Estimating Reliable Savings from New Technologies in the Northwest

UTILITY ENERGY FORUM
SUPPOSEDLY SUNNY LAKE TAHOE
MAY 17, 2013

RTF Overview

- **1996** *Congress Charged Council and Bonneville Power with Formation of a Regional Technical Forum (RTF)*
  - *"to develop consistent standards and protocols for verification and evaluation of energy savings, in consultation with all interested parties."*
- **1998** *Northwest Governor's Comprehensive Review Expanded RTF's Mission*
  - Track regional progress toward conservation & renewable goals
  - Provide feedback & suggestions for improving
  - Conduct periodic reviews of the region's progress
  - Communicate recommendations to appropriate decision-makers
- **1999** *- Council Formed the Regional Technical Forum*

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RTF Develops Estimates That Utilities & Regulators Can Rely On

- Provides Centralized & Unbiased Technical Review
  - Energy Savings Data & Assumptions
  - Cost-Effectiveness Methodology & Assumptions
  - Measurement &Verification Protocols & Guidelines
- Builds on Empirical Data & Historic Experience
- Provides Open Public Forum
  - Vetting Claims, Identifying Uncertainties
  - Keeping Up with Changes
  - Establish Standards of Proof

What the RTF **Does**

- Provide independent review of savings estimates for measures commonly used in PNW
- Provide cost-effectiveness estimates for measures
- Establish systematic approach for RTF review
- Continually update savings & cost-effectiveness estimates
- Provide open access to all estimates & data
- Provide guidance for estimating savings from custom measures & for program-level savings
- Assist the Council by assessing new efficiency technologies
- Track regional progress toward efficiency targets

What the RTF Does Not Do

- Perform direct regulatory function
- Require use of specific savings estimates/protocols
- Require the use of specific program designs
- Establish utility program reporting requirements
- Evaluate savings for ALL measures
- Restrict which measures utilities can install
- Establish “rebate or willingness to pay” levels
- Execute primary research (RTF relies on others for research)

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Action Shot

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How Measures Get to the RTF

Measures with Obvious Regional Scope

- Large Program Savings (CFL)
- High Unit Count (Appliances)
- Deployed widely across funders
- Most Mass Market Initiatives
- Large New Initiatives (Ductless HP, HP Water Heater)
- Long-Standing (Residential Weatherization)

RTF-Identified

Measures for Specific Needs

- Individual utility driven
- Vendor-driven (Grocery, Distribution Efficiency)
- Proposers develop data & analysis
- Some where proposers lack resources to develop data/analysis

Proposer Initiated

Other Technical Needs

- Council Plan Development
- Analytics (Marginal Line Losses, Direct Use of Gas, Codes)

Requests

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Evaluating Measures Consistently

- RTF Mission
  - Reliable estimates of savings
  - Transparent methods for estimating savings
- RTF operated for 10 years transparently but its “rule book” evolved with experience
- RTF needed to capture its current best practices as an add to consistent decision-making and operations

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Guidelines Scope and Intent

- "...describe how the RTF…selects, develops and maintains approved methods for estimating savings from the delivery of energy efficiency measures."
- "Four savings estimation methods…Unit Energy Savings (UES), Standard Protocol, Custom Protocol and Program Impact Evaluation."
- "…intention that each method will produce savings estimates of comparable reliability..." at the lowest reasonable cost

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Measure Category/Quality Standards

Proven	• RTF approves when statistical or calibrated engineering data are available and reliable to characterize both baseline and efficient-case energy consumption for measure-affected end uses
Provisional	• RTF approves with special conditions requiring the collection of data from all (or a sample of) specific measure applications to improve savings estimation
Planning	• RTF approves for measures with regional applicability and reasonable expectation that data will be collected to bring measure through an RTF path in the future
Small Saver	• RTF approves based on sound engineering analysis and applicability to the region and because cost to obtain quality data outweighs expected regional savings potential

So how does Emerging Tech fit with RTF's Guidelines for estimating reliable savings?

Reliability Concerns with E.T.

- Lack of verified performance data (small field sample)
- Product development timeline
  - Ready for large scale deployment?
- Persistence of savings over time
  - Initial product design/compatibility issues
  - Customer acceptance and potential for “takeback”

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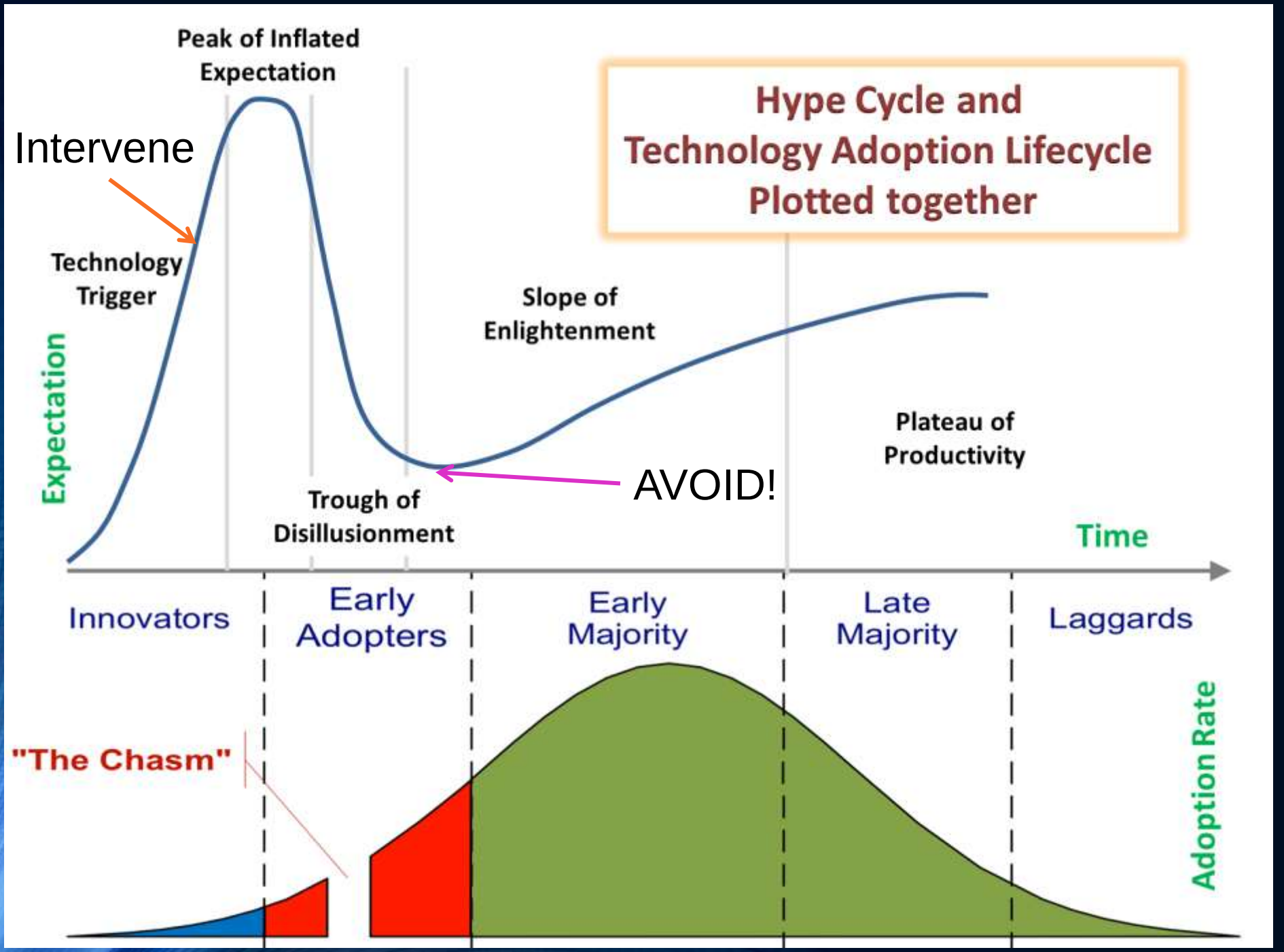
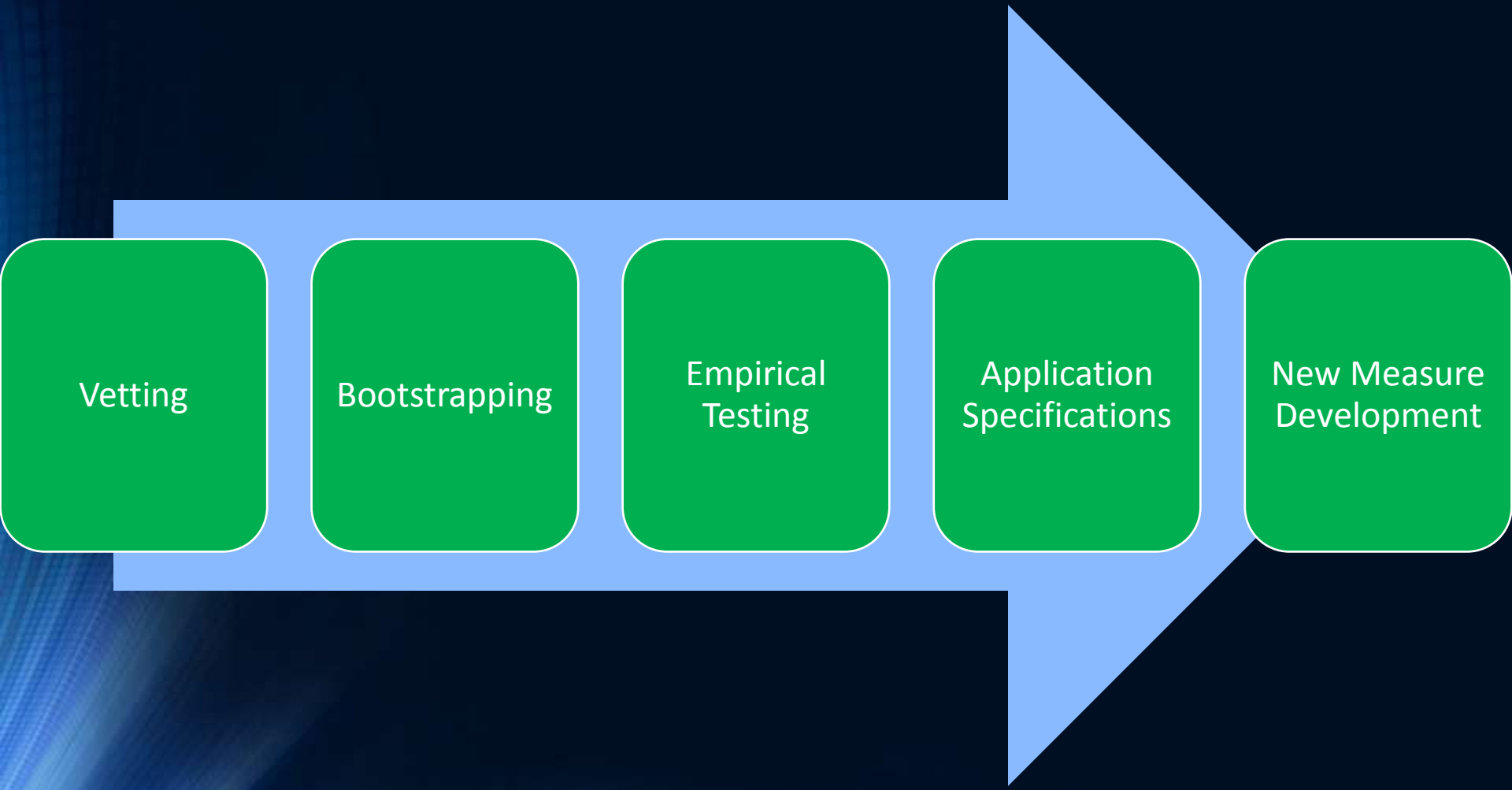

Hype Cycle and
Technology Adoption Lifecycle
Plotted together
Peak of Inflated Expectation
Intervene
Technology Trigger
Slope of Enlightenment
Plateau of Productivity
AVOID!
Trough of Disillusionment
Expectation
Time
Innovators
Early Adopters
Early Majority
Late Majority
Laggards
"The Chasm"
Adoption Rate

RTF Emerging Technology Approach



Vetting

- Figure out what is missing
- Write a research plan to go get needed data
  - RTF doesn't have funding to do primary research
  - Regional groups/utilities fund lab and field tests
- Place bounds on expected results

Vetting
Ductless Heat Pump example

- Good Looking Spec Sheets
- Large Potential Savings for the Region
- Lots of PNW Utility Interest in 2009
- But …
  - Very few installed & tested in the field in PNW
  - No idea of how PEOPLE use them
  - Sizing & placement issues
  - They ADD air conditioning load
  - They make noise
  - Cold climate performance?

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Bootstrapping

- The Problem:
  - Test data usually insufficient to estimate savings reliably
  - R&D efforts have been on the decline
- Our help with a way around:
  - RTF helps coordinate research efforts region-wide
    - Consistent research done among regional groups
    - Economies of scale reduce cost to obtain data

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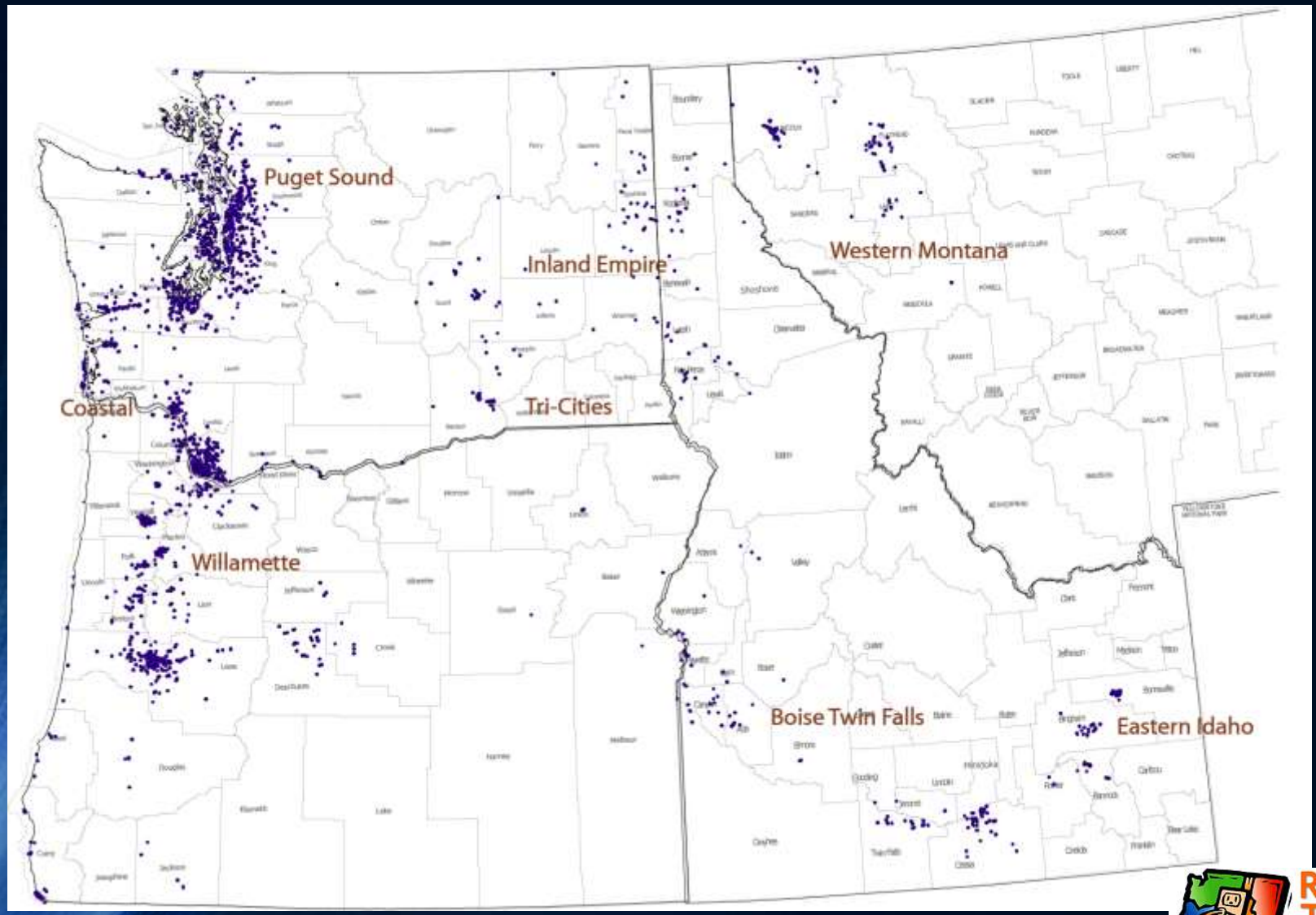
Bootstrapping
Ductless Heat Pump Example



Pilot Sites (n=3,899)

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Empirical Testing

- Is Performance “As Advertised”
- Performance versus Educated Assumptions
- Impact of Humans & Technology
  - In-the-Field versus In-the-Lab
- Find Ways to Improve Measures
- Find New Problems to Fix – New Measures

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Empirical Testing
Ductless Heat Pump Example

- Created a monitoring specification (2009)
  - Establish protocol to sub-meter installations
  - Identify data needed to determine performance
  - Develop research plan to collect and evaluate data
- Utilities & NEEA demonstrate use, costs, & energy savings
- Initial Savings Evaluation 2011

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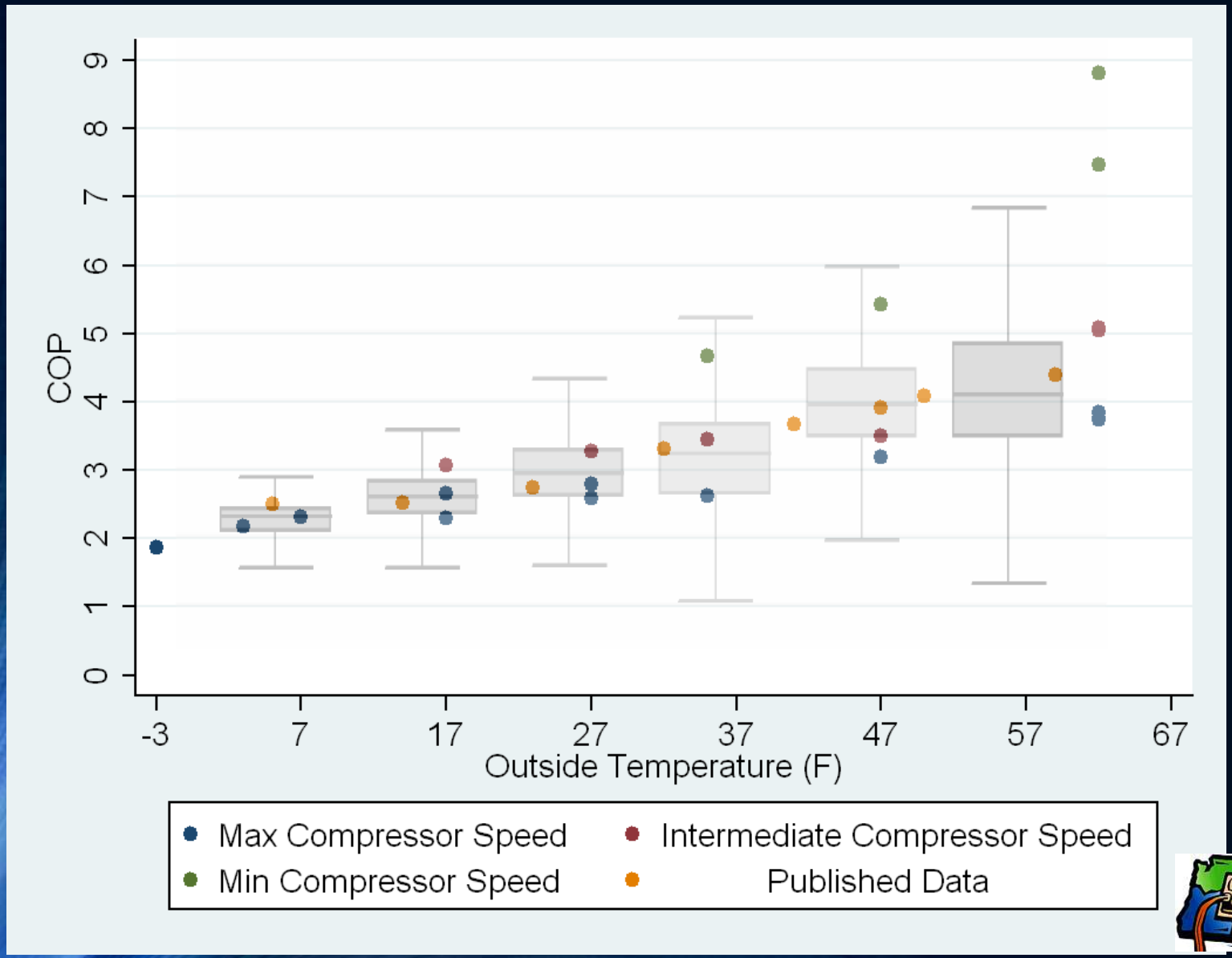
DHP Lab Testing Results Compared to Field COP Measurements



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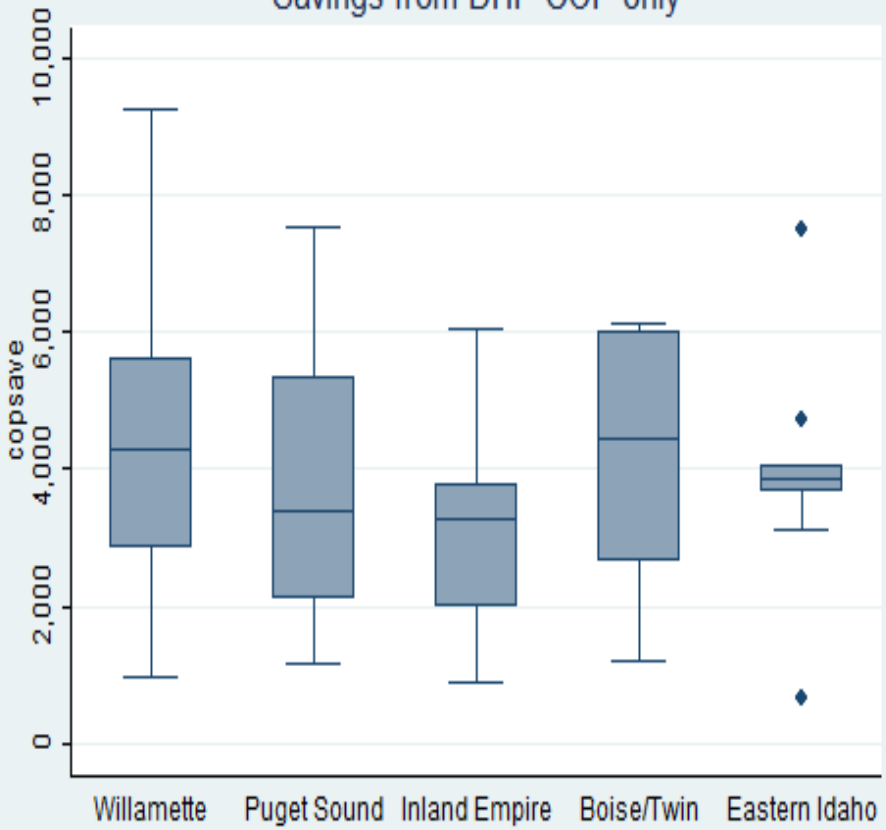
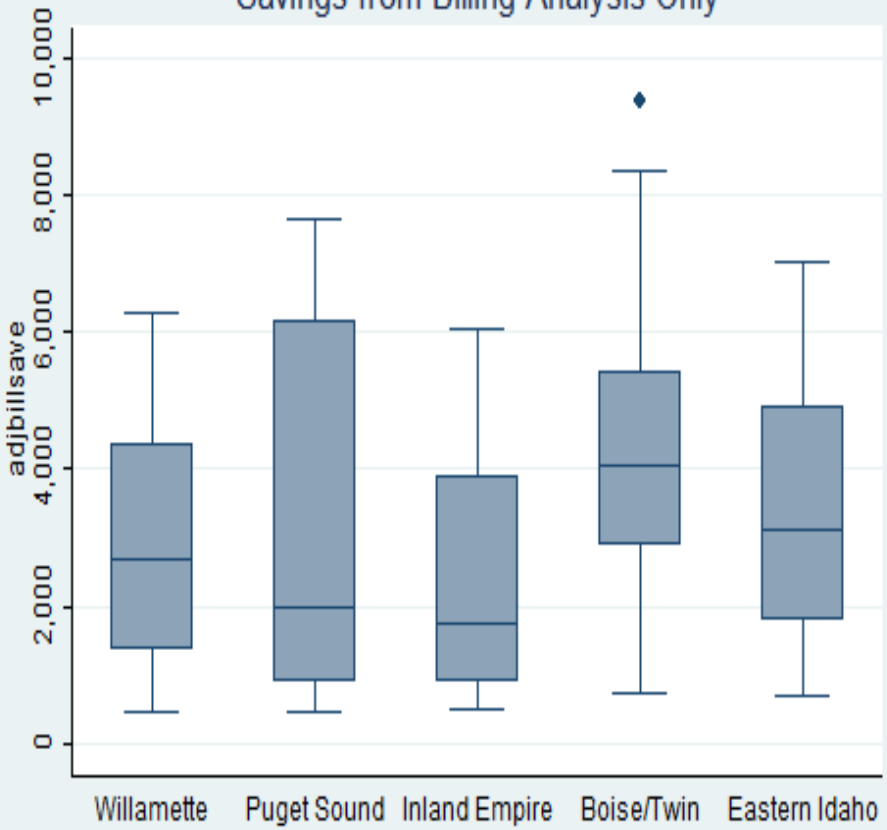
DHP Comparison Savings Estimates





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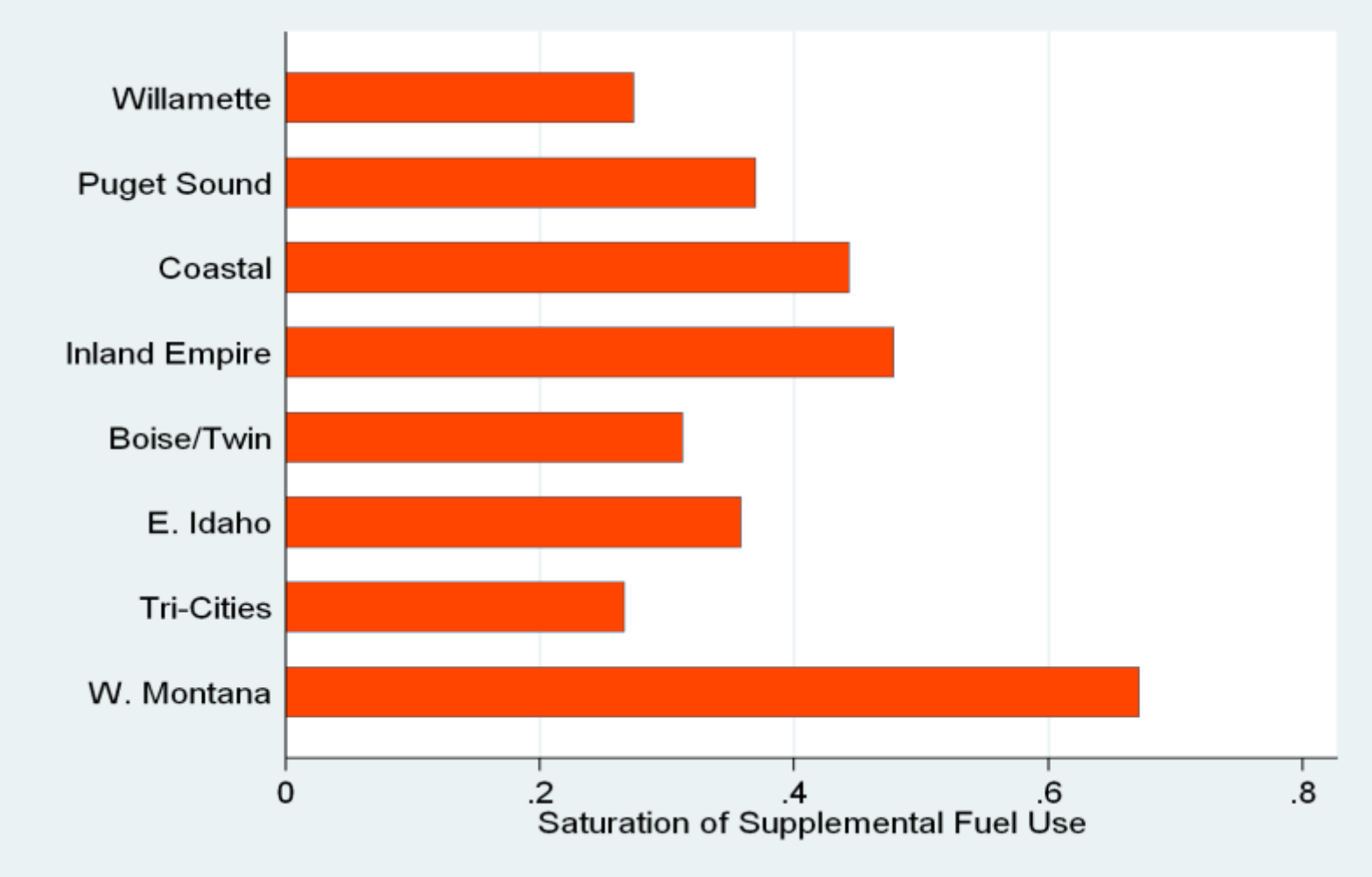
Supplemental Fuel Use, More to come*



*May RTF meeting will begin key issues discussion

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Application Specifications

- Developed after empirical data analyzed and accepted
- Helps place bounds on savings estimates, installation requirements, etc.
- Avoids common pitfalls with implementation
- Flexible to adjust over time with changing technology

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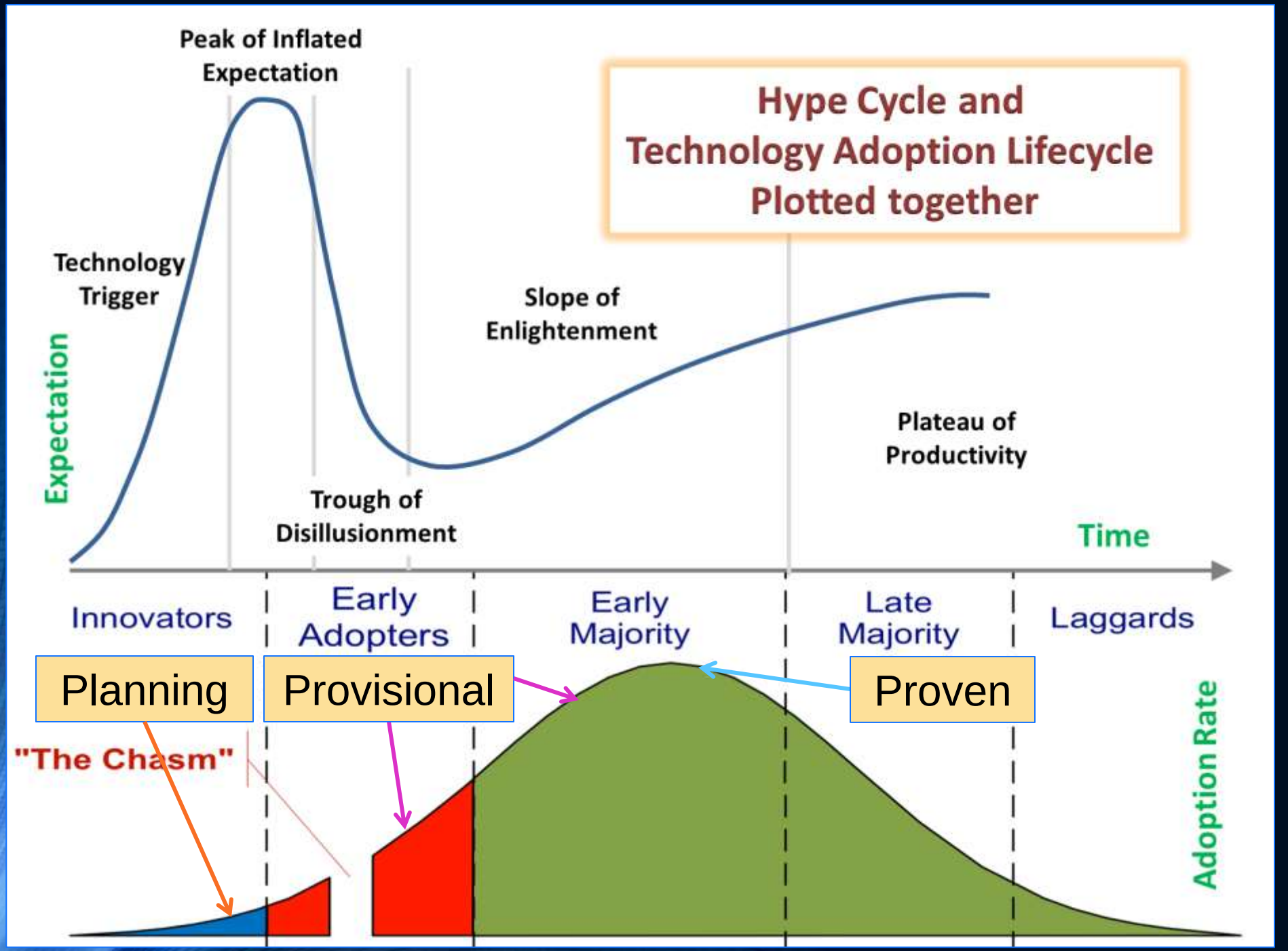
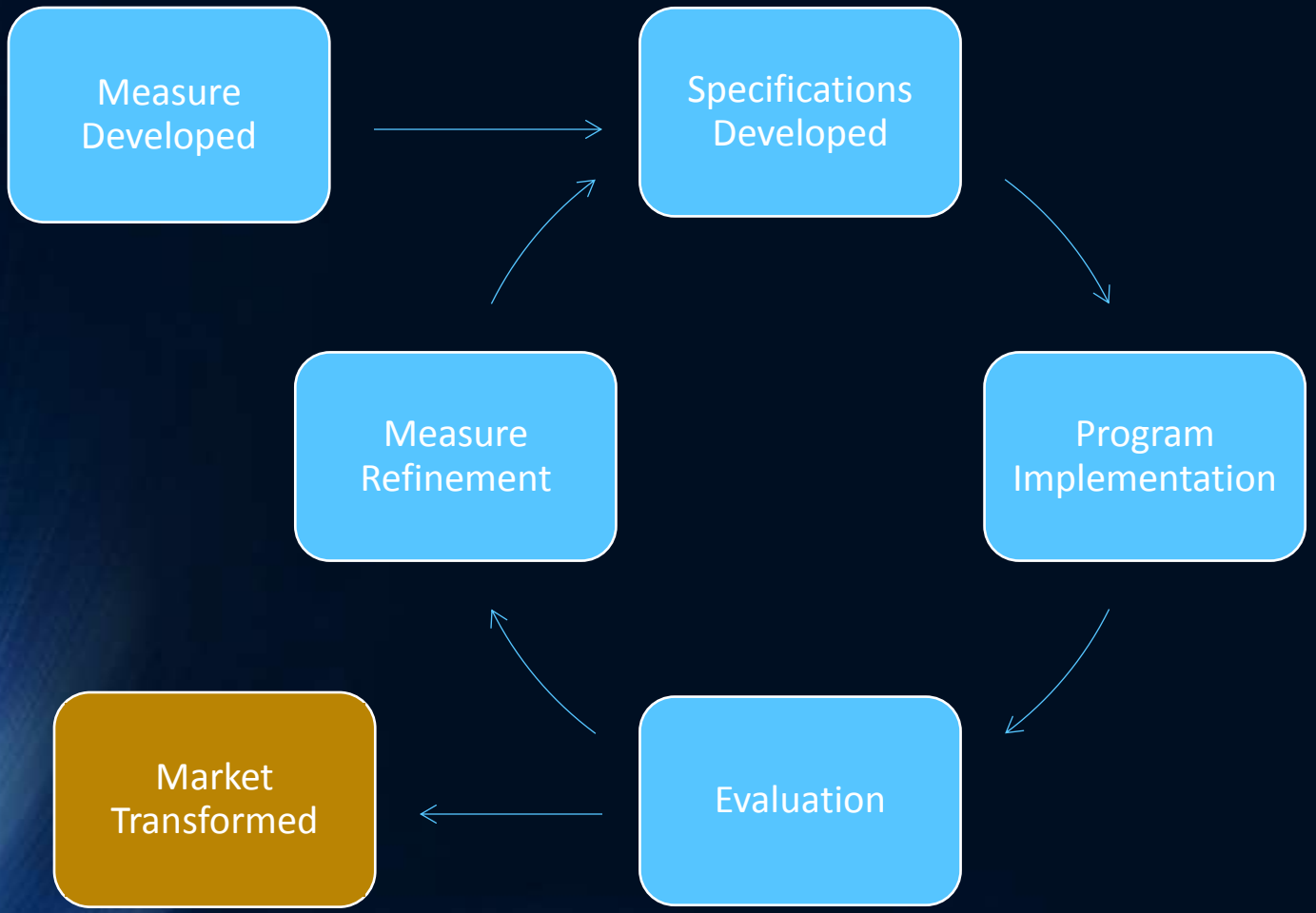

Hype Cycle and
Technology Adoption Lifecycle
Plotted together
Peak of Inflated Expectation
Technology Trigger
Slope of Enlightenment
Plateau of Productivity
Trough of Disillusionment
Expectation
Time
Innovators
Early Adopters
Early Majority
Late Majority
Laggards
Planning
Provisional
Proven
"The Chasm"
Adoption Rate

After that?



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RTF Categories Provide Direction

- Planning or Provisional provide a clear path forward
  - Most Emerging Tech not yet field-tested in large enough sample
  - Efficiency programs typically desire regional agreement on savings estimates and deployment
  - Ability to capitalize on economies of scale for research
  - RTF guidance on research helps ensure* a measure will eventually be considered reliable
  - Many hands make light work

*No guarantee

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Contact

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