Industrial Decision Making: Drivers and Hurdles to Implementing Low-Cost/Low-Payback Conservation Measures

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PADIGE Analysis Attribution Study: Overview

- Hydro-Québec 2003-2010 Large Industry Program Tactics
- Impact Attribution Challenges
- Attribution Study Methodology
- Results and Interpretation
- Program Implementation Implications

Note: The PADIGE Attribution Study was not carried out as part of Hydro-Québec formal evaluation framework.

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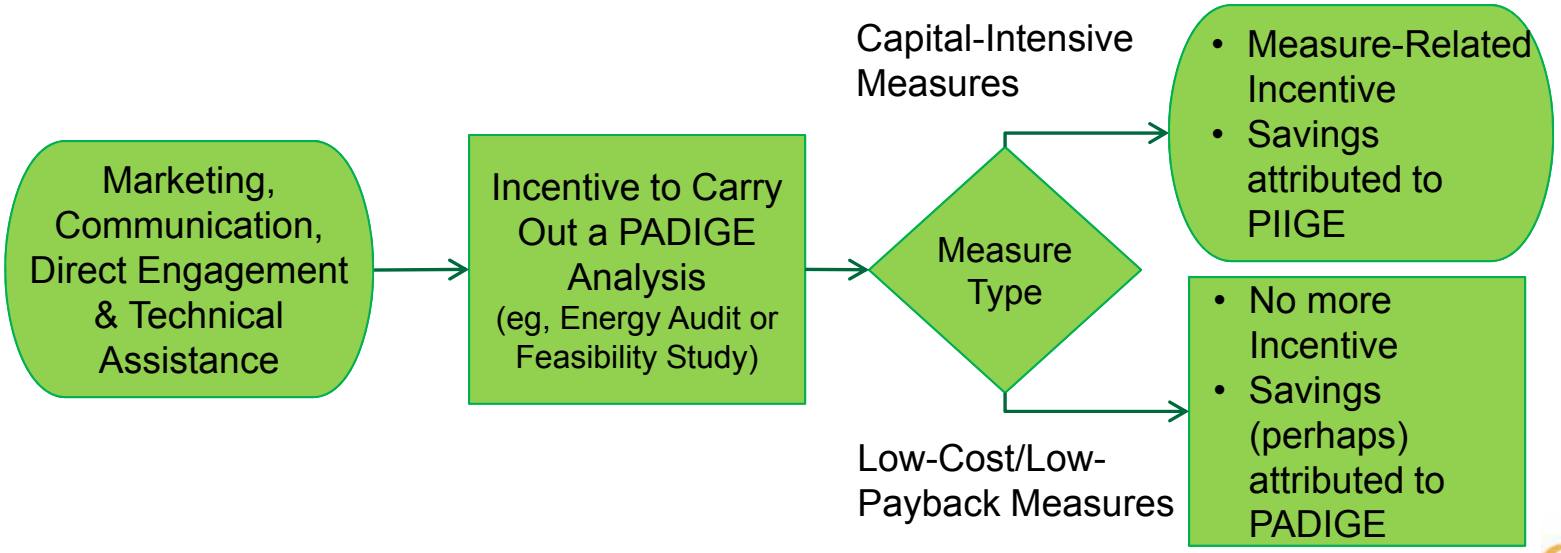
PADIGE Analysis

- Analysis and industrial demonstration program for large enterprises
  - Acronym in French: PADIGE
- Incentive: 50% or up to $25,000 for a PADIGE analysis (eg, energy audit or feasibility study)



PADIGE: Programme d'Analyse et de Démonstration Industrielle – Grande Entreprise
PIIGE: Programme d'Initiatives Industrielles – Grande Entreprise

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Hydro-Québec 2003-2010 Large Industry Program Tactics

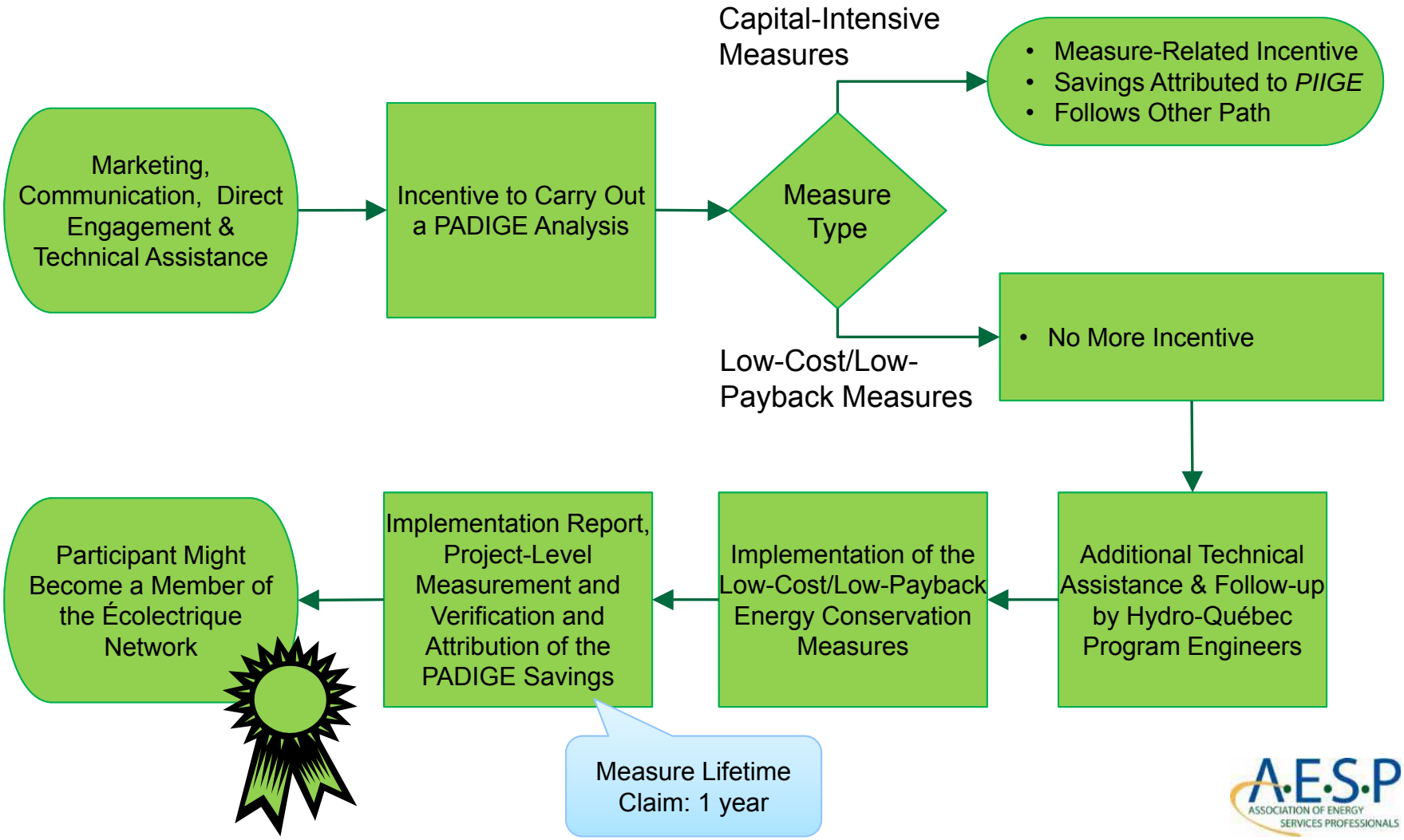
Écolectrique Network

- Recognition for corporate achievement in energy conservation as participants in Hydro-Québec programs
- Joint promotional and public relations efforts
- Key accounts only, in the industrial, commercial and institutional sectors
- Criteria: realizing 5% electricity savings or at least 50 GWh, having an energy master plan, and an in-house energy manager
- Membership: 3 companies in 2006, 24 in 2008, 50 in 2011

http://www.hydroquebec.com/grandesentreprises/ecolectrique.html

Hydro-Québec 2003-2010 Large Industry Program Tactics

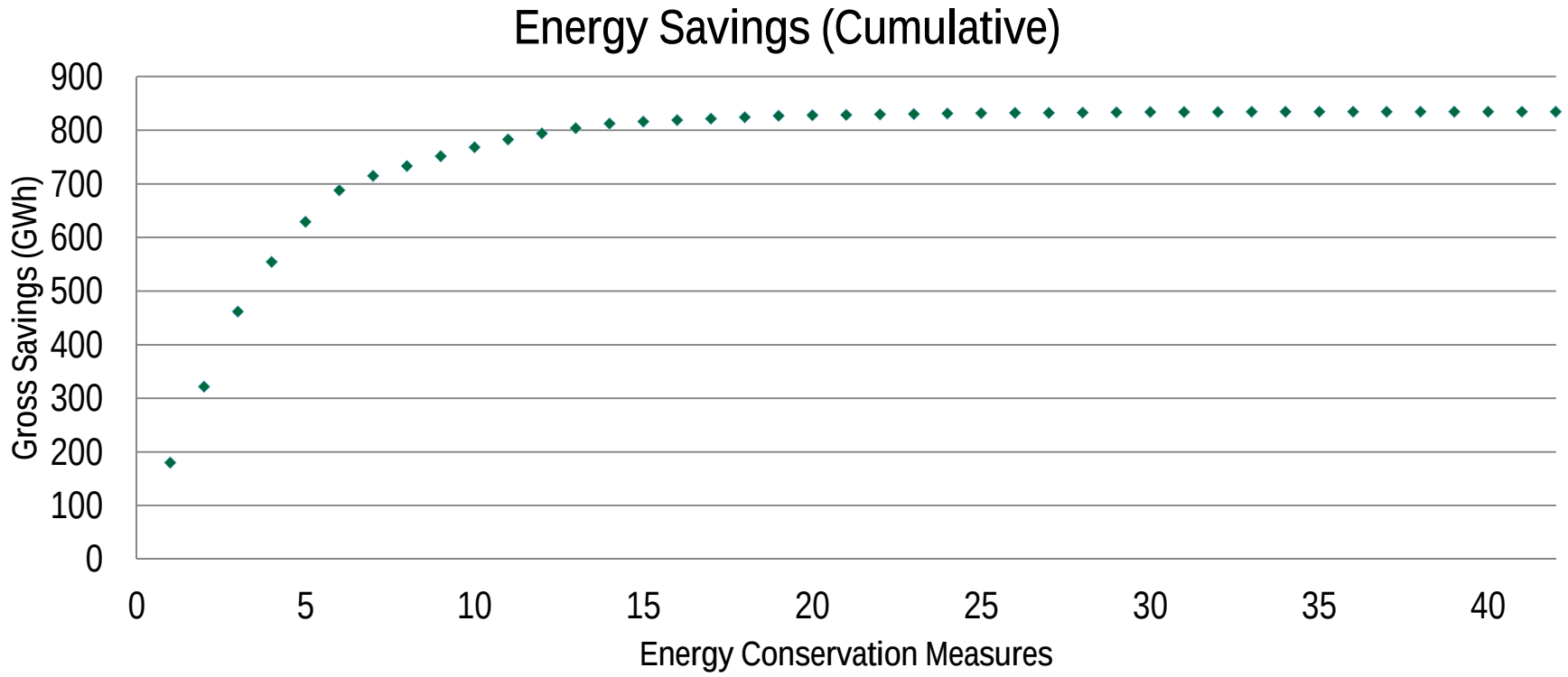
Participation Process



Hydro-Québec 2003-2010 Large Industry Program Tactics

PADIGE 2003-2010 in Numbers

- Population: 20 PADIGE analyses that identified low-cost/low-payback measures that were later implemented,
  13 industrial plants, 42 conservation measures
- Impacts: 841 GWh ≈ 17% of impacts claimed in 2003-2010

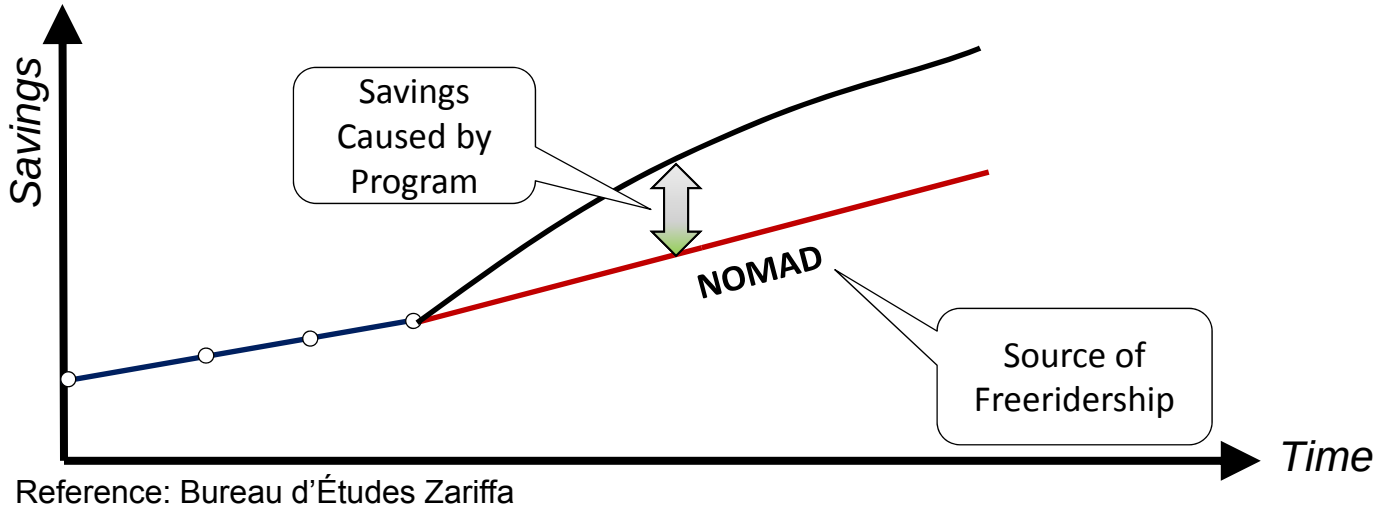


Large-Impact Conservation Measures

Questioning by the *Régie de l'Énergie* (Québec's regulator).

- the causality link between the savings and PADIGE analyses?;
- the freeridership distortion effect?; and
- the NOrmal Market Adoption of technology (NOMAD)?

Both the causality and the NOMAD questions were assumed to be answered by quantifying the freeridership effect.



Reference: Bureau d'Études Zariffa

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Existing Guidelines and Studies

1. CPUC – California Evaluators' Protocols
   - Basic level of rigor: Self-reporting
2. Standardized Methods for Free-Ridership and Spillover Evaluation
3. Gaz Métro – Review of distortion effect evaluation methodologies

1. **CPUC,** *California Energy Efficiency Evaluation Protocols, Technical, Methodological, and Reporting Requirements for Evaluation Professionals*, April 2006, available at : http://www.calmac.org/events/EvaluatorsProtocols_Final_AdoptedviaRuling_06-19-2006.pdf
2. **National Grid, NSTAR Electric, Northeast Utilities, Unitil, Cape Light Compac**, *Standardized Methods for Free-Ridership and Spillover Evaluation—Task 5 Final Report (Revised*June 2003, USA, available at : http://www.cee1.org/eval/db_pdf/297.pdf
3. **Gaz Métro**, *Révision des méthodologies d'évaluation des effets de distorsion*, 2010, Canada, available at : http://www.regie-energie.qc.ca/audiences/Suivis/Suivi_PGEE_GM/GM_3-Methodologie-EffetDistorsion_20dec10.pdf

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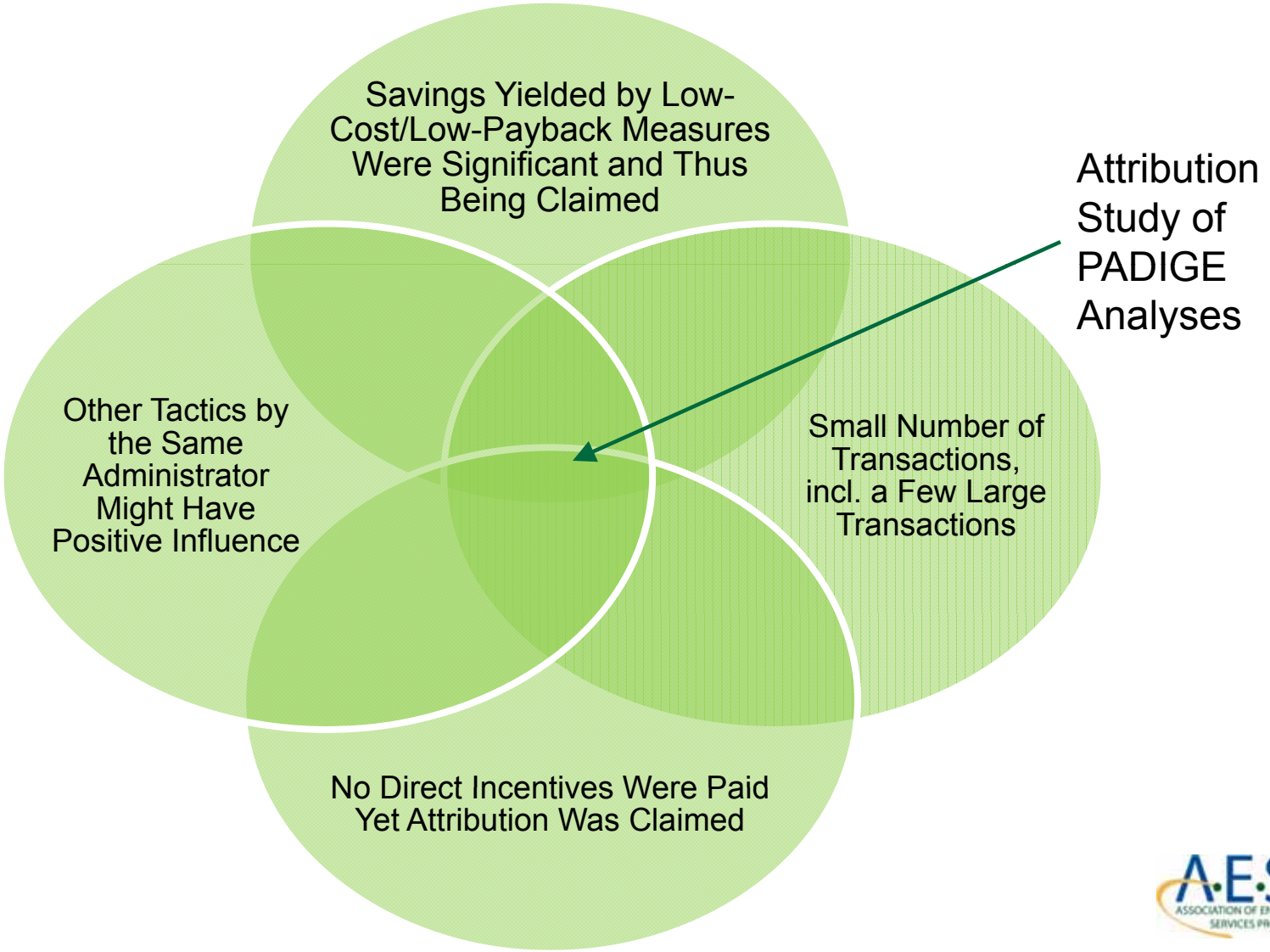
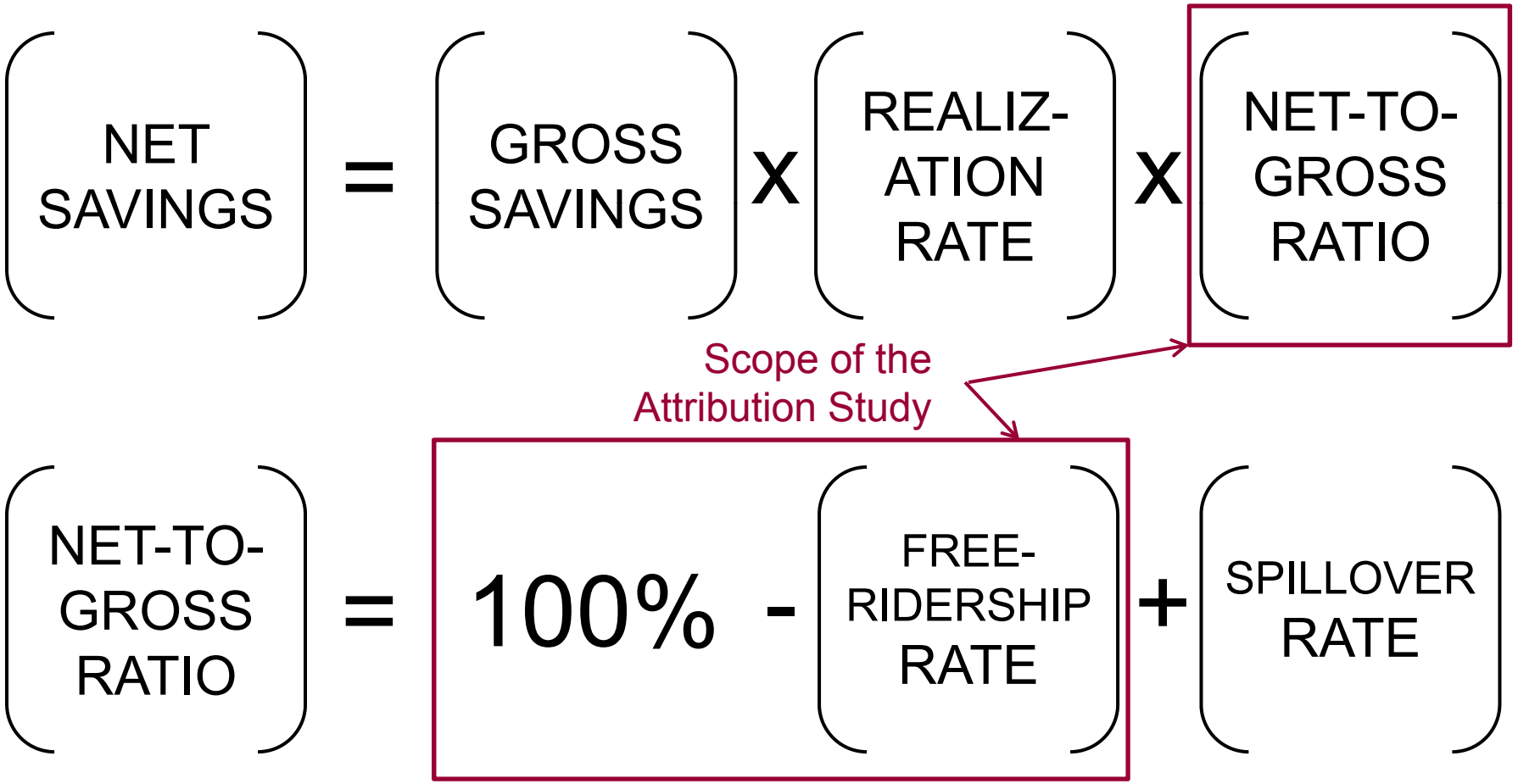
Impact Attribution Challenges

Need for a Specific Methodology



Scope of the Attribution Study



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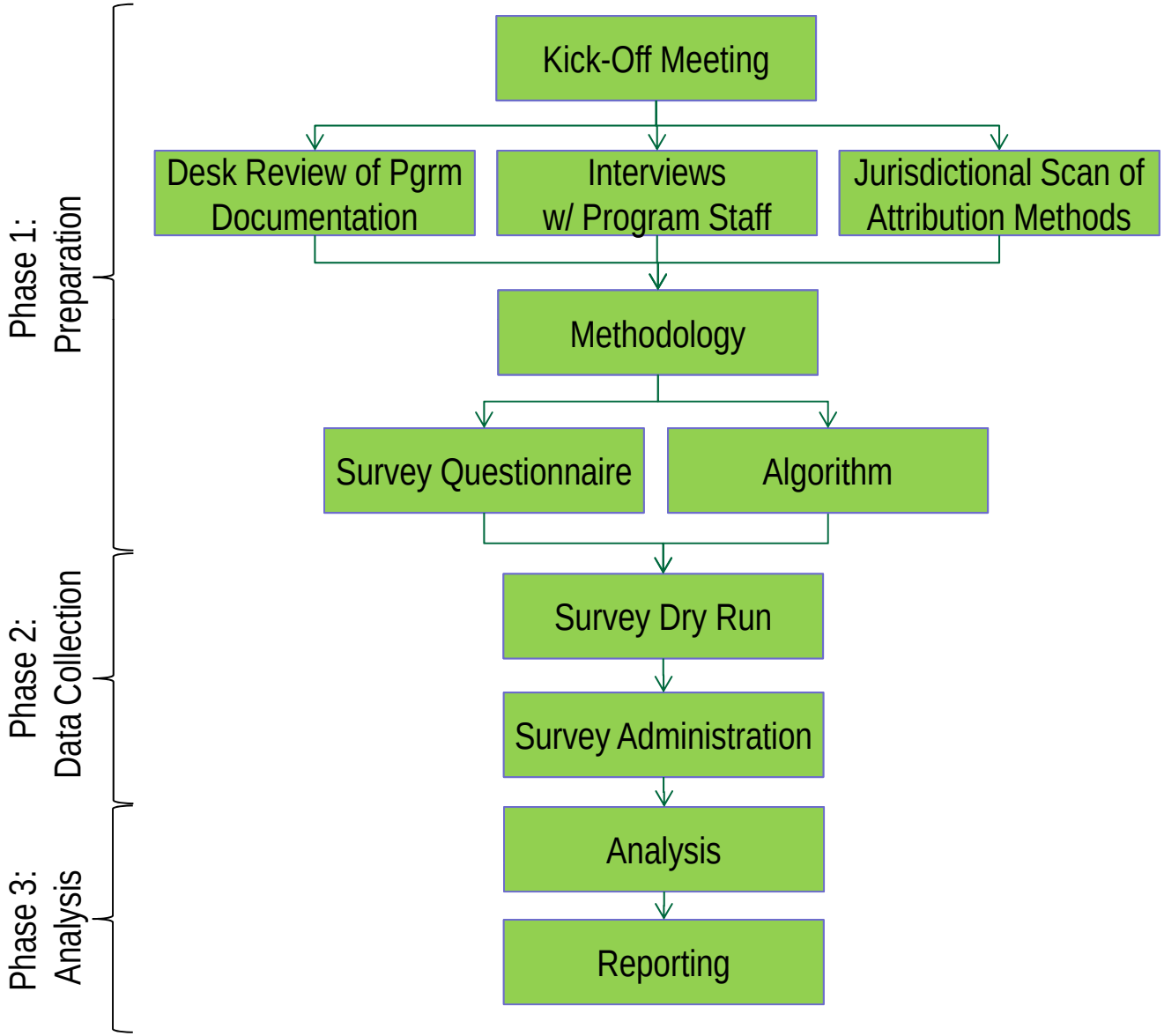
Attribution Study Methodology

General Approach



Characteristics of the Methodology

- Self-reporting attribution questionnaire
- Sampling:
  - quasi-census,
  - more than one respondent for each project/measure when possible.
- Respondents would answer for each measure
- Internet-based questionnaire
- Link to questionnaire sent by Hydro-Québec's account managers
- Bias mitigation: confidentiality statement, & third-party researchers
- Dry run of the questionnaire
- Specially-designed analysis algorithm
- More than one attribution pathway
- Bias control questions
- A few in-depth undirected interview(s)

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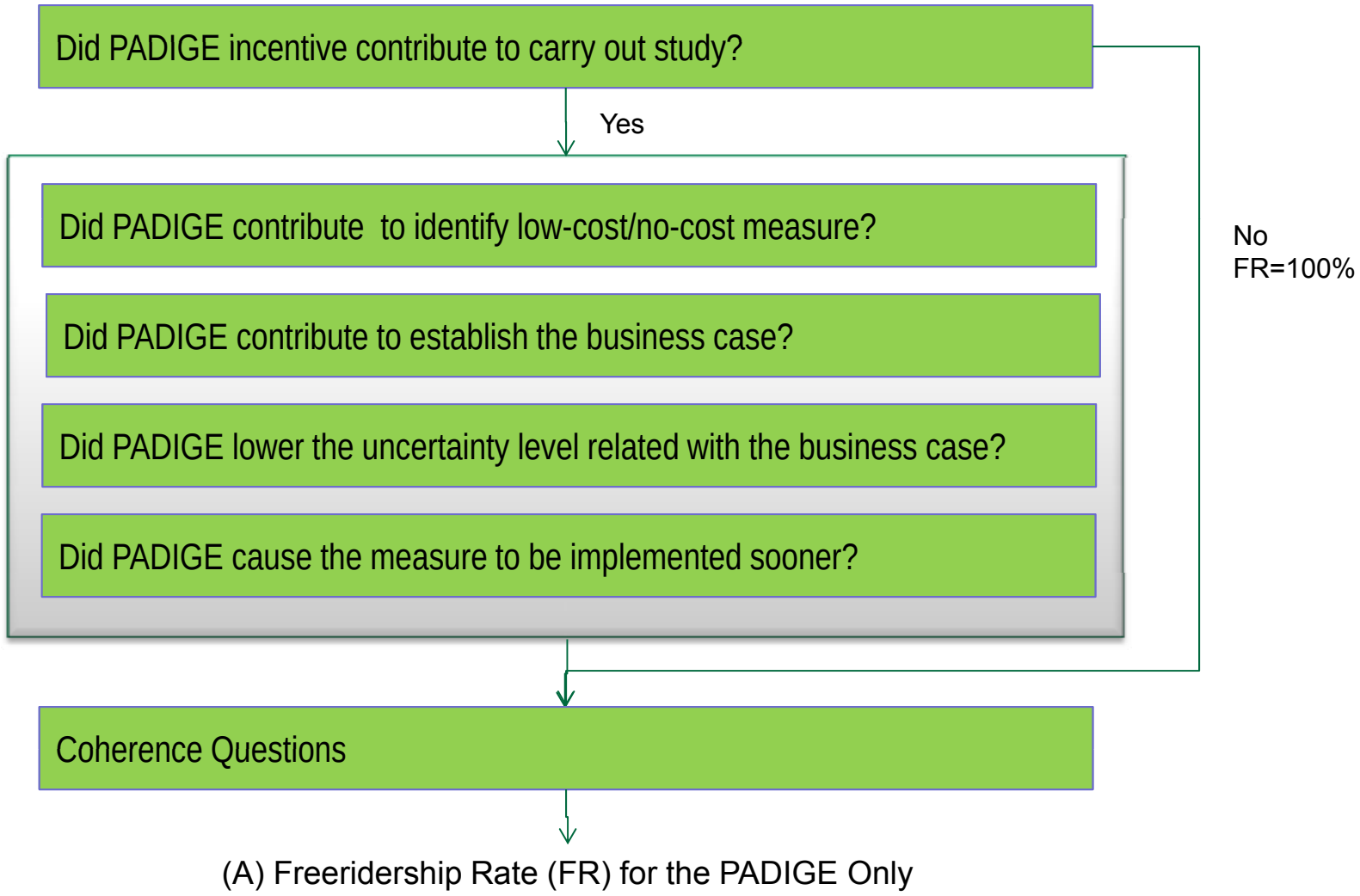
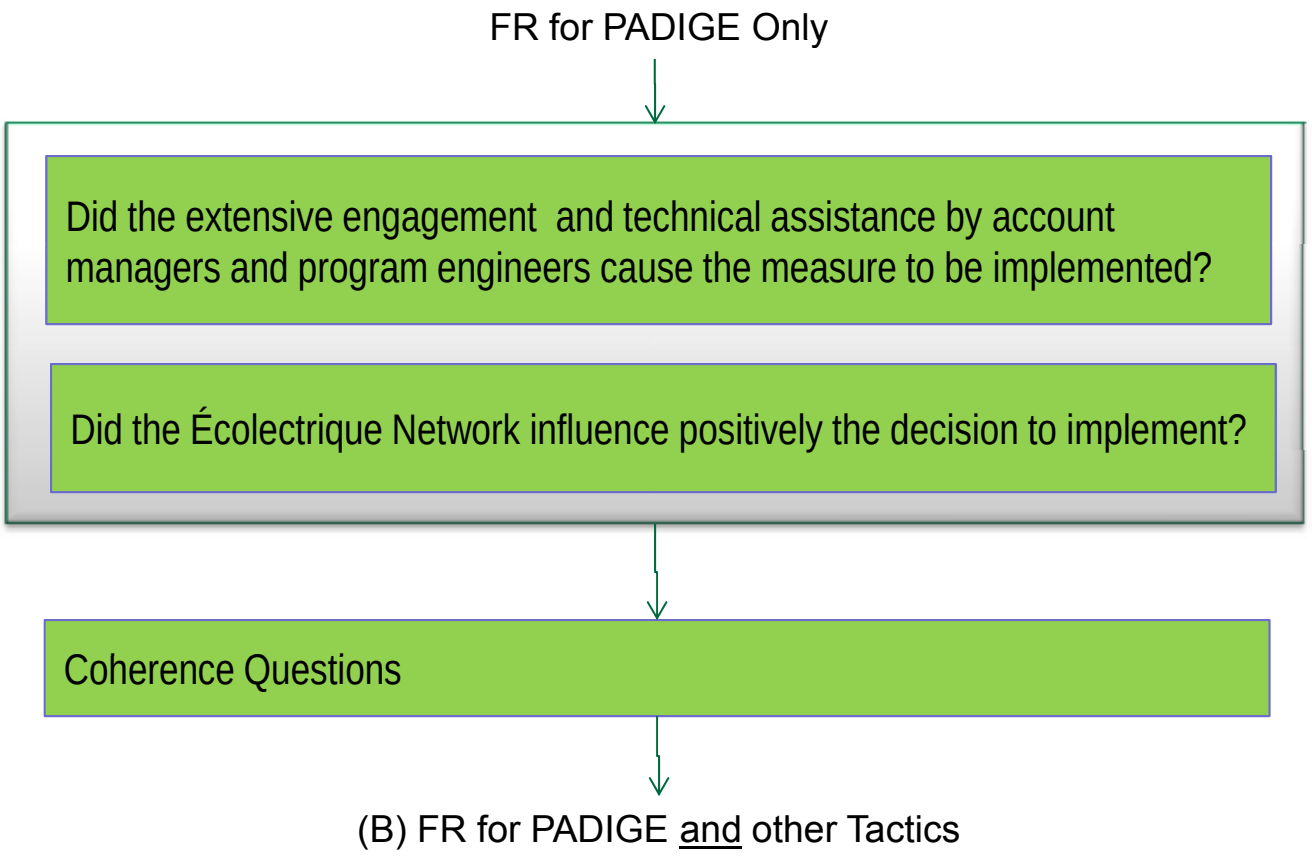
Attribution Algorithm (1 of 2)

(Simplified Version)



Attribution Algorithm (2 of 2)

(Simplified Version)



Rate of Response

Item	Population (p)	Response Rate (n)
Number of PADIGE Analyses	20	18
Low-cost/Low-Payback Energy Conservation Measures	42	40
Energy Savings (MWh)	841,312	832,741

Net Savings

Causality Link	Freeridership Rate (FR)	Net-to-Gross Ratio (NTG)
(A) FR PADIGE Only	5.2%	94.9%
(B) FR PADIGE and Other Tactics	0.6%	99.4%

Note: NTG = 1 – FR.

- Net Impact Attributed to Hydro-Québec: 836 GWh
- The difference between the two algorithms (1 and 2) represented 38.7 GWh

Conclusions of the PADIGE Attribution Study

- NTG ratio is 94.9% if accounting for PADIGE only, and 99.4% if accounting for all program tactics
- Direct engagement, technical assistance, account management and the Écolectrique Network contributed to strengthening the causality (as per program theory)
- Methodology compliant with the best practices, yet adapted to the specific circumstances of PADIGE
- Report filed with the *Régie de l'Énergie*
- Full report (in French):

Hydro-Québec & ICF Marbek, *Étude d'attribution des économies d'électricité au programme d'analyse et de démonstrations industrielles – Grandes entreprises*, January 2012, available at : http://www.regie-energie.qc.ca/audiences/Suivis/SuiviD-2011-028_PADIGE/HQD_ProgrammePadige_27fev12.pdf

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Lessons Learned During the PADIGE Attribution Study

- Successes:
  - Customized methodology
  - Internet-based questionnaire: easy and flexible for busy respondents in the industrial sector
- Caveats:
  - Tracking down contact people
  - Tracking down more than one person for each measure
  - Self-reporting many years after the fact
  - Lack of clear indication of negative or positive biases of respondents with regard to Hydro-Québec

Program Implementation Implications
According to ICF Marbek

- Mitigation of the Evaluation Lag Risk
  - Better handshake between evaluation and tracking
  - Fast attribution questionnaire
  - Deemed net-to-gross ratio
- Attribution is Effectiveness
  - Importance of deepening the understanding of the decision-making process of each participant
  - Importance of a multi-faceted approach because multiple tactics will strengthen the attribution
  - Importance of documenting the program theory in the form of a logic model

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Jan. 28-31, 2013	AESP's 23rd National Conference & Expo Orlando, FL
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