

NAVIGANT

ENERGY

Bringing Emerging Technologies into Utility Energy Efficiency Programs

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Size of
opportunity



Job
creation

**Huge
demand
reduction**

Innovation

Economic
development

Environmental
Improvement

New domestic
manufacturing

- State ET policies
- Mandated utility ET targets

Size of
opportunity

Early stage
investments
with high ROE

New
markets

Public R&D
funding

~\$5
Billion/Year
of
Investment

There are a variety of utility ET programs

	<i>Definition of Emerging Technology</i>	<i>Finding Tech</i>	<i>Screening/Selecting Tech</i>
DTE	<ul style="list-style-type: none"> Commercially available 	<ul style="list-style-type: none"> Download form online 	Third party panel of judges
ETCC	<ul style="list-style-type: none"> Not widely adopted by customers 	<ul style="list-style-type: none"> Leveraged partners 	Partner insight
NEEA	<ul style="list-style-type: none"> New, untested technology 	<ul style="list-style-type: none"> In-house market scan 	In-house testing
Nicor	<ul style="list-style-type: none"> Commercially available Not widely adopted by customers 	<ul style="list-style-type: none"> Online application system 	Screening, Scoring, and Selection, formal process
BPA	<ul style="list-style-type: none"> Commercially available Not widely adopted by customers 	<ul style="list-style-type: none"> Work with experts Suggestions submitted online 	Screening, scoring, and selection
NYSERDA	<ul style="list-style-type: none"> Commercially available Not widely adopted by customers 	<ul style="list-style-type: none"> Online application system Periodic solicitations 	Internal screening with stakeholder input and outside experts

Size of
realized
opportunity



- Unrealized opportunities
- Failed projects, products and companies
- Frustrated entrepreneurs and technology developers
- Unrealized potential
- Uninterested utilities

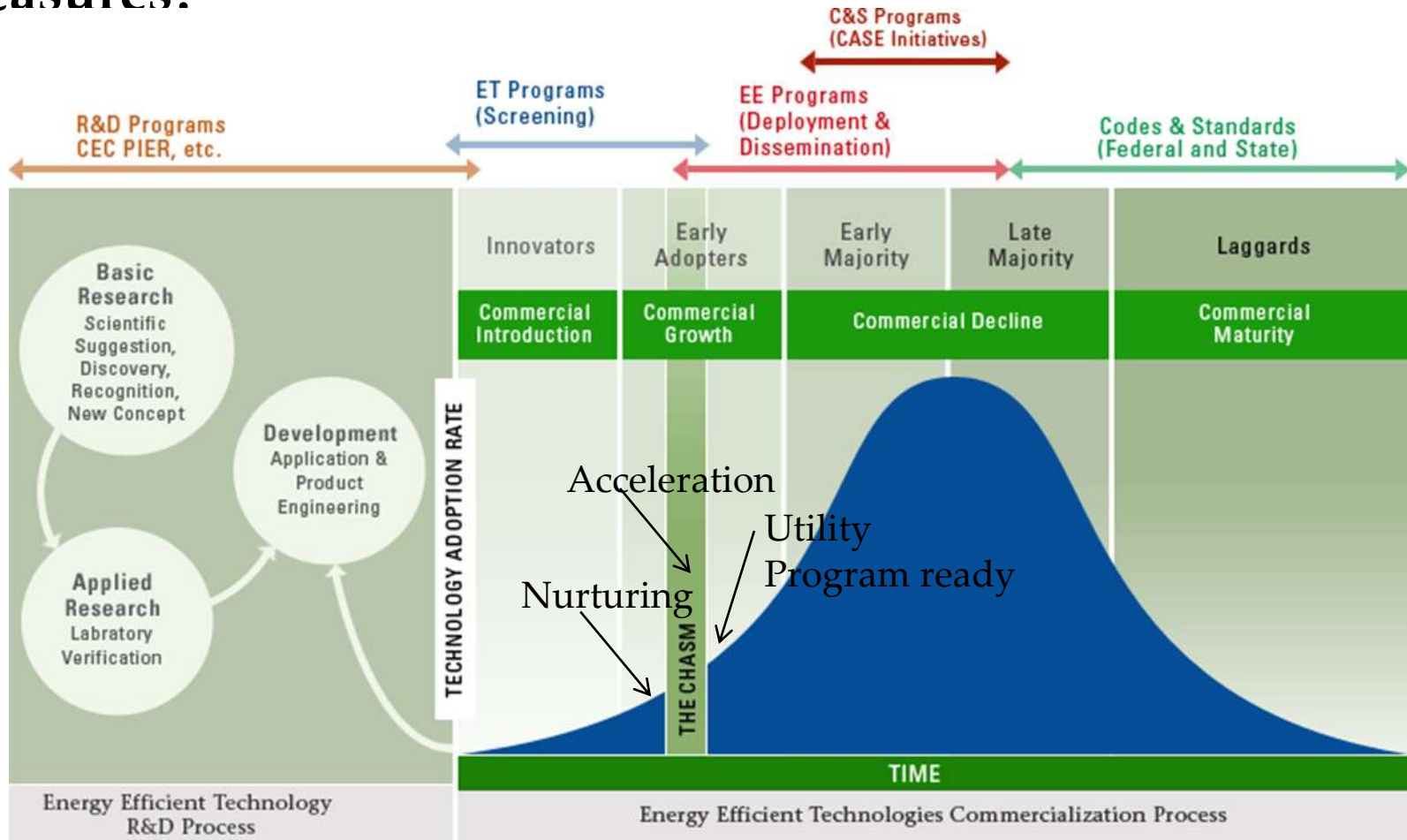
A well thought out definition of ET is required for a successful ET program.

Defining ET

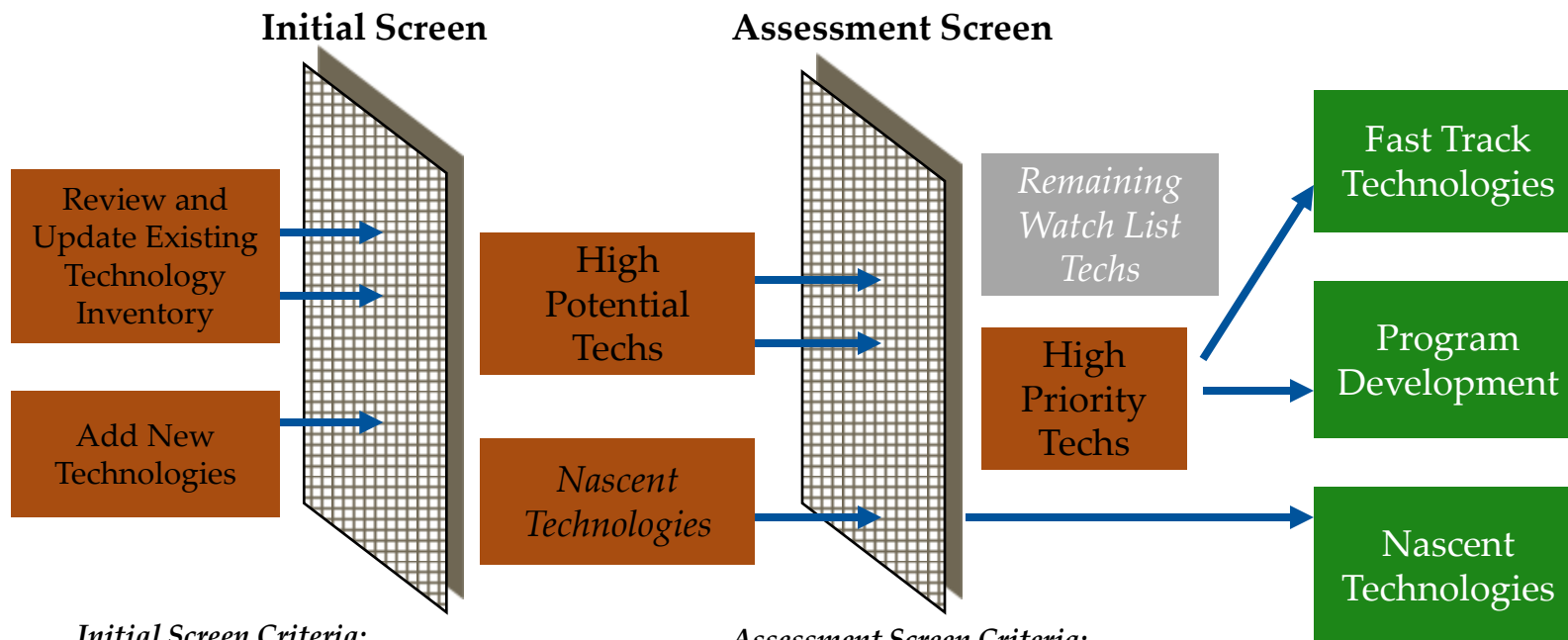
- » Navigant typically defines an ET as:
 - Post R&D
 - Entering early commercially availability
 - Either unproven in commercial setting or low market penetration
 - In need of business model innovation
- » Why is a clear definition necessary?
 - Stakeholders often confuse ET with R&D
 - R&D stage technologies are often not ready for commercialization and the testing/re-design cycle can take several years to complete.
 - If scanning for technologies or soliciting ideas, time and budget are wasted reviewing early stage technologies.
 - Excluding proven but underutilized technologies can eliminate high potential ET's that have not reached market penetration.

Where in the ET Spectrum Should Utility Efforts Focus?

Is the aim to prove the efficacy for inclusion in utility program, program development, or nurturing emergent measures?



Our process we has been used to successfully used to accelerate product adoption and utility program readiness.



Initial Screen Criteria:

- Inappropriate for EE program?
- Still in R&D stage?
- Widely commercialized technology?
- Low savings potential
 - Limited market application?
 - Low baseline consumption in utility territory?
 - Low efficiency improvement in utility territory?
 - Not cost effective in utility territory?
- Existing utility activity?

Assessment Screen Criteria:

- Energy technical savings potential (MTh, MW, MWh)
- Energy market savings potential (MTh, MW, MWh)
- Market risk
- Technical risk
- Utility ability to impact outcome
- Non-energy benefits: productivity; product quality; consumer utility, etc.
- Number of potential customers affected
- Payback period

Through our work, we have developed lessons learned to drive results out of ET programs.

Navigant's Key Lessons Learned

- » Be willing to terminate ET projects.
 - Some ET's become a pet project and they never die. This wastes budget and time. Document why they were buried to limit resurrection attempts.
 - Some ET programs are run by people with R&D backgrounds and don't address customer acceptance and program design issues.
- » A successful ET needs an internal non- R&D/ET champion and an envisioned development path
- » Value proposition needs to recognize non-energy benefits, including in water, O&M, productivity, emissions, and comfort. Sometimes, these benefits may eat into energy savings
- » Always have a clear articulation of the value proposition – why will the customer adopt
- » Commitment to act -- keep moving forward, relentlessly

Through our work, we have developed lessons learned to drive results out of ET programs.

Navigant's Key Lessons Learned

- » A well thought out stage gate process is important, but do not let it be a hindrance.
 - A fast track process for high potential ideas can drive quick wins.
 - Key criteria can identify fast track opportunities early on.
- » Programs needs integration between strategy, ET, R&D, operations ,and marketing groups and people.
- » Leverage partnering opportunities for analysis, demonstrations, and funding.
 - Other utilities, U.S. Department of Energy, Department of Defense, General Services Administration and state governments (e.g. NYSERDA, CEC, etc.) all fund ET development.
 - Partner with other organization to create a market pull for ET's.

But even this process has limitations in today's environment due to R&D legacy, and widget focus.

- » Cost-effectiveness
 - Future cost decreases
 - Condensing water heaters
 - Other customer benefits
 - Electric anti-scaling
 - Warm-mix asphalt
- » Bias for long measure life, hardware devices
 - Continuous commissioning
 - Learning thermostats
 - Behavior programs
- » Policy boundaries
 - Waste heat recovery for electric generation
 - Combined solar PV/hot water systems
 - Biogas recovery inside customer fence
 - Non-energy savings are key driver of customer's adoption decision
 - Fuel substitution

Success with ET's requires thinking about how they impact stakeholders: utilities, regulators, investors and end users.

ET Management

- » Scan, screen, assess and prioritize
- » Assess technical and market potential
- » Conduct field demonstrations
- » ET portfolio management
- » Assess costs and benefits
- » Integrate into business and processes

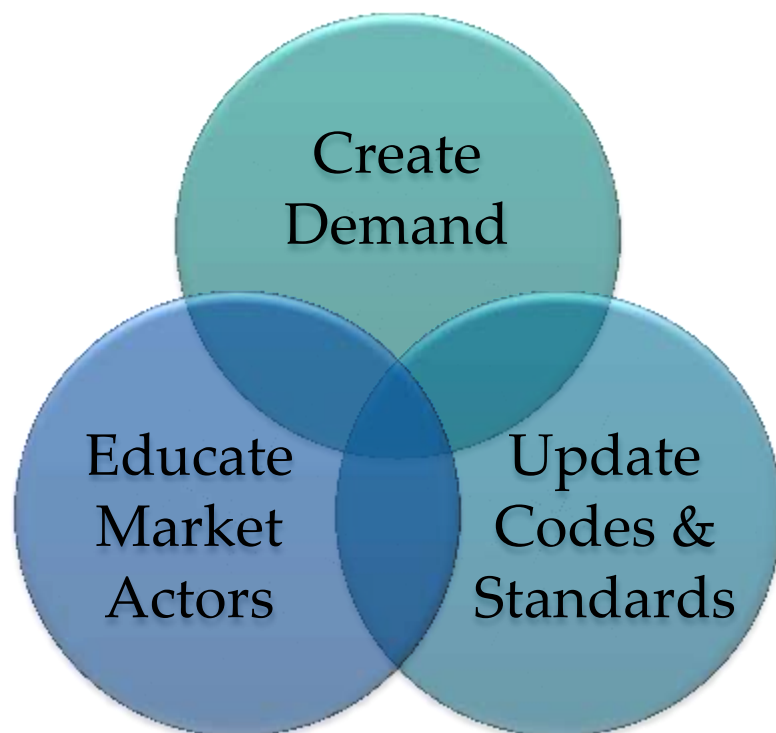
ET Policy

- » Develop or influence public policy regarding ET
- » Assess impact of public policy on ET
- » Incorporate ET into codes and standards
- » Assess economic impacts

ET Project Execution

- » Conduct feasibility study
- » Project due diligence or risk assessment
- » Evaluate ET programs
- » Operate and maintain ET

Take a broader view of what is needed to facilitate uptake of emerging technologies



ET development plan needs to include anticipated next steps in development – what happens next, who does it?

Strategic Options	
Support Industry	Support manufacturers, researchers, policymakers, and regulators in their efforts to bring these technologies to the general market (e.g., appliance standards, building codes).
Existing Activity	Integrate into existing utility activity (e.g., efficiency program, ET pilot demo); Learn from existing market development activities from vendors or other utilities before launching internal efforts.
Fast Track	Design program and incorporate into existing program. Develop a work paper documenting customer benefits, and defining the program characteristics, and target markets.
Pilot Project	Small scale demonstration project with select group of customers that will help validate energy, technology and financial performance, as well as identify potential barriers to large scale deployment. Potential to incorporate into efficiency programs in 1-2 years.
Venturing Assistance	Work with vendor to accelerate the market adoption of the technology. Includes a broad range of consulting services (e.g., manufacturing ramp-up, marketing, distribution). Potential to incorporate to efficiency programs in 1 yr.
Market Challenge	Develop specifications and work with vendors or issue RFPs for products

Utility efforts can bring new energy efficiency technologies into their programs to benefit customers more rapidly.

- » Dedicated budget with associated KPIs
- » Market and program as opposed to R&D orientation
- » Focus on:
 - Moving forward, making decisions
 - Customer value proposition
 - Regulatory barriers
 - Next steps, if successful and internal hand-offs
- » Best opportunities are not traditional energy efficiency widgets:
 - Multi-fuel
 - Non-energy benefits
 - Initial costs high but will decline rapidly as market develops
 - Behavior
 - Data and analytics driven

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Thank You!