Summary of UCAN Testimony and Selected Issues Relating to Expenditures for San Diego Gas and Electric Company's 2006 Advanced Meter Initiative Application

I. OVERVIEW

This testimony is presented by Michael Shames, Executive Director of Utility Consumers Action Network (UCAN) for issues relating to San Diego Gas & Electric (SDG&E). He has appeared before this Commission on numerous occasions and have been recognized as an expert on matters relating to both telecommunications and energy matters. His qualifications are attached in Attachment "A" .

This testimony is presented to address three matters:

1. Offer a brief summary of the findings and recommendations offered by all of the UCAN witnesses in this proceeding:
2. Provide a policy framework behind UCAN's testimony that helps explain UCAN's support of distribution grid upgrades but its opposition to SDG&E's AMI application .;

II. SUMMARY OF EXPERT WITNESSES' FINDINGS

UCAN retained the services of JBS Energy Inc to assess the details of SDG&E's AMI application. UCAN directed JBS' experts to focus upon the cost-effectiveness of SDG&E's specific plan to deploy electric real-time meters to every customer in the SDG&E service area. Their findings are very discouraging. UCAN has long supported the concept of upgrading the SDG&E

distribution infrastructure so as to provide advanced energy services to residential and small business customers, improve grid reliability and maintenance and to facilitate deployment of distributed generation. SDG&E's application, which it first introduced in early 2005 and then resubmitted in March 2006 and then revised again in July 2006 falls far short of what the Commission requested and what SDG&E ratepayers could have reasonably expected.

JBS' experts found that SDG&E did not comply with the specific guidelines established by the Commission for a advanced meter deployment and, for that reason alone, should probably be rejected.

But beyond that fatal flaw, SDG&E's own business plan doesn't pencil out. If the Commission were to apply an honest economic evaluation of SDG&E's AMI program, it would be hard-pressed to even want to hold evidentiary hearings, let alone seriously consider project approval. JBS' experts found little that achieved UCAN's objectives, but quite a bit that achieves SDG&E's financial objectives. William Marcus states in his testimony:

> "While AMI is a terrible investment for SDG&E's ratepayers, it is a different story for SDG&E's shareholders, who will receive a 10.7% return on the equity share of approximately $350 million of assets initially invested in the AMI project" (Marcus Testimony, p.9)

JBS Energy experts found that SDG&E has not developed a plausible and cost-effective program. Under SDG&E's "best-case scenario, it will take 25 years to break even. Under almost any more reasonable scenario, the program will lose money, and in all probability it will lose up to an astounding $328 million NPV loss on a $350 million initial investment, with subsequent investments of up to $600 million being similarly uneconomic. They also document how SDG&E's program is far less cost-effective than the PG&E program recently approved by the Commission.

A very important, if not critical, consideration that appears to be missed by SDG&E and should not be missed by the Commission is the concept of a missed opportunity or "opportunity cost" imposed by SDG&E's ill-conceived proposal.

Opportunity cost is a term used by economists to describe *the cost of something in terms of an opportunity forgone* (and the benefits that could be received from that opportunity) or *the most valuable forgone alternative.* For example, if SDG&E sinks close to a $1 billion dollars into its AMI project over the 34 years, the opportunity cost is *some other thing* that might have been done with that same money. In deploying the ratepayer monies in the very cost-ineffective manner proposed by SDG&E, those same monies will no longer be available to leverage the very promising emerging Smart Grid functionalities or to justify investment in other more economic peak shaving programs. SDG&E will have committed its customers to a 34-year investment scheme is not only cost-ineffective as of its conception, at the expense of comparable investment schemes that might require only an 11-year commitment.

Even though SDG&E's AMI program is crushingly uneconomic and poorly designed, UCAN supports Commission efforts to reduce peak load and invest in SDG&E's distribution grid. As discussed in Mr. Marcus' testimony and in my testimony below, UCAN supports an integrated and systems-wide approach to address the peak load problem and increase technical capabilities of addressing transmission and distribution operations ("Smart Grid"). Moreover, UCAN believes that SDG&E overlooked the value of Smart Grid communications to improve outage restoration and provide more information on transmission and distribution operations.

UCAN also supports deployment of interval meters to a limited subset of SDG&E customers – those SDG&E customers that are over 20 kW in size. It encourages the Commission and SDG&E to expand the Comverge program so as

to secure cost-effective and immediate peak shifting benefits amongst residential customers. UCAN also encourages the Commission to direct SDG&E to aggressively pursue air conditioner efficiency (for all sizes of customers) and combined heat and power producing chilled water to reduce air conditioning demand (for larger customers) Air conditioner efficiency will not only save energy on the 13 days when a CPP program might be operated but would save energy for an additional 50-100 days per year.

UCAN also urges SDG&E to re-assess UCAN's 2000 proposal for a gradual roll-out of cheaper time-of-use meters for residential customers – starting at the end of the AB1X period, with meters required first in new single-family construction and potentially later in customers above a certain size.

Finally, UCAN encourages SDG&E to take immediate steps to see that all residential swimming pools are equipped with load control devices that the utility can use at its discretion for up to 1000 hours per year through incentive programs and local licensing/code strategies.

III. UCAN'S VISION FOR SDG&E INVESTMENT IN DISTRIBUTION

A. SDG&E FAILED TO INTEGRATE EMERGING SMART GRID TECHNOLOGIES INTO ITS PROPOSAL

When SDG&E filed its initial AMI application in early 2005, UCAN was concerned about the narrow scope of SDG&E's plan. Rather than build a platform that could take advantage of emerging communications and "smart chip" technologies, the utility proposed a plan focused on a narrowband communications platform and off-the-shelf real-time meters.

UCAN's general familiarity with emerging "Smart Grid" technologies suggested that SDG&E's plan was unduly limited in scope and vision. In order to provide the Commission and policymakers with an alternative vision of grid investment possibilities, UCAN initiated a study in early 2006, conducted by the Energy Policy Initiatives Center (EPIC) located at the University of San Diego that examined the deployment of an integrated "smart grid" in the San Diego Gas & Electric service area. SDG&E later agreed to jointly fund the project with UCAN and to participate in the development of this report. EPIC retained the expert services of Science Applications International Center (SAIC) to perform this analysis, with cooperation from SDG&E. The report is expected to be released in early September and will be offered into the evidentiary record in this application and in the Commission's Long Term Resource Plan proceeding by UCAN.

The genesis of the report was UCAN's conviction that San Diego needs to be thoughtful and farsighted about investing in its distribution system. UCAN began investigating this issue in late 2004 and submitted substantial comments in the Commission's BPL OII (I. 05-09-006) about the potential benefits of an advanced, high-tech upgrade of SDG&E's distribution infrastructure. UCAN initiated the EPIC report so as to provide the region and state's policymakers an objective and authoritative analysis of distribution infrastructure modernization.

The SAIC report, when released, is expected to confirm that a "smart grid" modernization is cost-effective and practical for San Diego. However, its preliminary findings reinforced UCAN's conviction that SDG&E's AMI proposal is piecemeal and inappropriately limited. UCAN maintains that SDG&E should have pursued distribution modernization in a more holistic or systemic manner. SDG&E's distribution grid is a system, not just in the technical sense, but also in the geopolitical, regulatory, economic, and consumer services aspects.

SDG&E's AMI proposal suffers from an unduly narrow focus upon demand response and meter readings; it has not adequately applied a system-wide view to its initiative. For example, SDG&E would have benefited tremendously from having considered the findings of the EPIC study before unveiling its AMI proposal, but it chose not to wait.[1]

As described in Mr. Marcus' testimony on Integrated Resource Planning and on my observations below, a systems view requires a balanced approach that draws the best ideas from all stakeholders and operates in an integrated fashion. The stakeholders of the grid should be the beneficiaries of this approach. In so doing, policymakers, regulators and municipalities would see substantial benefits from modernization. And the utility's customers could be part of designing enhanced performance on every level. Additionally, the vendor community gains a clearer vision for product development.

SDG&E declined to pursue a systems view development of its "initiative". At a minimum, SDG&E should have availed itself of the EPIC study before resubmitting its application. Had it done so, it would have gained an appreciation into the value of an integrated Smart Grid pilot project where multiple improvement initiatives can be brought together at appropriate times in a controlled and deliberate environment. And as explained by Mr. Marcus, SDG&E declined to avail itself of far more cost-effective options as precursors to a massive distribution grid upgrade.

Clearly, integration of multiple new technologies required to transform the San Diego grid intelligence is a complex requirement. Admittedly, it is one in which the industry has little experience in deployment. Thus, SDG&E would have been well served to have sought funding for a Smart Grid pilot in defined areas could serve to test and experiment with the emerging

[1] I specifically drew the value of this report to the attention of SDG&E executives in a meeting I had with them in March 2006, but my suggestion was rejected.

technologies before tackling the entire region.[2] This approach would also provide value to the grid as new technologies and applications surfaced. Such a "testbed" would demonstrate the integrated environment and results for each new improvement initiative under the above priority scheme prior to transitioning to a "production" mode.

Most importantly, had SDG&E attempted to integrate some of the new, emerging grid technologies into a system-based grid upgrade, it might have been able to overcome the serious cost-effectiveness problems that have doomed its current initiative to being the grossly uneconomic, numbers-manipulation exercise that has been submitted to the Commission.

As will become apparently upon the release of the EPIC study, an AMI deployment serving as the foundation for other grid technologies could possibly be cost-effective. The study identifies over a dozen emerging applications that could offer three-five year paybacks; this compares favorably to SDG&E's 34-year payback proposal. For example, the EPIC report identifies some twelve promising emerging technologies that it views as sufficiently mature to warrant immediate investment and/or pilot projects. They include:

- Dynflo distributed series impedance sensors - The Dynaflo distributed series impedance device is expected to be low cost ($20 to $40/kVAr). It injects or removes series impedance, controls the flow of power using either wireless or power line carrier, is modular, and is coupled to the line at a transmission or sub-transmission tower. It balances the flow between phases and optimizes the use of T&D assets. Dynflo distributed series impedance devices on each phase on each tower can also measure line temperature and thus line sag. It is expected to be developed and tested at 161 kV during 2007. It can also monitor line conditions like thermal rating, vibrations, icing, etc

[2] Notably, SDG&E's initial 2005 application embraced a phased deployment approach but then abandoned it in its next incarnation.

- I-Grid Monitoring System (by Softswitching Technologies) – This is a wireless, intelligent system sensors for operating information (MW, MVAR, Volts, Amps, PF, PQ, etc.). Can be used at key nodes in the transmission system; and distribution system where load pockets are dynamic. I-Grid now offers a national web-based power disturbance monitoring and reporting system. Approximately 1500 power quality monitors are installed nation-wide. This technology can provide analysis of events in almost any given region
- Consumer Portal - Emerging information-based solutions that improve the efficiency, comfort and safety of businesses, buildings and homes and integrate with power delivery system applications (Broadband Energy Networks). Based on an open flexible architecture the portal can facilitate the implementation of new services such as DR and real time pricing, outage detection, remote connect / disconnect, support to distribution operations, PQ monitoring and improved customer information (EPRI Intelligrid). Integrated load controls using consumer portals will shed load based on dispatch signals from the utility or based on parameters set by the consumer.
- Ethernet over Fiber - Ethernet over Fiber (IEEE 802.3z) is becoming a common carrier service and in-expensive interconnection method as multi-gigabit ethernet switches are being used for fiber terminations. This technology aids in digital convergence when coupled with MPLS potentially simplifying the need to use costly digital cross-connect systems. Further use of optoelectronic technology allows operators to drive fiber deep into the network more effectively, make better use of existing bandwidth, economically increase bandwidth, target programming to specific areas, and enable the efficient delivery of many revenue-generating interactive services. Utilities can now cost-effectively overlay video on fiber in the loop (FITL) architectures, efficiently carry

analog video on synchronous optical network (SONET) backbones, and solve the power challenge the dense wave division multiplexing (DWDM) deployments impose on optical amplifiers in the long-haul network if needed for substation monitoring and providing new services.

- 4G WiMAX Fixed - Private Wireless/ Zigbee / WiMedia / WiFi – Wireless - WiMax can provide the requisite long distance communications up to 10 miles and in some instances beyond 30 miles at data transfer rates of 75 Mbps. WiMax using IEEE 802.16D-2004 can communicate between fixed sites in point to point and point to multipoint configurations with different vendors. This standard will likely be used for private fixed networks in the USA which will utilize super-cell (high site) based deployments more focused on coverage than capacity.WiMax can communicate our-of sight via IEEE 802.16E-2005 and can communicate with moving trucks or cars. Mobile WiMAX products are expected enter the market in late 2007 and is expected to be deployed by major carriers such as Sprint (which announced its plans in early August 2006) and Covad. The availability and capabilities of WiMAX allow it to be the backbone of a T&D communication system that will support WiFi applications for substation or distribution automation. Zigbee Alliance's Zigbee standard (IEEE 802.15.4) uses frequency hopping spread spectrum (FHSS) radio technology, which offers reliable, low speed, long range performance and immunity against jamming and interference. The 802.15.4 document provides a common standard for networking for sensors and control devices common to modern grid elements. The WiMedia Alliance is championing an Ultra-Wideband standard physical layer to the existing IEEE 802.15.3 standard. The subcommittee working on it is the 802.15.3a committee. The WiMedia solution can provide higher data rate service and mesh networking capability with similar RF

coverage capabilities as Zigbee. WiMedia UWB can expand grid control to include complex monitoring and content distribution applications.

- Semi-autonomous Agents - Collaborative agent societies with intelligent user interfaces (e.g., MIT's Project Oxygen) using techniques from the field of autonomous agents provides a new complementary style of human-computer interaction, where the computer becomes an intelligent, active and personalized collaborator. Interface agents are computer programs that employ Artificial Intelligence methods to provide active assistance to a user of a particular computer application.
- Advanced Visualization Methods (POM, ROSE, FFS, OPM, etc) – These are a group of grid operating functionalities that improve operation and troubleshooting. Physical Operating Margin (POM) for ultrafast load flows (40,000 bus system solved in 0.5 seconds) with Boundary of Operating Region visualization tools generating nomagrams for operators showing regions of secure operations limited by voltage constraints, voltage instability, thermal limits, and flow gate constraints. Optimal mitigation measures can be applied on-line to expand the boundary of operating region. Region of Stability Existance (ROSE) using phasor measurement data can be plotted for the operator on-line using PMU data in 1D or 2D space and show regions of secure operations limited by voltage constraints, voltage instability, thermal limits, and flow gate constraints. Optimal mitigation measures can be applied on-line to expand the ROSE. POM/TS with FFS can quickly determine areas of the system that can transient instabilities to support system planning and is fast enough to be used for on-line systems. Integrated with OPM can support CAPEX planning for minimal cost mitigation of transient instabilities, or in operations can mitigate potential transient instabilities.
- DER-based Microgrids - A DER based micro-grid concept is an aggregation of loads and resources, including DG and advanced energy

storage resources that operates as a single system providing both power and heat. The majority of the DER is power electronics based to provide the required flexibility to insure operation as a single aggregated system and to convert DER systems that are either high frequency AC (micro-turbines) or DC systems (solar, fuel cells, etc.) into 60 Hertz AC. This control flexibility allows the micro-grid to present itself to the bulk power system as a single “control area” that meets local needs for reliability and security. This application of distributed energy (DE) is minigrids, a set of generators and load-reduction technologies that supply the entire electricity demand of a localized group of customers. Power parks (also called "premium power parks") are an alternative to the traditional approach. They may include uninterruptible power supplies such as battery banks, ultracapacitors, or flywheels. They typically include an on-site power source to increase reliability. Pumped storage is used to even out the daily generating load, by pumping water to a high storage reservoir during off-peak hours and weekends, using the excess base-load capacity from coal or nuclear sources. Grid energy storage method is to use off-peak electricity to compress air, which is usually stored in an old mine or some other kind of geological feature. Off-peak electricity can be used to make ice from water, and the ice can be stored until the next day, when it is used to cool either the air in a large building (thereby shifting that demand off-peak) or the intake air of a combustion gas turbine generator (thereby increasing the on-peak generation capacity). The integration of plug-in hybrid electric vehicles, fuel cells and other forms of DG and advanced energy storage are other options of reducing load on the consumer side of the meter or contributing to microgrids.

- Advanced Energy Storage Systems - These are emerging new storage systems that can be used to supplement a grid. For example, NaS batteries are now available for up to 8 hours for about $3500/kw for load

follow and peak shaving the loads and can be used for voltage and transient stability support and customer ride-through.Shaving the peak can avoid need for new substations or second transformer banks. VRB flow batteries for 8 hours of storage currently in small sizes for $2800 / kw for load follow and peak shaving the loads , frequency regulation and can be used for voltage and transient stability support and customer ride-through. Shaving the peak can avoid need for new substations or second transformer banks. Beacon 25kWh flywheels are available for frequency regulation for $1000 / kw-15 minutes, and can be used for voltage and transient stability support and customer ride-through.

- Advanced Grid Control Devices - This class of devices include FACTS, GridAgents, Distr Power Flow Controllers, Fault Current Limiters, High-speed Switches, D-VAR, DSTATCOM, and SuperVAR. Flexible alternating current (AC) transmission systems, or FACTS, incorporate high-current and high-voltage power electronic devices to increase the carrying capacity of individual transmission lines and improve overall system reliability by reacting very quickly to grid disturbances. Infotility's GridAgents Framework has built-in capability for fast-switching microgrid control but is being developed to integrate with Distribution Automation. Solid State Transfer (SSTs) switches are available now to provide customers uninterruptible power from two independent feeders.
- Agent and Multi-Agent Systems - These systems integrate utility control operations with mainstream web technologies and through multiple independent computers communicating over a network accomplish a common objective or task. This enables agent and multi-agent systems to become adaptive, self-aware, self-healing and semi-autonomous control systems. This technology is currently in the research and development phase and projected to be commercially available in 1-5 years.

- Distribution (Feeder) Automation - Distribution automation control utilizes the integration of Intelligent Electronic Devices with distribution Supervisory Control and Data Acquisition Systems (SCADA) to provide rapid reconfiguration of discrete devices such as switches, capacitor banks, reactor banks, and tap changing transformers. DA objectives are to improve reliability and power quality by maintaining bus voltages across the system within specified voltage and power quality limits and responding to disturbances on the distribution system to minimize customer out of service time. It allows for coordinating the switching of discrete devices such as capacitor banks, reactor banks, and tap changing transformers as well as continuous control of generator high side voltage settings. (objectives include maintaining bus voltages across the network within specified voltage limits; minimize number of switchings, increase voltage control reserves by keeping maximum number of devices offline, mitigating circular reactive power flows, improve voltage security.

While I do not offer myself as an expert in these specific technologies, I can report that very capable analysts are finding that Smart Grid technologies are now reaching a level of maturity that they can and should be integrated into any utility distribution upgrade plan. The EPIC study will specifically propose that SDG&E develop research, development, and demonstration (RD&D) projects to test some of these technologies, such as a two-phased test utilizing the SDG&E XpertSIM suite to do a detailed real-time simulation of a defined DER-based Microgrid pilot circuit / area examining potential benefits and trouble spots. It also suggests an advanced energy storage system pilot designed to operate in conjunction with a distributed generation unit, or other form of intermittent generation to develop the test control schema to prove operational capabilities and flexibility, as well as the value proposition. The lessons learned on this project would additionally apply to the DER-based Microgrid project.

The report authors also raise the "enormous" potential benefits of autonomous monitoring and control and encourage SDG&E to seize upon the California Energy Commission's (CEC) expressed interest in developing distribution level grid agent software. They also recommend that SDG&E become engaged in a WiMAX pilot in conjunction with some local wireless companies.

The study's anticipated conclusion is an important one for this Commission: there are sufficient benefits, as societal or systems and in total, to justify a movement of the San Diego regional grid to a Smart Grid architecture. It prudently recommends a phased integration of at least the twelve projects discussed above as deployment programs. It is expected to offer at least one deployment scenarios that generate a 3-5 year payback period, however it admits that the sustained large benefits (> $50M / yr) do not occur until about a dozen years later. While not an alternative proposal to SDG&E's AMI initiative, the study suggests that had SDG&E integrated its AMI initiative with integration of Smart Grid technologies, the company could have created a far more robust, beneficial and cost-effective proposal.

B. REAL RESIDENTIAL CUSTOMER BENEFITS CAN BE REALIZED IN A SMART GRID PROPOSAL.

UCAN submits that SDG&E could have offered residential and small customers far more useful benefits had it approached its initiative with a greater awareness of Smart Grid applications. When UCAN submitted its 2005 comments to the Commission in I. 05-09-006, UCAN noted that broadband communications capabilities, when added to an electric distribution grid, could facilitate the offering of a number of very useful end-user products and services, including:

- Automated monitoring and control of end-use equipment, including demand response and load shedding

- Billing data and energy consumption data
- Real-time building security monitoring / reporting
- Automated inventory tracking of various goods such as fuel stocks
- Dynamic price information
- Video on demand
- Streaming audio delivered through a stereo or computer
- Real-time, interconnected Internet-based games
- Transmission of data / telephone / fax without multiple fixed lines

Moreover, UCAN identified a number of utility operational benefits that may be as important as end-user benefits listed above. Some of these are incorporated into SDG&E's AMI filing – such as automate meter reading and some are not. The operational benefits identified by UCAN included:

- Power quality monitoring
- Distribution system data monitoring
- Load control / demand-side management
- Outage detection
- Lightning detection and notification
- Fault location
- Voltage control
- Staging area command center
- Distributed resource control and dispatch
- Crew management
- Security monitoring[3]

While broadband Internet access was the focus of the Commission's attention in that particular investigation, the range of potential applications using such a communications network was enormous and needs to be also considered in a utility business case for distribution grid upgrades.

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[3] *Broadband Over Powerline 2004: Technology and Prospects*, October 2004, An EPRI White Paper, at page 17.

A 2004 NARUC Task Force report described the benefits of broadband communication service, such as Broadband Over Powerline (BPL), if implemented on its own or deployed as part of the Smart Grid.[4] Of greater relevance to this application, the Task Force found some observers who suggested that BPL could prove to have more value as a means of enhancing electric utility operations than as a means of extending broadband. Mike McGrath, Executive Director of Retail Energy Services for the Edison Electric Institute (EEI) is cited by the Task Force as saying that electric system enhancement is the primary objective for roughly half of the investor-owned utilities interested in BPL. He pointed out that other non-BPL communications technologies can also contribute to electric system enhancement. Others at the October 24, 2004 Task Force meeting asserted that every electric utility pursuing BPL is actively interested in system enhancement, despite the apparent focus on small-scale roll outs for revenue enhancement.[5] Work by the EPRI IntelliGrid Consortium has focused on an open-source communication architecture and how communication between elements of the power supply system could be handled so that smart devices can tie into any available communication medium.

In preparing for the PBL OII, UCAN came to appreciate the Task Force's conclusion that a communications system that enables better management of power use and demands could be worth many times the initial expenditure, if designed and integrated properly.[6]

The EPRI study attempted to roughly quantify the net benefits from investing in a Smart Grid. The required applications, included automation, communication architecture (a key foundation), distributed resources, electronic

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[4] Unfortunately, most of the presentations and literature reviewed by the Task Force focused on BPL as a communications technology that would enable electricity customers to obtain broadband service, thus artificially limiting the scope of the study.

[5] *Report of the NARUC Broadband over Power Lines Task Force*, February 2005, at page 14.

[6] Ibid, at page 15.

based controllers, consumer portals, and more. Over and above the investments needed to meet load growth and correct existing limitations, the costs of implementation was estimated at $165 billion over 20 years. This constitutes an annual investment of $8.3 billion above the approximately $18 billion in current annual investment. According to the study, the investment would yield a 20-year net benefit of between $638 billion and $802 billion, or a benefit-cost ratio ranging from about 4:1 to 5:1. Importantly, most the benefits are attributable to reliability and security. [7] This rough estimate is somewhat consistent with the PG&E initiative and it is also somewhat affirming of the anticipated EPIC study findings. However, comparison of SDG&E 's proposed 25-year payback for a relatively dumb grid upgrade far exceeds the ballpark costs offered by EPRI for a far smarter system investment.

UCAN believes that the communication component of a Smart Grid investment is essential for effective functioning of the grid. Various communication technologies can be used for smart grid applications. The Commission was overly focused on BPL, primarily because of its interest in accelerating broadband deployment by electric utilities. However, websites on GridWise by Pacific Northwest National Laboratory (PNNL) and IntelliGrid by EPRI, they don't talk about BPL, but just talk about the idea of using communication technologies for smart grid concept. BPL is not an essential communication technology. What is essential is high-speed communication. And, in all likelihood, a Smart Grid deployment will build upon a combination of various communications platforms.

Most analysts surveyed by UCAN found that BPL and WiMax may be too expensive to justify as the sole basis for developing delivery of broadband communication at the end-users' location. However, if when the utilities factor

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[7] Ibid, at page 16. (The EPRI benefit/cost study cited by the NARUC Task Force is "Power Delivery System of the Future: A Preliminary Estimate of Costs and Benefits," EPRI 2004.)

in the benefits of a smart grid and advanced metering combined with the attendant energy services that might be available, using these advanced communication platforms could turn out to be hugely prudent investments for today's utility and for future ratepayers.

Another important, but underappreciated, benefit of deploying broadband communications services is that it increases the potential for small customer acceptance of real-time meters. The Commission will be making decisions about AMI deployment that should include opt-in customer acceptance of real-time rate schedules. If broadband Internet service is included as a utility-deployed service, it would serve as an important tool in ubiquitous acceptance of real-time meters and rate schedules. In sum, a well-designed, customer-oriented Smart Grid investment scheme could serve as the "carrot" used to attract customers to what is an otherwise unwelcome regulatory change for most residential customers.

ATTACHMENT "A"

QUALIFICATIONS OF MICHAEL SHAMES

Michael Shames was the co-founder of Utility Consumers' Action Network and is currently UCAN's Executive Director. A 1978 graduate of UCLA, Mr. Shames received his Bachelor of Arts in Public Administration and went to receive a Juris Doctorate in 1982 from the University of San Diego School of Law. During his studies at the University of San Diego, Mr. Shames developed the model for UCAN. From the outset, UCAN was designed to represent residential and small business consumers in the highly technical areas of utility rate regulation.

During his 21 year tenure serving as Executive Director, Mr. Shames has participated in numerous regulatory proceedings before the PUC. In addition to all SDG&E general rate cases since 1986 and most major state-wide electric utility proceedings, Mr. Shames has played a major role in telecommunications issues before the PUC. He prepared expert testimony in each of SDG&E's last two Cost of Service proceedings and authored UCAN's comments in the Commission's investigation into Broadband over Power Lines. Mr. Shames has also sponsored testimony in a number of electric and telephone cases before the Commission, including more recent submissions in SDG&E's application for an Otay Mesa Purchase Power Contract, the Warmline complaint brought by UCAN against AT&T, the MCI-Sprint merger case, the Pacific Bell Marketing Case and the Cingular Investigation of 2003. He served on Pacific Bell's Consumer Advisory Panel from 1988-1991. Served for four years on Pacific Bell Mobile's Access Task Force. And, in 1995, he was appointed as a consumer

representative to the Commission's SB600 Task Force on Telecommunications Ratesetting by the CPUC Executive Director, Neal Shulman.

In addition to his work before the PUC, Mr. Shames has also participated in several regulatory hearings on behalf of UCAN before the California Department of Insurance. He presented expert testimony on the use of telecommunications technologies in insurance redlining in RH-292, which investigated "redlining" in the insurance industry and RH-313. These proceedings determined timelines for prior approval rate regulations procedures.

Because of his advocacy experience, Mr. Shames was hired by the California Department of Insurance to instruct and train CDOI employees on consumer advocacy strategies and legal analysis and was appointed to the California Automobile Assigned Risk Advisory Committee by Commissioner Garamendi.

Mr. Shames has repeatedly appeared before the California Energy Commission and California Legislative Oversight Committee on Energy and Public Utilities as a recognized consumer representative. He has spoken on assorted utility consumer issues at the National Association of State Utility Consumer Advocates (NASUCA) and the National Association of Regulatory Utility Commissioners (NARUC) conferences as well as a number of other conferences. He has testified in hearings before the Public Utilities Commission on cellular and electric regulation cases. And he was selected to serve on the Advisory Board of the Competition Policy Institute based in Washington DC.

In 1997, Mr. Shames was appointed by the California Public Utilities Commission to serve on two advisory boards: The California Board for Energy Efficiency and the Consumer Education Advisory Panel. And the California Senate appointed Mr. Shames to serve on the Joint Task Force on Privacy Reform.

In addition to his work for UCAN, Mr. Shames has served as an adjunct professor at University of San Diego, School of Business, where he has taught since 1994. His articles on utility issues have been published in most of the state's major newspapers and scholastic journals, including the Energy Law Journal on California's Electric deregulation in Summer 2003. He has published articles in Public Utilities Reports, Harvard Business Review and has contributed chapters to two books on deregulation. ["Preserving Consumer Protection and Education in a Deregulated Electric Services Industry", *Who Benefits From Privatization,* Hossain & Malbon, eds. (Routledge, 1998) and"Consumer Principles for Electric Utility Reform", in *Electric Utilities Moving into the 21st Century*, Enholm & Malko, eds. PUR Inc. (1994)]

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EXHIBIT _____

Prepared Testimony of
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on behalf of
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California Public Utilities Commission
Application 05-03-015

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