U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

FEMP Federal Energy Management Program

Mastering Campus Energy and Water Management – Tools for Success

August 8, 2016

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Pacific Northwest National Laboratory
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CSRA, Inc.
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Verus Resource Management, Inc.

Adminstrative Notes

- Logistics:
  - No tables, which means there will be times we will be asking for your help in re-arranging the room for different activities
  - Lunch is on your own
- To be eligible for continuing education units (CEUs) for this workshop, you must
  - Sign in and sign out
  - Complete a participant evaluation and take the quiz for this workshop. Access this workshop's participant evaluation and quiz using this link: http://www.wbdg.org/education/femplt08082016b.php
- Handouts and slides will be available at the FEMP Large Campus Innovative Change Initiative (LCIC) website: http://energy.gov/eere/femp/large-campus-innovative-change-initiative

Agenda

9:00-9:30am	**Introductions**
9:30-10:30am	**Addressing the Challenges: How to be a "Super Energy Manager"**
10:30-10:45	Break
10:45-noon	**Culture Change Game**
Noon-1pm	Lunch (on your own)
1:00-2:00pm	**Project Financing: One size does not fit all**
2:00-3:45pm	**Speed Dating: Meet some resources**
	» Guiding Principles [Nic Baker, FEMP]
	» Metering [Saralyn Bunch, FEMP]
	» Energy Security/Resiliency [Caroline Harrover, PNNL]
	» EISA Assessments [Emily Wendell, PNNL]
	» Water Management [Kate McMordie-Stoughton, PNNL]
	» Climate Resilience Planning [Kathleen Judd, PNNL]
3:45-4:30pm	**Large Campus Innovative Change Resources**

Speed Dating

- What do we mean by “Speed Dating”?
- Need questions for each topic area
  - Guiding Principles [Nic Baker, FEMP]
  - Metering [Saralyn Bunch, FEMP]
  - Energy Security/Resiliency [Caroline Harrover, PNNL]
  - EISA Assessments [Emily Wendell, PNNL]
  - Water Management [Kate McMordie-Stoughton, PNNL]
  - Climate Resilience Planning [Kathleen Judd, PNNL]

Sustainable Federal Buildings 2016 Guiding Principles

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- Executive Order 13693 section 3(h)(ii) states that agencies will identify "…a percentage of **at least 15 percent, by number or total square footage**," of their "existing buildings **above 5,000 gross square feet** (GSF) that will, **by fiscal year 2025**, comply with the revised Guiding Principles for Federal Leadership in…Sustainable Buildings (Guiding Principles)…and making annual progress toward 100 percent conformance with the Guiding Principles for its building inventory."
- The 2016 Guiding Principles for Sustainable Federal Buildings updates and replaces the December 2008 Guiding Principles to:
  1. Reflect the evolution of sustainable building design, construction, and operating practices since 2008,
  2. Incorporate other building-related E.O. 13693 requirements,
  3. Increase the economic and environmental benefits of Federal investments in facilities,
  4. Enhance occupant health, wellness, and productivity,
  5. Include climate resilience in building design, construction, and operations, and protect Federal facilities investments from the potential impacts of climate change, and
  6. Provide information on tracking agency green building performance.

FEMP Sustainability Project Manager: Nic Baker
Email: Nicolas.Baker@hq.doe.gov Phone: 202-586-8215

Federal Building Metering Guidance Overview

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- Metering is required for electricity, natural gas, steam, and water consumption per
  - Energy Policy Act of 2005
  - National Energy Conservation Policy Act Section 543, as amended (42 U.S.C. § 8253)
  - Executive Order 13693, Planning for Federal Sustainability in the Next Decade
- Federal Building Metering Guidance issued November 2014 stated the purpose of metering Federal buildings is to collect, analyze, and act on the energy performance data
  - Hourly data is minimum interval to be collected
  - Data must be incorporated into a data management system
  - Data must be provided to the energy manager
- The Guidance provides a two-step process for installation of meters in Federal buildings:
  - Step 1 sets criteria for determining Federal buildings for which the installation of meters is "appropriate."
  - Step 2 recommends a methodology for establishing a prioritization process for the installation of meters at all "appropriate" Federal buildings

FEMP Metering Project Manager: Saralyn Bunch
Email: Saralyn.Bunch@ee.doe.gov

Energy Security/Resiliency

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Proudly Operated by Battelle Since 1965

- Energy Security is "having assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet mission essential requirements" - FY2012, National Defense Authorization Act (NDAA)
- Resiliency is "the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions" – E.O. 13653
- Key elements of Energy Security/Resiliency Planning

Identify Core Assets & Potential Threats

- *Important facilities*
- *Critical missions*
- *Communication & cybersecurity*
- *Physical infrastructure security*

Assess Installation Status & Vulnerabilities

- *Existing plans*
- *Future installation investment plans*
- *Existing backup systems*

Identify & Analyze Risks

- *Physical and cyber threat identification*
- *Utility vulnerability*
- *Impact on core functions*
- *Temporal scenarios*
- *Risk prioritization*

Design Integrated, Resilient Solution

- *Infrastructure efficiency*
- *On-site generation economic analysis of resiliency options*
- *Microgrid design*
- *Cybersecurity plan*

Provide Implementation Strategy

- *Financing options*
- *Implementation schedule*
- *External partner coordination*
- *Communication strategy*
- *Continued evaluation of risks*

Energy Resiliency

The level of detail needed for a specific site's planning process depends on size of site, and the complexity and maturity of site systems.

Energy Security/Resiliency: Caroline Harrover Email: Caroline.Harrover@pnnl.gov Phone: (202) 557-0609

EISA Assessments

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EISA 2007 Sec 432: Evaluate 75% of energy consuming buildings every 4 years. Perform "Comprehensive Energy and Water Evaluations" and Retro-commissioning Assessment

3 Types of Assessments	Walk Through	Remote	Desk
Scope of Analysis	ASHRAE Level 1/2 & Commissioning Assessment	Subset of Level 1 & Commissioning Assessment	Facility Status Eval Utility Analysis ECM List Review

Assessment Type Criteria	Operating Status	Facility Characteristics	Utility Profile	Project Implementation Status

EISA Assessment programs can be tailored for each agency to meet a number of mandates and goals:

- Identify and develop Net Zero buildings or sites, State & Federal water and energy reduction mandates, alternative financing goals, etc.

Comprehensive Energy and Water Evaluation Contact: Emily Wendel
Email: Emily.Wendel@pnnl.gov Phone: (206) 528-3011

Facility Water Cycle

Climate Resilience Planning Framework

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Climate Exposures
- Past / Current
- Future

Vulnerability of Systems & Infrastructure
- Sensitivity
- Adaptive capacity

Impacts

Significance for Mission & Operations
- Mission attainment
- Operating/maintenance costs
- System reliability
- Safety

Adaptation Plans
- Reinforce existing measures
- Identify new measures
- Integrate into operations
- Monitor change

Climate Resilience Planning:
Kathleen Judd
Email:
Kathleen.Judd@pnnl.gov
Phone: (206) 528-3330

Adapted from Moss et al, 2010. http://www.esd.ornl.gov/eesdtech/biblio/1240754

Previously Identified Issues

- Develop a useful campus energy/water/sustainability plan that provides clarity on where the focus should be
- Address the conflict between near and long goals
- Need solutions to address the bandwidth limitations (time, funding)
- Address how focus a campus program given limited access to data
- Need tips on how to overcome the low cost of energy and water and the first cost of energy and water investments
- Emphasize a campus approach rather than an agency or individual building approach

Previously Identified Technical Areas of Interest

- **Energy Security/Resiliency**
- **Energy and Water Assessments**
- Energy Efficiency
- Energy Conservation
- **Energy and Water Metering and Data Management**
- Environmental Management Systems
- Reduce Greenhouse Gases
- **Climate Adaptation and Resiliency Planning**
- Electric Cars & Charging (Fleet & Personal vehicles)
- **HPSB Guiding Principles for new and existing buildings**
- **Reducing Water use**
- Connection between Water and Energy use
- **Financial incentives**
- Pollution Prevention/ Environmentally Preferable Purchasing
- ESPCs/UESCs

Feedback

- What do you consider the greatest issues at your campus inhibiting your ability to meet your energy/water/sustainability goals?
- What areas would you like to be provided FEMP technical assistance?
- What is working well at your campus?

Ten Steps to a “Super” Energy Program

1. Build a network
2. Use data
3. Set goals
4. Develop plan
5. Find funding
6. Communicate
7. Engage your network
8. Take action
9. Measure and verify progress
10. Recognize and reward accomplishments

Build a Network

- Identify key stakeholders at your campus and broaden your internal network to include unusual suspects
  - Contracting
  - Information Technology/Cybersecurity
  - Mission
  - Human Resources
  - Building occupants
  - Management/Leadership
- Build an external network
  - Peers
  - Community members
  - Technical service providers

Avengers image

Use Data

- Use energy and water data, where available, to
  - Benchmark performance
  - Assess usage trends
  - Identify opportunities for improvement
  - Track progress
  - Verify energy and water savings
- Look first where data exist
- Where data do not exist, use other means for documenting progress and develop plans to get the data in the future
- Develop a data management system

Matrix image

Set Goals

- Keep the number of goals small
- Long-term goals can be aspirational
- Near-term goals should be attainable and measurable
- Consider identifying potential “Quick Wins” to get buy-in from new stakeholders
- Work to imbed the goals

  into existing business

  systems

Hawkeye image

Develop Plan

- Connect energy, water, waste, and sustainability strategies whenever feasible
- Assign stakeholders to be accountable for different aspects of the plan
- Develop a clear plan of action and tasks
- Have a clear focal point and expected outcomes that can be communicated to others
- Develop schedule that includes regular progress checks with the stakeholders

Elephant superhero

Strategy vs. Strategery

- **Strategy** is a plan of action designed to achieve a particular goal
- **Strategery** is a reactive, quickly developed 'plan' of action passed off as strategy.

http://www.bing.com/videos/search?q=SNL+strategery&view=detail&mid=EDECA9699022352A961EEDECA9699022352A961E&FORM=VIRE

- If the 'strategy' meeting you're holding was called ten minutes ago it's a strategery meeting
- If you're developing the plan at midnight on your 10th cup of strong coffee, it's probably strategery
- If three participants in the meeting are dialing in separately by phone to discuss it, it's strategery
- If the 'strategic plan' needs to be implemented at 9am tomorrow morning and completed by 10am it's a strategeric plan
- If you're writing it on a plane, train or the back of a car, it's strategery

http://www.forbes.com/sites/dansimon/2012/09/11/5-differences-between-strategy-and-strategery/#63eab1b12af8

Find Funding

- Pursue funding from within the agency
- Use other people's money, when possible
- Look for low-/no-cost strategies that could be part of the Quick Wins
- Quantify the cost of delay if the plan is not fully implemented
- Use your extended network to look for new funding sources

Ironman image

Communicate

- Make senior leadership aware of the plan, and if possible get them to commit to the goals and participate
- Look at the plan and goals monthly to assess progress and help focus efforts
- Share the plan with internal and external stakeholders
- Engage campus occupants through competitions or general communications
- Track and share progress on goals

Deadpool image

Engage your Network

- Use your web of contacts to identify potential funding sources
- Offer training to key stakeholderes and your internal and external network
- Engage the campus occupants to be part of the effort
- Be persistent about engaging more than the usual suspects
- Continue to expand your network

Spiderman image

Take Action

- Pick one thing to focus on
- Use technology to your advantage
- Automate where logical
- Offer training resources for all key stakeholders
- Fix the basics
- Include a focus on quality maintenance
- Hold competitions

Captain America image

Measure and Verify Progress

- Develop a measurement and verification plan that is logical for the existing level of data
- Collect and analyze available data on a regular basis
- Use the data to further improve performance and to communicate successes with key stakeholders
- Continuous monitoring and assessment is preferred, where technical and human resources are available

Cyborg image

Recognize and Reward Accomplishments

- Publicly recognize or reward stakeholders and others that are actively reducing energy, waste or waste
  - Recognition in internal newsletters
  - Small token rewards such as food, pins, cloth bags, etc.
  - Submission into Federal awards program
  - Notes in their annual performance review
- Recognize key internal and external stakeholders whenever possible

Superman emblem image

Planning Worksheet

- What are the major goals that you are working toward? Are there any new ideas you want to pursue?
  - Make a list of goals and/or ideas
  - Identify key stakeholders that will need to be involved

GOALS/IDEAS	STAKEHOLDERS	STRATEGY

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Culture Change Activity

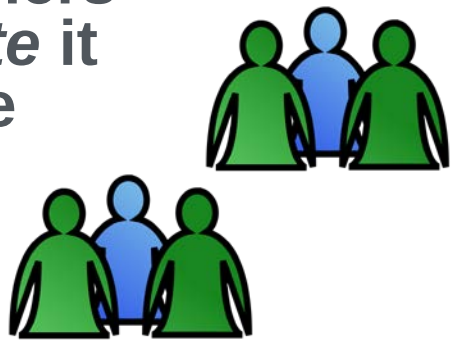
Return by 10:45 AM

The adoption of an innovation in a social system follows a predictable pattern:

It starts with a **small group**, even a **single person** who has an idea that is new to the system.

It spreads *slowly* at first through the work of change agents who ***actively*** promote it.

As more change agents and transformers adopt the innovation and *communicate* it to others, more early adopters join the process until the idea reaches critical mass and "takes-off."

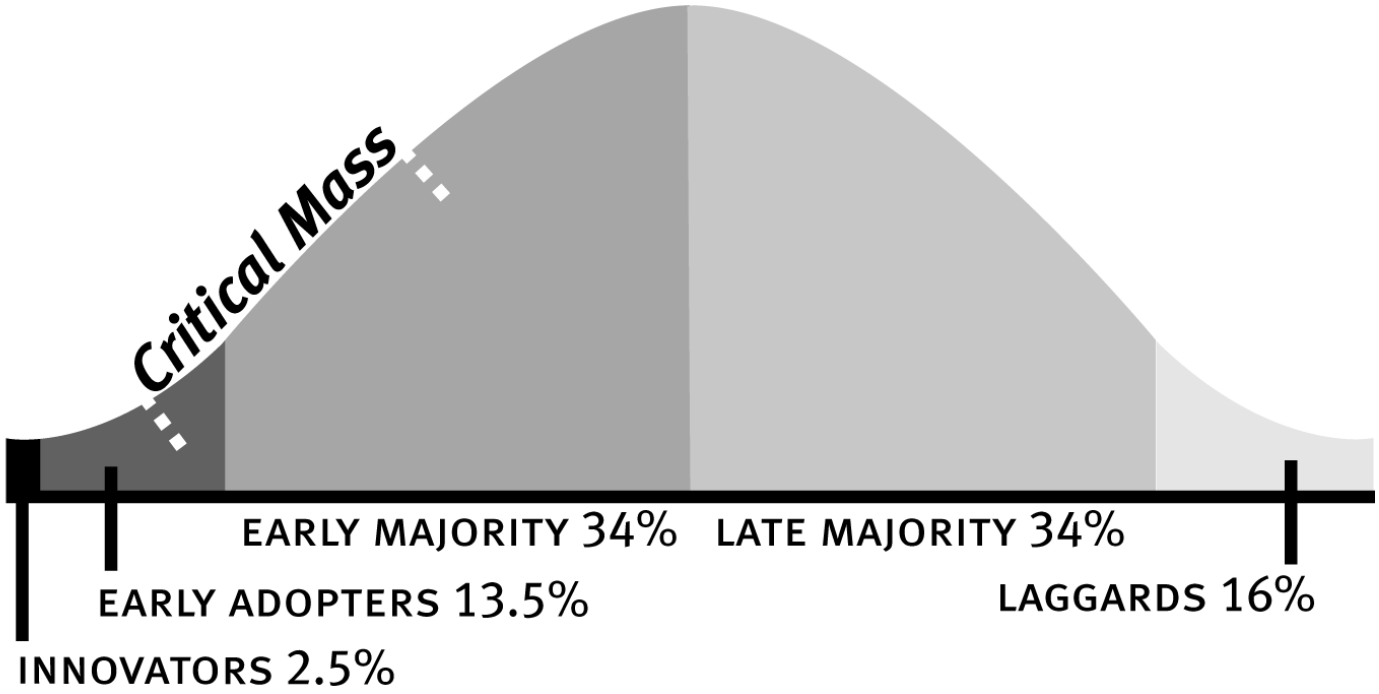


Stages of Adoption

Figure 3.2

Rate of Adoption of an Innovation Over Time

Source: Adopter Categorization on the Basis of Innovativeness
Adapted from: Rogers, 1995, pg. 262



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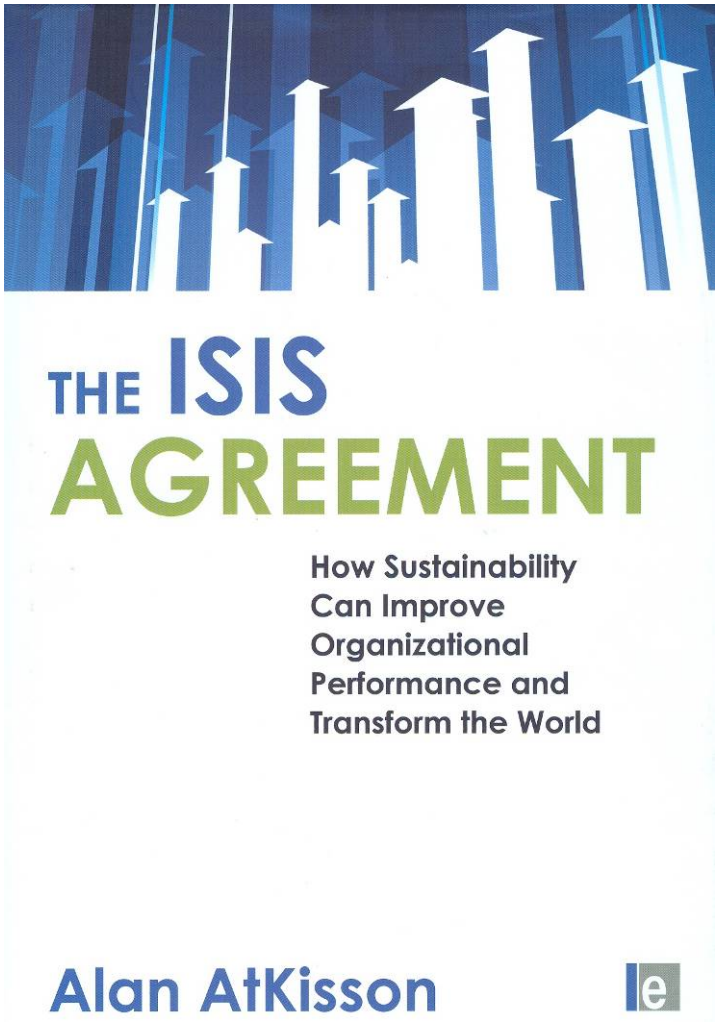
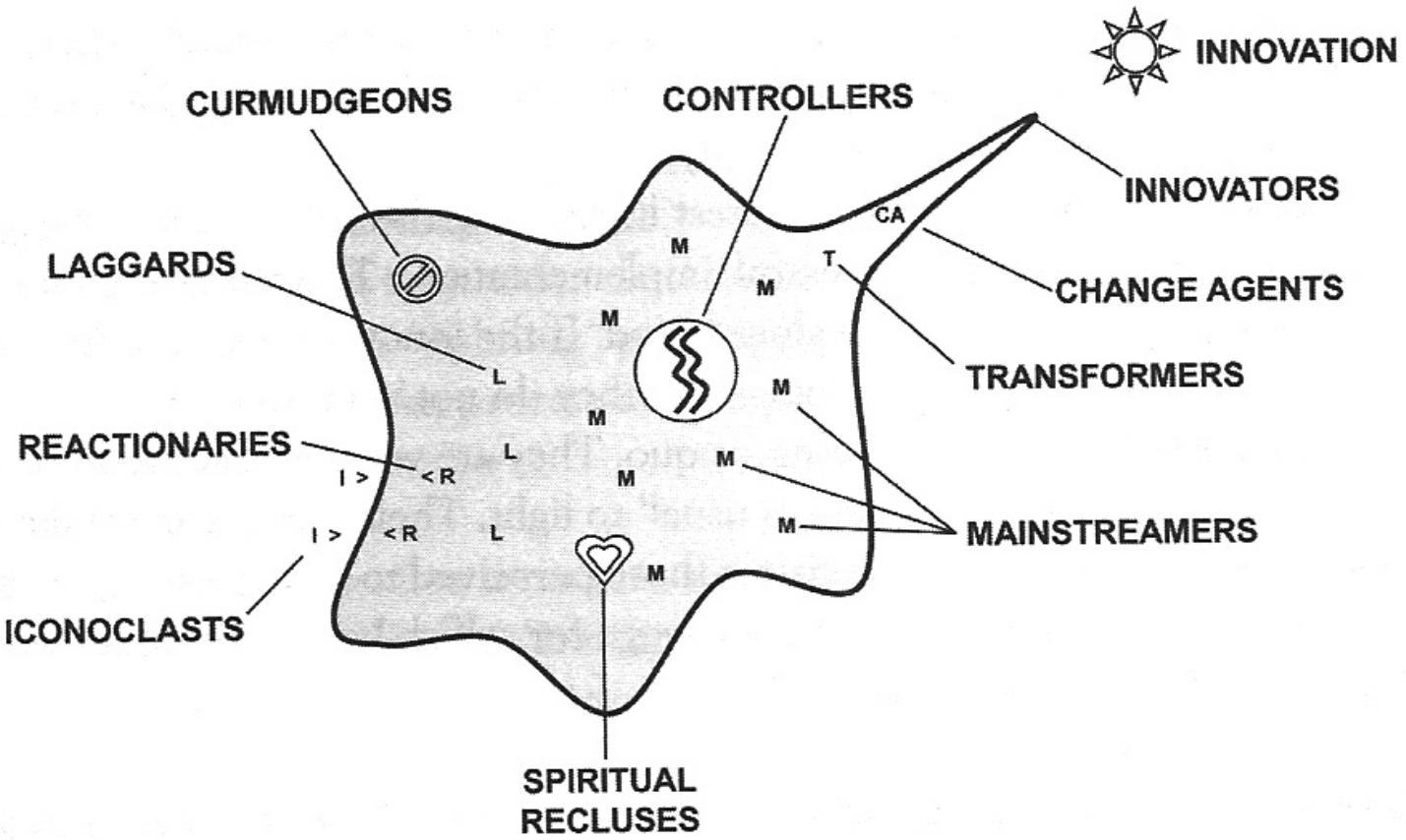
Cultural Change Game



Learning from the Amoeba



The ISIS Agreement: How Sustainability Can Improve Organizational Performance and Transform the World *(Figure 8.5, page 181)* By Alan AtKisson (2008, ISBN: 978-1-84407-415-0)

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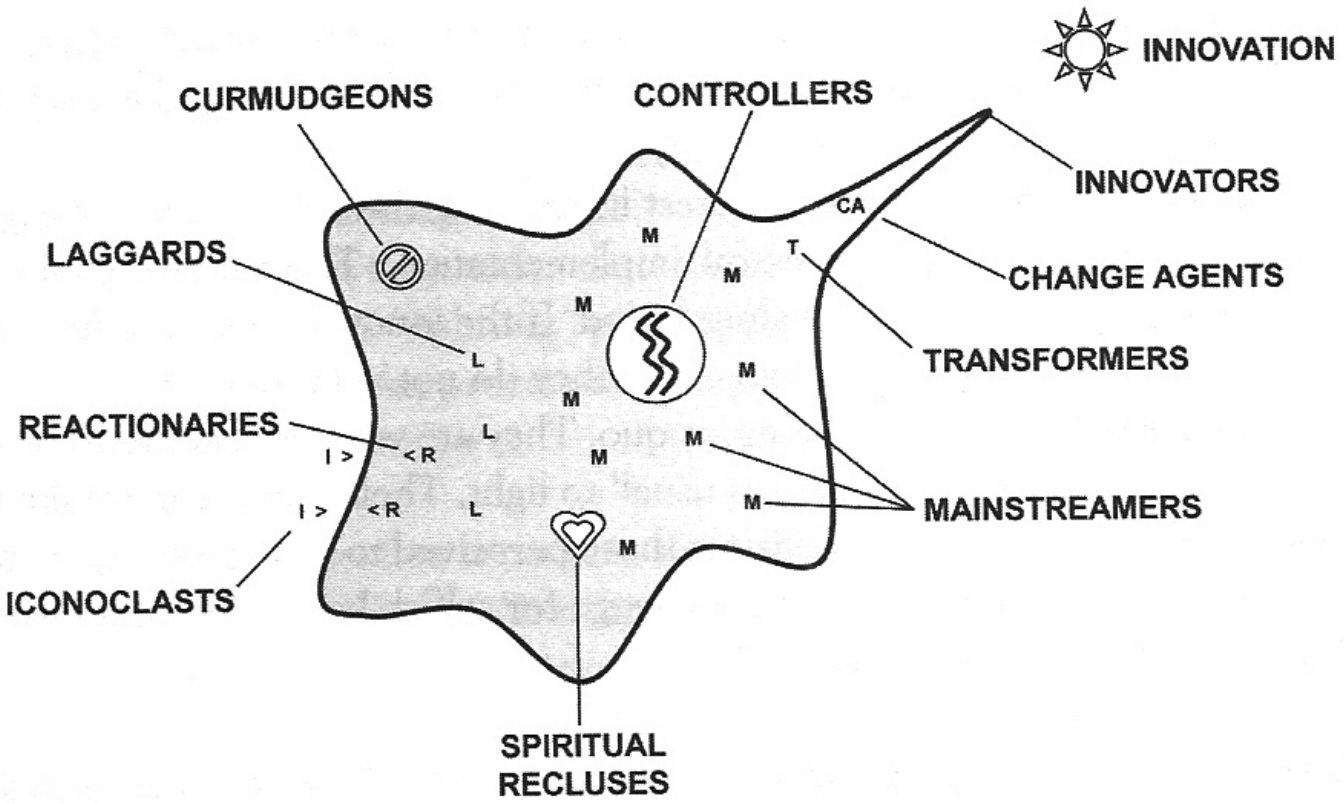
Amoeba Game

- The “Very Prepared Site” has initiated its Energy Security planning effort. The Sustainability Manager is the assigned lead for the Energy Security Plan and he/she is eager to build a team and get started with the planning effort. The site has 100 buildings and related infrastructure that needs to be considered for the Energy Security Plan. The Plan needs to ensure that the site’s key missions will be functioning during a grid outage of up to 30 days.
- The Sustainability Manager has called together the first meeting of potential stakeholders to discuss the goals of the Energy Security Plan, to identify additional stakeholders, and to define next steps. Each participant needs to do the following:
  - **Read your card to yourself and behave as the character represented on the card**
  - **Introduce yourself to everyone in your group (“My name is [your name]. I am the [title on your card].”)**
  - **The Sustainability Manager runs the meeting. He/She initiates the discussion by describing the goals of the Energy Security Plan and soliciting feedback**
  - **Meeting participants voice their opinions (and the Sustainability Manager responds as deemed appropriate)**

Feedback on Experience

- How much progress did you make?
- What challenges did you encounter?
- Have you encountered a situation similar to this in real life?

Who was playing?



The ISIS Agreement: How Sustainability Can Improve Organizational Performance and Transform the World *(Figure 8.5, page 181)* By Alan Atkisson (2008, ISBN: 978-1-84407-415-0)

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Influence Strategies

- Innovator
  - Express respect and appreciation
  - Learn important parts of their ideas
- Change agent
  - Use to produce a brochure, report or website
  - Test ideas and collaboration opportunities
- Transformer
  - Busy, but interested, so need the elevator speech
  - Listen carefully to their priorities
- Controller
  - Treat them as ‘super-transformers’
  - Have a clear action-focused message ready
  - Stress benefits of idea
  - Don’t waste time with chit chat
  - Avoid nervous laughter
- Curmudgeon
  - Energy drain that are best to avoid
  - Look for opportunities rehabilitate

Influence Stategies, continued

- Reactionary
  - Avoid or engage Iconoclasts to distract them
  - Recruit as Transformers, if they must be engaged
- Laggard
  - Avoid and keep away from Reactionaries
- Iconoclast
  - Give them information to support your cause
  - Publicly keep your distance
- Spiritual Recluse
  - Use when they can support your goals
- Mainstreamer
  - Approach after Transformer buy-in

Amoeba Game, Round 2

- The "Very Prepared Site" has initiated its Energy Security planning effort. The Sustainability Manager is the assigned lead for the Energy Security Plan and he/she is eager to build a team and get started with the planning effort. The site has 100 buildings and related infrastructure that needs to be considered for the Energy Security Plan. The Plan needs to ensure that the site's key missions will be functioning during a grid outage of up to 30 days.
- The Sustainability Manager has called together the first meeting of potential stakeholders to discuss the goals of the Energy Security Plan, to identify additional stakeholders, and to define next steps. Each participant needs to do the following:
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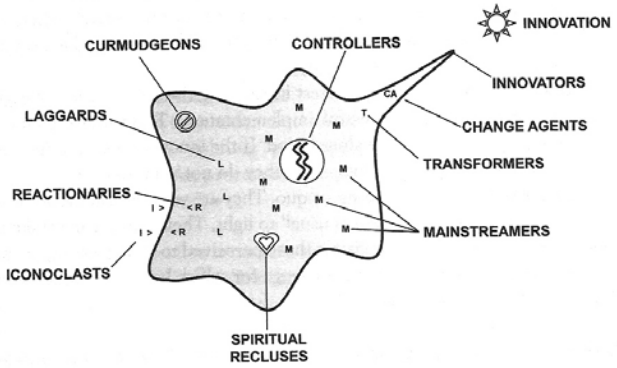
  - **The Sustainability Manager runs the meeting. He/She initiates the discussion by describing the goals of the Energy Security Plan and soliciting feedback**
  - **Meeting participants voice their opinions (and the Sustainability Manager responds as deemed appropriate)**

Feedback on Experience

- How much progress did you make?
- What challenges did you encounter?
- Pull out your Planning Worksheet:
  - Who else would you engage?
  - What strategies would you take with the key players?

Remember the AMOEBA



- A = Adapt the Innovation
- M = Mobilize the Change Agents
- O = Organize the Transformers
- E = Easy does it for the Mainstreamers
- B = Build momentum at the margins
- A = Avoid Reactionaries, Laggards, and Curmudgeons

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Additional Thoughts – *My personal favorites*

- Walk the Talk
  - Without the experience of wrestling with changes yourself, it is difficult to advise others on how to make a large-scale change
- Use up-to-date information
  - Have current information when you talk with your peers
  - Encourage your peers to be technical leads and to recommend strategies
- Share information and credit
  - Create a cooperative environment
  - Nominate peers in different organizations for energy and environmental awards

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Lunch

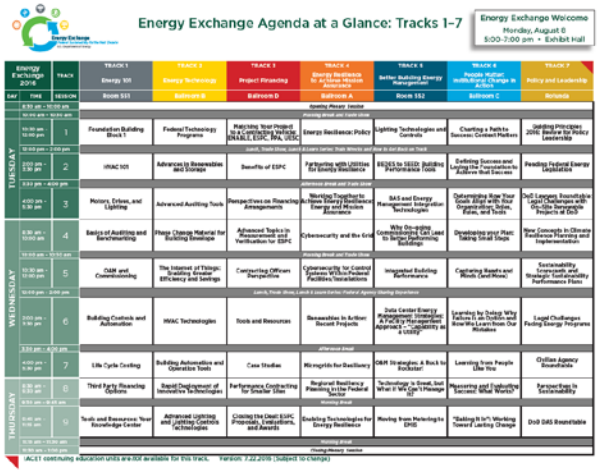
Please return at 12:55 PM

Speed Dating

- Break up into 6 groups
- At each location introduce yourself to the Subject Matter Expert (SME) and give them your business card
  - Name, title, agency, location
- Questions provided before lunch will be answered by the SMEs
- Rotate to the next location when told
- Answers to these questions will be posted on the FEMP LCIC webpage:

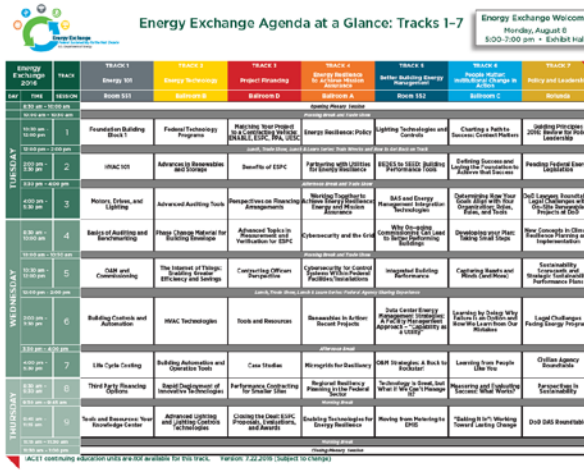
  http://energy.gov/eere/femp/large-campus-innovative-change-initiative

Energy Exchange Sessions



- Session 1
  - Track 7: Guiding Principles 2016
  - Track 10: Campus Approach to Energy Management
- Session 2
  - Track 3: Benefits of an ESPC
  - Track 10: Components of a Successful Master Planning
  - Track 12: Campus Utility Distribution System Strategies
- Session 3
  - Track 2: Advanced Auditing Tools
  - Track 10: Integrating Sustainability and Net Zero into Installation Master Planning
- Session 4
  - Track 7: New Concepts in Climate Resilience Planning and Implementation
  - Track 11: Metering Strategies: Opportunity Identification Using Energy Data

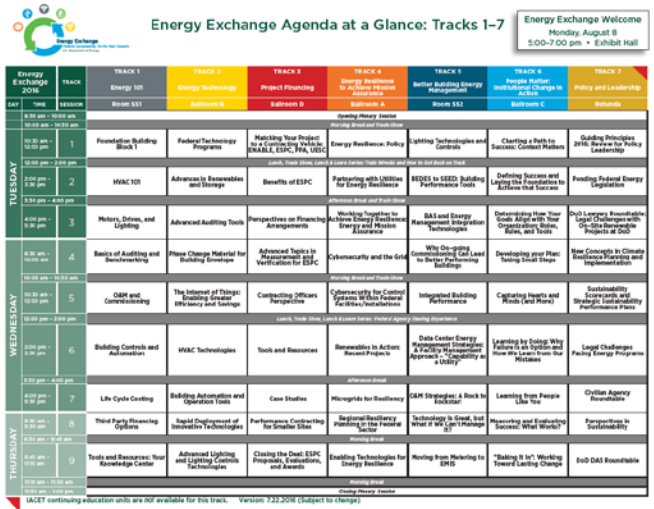
Energy Exchange Sessions



- Session 5
  - Track 6: Capturing Hearts and Minds (and More)
  - Track 8: Alternative Water: Sources, Uses, & Case Studies
- Session 6
  - Track 1: Building Controls and Automation
  - Track 8: Tracking Federal Energy and Water Performance
  - Track 10: What Can We Learn from Higher Ed?
  - Track 13: Maximizing FEMP's Customer Services
- Session 7
  - Track 4: Microgrids for Resiliency
  - Track 8: Engaging your Entire Organization to Affect Change
  - Track 10: Integrating Renewable Energy on a Federal Campus/Large Installation
  - Track 11: Integrating Multiple Projects
  - Track 13: Incorporating Renewable Energy into Performance Contracts

Energy Exchange Sessions

- Session 8
  - Track 4: Regional Resiliency Planning in the Federal Sector
  - Track 7: Perspectives in Sustainability
  - Track 8: A Conversation with the Federal Chief Sustainability Officer
- Session 9
  - Track 3: Closing the Deal: ESPC Proposals, Evaluations, and Awards
  - Track 4: Enabling Technologies for Energy Resilience
  - Track 8: Approaching Net Zero Water, Energy and Waste
  - Track 11: Long-term Energy Efficiency: It Takes a Village



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Feedback

- What do you consider the greatest issues at your campus inhibiting your ability to meet your energy/water/sustainability goals?
- What areas would you like to be provided FEMP technical assistance?
- What is working well at your campus?

Regional Sustainability Workshops

- FEMP will be providing Regional Sustainability Workshops in 2017
  - Hosted at GSA locations
  - Free to all Federal agencies
- Workshops will cover sustainable building and campus level strategies and practices addressing some of the regional priorities identified by agencies
- To express interest, contact:
  - Nic Baker; Nicolas.Baker@EE.Doe.Gov

FEMP Resources

- FEMP website: http://www.energy.gov/eere/femp/federal-energy-management-program
- LCIC website: http://energy.gov/eere/femp/large-campus-innovative-change-initiative
- FEMP Training website: http://www.energy.gov/eere/femp/federal-energy-management-program-training
- Water Resources:
  - FEMP EO 13693 Water Provisions: http://energy.gov/eere/femp/guidance-meeting-executive-order-13693-water-provisions
  - FEMP Water Efficiency Best Management Practice: http://energy.gov/eere/femp/best-management-practices-water-efficiency
  - FEMP Water Project Screening Tool: http://energy.gov/eere/femp/downloads/water-project-screening-tool
  - FEMP Alternative Water Mapping Tool: http://energy.gov/eere/femp/alternative-water-sources-maps

FEMP Resources

- Metering Resources
  - Federal Building Metering Guidance, November 2014 Update: http://energy.gov/sites/prod/files/2014/11/f19/metering_guidance.pdf
  - Metering Best Practices: A Guide to Achieving Utility Resource Efficiency, Release 3.0: http://energy.gov/eere/femp/downloads/metering-best-practices-guide-achieving-utility-resource-efficiency
  - De Minimis Thresholds for Federal Building Metering Appropriateness, March 2015: http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-24175.pdf
  - Federal Metering Data Analysis Needs and Existing Tools, July 2015: http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-24191.pdf
  - Simplified Data Processing Method for Meter Data Analysis, November 2015 (http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-24331.pdf)
  - Prioritizing Building Water Meter Applications http://energy.gov/eere/femp/prioritizing-building-water-meter-applications
  - Estimating Methods for Determining End-Use Water Consumption http://energy.gov/eere/femp/estimating-methods-determining-end-use-water-consumption

Reminder

- To be eligible for continuing education units (CEUs) for this workshop, you must
  - Sign in and sign out
  - Complete a participant evaluation and take the quiz for this workshop. Access this workshop's participant evaluation and quiz using this link: http://www.wbdg.org/education/femplt08082016b.php
- Handouts and slides will be available at the FEMP Large Campus Innovative Change Initiative (LCIC) website: http://energy.gov/eere/femp/large-campus-innovative-change-initiative
- Contacts:
  - Kim Fowler, kim.fowler@pnnl.gov, (509) 372-4233
  - Elena Meehan, elena.meehan@csra.com, (865) 278-3003
  - Jesse Maestas, jesse.maestas@verusrm.com, (303) 396-5819