Opinion Dynamics

Boston | Headquarters

617 492 1400 tel
617 497 7944 fax
800 966 1254 toll free

1000 Winter St
Waltham, MA 02451

Memorandum

AIC Strategic Energy Management Program

To: Ameren Illinois
From: The Opinion Dynamics Evaluation Team
Date: October 2, 2018
Re: Strategic Energy Management Literature Review Findings

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1. Introduction

SEM programs represent a new and growing opportunity to achieve savings in the Commercial and Industrial (C&I) sectors. The definition of SEM commonly accepted in the industry is "a holistic approach to managing energy use in order to continuously improve energy performance, by achieving persistent energy and cost savings over the long term. It focuses on business practice changes from senior management through shop floor staff, affecting organizational culture to reduce energy waste and improve energy intensity" (Consortium for Energy Efficiency, 2014). SEM programs in the US and Canada have rapidly expanded from serving fewer than 100 participants in 2011 to 707 participants in 2016 (Burgess, Cross, Baker, & Vohra, 2015; NEEP, 2017).

The Ameren Illinois Company (AIC) Strategic Energy Management (SEM) offering has been in operation since 2015, when it began as a pilot to help participants achieve ongoing energy and cost savings by motivating changes in participants' organizational culture and business practices. As part of the SEM program, AIC program staff help participants identify new energy savings opportunities and assist participants in taking full advantage of AIC program offerings. The program offers a base incentive to participants to assist with SEM program implementation, and a performance incentive for participants that reach their energy reduction targets through the program. Leidos energy advisors help participants implement the SEM program and participants are assigned to energy advisors based on their geographic region.

The basic standards of SEM programs allow for flexibility and innovation in program design and implementation. The rapid growth of these programs in the past few years has resulted in an abundance of new program design, implementation, and measurement approaches, as well as studies assessing these approaches and recommending best practices.

To support the AIC program, Opinion Dynamics conducted a review of industry white papers and program design manuals from across the country. Elements of this research include:

- A detailed summary of various program elements included in SEM programs nationwide and an assessment of their relevance for the AIC SEM offering
- A list of best practices and lessons learned from other SEM programs that could be applied to the AIC offering 's design and implementation

- Recommendations for specific program elements and implementation changes AIC could make to the SEM offering

Key findings from these research activities are summarized in Section 3.

2. Methods

The evaluation team conducted a literature review to identify program design elements, best practices, and lessons learned from other SEM programs. The evaluation team compared AIC's program design elements to four other programs across the country (Table 1). We selected these programs because they have been in existence for several years and there was information about their program design format, successes, and lessons learned extensively documented in white papers. In addition, the evaluation team identified best practices and lessons learned from multiple additional SEM programs included in white paper reviews and analyses.

Table 1. Utilities Included in Program Comparisons

Utility	Program Name	Year Established
AIC	Strategic Energy Management program	2015
AEP Ohio	Continuous Energy Improvement program	2012
Efficiency Vermont	Continuous Energy Improvement program	2014
Energy Trust of Oregon	Commercial Strategic Energy Management program	2011
National Grid	(No formal name)	2014

Sources: AEP Ohio, Efficiency Vermont, and National Grid (Burgess et al., 2015)
Energy Trust of Oregon (Volkman, Schick, Kesting, & Belkhayat, 2014)

The evaluation team used the three SEM Minimum Elements as an overarching guide to categorize the information gathered during the literature review process. As discussed in Section 1, CEE developed a definition of SEM that is widely accepted in the industry. This standard definition includes a set of three SEM Minimum Elements, which SEM programs should consistently share. The CEE defines a common set of activities that are carried out for each of the SEM Minimum Elements, but these guidelines allow for flexibility and innovation in SEM design and implementation across programs. To capture variation across programs, we supplemented information provided by CEE with detail about program offerings, best practices, and lessons learned from SEM programs across the country gathered during the literature review process the US that exemplify how the SEM Minimum Elements are incorporated into these programs.

CEE's definition of SEM includes three main components:

- **Customer Commitment**: Includes long-term goal setting with senior management from the participant's organization and ensuring that SEM initiatives are properly resourced for goal attainment.
- **Planning and Implementation**: Planning provides the starting point or foundation for the participant to strategically manage energy. Implementation is the translation of planning into actions that improve efficiency or reduce energy consumption.
- **A System for Measuring and Reporting Energy Performance:** According to CEE, participants should monitor and report energy performance according to energy performance indicators and regularly analyze actual consumption against estimated consumption.

Although not officially a SEM Minimum Element, the team also identified best practices and programs designs for the participant selection and marketing process.

3. Program Design Elements and Best Practice Findings

This section includes a review of program design elements, best practices, and lessons learned categorized by the SEM Minimum Elements defined by CEE. Table 2 presents program design elements identified during the literature review process and descriptions of these elements.

Table 2. SEM Minimum Elements and Program Design Elements

SEM Minimum Elements	Program Design Element	Description
Participant Selection and Marketing[1]	Select appropriate program model	Program administrators can choose between three different program models that dictate the program management structure and which sites are selected for inclusion in the program
Customer Commitment	Development of a Strategic Energy Management Plan	A Strategic Energy Management Plan is a roadmap that outlines how the participant will implement projects and activities to achieve energy savings goals
	Corporate Commitment	Corporate commitments can take the form of a formal corporate energy policy or a formal agreement with the utility offering the SEM program
	Team Assembly	Energy teams help implement the program and are often made of up facility management staff and can assist with engaging employees across the company
	Energy Champion Designation	Appointing an internal "champion" to manage the SEM program: The energy champion is generally the leader of the energy team
Planning and Implementation	Technical Workshops	SEM program designers suggest that program administrators incorporate workshops to educate participants about different aspects of SEM implementation in their program designs
	Energy Management Assessment	Energy Management Assessments include benchmarking participants' present energy management activities against industry standards and they may also include the completion of walk-throughs of participants' facilities to identify energy-saving opportunities
	Energy Map	A guide that documents how a facility uses energy and can help participant identify savings opportunities
	Energy Scan	Energy Scan or Kaizen Event involves examining an energy-intensive process within a facility and identifying O&M changes that can make this process more efficient
	Opportunity Register	A catalog of possible energy management projects to be implemented through the SEM program

[1] Customer selection and marketing is not an official SEM Minimum Element

SEM Minimum Elements	Program Design Element	Description
A System for Measuring and Reporting Energy Performance	Refer to the 2018 SEM Evaluability Assessment Memo for a detailed description of program design elements for developing a System for Measuring and Reporting	

In addition, Figure 1 summarizes the best practices identified during the literature review process.

Figure 1. SEM Best Practice Recommendations

Customer Selection and Marketing

1. Conduct market research to determine a target customer base
2. Incorporate more opportunties for interactions between SEM customers and peer-to-peer sharing into the formal program design
3. Consider employing new marketing strategies such as showcasing successful customers to recruit new customers

Customer Commitment

1. Make an effort to engage customers beyond their first year of participation, which can help ensure savings persist as the program matures.
2. Engage diverse partners throughout customers' organizations early in the SEM process

Planning and Implementation

1. Solidify a process for helping customers identify opportunities for ongoing energy savings
2. Including multiple stakeholders in SEM workshops can help ensure successful program implementation

Measuring and Reporting Energy Performance

1. Training customers how to continuously find energy savings on their own is key to achieving persistent savings
2. Ensure that customers make time to correctly track building performance.

In the following sections, we share SEM program design strategies, best practices, and recommendations for AIC based on the literature we reviewed.

3.1 Customer Selection and Marketing

Deciding which participants to include in an SEM program and how to market the offering to participants has a large influence on long-term program implementation and program success. In this section we identify participant selection and marketing program strategies and best practices.

3.1.1 Strategies

A recent industry review identified three different SEM program models including the cohort model, flagship model, and top-down model (Luboff, Legett, Vijeta, & Firme, 2016). AIC's SEM program currently does not fit directly into one of these three models, but the program may want to consider adopting elements of the cohort model and transitioning to the cohort program structure in the long-run. The cohort model is has proven to be beneficial for helping other program administrators scale up their SEM programs and facilitate communication between SEM participants. Descriptions of each program model are provided below:

- The **cohort model** is designed around delivering the program to cohorts or groups of similar participants who meet and share findings and lessons learned.
- For the **flagship model**, participants with numerous facilities, such as chain stores, implement SEM at one "flagship" facility with the goal of later bringing the program to other company facilities.
- Alternatively, for the **top-down** model, participants implement SEM in multiple buildings within one organization at the same time. Table 3 shows the appropriate SEM models for different characteristics of program administrators and participants.

Table 3. Characteristics of SEM Models

	Cohort Model	Flagship Model	Top-down Model
Target Participants	Similar-sized companies and organizations in the same sector (e.g. manufacturing, schools, colleges, and real estate companies)	Companies with franchises, including large chain stores, hotels, and convenience stores	Large companies with multiple facilities
Participation Requirements	Representatives from participating organizations must have the time to be able to participate in cohort meetings and implement SEM at the same time	Program administrators must make thoughtful participant selection choices and ensure that each participant is successful so the program can be replicated at other locations	Investment and commitment from participant executives
Example programs	Energy Trust of Oregon, AEP Ohio, Efficiency Vermont	Focus on Energy Wisconsin	NEEA and Xcel Energy

Source: (Luboff, Legett, Vijeta, & Firme, 2016)

3.1.2 Best Practices and Lessons Learned

The evaluation team identified several best practices and lessons learned in the area of customer selection and marketing.

Conduct market research to determine a target participant base

Effective SEM programs completed market research about potential SEM participants before initiating their SEM programs (Luboff et al., 2016). This research helped program administrators select an appropriate program design and determine ideal SEM participants to target for program participation.

Considerations

If the SEM program expands to new market segments such as serving smaller participants, conducting market research could help AIC understand which participants to select for the program and how to best serve these participants.

Design programs to facilitate peer-to-peer sharing

SEM program design experts suggest SEM programs should utilize a cohort model, because of the added benefits that come from the peer-to-peer sharing inherent in the model (Dias, 2017). The interactive aspects of the cohort model can be an effective way of engaging participants in SEM because it enables participants to facilitate conversations and share ideas rather than attending lectures (Dias, 2017). AEP Ohio's program featured cohorts from several different sectors, and this approach allowed the program to grow rapidly and effectively realize dramatic energy savings because program administrators reached out directly to industry groups which helped spread interest in the program within target industries (Burgess et al., 2015). Furthermore, the cohort approach helps to free up staff time, because participants can spend more time learning from other participants in their cohort instead of program staff (Burgess et al., 2015). The Energy Trust of Oregon is also interested in facilitating connections between SEM participants by developing working groups on topics such as working with energy use data (Volkman et al., 2014).

Considerations

Interviews with AIC's SEM participants conducted as part of the 2017 AIC C&I Custom Program Evaluation revealed that participants would like more opportunities to interact with other SEM program participants (Opinion Dynamics, 2018). As a result of this finding, the evaluation team recommended facilitated meetings and facility tours between participants to allow for additional peer-to-peer sharing.

AIC could build on this recommendation by incorporating additional opportunities for interactions between SEM participant and their peers. In the short run, AIC could consider adopting a modified cohort design by creating working groups and holding regular workshops to facilitate the introduction of SEM participants from similar industries. The implementation team could also hold webinars and facilitate site tours to connect participants located in different geographic areas of the state. As the AIC SEM program expands, the cohort model may be an appropriate program design in to consider in the long run as this type of model has proven to be effective for scaling-up programs because it helps to generate interest among similar types of participants (Burgess et al., 2015). Furthermore, most current AIC program participants are similar-sized manufacturing facilities that produce different products and these are ideal participants for the cohort design (Luboff et al., 2016).

Using case studies of successful SEM participants can be a tool to recruit new participants

After AEP Ohio completed the second year of their Continuous Energy Improvement program they began having participants who had success with their SEM programs share their experiences through case studies, conferences, and other public events (Burgess et al., 2015). The utility has found this to be an effective way of recruiting new participants. AEP Ohio also reaches out to industry groups in sectors of interest including hospitals, universities, and manufacturers.

Considerations

Interviews with SEM participants have shown that the SEM program is a good tool for introducing participants to other AIC energy efficiency programs. Developing case studies of successful participants can help AIC to recruit new participants to the SEM program and may be especially effective for recruiting participants who have not previously participated in AIC offerings.

3.2 Customer Commitment

Customer commitment is the process of ensuring that the SEM customer's senior management buys into the SEM program process and goals, and that several program requirements are in place to ensure successful program implementation.

3.2.1 Strategies

The evaluation team identified several different elements included in program designs to ensure customer commitment to SEM programs. These elements include the development of a Strategic Energy Management Plan, commitment to the SEM program from the corporate level, appointing an internal "champion" to manage the SEM program, and assembling an internal team to oversee the SEM implementation process.

- **The Strategic Energy Management Plan (SEMP)** is a roadmap that outlines how the participant will implement projects and activities to achieve energy savings goals (Volkman et al., 2014). The SEMP also generally includes a strategy for overcoming barriers to implementing SEM.
- **Corporate commitments** can take the form of a formal corporate energy policy or a formal agreement with the utility offering the SEM program.
- **Energy teams** help implement the program and are often made of up facility management staff and can assist with engaging employees across the company (Volkman et al., 2014).
- **The energy champion** is generally the leader of the energy team.

Table 4 illustrates how various programs are implementing these strategies.

Table 4. Comparison of Participant Commitment Program Design Elements

Organization	Strategic Energy Management Plan	Corporate Commitment	Energy Champion Designation	Energy Team Assembly
AIC	✓	✓	✓	✓
AEP Ohio		✓	✓	✓
Efficiency Vermont	✓	✓		
Energy Trust of Oregon	✓	✓	✓	✓
National Grid	✓	✓		✓

Sources: AEP Ohio, Efficiency Vermont, and National Grid (Burgess et al., 2015)
Energy Trust of Oregon (Volkman et al., 2014)

3.2.2 Best Practices and Lessons Learned

Build strong relationships with SEM participants and maintain participant engagement

Previous studies identified strong participant engagement as a key attribute of successful SEM programs (Luboff et al., 2016). In addition, the creation of an energy team, a committed leader to champion the program, and regular contact between utility staff and participants through workshops and meetings have been identified as key elements present in SEM programs that have successful participant engagement (Luboff et al., 2016; Volkman et al., 2014). Several studies emphasized that a strong commitment from the participant's senior management personnel from the outset of the program is also critical to ensuring that SEM programs have the leadership and resources they need to be successful (Collins & Birch, 2015; Luboff et al., 2016; Volkman et al., 2014). Implementing quick projects that achieve large savings at the beginning of program can help solidify buy-in from corporate leadership (Luboff et al., 2016). Energy Trust of Oregon SEM programs implement quarterly check-ins with senior management to ensure continued support (Volkman et al., 2014)

Considerations

AIC already incorporates many of the key factors that ensure successful participant engagement in their SEM program including the creation of an energy team, appointing a champion to oversee the program, holding monthly meetings with participants, and working to ensure SEM becomes part of participants' corporate policies. AIC staff should continue to make an effort to engage participants beyond their first year of participation, which can help ensure savings persist as the program matures. Offering free workshops beyond the first year of the program can help motivate sustained customer engagement. AIC can also help participants identify and implement quick projects with large savings rewards to encourage corporate buy-in.

Engage diverse partners throughout participants' organizations early in the SEM process

Multiple participants in the Energy Trust of Oregon's SEM program faced challenges engaging employees who have an impact on energy usage through purchasing and management decisions but are not a part of the facilities management teams that typically implement SEM activities (Volkman et al., 2014). To address this challenge, program administrators can encourage participants to include employees from different areas within their organizations on their energy teams from the start of SEM implementation. Offering a workshop about designing effective energy teams early in the SEM process can help motivate the formation of these diverse teams (Volkman et al., 2014).

Considerations

AIC could help program participants develop strategies for forming energy teams with representation beyond facilities departments during the SEM program planning process.

3.3 Planning and Implementation

In the SEM process, planning provides the starting point or foundation for the participant to strategically manage energy and implementation is the translation of plans into actions that improve efficiency or reduce energy consumption. There are several different activities that a program may include as part of their SEM implementation and this section includes a discussion of these activities, as well as an overview of best practices.

3.3.1 Strategies

SEM programs feature a variety of activities to help participants identify opportunities to achieve energy savings at their facilities. An energy management assessment occurs during the initiation of the SEM program and is a self-assessment that involves benchmarking participants' present energy management activities against industry standards. Frequently this assessment involves completing walk-throughs of participants' facilities to identify energy-saving opportunities (Luboff et al., 2016). All SEM programs included in this review conducted some type of energy management assessment, although in some cases individual assessment

activities varied by utility. AEP Ohio conducted an Energy Scan or Kaizen Event, which involves examining an energy-intensive process within a facility and identifying O&M changes that can make this process more efficient (Burgess et al., 2015; Collins & Birch, 2015). Efficiency Vermont, NGRID and AEP Ohio created energy maps or a guide that documents how a facility uses energy and can help participants identify savings opportunities. These same utilities and Energy Trust of Oregon also completed an opportunity register, or a catalog of possible energy management projects to be implemented through the SEM program (Burgess et al., 2015; Volkman et al., 2014). Similarly, AIC participants go through an energy audit with specialists that look at participants' energy-intensive processes and make recommendations for improvements.

Table 5. Comparison of Planning and Implementation Program Elements

Organization	Energy Management Assessment	Energy Map	Opportunity Register	Energy Scan	Workshops and Trainings
AIC	✓		✓	✓	✓
AEP Ohio		✓	✓	✓	✓
Efficiency Vermont	✓	✓	✓		✓
Energy Trust of Oregon	✓		✓		✓
National Grid		✓	✓		✓
Sources: Sources: AEP Ohio, Efficiency Vermont, and National Grid (Burgess et al., 2015) Energy Trust of Oregon (Volkman et al., 2014)					

SEM program designers suggest that program administrators incorporate workshops to educate participants about different aspects of SEM implementation. The California SEM Design Guide suggests programs complete a series of workshops featuring topics such as learning how to save energy, tracking energy performance, employee engagement, and energy management system assessment, with repeated workshops about how to save energy and tracking energy performance in the second year (Dias, 2017). AIC currently tailors the content covered in their monthly SEM meetings to the needs of their participants. Other topics of interest that SEM program design experts suggest incorporating into SEM educational efforts include teaching participants how to conduct energy scans, create energy maps and sub-metering strategies, develop a performance tracking regression tool, and identify savings opportunities (Collins & Birch, 2015). Additional potential topics are listed in Table 6.

Table 6. Example SEM Workshop Topics

Workshop Topics
Introduction to SEM
Organizational Commitment
Effective Energy Teams
Employee/Occupant Engagement
Saving Energy 101
Energy Management Assessment
Energy Management Planning
Energy Scan
Building Opportunity Assessments
Operations Assessment Training
Energy Mapping and Sub-metering Strategy
Benchmarking Facilities

Workshop Topics
Tracking Energy Performance Performance Tracking Regression Tool Training Energy Analysis and Audits

3.3.2 Best Practices

Solidify a process for helping participants identify opportunities for ongoing energy savings

Previous studies have found that effective SEM programs set their participants up to be able to identify energy savings opportunities on their own (Luboff et al., 2016). Identifying energy savings opportunities can be difficult for SEM participants and this is especially the case after the projects with the largest savings potential have been implemented, and participants may no longer have guidance from their energy advisors (Luboff et al., 2016). As such, training participants how to continuously find energy savings on their own is key to achieving persistent savings (Luboff et al., 2016).

Considerations

AIC should ensure that new participants are trained to systematically identify new savings opportunities. AIC could also connect participants in their second or third years of the program with access to advanced energy management trainings to help participants find additional savings opportunities. Encouraging participants from similar sectors to share ideas for energy saving projects could also help participants achieve persistent savings.

Including multiple stakeholders in SEM workshops can help ensure successful program implementation

Idaho Power offers a custom SEM program for a cohort of wastewater treatment plants (Jensen, Lott, & McWilliams, 2015). As part of the program, the utility offered cohort workshops, which included attendees from beyond program administration and implementation staff, and personnel from participants' organizations such as representatives from environmental regulatory agencies and engineering design firms. Inclusion of these external stakeholders helped the program function more effectively because the external stakeholders were more likely to buy in to the SEM program and give regulatory approval after having been involved in the process. Furthermore, utility and regulatory staff were more aligned about the process of claiming savings, there was greater buy-in among environmental regulatory groups, and the SEM program gained support from external stakeholders (Jensen et al., 2015).

Considerations

AIC can consider encouraging SEM program participants subject to operating process regulations to include external regulatory stakeholders in monthly energy team meetings. This can help promote external buy-in and build support for the program. This approach is most appropriate for public sector participants who may need to collaborate with many different stakeholders in order to move forward with large capital projects or other SEM-related activities.

3.4 Measuring and Reporting Energy Performance

This section includes a general overview of program performance and incentives, and provides general recommendations for improving the process of measure and reporting energy savings. Please see the Guidelines and Best Practices for Claiming Savings from SEM Projects Memo for a more detailed discussion about improving SEM tracking and reporting so that AIC can claim savings from SEM projects.

3.4.1 Strategies for Measuring and Reporting Energy Performance

The programs we reviewed had a variety of different incentive structures, including performance incentives per kilowatt hour or therm savings achieved, and technical delivery services offerings. AIC offers generous incentives in comparison to the other programs as AIC is the only program that offers a base incentive in addition to performance incentives (Table 7).

Table 7. Comparison of Program Incentives

Organization	Incentive Structure
AIC	$15,000 base incentive awarded after first 12 months after completion of program goals, performance incentive of $0.01/kWh or $0.20/therms awarded up to $15,000 based on energy efficiency measures implemented through the SEM program resulting in a payback period of one year or less.
AEP Ohio	$.02/kWh, paid for savings achieved in year 1, additional $.02/kWh paid for savings persistence in years 2 and 3, total available incentive over 3 years: $.06/kWh
Efficiency Vermont	No financial incentives in pilot, cost share provided for technical assistance, consulting services, sub-metering and EMIS
National Grid	Cost share for technical assistance, incentive amount based on participant's unique financial criteria, staffing grants and project financing
Energy Trust of Oregon	Technical delivery services provided at no charge, along with financial incentives of $0.02/kWh and $0.20/therm for measured and documented energy savings.
Sources: AEP Ohio, Efficiency Vermont, and National Grid (Burgess et al., 2015) Energy Trust of Oregon (Volkman et al., 2014)	

Based on these incentive structures, program administrators were able to achieve a range of different savings. For example, as shown in Table 8, programs administrators have been able to claim significant savings ranging from 2.7% to 8.6% of annual electricity consumption through their SEM programs. Savings results were variable between program years for most programs with evaluated savings. Sources of savings variability are discussed in more detail in the Guidelines and Best Practices for Claiming Savings from SEM Projects Memo.

Table 8. Comparison of Program Savings

Organization	Total Savings	Average Annual Savings as a Percentage of Load	Dates
AEP Ohio	77,800 MWh	8.6%	2013-2015
Energy Trust of Oregon	X	5%	2009-2014
Efficiency Vermont	1,877.8 MWh	5.4%	2015
NEEA's Industrial Initiative	X	2.7%	2006-2013

Organization	Total Savings	Average Annual Savings as a Percentage of Load	Dates
BPA's Energy Management Pilot	X	2.7% +/- 8% at 80% confidence and 20% precision	2010-2011
PG&E Continuous Energy Improvement program	X	8.4%	2010-2014
Sources: AEP Ohio (Burgess et al., 2015) Energy Trust of Oregon, Efficiency Vermont, NEEA, BPA, and PG&E (NEEP, 2017)			

3.4.2 Best Practices and Lessons Learned

SEM program participants may need help making building performance tracking a habit

Energy Trust of Oregon SEM program administrators realized that many of their program participants were not in the habit of tracking their energy performance, which made it challenging to encourage participants to devote time to this new task (Volkman et al., 2014). To address this, program implementers began conducting monthly operations calls to review tracking documents and discuss SEM performance with participating participants (Volkman et al., 2014).

Considerations

AIC Energy Advisors should review the status of participants' energy performance data tracking processes before SEM program implementation begins to identify customers who are not in the habit of tracking building performance. AIC Energy Advisors can review energy tracking documents and savings performance results with these participants during the first few energy team meetings to ensure that making time to correctly track building performance becomes a habit for these program participants.

Structuring incentives to reward actual savings may help ensure savings persistence

Energy Trust of Oregon currently offers performance incentives at the end of the first and second program years, which can help motivate participants to achieve persistent savings (Volkman et al., 2014). AIC currently encourages participants to achieve persistent savings by offering performance incentives to participants at the end of the two-year program period or upon verification of the participant achieving savings goals.

Considerations

AIC should continue to offer performance incentives after the first year and may want to consider offering two tiers of performance incentives to further encourage savings persistence.

Appendix A. References

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