EM&V Uniform Methods Project: Residential Lighting

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Agenda

- Overview of Residential Lighting
- Savings Algorithm and Recommended Approaches
- Author and Reviewers
- Comparison to Industry Practices
- Major Points Requiring Reconciliation
- Questions/Comments

Overview of Residential Lighting

- Measures
  - CFLs
  - ENERGY STAR fixtures
  - LEDs
- Delivery Strategies Vary
  - Upstream buy down/mark down
  - Direct installation
  - Giveaway
  - Coupons

Overview of Residential Lighting

What is Covered?

Methods address most measures
and delivery strategies

What is Not Covered?

Demand Savings

Attribution

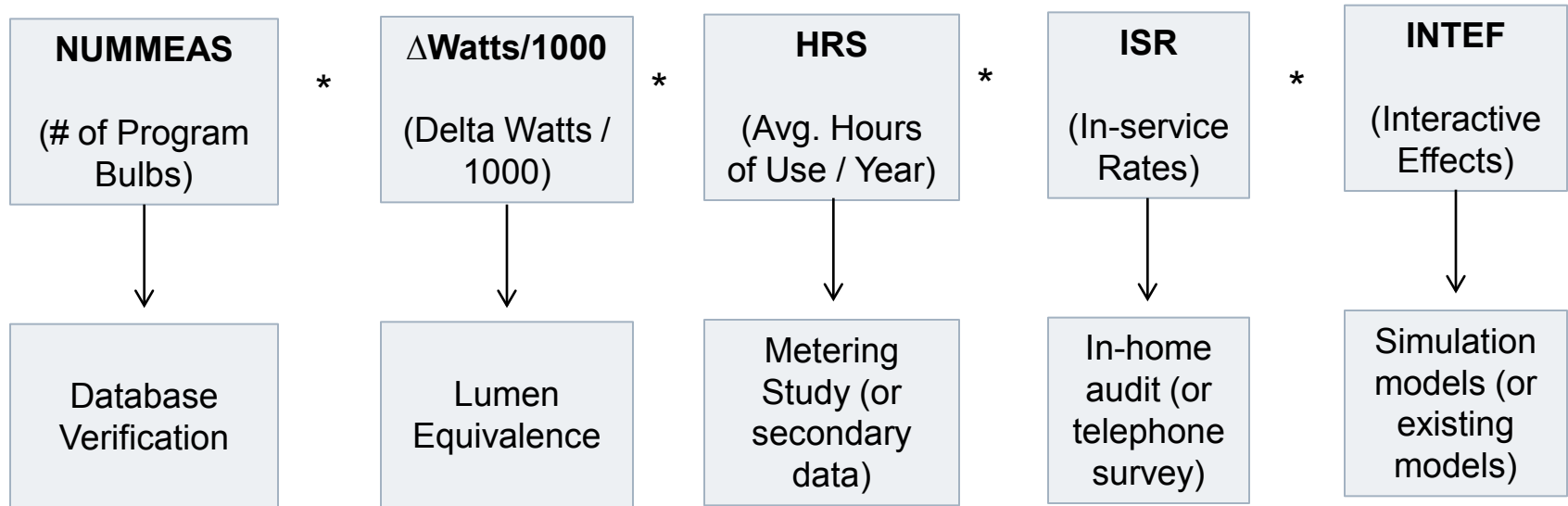EUL/ Inc. Cost

The Canadian Football League

Savings Algorithm

$$kWh_{saved} =$$

NUMMEAS		ΔWatts/1000		HRS		ISR		INTEF
(# of Program Bulbs)	*	(Delta Watts / 1000)	*	(Avg. Hours of Use / Year)	*	(In-service Rates)	*	(Interactive Effects)

Recommended Approaches

NUMMEAS		ΔWatts/1000		HRS		ISR		INTEF
(# of Program Bulbs)	*	(Delta Watts / 1000)	*	(Avg. Hours of Use / Year)	*	(In-service Rates)	*	(Interactive Effects)
↓		↓		↓		↓		↓
Database Verification		Lumen Equivalence		Metering Study (or secondary data)		In-home audit (or telephone survey)		Simulation models (or existing models)

Optional

Cross-customer class and cross-service area sales →
Customer Intercepts

Who Wrote Protocol?

- Scott Dimetrosky
  - Former principal at Quantec/Cadmus
  - 20 years EM&V experience
  - Led evaluation of upstream lighting programs across six states for 11 utilities

Who Reviewed Protocol?

Majority of Comments from:
- Jeremy Eddy, Itron
- Tom Eckman, NWPPC
- Dave Jacobson, Jacobson Energy
- Feitau King, NREL
- Mike Rufo, Itron
- Steve Schiller, Schiller Consulting
- David Sumi, Cadmus
- Bryan Ward, Cadmus

Comparison to Industry Practices

- Most evaluations using similar methods for impacts
- Strong divergence on NTG (not covered here)
- Some divergence/debate on the major points for reconciliation

Major Points for Reconciliation

- Overall
  - Mostly clarifying and justifying proposed approach
  - Questions about what is covered and what is not

Major Points for Reconciliation

- Delta Watts
  - More examples of uses/findings from different approaches
  - Bin shifting
  - CFL to CFL replacement
  - Use of lumen equivalence vs. wattage

Major Points for Reconciliation

- ## Annual Operating Hours
  - – More data on sample size/error bands
  - – Question about sample size assumptions (CV)

- ## In-Service Rates
  - – Trying to only identify recently purchased bulbs vs. long-term installations

Major Points for Reconciliation

- Interactive Effects
  - Simulation models preferred over existing models
- Cross-Class and Cross-Service Territory
  - Optional
  - Can extrapolate to channels not visited

Questions/Comments?

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