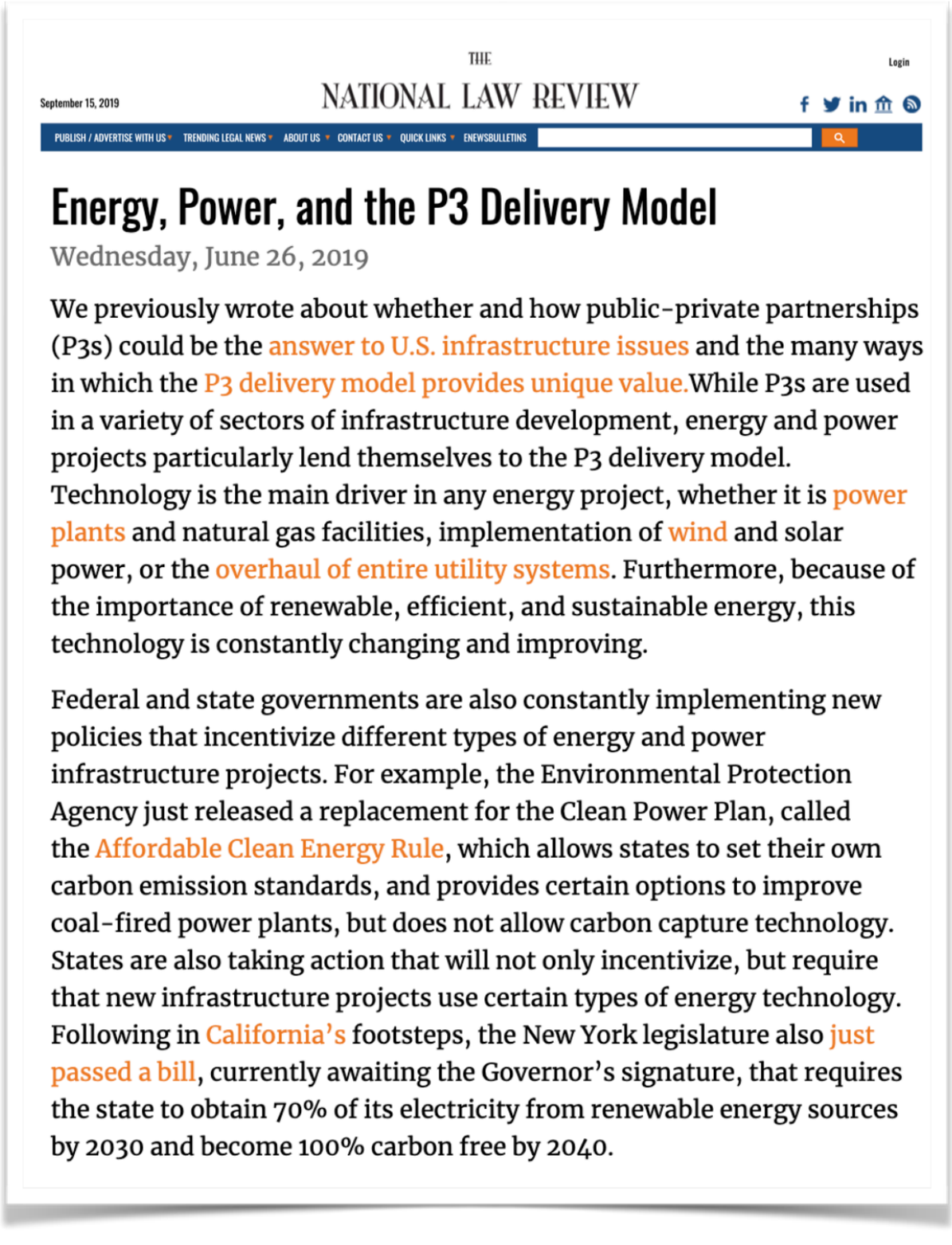


VfM PROJECTS OVER $50M 2015



"The AFP model brings together private and public sector expertise in a unique structure that transfers, to the private sector partner, the risk of project cost increases and scheduling delays typically associated with traditional project delivery… asset classes including transit, transportation, hospitals, courthouses, post-secondary institutions, detention centres, etc."

US MARKET - P3 USED FOR ENERGY PROJECTS



THE NATIONAL LAW REVIEW

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September 15, 2019

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Energy, Power, and the P3 Delivery Model

Wednesday, June 26, 2019

We previously wrote about whether and how public-private partnerships (P3s) could be the answer to U.S. infrastructure issues and the many ways in which the P3 delivery model provides unique value.While P3s are used in a variety of sectors of infrastructure development, energy and power projects particularly lend themselves to the P3 delivery model. Technology is the main driver in any energy project, whether it is power plants and natural gas facilities, implementation of wind and solar power, or the overhaul of entire utility systems. Furthermore, because of the importance of renewable, efficient, and sustainable energy, this technology is constantly changing and improving.

Federal and state governments are also constantly implementing new policies that incentivize different types of energy and power infrastructure projects. For example, the Environmental Protection Agency just released a replacement for the Clean Power Plan, called the Affordable Clean Energy Rule, which allows states to set their own carbon emission standards, and provides certain options to improve coal-fired power plants, but does not allow carbon capture technology. States are also taking action that will not only incentivize, but require that new infrastructure projects use certain types of energy technology. Following in California's footsteps, the New York legislature also just passed a bill, currently awaiting the Governor's signature, that requires the state to obtain 70% of its electricity from renewable energy sources by 2030 and become 100% carbon free by 2040.

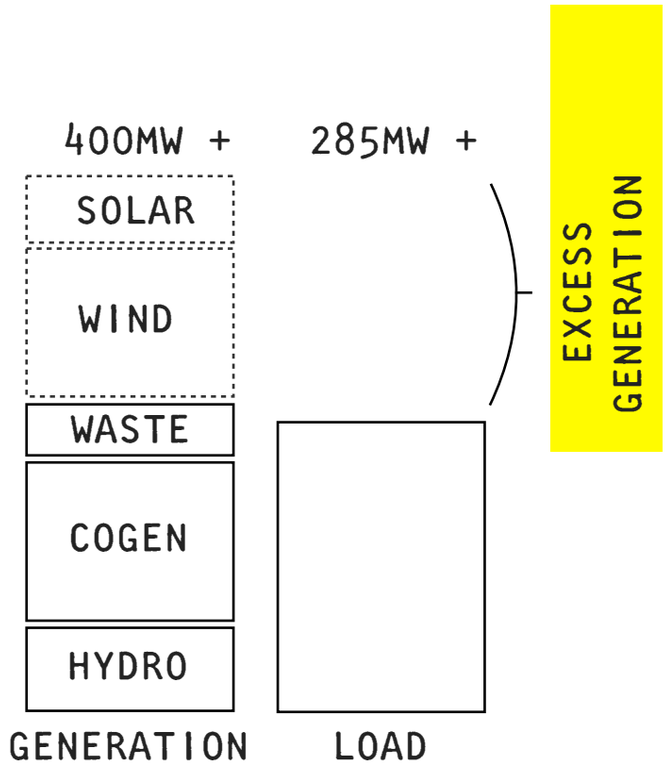
P3 DELIVERY MODEL FOR ENERGY

"While P3s are used in a variety of sectors of infrastructure development, energy and power projects particularly lend themselves to the P3 delivery model."

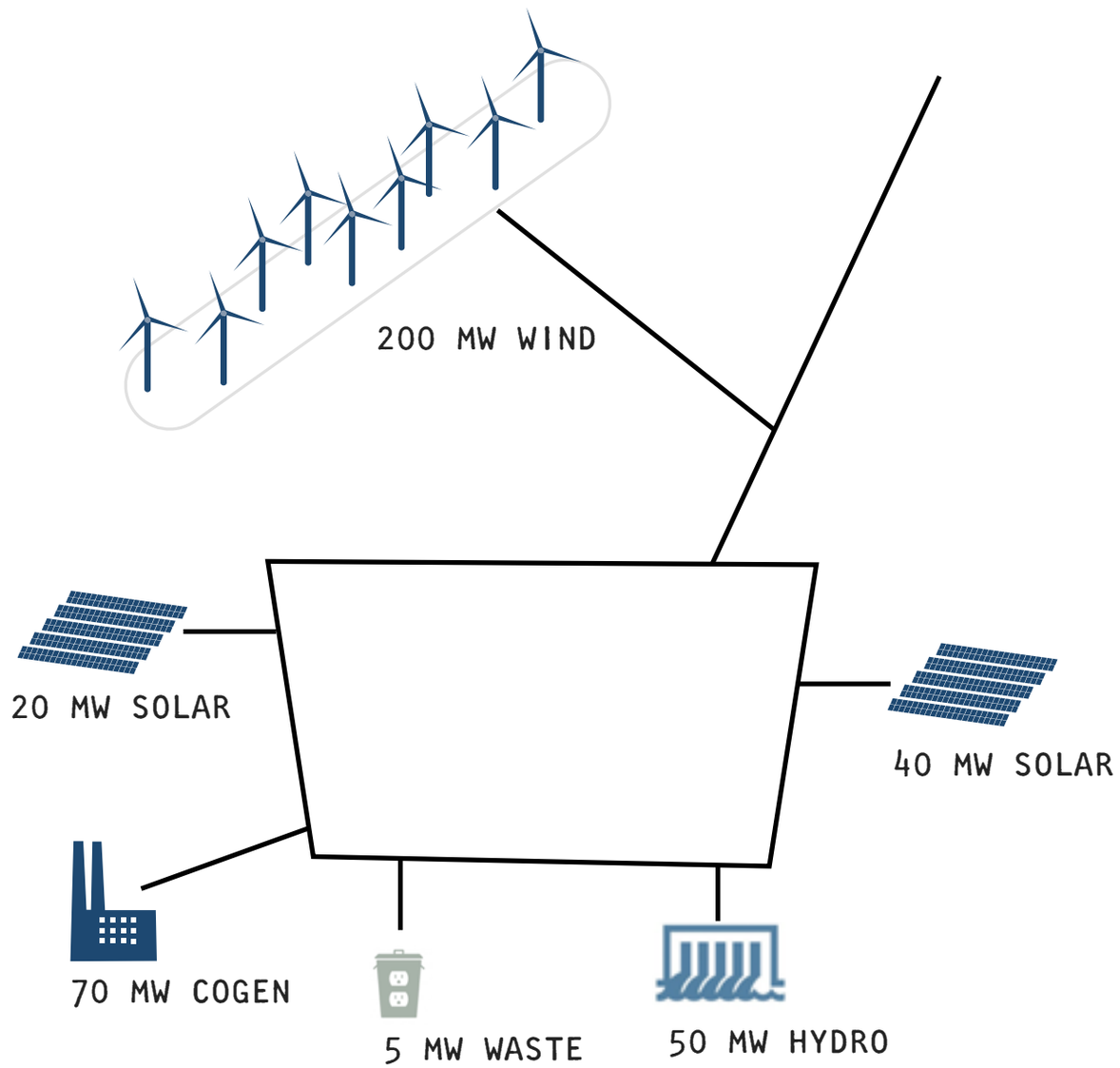
"The private sector is much better equipped to quickly react to and implement new technologies that may make the project more efficient, when governments may not be able to act as quickly or fund such implementation."

"Recent P3 successes include a wind farm in … Michigan, Ohio State University overhaul of its heating, cooling, and power systems, and Duquesne University's recent waste-to-energy deal. Fresno State University and Puerto Rico Electric Power Authority have similar projects in the pipeline."

AFP FOR GRID MODERNIZATION TEMPLATE



DEPLOYMENT COMMUNITY SELECTED



IE SURVEYED UTILITY CEO CONCERNS

NON-REGULATED REVENUE
AGING INFRASTRUCTURE
PROVINCIAL MANDATES
RISING RATES
GRID RELIABILITY

COMMUNITY-SCALE MICROGRID

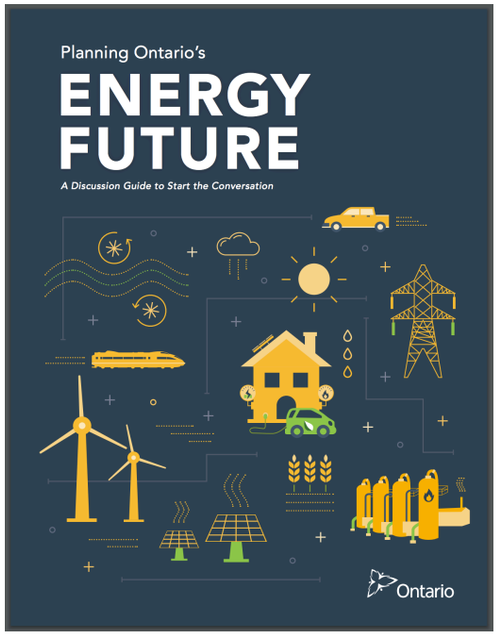
VVO/VVM - DA - AMI - CHP - COMMS

AFP FOR GRID MODERNIZATION TEMPLATE

ALIGN WITH ENERGY STRATEGY

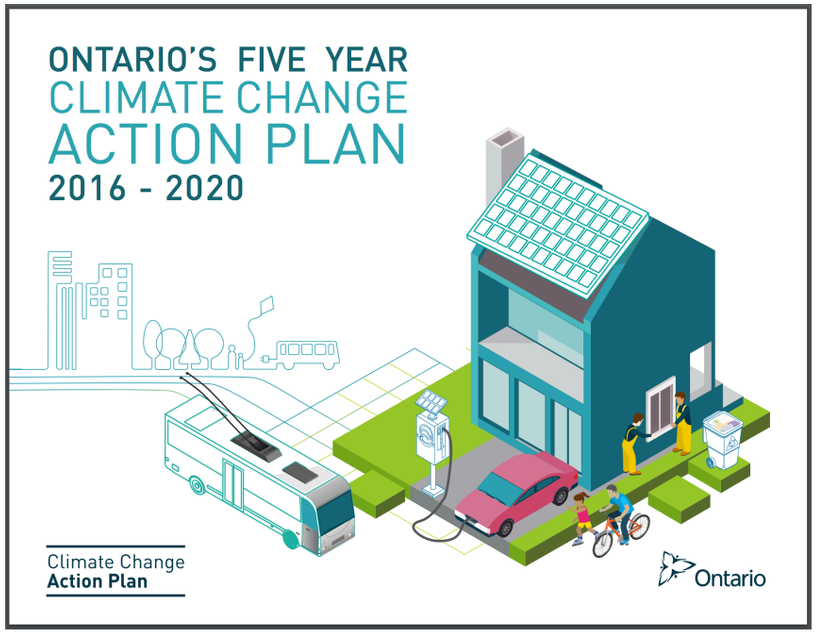
PROVINCIAL

MUNICIPAL



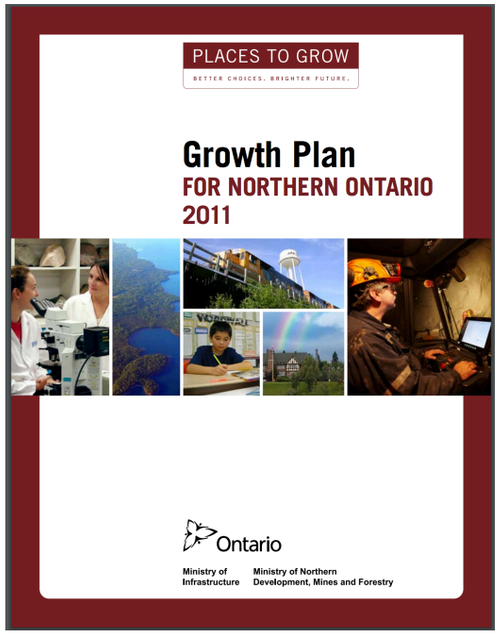
LONG TERM ENERGY PLAN

2017



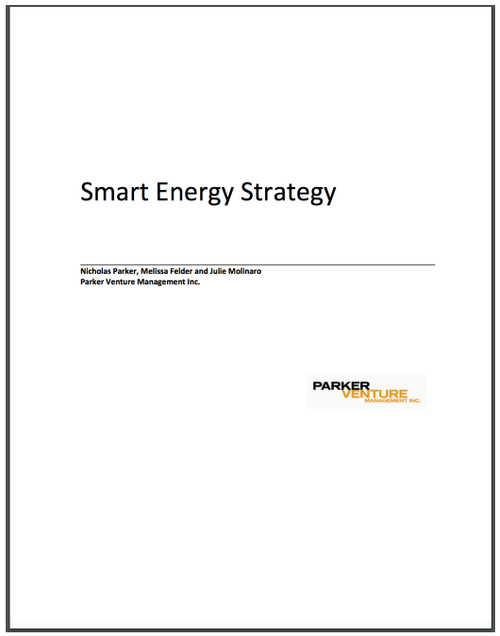
CLIMATE CHANGE ACTION PLAN

2016



GROWTH PLAN FOR NORTHERN ONTARIO

2011



SMART ENERGY STRATEGY

2011

ENERGY INFRASTRUCTURE THAT IS:

1. COST EFFECTIVE
2. CLEAN (LOW CARBON)
3. EFFICIENT
4. RELIABLE
5. RESILIENT

AFP FOR GRID MODERNIZATION TEMPLATE

PRELIMINARY DESIGN - INCREASING RETURNS TO SCALE

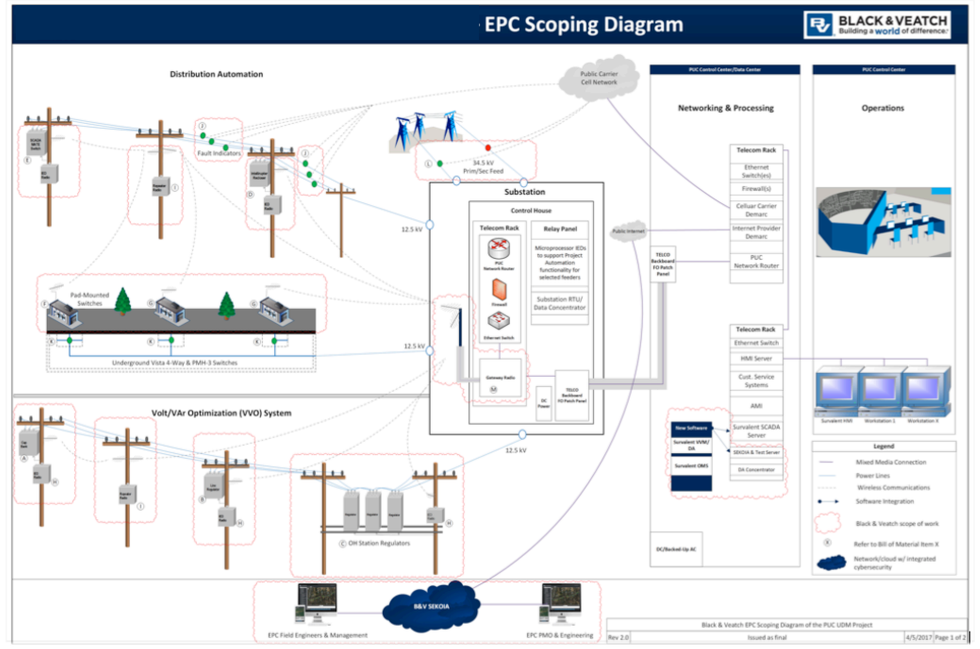
Utility Distribution Microgrid (UDM) Project

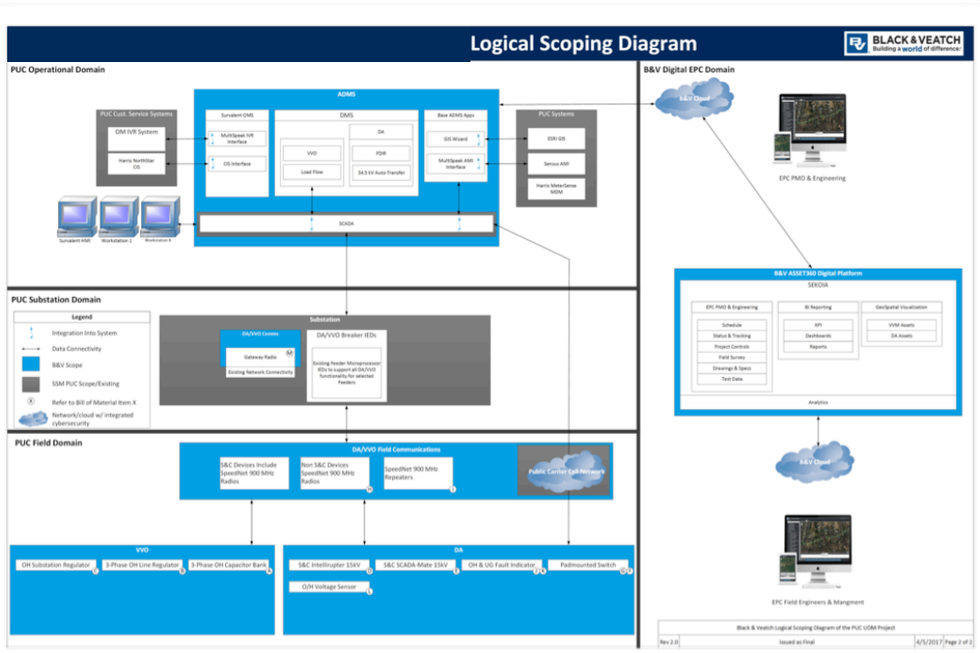
PROJECT SCOPE DESCRIPTION

UTILITY, Ontario, CAN

5 APRIL 2017

BLACK & VEATCH
Building a world of difference.





AFP FOR GRID MODERNIZATION TEMPLATE

PRELIMINARY DESIGN - EFFICIENCY EMPIRICAL SUPPORT

NAVIGANT

Considerations for Deploying In-Front-of-the-Meter Conservation Technologies in Ontario

Final Report

Prepared for:

Ontario

Ontario Ministry of Energy
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Submitted by:
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July 18th 2017

Alectra
Avangrid
Avista Corporation
BC Hydro
Cornerstone Hydro Electric Systems
Customer First
DVI Grid Solutions
Electricity Distributors Association
Entegrus
Enwin Utilities
Grid 20/20
Guelph Hydro Electric Systems
Hydro One Networks
Hydro Ottawa
Independent Electricity System Operator
KVAR Energy Savings
Northwest Power & Conservation Council
Ontario Energy Board
Pacific Gas and Electric
Southern California Edison
Thunder Bay Hydro
Toronto Hydro
Tucson Electric Power
Varantec
Veridian Connections

A number of IFMC technologies have been tested and proven effective, and are available to be deployed in Ontario

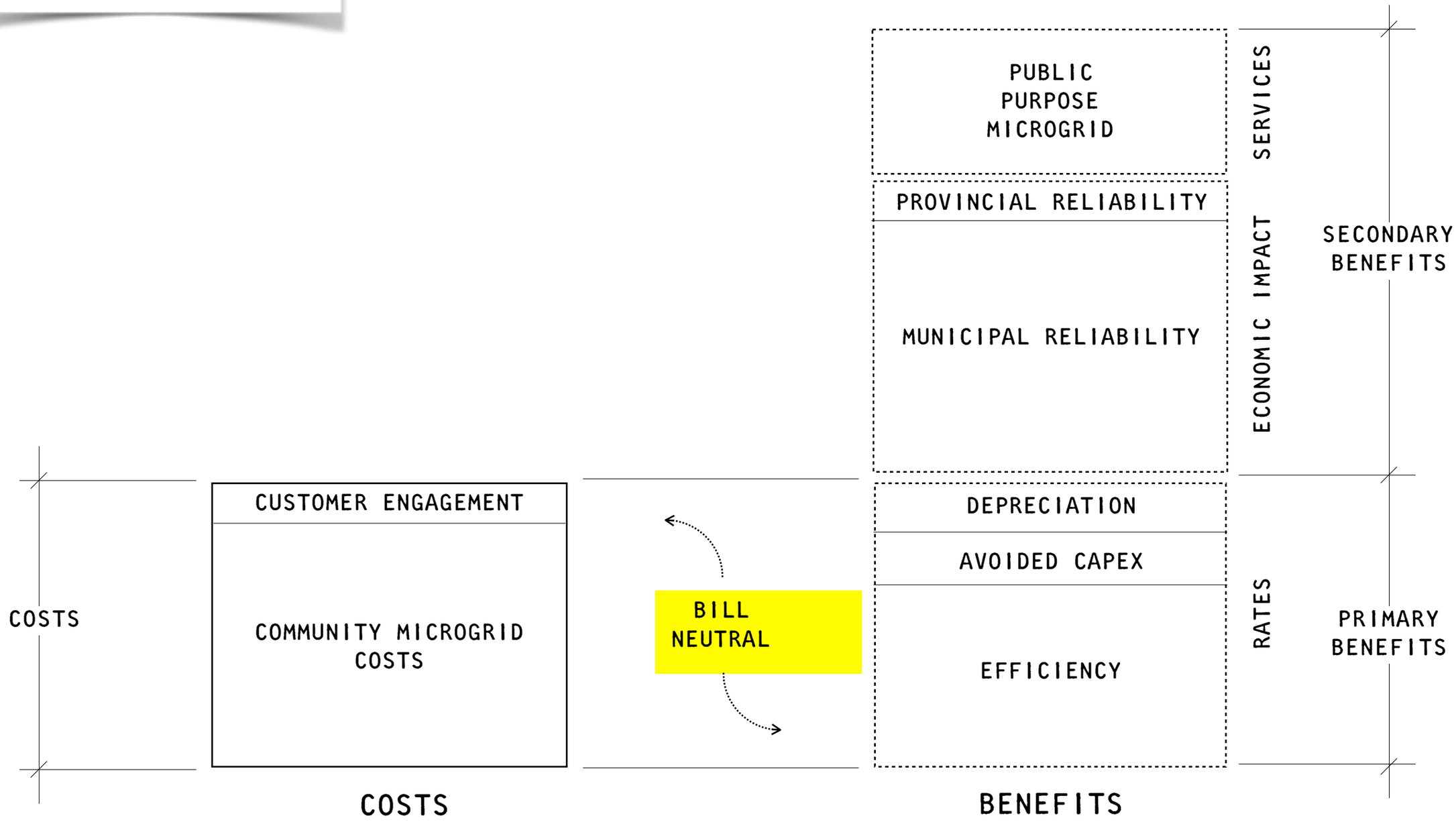
A significant level of economically viable IFMC potential exists in Ontario

Non-technical barriers are the primary inhibitor of IFMC deployment

AFP FOR GRID MODERNIZATION TEMPLATE

OPERIS

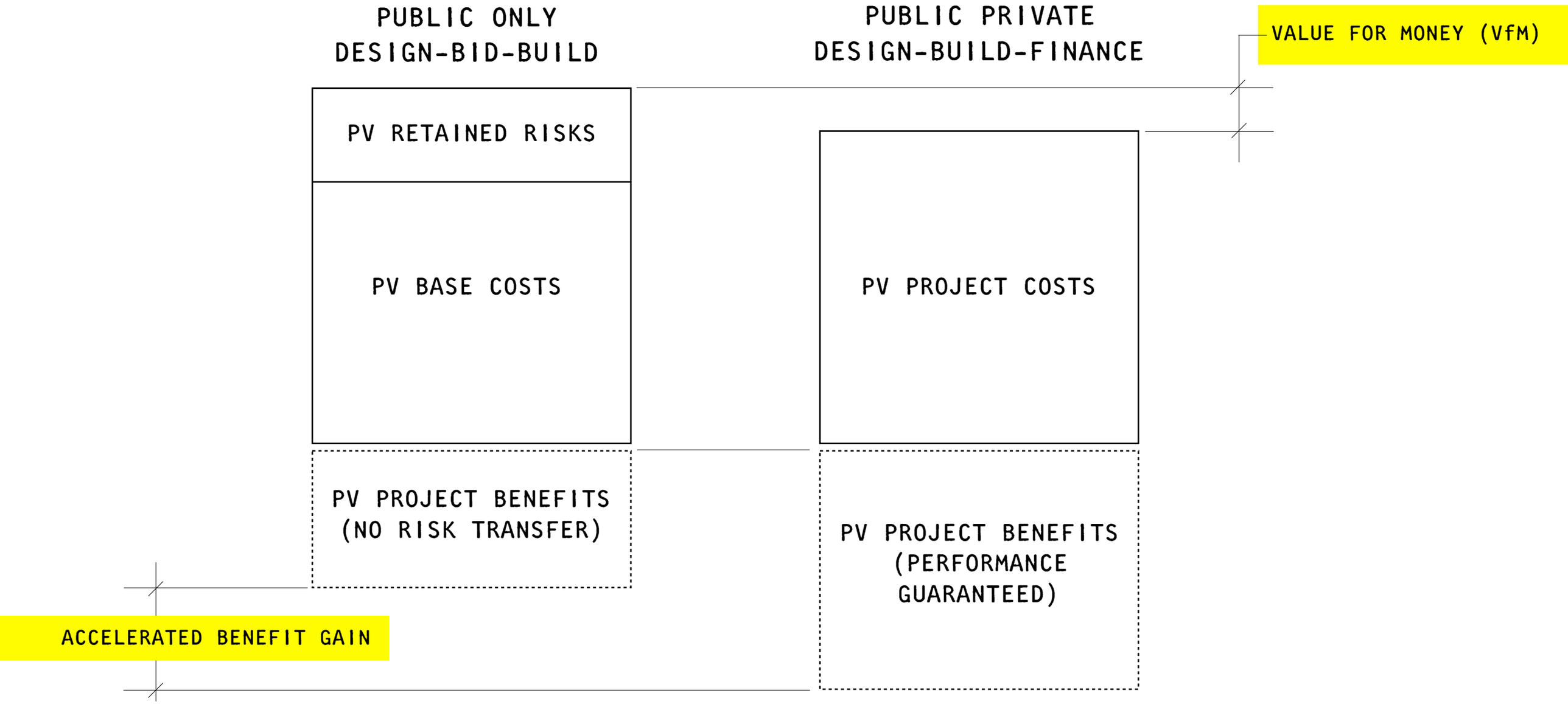
OPTIMIZED FOR BILL NEUTRALITY



AFP FOR GRID MODERNIZATION TEMPLATE

OPERIS

BENEFIT - VALUE FOR MONEY



NAVIGANT

Review of Business Case for Smart Grid Project

Prepared for:

INFRASTRUCTURE.ENERGY

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120 N Topanga Canyon Blvd #219
Topanga CA 90290

Navigant Consulting Ltd.
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Toronto, ON M5H 2R2
416-777-2440

Reference No.: 173200
April 15, 2015

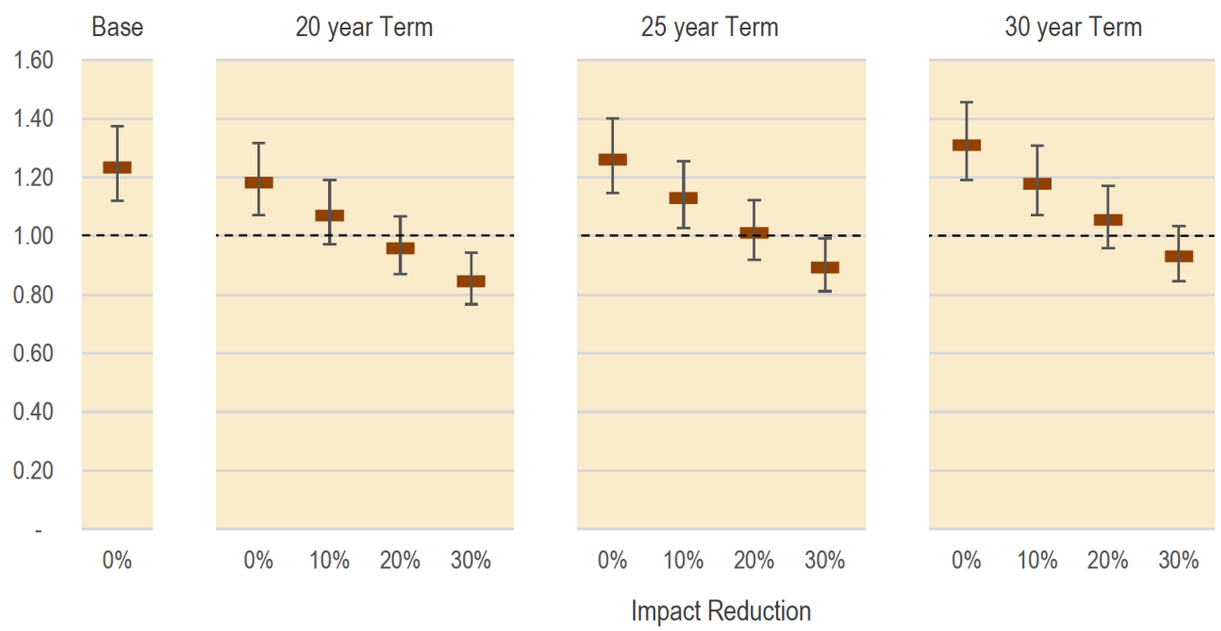
INDEPENDENT BUSINESS CASE REVIEW

Table 1: Summary of Results *(CAD $)*

	Low	High
Costs	41,391,630	50,815,617
Benefits	56,910,572	56,910,572
NPV	15,518,942	6,094,954
Benefit-Cost Ratio	1.37	1.12

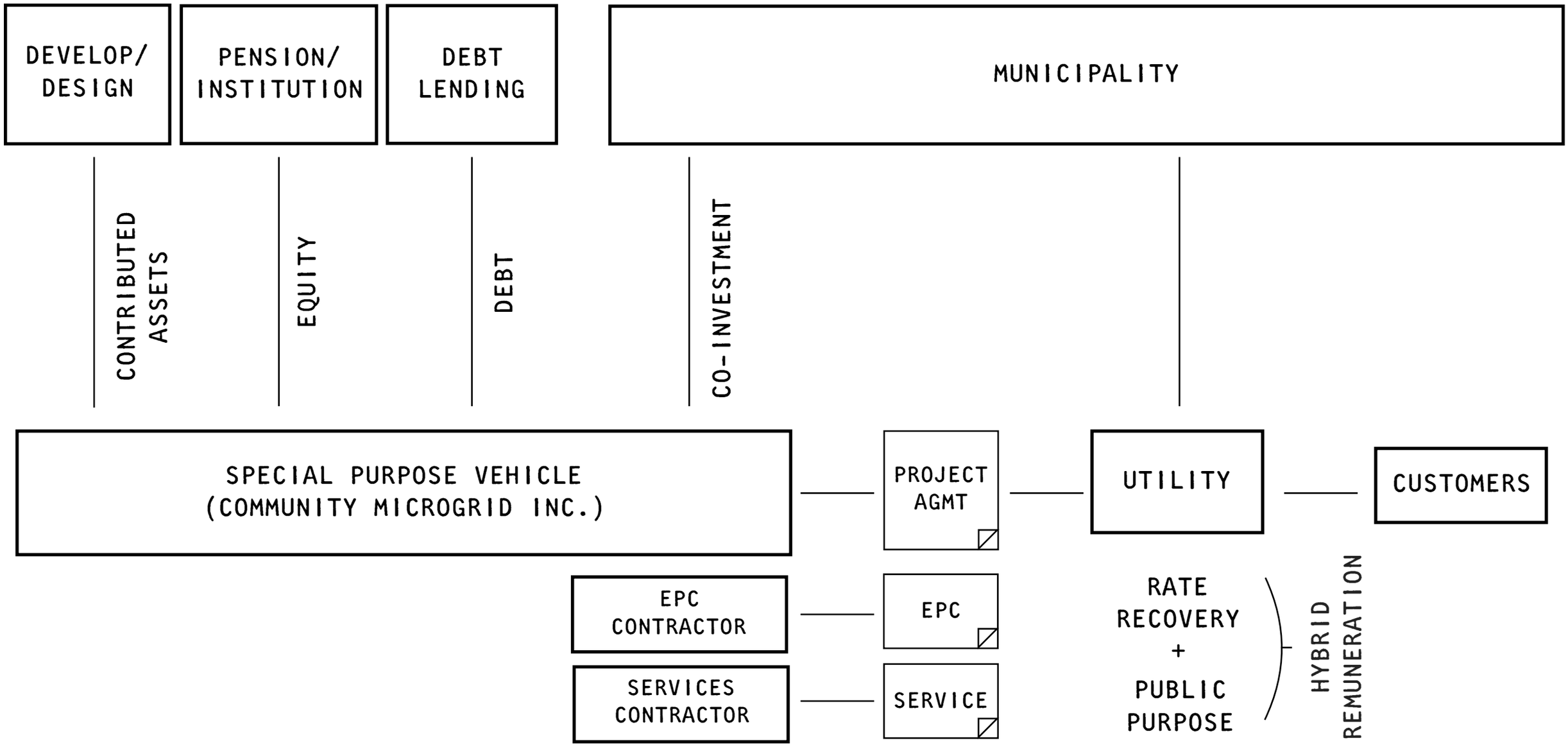
Source: Navigant; all values in 2015 CAD $ and reflect benefits and costs through 2035

Figure 2: Benefit-Cost Ratio Results of Sensitivity Analysis



AFP FOR GRID MODERNIZATION TEMPLATE

'DESIGN-BUILD-FINANCE'



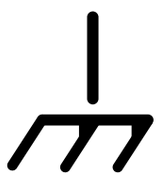
'OWN-MAINTAIN' BY UTILITY

RECOMMENDATION

OPEN SOURCE REGULATORY FRAMEWORK

CONVENE AFP/GRID MODERNIZATION WORKING GROUP

Engineering Procurement and Construction Firms
Private Equity and Pension Funds
Regulatory Attorneys and Customer Advocates
Industry Trade Groups



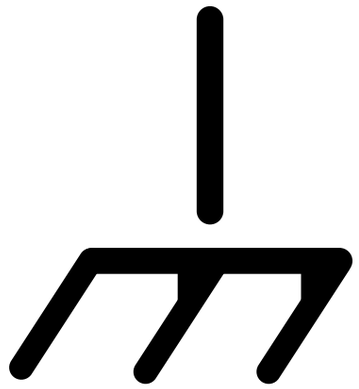
INFRASTRUCTURE ENERGY CONTRIBUTE AFP TEMPLATE DATA

TECHNOLOGY - TRADE METHODOLOGY FOR GRID MODERNIZATION PROJECTS

FINANCE - OPTIMIZATION FINANCIAL MODEL AND ASSESSMENT METRICS

LEGAL - STANDARD FORM AFP - PROJECT AGREEMENT - EPC - O&M

CANADIAN COUNCIL ON PUBLIC PRIVATE PARTNERSHIPS MODEL



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