OMB Number: 4040-0004
Expiration Date: 01/31/2009

Application for Federal Assistance SF-424 Version 02

*1. Type of Submission:	*2. Type of Application	* If Revision, select appropriate letter(s)
☐ Preapplication	☒ New	
☒ Application	☐ Continuation	*Other (Specify)
☐ Changed/Corrected Application	☐ Revision	

3. Date Received:	4. Applicant Identifier:

5a. Federal Entity Identifier:	*5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:	7. State Application Identifier:

8. APPLICANT INFORMATION:

*a. Legal Name: San Diego Gas & Electric Company

*b. Employer/Taxpayer Identification Number (EIN/TIN):	*c. Organizational DUNS:
95-1184800	00691-1457

d. Address:

*Street 1: 8330 CENTURY PARK COURT
Street 2:
*City: San Diego
County: San Diego
*State: California
Province:
*Country: USA
*Zip / Postal Code 92123-1530

e. Organizational Unit:

Department Name:	Division Name:
Network & Communications Services	Information Technology

f. Name and contact information of person to be contacted on matters involving this application:

Prefix: *First Name: Joseph
Middle Name: M
*Last Name: Shoffner
Suffix:

Title: Sr. Contracting Agent

Organizational Affiliation:

*Telephone Number: 858-654-3504 Fax Number: 858-654-1720

*Email: jshoffner@semprautilities.com

OMB Number: 4040-0004
Expiration Date: 01/31/2009

Application for Federal Assistance SF-424 Version 02

***9. Type of Applicant 1: Select Applicant Type:**

Q. For-profit Org(Other Than Small Business)

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

*Other (Specify)

***10 Name of Federal Agency:**

U.S. Department of Energy

11. Catalog of Federal Domestic Assistance Number:

81.122

CFDA Title:

Electricity Delivery and Energy Reliability Research, Development and Analysis

***12 Funding Opportunity Number:**

DE-FOA-0000058

*Title:

Smart Grid Investment Grant Program

13. Competition Identification Number:

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

The city of San Diego and 24 surrounding communities comprising San Diego County and southwest Orange County in the state of California.

***15. Descriptive Title of Applicant's Project:**

Proposal for GridComm: SDG&E's Advanced Smart Grid Communications System

OMB Number: 4040-0004
Expiration Date: 01/31/2009

Application for Federal Assistance SF-424 Version 02

16. Congressional Districts Of:

*a. Applicant: CA-052 CA-053

*b. Program/Project: CA-044, CA-49, CA-050, CA-051,

17. Proposed Project:

*a. Start Date: January 2010

*b. End Date: June 2012

18. Estimated Funding ($):

*a. Federal	$28,115,052
*b. Applicant	$30,976,915
*c. State	1,000,000
*d. Local	
*e. Other	
*f. Program Income	
*g. TOTAL	$60,091,967

***19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on _____

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☒ c. Program is not covered by E. O. 12372

***20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes", provide explanation.)**

☐ Yes ☒ No

21. *By signing this application, I certify (1) to the statements contained in the list of certifications** and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U. S. Code, Title 218, Section 1001)

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions

Authorized Representative:

Prefix: Mr. *First Name: Chris

Middle Name: J.

*Last Name: Baker

Suffix:

*Title: Senior Vice President & Chief Information Officer

*Telephone Number: 858-650-4096 Fax Number: 858-650-6106

* Email: JCBaker@semprautilities.com

*Signature of Authorized Representative: *Date Signed: August 3, 2009

U.S. DEPARTMENT OF ENERGY

FINANCIAL ASSISTANCE CERTIFICATIONS AND ASSURANCES FOR USE WITH SF 424

Applicant: **San Diego Gas & Electric Company**

Solicitation No.: **DE-FOA-0000058**

The following certifications and assurances must be completed and submitted with each application for financial assistance. The name of the person responsible for making the certifications and assurances must be typed in the signature block on the forms.

Certifications Regarding Lobbying; Debarment, Suspension and Other Responsibility Matters; and Drug Free Workplace Requirements

DOE F 1600.5, Assurance of Compliance Nondiscrimination in Federally Assisted Programs

CERTIFICATIONS REGARDING LOBBYING; DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS; AND DRUG FREE WORKPLACE REQUIREMENTS

Applicants should refer to the regulations cited below to determine the certification to which they are required to attest. Applicants should also review the instructions for certification included in the regulations before completing this form. Signature of this form provides for compliance with certification requirements under 10 CFR Part 601 "New Restrictions on Lobbying," 10 CFR Part 606 "Governmentwide Debarment and Suspension (Nonprocurement) and 10 CFR Part 607 "Governmentwide Requirements for Drug-Free Workplace (Grants)." The certifications shall be treated as a material representation of fact upon which reliance will be placed when the Department of Energy determines to award the covered transaction, grant, or cooperative agreement.

1. LOBBYING

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

2. ADDITIONAL LOBBYING REPRESENTATION

Applicant organizations which are described in section 501(c)(4) of the Internal Revenue Code of 1986 and engage in lobbying activities after December 31, 1995, are not eligible for the receipt of Federal funds constituting an award, grant, or loan.

As set forth in section 3 of the Lobbying Disclosure Act of 1995 as amended, (2 U.S.C. 1602), lobbying activities are defined broadly to include, among other thins, contacts on behalf of an organization with specified employees of the Executive Branch and Congress with regard to Federal legislative, regulatory, and program administrative matters.

Check the appropriate block:

The applicant is an organization described in section 501(c)(4) of the Internal Revenue Code of 1986? ☐ Yes ☒ No

If you checked "Yes" above, check the appropriate block:

The applicant represents that after December 31, 1995 it ☐ has ☐ has not engaged in any lobbying activities as defined in the Lobbying Disclosure Act of 1995, as amended.

3. DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS

(1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery; falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

(2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

4. DRUG-FREE WORKPLACE

This certification is required by the Drug-Free Workplace Act of 1988 (Pub.L. 100-690, Title V, Subtitle D) and is implemented through additions to the Debarment and Suspension regulations, published in the Federal Register on January 31, 1989, and May 25, 1990.

ALTERNATE I (GRANTEES OTHER THAN INDIVIDUALS)

(1) The grantee certifies that it will or will continue to provide a drug-free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

(b) Establishing an ongoing drug-free awareness program to inform employees about:

(1) The dangers of drug abuse in the workplace;
(2) The grantee's policy of maintaining a drug-free workplace;
(3) Any available drug counseling, rehabilitation, and employee assistance programs; and
(4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);

(d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will:

(1) Abide by the terms of the statement; and
(2) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace not later than five calendar days after such conviction;

(e) Notifying the agency, in writing, within ten calendar days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification number(s) of each affected grant;

(f) Taking one of the following actions, within 30 calendar days of receiving notice under subparagraph (d)(2), with respect to any employee who is so convicted:

(1) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
(2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State or local health, law enforcement, or other appropriate agency;

(g) Making a good faith effort to continue to maintain a drug- free workplace through implementation of paragraphs (a),(b),(c),(d),(e), and (f).

(2) The grantee may insert in the space provided below the site(s) for the performance of work done in connection with the specific grant:

Place of Performance: (Street address, city, county, state, zip code)

8315 Century Park Court, San Diego, CA 92123

☐ Check if there are workplaces on file that are not identified here.

ALTERNATE II (GRANTEES WHO ARE INDIVIDUALS)

(1) The grantee certifies that, as a condition of the grant, he or she will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in conducting any activity with the grant.

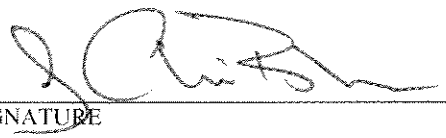
(2) If convicted of a criminal drug offense resulting from a violation occurring during the conduct of any grant activity, he or she will report the conviction, in writing, within 10 calendar days of the conviction, to every grant officer or other designee, unless the Federal agency designates a central point for the receipt of such notices. When notice is made to such a central point, it shall include the identification number(s) of each affected grant.

5. SIGNATURE

As the duly authorized representative of the applicant, I hereby certify that the applicant will comply with the above certifications.

Name of Applicant: **San Diego Gas & Electric Company**

Printed Name and Title of
Authorized Representative: **Chris Baker, Senior Vice President & Chief Information Officer**



SIGNATURE

August 3, 2009
DATE

DOE F 1600.5
(06-94)
All Other Editions are Obsolete

U.S. Department of Energy

Assurance of Compliance

Nondiscrimination in Federally Assisted Programs

OMB Control No.
1910-0400

OMB Burden Disclosure Statement

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Office of Information Resources Management Policy, Plans, and Oversight, Records Management Division, HR-422 - GTN, Paperwork Reduction Project (1900-0400), U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, DC 20585; and to the Office of Management and Budget (OMB), Paperwork Reduction Project (1900-0400), Washington, DC 20503.

San Diego Gas & Electric Company (Hereinafter called the "Applicant")

HEREBY AGREES to comply with Title VI of the Civil Rights Act of 1964 (Pub. L.88-352), Section 16 of the Federal Energy Administration Act of 1974 (Pub.L.93-275), Section 401 of the Energy Reorganization Act of 1974 (Pub.L.93-438), Title IX of the Education Amendments of 1972, as amended (Pub.L.92-318, Pub.L.93-568, and Pub.L.94-482), Section 504 of the Rehabilitation Act of 1973 (Pub.L.93-112), the Age Discrimination Act of 1975 (Pub.L.94-135), Title VIII of the Civil Rights Act of 1968 (Pub.L.90-284), the Department of Energy Organization Act of 1977 (Pub.L.95-91), and the Energy Conservation and Production Act of 1976, as amended (Pub.L.94-385) and Title 10, Code of Federal Regulations, Part 1040. In accordance with the above laws and regulations issued pursuant thereto, the Applicant agrees to assure that no person in the United States shall, on the ground of race, color, national origin, sex, age, or disability, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity in which the Applicant receives Federal assistance from the Department of Energy.

Applicability and Period of Obligation

In the case of any service, financial aid, covered employment, equipment, property, or structure provided, leased, or improved with Federal assistance extended to the Applicant by the Department of Energy, this assurance obligates the Applicant for the period during which Federal assistance is extended. In the case of any transfer of such service, financial aid, equipment, property, or structure, this assurance obligates the transferee for the period during which Federal assistance is extended. If any personal property is so provided, this assurance obligates the Applicant for the period during which it retains ownership or possession of the property. In all other cases, this assurance obligates the Applicant for the period during which the Federal assistance is extended to the Applicant by the Department of Energy.

Employment Practices

Where a primary objective of the Federal assistance is to provide employment or where the Applicant's employment practices affect the delivery of services in programs or activities resulting from Federal assistance extended by the Department, the Applicant agrees not to discriminate on the ground of race, color, national origin, sex, age, or disability, in its employment practices. Such employment practices may include, but are not limited to, recruitment advertising, hiring, layoff or termination, promotion, demotion, transfer, rates of pay, training and participation in upward mobility programs; or other forms of compensation and use of facilities.

Subrecipient Assurance

The Applicant shall require any individual, organization, or other entity with whom it subcontracts, subgrants, or subleases for the purpose of providing any service, financial aid, equipment, property, or structure to comply with laws cited above. To this end, the subrecipient shall be required to sign a written assurance form, however, the obligation or both recipient and subrecipient to ensure compliance is not relieved by the collection or submission of written assurance forms.

Data Collection and Access to Records

The Applicant agrees to compile and maintain information pertaining to programs or activities developed as a result of the Applicant's receipt of Federal assistance from the Department of Energy. Such information shall include, but is not limited to, the following: (1) the manner in which services are or will be provided and related data necessary for determining whether any persons are or will be denied such services on the basis of prohibited discrimination; (2) the population eligible to be served by race, color, national origin, sex, age, and disability; (3) data regarding covered employment including use or planned use of bilingual public contact employees serving beneficiaries of the program where necessary to permit effective participation by beneficiaries unable to speak or understand English; (4) the location of existing or proposed facilities connected with the program and related information adequate for determining whether the location has or will have the effect of unnecessarily denying access to any person on the basis of prohibited discrimination; (5) the present or proposed membership by race, color, national origin, sex, age, and disability, in any planning or advisory body which is an integral part of the program; and (6) any additional written data determined by the Department of Energy to be relevant to its obligation to assure compliance by recipients with laws cited in the first paragraph of this assurance.

DOE F 1600.5
(06-94)
All Other Editions are Obsolete

OMB Control No.
1910-0400

The Applicant agrees to submit requested data to the Department of Energy regarding programs and activities developed by the Applicant from the use of Federal assistance funds extended by the Department of Energy, Facilities of the Applicant (including the physical plants, building, or other structures) and all records, books, accounts, and other sources of information pertinent to the Applicant's compliance with the civil rights laws shall be made available for inspection during normal business hours on request of an officer or employee of the Department of Energy specifically authorized to make such inspections. Instructions in this regard will be provided by the Director, Office of Civil Rights, U.S. Department of Energy.

This assurance is given in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts (excluding procurement contracts), property, discounts or other Federal assistance extended after the date hereto, to the Applicants by the Department of Energy, including installment payments on account after such data of application for Federal assistance which are approved before such date. The Applicant recognizes and agrees that such Federal assistance will be extended in reliance upon the representation and agreements made in this assurance and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, the successors, transferees, and assignees, as well as the person(s) whose signature appears below and who are authorized to sign this assurance on behalf of the Applicant.

Applicant Certification

The Applicant certifies that it has complied, or that, within 90 days of the date of the grant, it will comply with all applicable requirements of 10 C.F.R. § 1040.5 (a copy will be furnished to the Applicant upon written request to DOE).

Designated Responsible Employee

Shawn L Farrar Director, Corporate Diversity
Name and Title (Printed to Typed)

(619 696-2655
Telephone Number

Signature

August 3, 2009
Date

San Diego Gas & Electric Company
Applicant's Name

(858) 654 - 3504
Telephone Number

8315 Century Park Court
Address:

August 3, 2009
Date

San Diego, CA 92123

Authorized Official:
President, Chief Executive Officer
or Authorized Designee

Chris Baker, Senior Vice President & Chief Information Officer
Name and Title (Printed to Typed)

(858) 650 - 4096
Telephone Number

Signature

August 3, 2009
Date

OMB Number: 4040-0010
Expiration Date: 08/31/2011

Project/Performance Site Location(s)

Project/Performance Site Primary Location ☐ I am submitting an application as an individual, and not on behalf of a company, state, local or tribal government, academia, or other type of organization.

Organization Name: San Diego Gas & Electric Company

DUNS Number: 00691-1457

* Street1: 8315 Century Park Court

Street2:

* City: San Diego County:

* State: California

Province:

* Country: USA: UNITED STATES

* ZIP / Postal Code: 92123 * Project/ Performance Site Congressional District: CA-053

Project/Performance Site Location 1 ☐ I am submitting an application as an individual, and not on behalf of a company, state, local or tribal government, academia, or other type of organization.

Organization Name:

DUNS Number:

* Street1:

Street2:

* City: County:

* State:

Province:

* Country: USA: UNITED STATES

* ZIP / Postal Code: * Project/ Performance Site Congressional District:

SDGE A Sempra Energy utility®

GRIDCOMM

GridComm: SDG&E's Advanced Smart Grid Communications System

Proposal

Volume I – Technical & Project Plan

August 6, 2009

Notice of Restriction on Disclosure and Use of Data

*The data contained in the **Budget Justification File** submitted with this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data here to the extent provided in the award. This restriction does not limit the Government's right to use or disclose data obtained without restriction from any source, including the applicant.*

Information about this agreement will be published on the Internet and linked to the website, www.recovery.gov , maintained by the Accountability and Transparency Board. The Board may exclude posting contractual or other information on the website on a case-by-case basis when necessary to protect national security or to protect information that is not subject to disclosure under sections 552 and 552a of title 5, United States Code.

VENDOR TEAM:

ARCADIAN Networks

CISCO

IBM

CELERGY NETWORKS INC.

CSC

SPACE•TIME INSIGHT

APPLICANT:

SDGE

A Sempra Energy utility®

TABLE OF CONTENTS

1.0 PROJECT ABSTRACT

Advanced Smart Grid Communications System
San Diego Gas & Electric Company (SDG&E), a California regulated public utility, is proposing a $60.1 million project as part of the DOE-administered Smart Grid Investment Grant (SGIG) program, under the *Integrated and/or Crosscutting Systems* topic. The proposed project – an advanced wireless communications system – will allow SDG&E to monitor, communicate with and control transmission and distribution equipment, thus accelerating deployment of smart grid applications and devices.

Known as GridComm, it will connect millions of electric smart meters and tens of thousands of smart grid assets across 4,100 square miles serving 3.4 million people. This project can start immediately and finish by December 2011 as described herein.

GridComm is required to support smart grid functions never envisioned for SDG&E's existing communications systems. It will replace outmoded, inefficient, single-use radio frequency (RF) systems with one secure, consolidated system yielding greater performance, security and interoperability for all smart grid stakeholders.

GridComm will achieve a pervasive reach across the SDG&E electric grid via three trusted communications "clouds", each supporting a specific smart grid feature set:

1) Foundation RF Services – licensed 700 MHz covering SDG&E's entire service territory
2) Broadband RF Services – licensed and license-exempt 2.4/3.65/5.8 GHz coverage for all major assets
3) RF Control Services – a single point of control and security

Foundation RF Services will communicate with such endpoints as AMI, SCADA, photovoltaic assets and the mobile electric workforce. Broadband RF Services will enable wide area measurement (WAM) capabilities, backhaul, and phasor measurements. RF Control Services provide integrated security and management of the entire GridComm solution.

GridComm will improve grid security, lower electricity rates, improve grid resiliency, support future smart grid technologies through standards-based communications, and create jobs immediately.

Building GridComm on this basis will advance SDG&E's capability to support smart grid applications and operations by years.

2.0 PROJECT TASKS & SCHEDULE

A construction and deployment project plan has been developed based on the proven technology and operational experience of the GridComm team. As a result, ***GridComm is "shovel-ready," will create jobs[1] beginning in Q3 2009 and begin supporting smart grid applications in 2010.*** GridComm will be completed within two years.

[1] See Appendix 6 – Estimated GridComm Job Creation

2.1 Project Equipment

The Foundation RF Services achieve pervasive coverage of SDG&E's service area using licensed spectrum which provides an extremely high level of reliability to both GridComm and the associated electric power grid communication needs. The Broadband RF Services will be realized using licensed and license-exempt spectrum, creating "Hot Zones" that provide very high throughput and traffic differentiation capabilities.

The Foundation and Broadband RF services are integrated by the RF Control Services, a software system using highly adaptive network management and optimization tools with integrated security features.

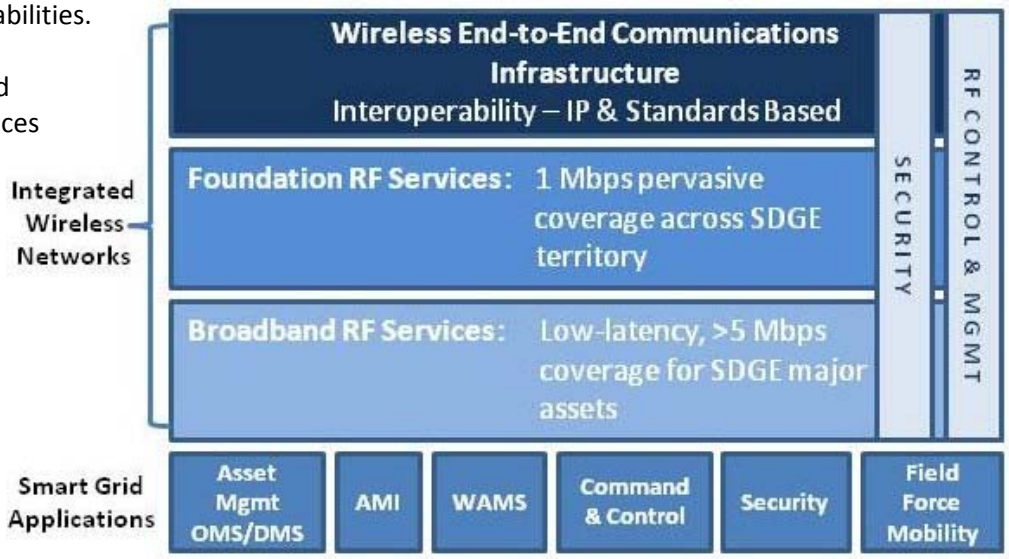


Figure 1: GridComm Smart Grid Architecture

GridComm's Foundation RF Services, Broadband RF Services and RF Control Services infrastructure includes the following estimated quantities of its key equipment components:

- 40 base stations utilizing 700MHz licensed spectrum
- 40 mobile-data base stations utilizing 700 MHz licensed spectrum
- 2,000 crossband repeaters utilizing licensed 900 MHz spectrum to connect to low-bandwidth grid and metering assets
- 2,000 mobile data radios utilizing 700 MHz licensed spectrum
- 2,000 mobile data radios for the Broadband RF Services
- 1000 fixed data radios supported by additional AMI backhaul devices for connecting 'stranded' meters via 700 MHz licensed spectrum
- One disaster recovery vehicle (DRV) equipped with mobile emergency communications equipment
- 400 broadband access points utilizing Wi-Fi/WiMAX equipment operating at various licensed and license-exempt frequency bands including 2.4, 3.65 and 5.8 GHz and associated hardware
- 320 point-to-point IP microwave links providing backhaul from the Broadband RF Services access points to the first point of entry to SDG&E's corporate backhaul network
- 200 Integrated Services Routers (ISR) handling switching, security and distributed network management
- A network optimization and management system providing a single point of control for the entire GridComm communications network integrated into two Network Operations Centers

- An integrated security solution encompassing physical security, access control and authorization, protection of data in transit, and prevention of intrusion into the associated application and storage systems

Additionally, for GridComm, SDG&E will acquire, install and deploy a Wide Area Management System (WAMS) to enable location-intelligent operating status and asset condition monitoring in historical, current and projected time horizons across its electric grid.

The GridComm project will also connect SDG&E's current complement of smart grid devices (listed below) and will scale to millions of devices for the future:

- 5 phasor measurement units
- 1,400,000 electric smart meters (currently being rolled out to residential customers)
- 820 switched and 560 fixed capacitor banks
- 127 regulators
- 4,662 switches and 211 reclosers
- 5,141 fault indicators
- Approximately 155,000 12 kV and 4 kV distribution transformers
- 86 electronic access badge readers & door locks at substations, communication sites and other accessible assets requiring higher levels of security
- 86 video surveillance cameras for remote monitoring of key installation including substations, communication sites and other accessible assets requiring higher levels of security

GridComm can scale well beyond the smart grid devices identified above and will support grid application traffic volume well into the future.

2.2 Project Schedule

The schedule developed for the GridComm project is shown in Figure 2 and allows for the project to be completed before by December 2011 subject to negotiation of definitive agreements, receipt of applicable permitting and regulatory approvals and force majeure delays.

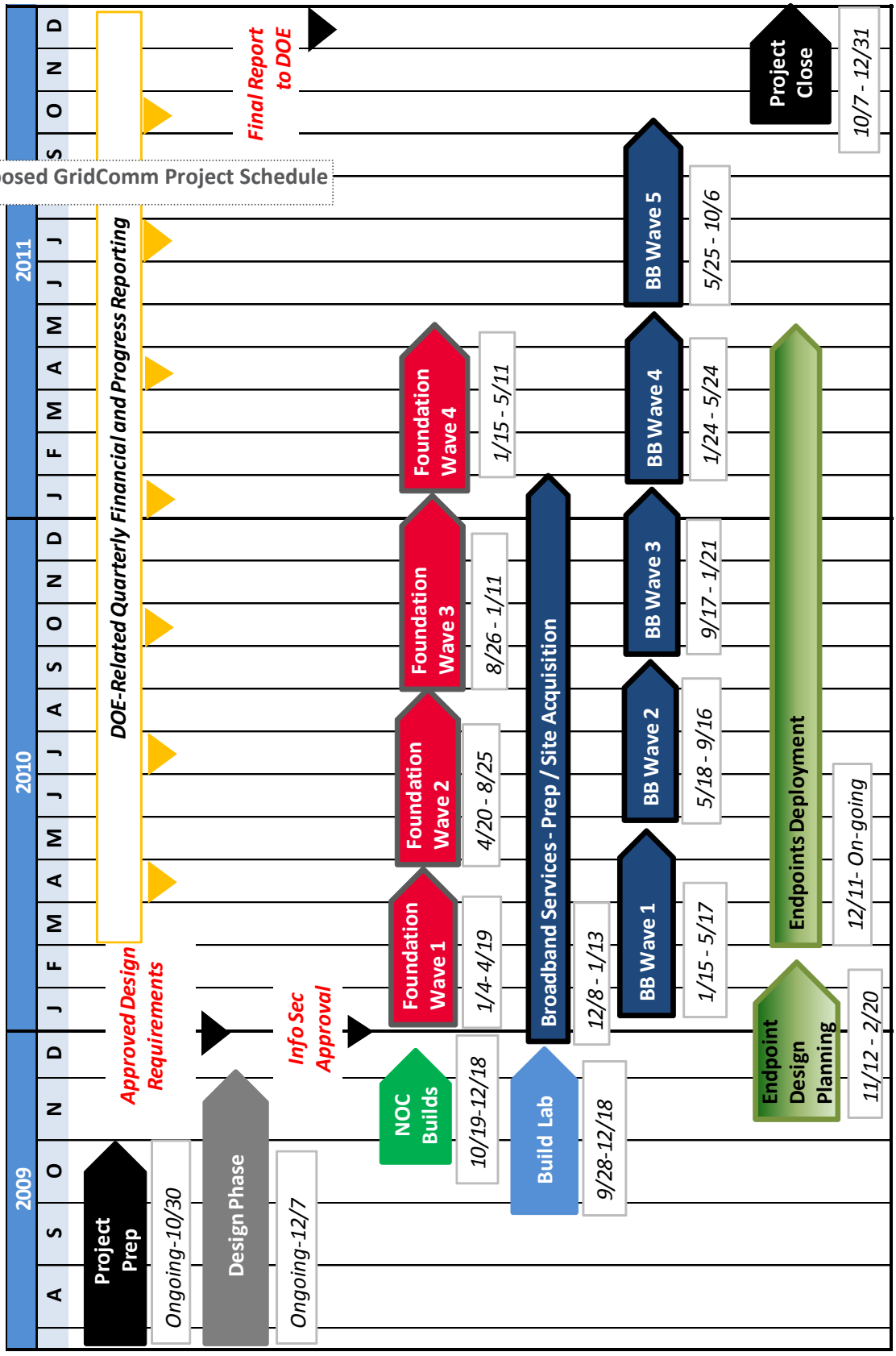


Figure 2: Proposed GridComm Project Schedule

2.3 Project Tasks

GridComm project planning has been divided in to the phases described below with several stages currently underway as noted. The SDG&E Network & Communications Services group has extensive experience planning and deploying such large-scale communications programs on time and on budget.

A. PROJECT PREPARATION & PLANNING *(in progress)*

Scope:

- All activities required to allow SDG&E to enter into contracts with vendors

Tasks:

- High-level requirements definition
- Finalize internal SDG&E business case and coordinate with affected SDG&E business units
- Identify diverse business enterprises (DBEs) qualified for project support
- Apply for California Energy Commission cost share
- Secure Smart Grid Investment Grant (SGIG) funding
- Secure project resources and hire additional project deployment staff
- Complete contracts with vendors to initiate vendor project ramp-up (including new hires, office expansions)

Milestones/Deliverables:

- Business plan
- Resource allocations
- Vendor contracts

B. COMMUNICATIONS INFRASTRUCTURE DESIGN (*in progress)*

Scope:

- All activities required to produce a comprehensive design package

Tasks:

- Mapping technical requirements to business requirements
- Establish the solution architecture
- Engage technical and vendor resources to generate the design
- Generate draft design and refine

Milestones:

- Approved detailed design document
- Obtain information security approvals

Deliverables:

- Detailed system design documentation

C. BUILD TESTING AND CONFIGURATION LAB

Scope:

- All activities required to allow SDG&E to enter into contracts with vendors

Tasks:

- Generate a bill of materials
- Construct lab facilities and install equipment
- Evaluate communication system connectivity and performance
- Smart grid end-point performance testing
- Document test scenarios

Milestone/Deliverable:

- Integration and testing configuration environment

D. ENDPOINT DEVICES DESIGN PHASE

Scope:

- All activities required to specify, design and plan for deployment of the required endpoints to enable smart grid benefits

Tasks:

- Establish type, location and timing of endpoint deployment
- Establish the operational requirements for each endpoint type
- Integrate communications into smart grid devices

Milestone/deliverable:

- Availability of a working device for each configuration and plan for roll out

E. NETWORK OPERATIONS CENTER (NOC) BUILD

Scope:

- All activities required to design, configure and deploy network operations center management capabilities

Tasks:

- Hire and train NOC staff members
- Design and install incremental NOC equipment
- Provide connectivity between NOC systems and backup NOC
- Develop network and site specific design documentation
- Integrate new GridComm processes into existing enterprise NOC

Milestone/Deliverable:

- Completion of two NOC facilities for network provisioning and monitoring

F. DATA CENTER DESIGN/INTEGRATION

Scope:

- All activities required to provide a secure interface into the SDG&E computing platforms

Tasks:

- Define router, server and firewall requirements
- Obtain information protection approval
- Establish route and switch configurations and set firewall security policies
- Plan and provision physical back haul connections
- Install, test and optimize equipment
- Conduct security penetration testing

Milestone/Deliverable:

- Provide secure and tested connectivity between the smart grid applications and endpoints

G. FOUNDATION RF INFRASTRUCTURE CONSTRUCTION

Scope:

- All activities required to construct the Foundation RF Services sites in four consecutive waves.

Tasks:

- Complete site preparation and backhaul provisioning
- Install mobile and fixed base stations and antennas

- Provision equipment through the NOC
- Test and optimize site equipment
- Conduct site acceptance tests
- Fully document as-built configuration and programming

Milestone/Deliverable:

- Completion of 40 operational mountain-top sites in four waves

H. BROADBAND RF INFRASTRUCTURE CONSTRUCTION

Scope:

- All activities required to construct the Broadband RF Services sites in five consecutive waves

Tasks:

- Complete site preparation and backhaul provisioning
- Install mobile and fixed base stations and antennas
- Provision equipment through the NOC
- Test and optimize site equipment
- Conduct site acceptance tests
- Fully document as-built configuration and programming

Milestone/Deliverable:

- Completion of 400 operational sites in five waves

I. ENDPOINT DEPLOYMENT & SMART GRID ENABLEMENT

Scope:

- All activities required to enable smart grid functionality through the provisioning of communications to fixed and mobile endpoints

Tasks:

- Conduct a phased procurement of endpoint equipment
- Coordinate installation onto the grid to minimize disruption
- Install, connect and test endpoints over the network
- Fully provision and authenticate through the NOC

Milestones/Deliverables:

- Phased integration of endpoints with the electric grid control and mobile data application servers
- Integration of GridComm network and smart grid endpoints into a production environment

J. PROJECT CLOSURE

Scope:

- Complete all documentation for system configurations and operational procedures

Tasks:

- Finalize system documentation
- Prepare all applicable reports including internal and DOE reporting
- Establish continuous improvement procedure
- Turn over to operational business unit

Milestone/Deliverable:

- Hand off to operations team; project closure

2.4 DOE-Related Data Collection & Reporting

Data Collection & Reporting
SDG&E will comply with DOE's detailed reporting requirements, as specified in Appendix 3 of DE-FOA-0000058. Section 6.0 of this proposal describes the methodology that will be used to collect and report the data as well as the type of data that will be collected, the types of benefits that the initiative will yield, and the associated costs for the project. Data will be collected and compiled according to industry standards and best practices, IEEE Standard 1366-2003, and the directives of the California Public Utilities Commission (CPUC) as applicable.

Financial Reporting
Not later than 10 days after the end of each calendar quarter, SDG&E will submit a report to the Contracting Officer that contains:

i. The total amount of Recovery Act covered funds received from that agency;
ii. The amount of Recovery Act covered funds received that were expended or obligated to the GridComm project and activities;
iii. A detailed list of all projects or activities for which Recovery Act covered funds were expended or obligated as requested by DOE and in compliance with all Recovery Act requirements.

In addition to Federal reporting requirements, SDG&E has received approval of its pre-application to the CEC Public Interest Energy Research (PIER) program for State cost share funding. Should this application be chosen for Federal and State funding SDG&E will provide the additional reporting required to document the State's infrastructure investment.

2.5 Project Regulatory & Other Approvals

FCC Approvals
Foundation RF Services utilize spectrum in the 700 MHz band and will be secured through the currently licensed and authorized spectrum holder. The spectrum is already FCC cleared and approved for use, and temporary licenses are issued and in place.

The proposed Foundation RF Services equipment is FCC type accepted.

Further, several licensed channels in the 900 MHz band, which SDG&E holds, will also be used to support the Foundation RF Services.

For the proposed Broadband RF Services equipment, SDG&E currently holds the right to operate on the 3.65 GHz spectrum per FCC licensing. Licenses are not required for 2.4 and 5.8 GHz operation.

The proposed Broadband RF Services equipment is FCC type accepted.

Local Use Permits
Extensive use of SDG&E infrastructure (towers, poles, etc) for communications infrastructure minimizes the need for local permitting and approvals.

California Public Utilities Commission (CPUC) Filings

The CPUC initiated Rulemaking (R.) 08-12-009 on December 18, 2008 to guide the development of a smart grid system in the state of California. As part of the Order Initiating Rulemaking (OIR), the CPUC, working collaboratively with the California Energy Commission (CEC) and the California Independent System Operator (CAISO), wants to ensure that federal money comes to the state to further state energy policies, create jobs, and stimulate the economy.[2] A draft decision, currently on the CPUC's August 20, 2009 meeting agenda, creates a streamlined process in which California utilities may receive cost recovery for the ratepayer portion of ARRA-funded activities.

In short, if adopted, California utilities will have the authority to book their share of costs into a memorandum account. Funds booked into the memorandum account would then be subject to recovery through an expedited process. SDG&E will comply with the CPUC's ARRA-funded approval process and will seek the appropriate approvals as directed. Additionally, the SDG&E SGIG has been approved to apply to the CEC's PIER program for cost share.

Federal Energy Regulatory Commission (FERC)

FERC issued its final policy statement and action plan for smart grid development July 16, 2009. The purpose of the policy is to prioritize and accelerate development of key interoperability standards and grid functionalities of smart grid devices and systems. The key priorities identified in the policy statement include two cross-cutting issues, system security and inter-system communication and four key grid functionalities: (1) wide-area situational awareness, (2) demand response, (3) electric storage, and (4) electric transportation. In addition, FERC set forth its interim rate policy for near term deployment of devices and equipment. The policy allows smart grid costs to be recovered through formula rates.

The SDG&E GridComm proposal is designed to fully comply with NERC-Critical Infrastructure Protection (CIP) physical and cyber security standards and is based on industry interoperability standards as detailed in Section 5.1 through 5.3 of this proposal. SDG&E will also comply with FERC's interim rate policy as it applies to GridComm in the event the project qualifies for an award under DOE's Smart Grid Investment Grant program.

3.0 MANAGEMENT PLAN

GridComm is necessary to accelerate the modernization of the Southern California electric transmission and distribution system as well as to support additional investment in SDG&E's plans for new smart grid technologies and tools.

Per the DOE merit criteria, the objectives of SDG&E's GridComm project fulfill the purpose and goals of the SGIG as summarized below:

[2] Assigned Commissioner's ruling amending the scope and schedule of proceeding to address policy issues pertaining to smart grid funding appropriated in the American Recovery and Reinvestment Act of 2009, p. 7.

SGIG PURPOSE	GRIDCOMM SUPPORTS SGIG PURPOSE VIA THE FOLLOWING:
○ **Reliability of the electric power system**	○ Expands communications system across 98% of SDG&E grid assets and 100% of major assets such as sub-stations and PMUs ○ Achieves 99.5%-99.9% communications availability for two-way communication with all grid assets ○ Achieves mission-critical interconnection of grid assets for reduced downtime ○ Reduces mean time to repair (MTTR) of grid assets
○ **Electric power system costs and peak demand**	○ Enables SDG&E 'Smart Meter' program (1.4MM electric meters), real-time pricing (RTP) and critical peak pricing (CPP) to manage peak demand
○ **Consumer electricity costs, bills, and environmental impacts**	○ Lowers costs by shifting electrical usage to off-peak times ○ Reduces electricity usage resulting in CO2 emissions reductions
○ **Clean energy development and greenhouse gas emissions**	○ Enables command & control of real-time and dynamic distributed and de-centralized (wind/solar) generation into Southern California
○ **Economic opportunities for businesses and new jobs for workers**	○ $60.1 million capital program for deployment over 4,100 square miles ○ Creation of a minimum 83 direct, new jobs[3] with emphasis on vendor relationships with innovative San Diego and California companies as well as a balanced mix of small to mid-size to Fortune 500 vendor companies ○ Minimum 10-year operating horizon for sustainable job creation ○ The opening of new California facilities for out-of-state vendors ○ Innovative RF-based solution suitable for replication by other utilities
SGIG GOALS	**GRIDCOMM ACHIEVES SGIG GOAL VIA THE FOLLOWING:**
○ **Enabling informed participation by consumers in retail and wholesale electricity markets**	○ Provides backhaul and control for SDG&E 'Smart Meter' program which will extend the RTP and CPP currently used by business customers to SDG&E's residential customers
○ **Accomodating all types of central and distributed electric generation and storage options**	○ Through the trusted communications cloud, all assets can be managed with wide area measurement system and smart grid visualization tools
○ **Providing for power quality for a range of needs by all types of consumers**	○ Increases the visibility and reliability of the electric system and assets through real-time operational controls
○ **Enabling new products, services and markets**	○ Provides sufficient mobile and fixed asset RF coverage to support smart grid functions across SDG&E's grid operations today and in the future ○ Uses IP and standards based technologies, supports emerging

[3] See Appendix 6

	interoperability standards, and uses off-the-shelf technologies to achieve compatibility with as wide variety of products and services in the marketplace as possible ○ Positions southern California with one of the most secure, capable smart grid communications system in the U.S.—a model that could be replicated to accelerate smart grid adoption elsewhere in the country.
○ **Optimizing asset utilization and operating efficiency of the electric power system**	○ Low-latency communications enhance grid visibility and control ○ GridComm supports traffic prioritization so that mission critical business applications, SCADA monitoring, emergency restoration teams, and substation monitoring can be managed through a single infrastructure
○ **Anticipating and responding to system disturbances**	○ Critical assets will have redundant communications links allowing the electric system to recover faster ○ GridComm is designed to reduce MTTR of grid assets ○ Enables data capture for wide area measurement system (WAMS), providing proactive grid control
○ **Operating resiliently to attacks and natural disasters**	○ GridComm is designed to operate resiliently to attacks and natural disasters ○ Private, dedicated, and secure system with optimized communications spectrum ○ GridComm provides multiple layers of communication, integrated via a control and security software system

3.1 Project Team

To assure GridComm's success, SDG&E has assembled a world-class group of vendors with proven, off-the-shelf technological products and services to deliver an advanced smart grid communications service in an estimated two years.

Cognizant of both the DOE's and overarching Recovery Act's objectives, SDG&E mixes the industry's Tier One IT products and service companies (Cisco, CSC, and IBM) with local/regional technology innovators (Arcadian, Celergy, and Space-Time Insight). This balanced program approach ensures that the project team has strong depth with access to financial and technical resources, yet is able to leverage the specialized skills, technologies and price advantages that local talent can provide. This will yield a progressive and motivated team to deliver against fast-paced timelines.

The vendor team assembled by SDG&E to implement GridComm as well as each vendor's role in GridComm, its capabilities and credentials are described below:

GridComm Technology Innovation Vendors

ARCADIAN Networks	Arcadian Networks designs and delivers wireless communication systems to the energy sector. The real-time two-way communication networks provide the backbone of all "smart" energy solutions – delivering operating efficiencies, interoperability, and security.

SDG&E SGIG Role: Vendor for: - Smart grid (Foundation RF Services) build-out and managed services including 24x7x365 network operation center - Exclusive and licensed 700 MHz frequency spanning SDG&E service area - High powered basestations ideally suited to large coverage areas - Focused smart grid hardware solutions (gateways, end-points, routers) **Credentials:** - Multi-year deployment and operation of statewide smart grid network serving Great River Energy (GRE) and 17 additional utilities - Strong partnership with Itron for AMI integration - Active field deployment with SDG&E implementing GridComm demonstration in partnership with Celergy-partner Proximetry and SDG&E for over one-year on GridComm vision	Designed specifically for utility, oil and gas, and renewable energy industries, the IP converged networks are based on private, secured 700 MHz spectrum. *Arcadian's field-proven solutions are a key component in mitigating GridComm risk and supporting a timely roll-out.* Arcadian presently operates one of the largest smart grid networks in the country representing over 60,000 square miles of coverage providing interoperable and secure smart grid connectivity to over 18 utilities. Arcadian's products and services are ideally suited to meet the expansive coverage requirements dictated by SDG&E and the GridComm mission. Arcadian is focused on applying these assets to the needs of the smart grid opportunity and as such has cultivated partnerships with some of the leading OEM and component systems suppliers. The company's products are fully demonstrable today (inside SDG&E) and ready for deployment. Additionally, during late 2008 and early 2009, Arcadian successfully demonstrated the coupling of the Foundation RF network platform with the "Broadband" service products, supported at the time by Celergy-partner Proximetry. With these demonstration networks, the vendors were able to support the full range of GridComm use cases with network solutions spanning AMI backhaul, substation connectivity, and the full range of mobile/ emergency scenarios.
CELERGY NETWORKS, INC. **SDG&E SGIG Role:** Vendor for: - GridComm site assessment, planning, & deployment - Depot level configuration, "kitting," and logistical support - Provider & integrator of Proximetry's AirSync ™– RF Control Service platform	Celergy Networks is a current vendor for network integration and deployment services across the SDG&E enterprise. Celergy, its staff, and business partner Proximetry (provider of the AirSync™ software platform) have been involved in the GridComm planning since program inception. Celergy and Proximetry were integral in SDG&E's network deployment in response to the 2007 wildfires during which the necessity and associated enterprise value of a dedicated/private broadband network platform was proven. With the support of these vendors, SDG&E was awarded the UTC's Apex Award for Innovation in Utility Communications in 2008. (See Appendix 7 for award case study.) Through its nationwide network of deployment resources (3,500 affiliates & over 15,000 FTEs), the company is ideally suited to the

Credentials: - Existing SDG&E vendor (extensive knowledge of SDG&E sites, systems, & personnel) - Nationwide deployment support for leading Fortune 500 enterprises **Partner:** PROXIMETRY	accelerated deployment plans within this program. The company has existing personnel, systems, and knowledge of the SDG&E enterprise, and as such, can move swiftly to meet GridComm timelines. The company's proven methodology for wireline and wireless deployments has delivered on-time/on-budget solutions in mission critical settings – including leading customers in Financial Services, Transportation, Defense, and Energy segments. Internal to SDG&E, Celergy has offered primary deployment support on both the *One Voice* (VOIP) and Foundry LAN Refresh programs. Celergy has further differentiated itself by investing in the integration and tailoring of Proximetry's RF Control Platform – AirSync for certain industry applications. This investment has included the deployment and support of test networks in San Diego County that mirror those contemplated by GridComm.
SPACE•TIME INSIGHT **SDG&E SGIG Role:** Vendor: - Smart Grid & Wide Area Management System - WAMS support/consulting **Credentials:** - Provider of a geospatial visualization solution for wildfire response and crew mobilization for SDG&E for the past 1.5 years. - Used for PMU monitoring in Entergy's synchrophasor program for transmission and distribution management - Provider of geospatial visualization solution used by California ISO for response to wildfire threats to transmission grid and for visual management of nodal pricing of power on the California grid.	Space-Time Insight of Fremont, California is a software licensor. Its software is used by a number of utilities and system operators with sophisticated grid management tools. With GridComm's enablement of phasor measurements, Space-Time Insight will provide its Space-Time Energy Management Module (STEM) for Smart Grid and Wide Area Management Systems, for the end-to-end smart grid, to enable location-intelligent operating status and asset condition monitoring in historical, current and projected time horizons across the grid. Space-Time Insight's solutions deliver real time geospatial analytics that visually communicate the dynamic behavior of the electric grid, in context, across multiple regions, providing multi-layered situational awareness. GridComm will enable data visualization to provide complete situational awareness By visually pulling together smart grid assets and field personnel, SDG&E can monitor and improve system reliability : • spotting and islanding disturbances in the grid, • bettering management of its demand response programs, • improving management of distributed assets, • operating resiliently to natural disasters, • accommodation of central and distributed generation and storage, and • ensuring efficient asset and outage management. Space-Time Insight will provide true situational awareness for the GridComm project.

GridComm Core Infrastructure Vendors

SDG&E SGIG Role: Vendor for: - Core routing platform - Select WLAN installations **Credentials:** - Annual R&D spend > $5B - Global service & support - Current provider of SDG&E's datacenter routing/switching platform - ISR platform leads industry with 86% market share - Vendor to numerous Fortune 500 energy companies	Equipment vendor Cisco is a worldwide leader in networking that transforms how people connect, communicate and collaborate. Cisco enables people to make powerful connections-whether in business, education, government, philanthropy, or creativity. Cisco hardware, software, and service offerings are used to create the Internet solutions that make networks possible-providing easy access to information anywhere, at any time. Since the company's inception, Cisco engineers have been leaders in the development of Internet Protocol (IP)-based networking technologies. Today, Cisco employs more than 63,000 people worldwide, and has industry-leading products and solutions in the company's core development areas of routing and switching, as well as in advanced technologies and services. Designed to meet the requirements of next-generation energy networks, the Cisco Smart Grid solution takes advantage of a secure, standards-based IP-infrastructure for energy providers and consumers. Cisco Smart Grid is a combination of commercially available products, technologies, services, and eco-system partners that help utilities deliver a solution designed to: • Reduce energy network outages and disruptions • Minimize risks by increasing the resiliency and security of the power grid • Lower the cost of energy storage, transmission, and distribution • Improve management operational efficiency • Increase environmental sustainability
SDG&E SGIG Role: Vendor for: - Design/build/integration for RF Control Services - Network deployment - Network operations consulting & design - DOE-related data collection	Computer Sciences Corporation will provide program management, consulting, and integration services targeted towards the deployment and operations of GridComm. CSC is recognized as an industry innovator for its trusted cloud computing, networks and security solutions as well as its deep expertise in the utilities industry. CSC's industry best practices for deployment and operations will support a timely, robust, and secure GridComm roll-out. CSC brings to the following expertise to the GridComm initiative including: • Robust program and project management to drive reliable, on-time and on-budget delivery of quality results for large-scale,

and reporting **Credentials:** - $16.7B in annual rev. (>45% infrastructure outsourcing & operations) & 92,000 employees - Vast I.T. operating infrastructure: 60 global sourcing centers, 4 state-of-art datacenters - Energy solutions account for $1.1B of annual rev. - Current supporter of 15,000 SDG&E desktop/laptop systems - Solution provider to many energy industry leaders across the globe - Vast experience in network operations earning the company "Leader" status within Gartner's "Magic Quadrant" rankings.	enterprise-wide, global programs and projects • Unrivalled capabilities in large-scale network design, deployment, operation, and performance • Strong experience in both public sector as well as commercial sector metrics and performance capture and reporting to drive continuous improvement and sustainability • Legacy of disciplined integration management, including multiple partners, competitors, vendors, and third parties, with an independent view of quality and customer-driven results. Specifically, CSC will be acting as a key integrator in establishing the operating agreement of the vendors involved in the design, build, integration and deployment services from the early planning and resourcing phase through deployment. CSC will provide a network team for architectural and design leadership, engineering services to build out the solution in scalable form, component and integration testing, oversight of engineering, staging and testing in the field, and validation of the deployed components. An experienced Network Services Deployment Manager will continually assess/mitigate risk, ensure schedule and resource alignment, and assure operational readiness and quality. The team will leverage CSC's best practice reporting and capture of the data and metrics to provide operational and project reporting of key statistics, in support of internal and DOE requirements, and will test each deployment and integration work stream against the appropriate completion criteria before completing the cutover and project work, migrating to operational status. The fusion of CSC's secure network solutions with its rich base of energy systems, experience in public sector funding and compliance and technology/applications knowledge is core to mitigating GridComm deployment risks and to assuring the quality of the deployed solution. The company's existing operating role within SDG&E's I.T. strategy and operations minimizes any start-up contract risk.
 **SDG&E SGIG Role:** Vendor for: - QA/ IV&V services - Security & cyber-security consulting services **Credentials:** - $103.6B revenue total - $4.7B IBM Global Business	IBM Global Business Services has been a long-standing vendor to SDG&E and in addition to supporting GridComm's security needs, currently serves as the core architect of SDG&E's Smart Grid initiative. IBM also supports SDG&E with a wide range of outsourced offerings including systems integration, application development, and data center operations. For GridComm, IBM will assist SDG&E in addressing the project's multiple security and interoperability challenges. IBM will assist SDG&E with the interoperability issue through participation with SDG&E and vendors in standards groups, as well as through the adoption and implementation of an approach to systems integration

Services revenue - $6.5B annual R&D - Existing SDG&E 'Smart Grid' program key vendor	with application components. This approach will involve adherence to SDG&E's architectural principles and security standards. IBM Security & Privacy Services will be applied to: ○ Develop the GridComm cyber security strategy and roadmap ○ Define GridComm's security architecture framework ○ Create GridComm's cyber security governance, risk, and compliance (GRC) management plan Its solution design support will include: ○ Perform a GridComm cyber security risk assessment ○ Create GridComm security penetration and vulnerability test plan ○ Conduct security penetration and vulnerability testing

A senior executive of SDG&E as well as each of its vendors have provided a letter of support to demonstrate organizational commitment, and these can be found in Appendix 2 and Appendix 3.

3.2 GridComm Project Management & Staff

GridComm will be a project of SDG&E's Network & Communication Services (NCS) group, staffed with 250 full-time equivalents (FTEs) and responsible for delivering communications to all of SDG&E and Southern California Gas Company facilities, sites and personnel throughout a 24,000 square mile region serving 23.4 million residents.

SDG&E will form a cross-functional GridComm steering committee comprising senior electric utility executives listed below. The GridComm deployment will fall under the day-to-day management of the SDG&E Project Management Office (PMO) and its Infrastructure Technology Manager. The NCS PMO team of 11 Project Managers and two Financial Analysts manages a project portfolio of $40-50 million in network and communications projects annually. With deep experience in utility programs and a history of collaboration with SDG&E's Smart Grid department and its team members, the PMO team regularly manages large teams comprised of multiple vendors.

Key SDG&E personnel as well as vendor personnel are listed below with résumés for each included in Appendix 1, excluding personnel acting in steering committee capacity.

SDG&E Steering Committee:	PATRICIA WAGNER, VP–Information Technology
	JEFF NICHOLS, Director, Network & Communications Services
	LEE KREVAT, Director, Smart Grid
	DAVE GEIER, VP Electric Transmission and Distribution
GridComm Program Manager:	DANIEL THOMPSON, Infrastructure Technology Manager – *PMO*
GridComm Chief Engineer:	GARY HAWKINS, C.Eng, Chief Technology Officer- *Broadband RF Services*
GridComm Technical Leads:	MIKE CALCAGNO, IT Network Architect - *Foundation RF Services*
	DENNIS FOSS, Senior Infrastructure Technologist- *Broadband RF Services*
	ALEX KUNZ, Information Security Manager - *Information Security*
Arcadian Project Lead:	JAKE RASWEILER, Vice President IT Engineering and Network Operations

Celergy Project Lead:	TODD MAKIE, Principal Consultant – *Broadband RF Services Program Manager*
Celergy Key Individuals:	MIKE SANDERSON, Vice-President, Engineering - *AirSync Network & Broadband RF*
CSC Project Lead:	PAUL N. PECHERSKY, Program Director - *Integration & Deployment Services*
CSC Key Individuals:	ANDY SYKES - Network Architect - *Design/Build/Integration & Network Operations Center Design* RICK NUNEZ - Network Engineering Manager - *GridComm Design/Build/Integration, Network Operations Center Design, & Network Deployment* RICK YEE - Network Engineering Manager - *Design/Build/Integration, Network Operations Center Design, & Network Deployment*
IBM Project Lead:	TIMOTHY DELOACH, Senior Managing Consultant – *Security Consulting* GENE RODRIGUEZ, Associate Partner – *Security & Privacy Consulting*
Space-Time Insight Lead:	MOZHI HABIBI, Director of Product Management - *WAMS*

The organizational structure for GridComm is shown in Figure 3 below:

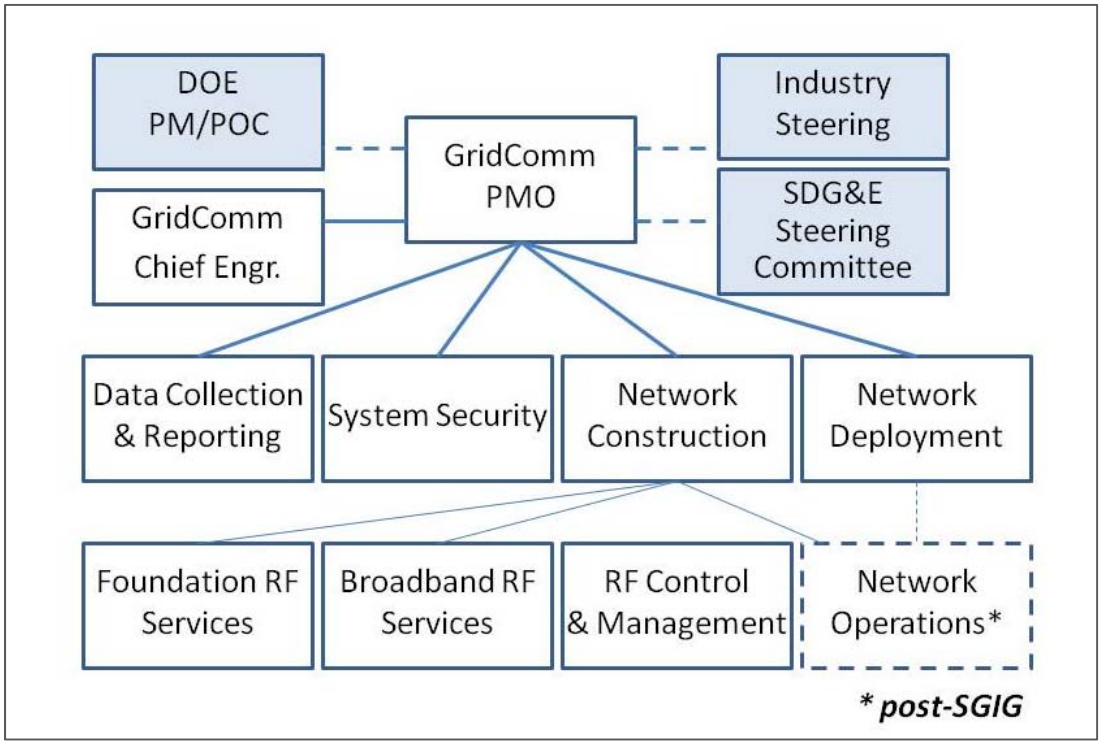


Figure 3: GridComm Project Organization

3.3 Risk Management

SDG&E proposes the following project strategies to address risks to project schedule/completion including technical, financial, regulatory, and institutional risks:

APPROACH TO ADDRESSING POTENTIAL RISKS TO PROJECT SCHEDULE/COMPLETION	
RISK AREA	**MANAGEMENT/MITIGATION**
CPUC ruling regarding stimulus funding and rate recovery	SDG&E is participating in the CPUC Smart Grid OIR, is supportive of Commissioner Rachelle Chong's July 21, 2009 Proposed Decision *Establishing Commission Processes for Review of Projects and Investments by Investor-Owned Utilities Seeking Recovery Act Funding*, and expects that its share of the proposed GridComm project that is contingent upon CPUC approval for cost recovery will be fully compliant with the CPUC's final ruling should it receive DOE funding (See Section 2.5). Also, SDG&E has been approved to apply for an additional $1 million cost-share grant available through the California Energy Commission.
Project funding	**SDG&E is fully prepared to fund its share of GridComm, subject to the items listed in section 3.3.1. All SDG&E participating companies are Vendors and are prepared to deliver their good/services at very competitive prices.**
Equipment Availability	SDG&E with its equipment Vendor team has already developed a bill of material for GridComm and is negotiating definitive agreements.
RF coverage fulfillment	The GridComm team has done extensive RF modeling of the SDG&E coverage area for multiple frequency options, verifying the coverage with the design. The GridComm project plan includes an ongoing RF modeling and optimization task.
Network security & approvals	GridComm security design and procedures comply with SDG&E's already-verified NERC-CIP standards for encryption, physical and cyber security requirements. GridComm's licensed spectrum mitigates shared interference risks. Standards-based communications enables new cost-effective security features such as electronic remote access control and video surveillance. GridComm will be more secure than commercial solutions or previous generation networks.
Back haul design	Extensive SDG&E private back haul will be used to minimize long term operating costs. Enterprise network back haul enhancement will commence upon award to meet project timelines. Approximately 80 new or upgraded backhaul points are needed to transport GridComm/Smart Grid data to secure processing centers. Once deployed, the network is scalable and flexible which will provide an improved cost structure for backhaul configuration changes as smart grid applications mature.

Network security between vendor & SDG&E networks	Arcadian will provide initial NOC services via an existing facility/system and will provision services via existing, centralized authentication servers. As other GridComm services are built, NOC services and functions will be modified accordingly. Security will be addressed by adhering to practices consistent with NERC-CIP as well as utilizing SDG&E's existing vendor management and access controls.
Equipment shelter and antenna tower availability	SDG&E has already begun to survey and inventory existing towers, shelters and backhaul to determine if they meet GridComm space requirements. The project will incorporate third party tower assets as a backup to SDG&E assets. The project design team has access to 3rd party tower databases for backup locations. This survey work will be complete by the time of any anticipated SGIG award, so that construction can commence immediately.
Negotiations with additional leased site locations	SDG&E may be required to secure additional radio site facilities for GridComm. Costs for prospective third-party leased sites have already been incorporated into the financial model.
Weather considerations	While southern California has short and mild winters, many sites are located at the tops of mountains. Sites will be scheduled for upgrade/completion when weather conditions are favorable.
Municipal & zoning	Deployed devices may be subject to regulatory approval and permitting that may add unforeseen time and effort to the project. SDG&E is already working with authorities to determine optimal placement of GridComm communications equipment.

Caveats and Major Assumptions

In addition to the Risk Management discussion above, in its development of the GridComm SGIG proposal, SDG&E has based its schedules, cost estimates and technological discussions on several major assumptions for which it provides the following clarifications:

Definitive Agreements

The SGIG and SDG&E's acceptance thereof would be subject to the execution of mutually acceptable definitive agreements between DOE and SDG&E covering, among others, such issues as:

- Asset use, ownership and disposition
- Appropriate confidentiality terms and waivers of intellectual property rights to satisfy SDG&E's vendor requirements
- Determination of allowable cost allocation methodologies and documentation
- Rights granted and approvals required by governmental and regulatory agencies to implement the smart grid network uses as described

Buy American

- SDG&E is basing its proposal on its understanding that Buy American requirements do not apply to GridComm equipment as GridComm is not a public works project.

Other Uses of the System

- Some incidental usages of the system are likely to occur for gas and other internal utility operations as SDG&E is both a gas and electric utility. For instance, in some instances, the network may provide some gas AMI backhaul as well as electric. SDG&E is assuming these uses would be permissible.

Vendor Agreements

- SDG&E has identified individual vendors for the products and services needed to support GridComm. While many vendors are in negotiations with SDG&E, all GridComm vendor determinations will ultimately be subject to SDG&E achieving mutually acceptable definitive agreements with each vendor.

Vendor Status

- SDG&E realizes that distinctions between vendors and sub-recipients are factually driven. Applying the five factors listed in OMB M-09-21, *Implementing Guidance for the Reports on Use of Funds Pursuant to the American Recovery and Reinvestment Act of 2009* (June 22, 2009), SDG&E believes that all of the vendors described herein should be characterized as such because, even where their contribution is very substantial, (a) all of the vendors offer similar goods and services in other, competitive environments, and (b) there are acceptable alternatives to each such vendor's contributions and they are thus each, when viewed individually, ancillary to the operation of the program described herein.

4.0 TECHNICAL APPROACH TO ENABLING SMART GRID FUNCTIONS

GridComm enables and accelerates smart grid functions across the SDG&E service territory. The SGIG smart grid enabling merit criteria and associated GridComm feature is shown in the table below. A more detailed technical description of GridComm's enabling features is elaborated in Section 4.1 below:

SGIG MERIT	GRIDCOMM SMART GRID ENABLING FEATURE
Meets the SGIG conditions of qualifiying investments	GridComm ***advances the ability to develop, store, send and receive digital information related to real-time usage, pricing and other important data points to and from electric utility system assets***. It specifically extends this capability to 98% of grid assets as well as supporting scalable expansion. GridComm ***advances the electric grid's ability to detect, prevent, respond to and recover from system security threats, including cyber-security threats and terrorism but also natural disasters***. It does this through enhanced security functions and technologies built into the communications network and described fully in Section 5.4 as well as disaster recovery communications outlined in Section 4.1.

	GridComm ***requires the purchase and installation of monitoring and communications devices for enabling smart grid functions across the SDG&E transmission and distribution equipment*** as well as providing the backhaul needed to ***communicate with metering devices, sensors and other such smart grid devices and tools*** across SDG&E's 4,100 square mile service territory.
Installs qualified smart grid technologies and connects them to the electric system	GridComm will deploy approximately 40 Foundation RF Service sites and 400 Broadband RF Service sites with RF Control Services for monitoring, communicating with, and controlling the utility's smart grid and electric smart meter assets and the enterprise. GridComm will connect SDG&E's existing smart grid endpoints (as listed in Section 2.1.) GridComm will scale to allow many more devices, tools and technologies to be incorporated into the grid. GridComm will include a grid visualization system to deliver location-intelligent operating status and asset conditions in historical, current and projected time horizons resulting in the ability to identify infrastructure problems and preempt outages, better manage supply and demand, and support wide area management and visualization.
Plan for operating smart grid technologies in a manner that clearly causes smart grid functions to actually occur	SDG&E has a robust smart grid vision that already includes the planned rollout of 1.4 million electric smart meters serving residential and business customers by 2011. GridComm's dedicated, licensed Foundation RF Services enable SDG&E to extend its smart grid operations to hard-to-reach AMI and AMR locations (See Figure 4). SDG&E is actively developing future smart grid applications that leverage existing foundational system upgrades and advances in communications and IT systems and two microgrid projects that will demonstrate a small-scale smart grid community. A pervasive communication environment as envisioned by GridComm is essential for SDG&E's future smart grid success.
Additional Technical Merit: PMU Support & Visualization System	GridComm will directly and immediately enable smart grid operations through the installation of a visualization system that allows SDG&E to view the data from the PMUs and PDCs and observe steady state and dynamic conditions on its system. GridComm's broadband hotzones enable such communications with phasor units and wide area management.
Plan for expanding installation and operation of the qualified smart	The SDG&E GridComm vision cost-effectively proposes extending two-way smart grid-enabling communications across the utility's service territory. GridComm is designed for expandability through its standards based design, IP platform and its support of key interoperability standards. It is ultimately the intent that GridComm be extended to serve the 20,000 square mile territory of the Southern California

grid technologies	Gas Company. Because GridComm is designed for such a significant expansion, it is also suitable for interconnecting other municipal utilities in the Southern California region and some initial discussions to that effect are underway. In addition, these same criteria will facilitate adoption of the GridComm model by other utilities. Replicating GridComm across the country will accelerate deployment of PMU support and more pervasive smart grid models.
Plan for assessing operational performance and for optimizing the way electricity is generated, delivered, or used	SDG&E continually assesses its grid operations to optimize grid performance. The GridComm communications solution and the PMU support and data generated through wide area measurement and management will be incorporated into the utility's systems. The SDG&E GridComm Steering Committee will ensure cross-functional participation representing not just the senior I.T. perspective but the Smart Grid Director and Vice President of Transmission and Distribution to ensure that efficiencies gained through more pervasive smart grid communications are captured and acted upon. The SDG&E GridComm proposal stands out for its cross-functional, enterprise-wide model which replaces outmoded and disparate systems currently serving the utility's communications needs with an integrated and centralized system delivering a more comprehensive view of the utility's smart grid operations.

4.1 GridComm Technical Approach to Enabling SDG&E Smart Grid Function

SDG&E's GridComm technical approach to enabling smart grid function is based on an innovative system design and deep experience with RF communications in a utility setting. Fundamentally, GridComm is designed to enable communications to and from the greatest number and type of endpoints that are integral to smart grid functionality, while at the same time leveraging this communications network to enable modern security controls at remote/unmanned facilities and assets. At a minimum, these links apply to customer systems, AMI, and the electric distribution and transmission systems (see Figure 4).

GridComm's design and build principles include:

- **Private RF Network**: While commercial operators can reach 90% of SDG&E's grid assets in coastal San Diego County, coverage falls to as low as 50% in inland areas of its service territory. The GridComm solution achieves 100% coverage of substations and PMUs and 98% coverage of all smart grid assets – something that is unlikely to ever be financially viable for commercial 3G or 4G carriers to provide.

- **Optimized Spectrum Usage:** SDG&E will use the right spectrum for the right tasks: licensed 700 MHz to achieve pervasive coverage of SDG&E smart grid assets, and licensed and license-exempt 2.4/3.65/5.8 GHz for broadband coverage of SDG&E's major assets, including substations and synchrophasor collection points.

- **Link Diversity:** The GridComm architecture includes multiple trusted network clouds and redundant NOC services as well as emergency backup communications to ensure no single point of failure.

Additionally, SDG&E's endpoints include provisions for using 3G and 4G carrier services where they exist.

- **Defense in Depth:** GridComm's security design uses a "defense in depth" strategy, layering VPNs, encryption, proactive intrusion detection and prevention and other techniques to yield a communications system with sufficient integrity for SDG&E's smart grid future. Moreover, GridComm is designed for reliable performance with 99.5%-99.9% communications availability for the mission-critical applications it supports. Commercial wireless operators cannot provide the very high performance (low latency and high capacity) levels or the stringent security that SDG&E requires for its smart grid communications.
- **Off the Shelf**: GridComm employs off the shelf RF solutions for cost-effective smart grid communications. No technology breakthroughs are required.
- **Single Point of Control**: GridComm's multiple network clouds are tied together through a single network optimization and management system. This provides SDG&E with a single point of control for all elements of the network resulting in improved network visibility, efficiency and reliability.
- **Positive, Proactive Grid Controls**: With GridComm's RF Control Services, network policy is dynamically mapped onto network infrastructure. Therefore, communications traffic routing is optimized automatically for improved service flows, control of grid assets, and enhanced security for mission critical and other data transport.

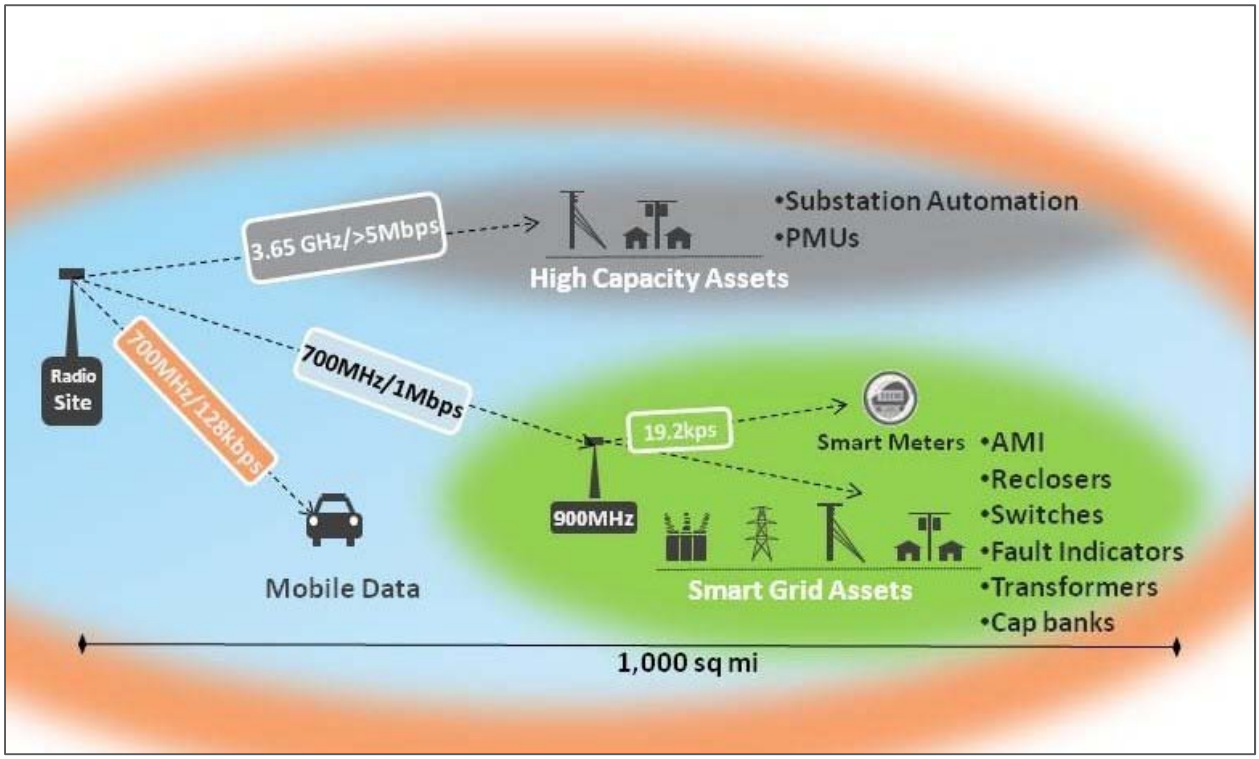


Figure 4: GridComm connects, communicates with and controls a wide variety of SDG&E's electric smart grid assets.

The integration of these communications into the operations of the electric utility will also be easily extensible to as yet undefined requirements that will become better defined as technology develops.

Key GridComm design criteria include standard interfaces to enable:

- Connectivity to the widest variety of devices on the electric system, utility facilities and equipment
- Seamless and integrated data transfer among the authorized endpoints
- The ability to transfer appropriate information to affected entities to achieve interoperability on a company and territory-wide basis, particularly between two or more utility systems (interties)
- The ability to incorporate connectivity to a substantial number of endpoints including:
    - SCADA based devices for monitoring and control
    - Electric AMI to enable dynamic real-time pricing (RTP) and critical peak pricing (CPP) supporting the ability of the consumer to make informed decisions on energy usage
    - Digital data capture to/from active grid devices such as switches, regulators, capacitor banks, transformers and fault indicators
    - The ability to incorporate tens or hundreds of thousands of endpoints by provisioning a scalable solution with the appropriate bandwidth and latency characteristics
    - The broadest coverage umbrella across the existing and projected electric system assets of the utility
- Two-way communications for monitoring, control and information transfer as required to assure the efficient operation o f the grid
- A multi-layered approach to assure the most cost effective and flexible solution is available to enable the wide ranging functionality

Electric Smart Meter & Smart Grid Technology Enablement

SDG&E is at the forefront of AMI deployments in the U.S. and has an approximately $500-million electric smart meter deployment under way in the San Diego service territory with 150,000 such meters already deployed as of Q3 2009, and 1.4 million planned by 2011.

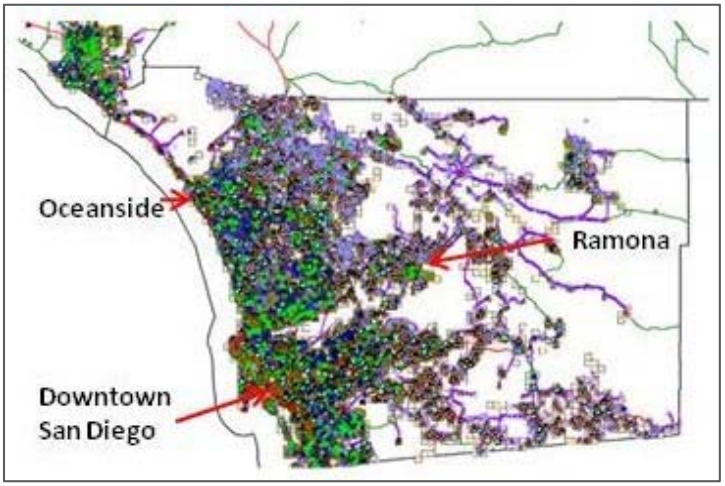


Figure 5: Initial SDG&E Smart Grid Assets

Purple denotes locations of hard-to-reach grid assets and green indicates hard-to-reach smart meters.

GridComm will provide the backhaul needed to support two-way connectivity including connections to 'hard-to-reach' meters (rural, underground, etc). (As shown in Figure 5.)

Today, such connectivity is provided by commercial carriers via networks that do not serve hard to reach or rural endpoints.

Smart grid assets to be connected include:

- Distribution automation (reclosers, switches, cap banks, PMUs/PDUs, fault indicators, etc)

- Outage management systems/distribution management systems (OMS/DMS)
- Substation connectivity and automation
- Renewables (distributed and centralized)
- PHEV and photovoltaics

Real-Time & Critical Peak Pricing Enablement

At present, SDG&E's commercial and industrial customers with greater than 200 kW of load already have some form of real-time pricing or critical peak pricing. With its AMI roll out scheduled to be completed by 2011, SDG&E will enable residential customers, with appropriate tariffs, the ability to obtain the type of rates currently available to these commercial and industrial customers.

GridComm will provide a comprehensive communication solution that is essential to allowing two-way communications and time differentiated rates.

The two-way capability of this project will ensure confirmation that the needed functionality is actually available. The use of RF-based communications will extend this capability across the entire electric grid. A common security, management and control layer will protect the critical customer and system data, simplify the operation of the network and provide the needed visibility to assure the highest availability and survivability of this solution.

Wideband, High QoS Services

Another key feature of GridComm is a designed-in ability to support near-real-time grid operations via wireless communications. All key GridComm service features support this:

- High capacity: >1 Mbps nearly everywhere, and >5 Mbps over major grid assets such as substations
- Low latency: <50 msec round trip latency for key command and control signals
- Pervasive coverage: 98% all grid assets and 100% of major grid assets
- High availability: 99.5% for Foundation RF Services, 99.9% for targeted Broadband RF Services
- Comprehensive, end-to-end security and control services

Commercial, consumer-oriented 3G/4G services can deliver some of these capabilities, in some locations – but not the entire set. Smart grid communication infrastructure, however, must be capable of delivering all of these features in all locations.

Wide Area Synchrophasor Measurements

The combination of high capacity / low latency is particularly challenging but essential for synchrophasor monitoring, command and control of the grid. Based on experience with this technology, SDG&E has identified a latency requirement of no more than 50 msec and sustained capacity of ~200 Kbps/substation to enable synchrophasors in grid operations. SDG&E has demonstrated that a properly designed wireless infrastructure can meet these requirements, and one SDG&E eight-mile WiMAX link, for example, routinely and reliably achieves 8 Mbps sustained performance and 25 msec round-trip latency.

Supported by this feature set, GridComm will enable and include the deployment of a Wide Area Management System (WAMS) monitoring key grid telemetry values like frequency, voltage and phase-angle differences and automatically mapping them (see Figure 6). The objective of the WAMS is to allow anomalies to be quickly identified and "islanding" decisions to be made quickly in the control room to quarantine problems at the source.

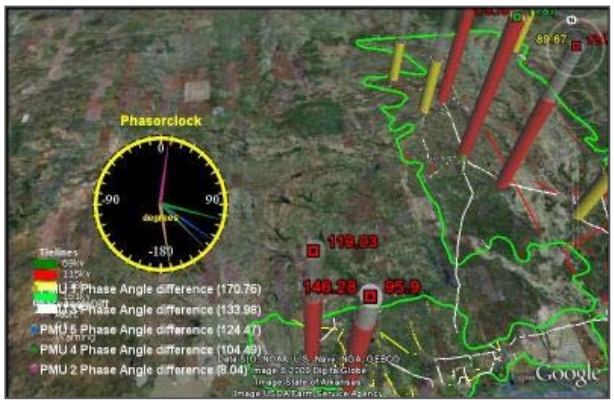


Figure 6: Space-Time Energy Management Module (STEM) for Smart Grid and Wide Area Management Systems

GridComm's pervasive wireless coverage will enable synchrophasor connectivity to key points in the SDG&E service territory. While such coverage is technically achievable with fiber, in practice, it is quite difficult and costly for remote locations. Neither can consumer-focused wireless services support such stressing grid operations requirements.

Smart Grid Mobility Communications

GridComm enables a high performance and efficient mobile communications service for more efficient deployment of customer facing activities including grid repair and maintenance services. Improved efficiency in field activities reduces carbon and greenhouse gas generation.

Broadband hotzones enable very high bandwidth mobile communications (via GridComm's Broadband RF Services) in selected locations, while the territory-wide Foundation RF Services' coverage (at medium bandwidth) ensures that mobile assets located anywhere in the service territory can access the network.

Emergency Management & Recovery

Critical grid performance is perhaps never more important than during emergencies, such as wildfires and earthquakes, to which the Southern California environment is particularly subject. These natural disasters can lead to full grid failure if communications are unavailable or monitoring and control capabilities are impeded.

Plans for GridComm include deploying fully featured emergency management services to maintain mission-critical grid communications as well as augmenting available bandwidth as needed, to protect customers in the event of major emergencies and disasters with:

- SDG&E's primary and backup 24x7x365 operations center, and
- Disaster recovery vehicles (pictured at right)

Enhanced Physical Security Systems

Lastly, GridComm enables real-time remote physical security monitoring and controls accross the grid. In addition to the cyber-security features inherent to the network, GridComm supports video surveillance, remote access notification and controls including electronic door locks, RF ID and biometric access capabilities. Such systems provide for improved multi-factor authentication and authorization. Unlike, conventional lock and key systems requiring a truck-roll to re-key a lock, security changes can be implemented remotely to increase physical security and quickly limit access where appropriate.

5.0 TECHNICAL APPROACH TO INTEROPERABILITY & CYBER SECURITY

Interoperability and network security are two primary goals of GridComm.

5.1 Interoperability Enabled by GridComm

Based on the GridWise Architecture Council's[4] proposed interoperability checklist[5] the following defines how GridComm advances interoperability in the southern California region. This interoperability model will enable rapid replication by other U.S. utilities saving them the money and resources associated with research, design and testing of wireless communications.

1. The GridComm communication components, security layers and domains as well as the overall network design specify and define the points of interface and protocols relevant to:
   - Grid equipment
   - Software applications to be used
   - The market – including demand response
   - Business organizations both internal to and outside SDG&E
   - Users/operators
2. The GridComm wireless system utilizes IP based standards to the fullest extent possible including IP-based switching and routing, DOCSIS, WiFi, and WiMax.
3. The GridComm wireless solution is technologically neutral to standards-based interfaces allowing for ease of integration from a variety of smart grid applications and vendors. This has been tested and verified by SDG&E.
4. The GridComm wireless infrastructure relies on open and published standards for connection to network elements including serial and Ethernet.
5. The GridComm wireless solution allows for vendor and communication interface flexibility with Ethernet available throughout with serial interface available wherever necessary.
   - The wireless system uses standard communication protocols capable of supporting common electric utility protocols including Modbus, DNP3, and IEC 61850 and supports common information models.
6. The GridComm wireless solution provides improved access and availability of data to the targeted information users including:
   - Interval data

[4] GridWise Interoperability Context-Setting Framework – Draft, January 2007
[5] GridWise Architecture Council, Decision maker's interoperability checklist draft version 1.0, April 2007

- Grid health and centralized network management
- Centralized Network Security and Access
- Policy management
- Operational commands

7. Using the multi-service approach, GridComm enables efficient expansion and scalability where needed with scalable options that allow for efficiency and rapid response to changes in network demands.
8. GridComm provides cyber-security compliant with NERC-CIP standards by incorporating standards based encryption, firewalls, network segmentation (VLAN), centralized access, authentication (e.g. RADIUS, etc.) and policy. For more on cyber security, see Section 5.4 below.
9. GridComm provides mission critical redundancy and protection via the various wireless layered solutions.
10. The GridComm wireless system components software can be upgraded and remotely configured through centralized network management.
11. GridComm will be backwardly compatible to earlier generations of wireless infrastructure.
12. GridComm's broadband RF services endpoints will be built using advanced, multi-mode, software configurable wireless equipment that support today's protocols (IEEE 802.11 a,b,g; IEEE 802.16d,e) as well as future protocols (IEEE 802.11n, IEEE 802.16m, and LTE) providing expanded interoperability with commercial carriers as well as the foundation for future applications.
13. GridComm allows collaborators or users to make independent decisions through the use of authorization levels and permissions managed through a central policy management system.

5.2 *Interoperability: Information Exchange Interfaces*

A sample set of grid-connected devices and the interfaces GridComm supports are discussed below:

Synchrophasor Measurements

- Typically serial, however, future models should have Ethernet connections.

Electric Smart Metering

- Metering WAN technologies include GSM, CDMA, direct serial and Ethernet connections, PLC and BPL.

Capacitor Banks

- Typically serial, however, future models should have Ethernet connections. Both are supported.

Regulators

- Communications I/O to controller are serial.

Switches/Reclosers

- Typically serial, however, future models should have Ethernet connections. Both are supported.

Fault Indicators

- Typically serial, however, future models should have Ethernet connections. Both are supported.

Distribution Transformer Monitoring

- At least serial and Ethernet. RS485 is also available.

5.3 *Interoperability: Compatibility with NIST Emerging Smart Grid Framework*

Under the Energy Independence and Security Act (EISA) of 2007, National Institute of Standards and Technology (NIST) has primary responsibility to coordinate development of a framework that includes protocols and model standards for information management to achieve interoperability of smart grid devices and systems. SDG&E will actively participate in and monitor the NIST working groups and ultimately adopt the standards approved by FERC.

The GridComm Network is IP-based for ease of integration. Its interconnected systems are compliant with the following emerging NIST standards for smart grid which SDG&E supports:

ANSI C12.19/MC1219 - SDG&E requires the information within each AMI electric meter to be stored in standard ANSI C12.19 defined standard tables and allowable manufacturer tables (for unique data elements not defined within the standard tables).

DNP3 - All new SDG&E Distribution RTU's are certified DNP 3.0 compliant and SDG&E's SCADA master vendor, ACS, participates on the DNP users group.

IEC 60870-6 / TASE.2 - SDG&E uses this standard protocol to exchange operational data with the California ISO, the Western Electricity Coordinating Council (WECC), as well as multiple utilities within the WECC.

IEC 61850 - SDG&E based the Application Framework & Module Database for the OSI Pi system of its recent CBM project on this standard.

IEEE C37.118 - SDG&E uses this standard for advanced system monitoring and potential control algorithms; also to transport PMU information through SCADA systems over serial communication systems.

IEEE 1547 - SDG&E was a stakeholder in the development of California's Rule 21, Interconnection Standards for Non-Utility Owned Generation, approved by the CPUC and which incorporates technical requirements stated in IEEE 1547 for distributed generation interconnection. Interconnection parameters for new distributed generation are reviewed in conjunction with this standard, both for commercial entities and proposed Smart Grid generation additions.

NERC Standards CIP-002 through CIP-009 – SDG&E has incorporated the requirements of CIP-002 through CIP-009 into its electric system standards and processes. All Critical Assets and Critical Cyber Assets have been identified and are being protected in accordance with CIP-002 through CIP-009. SDG&E requires background checks, training and authorization for all personnel requiring access to Critical access and conducts ongoing audits to assure all appropriate measures are being taken to prevent unauthorized use of the transmission system data or activation of any power system controls.

NIST 800-53 – SDG&E's information security requirements are mapped to NIST 800-53.

In addition, the GridComm network design ensures compatibility with new standards and protocols as they become available. The GridComm backbone enables communication to a wide variety of protocols and, therefore, devices to protect an organization's previous capital investments.

5.4 Cyber Security Approach

Cyber Security Assessment Methodology & Best Practices

SDG&E will apply rigorous cyber security best practices and methodologies to every phase in GridComm's planning, design and deployment.

SDG&E GridComm security requirements will be mapped to the AMI System Security Requirements developed by the AMI-SEC Task Force--part of the Utility Communications Architecture International Users Group (UCAIug). These requirements will include (1) primary security services; (2) supporting security services, and (3) assurance services. Primary security services will comprise confidentiality and privacy, integrity, availability, identification, authentication, authorization, non-repudiation, and accounting. Supporting security services will comprise anomaly detection services, boundary services, cryptographic services, notification and signaling services, resource management services, and trust and certificate services. Assurance services will comprise development rigor, organizational rigor, handling/operating rigor, accountability, and access control.

In addition, SDG&E's security methodology will give priority to cryptographic components in GridComm that have been validated by an independent accredited Cryptographic Module Testing laboratory compliant with the NIST Federal Information Processing Standards FIPS 140-2. GridComm's cryptographic key management techniques and implementations will also seek to comply with NIST standards enumerated in SP-800-56 - Recommendation for Key Management. SDG&E maps its information security requirements to NIST 800-53, and thus, security requirements will be evaluated for completeness against this standard. Compliance with selected controls will also be validated through security testing.

SDG&E will utilize cyber security standards at both the security governance and technology components levels. Cyber security standards and best practices, such as those propagated by NERC-CIP Cyber Security Standards and AMI UtiliSec will form the basis of GridComm's business and cyber security policies. Other widely accepted industry standards such as ISO 27002, A Code of Practice for Information Security Management, will be used to ensure the inclusion of appropriate control objectives and control points in SDG&E's security governance policies.

The following activities will ensure ongoing adherence to existing and emerging cyber security standards.

- Continuous monitoring and assessment of GridComm's compliance with emerging NIST interoperability and security standards.

- Continuous monitoring and collaboration in the activities of the DOE Gridwise® Architectural Council (GWAC) and participation in the GridWise® Alliance and the UCA® International User's Group's Open Smart Grid Subcommittee. SDG&E will also continue to adopt emerging standards that have cyber security components, including those being promulgated by the International Society of Automation, Department of Homeland Security Control Systems Security Program and the Electric Power Research Institute (EPRI).

- Monitoring and adoption of the NERC- CIP Cyber Security Standards for those portions of the Smart Grid deemed critical infrastructure and other NERC and FERC reliability and security standards as they continue to evolve.

Security-related Design Features

GridComm has been designed from the ground up as a secure system, encompassing all aspects from corporate access policy through physical equipment security and all points in between. Security runs through the entire system, and its monitoring and control is a key aspect of GridComm's RF Control Services.

The RF Control Services provide the ability to detect, prevent, communicate with regard to, respond to, or recover from system security threats, including cyber security threats and terrorism. Moreover, there is a deliberate separation of responsibility between grid communications and grid operations to limit grid operations vulnerability. The RF Control services monitor, prioritize and route encrypted grid information and system operations securely but do not store grid data or directly control the grid.

Key aspects inherent to GridComm's network components are:

- Physical Security: GridComm's RF Control Service manages port inventory and state, ensuring no "open" ports exist.

- Logical Segmentation:
  - GridComm uses a private network addressing scheme so the connected devices are not explicitly routable over the Internet.
  - VLAN segregation segments network management and grid data streams limiting access to grid control to operators wherever possible.

- Access Control: Access to GridComm's services (Foundation and Broadband) is strictly overseen by the RF Control Service's policy engine.

- Encryption: All traffic carried by GridComm may be encrypted using federally approved methods in order to protect consumer, business, and operational information.

- Quality of Service: GridComm's RF Control Services leverages the Foundation and Broadband RF Services equipment capability for providing per data flow quality of service. In this way, one data flow cannot impact another data flow. Moreover, QOS allows prioritizing the most critical grid operations where appropriate.

- Centralized Policy Management: Ensures that the network reacts automatically and immediately to policy changes, eliminating the gaps left in other systems when policy is not dynamically mapped to the network.

- Core Routing & Switching: GridComm's security approach also incorporates security and privacy best practices and active and proactive sensors including a modular structure that allows expansion and deployment in contingency operations. The active network feature prevents unauthorized transmission, while the proactive network enables better forecasting of activity, use and load.

Network-centric security is not dependent on a centralized command center and fosters electrical efficiency and organizational effectiveness. GridComm will also have self-defending components designed for the evolving security landscape.

SDG&E will install, operate, and optimize network components that defend critical smart grid processes against attack and disruption, protect privacy, and support policy and regulatory compliance controls.

While prevention through security and encryption appliances is inherent to the technology, the RF Control Services consolidate and centralize security across platforms to improve detection, reaction and mitigation across the GridComm network.

The RF Control Services implementation will be redundant and physically separated, ensuring that if a failure were to cut off one Network Operations Center, that the network will remain not only operational, but completely monitored and managed.

6.0 PROJECT COSTS & BENEFITS

6.1 Data Collection Process & Methodology

The internal and DOE-driven reporting requirements encompass three primary areas:

1. Program progress and status
2. Financial status and use of funding
3. Operational results and outcomes (benefits/ROI)

Data collection and reporting services will be provided by CSC, which has extensive experience in its direct support of DOE projects and the related reporting requirements; this team will leverage its proven, best-in-class disciplines and methods to ensure that all data is collected and retained according to IEEE, CPUC, industry and government standards.

During the planning phase, an initial effort will be conducted to define all reports and their corresponding data elements, with documented and aligned definitions supporting them. The source(s) of record for each data element and any reconciliation with a conflicting source of the same data element will also be documented, if needed, to exhibit integrity and traceability of the data. A separate data repository will be developed and leveraged to collect and version operational data, as needed; financial and project data will be leveraged from the standard PMO tools and reports, as described below. A baseline value of each data element and each report value in all three categories will be documented, after a reasonable testing and validation effort.

Program Progress and Status

The GridComm Program Management Office, leveraging the SDG&E Program and Project Management standards and tools, will be responsible for establishing and maintaining all program and project information, including:

- Detailed integrated program and individual project plans and schedules
- Resource plans and actual hours tracking by task
- Detailed program and project budgets
- Earned value and estimate to complete of each task, activity and deliverable
- Integrated issues, actions, and risk logs
- Deliverable completion criteria and status

The program and project status will be reported internally, in accordance with PMO stipulations.

To fulfill DOE requirements, quarterly and annual reports will be generated to report project goals and objectives, significant accomplishments and key metrics in the progress against those goals and objectives, plans for the next reporting period, and any issues, changes, or risks that pose a variance to the outcome of the initiative. All reports and data will be appropriately documented and versioned, and will be held in the standard PMO library. The status and progress reported will include cost, schedule, resource, technology/product, and quality assessments and quantifications, as well as any significant occurrences or transfers that take place during the reporting period.

Project and program management reporting of this nature ensures that the program is managed with the utmost discipline to ensure that reporting expectations are met or exceeded regarding cost, schedule, and quality of outcome. This level of discipline will provide the DOE with assurance that every effort is being made to fulfill the terms of the funding proposal as defined, and that deviations are understandable, explainable, and appropriate.

Financial Status and Use of Funding

SDG&E will be responsible for financial tracking of the initiative, including all internal and external costs, to portray a complete view of the investment in GridComm. The financial information tracked will include:

- Detailed hours of internal resources expended, applied with a standard or actual labor cost rate, with reconciliation to the budget and time reporting systems
- Detailed billings of external labor from service providers, with reconciliation to the vendor payments, as well as to the budget and time reporting systems (if applicable)
- Detailed accounting of all product and asset costs, by component and compiled into logical units (e.g., endpoint), with tracking through the asset management system and configuration management database
- Separate tracking of software licensure, with details of compliance to vendor terms
- Detailed accounting of all expenses by category
- Itemization of the financial impacts of risks and changes, along with their mitigation and budget/forecast impact to the program
- Tracking of milestone and deliverable payments to vendors against budget, with rolling cash flow projection
- Reconciliation of all project and program costs through the financial systems and cash statements

The financial status will be reported internally, along with the program and project status, regularly, in accordance with PMO stipulations.

As stipulated in the FOA, SDG&E will fulfill the DOE reporting requirement by leveraging this information in completing form SF-425, which requires detailed accounting and reporting on the use of DOE-sourced funding. Any additional funding or contribution provided by SDG&E will also be documented, noted, and reported as appropriate but separated from the core funding detail.

Operational Results and Outcomes

In order to track and report on the benefits yielded from the GridComm initiative, SDG&E will collect and report on key operational results and outcomes, leveraging data and metrics from utility customers, transmission operations, and distribution operations. The data currently resides in a number of sources, dispersed across various operational systems; it is currently being collected and stored in various databases, with the intent that a single repository be developed and used as the source of record for all operational outcomes, and benefits reporting associated with GridComm. As mentioned above, this will be done during the planning phase of the program, so that the baseline data and metrics will be clearly defined and available prior to the program measurement period.

The operational data metrics collected will be leveraged in development of a GridComm Performance Scorecard, which will define the baseline value for the metrics as well as the target over the life of the program. The baseline will be taken, compared with the current and average trended values of these metrics in the market and at SDG&E, and reported against the targeted outcomes, with improvements associated with key GridComm infrastructure deployment milestones.

The key customer, transmission, and distribution outcome metrics to be collected and measured are as follows:

1. **Customer-Level Metrics**
   - The number and percentage of electricity customers and the electric load enabled by GridComm and served by:
     - AMI
     - RTP, CPP, and/or time-of-use tariffs
     - Load management programs (e.g., interruptible tariffs, direct load control, and consumer load control with incentives)
     - Appliances and/or equipment which can communicate information automatically about on/off status and availability for load control
     - Grid-connected distributed generation (renewable and non-renewable) and storage
   - The number and percentage of projected annual vehicles sold that involves electric and plug-in hybrid electric vehicles

2. **Distribution-Level Metrics**
   - The number and percentage of installations and total load enabled by GridComm and:
     - Served by substations or feeder lines that use automation equipment or that possess advanced measurement technologies
     - Covered by microgrids

- Covered by Supervisory Control and Data Acquisition (SCADA) systems

3. Transmission-Level Metrics

- The number of installation points and percentage of the load, as enabled by GridComm, and:
  - Covered by phasor measurement units (PMUs)
  - Served by phasor data concentrators (PDCs) receiving data from PMUs that share relevant data with external parties in support of reliability management
  - Served by real time data management and visualization systems receiving data from PDCs and PMUs
  - Covered by automated electric transmission systems or possessing advanced measurement

These metrics are essential in tracking and defining the benefits to be derived from the GridComm initiative.

6.2 Proposed Benefits

The following table delineates proposed benefits enabled by the GridComm initiative. Some of the benefits are direct customer benefits, others benefit all utility customers, while the environmental and energy security benefits accrue to society in general.

Benefit Category	Benefit	Source of Benefit	Information Reported by GridComm Project
Economic	Lower electric commodity costs	• Shift of electrical use to off-peak times • Reduced electrical consumption	• On-peak and off-peak prices by month • On-peak and off-peak usage by month
	Lower peak demand costs	• Reduced/deferred capital costs for capacity	• Cost of new capacity • Annual deferral value • Usage at peak system/ peak hours
	Lower T&D losses	• Reduced impedance in conductors / improved grid efficiency	• On-peak and off-peak losses at transmission and distribution level • Energy prices by on-peak and off-peak periods
	Lower O&M costs	• Reduced call center costs • Reduced field support cost • Reduced electrical theft • Asset optimization and efficiency: ○ Substation system infrastructure	• Direct measurement of operational costs

		○ Distribution transformers ○ Substation transformer / substandard breakers	
Reliability and Power Quality	Reduced transmission congestion costs	• Reduction in nodal locational marginal prices	• On-peak usage by month • Congestion prices and load in peak periods
	Reduced costs of power interruptions	• Reduced outages • Reduced cost to customers of un-served energy ○ Lost productivity for businesses ○ Outage discomfort in higher temperatures, food spoilage, and device reconfiguration	• Actual outages and durations • Predicted power interruptions (e.g., change in SAIDI) • Cost / kWh Un-Served
Environmental	Lower GHG/ carbon emissions	• Shift from high emitting older gas plants on peak to more efficient combined cycle generation • Impedance and grid efficiency • Enablement of remote trouble-shooting and reduced outage/ field support truck rolls • Improved respiratory health	• Calculated CO2 emissions reductions based on implied heat rates • Calculated criteria pollutant reductions (PM-10 and NOx) based on natural gas generation
Energy Security	Lower consumption of oil	• Reduced reliance on natural gas • Reduced outage/ field support truck rolls	• Reduction in driving miles multiplied by gasoline MPG • Calculated environmental benefit
	Enable integration of new renewable energy sources and users	• Ability to utilize more distributed renewable energy • "Zero energy homes" • Assist in system integration of large renewable energy, especially baseload/off-peak renewables – geothermal and wind and baseload CHP • Enablement of electric vehicle utilization	• Number of new distributed renewables and CHP • Number of new plug-in hybrids and EVs

6.3 Cost-Benefit Analysis Discussion

The GridComm smart grid communication system enables customers and utilities to reduce costs, deliver and experience more reliable and secure utility services, and utilize a more diverse set of environmentally friendly energy sources. Residential customers, commercial customers, the utility company and society all benefit from the smart grid and supporting communication system. The DOE Cost Benefit Analysis (CBA) methodology will be followed, once published, in capturing and reporting the costs and benefits associated with the GridComm initiative.

The following table outlines the data to collect, the anticipated costs and resulting benefits for each Stakeholder enabled with the Smart Grid communication system.

Category	Data and Costs Collected	Benefits Anticipated
Customer	• Utility costs per KWh/year • Utility usage per year (KWh/year) • Average cost per gallon of gasoline • Total cost of utilities per GDP	Residential Customers: • Reduced utility costs • Increased utility reliability (reduced spoilage and outage disruption) • Reduced gasoline costs for transportation • Enabled use of alternative energy sources for transportation Commercial Customers: • Reduced or stabilized utility / energy costs • Increased utility reliability (reduced lost-time and electrical hardware damage)
Utility Company	• O&M costs per kWh produced • Total cost per kWh • Peak utilization by day by month (measure reduction / smoothing of peak) • SAIDI (System Average Interruption Duration Index) • Legacy disparate voice and data communication hardware, software costs/ depreciation • Legacy O&M labor to support aging disparate systems • Warranty / Maintenance costs for hardware / software • Costs for call center infrastructure, labor to support call center tickets and truck rolls, technicians, and transportation costs	• Delay of capital investment • Reduction operating costs • Ease of integration of new energy sources into the grid • Proactive communication and anticipation of hardware / system failures • Increased security and reduced theft of services

	• Capital costs for new communication hardware, software and depreciation • Capital costs for labor to design, test, and build new communication infrastructure • O&M associated with the warranty / maintenance / licensing of new hardware / software / spectrum	
Society	• Greenhouse gases and CO2 emissions in cities served by SDG&E utilities • CO2 emissions per kWh • Number of net-new jobs created to build GridComm	• Reduced CO2 emissions • Creation of jobs • Ability to distribute more environmentally friendly energy sources • Enablement of distribution of energy for new transportation methods (electric cars)

7.0 ATTACHMENTS

This concludes the GridComm Project Plan description. The following pages contain attachments including résumés, a letter of support from an SDG&E senior executive, letters of support for the project from SDG&E's vendors, as well as additional supplemental reference material.

APPENDIX 1 – Proposed Project Team Résumés

GridComm Program Manager:	DANIEL THOMPSON, Infrastructure Technology Manager – *PMO*
GridComm Chief Engineer:	GARY HAWKINS, C.Eng, Chief Technology Officer- *Broadband RF Services*
GridComm Technical Leads:	MIKE CALCAGNO, IT Network Architect - *Foundation RF Services* DENNIS FOSS, Senior Infrastructure Technologist- *Broadband RF Services* ALEX KUNZ, Information Security Manager - *Information Security*
Arcadian Project Lead:	JAKE RASWEILER, Vice President IT Engineering and Network Operations
Celergy Project Lead:	TODD MAKIE, Principal Consultant – *Broadband RF Services Program Manager*
Celergy Key Individuals:	MIKE SANDERSON, Vice-President, Engineering - *AirSync Network & Broadband RF*
CSC Project Lead:	PAUL N. PECHERSKY, Program Director - *Integration & Deployment Services*
CSC Key Individuals:	ANDY SYKES - Network Architect - *Design/Build/Integration & Network Operations Center Design* RICK NUNEZ - Network Engineering Manager - *GridComm Design/Build/Integration, Network Operations Center Design, & Network Deployment* RICK YEE - Network Engineering Manager - *Design/Build/Integration, Network Operations Center Design, & Network Deployment*
IBM Project Lead:	TIMOTHY DELOACH, Senior Managing Consultant – *Security Consulting* GENE RODRIGUEZ, Associate Partner – *Security & Privacy Consulting*
Space-Time Insight Lead:	MOZHI HABIBI, Director of Product Management - *WAMS*

Daniel P. Thompson, PMP
Manager NCS PMO
Information Technology Dept.
SDG&E Sempra Energy Utilities

SDG&E GridComm Role

- Network Communications Services Program Management Office will have responsibility for the GridComm Program scope of work, schedule and budget oversight.

Professional Experience

1/96 – Present: Sempra Energy utilities
Network Communications Services Project Management Office, Manager, Information Technology

- Management of Project Leads and Project Manager resources
- Oversight of $40M - $50M annual capital budget
- Projects managed:
  - GridComm
  - LAN Refresh
  - WAN Rebuild
  - OneVoice VoIP Program
  - Data Center Rebuild
  - Microwave Rebuild
  - Wireless Network Access Control
  - Exchange Messaging Upgrade
  - TelePresence
  - Video Conferencing

Education

BBA, Management Information Systems
Pace University, New York NY

Project Management Professional Certification, 9/26/2003
Project Management Institute

Dr. Gary J. Hawkins, C.Eng.
Chief Technical Officer
Celergy Networks, Inc.

SDG&E GridComm Role

- Acting GridComm Chief Engineer

Professional Experience

2009 – Present **CHIEF TECHNICAL OFFICER** ***San Diego, CA***

Celergy Networks, Inc. – Technology: *Company specializing in wireless broadband, wireless networking, cabling, and infrastructure planning and deployment.*

- Key player in defining Celergy's go to market strategy within the Wireless Energy and Broadband Data markets.
- Responsible for business development, project definition and technical consulting for the Wireless Energy and Broadband Data markets.
- Responsible for the development of whitepapers, marketing and business development material relating to Celergy's wireless activities.

2006 – 2008 **VICE PRESIDENT OF PRODUCT DEVELOPMENT - INFRASTRUCTURE** ***San Diego, CA***

NextWave Wireless – Technology: *Company providing network operators, infrastructure vendors and mobile device manufacturers cutting-edge WiMAX and TD-CDMA products and technologies that enable broadband multimedia provision.*

- The primary point-of-contact within NextWave's Network Products Group for ASN product marketing activities and the management of business relationships with third party infrastructure vendors.
- Successfully negotiated MOUs, strategic partnership agreements and joint development agreements detailing the implementation and licensing of NextWave's WiMAX technology initiatives with several Tier 1 infrastructure vendors, plus a number of smaller specialized supply companies.
- Account managed a Tier 1 vendor's multi-million dollar implementation of NextWave's MXtv technology within their BTS and ASN infrastructure equipment. Implementation was completed in just six months, leading to a widely reported public demonstration of MXtv at CTIA 2008.
- Evangelized MXtv and other NextWave technology initiatives to WiMAX carriers and vendors throughout the world in support of developing NextWave's multimedia ecosystem.

2004 – 2006 **PRINCIPAL CONSULTANT / VICE PRESIDENT** ***San Diego, CA***

Sun Ray Solutions – Consulting: *A company providing strategic business and technical consulting and agency representation services to entities within the telecommunications sector, particularly those located in the United States and China.*

- Responsible for the day-to-day operations, new business development and financial management of this wireless consultancy company.

- A key technical contributor for client projects covering items such as technical evaluation and critique, development of infrastructure cost models, development of product roadmaps, marketing and competitive analysis and the support of Chinese distributors relating to the sale of broadband access equipment.

2001 – 2004 **DIRECTOR OF PRODUCT MARKETING / ADVANCED TECHNOLOGY** ***San Diego, CA***

Littefeet – Technology: *A VC funded wireless infrastructure company focused on providing distributed coverage systems designed to improve coverage quality within GSM and 3G cellular networks.*

- Led the Product Marketing, Marketing and Advanced Technology functions within the company.

1995 - 2001 **DIRECTOR OF ENGINEERING / SENIOR MANAGER / PROJECT MANAGER** ***McLean, VA***

LCC International – Consulting: *Leading global provider of telecommunication engineering design and management services.*

- Responsible for leading the RF or turnkey deployment of multiple wireless networks in the US, Europe and Asia. A principle player in the development of LCC's turnkey cellular network deployment offering.

1990 - 1994 **BSS DESIGN MANAGER / MULTIPLE ENGINEERING ROLES** ***Bristol, United Kingdom***

Orange PCS – Cellular Operator: *First GSM operator to provide 1800MHz 2G cellular service to the UK marketplace.*

- Performed multiple management and technical roles critical to the deployment of Orange's base station infrastructure.

Education

University of Bristol, UK, Ph.D in Satellite Communications, 1990
University of Bath UK, B.Sc. Honors in Electrical and Electronic Engineering (1st Class)

Affiliations

Chartered Engineer (C.Eng) status with The Institution of Engineering and Technology, UK.

Mike Calcagno, BSE
Network Services Architect
Network and Communications Services
SDG&E/Sempra Energy utilities

SDG&E GridComm Role

Responsible for high level requirements definition, development of overall system architecture and chief technical resource for the GridComm program.

Professional Experience

1989 to Present
SDG&E / Sempra Energy utilities
Network & Communications Services, Network Services Architect

- Primary Responsibilities
  - High level requirements definition
  - Business requirement to technical requirement mapping
  - Development of solution architecture
  - Critical design reviews with technical staff
  - Ongoing evaluation and analysis of developments in communications technology
- Major Project Involvements
  - Chief technical resource for the GridComm program
  - Network Architect for the SDG&E Microgrid program
  - Network Architect and lead for developing the network response for Firestorm Preparedness
  - Technical network advisor for the SDG&E Advanced Metering infrastructure Program
  - Technical Network Advisor for the SoCalGas Advanced Metering Infrastructure Program
  - Network Architect for the 500 KV Sunrise Powerline Program
  - Project Manager/Engineer for WiMAX demonstration project
  - Project Manager/Engineer for the SDG&E 900 MHz Wide-area voice radio system
  - Project Manager/Engineer for the SDG&E 800 MHz wide-area mobile data system
  - Network Engineer for the Broadband over powerline (BPL) evaluation and demonstration program across five vendor offerings
  - Project Engineer / developer of RF based prototypes for remote fault indicator monitoring
  - Network Engineer for the early development of communications links to utility customers
  - Fiber Optic Project Manager/Engineer for development of utility long-haul fiber networks
  - Project Manger / Engineer for development of monitoring capability on mission critical battery back-up systems
  - Project Manager / Engineer for expansion of the SDG&E 6 and 10 GHz microwave network
  - Technical advisor for the leasing of Utility assets to third party communications providers

1985 to 1989
Computer Sciences Corporation

Systems Integration Division, Systems Engineer

- Primary Responsibilities
  - Member of the Technical Staff (MTS) for tasking by NORAD at the Cheyenne Mountain Complex and Peterson AFB in a top secret environment
  - Requirements validation, solution engineering, project preparation and oversight of project execution
- Major Project Involvements
  - Design, configuration and construction of the networks for the Test, Development and Training Center (TDTC) at Peterson AFB simulating NORAD worldwide communications connectivity
  - Design, development and construction of an EMF warning system from Peterson AFB to the Cheyenne Mountain Complex
  - Design, document and execute the plan to relocate the Graphic Display Consoles in the NORAD Command Center with minimal interruption to active operations
  - Design and implement the expansion of the multiplexing capabilities to accommodate additional cryptographic circuits

1982 to 1985
Entrepreneur

- Restaurant proprietor
- Owner / Manager Construction Contractor

1971 to 1982
Motorola Communications & Electronics
Consultant, Account Executive, Systems Engineering

- Primary Responsibilities
  - Primary consultant for the INTRAC radio alarm and control product line as well as radio control consoles throughout the Rocky Mountain region
  - Account responsibility for Federal Government agencies including DoD, BIA, NOAA, Bureau of Standards and Indian tribes
  - Primary contact for providing applications engineering support to the field staff in support of sales
- Major Project Involvements
  - Account Executive for the RF system to coordinate the Minute Man Missile shipments in Arizona
  - Responsible for moving entrenched competitive customers to the Motorola platform
  - Designed, configured and deployed remote monitoring and control to the agricultural irrigation market
  - Instrumental in the early deployment of SCADA to the Utility market
  - Supported numerous Public Safety and Commercial network designs and rollouts

Education

BS, Electronics, Chapman University
Civil Engineering Study, USAF Academy
Graduate, Motorola Training Institute in Two-way Radio Fundamentals
Completion of USAF Training in Radio Relay Equipment Repair (30470)
FCC General Radiotelephone License (Lifetime)
Member, IEEE
Public Speaking Presentations to the Community through the SDG&E Energy Speakers Corps and to Industry Organization including UTC and T&D Automation

DENNIS J. FOSS
Sr. Infrastructure Technologist
Network and Communications Services
SDG&E/Sempra Energy Utilities

SDG&E GRIDCOMM ROLE

Response for the design details for the broadband communications layers used to enable communications between the utility applications and numerous high density distributed elements along the electric grid.

PROFESSIONAL EXPERIENCE

SEMPRA ENERGY UTILITIES / SDG&E - San Diego, CA **2009 - PRESENT**

SR Infrastructure Technologist

- Provide design and implementation engineering support for portions of a multi-layer RF communications network that will enable Smart-Grid services throughout the SDG&E electric and gas infrastructure in southern California.
- Provide RF design, problem analysis, and systems integration oversight of SDG&E's electric 'Smart Meter' project.

NORTHROP GRUMMAN - San Diego, CA **2002 - 2009**

Test Systems Architect / Sr. Systems Engineering Lead

- Develop the system architecture and manage the engineering development of several complex communications system simulator products used to evaluate radio performance for the Joint Strike Fighter (F-35's) Communication, Navigation, and Identification, and the military's next generation JTRS radios.
- Manage the activities of RF and software engineering design teams.
- Develop and maintain subcontract relationships with external suppliers for manufacturing of custom RF hardware and software products.
- Integrate products, and deploy systems to internal & external customer lab facilities.
- Create and deliver hands-on training and demonstrations for end-users.

Project / Cost Accounting Manager

- Define tasks, scope of work, and manage engineering design team's ongoing development activities.
- Efficiently manage $35M fiscal resources, with consistent goal to minimize costs without sacrificing product quality.

ENSEMBLE COMMUNICATIONS - San Diego, CA **2000 - 2002**

Field Engineering Team Manager

- Managed personnel for testing, integration, and field deployment of wireless ATM Local Multipoint Distribution System (LMDS) Base Station and CPE products from 24 to 42 GHz.
- Managed installation teams and worked closely with clients in field installation environments.
- Worked with sales and marketing teams to develop and deliver product demonstrations to customers.
- Conducted validation testing for T1 (Structured / Unstructured), and 802.3 (Ethernet) networks utilizing Cisco routers and Marconi ATM switches, Smart-Bits, Fluke, SunSet and other test equipment.

- Worked closely with system test laboratory and R&D groups to validate product performance, assist with GUI designs, and improve product quality.

MOTOROLA - Commercial, Government, Industrial Solutions Sector - San Diego, CA **1998 - 2000**
Lead Customer Engineer

- Responsible design engineer (RDE) for the design and implementation of wide-area trunked wireless voice and data communication networks for utility and public safety markets.
- Pre-sale responsibilities included customer needs analysis, system architecture development, spectrum planning, proposal generation, sales presentations, and contract negotiations.
- Post-sale activities included field deployment, system testing, RF network optimization, and system capacity optimization.
- Worked closely with clients to evaluate and remedy Y2K system deficiencies in state-wide 900 MHz wireless utility dispatching network.

VIASAT - Carlsbad, CA **1996 - 1998**
Technical Staff, Software Engineering Department

- Developed Relay Bus Controller application software in C to control MIL-STD-1553 serial bus.
- Tasks included 1553 protocol designs, bus traffic loading analysis, software development, and integration testing.
- Developed 5 kHz Demand Assigned Multiple Access (DAMA) satcom multimedia training application.
- Extensive international travel to provide formal classroom instruction to end-users in the operation and maintenance of DAMA satellite communication network equipment and protocols.
- Developed high performance UHF (240-273 MHz) receiver. Tasks included analog circuit design, PWB layout, software development, and lab integration and performance testing.

MOTOROLA - Land Mobile Products Sector - San Diego, CA **1991 - 1996**
Senior Systems Engineer

- Designed and implemented Motorola's packet-switched RD-LAP (Radio Data-Link Access Procedure) wireless data networking product for public safety clients.
- Developed product performance test plans and procedures for Motorola's RD-LAP wireless data protocols and managed lab testing of 500 MHz Base Station and RF modems.

TRW - Military Electronics and Avionics Division - San Diego, CA **1988 - 1991**
Technical Staff, Systems Engineering Department

- Developed direction-finding receiving system that measured and evaluated pulsed RF signal properties for electronic warfare applications.
- Developed signal processing algorithms for the narrow-band DQPSK FDM Link 11 digital radio for the Navy.

EDUCATION / OTHER

B.S. Electrical Engineering - CSU, Fresno.

Post-graduate work in communications, networking, DSP, software development – San Diego State University.

Hold U.S. Dept. of Defense (DoD) clearance.

Alexander Kunz
Information Security Manager, CISSP, HISP
akunz@sempra.com

SDG&E GridComm Role
Responsible for providing the project's Information Security resources dedicated to aligning the project with security best practices and SDG&E Information Security policies.

Summary
Leader, Professional Team Builder and expert in Information/Physical security, Business Process, Strategy, Governance, Risk, Compliance and Special Operations.

Specialties
Regulations, Risk Assessment Methodologies, Information Security Governance, Security Operations, Security Engineering, Regulatory/Compliance, Application Security, Certification and Accreditation (CAP), Information Assurance, Risk Assessment/Management, Expert in IT Compliance, Security Frameworks, Security Standards, Security Program Development, IT Strategy, Security Awareness, Forensic and E-Discovery. Expert in Special Operations.

EXPERIENCE

Information Security Manager at Sempra Energy
September 2007 - Present (1 year 11 months)
Information Security Manager for the company Information Security Program. Direct responsibility for IT/IS compliance, security engineering, security awareness and security operations of the utilities and corporate center information systems and networks.

Board of Directors at Nicholas K.
January 2006 - Present (3 years 7 months)

Special Operations at Other Government Agency
January 2003 - Present (6 years 7 months)

Security Operations Lead at Sempra Energy
January 2005 - September 2007 (2 years 9 months)
Security Operations lead for the information security department.

Wireless Security Consultant at Sempra Energy
November 2003 - January 2005 (1 year 3 months)
Technical expert for the enterprise wireless security infrastructure.

Other at Other Government Agency
January 2003 - November 2003 (11 months)
Work in Foreign countries

Information Security Operations at Raytheon Technical Services Company
January 2002 - December 2002 (1 year)

Consultant for Navy and Marine Corps network.

Information Security Operations at PEC Solutions Inc.
2001 - 2002 (1 year)
Information Security Consultant for the Navy and Marine Corps Intranet

United States Navy SEAL at Naval Special Warfare Command
April 1991 - April 2001 (10 years 1 month)
2 recommendations available upon request

HONORS AND AWARDS

Multiple Department of Defense Awards for military related service.
Multiple commendations and letters of recommendations.

JOHN J RASWEILER V – B.A., M.S.E.E., M.B.A., PE,
Vice President
IT, Engineering & Network Operations
Arcadian Networks, Inc.

SEMPRA GRIDCOMM ROLE

- Arcadian Networks' Project Executive overseeing Arcadian's GridComm participation

PROFESSIONAL EXPERIENCE

ARCADIAN NETWORKS, INC. **4/2006 – Present**

VICE PRESIDENT IT, ENGINEERING & NETWORK OPERATIONS, Valhalla, NY

- Senior executive leading technology strategy, technology partner development, and product and services roadmap
- Senior executive leading all corporate technical functions including Project Management, fixed wireless broadband IP network deployment, corporate IT, Network Operations and Engineering
- Supervised and participated in process and policy development including project and financial controls, security, business continuity and change control
- Supporting over 16 utility companies, deployed DOCSIS, Wi-Fi and standards based networks supporting AES/3DES encrypted, broadband, wireless networks to deliver applications and services including end-to-end IP based QOS, VOIP, SCADA, IP video, and designs for MPLS

NEXTEL COMMUNCATIONS, INC. (SPRINT NEXTEL CORPORATION) **1997- 2006**

REGIONAL SENIOR DIRECTOR/MANAGER- NY/NEW ENGLAND, NY 10/2005 – 3/2006

- Led 70+ member CDMA and IDEN voice and data network design team
- Supervising post-merger design activity to realize over $400 Million in network synergy savings
- Directed in-building and customer premises business development and equipment design
- Provided extensive leadership and support for transition to post-merger organizational structure

NEXTEL COMMUNICATIONS, INC.

SENIOR DIRECTOR ENGINEERING – NEW YORK AREA, White Plains, NY 1/2003 – 12/2005

- Directed 100+ member team responsible for voice and data network design, performance and solutions business development serving 13% of Nextel's network usage
- Planned and managed Capital and Operating budgets exceeding $150 million annually
- Led overall project management, network design, cell site design, network operations, performance and customer trouble ticket support of area wide network achieving as high as 168% of targeted bonus objectives
- Public sector technical lead for large customer projects including the Republican National Convention, World Series, USTA and PGA Open events, Times Square New Year's Eve, UN General Assembly and TOPOFF 3
- Maintained network quality while supporting largest customer and traffic growth of any metropolitan area in Nextel in 2004 exceeding 35% annually
- Member of national process and organizational redesign teams improving workflow, workforce and capital efficiency realizing as much as 60% increase in employee productivity

- Designated Network Incident Management Commander (NEMS) for disaster and event management including 2003 Blackout
- Supervised project management for field acceptance of new handset models, system Beta, First Office Application (FOA), General Release (GR) and software implementation including deployment of new features

DIRECTOR TECHNICAL SERVICES, White Plains, NY 9/2001 – 12/2002

- Successfully improved network quality by 40% while reducing capital spending by one-third in 2002
- Led thirty-seven member team responsible for overall management and long-term planning

ENGINEERING & OPERATIONS SENIOR MANAGER – NEW YORK CITY 5/1998 – 9/2001

- Supported traffic growth as high as 300% annually with sixty-five member team responsible for field operations, frequency planning, network design, datafill, system performance and traffic engineering

TEAM LEADER ENGINEERING, White Plains, NY 11/1997 – 4/1998

- Managed engineering team responsible for traffic engineering, fixed network topology, BSC and site design, zoning, sales support and wireless network configuration

MCCAW CELLULAR COMMUNICATIONS INC. (AT&T WIRELESS SERVICES) **1994 - 1997**
SENIOR ENGINEER, New York, NY 6/1996 - 11/1997
RF ENGINEER: 1/1995 - 6/1996
ASSISTANT RF ENGINEER: 1/1994 - 12/1994

- Provided technical supervision to an eight member engineering staff
- Pioneered design of urban cellular network architecture studied as model for AT&T nationwide deployment

EDUCATION & CERTIFICATIONS
Master's Degree: M.B.A. in Management
FORDHAM UNIVERSITY, Graduate School of Business Administration: New York, NY, 8/1997
Master's Degree: M.S. Electrical Engineering: Concentration in Fiber Optics
POLYTECHNIC UNIVERSITY: Brooklyn, NY, 1/1995
Bachelor's Degree: B.A. Physics and Economics
COLGATE UNIVERSITY: Hamilton, NY, 5/1992
New York State Licensed Professional Engineer (P.E.): Lic.#080608
Project Management Professional (PMP): February 2006

PATENTS
Antenna. U.S. Patent Number: D383463, September 9, 1997
Antenna for Enhanced Radio Coverage. U.S. Patent Number: 5638081, June 10, 1997

AFFILIATIONS
Institute of Electrical and Electronics Engineers: 1994 – Present
Project Management Institute (PMI): 2006 – Present

Todd Makie
Principal Consultant /Program Manager
Celergy Networks, Inc.

SDG&E GridComm Role

- Program Manager for the design, build, integration and testing of the Broadband HotZone Services layer within the GridComm wireless network.

Professional Experience

2009 – Present **PRINCIPAL CONSULTANT / PROGRAM MANAGER** ***San Diego, CA***

Celergy Networks, Inc. – Technology: *Company specializing in wireless networking, cabling, and infrastructure planning.*

- Project Manager – Managed the pre-planning activities associated with the site assessments and budget analysis for GridComm.
- Developed the integration plan, build and rollout of Salesforce.com within Celergy.

2007 – 2009 **PRINCIPAL CONSULTANT / PROJECT MANAGER** ***San Diego, CA***

Sempra Energy – Energy: *Southern California utility providing electricity and natural gas services to residential and commercial customers.*

- Project Manager – Managed the WAN Rebuild project which upgraded the WAN infrastructure to support major company Programs.
- Project Manager – Managed the infrastructure build supporting the wireless Smart Meter project.
- Financial Analyst – Developed dynamic financial models to assess the benefits of IT infrastructure projects.
- Project Manager – Project Manager for the deployment of infrastructure upgrades at numerous Regional Offices delivering network performance improvements which served as the framework for future root cause analysis and remediation activities.

2006 – 2007 **PRINCIPAL CONSULTANT / PROGRAM MANAGER** ***San Diego, CA***

Rose International – Consulting: *a leading international consultancy providing application development and integration, infrastructure and managed services.*

- Program Manager – Managed the migration of a Kaiser Permanente data center to a newly constructed data center. The program management responsibilities included managing a team of project managers, developing the strategy and budget for migration options, and developing and executing the move plans.
- Business Analyst / Requirements Analyst eliciting and delivering the infrastructure requirements for a new data center at Kaiser Permanente.
- Infrastructure architect for the enterprise-wide Peoplesoft Financials and Supply Chain Management implementation at Kaiser Permanente. Activities included: gathering/defining the non-functional requirements for the solution, working with Kaiser National Operations and business partners to design, size and estimate the infrastructure required to deliver the Peoplesoft solution.

- Business Analyst - Served as the liaison between the Kaiser Operations service areas, development teams, and business stakeholders to ensure the optimal and most cost effective infrastructure is provided to deliver the Peoplesoft solution to the enterprise.

2000 – 2005 **SENIOR CONSULTANT** – *Wireless Technologies* ***San Diego, CA***
California Amplifier – Consulting Division: *a leading systems integrator providing business strategy, software development and embedded systems.*

1997 - 2000 **CONSULTING PRACTICE MANAGER (MANUFACTURING EMPHASIS)** ***Wausau, WI***
Wipfli Ullrich Bertelson LLP *is the 17th largest accounting firm in the United States. Wipfli provides traditional accounting, tax, audit, information technology, and management consulting services to its clients. The manufacturing vertical has the largest number of active clients for Wipfli.*

1994 – 1997 **OPERATIONS DIRECTOR** ***Green Bay, WI***
Graphic Managment: *Printing – Lithography, screen printing, design, pre-press*

1993 – 1994 **MANAGEMENT CONSULTANT (MANUFACTURING EMPHASIS)** ***Indianapolis, IN***
Olive LLP *Consulting/Accounting firm providing traditional and management consulting services*

1991 – 1993 **CUSTOMER SERVICE MANAGER**
Process Displays *Point-of-Purchase Display Manufacturer* ***Milwaukee, WI***

1989 - 1991 **FINANCIAL SERVICES/SYSTEMS/CORPORATE PURCHASING MANAGER**
Phillips Plastics *Custom Injection Molder and Decorator* ***Medford, WI***

1985 - 1989 **PURCHASING AND MANUFACTURING SYSTEMS MANAGER**
Kraft-Tombstone Pizza *Manufacturing – Food Products* ***Medford, WI***

Education

B.S. – Business Administration
University of Wisconsin – Eau Claire, 1985

Michael Sanderson
Vice President of Engineering
Proximetry

SDG&E GridComm Role

- Technical lead for AirSync Network Optimization
- Expert on broadband RF services infrastructure (WiMAX, Wi-Fi, etc.) supporting Celergy Network's roll-out of the Broadband RF Services within the GridComm Wireless Network.

Professional Experience

06/2007 – Present **Vice President of Engineering** ***San Diego, CA***
Proximetry , Inc. – Technology*: Company specializing in wireless network optimization software*

- Responsibilities
  - Define, develop, and position the company's multi-frequency, multi-technology, wireless network optimization solution
  - Design and implementation of industry's first low cost WiMAX pBS and bridge boxes
  - Engineering activities for more than 65 engineers at 3 locations
- Major project involvements
  - Design and implementation of industry's first low cost, portable WiMAX pBS software image
  - Design and implementation of AirSync bridge, a low cost multi-technology wireless network bridge software image.
  - City of Anaheim public safety managed wireless mesh network
  - Ozone, Paris metro-Wi-Fi mesh network deployment
  - Exatel, Poland national 3.5 GHz broadband wireless access network
  - PacificNet, Mexico community broadband access network.

10/2006 – 06/2007 **Director Product Management, WIMAX** ***San Diego, CA***
RF Magic, Inc. – Technology*: Fabless semiconductor company developing broadband wireless chipsets*

- Responsibilities
  - Define, develop, and position a new mobile WiMAX transceiver
  - Extend the market position of the existing fixed WiMAX broadband transceivers
- Major project involvements
  - Managed transceiver integration in industry leading reference design (Wavesat's miniPCI WiMAX)
  - Ramped run rate for both Airspan and SR Telecom to more than 10k chipsets/month

08/2003 – 09/2004 **Director Product Management and Application Engineering** ***San Diego, CA***
Alvarion Inc – Technology: *Industry leader for broadband wireless access equipment (WiMAX)*

- Responsibilities
  - Define, develop, and position new product line based on the WiMAX standard for North American Tier 1 operators.

- Coordination of Product Management and Technical Marketing with Intel, Alvarion's WiMAX partner
- North American Application Engineering Team (pre-sales)

- Major project involvements
  - WiMAX Forum Certification Lab Selection and Establishment
    - As part of the CWG defined requirements and assessed candidate labs ultimately selecting Cetecom, Malaga, Spain for WiMAX Forum Certification services
  - Created business cases, network designs, and deployment plans for more than 50 of Alvarion's BWA operator customers.

03/1999 – 08/2003 **Director Product Marketing and Customer Engineering** ***San Diego, CA***
Ensemble Communications – Technology: *Founder of WiMAX forum and provider of millimeter wave BWA equipment*

- Responsibilities
  - Product development process from initial product business case through end-of-life.
  - Operator business case modeling
  - Pre-sales (sales engineering) and post-sales (customer support)
- Major project involvements
  - Broadband Wireless Access Network Deployments
    Responsible for network business case development, network design assessment (RF and IP), equipment selection, installation, and performance assurance for:
    - Adelphia Business Solutions, USA
    - Butler Networks, Denmark
    - Hong Kong Broadband, Hong Kong
    - Telecentrs, Latvia
    - Teligent, USA

Education

Bachelor of Science, Electrical Engineering, April, 1990
University of Saskatchewan, Saskatoon, Saskatchewan, Canada

Bachelor of Science, Computer Science, April, 1991
University of Saskatchewan, Saskatoon, Saskatchewan, Canada

Paul N. Pechersky, M.S., Info Systems, B.S, Finance
CSC Program Director

SDG&E GridComm Role

- Program Director, with overall responsibility for the successful completion of integration and deployment services of the GridComm project. This includes oversight of the integration and deployment Program Management Office, and the included workstreams: architecture and design, engineering and development/build, operational integration, and deployment services. Responsibilities will also include direct support of the overall program structure and PMO, reporting on program status as well as the network metrics collection and reporting, and assessment of operational readiness and assurance of completion to quality and program specifications.

Professional Experience

2005 – Present
CSC, Director

- Management of Global (Americas, EMEA, APAC) World Sourcing New Business Support activities for all industries including Utility, Technology, Manufacturing, etc.
- Other positions include: Director, North American Project Management Competency Center; and Outsourcing Solutions Executive
- Major Projects include:
  - Start-up of World Sourcing New Business Support Organization
  - New Business Support for a variety of Utility Industry related deals including: Exelon, National Grid, Verve Energy, etc.
  - Assessment of all North American Project Managers

2003-2005
IT Advisory Services, Managing Partner

- "C" level advisor on Information Technology (IT) matters including Infrastructure, Governance, Strategy, Planning, M&A, Organization, Software Selection and Cyber Security.
- Major Projects
  - Electric Utility - Process Improvement (Bonneville Power Administration), Independent Verification and Validation (IV&V) of Oracle ERP project, Strategic Planning, ISO Billing Process Analysis, IT Assessment (Infrastructure, Delivery, Security, etc.)
  - Manufacturing - Organization Analysis and CIO Selection, M&A Due Diligence, Disaster Recovery Planning, IT Assessment

2000-2002
Gartner, Consultant

- "C" level consultant on Information Technology (IT) matters
- Major Projects
  - Cyber Security – Nuclear Power Plant Security Assessment (AEP); Scenario Planning for cyber attacks on National Utility Grids (aka *Digital Pearl Harbor*)
  - IT Strategy & Planning - Electric Utility, Transportation, Big Five Accounting, Higher Ed., Aerospace
  - IT Governance - - Manufacturing, Transportation, Oil and Gas Industry, Healthcare, etc.

1997-2000
Science Applications International Corporation (SAIC), Vice President

- Utility Industry Account Executive
- Major Projects
    - Call Center Development, CRM upgrade, Y2K Prep, etc. (Edison International)
    - Developed a Utility Industry M&A IT Due Diligence Process
    - Developed IT Consulting Practice for BELLCORE Communications subsidiary

1994-1997
PacifiCorp, Vice President and CIO

- Corporate Officer, reporting directly to the CEO, responsible for worldwide Information Technology activities including Distribution (including SCADA, Power Line Carrier), Transmission, Generation and Mining Business Units.
- Major Projects
    - Developed worldwide IT Strategy (including architecture & telecom (voice, data, video, etc.)
    - Developed and implemented a customer care & billing system
    - Conducted ERP Analysis resulting in the selection of SAP for global use
    - Participated in a number of M&A activities including the acquisition of an applications software company
    - In partnership with Business Units developed strategy and plan for I/T enabled products and services

Previous positions include Consultant & CIO of three global companies (Manufacturing, IT Products & Services and Aerospace & Defense). Started IT Career as a Programmer and progressed thru all organization ranks to CIO.

Education & Honors

M.S., Info Systems, 4.0 GPA, 1977
American University, Washington, D.C.

B.S., Finance
Wall Street Journal Student Achievement Award
Duquesne University, Pittsburgh, PA

Effective Executive Program, University of Pennsylvania, Wharton School, 1986

Nominee - *Computerworld-Smithsonian Award, 1996*

Community Service, Professional Associations, Publications and Guest Speaker Appearances

- Industry Advisor, American Heart Association
- Chairman, University of North Texas Industry Advisory Board
- Member, Technical Advisory Group, Department of Defense
- Founding Member and President, Dallas/Fort Worth Chapter, Society for Information Management (SIM)
- Published *"Prepare for Cyber Attacks on the Power Grid,"* Gartner
- Published *"Wireless Applications in the Utility Industry,"* Gartner
- Published "*"IT Health Check – Do you need one?,"* Utility Automation

ENRIQUE "RICK" NUNEZ, BS, MIS
PRODUCT MANAGER
NETWORK SERVICES
CSC

Sempra GridComm Role

- Engineering Manager - GridComm Design/Build/Integration, Network Operations Center Design, and Network Deployment

Professional Experience

Product Management – Network Management / IPT, CSC 2006- Present

- Manage various programs in support of the Voice Core infrastructure for our clients.
- Manage an Engineering team to deliver technical solutions and collateral for Unified Communications for our CSC product portfolio as well as our potential new clients.
- Provide consulting for IPT and Network Management on New Business
- Program lead for Unified Communications for CSC on a regional and global level

Senior Network Manager - Network Management Center, CSC 2003-2006

- Managed an engineering team to deliver Network Management solutions
- Delivered the Transition and Transformation task deliverables per the contractual requirements for multiple large accounts globally
- Provided senior leadership in establishing operational efficiencies for our clients within the Network Management Center

Manager, Network Applications R&D, Motorola (Phoenix, AZ) 1999- 2003

- Responsible for managing and directing all functions within a Global Service model for Motorola on Network Management solutions
- Managed, Created and established Global footprint and team
- Consolidated multiple tools into documented standards and provided process for enforcing the standards.
- Led the team into saving $millions of dollars in consolidation efforts and operational efficiencies
- Implemented critical procedures to ensure compliance with all Networking standards for data networks
- Documented and instituted a committee for standards approvals.
- Established and documented the enforcement of revision control for software development in Network management support

Technical Program Manager (WAN), Motorola (Phoenix, AZ) 1998- 1999

Responsible for managing and directing all key engineering personnel recruited into the Core network program. Mission was to deliver a single network for Motorola by collapsing the 5 different networks existing at the time.

- Developed and implemented strategic network upgrade and conversion procedures globally;

- Led a comprehensive program to deliver the Core network solution for an ATM network running BGP with EIGRP touching all primary regions, US, EMEA, Asia and Latin America
- Developed and implemented the following programs: Core network, Circuit consolidation, Network management process, Tool consolidation program, Application characterization

Education

Bachelor of Science Degree in Business, Management Information Systems - University of Arizona
Experience with the following technologies, applications and solutions:

- Cisco Routers, Switches, IPT handsets
- Network Management tools (SMARTS, Concord, HP Openview, Net Cool, Network Associates Sniffer, Netscout, App Vantage, Net Vantage, Network configuration management, sniffer probes, Netscout probes, and many others

Professional Involvements & Achievements

Knights of Columbus – St Thomas Aquinas 2006 - Current

ANDY SYKES, BSc(Hons), MSc
Principal Computer Scientist
CSC

Sempra GridComm Role

- Network Architect in GridComm Design/Build/Integration and Network Operations Center Design

Professional Experience

1999 to Date
CSC

Employed as the European representative on the CSC Global Network Strategy and Architecture Team. This key, high level team was responsible for the design and development of an industry leading, MPLS based network backbone capable of supporting CSCs current and future business needs and underpinning it's ability to efficiently respond to market development. As a direct result, CSC has been placed in the upper right quadrant by Gardner for Network Service Delivery.

I relocated to the USA in 2001 in order to continue to provide Network Architecture consulting services and Level 3 support to CSCs account facing organization. My duties also include acting as the Network Solution Architect for the CSCs major bid engagements.

Achievements

- The creation of the architecture for and the deployment of CSCs Enterprise Voice Core, a global IP Telephony infrastructure that provides CSC and it's customers with IPT Trunking, Hosting and support services with presence in North America, Europe and Asia. This network currently carries approximately 150 million minutes per annum of CSC and it's customer's traffic
- The creation of a industry leading network interconnection methodology to enable CSC to interface efficiently with 3rd party networks, such as those of it's customers, without compromising security yet allowing for the delivery of all of CSC's support services. This methodology allows expensive assets, such as network/server management to be leveraged amongst many customers and thus significantly reduce the cost of ownership.
- The development of a world-class network architecture for CSC based on fully researched requirements, a sound business case and leading edge technology. Since it's inception in 1999, the CSC network based on this architecture has accounted for $300m annual revenue for CSC. The architecture has been also been deployed in all of CSC's network outsourcing engagements since 2001.
- Demonstrated effective presentation skills to put complex technical issues to Senior Management and existing or prospective Customers
- Effective management of specialized, geographically diverse project teams
- Effective contract negotiation with US and foreign suppliers
- Experienced a traveling to and working in non-western countries
- Team building and recruitment of IM staff

Education

Bachelor of Sciences with Honors in Electronics, 1976
Chelsea College, University of London, Great Britain

Master of Sciences in Computer Communications, 1978
Brunel University, Great Britain

RICHARD YEE, BS – ME, MBA
LEADER, MANAGED NETWORK SERVICES
CSC

Sempra GridComm Role

- Engineering Manager - GridComm Design/Build/Integration, Network Operations Center Design, and Network Deployment

Professional Experience

Leader, Managed Network Services, Exelon Account

- Responsible for all voice and data network activities for 1,000+ locations

CSC, Global Portfolio Director, LAN Services

- Service lifecycle management and go-to-market planning for Wireless LAN (Local Area Network)
- Premises Cabling
- Address Management
- Application Modeling
- Data Center LAN Services

Senior Vice President-Operations, Bluegate Corporation

- Directed all engineering, maintenance, help desk, and provisioning activities

Vice President, Network Planning/Engineering, Wiltel Communications

- Directed the long-term planning and integration of all strategic network functions for voice, data, IP, international, local, traffic, and transport; Wiltel carried 5 billion voice minutes-of-use monthly on its next-generation fiber optic network, serving as SBC Long Distance's primary provider

Director, Solutions Consulting, Marconi Communications

- Identification, analysis, and development of tailored ATM-based (Asynchronous Transfer Mode) telecommunications business solutions specifically targeted at "alternative carriers" (e.g., cable television operators, Internet service providers, utilities, etc.)

General Manager for the CLEC affiliate of Reliant Energy

- Responsible for all network engineering, operations, sales, and marketing activities

Enterprise Director - Telecommunications, Reliant Energy

- Led negotiation regarding the lease of telecommunications assets to external parties, producing several high-volume "dark fiber" and/or antenna site license agreements to AT&T, MCI WorldCom, PCS Primeco, and Sprint PCS, as well as local universities and school districts

Education

Bachelor of Science, Mechanical Engineering
Carnegie-Mellon University, Pittsburgh, Pennsylvania

MBA
Gannon University, Erie, Pennsylvania

Registered Professional Engineer

Timothy DeLoach
Senior Managing Consultant, IBM Business Consulting

SDG&E GridComm Role: Project lead for security consulting

Profile: Experienced IT professional, 20+ years managing multi-disciplinary project teams including an IBM internal Global Health Check project. Proven track record of accomplishment in SMBs, government and fortune 200 companies. Previously served as Chief Security Officer in defense and energy sectors. Developed technical security architectures including SOA security, Risk and Compliance management, Vulnerability management, and identity management. Expertise in securing the Smart Energy Grid.

Career History:

04/2006 to Present IBM, San Diego, CA, US
Senior Managing Consultant
- Security Architect managing or leading security consulting engagements
- Participate in solutions design with multidisciplinary teams

01/2005 - 01/2006 Science Applications International, Inc., (SAIC) San Diego, CA, US
Security Engineering Manager (Corporate):
- Developed a standards-based, comprehensive security engineering program.
- Managed a team of engineers to define requirements, design and deploy solutions for SAIC.
- Responsible for oversight and leadership of a best-practice Public Key Infrastructure (PKI).
- Created Enterprise Vulnerability Assessment and Monitoring (EVAM) Service Center.

11/2004 - 01/2005 Blue Oasis Technologies, San Diego, CA, US
Security Consultant
- Designed programs and developed policies for (SAIC) Corporate IT Security.
- Delivered comprehensive security program for SAIC enterprise.
- Implement detailed security procedures, processes and guidelines

03/2003 - 11/2004 Intuit, Inc., San Diego, CA, US
Network Engineering Manager
- Designed and deployed legacy-to-VoIP switch redesign, reducing the overall number of PBXs required by 50%: a five year, $6 million project.
- Produced a savings of ~$3 million per year by redesigned the network perimeter.
- Introduced and implemented ITL and Six Sigma-based key operating mechanisms.
- Managed capital projects totaling over $8 million to design and support deployment of voice and data networks.

11/2000 - 03/2003 Sempra Energy, San Diego, CA, US
Information Security Manager
- Developed and implemented an ISO 17799-based comprehensive security program.
- Managed a multidisciplinary staff of up to 20 engineers, project leads, network engineers, DBA's, application developers, firewall, intrusion detection and forensics specialists.
- Managed capital projects totaling over $15 million.

- Completed all projects on time and consistently 20% under budget.
- Redesigned perimeter network architecture for ~200 applications, 20 firewalls and 75 routers.
- Developed a state-of-the-art forensics lab to support internal investigations.

04/1998 - 10/2000 Global Customer Relationship Management System Provider, Digital Lighthouse. Inc., San Diego, CA, US

Network and Telecom Manager

- Redesigned network to provide robust security services to protect financial transactions of several global Fortune 500 clients.

- Implemented Public Key Infrastructure (PKI), application security infrastructure, including automated code reviews and application security standards.

01/1996 - 03/1998 Pacific Regional Medical Command/ISS, Honolulu, HI, US

Chief Security Officer/Chief Systems Engineer

- Responsible for managing all aspects of a comprehensive DoD security program, compliant with DoD Security regulations.
- Engineered security solutions for advanced technologies for the warfighter in the Pacific Region.
- Worked with the NSA to develop the first Protection Profile for firewalls in a health care system under the NIST Common Criteria within the global Tri-Service Medical Command.

02/1993 - 12/1995 Science Applications International, Inc., San Diego, CA, US

Senior Systems Engineer

- Designed and implemented network security architecture for the Army Medical Command
- Implemented the first firewalls for Military Health Systems Command. This design was replicated across DoD medical facilities.

Assignment History:

- **Major Energy Company:** 01/2009 - 05/2009 Consultant
- **IBM:** 05/2008 - 01/2009 Co-Project Manager
- **A major energy generation, transmission and distribution company:** 03/2008 - 05/2008 Network Security Architect
- **A major energy company in Southern California:** 02/2008 - 03/2008 Security Architect
- **One of the nation's largest county governments:** 11/2006 - 02/2008 Engagement Manager and Security Architect

Education:

MHS, Human Services	BA,Information Systems
Lincoln University, US	Temple University, US

Memberships in Professional Organizations:

Dean's Advisory Council, University of California, Irvine - Member
Healthcare Information Management Systems Society - Past Faculty
Information Systems Security Assoc. - Member

Gene Rodriguez
Associate Partner, IBM Global Business Services

SDG&E GridComm Role: Technical lead for security and privacy consulting services

Career History:

04/2003 - present: IBM Global Business Services, Dallas, TX, US

Associate Partner

-Sell, develop, and deliver large, complex security and privacy assessment, design, and implementation engagements for energy and utilities industry customers.
- Support complex security requirements for the energy and utilities industry for advanced metering infrastructure (AMI) projects, Smart Grid Security, NERC CIP Cyber Security, and overall security program management.
- Manage and direct industry solutions for SAS 70 security controls, Sarbanes Oxley (SOX) and CoBIT/COSO security controls, HIPAA, enterprise security architectures, identity and access management, FERC/NERC (UAS 1200/1300/CIP) Cyber Security Standards, advanced metering infrastructure, and smart grid security.

11/1999 - 01/2003 Major Electric & Gas, Energy & Utilities Company, Dallas, TX, US

Technical Support & Information Security Officer

- Responsible for corporate security policies, standards, procedures, governance, risk management, compliance management, and security-related investigations,
- Managed external security relationships, senior executive relationships regarding security, application security, security architecture framework, forensics gathering, records management, data retrieval, legal investigations, disaster recovery, budgets, business continuity, and technical support for all systems and network infrastructures within the IT enterprise.
- Managed 200-250 employees and 16-20 first/second level managers
- Managed corporate network services, consisting of ATM/frame relay network, data switches, routers, Voice over IP (VoIP), internet communications infrastructure, remote access services, corporate firewalls, DMZ's, and voice engineering function.
- Functional manager over corporate telecommunications, consisting of Wide Area Network (WAN), fiber network, microwave (towers and shelters), ISP connections, network backbone, hubs, dedicated high speed circuits, and long distance services.
- Responsible for large scale disaster recovery and business continuity internal and external projects consisting of data center/technology consolidation, high availability solutions, business cases, and business risk assessments.
- Managed Enterprise Servers Support, consisting of 2000+ Windows NT/2000 and UNIX platforms, Lotus Notes e-mail systems (clustered), Notes applications, internet/intranet infrastructure, FTP, SNTP (mail host servers), corporate application/database servers, enterprise networking servers (DNS/WINS/DHCP/IIS/PDC/BDC's), file/print servers.

04/1981 - 11/1999 IBM Global Services, Dallas, TX, US

Consultant/Project Manager

Developed, sold, and delivered/managed complex business recovery and disaster recovery engagements for cross-industries.

Assignment History:

Major Electric Utility Company: 01/2009 - 02/2009 Engagement Manager
Managed a NERC Critical Infrastructure Protection (CIP) Cyber Security Standards network redesign project, providing an assessment of the current power plant facility network in order to re-design the network to comply with the NERC CIP Cyber Security Standards.

Large Electric T&D Company: 08/2008 – to present AMI Executive Security Leader
Developed business/technical requirements and delivered a macro level solution design for a complex Automated Metering System (AMS) Project. Directed security team members in electric utility industry security management "Best Practices" and NERC-CIP Cyber Security Standards regulatory requirements.

Major Energy & Utilities Company: 05/2007 - 07/2007 Engagement Leader
Led NERC Critical Infrastructure Protection (CIP) Cyber Security Standards assessment, design, implementation engagement that included the communications network; SCADA (EMS/OMS/GIS, etc.) control systems; identity/access management; compliance management; logging and monitoring; and enterprise content management. Developed the NERC CIP cyber security strategy and roadmap to address NERC CIP requirements for the control centers and other facilities.

Large Energy & Utilities Company: 11/2006 - 02/2007 Executive Consultant
Led security regulatory assessment for a complex Business Transformation Outsourcing initiative the included SOX, FERC, NERC and HIPAA compliance with regard to Global Resourcing (off-shore) implications. Provided a risk assessment of business exposures.

Major Natural Gas Company: 04/2006 - 08/2007 Engagement Leader
Led an identity and access management strategy and roadmap development engagement to assist the client in building a reference architecture that suits the complexities of the enterprise and FERC requirements for regulated/unregulated business separation for a natural gas company.

Education:

Master of Arts in Management in Business Management
University of Phoenix, US

Other Job-related Activities:

- Certified Information Systems Security Professional (CISSP), 2002
- Certified Project Management Professional (PMP): Project Management Institute, 2001
- Certified Disaster Recovery Planner (CDRP): Disaster Recovery Institute, 1991
- IBM Certified Professional: IBM Global Services, 1998
- Certified in Information Technology Information Library (ITIL) Foundations, 2001

Mozhi Habibi

Senior Director, Product Management
Space-Time Insight Corporation

SDG&E GridComm Role:

Responsible for oversight and deployment of Space-Time Insight's smart grid visualization tool.

Career Synopsis

SPACE-TIME INSIGHT CORPORATION..... 06/2009 – PRESENT
A global business solution provider to Energy, Utilities and Transportation industries .

Sr. Director, Product Management

- Responsible for the company's product portfolio and managing all phase of the product life cycle from concept to launch
- Manage product go-to-market strategy, based on company vision
- Improve customers "out-of-the-box" experience by simplifying product installation, and increasing customer satisfaction
- Manage STI's "voice of the customer (VOC)" program, to ensure product development is aligned with customer requirements
- Authored whitepapers on geo-spatial visualization benefits in Smart Grid

VENTYX CORPORATION..... 08/2007 – 04/2009
A global business solution provider to Energy, Utilities, Communications and other asset-intensive organizations.

Sr. Director, Strategic Marketing & Global Partner Marketing

- Developed product positioning, pricing, and go-to-market strategy working with sales and product development/management teams.
- Spearheaded the company's Smart Grid initiative, including value proposition, product positing and market segmentation. The smart grid initiative included Demand Response, Distributed Resources Management, and Complex Billing.
- Conducted global market assessment for new vertical markets and geographical regions developing the business plan for a product portfolio to address the market opportunity.
- Enhanced and finalized mid to long-term product strategy by leading "voice of the customer" (VOC) and partner meetings, to ensure the uniformity of business needs and the solutions offered.
- Architected and deployed a systemic process for knowledge transfer of value propositions and business issues to internal and external sales channels.
- Re-launched the Professional Services Organization by re-architecting business processes and resulting in the creation of new service lines (i.e. Value Assessment), which generated additional revenue stream and attach rate.
- Provided thought leadership and whitepapers on energy industry issues such as smart grid, enterprise workforce management, enterprise asset and operations management.

Ventyx acquires Global Energy Decisions in August of 2007

GLOBAL ENERGY DECISIONS ..... 07/2000 - 08/2007

Sr. Director, Product Management

- Executed the NPI (New Product Innovation) for new product ideas, including market research, cost estimation, sales channel identification, pricing and ROI. The NPI process included customer funding, identifying beta test community, and identifying development and sales partners.
- Devised and launched a tracking system to match the R&D funds to ultimate product sales. Enabling the executive team to make go or no-go decisions in funding new projects.
- Implemented a comprehensive product launch process for the business units, including knowledge transfer, risk factor monitoring, marketing launches, sales aides, documentation and internal and external training.

Director, Client Services & Professional Services

- Architected and deployed company's worldwide Client Services organization.
- Developed & deployed worldwide product training programs for customers.
- Revitalized the worldwide Client Services organization and processes which resulted in raising customer satisfaction index from below 50% to 98%.
- Successfully managed large-scale implementation projects resulting in highly referencable customers.

COMMUNICATION INTELLIGENCE CORPORATION (NASDAQ:CICI) 12/1998- 06/2000

CIC is an enterprise software company focused on security, biometric signature verification and natural input software solutions.

Sales Support Manager (1999-2000)

- Responsible for all worldwide pre- and post- sales support for the organization.
- Served as Company spokesperson in industry events on the Security issues and technology trends

Business Development Manager / OEM Sales Engineer (1998-1999)

- Created the support and feedback platform for the Company's software developer community
- Recruited key partners and developed joint go-to-market strategies resulting in several major wins.
- Closed 3 major accounts: Hitachi, Compaq and Intermec.

Education

SAN JOSE STATE UNIVERSITY – MBA, 1997

CALIFORNIA POLYTECHNIC STATE UNIVERSITY, San Luis Obispo, CA – BS Aeronautical Engineering, 1992

Affiliations

SMART GRID EXECUTIVE FORUM

COMMON WEALTH CLUB OF CALIFORNIA

AMERICAN MANAGEMENT ASSOCIATION

PRODUCT DEVELOPMENT & MANAGEMENT ASSOCIATION

SOCIETY OF WOMEN ENGINEERS

APPENDIX 2 – SDG&E LETTER OF SUPPORT

Patti Wagner
Vice President, Information Technology

8330 Century Park Court
San Diego, CA 92123

Tel: 858.650.6133
Fax: 858.650.6106
pwagner@SempraUtilities.com

August 6, 2009

U.S. Department of Energy
Office of Electricity Delivery and Energy Reliability
1000 Independence Ave., SW
Washington, DC 20585

RE: Letter of Support for the proposed SDG&E Smart Grid Investment Grant project: GridComm

On behalf of San Diego Gas & Electric, I am pleased to submit this letter of support for the enclosed SDG&E Smart Grid Investment Grant program application and confirm the organization's commitment to supporting it, should it be chosen for funding, through deployment of the necessary personnel, resources, carefully-chosen vendors and required cost share.

I will be involved in the GridComm project should it receive grant funding in my capacity as an executive with responsibility and oversight for network and communications services.

GridComm plays a vital role in ensuring SDG&E achieves its smart grid vision. Enabling pervasive, comprehensive, secure and reliable communications across the grid is essential to the performance of the SDG&E Smart Meter and Smart Grid programs.

Additionally, SDG&E is a good corporate citizen and very active in the San Diego community. The organization welcomes the opportunity to play a role in additional new job creation and economic investment in the region in addition to making its electric grid more efficient and better equipped to leverage the utility's investment in renewable energy.

Yours truly,

Patti Wagner

APPENDIX 3 – Vendor Letters Of Support

August 6, 2009

U.S. Department of Energy
Office of Electricity Delivery and Energy Reliability
1000 Independence Ave., SW
Washington, DC 20585

RE: Letter of Support for the proposed Sempra Smart Grid Investment Grant project: GridComm

On behalf of Arcadian Networks, Inc., I am pleased to submit this letter of support for Sempra's Smart Grid Investment Grant application.

As I have the authorization to and have committed the people and resources required to support the GridComm project with the goods and services as described in Sempra's application should it be chosen for funding.

The individual who has decision making authority to commit organizational resources to support the proposal GridComm project tasks and his role in the project includes:

- John J Rasweiler V, Vice President - IT, Engineering and Network Operations
  Project Manager of GridComm

We understand the role that GridComm plays in ensuring Sempra achieves its smart grid vision. Enabling pervasive, comprehensive, secure and reliable communications across the grid is essential to its performance, and we are proud to be contributing to this vision.

I sincerely look forward to the opportunity and playing a role in job creation and economic investment in the region as well as making Southern California's electric grid more efficient and better equipped to leverage the state's investment in renewable energy.

Yours truly,

Arcadian Networks, Inc.

Ed Solar

Digitally signed by Ed Solar
DN: cn=Ed Solar, o=Arcadian Networks, ou, email=ed.solar@arcadiannetworks.com, c=US
Date: 2009.07.23 11:43:11 -04'00'

President and Chief Executive Officer
Ed Solar

August 6, 2009

U.S. Department of Energy
Office of Electricity Delivery and Energy Reliability
1000 Independence Ave., SW
Washington, DC 20585

RE: Letter of Support for the proposed SDG&E Smart Grid Investment Grant project: GridComm

On behalf of Celergy Networks Inc., I am pleased to submit this letter of support for SDG&E's Smart Grid Investment Grant application.

As President of Celergy I have the authorization to and have committed the people and resources required to support the GridComm project as described in this application.

We understand the role that GridComm plays in ensuring SDG&E achieves its smart grid vision. Enabling pervasive, comprehensive, secure and reliable communications across the grid is essential to its performance, and we are proud to be contributing to this vision.

As a California-based company and employer, I am ready to hire additional technicians and engineers in order to proceed immediately with this shovel-ready project. I sincerely look forward to stimulating job creation and investment in the state as well as making Southern California's electric grid more efficient and better equipped to leverage the state's investment in renewable energy.

I will be involved in the GridComm project providing wired / wireless communication site assessments, engineering and hardware / software installation supporting the GridComm communication system.

Yours truly,
Celergy Networks, Inc.

Art Cormier
President

August 3, 2009

Jeff Nichols
Director – Network & Communication Services
SDG&E
10975 Technology Place
San Diego, CA 92127

Re: Department of Energy Solicitation No. DE-FOA-0000058A – Letter of Support to SDG&E's Advanced Smart Grid Communications System Project

Dear Mr. Nichols:

Cisco Systems, Inc. is pleased to provide a letter of support for SDG&E's application for funding under the End-to-End Smart Green Grid Demonstration Project area of the above referenced FOA for the *Smart Grid Investment Grant Program.* This Letter of Support specifically excludes the purchase of any architectural and design services from Cisco, and such services may not be purchased with any DOE award funding.

Cisco is committed to delivering successful Smart Grid solutions and believes that as the world builds out a smart, secure energy grid for the 21st century, networking technology will serve as the platform and public-private cooperation will be key to the success. Designed to meet the requirements of next-generation energy networks, the Cisco Smart Grid solution will take advantage of a secure, standards-based IP-infrastructure for energy providers and consumers.

As a vendor in SDG&E's Advanced Smart Grid Communications System Project, Cisco will provide commercially available equipment and services to enable our shared vision of SDG&E's project. Cisco is committed to SDG&E's long-term success in this effort.

In the Grant Request or any other grant application or funding request made to the DOE or otherwise to the U.S. federal government and in all supporting documentation or other communications by SDG&E with respect thereto, SDG&E will:

(a) Not represent or identify Cisco's participation in any capacity other than that described, and will provide Cisco with any portions of the Grant Request referencing Cisco's participation in the Project (for informational purposes only, not for approval);

(b) Refer to Cisco solely as a “Vendor”, and otherwise not portray or represent Cisco as an “Applicant”, “Lead Applicant”, “Prime”, “Recipient”, “Subawardee”, or “Supporting Organization”;

Regards,

Marthin De Beer
SVP Emerging Technologies Group &
Cisco Smart Grid Board Chair

ROBERT E. WELCH
President
Chemical, Energy and Natural Resources Group

August 6, 2009

U.S. Department of Energy
Office of Electricity Delivery and Energy Reliability
1000 Independence Ave., SW
Washington, DC 20585

RE: Letter of Support for the proposed SDG&E Smart Grid Investment Grant project: GridComm

On behalf of CSC, I am pleased to submit this letter of support for SDG&E's Smart Grid Investment Grant application.

As President of the Chemicals, Energy, and Natural Resources Group for CSC, I have the authorization to and have committed the people and resources required to support the GridComm project with the goods and services as described in SDG&E's application should it be chosen for funding.

The individual(s) who have decision making authority to commit organizational resources to support the proposal GridComm project tasks and their roles in the project include:

- Terri Staton Gale, Director of Strategy and Operations, CENR Group – Proposal Manager

We understand the role that GridComm plays in ensuring SDG&E achieves its smart grid vision. Enabling pervasive, comprehensive, secure and reliable communications across the grid is essential to its performance, and we are proud to be contributing to this vision.

I sincerely look forward to the opportunity and playing a role in job creation and economic investment in the region as well as making Southern California's electric grid more efficient and better equipped to leverage the state's investment in renewable energy.

Sincerely,

Robert E. Welch
President, Chemical, Energy and National Resources Group

Two Lincoln Center
Oakbrook Terrace, IL 60523

August 6, 2009

U.S. Department of Energy
Office of Electricity Delivery and Energy Reliability
1000 Independence Ave., SW
Washington, DC 20585

RE: Letter of Support for the proposed SDG&E Smart Grid Investment Grant project: GridComm

To Whom It May Concern:

IBM Corporation is committed to assisting SDG&E with security consulting services and other and related products as outlined in this Stimulus Grant. IBM appreciates the opportunity to work with SDG&E in advancing the Smart Grid as expressed in the goals and objectives of the DOE funding opportunity announcement.

It is our expectation that we will provide the following:

- network security, cyber system security, security consulting, products, software, etc

In this role, IBM will perform as a vendor in the Smart Grid Stimulus Investment Grant. It is our expectation to provide products as described above and perform as a contractor to complete the scope of work outlined in the Stimulus Grant.

IBM has the personnel and products to meet the agreed-upon objectives within the dates outlined in the Stimulus Grant.

Sincerely,

James G. Bales
IBM Global Business Services

SPACE•TIME•INSIGHT

August 6, 2009

U.S. Department of Energy
Office of Electricity Delivery and Energy Reliability
1000 Independence Ave., SW
Washington, DC 20585

RE: Letter of Support for the proposed SSDG&E Smart Grid Investment Grant project: GridComm

On behalf of Space-Time Insight, I am pleased to submit this letter of support for SDG&E's Smart Grid Investment Grant application.

As CEO, I have the authorization to and have committed the people and resources required to support the GridComm project with the goods and services as described in SDG&E's application should it be chosen for funding.

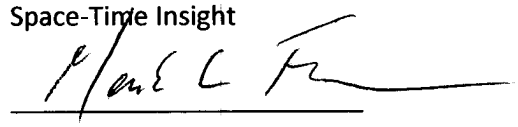
The individual(s) who have decision making authority to commit organizational resources to support the proposal GridComm project tasks and their roles in the project include:

- Bob Norling, Account Executive – Sales role
- Krishna Kumar, CTO – Technical role
- Mozhi Habibi, Product Management – Products role
- Venkata Jagadeesh Kumar Macherla, Sr. Architect – Implementation role
- Raj Gupta, VP Products – Development role

We understand the role that GridComm plays in ensuring SDG&E achieves its smart grid vision. Enabling pervasive, comprehensive, secure and reliable communications across the grid is essential to its performance, and we are proud to be contributing to this vision.

I sincerely look forward to the opportunity and playing a role in job creation and economic investment in the region as well as making Southern California's electric grid more efficient and better equipped to leverage the state's investment in renewable energy.

Yours truly,
Space-Time Insight



CEO
Mark L. Feldman PhD

APPENDIX 4 – Other SDG&E ARRA Applications

ARRA Area	Proposal
Smart Grid regional demonstration project DE-FOA-0000036	• SDG&E is the lead on a regional demonstration project proposal building on its current micro grid demonstration with added scope and partners including storage, HAN, V2G *NOTE: Submission is scheduled for Aug. 26.*
Smart Grid Investment Grant DE-FOA-000058	• SDG&E is the lead on a proposal for a comprehensive, secure and consolidated communications network to reach and connect all smart grid assets and support smart-grid functions across the utilities' service territories.

Supplier Diversity

Our Commitment

At San Diego Gas & Electric and Southern California Gas Company® (Sempra Energy utilities®), we are committed to working with a wide variety of diverse suppliers. Our commitment to supplier diversity helps provide our customers with the best possible energy services at the most competitive prices.

We always seek qualified new suppliers who can help strengthen our supplier base and resources and share in our success. On our website, we provide information on how qualified businesses owned by minorities, women, and service-disabled veterans (otherwise known as diverse business enterprises – DBEs) can participate in our procurement process.

In addition to working with DBEs, we also support non-DBE businesses that participate by subcontracting work to participating DBEs. To encourage diversity among our prime contractors, each year we ask them to support our goal of subcontracting 30% of their services to such businesses.

APPENDIX 6 – Estimated GridComm Job Creation

GridComm is expected to generate a minimum 83 full-time equivalent (FTE) jobs within its initial two-year planned implementation phase.

EMPLOYER	ESTIMATED FTE
SDG&E:	
Project management-various	8 (2 - 10 years)
Security	3 (2 - 10 years)
ARCADIAN:	
California	
Field Technicians and RF/Network Engineers:	23 (spanning from 2-10 years)
Project Managers:	2 (10 years)
General Manager:	1 (10 years)
New York	
NOC & Network Engineers	4 (10 years)
Washington	
Meter Assembly	2 (2 years)
CISCO:	5 (2 years)
CELERGY:	15 (2 years)
IBM:	2 (2 years)
CSC:	17 (2 years)
SPACE-TIME INSIGHTS:	1 (2 years – 10 years)

APPENDIX 7 – SDG&E 2008 UTC Apex Award

Establishing Connectivity through California's Wildfires

SITUATION

The Sempra Energy utility's Network/Telecom Engineering and Operations Department is always looking for new and innovative ways to meet the communications challenges of San Diego Gas & Electric and the Southern California Gas Co. The opportunity to do so under the most extreme conditions arose during the recent wildfires that gripped Southern California.

The multiple fires that raged throughout SDG&E's 4,200-square-mile service territory burned more than 1,800 utility poles and 35 miles of power lines. Thousands of customers were left without electric service. Quick repair and replacement of damaged facilities was imperative to restoring service to disaster-weary customers.

To coordinate the restoration effort, nine forward command centers were set up in fire-affected areas, many of which lay in remote, mountainous backcountry terrain. Within a matter of days, SDG&E's team had to deploy communications systems that would allow for voice and high-speed data connectivity at the command centers, as well as communication to crews in the field.

SOLUTION

SDG&E's IT department deployed three, previously unused technology applications to meet the restoration teams' voice and data challenges.

When the fires started, Proximetry offered to help SDG&E formulate and implement connectivity using its point-to-point and point-to-multipoint unlicensed broadband solutions. The design used 802.11a on a seven-mile link from SDG&E's data center, through Mount Woodson to the command centers at the utility's Poway substation and location outside of the city of Ramona. At the command centers, 802.11b/g was used as a hotspot to support Voice-over-IP (VoIP) phones and data connectivity of 5 Mbps for access to back-office computing resources at SDG&E's data center.

The solution, which was up and running within days of identifying the remote command center locations, gave SDG&E field employees access to their usual network and computing resources. The ability to use unlicensed spectrum Wi-Fi technology over vast distances was remarkable. The team was equally impressed with the high data speeds that were maintained, even though a repeater was needed because of foliage and terrain issues. This ability to coordinate field personnel and materials was invaluable to expediting the restoration effort.

Although Mount Woodson is centrally located, Dulzura, Highland Valley and Santa Ysabel had no access to the Wi-Fi umbrella. Overnight, Tachyon deployed satellite links that provided 1.5 Mbps downloads, 512 Kbps uploads and VoIP phones. Although a geosynchronous satellite was used, there was no noticeable delay with the Tachyon-hosed VoIP services. This system provided command center employees access to the Internet and SDG&E's corporate email system.

In addition to providing communications to fixed locations, it was necessary to optimize communications for field crews. Early in 2007, SDG&E's IT team initiated a project of mutual cooperation with the San Diego County Regional Communications System (RCS) to integrate with its 800 MHz Smartzone system. This integration provided supplemental coverage as well as interoperability between SDG&E and public safety operations.

To achieve full functionality, several SDG&E talkgroups were programmed into the RCS system. Patches between the central electronics of the two systems were configured and activated. More than 100 radio units were issued to field personnel working in remote areas. This system enabled talkgroups on the SDG&E system to automatically hear the traffic on the RCS system over their own 900 MHz equipment. Units on the 800 MHz RCS system would likewise hear the 900 MHZ SDG&E traffic using the patched-through parallel talkgroups. The RCS radios allowed SDG&E fire coordinators to talk directly with public safety, fire agencies and law enforcement.

RESULTS

Maintaining communication was vital to the restoration efforts under very adverse conditions in extremely rough terrain. The cooperation and expertise of the San Diego County Sheriff's department RCS team, as well as Motorola, were instrumental in maximizing the value of this technology.

The rapid deployment of this telecom technology aided coordination. It was a crucial component in enabling SDG&E and mutual aid field crews to swiftly repair damaged lines and restore electrical service to customers.

Applicant Name: San Diego Gas & Electric | Award Number: DE-FOA-0000058 | Appendix 8

Budget Information - Non Construction Programs

OMB Approval No. 0348-0044

Section A - Budget Summary

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds Federal (c)	Estimated Unobligated Funds Non-Federal (d)	New or Revised Budget Federal (e)	New or Revised Budget Non-Federal (f)	Total (g)
1. Electricity Delivery and Energy Reliability Research, Development and Analysis	CFDA Number: 81.122			$28,115,052	$31,976,915	$60,091,967
2.						$0
3.						$0
4.						$0
5. Totals		$0	$0	$28,115,052	$31,976,915	$60,091,967

Section B - Budget Categories

6. Object Class Categories	Grant Program, Function or Activity (1) ED&E	(2)	(3)	(4)	Total (5)
a. Personnel	$18,618,380				$18,618,380
b. Fringe Benefits	$0				$0
c. Travel	$1,861,863				$1,861,863
d. Equipment	$21,455,428				$21,455,428
e. Supplies	$0				$0
f. Contractual	$231,000				$231,000
g. Construction	$1,748,262				$1,748,262
h. Other	$10,910,000				$10,910,000
i. Total Direct Charges (sum of 6a-6h)	$54,824,933	$0	$0	$0	$54,824,933
j. Indirect Charges	$5,267,034				$5,267,034
k. **Totals** (sum of 6i-6j)	$60,091,967	$0	$0	$0	$60,091,967
7. Program Income					$0

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Section C - Non-Federal Resources

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) **Totals**
8. Electricity Delivery and Energy Reliability Research, Development and Analysis	$31,976,915	$1,000,000	$0	$32,976,915
9.				$0
10.				$0
11.				$0
12. **Total** (sum of lines 8 - 11)	$31,976,915	$1,000,000	$0	$32,976,915

Section D - Forecasted Cash Needs

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th quarter
13. Federal	$13,574,286	$3,053,837	$3,394,517	$3,760,723	$3,365,209
14. Non-Federal	$17,026,138	$3,781,838	$4,268,150	$4,741,720	$4,234,430
15. **Total** (sum of lines 13 and 14)	$30,600,424	$6,835,675	$7,662,667	$8,502,443	$7,599,639

Section E - Budget Estimates of Federal Funds Needed for Balance of the Project

	Future Funding Periods (Years) (b) First	(c) Second	(d) Third	(e) Fourth
(a) Grant Program				
16. Electricity Delivery and Energy Reliability Research, Development and Analysis	$13,574,286	$14,540,766		
17.				
18.				
19.				
20. **Total** (sum of lines 16-19)	$13,574,286	$14,540,766	$0	$0

Section F - Other Budget Information

21. Direct Charges

22. Indirect Charges

Indirect rates are fixed as follows: SDGE Labor rate is 78.55% and 5.35% for all other items.

23. Remarks

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Instructions for the SF-424A

General Instructions
This form is designed so that application can be made for funds from one or more grant programs. In preparing the budget, adhere to any existing Federal grantor agency guidelines which prescribe how and whether budgeted amounts should be separately shown for different functions or activities within the program. For some programs, grantor agencies may require budgets to be separately shown by function or activity. For other programs, grantor agencies may require a breakdown by function or activity. Sections A, B, C, and D should include budget estimates for the whole project except when applying for assistance which requires Federal authorization in annual or other funding period increments. In the later case, Sections A, B, C, and D should provide the budget for the first budget period (usually a year) and Section E should present the need for Federal assistance in the subsequent budget periods. All applications should contain a breakdown by the object class categories shown in Lines a-k of Section B.

Section A. Budget Summary Lines 1-4 Columns (a) and (b)
For applications pertaining to a **single** Federal grant program (Federal Domestic Assistance Catalog number) and **not requiring** a functional or activity breakdown, enter on Line 1 under Column (a) the catalog program title and the catalog number in Column (b).

For applications pertaining to a **single** program **requiring** budget amounts by multiple functions or activities, enter the name of each activity or function on each line in Column (a), and enter the catalog number in Column (b). For applications pertaining to multiple programs where none of the programs require a breakdown by function or activity, enter the catalog program title on each line in **Column** (a) and the respective catalog number on each line in Column (b).
For applications pertaining to **multiple** programs where one or more programs **require** a breakdown by function or activity, prepare a separate sheet for each program requiring the breakdown. Additional sheets should be used when one form does not provide adequate space for all breakdown of data required. However, when more than one sheet is used, the first page should provide the summary totals by programs.

Lines 1-4, Columns (c) through (g)

For new applications, leave Columns (c) and (d) blank. For each line entry in Columns (a) and (b), enter in Columns (e), (f), and (g) the appropriate amounts of funds needed to support the project for the first funding period (usually a year).

For continuing grant program applications, submit these forms before the end of each funding period as required by the grantor agency. Enter in Columns (c) and (d) the estimated amounts of funds which will remain unobligated at the end of the grant funding period only if the Federal grantor agency instructions provide for this. Otherwise, leave these columns blank. Enter in columns (e) and (f) the amounts of funds needed for the upcoming period. The amount(s) in Column (g) should be the sum of amounts in Columns (e) and (f).

For supplemental grants and changes to existing grants, do not use Columns (c) and (d). Enter in Column (e) the amount of the increase or decrease of Federal funds and enter in Column (f) the amount of the increase or decrease of non-Federal funds. In Column (g) enter the new total budgeted amount (Federal and non-Federal) which includes the total previous authorized budgeted amounts plus or minus, as appropriate, the amounts shown in Columns (e) and (f). The amount(s) in Column (g) should not equal the sum of amounts in Columns (e) and (f).

Line 5—Show the totals for all columns used.

Section B. Budget Categories
In the column headings (a) through (4), enter the titles of the same programs, functions, and activities shown on Lines 1-4, Column (a), Section A. When additional sheets are prepared for Section A, provide similar column headings on each sheet. For each program, function or activity, fill in the total requirements for funds (both Federal and non-Federal) by object class categories.

Lines 6a-i—Show the totals of Lines 6a to 6h in each column.

Line 6j—Show the amount of indirect cost.

Line 6k—Enter the total of amounts on Lines 6i and 6j. For all applications for new grants and continuation grants the total amount in column (5), Line 6k, should be the same as the total amount shown in Section A, Column (g), Line 5. For supplemental grants and changes to grants, the total amount of the increase or decrease as shown in Columns (1)-(4), Line 6k should be the same as the sum of the amounts in Section A, Columns (e) and (f) on Line 5.
Line 7—Enter the estimated amount of income, if any, expected to be generated from this project. Do not add or subtract this amount from the total project amount. Show under the program narrative statement the nature and source of income. The estimated amount of program income may be considered by the federal grantor agency in determining the total amount of the grant.

Section C. Non-Federal Resources

Lines 8-11—Enter amounts of non-Federal resources that will be used on the grant. If in-kind contributions are included, provide a brief explanation on a separate sheet.

Column (a)—Enter the program titles identical to Column (a), Section A. A breakdown by function or activity is not necessary.

Column (b)—Enter the contribution to be made by the applicant.

Column (c)—Enter the amount of the State's cash and in-kind contribution if the applicant is not a State or State agency. Applicants which are a State or State agencies should leave this column blank.

Column (d)—Enter the amount of cash and in-kind contributions to be made from all other sources.

Column (e)—Enter totals of Columns (b), (c), and (d).

Line 12—Enter the total for each of Columns (b)-(e). The amount in Column (e) should be equal to the amount on Line 5, Column (f) Section A.

Section D. Forecasted Cash Needs

Line 13—Enter the amount of cash needed by quarter from the grantor agency during the first year.

Line 14—Enter the amount of cash from all other sources needed by quarter during the first year.

Line 15—Enter the totals of amounts on Lines 13 and 14.

Section E. Budget Estimates of Federal Funds Needed for Balance of the Project

Lines 16-19—Enter in Column (a) the same grant program titles shown in Column
(a), Section A. A breakdown by function or activity is not necessary. For new applications and continuation grant applications, enter in the proper columns amounts of Federal funds which will be needed to complete the program or project over the succeeding funding periods (usually in years). This section need not be completed for revisions (amendments, changes, or supplements) to funds for the current year of existing grants.
If more than four lines are needed to list the program titles, submit additional schedules as necessary.

Line 20—Enter the total for each of the Columns (b)-(e). When additional schedules are prepared for this Section, annotate accordingly and show the overall totals on this line.

Section F. Other Budget Information

Line 21—Use this space to explain amounts for individual direct object-class cost categories that may appear to be out of the ordinary or to explain the details as required by the Federal grantor agency.

Line 22—Enter the type of indirect rate (provisional, predetermined, final or fixed) that will be in effect during the funding period, the estimated amount of the base to which the rate is applied, and the total indirect expense.

Line 23—Provide any other explanations or comments deemed necessary.

Use or disclosure of the data set forth below is subject to the restriction on the cover page of this application.

Indirect Charges Contact Edward Reyes 213-244-3196 EReyes@semprautilities.com

	Personnel	Fringe Benefits	Travel	Equipment	Supplies	Contractual	Construction	Other	Indirect Rates
Site Prep:									$ -
Basic RF Modeling - Basic data entered into RF planning tool, using existing morphology / topography / structure clutter data - Analyze the possible coverage area - Examine FCC ULS for possible interference. Back analysis where appropriate.	$ [redacted]								$ [redacted]
Site Survey - Walk site, plan mounting, cable runs, power, etc.	$ [redacted]								$ [redacted]
Fine tune RF modeling based on site survey - Develop mounting recommendations - Antenna and mounting recommendations - Element Configurations (freq, power, etc.)	$ [redacted]								$ [redacted]
Zoning / Facility / Real Estate Applications and Approvals - Develop mounting proposal and sketches.	$ [redacted]								$ [redacted]
Complete Site Build Plan - Bill of Materials - radios - antennas - cabling - routers / switches - power (ups?) - masts, grounding - backhaul - Checklists - RF, IP, etc.	$ [redacted]								$ [redacted]
FCC ULS Location Registration and Approval	$ [redacted]								$ [redacted]
Site Build:									$ -
Travel Time			$ [redacted]						$ [redacted]
Mast, Conduit, Grounding, Data / Power Cabling	$ [redacted]								$ [redacted]
Indoor Mounting and Connecting - Mount PoE, run cables, terminate and label	$ [redacted]								$ [redacted]
Radio / Antenna mounting, cabling	$ [redacted]								$ [redacted]
Router Provisioning / Configuration	$ [redacted]								$ [redacted]
Site ATP: Deployment Acceptance Tests	$ [redacted]								$ [redacted]
PM - Vendor Broadband RF Program Manager	$ [redacted]								$ [redacted]
PM - Vendor Broadband RF Project Manager	$ [redacted]								$ [redacted]
Chief Engineer	$ [redacted]								$ [redacted]
Systems Integration Eng	$ [redacted]								$ [redacted]
NOC:									$ -
Cisco 5508 Wireless LAN Controller N+1 w/ license for 250 AP/each				$ [redacted]					$ [redacted]
Cisco WCS Software to manage the Wi-Fi Aps				$ [redacted]					$ [redacted]
AirConsole				$ [redacted]					$ [redacted]
AirSync RF Foundational Services Integration				$ [redacted]					$ [redacted]
AirSync RF Control Services Customization				$ [redacted]					$ [redacted]
Servers				$ [redacted]					$ [redacted]
Car Rental and Gas			$ [redacted]						$ [redacted]
PerDiem Charges			$ [redacted]						$ [redacted]
Hotel			$ [redacted]						$ [redacted]
Mobile WiMAX pBS - WiNetwork 3.65 GHz				$ [redacted]					$ [redacted]
Cisco Outdoor Wi-Fi (1524)				$ [redacted]					$ [redacted]
Antennas - for 3.65 WiMAX or 5.8 GHz Wi-Fi (Omni or sector)				$ [redacted]					$ [redacted]
Backhaul - P2P Wi-Fi Equipment (both endpoints incl. antennas)				$ [redacted]					$ [redacted]
Cisco ISR 2821 w/ AXP plus 4-port Eth. WIC and Enterprise IP Services S/W				$ [redacted]					$ [redacted]
Ancillary Equipment - Mounts, Conduits - Coaxial Surge Suppressors - Grounding Kits - Cat 5e cabling and plugs - UPS All expected to be no more than $1,000				$ [redacted]					$ [redacted]
PM - SEU Program Manager	$ [redacted]		$ [redacted]						$ [redacted]
PM - SEU Project Manager	$ [redacted]		$ [redacted]						$ [redacted]
SEU Engineer	$ [redacted]		$ [redacted]						$ [redacted]
SEU Analyst	$ [redacted]		$ [redacted]						$ [redacted]
SEU Technician	$ [redacted]		$ [redacted]						$ [redacted]
PM - Program/Project Management (PD, Tech PM)	$ [redacted]		$ [redacted]						$ [redacted]
PM - PMO and Reporting	$ [redacted]		$ [redacted]						$ [redacted]
DOE-Related Reporting:									$ -

Reporting Structure Creation	$								$
Collection and Validation of Data	$								$
Initial Reporting and Validation	$								$
Review and Submission of Reporting Package	$								$
Archival and Reconciliation of Reports/Feedback	$								$
Management and Audit Support	$		$						$
Security & Privacy Services can be applied to the following Smart Grid Cyber Security Work Streams: (3000 hours) –Develop Smart Grid Cyber Security Strategy and Roadmap –Define the Smart Grid Security Architecture Framework –Design and implement the Smart Grid Identity Management Solution Design –Design and implement the Access Management Solution Design –Create the Smart Grid Cyber Security Governance, Risk, and Compliance (GRC) Management	$		$						$
Solution Design –Define the Smart Grid Message Digests Solution Design –Develop the Smart Grid Security Policy Management Solution Design –Design and implement the Smart Grid User Registry Solution Design –Perform a Smart Grid Cyber Security Risk Assessment –Create Smart Grid Security Penetration and Vulnerability Test Plan –Conduct Security Penetration and Vulnerability Testing	$		$						$
SDGE fixed	$			$					$
SDGE Mobile	$			$					$
Cross-Band Gateways				$					$
Data Radio GeminiG3				$					$
AMI Backhaul Radio				$					$
Direct to Meter				$					$
AE11				$					$
Truck only				$					$
Equipment				$					$
Test Equipment for F. Tech				$					$
Field Equipment				$					$
Gateway Install	$								$
Frequency Planning	$							$	$
DRV Install	$								$
Managed Service	$								$
Network Design	$								$
Spectrum						$ -	$		$
Travel Expenses			$						$
IT Communications						$ -			$ -
Visualization Software				$		$			$
Project Contingency								$	$
	$ 18,618,380	$ -	$ 1,861,863	$ 21,455,428	$ -	$ 231,000	$ 1,748,262	$ 10,910,000	$ 5,267,034

Smart Grid Investment Grant DE-FOA-0000058A

ENVIRONMENTAL QUESTIONNAIRE

SDG&E has answered this questionnaire in good faith based upon our current understanding of the GridComm project as described in the accompanying Smart Grid Investment Grant application. However, SDG&E reserves the right to complete further analysis as it relates to environmental impacts and amend our responses if need be.

I. BACKGROUND

The Department of Energy (DOE) National Environmental Policy Act (NEPA) Implementing Procedures (10 CFR 1021) require careful consideration of the potential environmental consequences of all proposed actions during the early planning stages of a project or activity. DOE policy directs at the earliest possible stage in a project whether such actions will require preparation of an Environmental Assessment, an Environmental Impact Statement, or a Categorical Exclusion. To comply with these requirements, this Environmental Questionnaire must be completed for each proposed action to provide DOE with the information necessary to determine the appropriate level of NEPA review and documentation.

II. INSTRUCTIONS

Separate copies of the Environmental Questionnaire should be completed by the principal proposer and principal subcontractor(s) as needed to address the proposed project/activity. In addition, if the proposed project includes activities at different locations, an independent questionnaire should be prepared for each location. Supporting information can be provided as attachments.

In completing this Questionnaire, the proposer is requested to provide specific information and quantities, when applicable, regarding air emissions, wastewater discharges, solid wastes, etc., to facilitate the necessary review. The proposer should identify the location of the project and specifically describe the activities that would occur at that location. In addition, the proposer will be required to submit an official copy of the project's statement of work (SOW) or statement of project objective (SOPO) that will be used in the contract/agreement between the proposer and DOE.

III. QUESTIONNAIRE

A. PROJECT SUMMARY

1. Solicitation/Project Number: DE-FOA-0000058
2. Proposer and Subcontractors: San Diego Gas & Electric Company
3. Principal Investigator: Mike Calcagno
   Telephone Number: 619-260-4304
4. Project Title: GridComm Proposal
5. Duration: Jan. 2010 – Dec. 2011
6. Location(s) of Performance (City/Township, County, State): San Diego County, Calif.
   Orange County, Calif.
7. Identify and select checkbox with the predominant project work activities under Group A-7a, A-7b, or A-7c. A-7b

Group A-7a

☐ Routine administrative, procurement, training, and personnel actions. Contract activities/awards for management support, financial assistance, and technical services in support of agency business, programs, projects, and goals. Literature searches and information gathering, material inventories, property surveys; data analysis, computer modeling, analytical reviews, technical summary, conceptual design, feasibility studies, document preparation, data dissemination, and paper studies. Technical assistance including financial planning, assistance, classroom training,

public meetings, management training, survey participation, academic contribution, technical consultation, stakeholders surveys. Workshop and conference planning, preparation, and implementation which may involve promoting energy efficiency, renewable energy, and energy conservation.

Group A-7b

☒ Work does NOT involve new building/facilities construction and site preparation activities. This work typically involves routine operation, modification, and retrofit of existing utilities and transportation infrastructure, laboratories, commercial buildings/properties, offices and homes, test facilities, factories/power plants, vehicle test stands and components, refueling facilities, greenspace infrastructure, or other existing facilities.

Group A-7c

☐ Work or project activities typically involves major building or facility construction, site preparation; the installation, replacement, or major modifications of energy system prototypes and infrastructure, access right-of-ways and roads; utility, greenspace, and transportation infrastructure, vehicle test facilities; commercial buildings/properties, fuel refinery/mixing facilities, factories/power plants; and other types of energy efficiency/conservation related systems, structures, and facilities. This work may require new or modified regulatory permits, environmental sampling and monitoring requirements, master planning, public involvement, and environmental impact review.

☐ Other types of work or project activities not listed (please describe):

If all work activities related to this project can be classified and described within categories under item A-7a, it is a categorically excluded action. Proceed directly to Section IV CERTIFICATION BY PROPOSER, completing information and signatures as requested. The questionnaire is now complete and no additional information is required.

If project work activities are described under either item(s) A-7b, or A-7c.; then continue filling out questionnaire starting below with Question.A.8.

8. Summarize the objectives of the proposed work. List activities planned at the location as covered by this Environmental Questionnaire.

   Objectives are deployment of wireless communication system connecting all SDG&E grid assets and endpoints across San Diego County and southwestern Orange County. Activities involve routine operation, modification, and retrofit of existing utility communications infrastructure, commercial buildings/properties, offices and homes, test facilities, factories/power plants, and other existing facilities.

9. List all other locations where work would be performed by the primary contractor of the project and primary subcontractors.

   Project will install communications equipment on sites throughout the SDG&E service territory. Such sites already are used for this purpose and do not require modification.

10. Identify major project operation related materials and waste that would be used, consumed, and produced by this project or activity.

    No operations related materials or waste will be used, consumed or produced by this project.

11. Provide a brief description of the project location (physical location, surrounding area, adjacent structures). Project sites vary from urban to rural locations, indoors and outdoors.

Project locations will be on radio communications sites in urban, suburban and rural areas that are already approved and in use for this purpose. Endpoint devices will be installed on the existing electric system infrastructure as part of the infrastructure itself and will not require changes to the environment.

12. Attach a project site location map of the project work area.
Attached.

B. ENVIRONMENTAL IMPACTS

This section is designed to obtain information concerning environmental impacts and regulatory compliance of a proposed project. NEPA procedures require evaluations of possible effects (including land use, energy resource use, natural, historic and cultural resources, and pollutants) from proposed projects on the environment.

1. Land Use

a. Characterize present land use where the proposed project would be located.

☒ Urban	☒ Industrial	☒ Commercial	☐ Agricultural
☒ Suburban	☒ Rural	☒ Residential	☐ Research Facilities
☐ Forest	☐ University Campus	☐ Other	

b. Identify the total size of the facility, structure, or system and what portion would be used for the proposed project.

No new facilities will be constructed by this project. Either one or two equipment racks or cabinets will be installed at facilities that are already in use for this purpose. Endpoint devices will be installed on the electric system infrastructure itself and require no new facilities.

c. Describe planned construction, installation, and/or demolition activities, i.e., roads, utilities system right-of-ways, parking lots, buildings, laboratories, storage tanks, fueling facilities, underground wells, pipelines, or other structures.
☒ No construction would be anticipated for this project.
Note: Construction is not required. Communications equipment to be installed in and on existing facilities.

d. Describe how land use would be affected by operational activities associated with the proposed project.
☒ No land areas would be affected.

e. Describe any plans to reclaim areas that would be affected by the proposed project.
☒ No land areas would be affected.

f. Would the proposed project affect any unique or unusual landforms (e.g., cliffs, waterfalls, etc.)?
☒ No ☐ Yes (describe)

g. Would the proposed project be located in or near local, state, or federal parks; forests; monuments; scenic waterways; wilderness; recreation facilities; or tribal lands?
☐ No ☒ Yes (describe)

The purpose of the project is to enable and advance the providing of Smart Grid services across the SDG&E service territory. Since SDG&E provides electric services in the above-referenced areas, there will be equipment located in these areas. However, as to installations on the electric infrastructure, they will be in locations where the electric assets already are authorized through existing rights of way, easements, or other appropriate authority.

Likewise, the communications infrastructure will, by necessity, use radio sites that may also be located in the referenced areas. The proposed project intends to use only existing sites that are already in use for this purpose. No development of new sites are planned or projected for this project.

If project work activities falls under item A-7b; then proceed directly to question D.6 (Atmospheric Conditions/Air Quality) and continue to fill out questionnaire.

If project work falls under item A-7c; then proceed directly below to question D.2 (Construction Activities and/or Operations) and continue to fill out questionnaire.

2. Construction Activities and/or Operation

a. Identify project structure(s), power line(s), pipeline(s), utilities systems(s), right-of-way(s) or road(s) that will be constructed and clearly mark them on a project site map or topographic map as appropriate.
☒ None

b. Would the proposed project require the construction of waste pits or settling ponds?
☒ No ☐ Yes (describe and identify location, and estimate surface area disturbed)

c. Would the proposed project affect any existing body of water?
☒ No ☐ Yes (describe)

d. Would the proposed project impact a floodplain or wetland?
☒ No ☐ Yes (describe)

e. Would the proposed project cause runoff/sedimentation/erosion?
☒ No ☐ Yes (describe)

3. Vegetation and Wildlife Resources

a. Identify any State- or Federal-listed endangered or threatened plant or animal species affected by the proposed project.
☒ None

b. Would any foreign substances/materials be introduced into ground or surface waters, soil, or other earth/geologic resource because of project activities? How would these foreign substances/materials affect the water, soil, and geologic resources.
☒ No ☐ Yes (describe)

c. Would any migratory animal corridors be impacted or disrupted by the proposed project?
☒ No ☐ Yes (describe)

4. Socioeconomic and Infrastructure Conditions.

a. Would local socio-economic changes result from the proposed project?
☐ No ☒ Yes (describe)

SDG&E plans to employ local resources for the fulfillment of various services in support of the build out and ongoing support of the GridComm infrastructure. Furthermore, SDG&E plans to utilize the services of PUC certified diverse business enterprises and/or service disabled veteran business enterprises.

b. Would the proposed project generate increased traffic use of roads through local neighborhoods, urban or rural areas.?
☒ No ☐ Yes (describe) While some vehicle traffic will be required to access each radio site, overall, the automation enabled by the system will have the impact of reducing truck rolls required for maintenance.

c. Would the proposed project require new transportation access (roads, rail, etc.)? Describe location, impacts, costs.
☒ No ☐ Yes (describe)

d. Would the proposed project create a significant increase in local energy usage?

☒ No ☐ Yes (describe)

5. Historical/Cultural Resources

a. Describe any historical, archeological, or cultural sites in the vicinity of the proposed project; note any sites included on the National Register of Historic Places.
☒ None

b. Would construction or operational activities planned under the proposed project disturb any historical, archeological, or cultural sites?
☒ No planned construction ☐ No historic sites ☐ Yes (describe) ☐ No Impact (Discuss)

c. Would the proposed project interfere with visual resources (e.g., eliminate scenic views) or alter the present landscape?
☒ No ☐ Yes (describe)

For all proposed project work activities identified under item A-7b, respond to item D6 directly below and continue filling out environmental questionnaire.

6. Atmospheric Conditions/Air Quality

a. Identify air quality conditions in the immediate vicinity of the proposed project with regard to attainment of National Ambient Air Quality Standards (NAAQS). This information is available under the NAAQS tables from the U.S. EPA Air and Radiation Division.

	San Diego Air Basin			South Coast Air Basin	
	Attainment	Non-Attainment		Attainment	Non-Attainment
O_3 - 1 Hour	☒	☐	O_3 - 1 Hour	☐	☒
O_3 – 8 Hour	☐	☒	O_3 – 8 Hour	☐	☒
SO_x	☒	☐	SO_x	☒	☐
PM-2.5	☒	☐	PM-2.5	☐	☒
PM-10	☒	☐	PM-10	☐	☒
CO	☒	☐	CO	☒	☐
NO_2	☒	☐	NO_2	☒	☐
Lead	☒	☐	Lead	☒	☐

Source: http://www.epa.gov/region09/air/maps/maps_top.html

b. Would proposed project require issuance of new or modified major air quality permits?
☒ No ☐ Yes (describe)

c. Would the proposed project be in compliance with the National Emissions Standards for Hazardous Air Pollutants?
☐ No (explain) ☒ Yes

d. Would the proposed project be classified as either a New Source or a major modification to an existing source?
☒ No ☐ Yes (describe)

e. Would the proposed action be in compliance with the New Source Performance Standards?
☒ Not Applicable ☐ No (explain) ☐ Yes

f. Would the proposed project be subject to prevention of significant deterioration air quality review?
☒ Not applicable ☐ No (Explain) ☐ Yes (describe)

g. What types of air emissions, including fugitive emissions, would be anticipated from the proposed project?
There will be no emissions generated by the operation of the equipment installed by this project.

h. Would any types of emission control or particulate collection devices be used?
☒ No ☐ Yes (describe, including collection efficiencies)

i. If no control devices are used, how would emissions be vented?
There will be no emissions generated by the operation of the equipment installed by this project.

7. Hydrologic Conditions/Water Quality

a. What is the closest body of water to the proposed project area and what is its distance from the project site?
Various storage reservoirs are within several miles of the planned installations as is the Pacific Ocean.

b. What sources would supply potable and process water for the proposed project?
Potable or process water is not required for this project.

c. Quantify the daily or annual amount of wastewater that would be generated by the proposed project.
No wastewater will be generated by this project.

d. Identify the local treatment facility that would receive wastewater from the proposed project.
☒ No discharges to local treatment facility

e. Describe how wastewater would be collected and treated.
None generated.

f. Would any run-off or leachates be produced from storage piles or waste disposal sites?
☒ No ☐ Yes (describe source)

g. Would project require issuance of new or modified water permits to perform project work or site development activities?
☒ No ☐ Yes (describe)

h. Where would wastewater effluents from the proposed project be discharged?
☒ No wastewater produced

i. Would the proposed project be permitted to discharge effluents into an existing body of water?
☒ No ☐ Yes (describe water use and effluent impact)

j. Would a new or modified National Pollutant Discharge Elimination System (NPDES) permit be required?
☒ No ☐ Yes (describe)

k. Would the proposed project adversely affect the quality or movement of groundwater?
☒ No ☐ Yes (describe)

8. Solid and Hazardous Wastes

a. Identify and estimate major nonhazardous solid wastes that would be generated from the project. Solid wastes are defined as any solid, liquid, semi-solid, or contained gaseous material that is discarded or has served its intended purpose, or is a manufacturing or mining by-product (40 CFR 260, Appendix I).

No non-hazardous solid wastes would be generated by this project.

b. Would project require issuance of new or modified solid waste and/or hazardous waste related permits to perform project work activities?

☒ No ☐ Yes (explain)

c. How and where would solid waste disposal be accomplished?
☐ On-site (identify and describe location)
☐ Off-site (identify location and describe facility and treatment)
N/A

d. How would wastes for disposal be transported?
N/A

e. Describe and estimate the quantity of hazardous wastes (40 CFR 261.31) that would be generated, used, or stored under this project.
☒ None

f. How would hazardous or toxic waste be collected and stored?
☒ None used or produced

g. If hazardous wastes would require off-site disposal, have arrangements been made with a certified TSD (Treatment, Storage, and Disposal) facility?
☒ Not required ☐ Arrangements not yet made ☐ Arrangements made with a certified TSD facility (identify):

C. DESCRIBE ANY ISSUES THAT WOULD GENERATE PUBLIC CONTROVERSY REGARDING THE PROPOSED PROJECT.
☒ None

D. WOULD THE PROPOSED PROJECT PRODUCE ADDITIONAL DEVELOPMENT, OR ARE OTHER MAJOR DEVELOPMENTS PLANNED OR UNDERWAY, IN THE PROJECT AREA?
☒ No ☐ Yes (describe)

E. SUMMARIZE THE SIGNIFICANT IMPACTS THAT WOULD RESULT FROM THE PROPOSED PROJECT.
☒ None (provide supporting detail) ☐ Significant impacts (describe)

IV. Categorical Exclusion (CX) Project Identification

A. List any Categorical Exclusions that would apply to the project and a short summary of the project activities that would apply to the CX.

For example;

Categorical Exclusion B.4.6, Additions or modifications to electric power transmission facilities that would not affect the environment beyond the previously developed facility area including, but not limited to, switchyard rock grounding upgrades, secondary containment projects, paving projects, seismic upgrading, tower modifications, changing insulators, and replacement of poles, circuit breakers, conductors, transformers, and crossarms" would encompass the following proposed activities: [applicant description].

Facility Operations -B.1

B1.7 Acquisition/installation/operation/removal of communication systems, data processing equipment

Safety and Health- B.2

B2.2 Installation of, or improvements to, building and equipment instrumentation (including, but not limited to, remote control panels, remote monitoring capability, alarm and surveillance systems, control systems to provide automatic shutdown, fire detection and protection systems, announcement and emergency warning systems, criticality and radiation monitors and alarms, and safeguards and security equipment).

B. Are any portions or the proposed scope of work or activities that impact workers, the public or the environment, not included in the CX (s) identified above?

☐ Yes

☒ No (Explain)

C. Would the proposed action violate any ES& H requirements, or any other actions listed at 10 CFR Part 1021 Subpart D (B) Conditions that are Integral Elements of the Classes of Actions in Appendix B?

☐ Yes

☒ No (Explain)

V. CERTIFICATION BY PROPOSER

I hereby certify that the information provided herein is current, accurate, and complete as of the date shown immediately below.

SIGNATURE: _____ DATE: _____ / _____ / _____
month day year

TYPED NAME: _____

TITLE: _____

ORGANIZATION: _____

SDG&E Site Locations (Type Classification)
San Diego County and southwest Orange County