



Cage Match or Happy Couple? Engineering Simulation Models and Billing Analysis

B O N N E V I L L E
POWER ADMINISTRATION



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2015 IEPEC Conference — Long Beach, California

CAGE MATCH



SENSATIONAL MAIN EVENT



HEAD
TO
HEAD



JOSH
"BILLING ANALYSIS"
RUSHTON

VS

JUSTIN
"ENGINEERING MODEL"
SPENCER

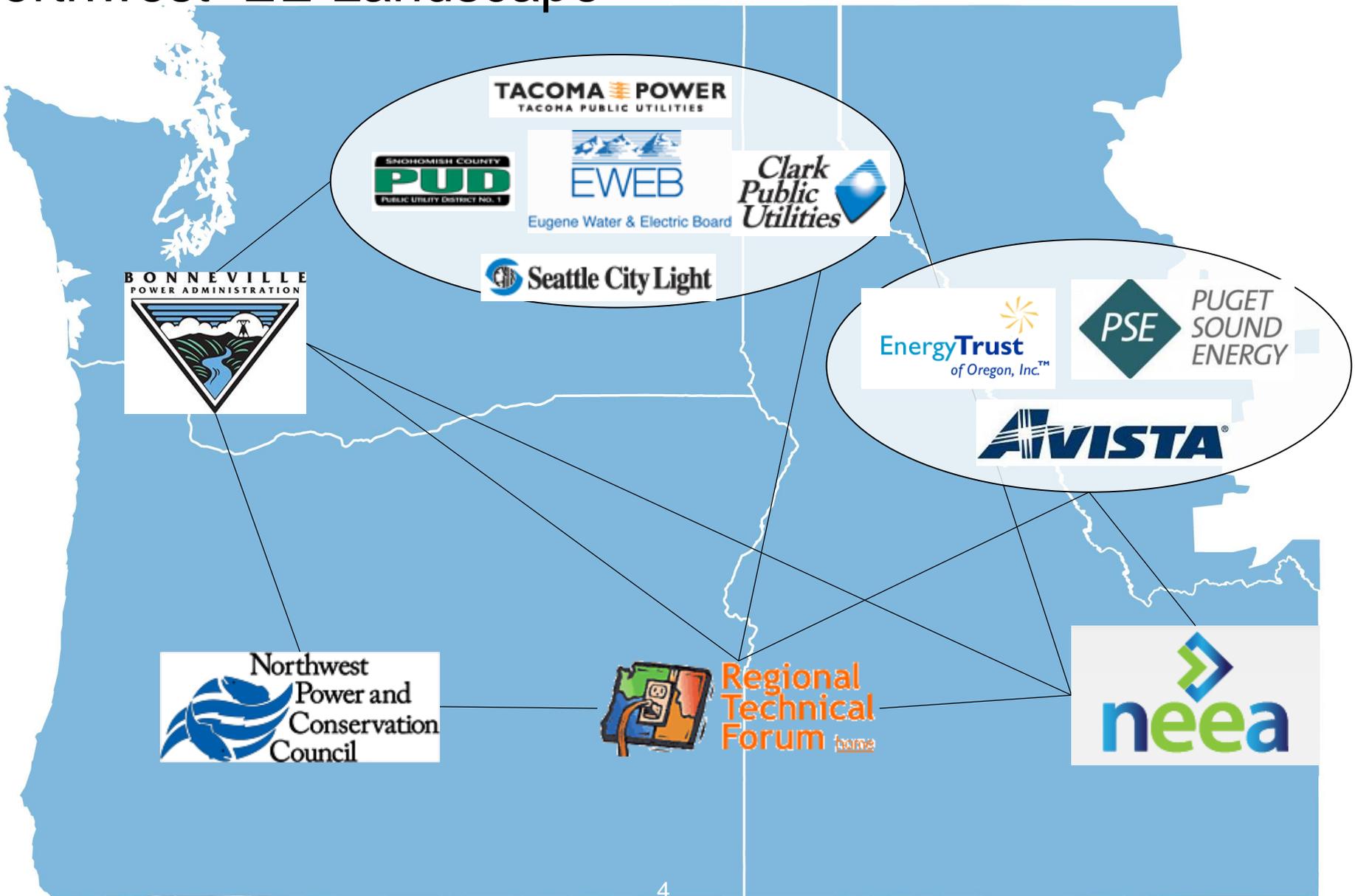


MICHAEL
"MR GUIDELINES"
BAKER

VS

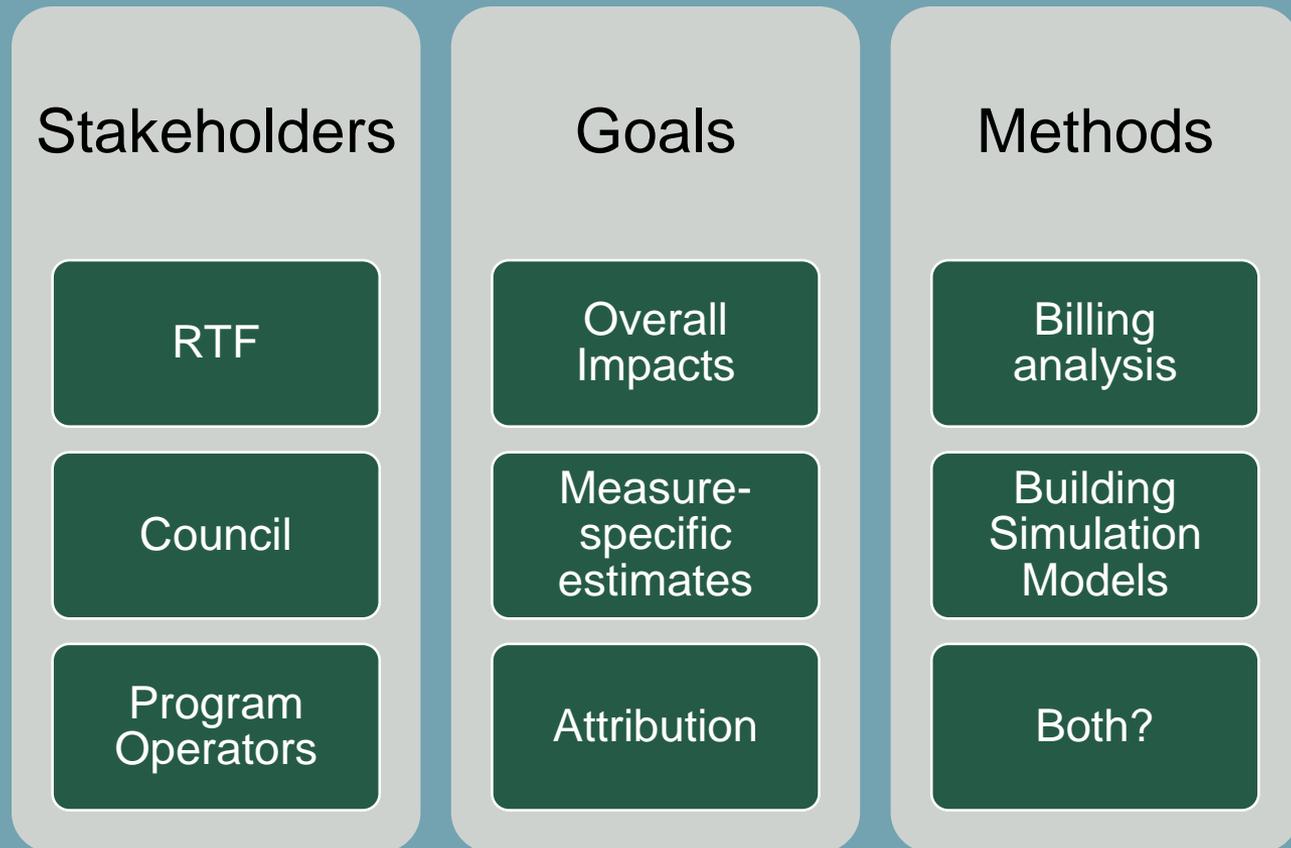
DAVID
"RAISING HELL"
BAYLON

Northwest EE Landscape

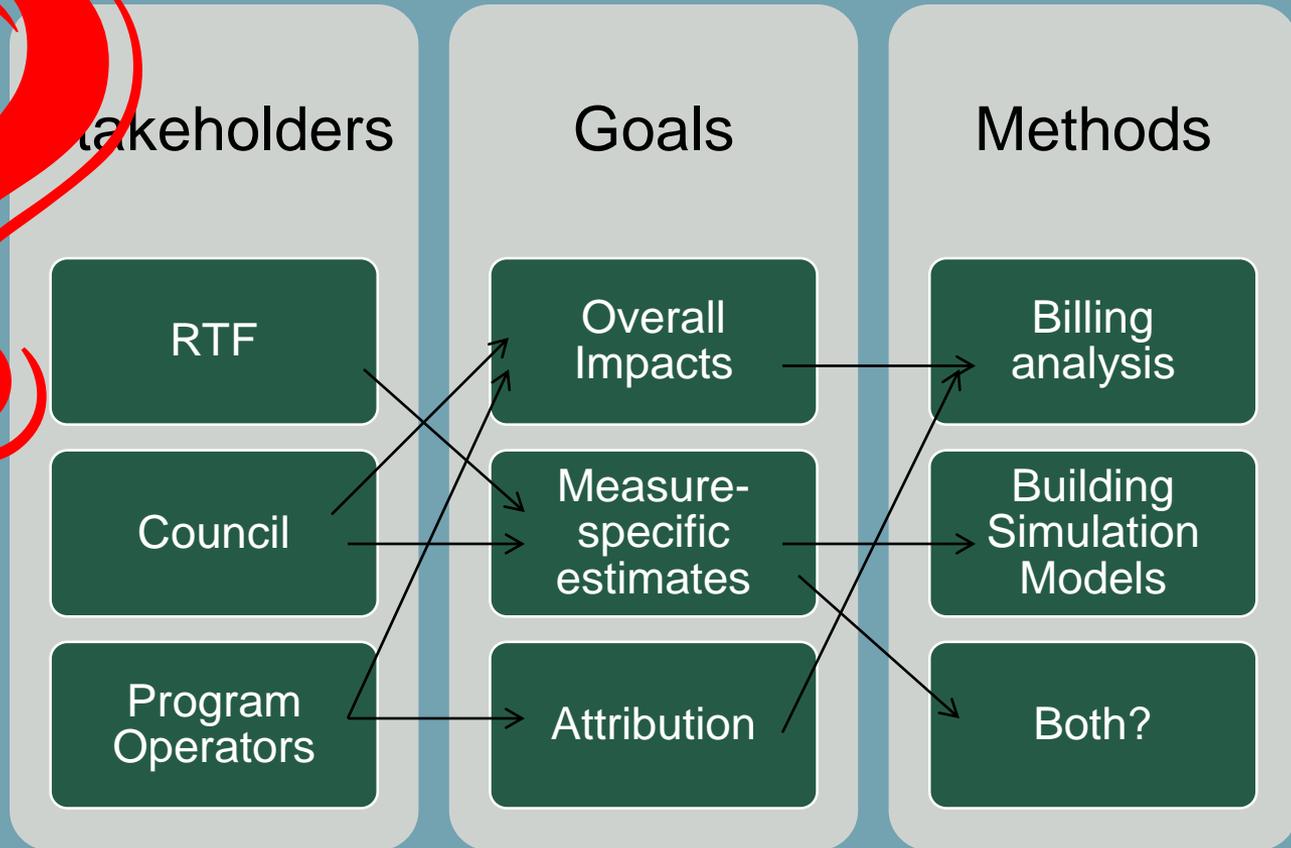




Lining up Methods with Goals



Lining up Methods with Goals



CAGE MATCH

**BILLING
ANALYSIS**

VS

**ENGINEERING
SIMULATION**

Left Corner: Billing Analysis

Changes in usage with billing data

Easy data, reliable and inexpensive

Granularity, small signal, why, baselines



You didn't let the temperature set point vary??

Right Corner: Engineering Simulation

Measure-specific savings using simulation tool

Thermodynamics, variations, small, baselines, interactions

Occupants, input heavy

You want how many millions for sub-metering?



Happy Couple?

I estimate savings reliably on aggregate, but lack precision to estimate measure savings



I understand physical drivers and can extrapolate, but usually lack the data to accurately estimate savings

Combined Approaches

Statistically
Adjusted
Engineering
Models

Engineering
results into
regression
model

Calibrated
Building
Energy
Simulation

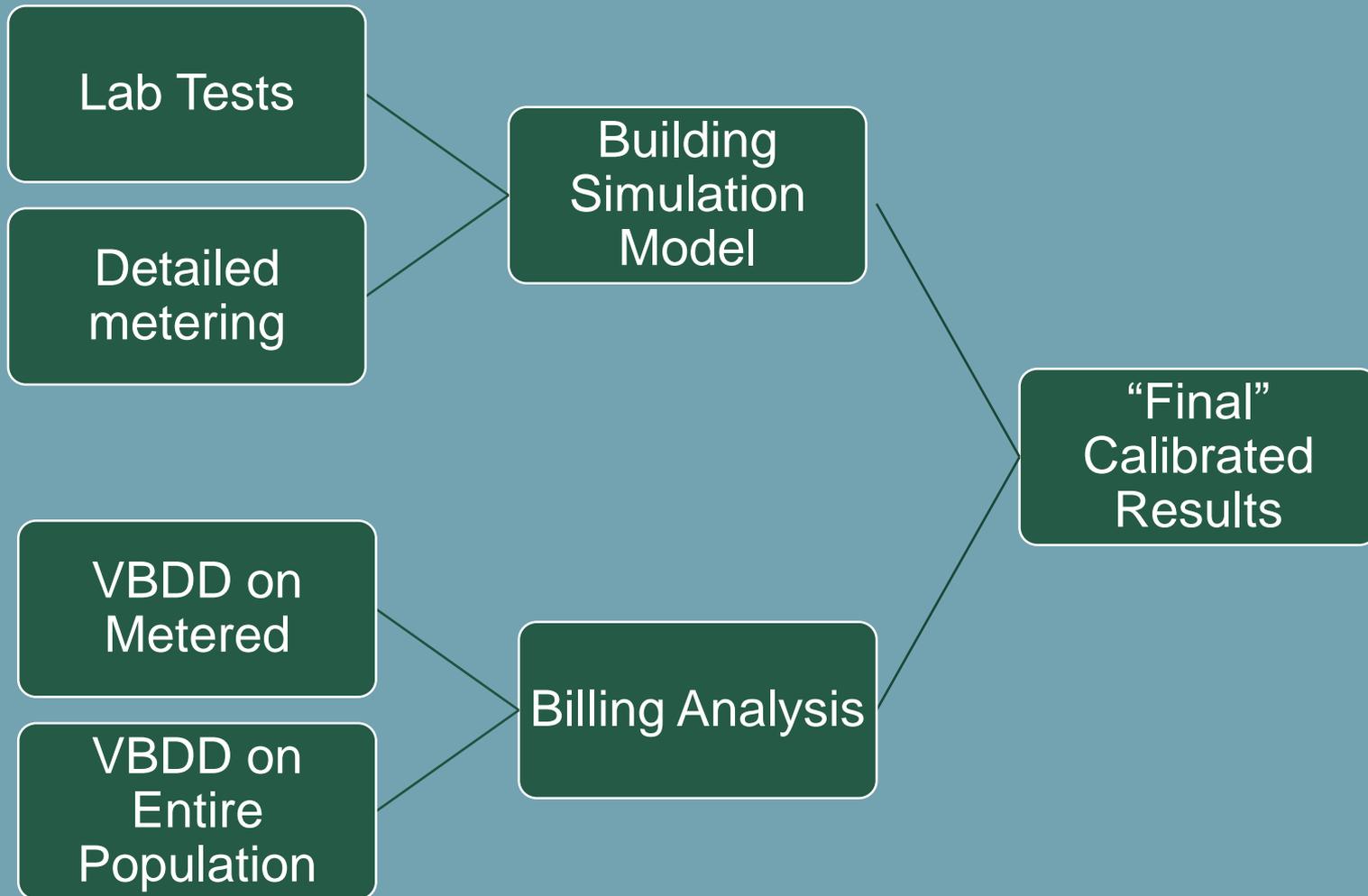
Regression for
overall change;
simulation to
divvy up



NW Ductless Heat Pumps



DHP Research

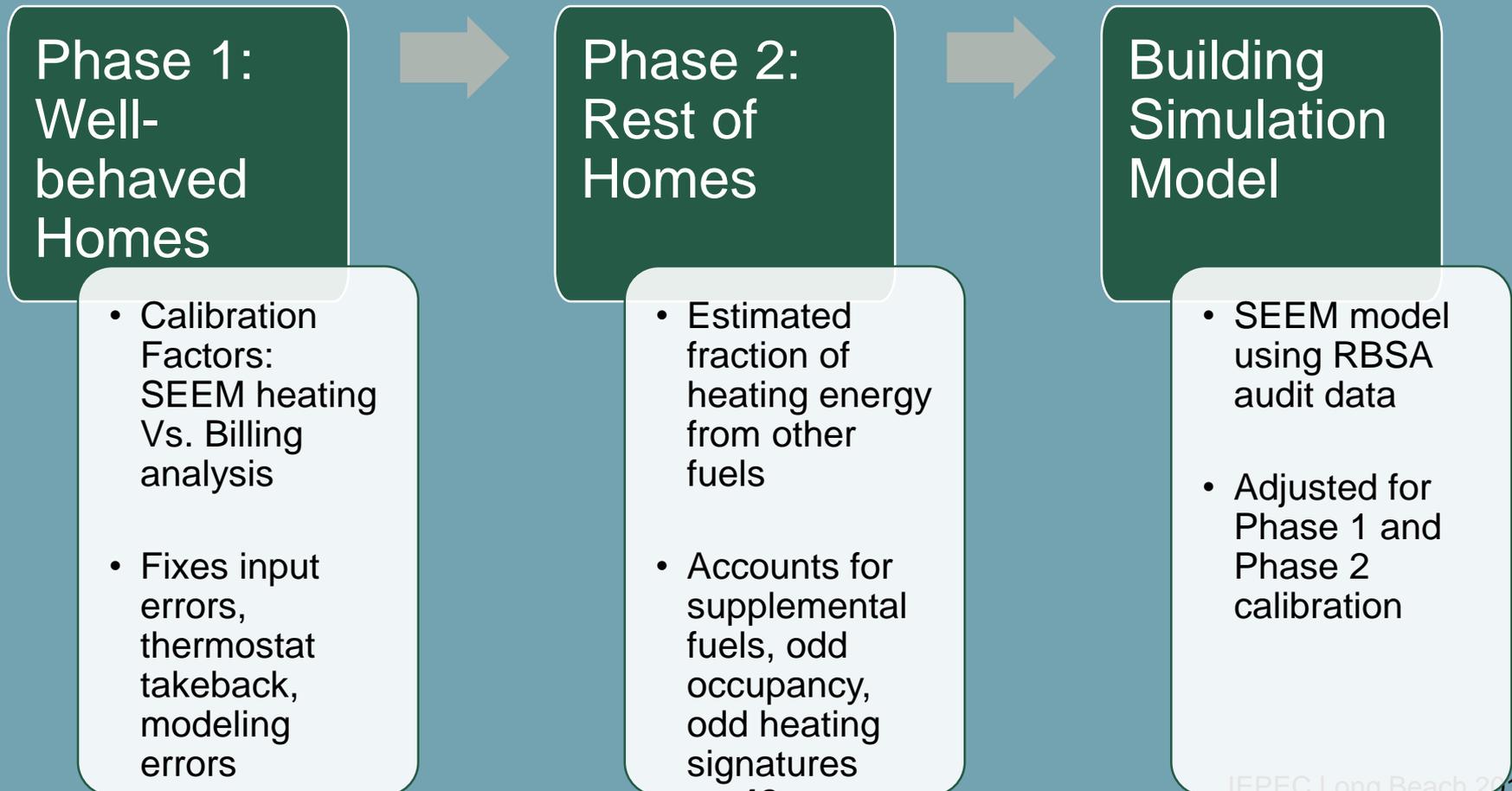




**Supple
mental
Fuels**

**Metering
vs Billing
VS
RBSA**

Weatherization



**You're killing
my
programs!**

Granularity

**Supplemental
Fuels**



Conclusions

Better off with both methods.

But it often hurts getting the answer.



Maybe it's both cage match and happy couple?

Questions?

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