

CEC Workshop Notes

As taken by Grant Gilchrist – EnerNex Corporation
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Intro

- Laurie ten Hope
 - Want to encourage a *dialogue* that will bring new, lower cost products to the marketplace.
 - Need to look at what capabilities we can envision in the future.
 - Concerned about interoperability between players.
 - Want to encourage innovation, reduce obsolescence, and prevent stranded assets.
 - Pyramid: Governor = Vision, CEC/CPUC = Policy, Industry = Reference Design, Utilities = Functional Specs, Vendors = Product Designs
 - We are not trying to constrain the market, but to provide a common framework.
- What is PIER?

Review of the Energy Action Plan and Existing Policy

Jackalyne Pfannenstiel, CEC Commissioner

- We want to know what is possible, what is available.
- I understand that you want to know from us what we have in mind
- We are not talking about just “meters” here
- I’ve been concerned about DR for 30 years now
- The problem with deploying time-varying rates has been the cost of the meter. Early prototypes cost \$800!
- Very little deployment so far: hundreds out of 11 million
- Two years ago we adopted an Energy Action Plan
- Now we have to cost-justify this investment and finding a way to replace the old meters with a new device.
- Where can we get the cost benefit that is necessary? That’s what the dialogue today needs to go toward.
- We don’t want to get this wrong, but that concern is what has been stopping us from moving forward. We have to take action!

Art Rosenfeld, CEC commissioner

- Slide shows 43.6 GW peak in August 2000
- 14% is commercial air conditioning, another 14% residential AC
- All this started in June 2002 (Commissioners Peevey, Rosenfeld, McPeak)
- Divided into two working groups
- WG2 used interval meters – small group

- WG3 is everyone else! Statewide Pilot Project (SPP) – still in progress
- Utilities have submitted business plans. PGE enthusiastic, SCE “unconvinced”, Sempra not sure
- Other states and countries moving forward with AMI
- The goals are vague at the moment, but we would like to do at least 1% a year.
- TOU – Time of Use; all buildings > 2KW
- Critical Peak Pricing (CPP) – high price on a few days a year,
- Real-time Pricing (RTP) – hourly cost
- All customers should be at least on CPP, but could pay more to stay on TOU. Larger customers could be on RTP, but not practical now.
- CPP example: 10 times normal rate on peak days, 50% more on regular days during peak hours (TOU)
- 1700 MW in DR pilot programs, only 26MW in CPP
- Smart thermostat program gave some results, but SPP climate project showed better response, even when diluted by houses w/o AC – 20%! 10% to 25% depending on climate zone.
- People will reduce their thermostats even if they don’t receive a price benefit, just from “patriotic duty”.
- High-level model: 10 minute interval data out (\$50-100), inbound control (“thermostat”) (\$50). Note that a “meter” may not be a meter
- Have to be able to download new applications.
- Are we ambitious enough to do the whole system?
- We could also have this device respond to emergencies, e.g. undervoltage, underfrequency.
- We could have it track VARs etc.
- Customer should have access to their own data for technical, competitive, and psychological reasons.

Dian Grueneich, CPUC commissioner (new)

- Started as an employee with CPUC many years ago.
- This is one of the best times for CEC/CPUC cooperation
- Want to ensure there is adequate funding for R&D efforts
- We’ve been “hooked on the meter” for 30 years. We have a chance to move ahead.
- Want to find out what new technologies are available.
- I noted that the customer was not shown on the “pyramid” slide. The success of this program will depend on being able to listen to customers.

Julie Fitch – Adviser to CPUC President Peevey

- This looks like a vast task – modernizing the entire utility infrastructure
- We need to find a way to do a step-by-step approach

What is a Reference Design?

Ron Hofmann – PIER DR Program Advisor

- OIR for Demand Response has been underway for two years
- CPUC is a legal document, which can be misinterpreted
- We need to ensure interoperability through an “unambiguous mapping”
- The reference design process is *parallel*. It is not intended to slow down the legal OIR process.
- The design *must* accurately reflect the new regulations.

Technical Notes:

- Reference designs have been around a long time – they “hide in plain sight”
- They build markets. PCs are built on the same reference design developed in the 80s.
- This is a *generic* model from which physical designs can be built
- The intent is not to constrain, but to ensure interoperability
- This is NOT a standards process – it is to define a starting point
- Purpose: not to pick a solution but to promote low-cost interoperability and future adaptability
- We will not get this right on day one! Policy makers will need to make adjustments in the future.
- The line on the pyramid between policy and reference design is critical
- The “straw man” reference design is just to “get your juices flowing”.

Erich Gunther – EnerNex

- Reference designs have several facets: hardware, software, networks, informational (process). Which aspects do we want to address first?
- The ATM is a great example. Hardware is recognizable, use is almost intuitive, software user interface is similar, and network communications is standardized. POS is similar.
- Examples include cellphones, PC, POS, ATM, USB drive, Cable Modem
- Original cellphones functionality remains even though new devices are very sophisticated.
- There is a clear business model behind all the pieces of the system.

Cable Modems

- Cable modem is an example of a system-level reference design, but there is also a device-level portion of it that permits a vendor to implement it in a variety of ways.
- The reference design does not have to be excessively complicated
- Cable modems are a good example of vendor lock-in over the years (1992-1996) until standards were developed around 2001 (DOCSIS). Price to customer has come down from several hundred dollars down to 30-40 dollars now.
- The Cable operators have found that vendor lock-in is a problem.
- There are still a few operators with a duopoly, but that may improve soon.
- Whole new industries pop up, e.g. Cable Labs

Document Outline

- Overview, market segment opportunities, success factors, cost, users, cost, building blocks
- Configuration: Equipment resources, modes, scenarios, flow diagrams, hardware, software, third-party components

Intel's media center design

- Purpose is to reduce the barriers to entry for anyone trying to use their chips
- Increases size of market and customer spending

Benefits

Deputy Secretary of Resources, Joseph Desmond

- Anecdote: utility and vendor paying for meter change. Customer could not access the data because of a problem with forms and process.
- Data available online may not necessarily be useful unless it is interoperable.
- How do we get the most benefit from the system?
- We have been doing meters more or less the same way for 130 years!

Questions

- What do the following successful things have in common? Airlines, hotels, NYSE, credit bureaus? Answer: they all have a clearinghouse system, e.g. Sabre. A lot of businesses have grown up around providing an interface to that data.
- Why is the Internet so successful? Answer: standardization that permits extensibility.
- What can we learn from the fax machine? Answer: network effects. The more people who have fax machines, the more benefit there is. The more people who have advanced meters, the more benefit.
- There are a number of different technologies that could be used, but the information needs to have a way to get into the marketplace for people to use the data.
- Policy needs to keep ahead of technology, e.g. the Gatling gun.
- What's changed since 1998? Distributed computing, open source, web services.
- DR is only one application of how this data could be applied.
- How can we simplify billing? It's clear that people do not understand what bills are and what they mean, so they can make rational, intelligent decisions.
- Can encourage new generation technologies.
- The lowest common denominator in the power system is the kilowatt-hour, if we can make that available.
- There are opportunities not just in California, but nationwide.
- The typical reaction from industry is resistance, and yet today the greatest contributor to their revenues comes from standardization: phone, VCR, MLS

Remember:

- There needs to be security, but those technologies do exist

- Look at the interface layer, because that WILL be the requirement
- How is the data going to be used?
- There are a lot of other states looking at this, and it can go elsewhere

Discussion

- Joe used the example of AT&T. Note that AT&T finds itself in an interesting place today.
- Erich, was there regulatory input early in the process for the examples you gave?
- Erich: Those were industry-driven designs. This is a little different because of the regulatory issues.
- Ron: There are no regulatory examples that I could find. Industry should lead the way.
- Joe: Australia adopted ASE-XML a while ago and adopted the work that was previously done on the “decade tables”. This is a decision to commit to a process. The tools are there.
- Why do terms like functionality and user interface not enter explicitly into the reference design? Is it because there is already equipment on the market? Is it not the job of the regulator to simply set minimum requirements?
- Erich: There is an issue in reference designs regarding how much detail to get into. The more detail you put in, the less “legs” the design will have. User interface is not in the strawman you will see this afternoon.
- But why not?
- Erich: It may be there eventually, but we have to work that out by consensus.
- DCS: I heard two different levels of interoperability. Mr. Desmond talks about handing off data, while if you get to the product level, we’re talking about interchangeability?
- Ron: Less is more. These decisions need to be made by the industry group. I apologize to the commissioners that we didn’t focus more on the customer, but the design will help the customer know what to expect.
- Joe: The problem we are looking at is DR. From my point of view, we need a common data format, a common price format, and a control signal. It doesn’t have to be more complicated than that. There are some old standards for that, but we need to modernize them.
- Ron: The strawman is currently only for information exchange, not any deeper than that.
- Richard S. from France: Could you give some ideas of what the process might be? Do we envision that the reference design might involve human interface, i.e. the data packet presented to end users?
- Ron: The reference design will be a document, but it will also be a process, to determine how to create and update specifications like this. How can OpenAMI get their standard adopted by regulators?
- TURN – Utility Reform Network: I can see the benefits in that the costs will come down. But in 6 weeks, the utilities will be filing their proposals on what meters and devices they will be rolling out. What happens if the reference design contradicts

what they are proposing? The process doesn't seem to line up with the reference design concept.

- Ron: I worry about that, too, but we will try to keep the reference design at a high enough level to avoid stranding assets. I hope you will see this afternoon that enough has been done that we can convince ourselves in the next six weeks that we are talking about the same thing. Hopefully it will be a matter of formalization after that.
- Dian: I would like to know how there will be communication to ensure the reference design lines up with the process.
- Joe: I don't think it's a problem. There is nothing in the CPUC regulations that requires a meter to respond to a control signal. It really comes down to an open API to permit queries to be made. I think this is something that's easily incorporated into a PUC decision. Web Services for Business Processes could help us here. This is a software issue; it doesn't affect the meter technology decision.
- Lawrence Berkeley National Lab: Addressing the issue, "to what degree should regulators be involved in the process?" In our experience, use cases are a good way to deal with this. Are there use cases that benefit the public that vendors might miss? That's where regulators can be of value.
- Mike Messenger: Hearing from all the users of the network what their use cases are is an important part of this process.
- SMUD: I'm having trouble finding a correlation with requirements. We seem to be steamrolling ahead. What are the business cases that will determine whether this is worthwhile? What are the PUC decision points?
- Joe: The commission will make a decision to go ahead with any or none of the business models proposed by the utilities. Regardless of that business model, the reference design process can still go forward, albeit with less interest if no model is chosen. I want to divorce the technology from the regulatory process.
- SMUD: I don't see how you can, given that we want to reduce the cost of deployment
- Erich: We can work at a high level, quickly.
- Frances, UCI: One of the things I'm hearing is that one group is looking at the reference design as a "smart meter". We can do that fairly quickly. However, when we look at the bigger system, with the regulator acting for the customer, that will take longer to do.
- Attorney and investor: This all makes sense to me. Yes, it will cost billions, but adding new generation ALWAYS costs billions, too.

===== Lunch =====

Strawman Project Report

Ron Hofmann

- Public Interest Energy Research = PIER
- C²I = controls and communications integration
- Erich mapped R&D against needs, led to the 2004 strawman reference design
- This was an R&D step based on information that was out there already
- Reminder: we're trying to map between policy and functional specifications.

Erich Gunther

- Report is published on the web sites (<http://ciee.ucop.edu/dretd/ReferenceDesign.pdf>)
- The 2000/2001 electricity crises had a lot of causes, but one possible mitigating factor was missing: DR
- Stakeholders have a wide variety of views on how that infrastructure could be deployed
 - Not scaleable
 - Not standards-based
- The design was to try to eliminate these factors
- Started with “back of napkin concept”: LSE, ISO, Translation, UDC communicating through standards
- Characteristics:
 - Shareability
 - Ubiquity
 - Integrity/reliability
 - Ease of Use
 - Cost-effective
 - Standards-based
 - Open
 - Secure
- Purpose: establish a common starting point
 - Scaleable
 - Interoperable with new and existing systems
 - Facilitate innovation
- Concepts:
 - Zones of information exchange
 - Well-defined interfaces between zones
- Components: Actors, applications, protocols, language, objects, translation, security
- We don't have to re-invent technologies. All we have to do is to map policy to functional requirements in a collaborative process.
- Any new system will have to connect via an existing or standard interface
- All interfaces must be open and standards-based so they can evolve
- Don't get hung up on the particular technologies – that's what the industry group must decide

- Mapping process must capture requirements from tariffs, policy, DR functionality, etc.
- Q: what are “objects” and “transactions”? A: Erich explained.

Industry Activities

Rick Drummond – Chairman: GridWise Architecture Council

- CEO and Chief Scientist of Drummond Group
- Helped develop XML and EDI and business-to-business communications
- GridWise Architecture Council (GWAC) overview
- The key thing is passing the RAW data back and forth, not the ANALYZED data
- GridWise Architecture Council is intended to “establish broad industry consensus” to “integrate markets and technology”.
- Technology -> Markets -> Business -> Regulation -> Technology loop
- How are we going to get the next generation of power engineers trained?
- Focus items:
 - Establish a *constitution* for the grid
 - Identify best practices, standards, new technologies
 - Create liaisons
 - Establish a continual education process
 - Activity roadmap
- Constitution
 - Governance model
 - Must have buy-in because it is a federation!
- Note that interoperability does not follow the laws of math, e.g. commutative, associative, etc. Interoperability and conformance are not the same!

Wade Malcolm – EPRI Intelligrid

- EPRI Electric Power Delivery and Markets
- Intelligrid overview
- A lot of the work that needs to be done has already *been* done; we just need to pull it together.
- Public/Private Partnership between vendors, utilities, regulators
- Developed the Intelligrid architecture

Ray Bell – Co-Chair: OpenAMI

- CTO of Silver Spring Networks
- Involved with switched-to-packet tech change in telecom
- “When was the last time you had the opportunity to replace every meter in your service territory?”
- The same OpenAMI presentation as last week at DistribuTECH
- What we’re all struggling with is “What are the minimum requirements?”

- Don't want to re-invent the wheel; want to re-use information from the SPP
- Ontario Energy Board and Australia have similar ideas
- There is not one product today that can meet all the requirements. We're not there yet.
- We've been told our schedule is not aggressive enough; I think it's plenty aggressive.
- First requirements draft due March 7.

Richard Schomberg - EDF R&D

- President of IEC SC-45
- Deregulation of the residential market in 2007; major change because EDF has been vertically integrated for ages.
- New paradigms:
 - Re-regulation drives new services to compete
 - Must have frequent access to data from
 - Required to save 1% in energy each year from now on
- 10 million meters permitting demand response for 25 years (25% of market)
- Reference design for each category of meter – perhaps too specific
- Downloadable software to each meter to deal with new applications
- Showed pictures of three different meters developed to the same specification
- We buy a million electronic meters a year (this got peoples attention)
- The information system required is more important than the meters themselves
- There will be a new “Internet meter”, with new reference design
- No longer “gold plated” designs
- We are betting on the capability to remotely re-configure the meters.
- Key items:
 - US experience of competitive market and European standards experience
 - Need a critical mass of enabling technologies
 - Fantastic business opportunities

Public Discussion

Terry Mohn – Sempra Energy?

- We have found over time that we have invested in a lot of stranded assets
- We would therefore welcome a framework that technologies can move in and out of
- Re: GridWise; very much like the talent they've brought together
- How does one distinguish the constitution from the charter that created the council?
- A: The charter is specific to the group; the constitution has to do with the whole industry, including a governance board, market issues, etc.
- Our organization is very excited about Intelligrid and is involved in several Public Advisory Groups (PAGs). It will be great to get OpenAMI involved as one of the projects arising from Intelligrid.

Dave Cohen - CEO – Infotility

- Currently developing software framework for DER capabilities
 - Lots of people have done this on a small scale, it's the large scale that will be tricky
 - We have to have "plug and play", i.e. not rebooting the grid when something changes
 - PGM has hundreds of business rules just to handle one demand response project; I like the idea of just getting access to the raw data and letting vendors handle the rest.
 - Standard market design failed because it couldn't meet everyone's requirements
 - We could learn a lot from the "semantic web" and "ontologies". We need to define what we think these things mean so we can integrate with the rest of the world.
 - Cellphones have a lot more capability than any meter I've seen
 - I support these industry developments 100%.
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- Mike Messenger: What are the components of the solution? How do we stay focused?
 - Ray: We think of three parts: a network, back office systems, and premises devices
 - Richard: We are dealing with something very tricky: information is non-material. The meter is only the tip of the iceberg. The complexity is comparable to that of when the FAA began changing their system. In that situation, they used competing design teams. It's expensive, but it helps.
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- Dian: Richard, what guidance could you give us?
 - Richard: We had to pay a very heavy price on developing past projects which became smoke. There are hidden layers of complexity everywhere. I would avoid splitting the problem too early, because the businesses may be more interrelated than you think. I would also recommend that you look outside the utility business for examples, such as the FAA.
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- Kerry Evans? We could break into groups that focus on different aspects of the problem and improve speed and parallelism.
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- I like the idea of competing designs and perhaps another group that could oversee them. There is risk of doing it too early in the process, but with an oversight committee, you can manage that risk.
 - There is already an existing successful model for this: The DSM collaborative. We can use them as examples. There is a problem that there are already a number of groups doing this kind of thing, and no one agency responsible for dealing with infrastructure issues. A super-group is needed a la the DSM collaborative. One other comment: there is a lot more to be gained in specifying performance requirements than particular solutions.
 - Ray: This is actually a fairly well-defined problem. These are not difficult ideas; you just get the right people together to deal with it.
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- Ward Camp, DCSI: Are you proposing to add additional functional requirements to what the CPUC has already developed over two years in the working groups?
 - Ray: No, we would use it as a starting point.

- No, that is the problem. We already have the minimum requirements in the CPUC. We should not be redefining them and creating new “minimum requirements”.
- Ray: The consensus last week was that we should review the CPUC spec and the information out of Ontario as part of the requirements definition.
- But if a vendor meets the CPUC requirements, are they now going to be asked to meet whatever comes out of the OpenAMI work?
- Mike Messenger: There might be a quality control/improvement change to the CPUC specs later on. The six functional requirements must be met, but what’s the next logical step?

Facilitated Discussion

- Mike Messenger
- There are already some requirements coming from the CPUC
- How do you work those requirements into a reference design? (i.e. the design is a superset of the CPUC requirements)
- Policy Goal 1 – Dynamic pricing. Support CPP for small customers, RTP for large customers, assume monthly billing, including capability for customer to change their tariff preference without significant costs
- Policy Goal 2 – Customer access. Make energy profile data available too customers at level of
- Policy Goal 3 – Support energy management
- Policy Goal 4 – Support increases in reliability
- Policy Goal 5 – Easy upgrades
- Policy Goal 6 – Load control interface (controversial) all w utilities to dispatch existing load control devices, verify load reductions, and communicate with advanced control options for future customers.

- Mike: do people understand what a reference design is? If not, we need a better explanation?

- Do people think there is a need for a reference design? Some still not convinced.
- Do people understand how the development of the design can take place? Not very many people do.
- Who has a view of a better process?
- Eric Miller, Itron: the processes I’ve seen work best is if the regulatory group pins down a schedule and industry comes back with an answer in a given schedule. I think we have a problem that we don’t have a clearly-defined scope.
- Art Rosenfeld: Eric, I agree that there are business plans for just the metering part of the system. But that’s only the meter part of it. There is no clock ticking on the controls part of it.
- Eric Miller: I think we could move quickly on the upper level of it. It’s the cost and performance goals for the meter itself that would be very tricky. The data interface could probably be done very practically and
- Mike: I noticed three different possible scopes:
 - Information model only

- Mapping of the policy requirements into the reference design
 - Need to have a mechanism between the network and the meter itself
- Mike: Some people think all three can be done at once
- Veronika: Some of the goals are better-defined than others. Let's take the one that's well-defined and hand it off. Then separately look at the goals and future vision of demand response.
- Silicon Valley mfg. Group – would advocate focusing on (Didn't catch it).
- The ultimate goal might be that a building or a group of buildings could be a set of "spinning reserves".
- Ron: We're looking at that as a project.
- Oracle, and large energy users from Silicon Valley: We need the ability to transport the data to the energy management systems of the end users in real-time. Right now that information is only coming once a day.
- Mike: One thing I note is that there are 6 functional requirements that have been listed without a cost.
- Solarity Energy, DR provider: Officially starts for us on June 1 before we start shedding load. We need information to be released soon so we can release it with our customers. Our fear is that the IOUs will not move on this until they get the final document. I would like to see this implemented before this summer because we all know what the summer will bring.
- We should build systems that are remotely upgradeable, but some systems are not really upgradeable that way. There are some serious issues regarding performance in the future. The big issues will be throughput performance.
- Ray: The Internet is not built on any one router. We have to understand that this has to be an evolutionary network, not a forklift network.
- Frances: There has only been one mention of DER. I'm wondering whether we should not be making sure that these requirements are added in.
- Art: The last bullet of my presentation mentioned that DER must be involved.
- Mike: Note, however, that net metering was not one of the 6 policies.
- Frances: This is not just net metering, it's selling generation back.
- I've done a lot of pilot projects, and seen a lot of money wasted. Who is "industry", and how will they collect feedback for their design?
- David Wylie, ASW – ancillary services coalition: Like the effort that's been made to bring metering down to lower levels of services. It only used to take 6 months to get data from the IOUs. We're down to one month now. All the demand response vendors have to put in their own systems in order to get information back in time. We could do a carrot or a stick. There is no carrot for the DR vendors. The meter IS the stick. I think the carrot works better. Use the meters where they need them.
- WG3 member: Mike's process is useful, starting with the 6 policies. I think the process is going down 'way to fast. I'm a WG3 member and I wasn't notified. We need to make sure a broader list of industry is involved.
- Mike, Ray: We can fix that.
- Mike: does the process I'm suggesting make sense? Working from the CPUC policies and give them to OpenAMI with the mandate to meet those requirements,

and check to see if other areas have further requirements. Give them 6 months to do it. (Most agreed that this was “reasonable”)

- An alternate method was to focus only on the information exchange portion first. Can we agree on that?
- I’ve heard a lot of different scenarios of scope, and different scenarios of timing. We have contradictory schedules for timing. I want to hear some clarification.
- Ray: the three levels of domain came out of the CPUC document; we didn’t
- Mike: I will work to make sure that the reference design work does not derail the current process.
- I have heard some references to “the network”. Comparing to the telephone network, there were some very specific performance requirements that were placed on that network, and they had significant impact on the design of devices in that network.
- Peter Schwartz: We have a long history of going forward with these initiatives and not getting everyone involved who has a stake. Unless we have clear sign-off from all the stakeholders on the vision and goals, we shouldn’t start OpenAMI. I don’t like the idea of the “bring me another rock” scenario. I still like the idea of a governance board.
- Mike: I’ve seen big problems with people being left off until the last minute. I agree we need to get
- TURN: I’m really concerned about the impact of this reference design on cost. What happens if the reference design doesn’t match what we chose? Your answer was doing a change order. That’s not going to work! I also don’t like the idea that the policies we are working from don’t include cost.
- Ray: The IOUs could serve as an oversight body over the OpenAMI effort. We could add more checkpoints.
- Erich: The Intelligrid and GridWise groups are also good at stakeholder involvement. I also want to point out that there is a lot of value in capturing what everyone thinks is “obvious”.
- Mike:
 - Option 1: Can we agree on the idea that the information model should be a high priority?
 - Option 2: Work from the CPUC requirements
 - Option 3: Address controls as well as just metering
 - Option 4: We’re going to do all these things simultaneously
- Peter Sanza: These things are not necessarily decoupleable.
- Frances: I agree that it’s fine to try to move ahead in certain areas, but we need some people overlooking the whole process. There’s Intelligrid, GridWise, IEC, regulators, etc.
- Mike: I hesitate to form this kind of oversight bodies, because they tend to go around like a bull in a china shop. We could ask OpenAMI to appoint their own oversight group. Please send us ideas for who should be on such a group.
- Mark McGranaghan: I agree with Frances and Peter, but we don’t need another super-group. The existing Intelligrid and GridWise groups are already there.

- Optimal Technologies: How do we defend this whole process? What happens when we go through this process – how do we make sure that all utilities will accept meters that meet this specification, without getting vendors to re-certify for each utility?

Summary – Mike

What I hear is:

- There is a need for a reference design
- We need to ensure all stakeholders are involved
- There may be a need for an oversight group
- We need clarification on scope and schedule
- We don't want a major increase in cost at the end of the process due to the reference design.
- The CEC should do this clarification in the next couple of weeks.

OpenAMI Eric Dresselhouse, Silver Springs Networks

- 744 P Street, Building 9 in the Auditorium
- Please visit <http://www.openami.org>. If you can't come to the meeting, contribute to the site.
- Note that Ontario has gone the other way (OED), much more dictatorial
- Ray – we need to schedule another in-person meeting very quickly.
- Send email to Mike or Laurie to provide input.
- Note that the http://energy.ca.gov/pier/notices/2005-02-01_workshop will have the presentations and transcription.