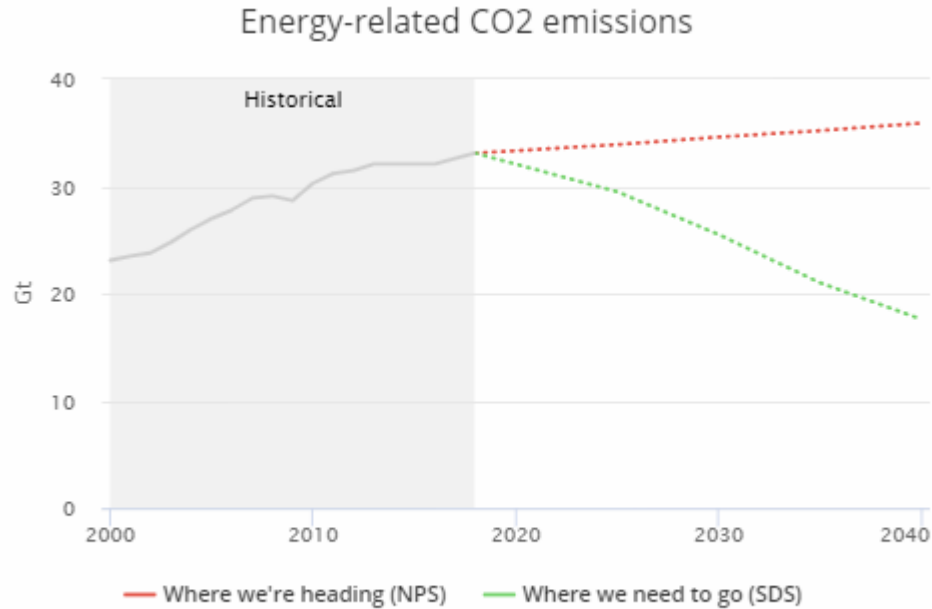




Why evaluation matters?

EPATEE Conference, 'What can we learn from existing evaluation practices?'
Paris, 19 September 2019

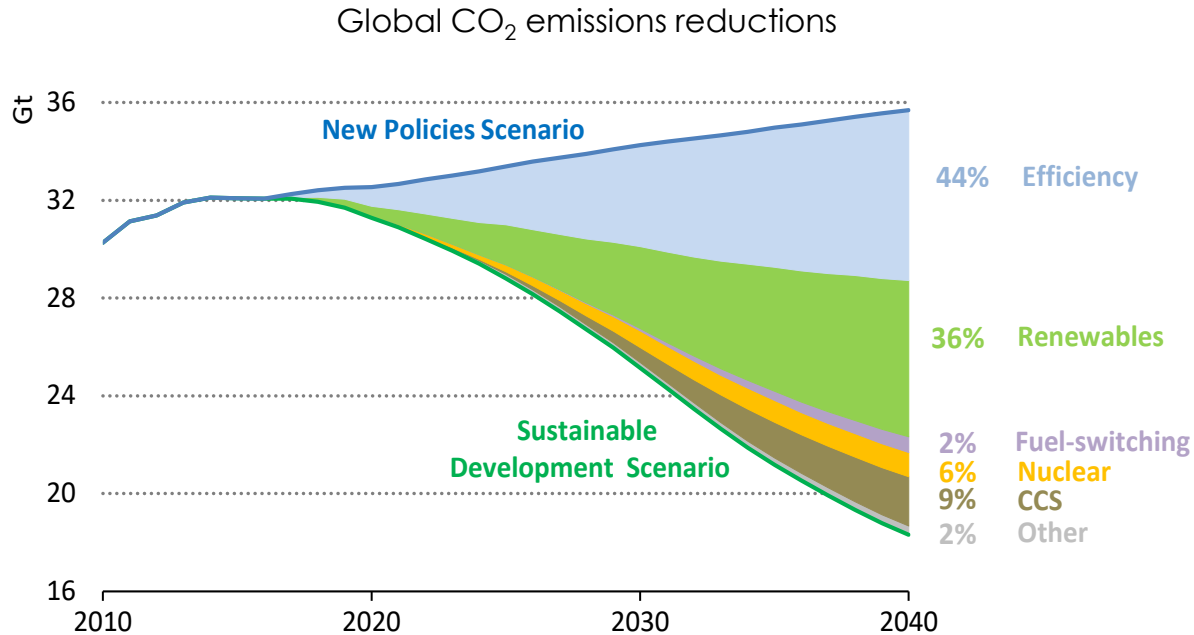
There's a lot at stake ...



IEA. All rights reserved.

We have a pathway to achieve global climate, energy access and air quality goals, but we are far from on track.

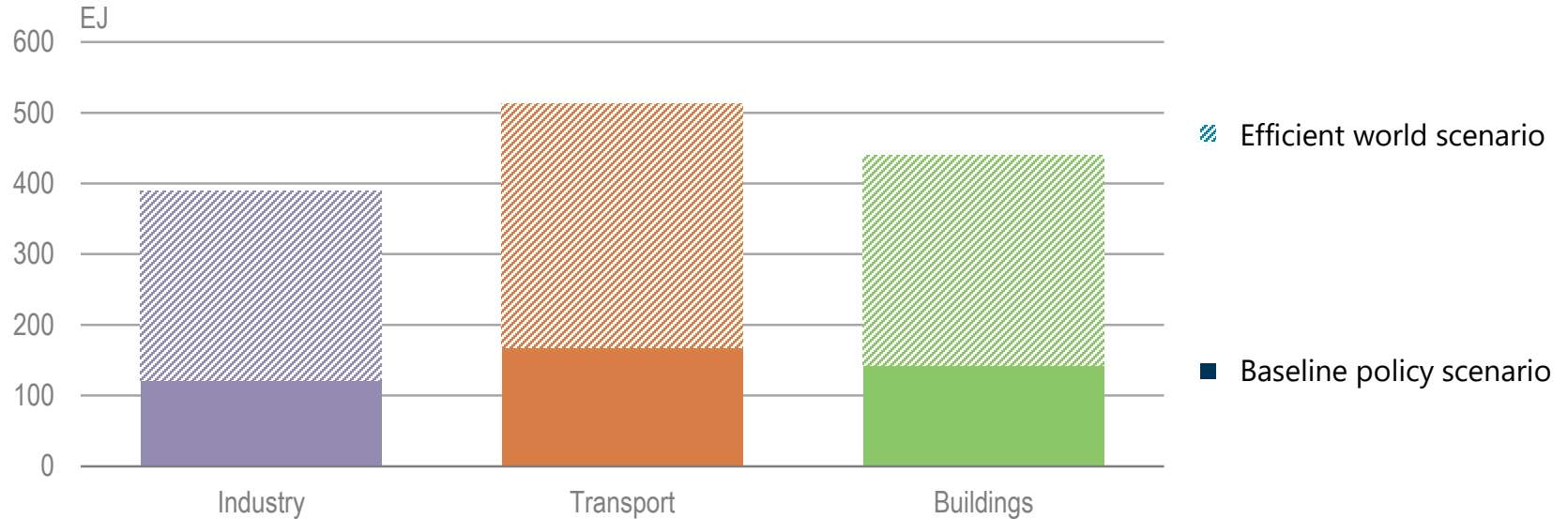
... and there's a lot riding on energy efficiency's role



Energy efficiency can contribute over 40% of the abatement required to be in line with the Paris agreement.

Huge potential across all sectors ...

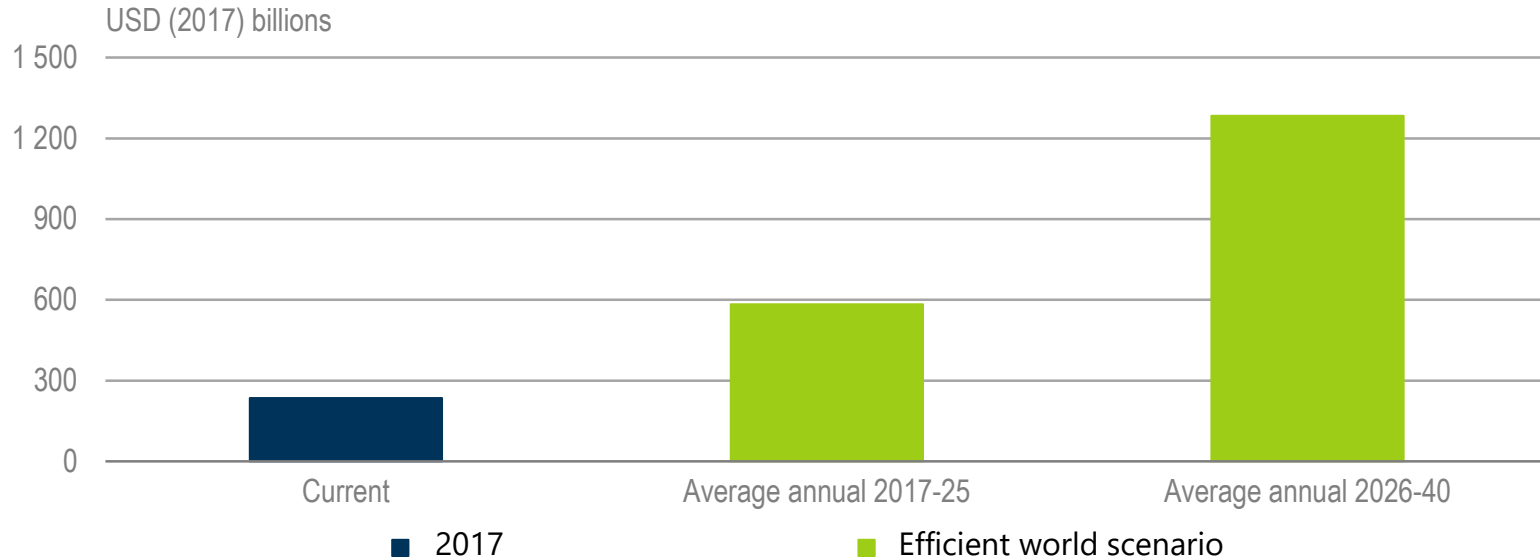
Cumulative energy savings in baseline and full potential scenario to 2040



Only one third of the potential cumulative energy savings from efficiency gains by 2040 will be realized based on policies in place today.

... and staggering, cost-effective investment opportunity

Annual energy efficiency investment levels: now and in the future



Annual energy efficiency investment must double to 2025 and then double again to 2040 – from USD 240 billion per year today, to about 580 billion on average by 2025, to USD 1.3 trillion per year by 2040.

So, why does evaluation matter?

- There's a lot at stake...
- There's a lot riding on energy efficiency...
- There's a huge untapped potential and investment opportunity...

- So, why aren't we seeing the type of policy progress & market scale-up?

Policy makers don't believe energy efficiency is real...



Where is the independent and credible evidence base?

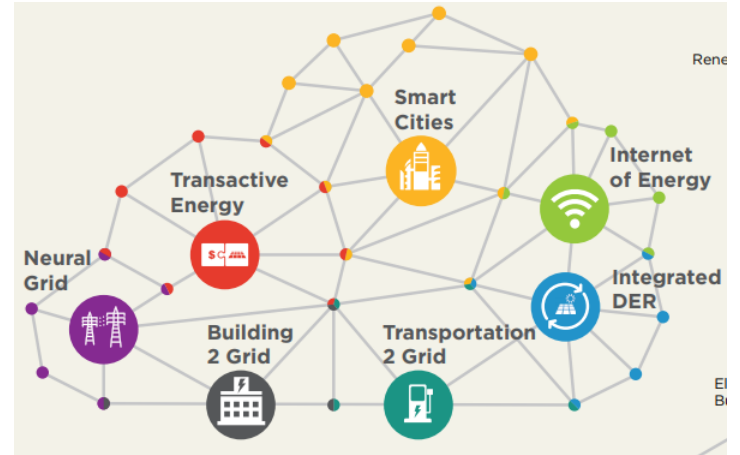
Energy system modellers don't trust that it will deliver...



Avoided generation



Deferred network investment



Non-optimal energy system of the future

Energy Cloud 4.0
(@Navigant)

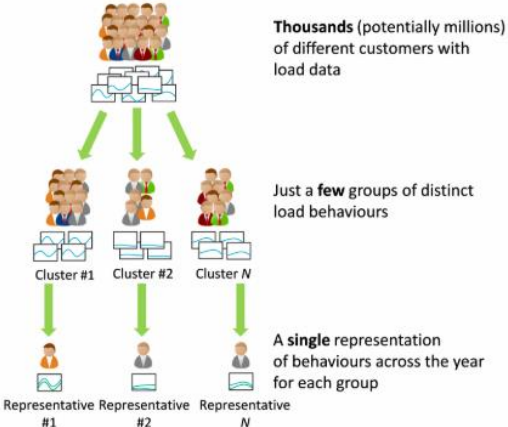
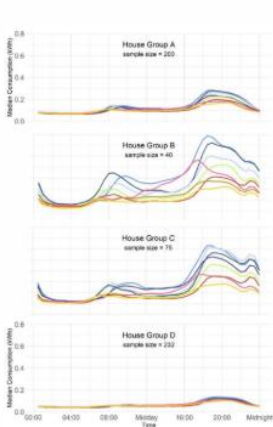
Where is the reliable and predictable evidence base?

Energy efficiency program managers don't know where to start...



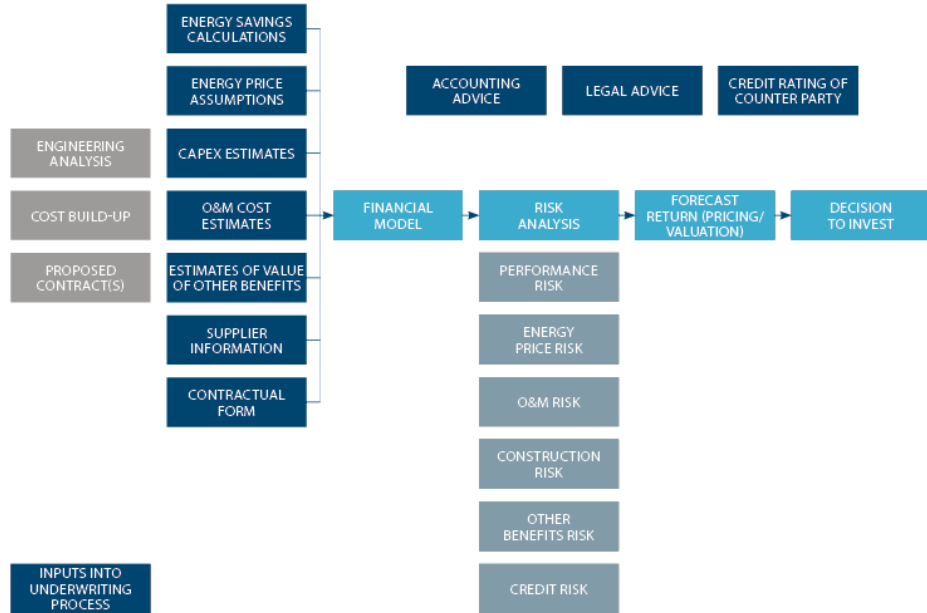
THE HISTORY OF
TECHNICAL REFERENCE MANUAL (TRM) AND ELECTRONIC TRM (eTRM)
IN ENERGY EFFICIENCY TRACKING & DEMAND-SIDE MANAGEMENT PROGRAMS

eTRM	1977 Department of Energy was formed in the United States of America	1981 Test pilot demonstrations done to outline innovative methods to promote energy efficiency	1996 California Public Utility Commission sets up the first database of energy savings (DEER = Database of Energy Efficient Resources)
	2007 Oracle Releases an e-Business Suite for energy providers. Electronic TRM was first developed as a proprietary software application	2005 California comes up with aggressive energy efficiency goals, with wide range of programs	2004 Three more states build Technical Reference Manual for their respective jurisdictions
2010 13 states adopt Technical Reference Manual to review energy efficiency measure data, and calculate energy savings	2014 California Technical Forum is formed, and "TRM Best Practices" is rolled out to build eTRM	2016 10 more states roll out their respective documents, making it 23 states in the country that use TRM to calculate energy savings	2018 ANB SYSTEMS launches eTRM. A central repository and savings calculator https://etrm.anbtrack.com/



How to target limited resources?

... not comparable to other investment opportunities



How to make it bankable?

- Underwriting Process Steps
- Inputs
- Components of Risk Analysis
- Inputs into underwriting process

EEFIG flow chart

So, why does evaluation matter?

- ... provides credible, independent evidence base
- ... improves reliability and predictability of impacts
- ... helps target and design better policies and programs
- ... quantifies risks / comparability with other investments

BUT HOW?

How?

- **Impact evaluations**

- Assess outcomes of the changes attributable to an energy efficiency policy or program.

- **Process evaluations**

- Assess program operations to identify and recommend areas of improvement.

- **Market evaluations**

- Assess broad aspects of the energy efficiency marketplace (e.g., changes in the structure or functioning of the market or the behavior of market participants) attributable to the policy or program

How else?

- Ex-ante v ex-post evaluations
- Market transformation evaluations, including market baseline and market characterization studies
- Non-energy impact evaluations
- Innovation, R&D evaluations
- Energy efficiency potential studies (technical, economic, achievable)
- Program goals and target-setting studies
- Market penetration or saturation studies
- Parameter studies (measure lifetime, avoided costs)
- Methods studies
- More general market research studies

The changing evaluation paradigm...

Advanced Data Analytics

Software: The growing range of cloud-based software and platforms that process large volumes of data quickly using publically available or proprietary algorithms. These solutions present opportunities for analyzing the increased data collected in order to inform utility programs and EM&V efforts.

Improved Data Collection Tools and Increases in Data Availability

Hardware: The use of smart meters and smart thermostats, non-intrusive load monitoring and other tools that both collect energy usage data in new ways and present opportunities to increase the amount and type of data collected.

<https://neep.org/sites/default/files/resources/NEEP-DNV%20GL%20EMV%202.0.pdf>

...offers new evaluation tools & features...

New Tool/Method	Key New Features
Advanced Data Analytics	Predictive Analytics Machine learning
Auto M&V Software	Machine learning Cloud platform High volume auto processing
Auto M&V Software as a Service (SaaS)	Service delivery via Auto M&V
AMI	Large scale high-volume interval data 2-way communication
Smart Devices	2-way communication
Home Energy Management System	Monitoring, feedback, & controls, 2-way communication
End-Use Metering	Non-Intrusive Load Monitoring

<https://aceee.org/sites/default/files/pdf/conferences/ie/2015/Session3C-Goldberg-IE15-12.7.15.pdf>

...and has implications for evaluation

- **New value in engagement and understanding** markets, technologies and end-users
 - Project identification, program planning, rapid and ongoing feedback
 - Early indications of effects, enabling finer resolution analysis of energy usage, new bases for customer segmentation using machine learning
- **Some problems not solved** by greater volumes or frequency of data, or higher speeds of data processing
 - Estimating baselines, analysis of complex processes, assessing market conditions and additionality
- Can shorten elements of evaluation analysis, but **evaluation results may not be available sooner**
 - Other factors affect evaluation timelines, such as planning & scoping activities, as well as stakeholder engagement
 - Post-implementation and persistence timelines
- Expanded toolkit of evaluation techniques, but **selection of method(s) needs to balance** accuracy, timeliness, cost according to evaluation objectives and priorities
- Emerging offerings, many of which still very much **works in progress**, suggesting need for further testing, protocol development, cost-effectiveness assessment, etc.

iea