

**MEETING NOTICE**

**STUDY SESSION**

Of The

**TRAVERSE CITY LIGHT AND POWER BOARD**

Will Be Held On

**TUESDAY, December 15, 2015**

At

**5:15 p.m.**

In The

**TRAINING ROOM**

(2<sup>nd</sup> floor, Governmental Center)  
400 Boardman Avenue

Traverse City Light and Power will provide necessary reasonable auxiliary aids and services, such as signers for the hearing impaired and audio tapes of printed materials being considered at the meeting, to individuals with disabilities at the meeting/hearing upon notice to Traverse City Light and Power. Individuals with disabilities requiring auxiliary aids or services should contact the Light and Power Department by writing or calling the following.

Stephanie Tvardek,  
Administrative Assistant  
1131 Hastings Street  
Traverse City, MI 49686  
(231) 922-4940 ext. 201

**AGENDA**

Roll Call

1. Introduction of new Manager of Engineering and Operations, Pete Schimpke. (p. 2)
2. Discussion of Advanced Metering Infrastructure (AMI). (p. 6)
3. Public Comment.

Traverse City Light and Power  
1131 Hastings Street  
Traverse City, MI 49686  
(231) 922-4940

Posting Date: 12-11-15  
4:00 p.m

Peter J. Schimpke, P.E.

**WORK EXPERIENCE:**

**APRIL 2011- NOVEMBER 2015 - MICHIGAN PUBLIC POWER AGENCY (MPPA)  
MANAGER OF COMPLIANCE AND ENGINEERING**

Same as Manager of Engineering Services (below), except for load forecasting and power pool billing (pool terminated), plus the additional duties of: Project Manager for MPPA's natural gas supply, Project Manager for MPPA's Energy Efficiency Program as mandated under PA 295; Project Manager for the AMP Fremont Energy Center (AFEC) & member of the AFEC Fuel Subcommittee; responsible for the development, updating, implementation and overall management of MPPA's and member city's reliability standards compliance program to ensure full compliance with standards of the Federal Energy Regulatory Agency (FERC), North American Electric Reliability Corporation (NERC), and Reliability First Corporation (RFC); serve as the primary contact for existing MPPA joint generation projects and lead on new generation projects, development of MPPA's combustion turbine bid price into the MISO day ahead market.

**MARCH 2007-MARCH 2011-MICHIGAN PUBLIC POWER AGENCY (MPPA)  
MANAGER OF ENGINEERING SERVICES**

Identify and prepare assessments of potential power supply resources; perform economic, feasibility, and technical studies for power supply resource (coal, natural gas, wind, landfill gas, biomass) alternatives for both ownership and purchase power agreement options; review, analyze, and negotiate confidentiality agreements, conceptual terms and conditions agreements, ownership/partnership agreements, and long term purchase power agreements as required; produce long term demand and energy forecasts for member cities and develop conceptual resource plans to meet load requirements; assess local MISO locational marginal pricing (LMP) and produce ongoing long range forecasts for LMP in the Michigan area; produce long term price forecasts for MPPA's share of the Belle River and Campbell 3 coal plants, generic coal, generic combined cycle, and generic peaking plants, natural gas, coal, and Michigan renewable energy credits; review & analysis of FERC filings and certain MPSC and State of Michigan documents; provide informal supervision and direction to more junior members of the Engineering Staff; represent MPPA in the MISO Transmission Owner (TO) group, represent MPPA at other industry group meetings; provide oversight of the Power Pool Project billing process; responsible for NERC compliance for standards as the pertain to Resource Planners; serve as a technical resource for MPPA members; serve as a cost of service/rates resource for MPPA members; produce member Renewable Portfolio Plans for Michigan PA 295 compliance; administer the Michigan Renewable Energy Credit (MIRECS) program for MPPA and member cities; and staff, supervise a small engineering staff.

**MAY 2005 – MARCH 2007-LANSING BOARD OF WATER & LIGHT (BWL)  
MANAGER, RESOURCE & SYSTEM PLANNING**

Direct, plan, develop, manage, monitor and lead personnel engaged in the direct and related activities of Resource/T&D Planning, Standards, & Marketing including the BWL Integrated Resource Plan, production cost modeling (using UPLAN software) economic development, conservation, fuel cost forecasting, market analysis/strategies, load forecasting, new technologies, construction standards, material standards, T&D master plans, system studies, project management, feasibility studies for alternative energy systems, records management group (GIS, maps, drawings, specifications) and conceptual designs for the electric, water, steam, and chilled water utilities. Responsible for the development of Requests for Proposals and proposal analysis. Responsible for practices and implementation of infrastructure and programs required to meet electric, water, steam, and chilled water utility needs. Reports to and advises senior management on issues, needs, and plans. Reviews and recommends department operating and capital budget for approval. Administer and monitor monthly the budgets of development capital, operations and projects; and reports variances to senior management. Develop and maintain employee skills, knowledge and performance.

Interpret, implement, and coordinate major goals, programs, and activities toward the accomplishment of division and department objectives. Maintains a professional level of requisite knowledge in areas of responsibility. Establish and maintain department procedures for cost effective, reliable, and safe issues and technology. Prepares and maintains reports reflecting department operations or writes special reports as required. Support all company initiatives. Represented the BWL on the Michigan Public Service Commission's Capacity Need Forum & 21<sup>st</sup> Century Plan Project.

**JUNE 2000 – MAY 2005- CHERRYLAND ELECTRIC, GRAWN, MICHIGAN**

- November 2002 to May 2005 – Manager of Engineering & Operations
- August 2002 to November 2002 – Manager of Engineering
- June 2000 – August 2002 – System Planner

Project Manager for the AMR Project; Project Manager for the Radio/Communication Project; Member of the Cherryland Electric Cost of Service Study team; perform rate comparison studies for Key Accounts; development of special retail customer service contracts, electric energy audits, and member of the Customer Key Accounts team.

Management of 23 employees plus up to 25 contract employees, a capital budget of approximately \$3.5 million and an O&M budget of \$1.8 million; schedule work; management of storm restoration, manage new large customers accounts until they are energized; lead the reliability improvement initiative; respond to customer requests and inquiries; and responsible for the operation, maintenance, and capital additions of the Cherryland transportation fleet as of January 2004.

Responsible for: preparation of the analysis of the strengths & weaknesses of Cherryland competitors and development of a strategic plan and strategy to address this competition for inclusion in the yearly Cherryland Business Plan; Cherryland work plan construction budget (approximately \$2 million); Cherryland power quality & preventative maintenance program (approximately \$700,000); Cherryland GIS and mapping; construction standards based on RUS standards and NESC; engineering studies using Milsoft Engineering Analysis (Windmil) software plus Milsoft Lightable software.

Responsible for: financial evaluation of major project alternatives using net cash flow analysis and revenue requirement analysis and utilizing net present value techniques; preparation of the Year 2000 Cherryland Electric revenue neutral rate case (Case No. U-13071) filing and coordination of Cherryland's responses throughout the regulatory process; development of special electric service rates for competitive situations; developed a comprehensive project financial analysis computer spreadsheet estimating the cost of a 400 MW coal fired power plant, natural gas peakers, diesel peakers, and smaller distributed generation options; union contract negotiations, and typical duties of a Cooperative System Engineer.

**AUGUST 1998 TO JUNE 2000 – CTM ASSOCIATES, TRAVERSE CITY, MICHIGAN  
CONSULTING ELECTRICAL ENGINEER**

Responsible for the design, specification, and AutoCAD drawing preparation for electrical power, lighting, and fire alarm design for commercial, industrial, government, and institutional clients. Strict adherence to the National Electrical Code and other applicable codes required. Monitored construction and supplied support to electrical contractors. Responsible for marketing the electrical services of the company and interfacing with electric utilities on behalf of the customer.

**FEBRUARY 1998 TO AUGUST 1998 - WOLVERINE POWER SUPPLY COOP., CADILLAC, MI.  
RATES AND PLANNING MANAGER**

Responsible for the development, presentation, and justification of all cooperative electric wholesale and retail work. Responsible for the preparation of long range plans for generation, transmission, and purchased power. Job duties include heavy emphasis on specialized financial analysis and contract writing and negotiation. Developed a comprehensive project financial analysis computer spreadsheet.

**OCTOBER 1997 TO FEBRUARY 1998 - THE DESIGN FORUM, GRAND RAPIDS, MICHIGAN  
ELECTRICAL ENGINEER**

Responsible for the design, specification, and computer aided design drawing preparation for government and commercial projects. Design includes electric power system, lighting, fire alarm, sound system, and data communication layout. Strict adherence to the National Electrical Code and other applicable codes required. Duties also include monitoring construction and providing technical support to electrical contractors. In addition, responsible for soliciting additional work in new disciplines for the Company to diversify the Company's portfolio of services.

**FEBRUARY 1995 TO SEPTEMBER 1997 - TENNECO PACKAGING, MANISTEE, MICHIGAN -  
PROJECT MANAGER**

Responsible for project cost estimates, project schedules and coordination, project implementation, energy saving projects, electrical design upgrades, new installations, and managing contract engineers. Projects include electrical, steam, compressed air, and piping. Provide electrical engineering support for maintenance. Also, prepared RFP for co-generation, analyzed results, met with bidders and financial investor to discuss off balance sheet financing and off credit financing. Developed a short list of bidders and submitted project to corporate office. In addition, act as Mill contact for the State of Michigan retail-wheeling program; supervised 11 electricians and 4 instrumentation technicians. Responsible for repairing and maintaining the plant's electrical system, designing low cost electrical improvements, implementing improvements to the system, replacing and/or modifying control circuits. Primary responsibility was to keep the mill running from an electrical standpoint. Duties include engineering electrical improvements for voltages ranging from 4,160 volts down to 120 volts. Emphasis placed on safety improvements and corrections of National Electric Code violations. Developed an electrician's apprentice training program.

**MAY 1992 TO JULY 1994 - DAYTON POWER & LIGHT COMPANY, DAYTON, OHIO  
MANAGER OF ENGINEERING SERVICES**

Managed a department of approximately 42 full time employees, 4 part time employees, and numerous consulting engineering firms. Responsibilities included: protective relay control, electric distribution planning, electric distribution standards, substation design, transmission line design, underground network design, drafting, electric equipment specification, budget development & control, feasibility studies, financial analysis, training of personnel, continuous improvement plans, storm restoration management, and strategic planning. Project Manager of an \$11.7 million transmission and distribution project. Also, responsible for the Company research & development program, construction work measurement system, distribution reliability project, and power quality program.

**FEBRUARY 1990 TO APRIL 1992 - AMERICAN MUNICIPAL POWER-OHIO (AMP-OHIO),  
WESTERVILLE, OHIO. DIRECTOR OF ENGINEERING, POWER SUPPLY, AND PLANNING**

Managed a group of employees responsible for: performing various economic analyses including special project financing options and legal entity structure to obtain tax-exempt financing, planning for long term power supplies for AMP-Ohio members, evaluating power supply options, obtaining power supplies through the writing and negotiation of contracts, , developing the AMP-Ohio long term power forecast for internal use and to meet Commission requirements, administering consultant contracts, providing protective relay engineering for the company power plant, and performing various engineering, financial, and special rate design services for AMP-Ohio members. Also, member of the Board of Directors of the Great Lakes Electric Consumers Association (GLECA), and Project Manager for the: Belleville Hydro Project, Western Transmission Project, and OMEGA Joint Ventures 1, 2, & 3. Made several presentations to large groups of people at conferences and city councils.

**ADDITIONAL POSITIONS:**

Resource Management International (RMI): Principal Consultant

Arizona Public Service: Supervisor of System Protection, Metering, & Automated Control  
Supervisor of Capital Budgets & Forecasts  
Power Contracts Engineer  
Telecommunications Engineer  
Relay/Design Engineer

Wisconsin Public Service: Relay/Design Engineer  
Distribution Planning Engineer

**EDUCATION:**

MBA: Arizona State University  
Tempe, Arizona 85281  
January, 1981 - May, 1982  
Emphasis in Finance  
Sigma Iota Epsilon Honor Society

BSEE: Michigan Tech University  
Houghton, Michigan, 49931  
August, 1973 - May, 1978  
Emphasis in power/machinery  
Eta Kappa Nu Honor Society

**AWARDS/COMMUNITY SERVICE:**

- Representation of Company at various after hour events.
- Taught Corporate Finance for Davenport College at West Shore Community College
- Registered Professional Engineer (PE) in Michigan
- Coaching of Girl's and Boy's varsity basketball.
- Coached various youth athletics for several years
- Hobby is exercise / weight lifting
- Member of the "Wildest Club in Town" in Phoenix, Arizona, Worked for the Phoenix Zoo and put on the annual Black Tie Ball fundraiser.
- Completed APPA Cost of Services Classes
- Trained in PowerWorld power system analysis for steady state and transient analysis
- Trained in Milsoft WindMil and LightTable



GE Energy  
Digital Energy

Grid IQ™  
Solutions as a Service

# Advanced metering solutions Advancing TCLP's Strategic Plan

December 15, 2015



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# Introduction and Background



- Over 100 yrs old
- Safety, reliability
- Low rates, transparency
- Exceed customer expectations



- Over 130 yrs old
- Reliability is high priority (first UL rated meter)
- Over 15MM smart meters installed
- "SaaS"- solutions as a service created for Munis



- Founded over a decade ago
- Over 20MM connected devices
- Over 150 ecosystem of partners
- Public company on NYSE



# Working with GE Grid IQ Team

- GE.....
- is a partner, not just a supplier
- provides municipal utilities with a turn key solution for Electric and Water
- partners with best in class complimentary solutions: Silver Spring Networks
- Has over 100 years of innovation
- deployed over 50+ million advanced meters
- Is the first meter manufacturer to offer UL-certified electronic meter
- Has the last American-made smart meter available



# Advanced Metering Infrastructure (AMI) & TCLP

## TCLP becomes a "Tech City":

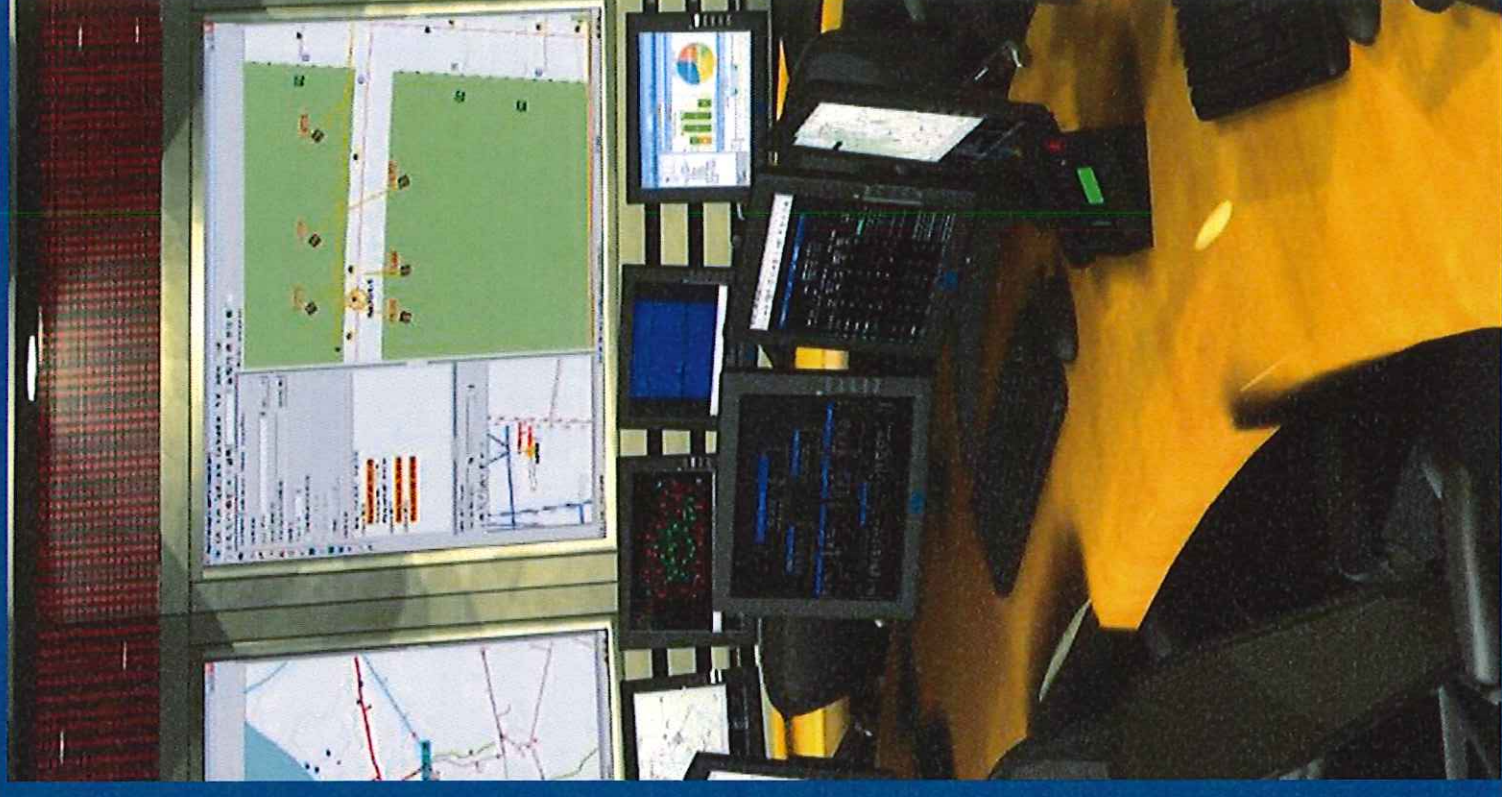
Intelligent infrastructure that can monitor, analyze, predict, optimize and report on its own condition improving safety and reliability. The ability to make more informed decisions based on real time data

## Providing:

Efficiencies leading to cost reductions, allowing re-investments into economic development programs

## Enabled by:

1. Smart Devices
2. Smart Communications
3. Smart Software





# GE's Grid IQ Connect SaaS AMI: Best in Class Solution

## Network

Grid IQ SaaS offers Silver Spring's networking with powerful technology.



## Metering

Market leading GE electric meters & Badger Meter water meters.



## Software

Grid IQ Hosted SaaS for AMI, and integrates with Utility billing/CIS



## Meter Data Mgmt

Grid IQ Connect supports numerous choices for Meter Data Management Systems. GE provides pre-built interfaces to market leading CIS systems.



Training, Project Management, Implementation, Integration



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# Traverse City & Grid Modernization

## Hurdling the gap

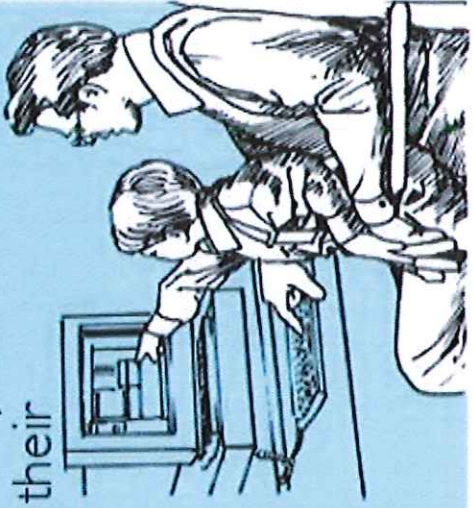


Many municipalities  
have meters over 30  
years old



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That moment when you use your parents' desktop computer, and your child swipes their finger across the monitor's screen.



someecards  
user card

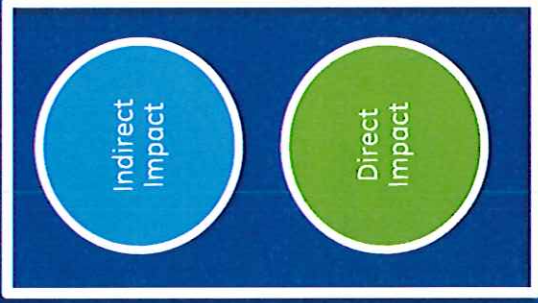
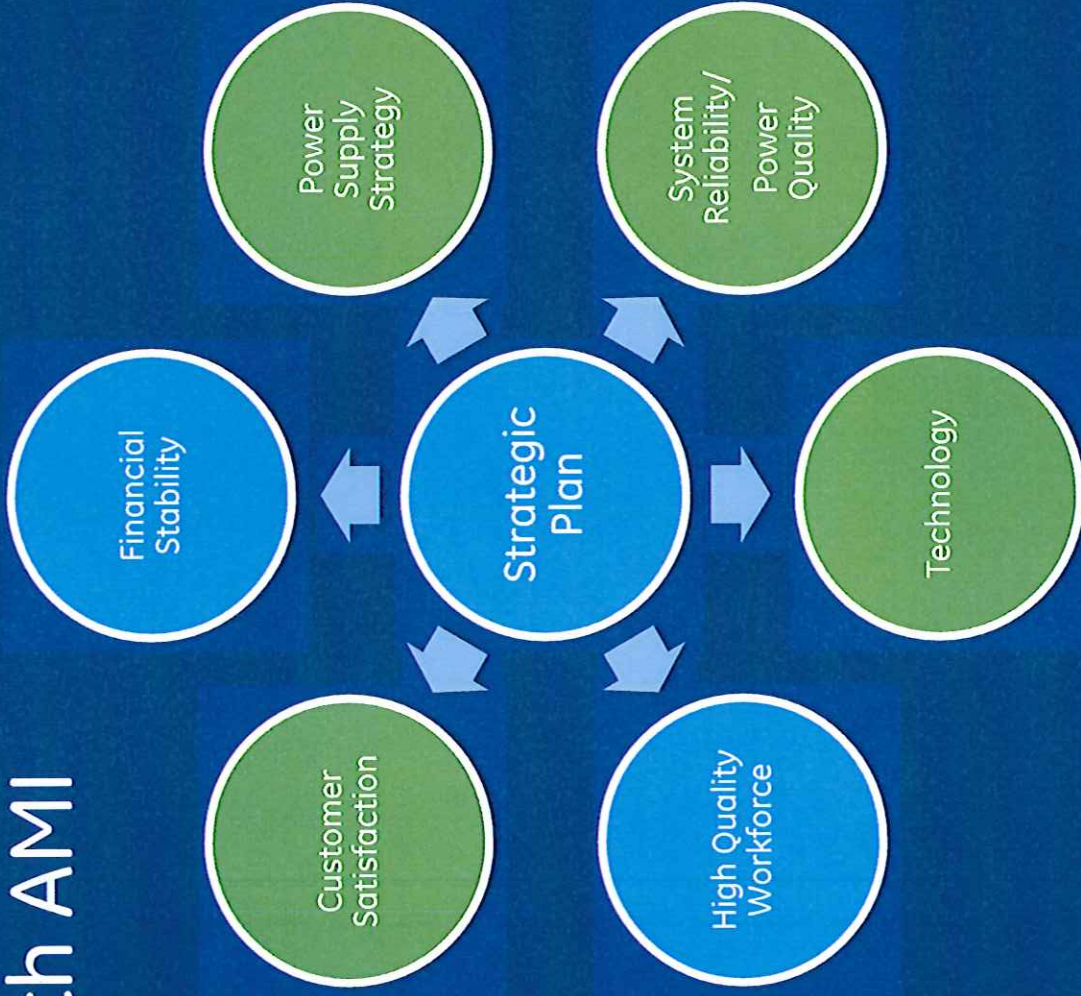
An illustration showing a man and a young child sitting at a desk with a desktop computer. The child is pointing at the monitor screen, and the man is looking on. The scene is drawn in a simple, sketchy style.

## Technology savvy generation





# TCLP's Strategic Plan Aligns with AMI



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# Technology

City-wide communications platform  
Reliable, scalable, proven



Phase	Goal	Benefits
1	<ul style="list-style-type: none"> <li>Deploy Communications Network to Enable Automated Reading of <u>Electric and Water Meter</u></li> <li>Enable Remote Service Disconnect and Re-connections</li> <li>Deploy Customer Portal</li> </ul>	<ul style="list-style-type: none"> <li>Reduced Truck Rolls</li> <li>Elimination of meter Reading Labor Costs</li> <li>Customer visibility to Usage and Energy efficiency improvements</li> <li>Deploy Common Platform for future Phases</li> </ul>
2	<ul style="list-style-type: none"> <li>Deployment of Communications to Distribution Devices</li> <li>Integration of AMI into OMS System</li> </ul>	<ul style="list-style-type: none"> <li>Enhanced Capital Efficiency by Directing Investment to Highest ROI Initiatives</li> <li>Improved SAIFI, CAIDI</li> <li>Improved Outage Response</li> </ul>
3	<ul style="list-style-type: none"> <li>Deploy Smart Utility Applications, e.g., TOU rates, Pre-pay, Demand Response, VVO</li> <li>Deploy Smart City Applications. e.g., Street Light Control, Traffic Controls,</li> </ul>	<ul style="list-style-type: none"> <li>Improved Customer satisfaction</li> <li>Improved Energy Efficiency</li> <li>Forecasting rate increases</li> <li>Increasing economic competitiveness</li> </ul>
4	<ul style="list-style-type: none"> <li>Stand Ready to Respond to Other Challenges that Emerge</li> </ul>	<ul style="list-style-type: none"> <li>Open standards, and future proof</li> </ul>

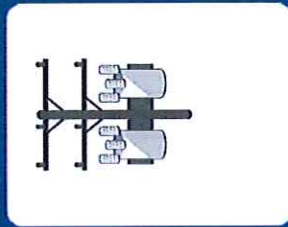


# Silver Spring Networks Solutions Breadth



**AMI  
OPERATIONS**

- ELECTRICITY
- GAS
- WATER
- NON-TECHNICAL LOSS
- PREPAY



**GRID  
RELIABILITY**

- FLISR
- VOLTAGE OPTIMIZATION
- NETWORK MONITORING
- PV & RENEWABLE INTEGRATION



**DEMAND  
RESPONSE**

- DIRECT LOAD CONTROL
- PRICE RESPONSE
- ENERGY EFFICIENCY



**CUSTOMER  
ENGAGEMENT**

- CUSTOMER IQ
- MARKETING SERVICES



**ACTIONABLE  
INSIGHTS**

- SILVERLINK INSIGHTS SERVICE



**ENABLING  
SMART CITIES**

- STREET LIGHTS
- TRAFFIC CONTROL
- NOISE SENSORS
- ENVIRONMENT SENSORS



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# Further Benefits With Enhanced Applications

### SOFTWARE

EMC, CLEVEST, SIEMENS, Itron, Oracle, EcoLogic, HITACHI

### ADVANCED METERING

eMeter, Oracle, Landis+Gyr, Itron, Ecologic, Clevest, others

### LIGHTING & CONTROL

OSRAM, DL, SELC, APANET, PHILIPS, THORN, AMKO, others

### DEMAND-SIDE MANAGEMENT

BELKIN, Entek, comerge, others

### DISTRIBUTION AUTOMATION

SEL, ABB, SIEMENS, GridSense, others

### LIGHTING DEPLOYMENT

SJA, SECE, SPIE, TELVENT, others



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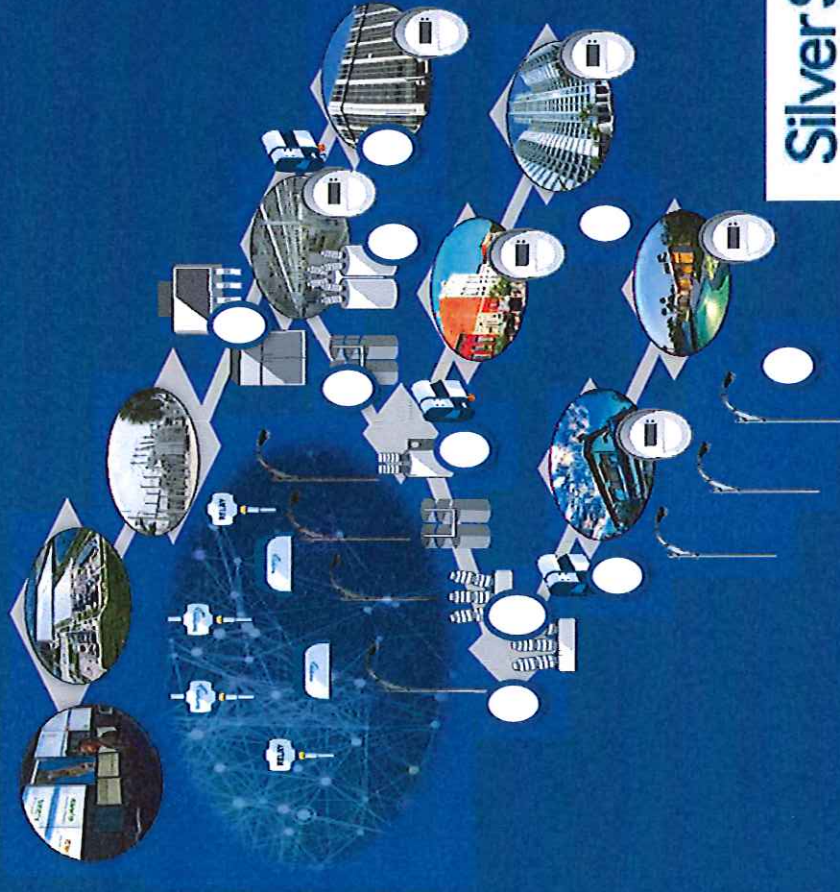


# Case Study: FPL



No other company in the industry has ever operated large scale AMI, DA, DR, Street lighting apps on one network together!

- Controllers
- Automated Feeder Switches
- Teaming Reclosers
- Fault Current Indicators
- Voltage and Current Sensors
- Transformer Monitors
- Commercial and Industrial Meters
- Residential Meters
- LED street lighting



Networked city lighting



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# Multi-application Deployments

## Range from 10,000 to 5,200,000 Customers



Indianapolis, IN - 10,000 meters  
Full DA Deployment



Leesburg, FL - 20,000 customers  
AMI Only, Fully Deployed in 2011



Guelph, ON, Canada - 50,000 customers  
TOU pricing, Converged AMI/DA  
deployment



60,000 electric, gas and water endpoints



Modesto, CA - 115,000 customers  
AMI Completed in 2011, Initiating DA & DR



South Bend IN - 132,000 meters  
Full AMI and DA Deployment, In-service 4 years



134K AMI meters,  
Added Demand Response



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# Multi-application Deployments

Range from 10,000 to 5,200,000 Customers



300,000 electric, gas and water endpoints



Sacramento, CA - 595,000 customers  
AMI Completed 2012, Full DA, TOU/CCP Pricing



Oklahoma City, OK - 766,000 customers  
AMI 97% Complete, 50K DR Customers,  
TOU pricing



San Antonio, TX 800,000 customers  
Converged Network for Electricity, Gas,  
DA, and DR



Deployment Underway  
Florida-wide, 4M meters  
6K DA endpoints, 75K street lights



5.2 M meters  
Trialing advance applications, TOU Rates





# Financial Stability



## Advanced Meter Infrastructure (AMI)

- 1) Reduce truck roll for all meter reads and remote connect/disconnects
- 2) Revenue improvement with meter accuracy and theft detection
- 3) Outage and leak detection
- 4) Improved billing and customer service

Financial  
Stability

Enable future applications and align with strategy

- Time of use
- Voltage Optimization
- Load Control
- Street Light Control

Long term benefits

- Financial &
- Operational

Short term benefits

- Financial &
- Operational



# Multi App Network Is Key To Value

\$50 per premise per year X 130m premises = 6.5B in North America of known documented benefits



Average US Smart Grid Business Case (SilverSpring Estimates)  
 \$/customer, Electric only, PVRR over 20 years

Benefit/Cost Payback ratio

years

ratio

years

ratio

years

ratio

years

ratio

years

ratio

years

ratio

years

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ratio

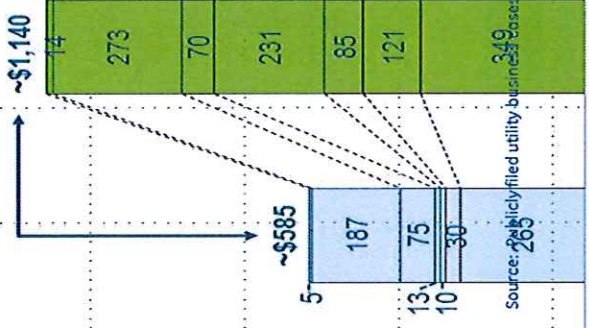
years

ratio

years

ratio

years



- A** Advanced Metering Infrastructure
- B** Demand Response
- C** Energy Efficiency
- D** Distribution Automation - CVR<sup>2</sup>
- E** Distribution Automation - Reliability<sup>1</sup> (does not include benefits to the economy)
- F** Streetlights
- G** Critical Operations Protector (COP)

Source: Publicly filed utility business cases and SilverSpring estimates

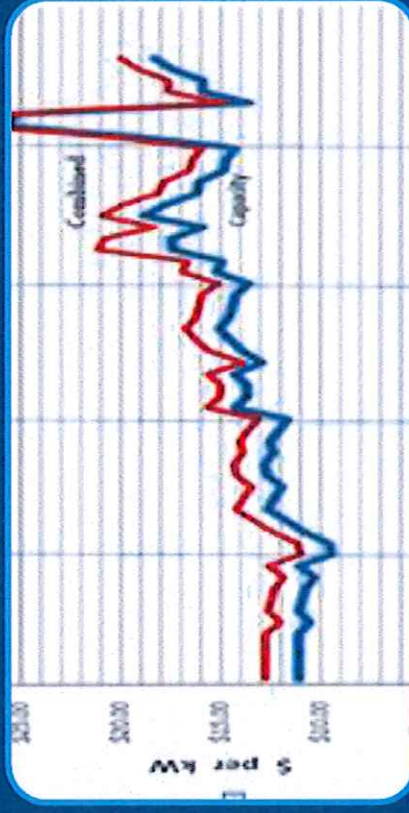




# Power Supply Stability

Power  
Supply  
Strategy

Today: Peak demand based on estimates  
With AMI: Peak demand based on actual data



## Improve efficiency in energy purchases

- 1) AMI data provides measurements at customer location at frequent intervals = knowing when real peaks occur
- 2) Provides better forecasting capabilities
- 3) Optimize strategy for energy purchases



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Silver Spring  
NETWORKS



# System Reliability and Power Quality

System Reliability/  
Power Quality



## Reduce system losses

- 1) AMI
- 2) Transformer management
- 3) Volt/Var optimization



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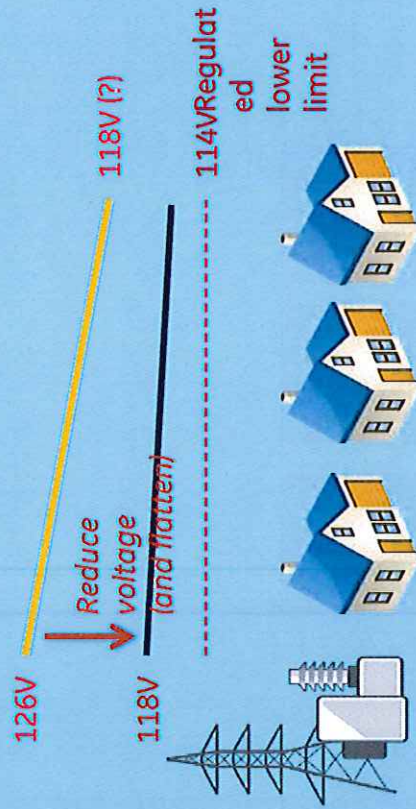




# Significant Savings from VVO / CVR

## Description

- Monitor voltage at end of line
- Reduce (and flatten) voltage from substation to reduce excess power delivered to customers, while meeting regulated lower limit

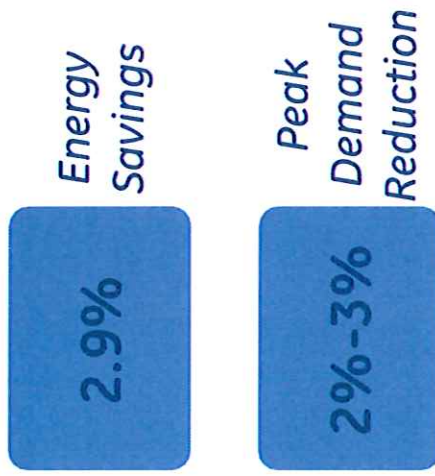


\* Annual projected benefit of \$30 - \$40 million based on Silver Spring estimate. From AEP initial energy savings results. Source: AEP published results



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## Initial Results\*

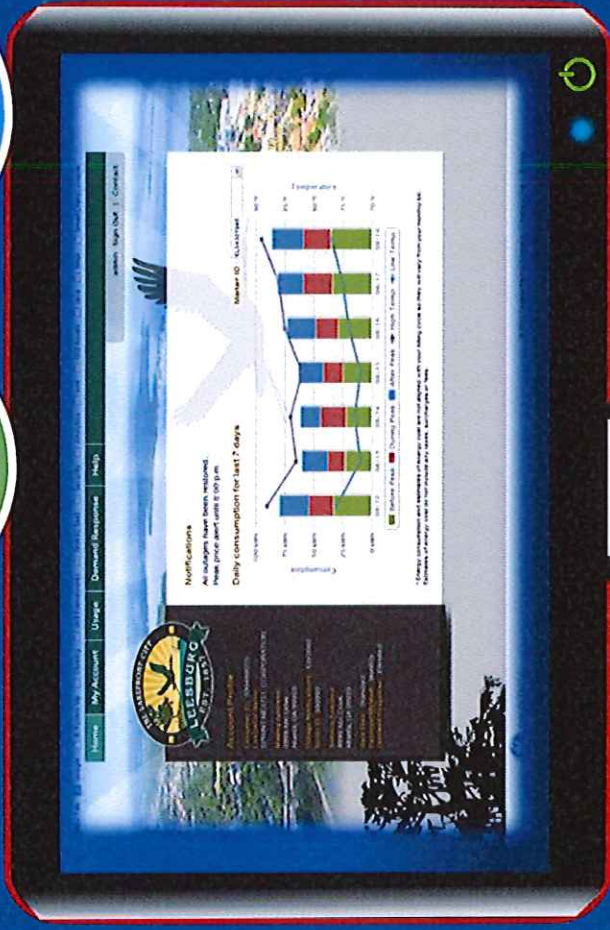
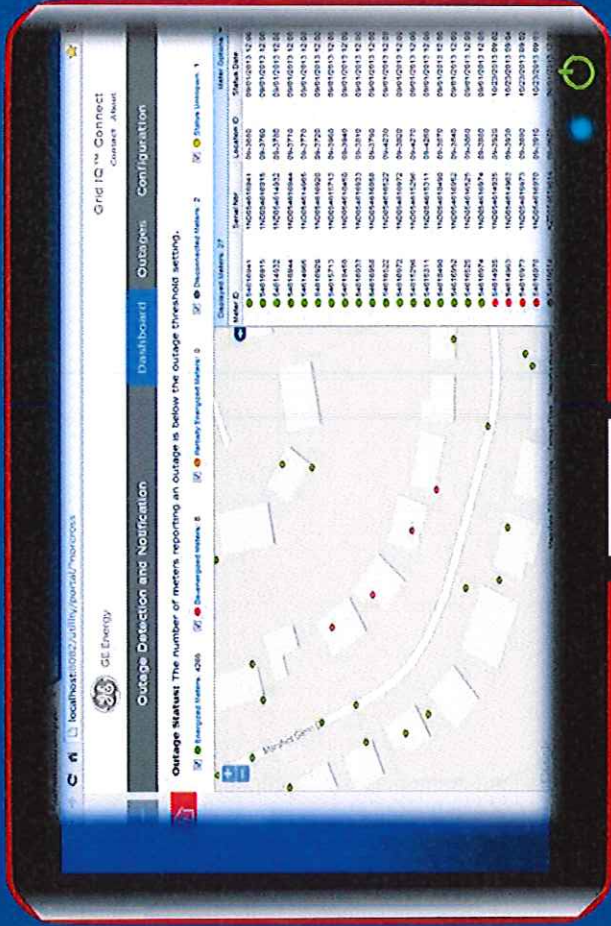




# High Quality Workforce and Customer Satisfaction

Customer Satisfaction

High Quality Workforce



## Enhance efficiencies to the Utility

- Cost savings
- Improve reliability
- Outage detection- electric
- Leak detection- water
- Enhance safety

## Improve customer experience

- Provide customer with powerful information
- Support new programs: TOU, renewables etc.



# ROI (Electric Contribution only)

## Assumptions:

- Elec meters: 12,125
- 1/4 deployed in first calendar year
- 3/4 deployed in second calendar year
- AMI only benefits kick in according to install above

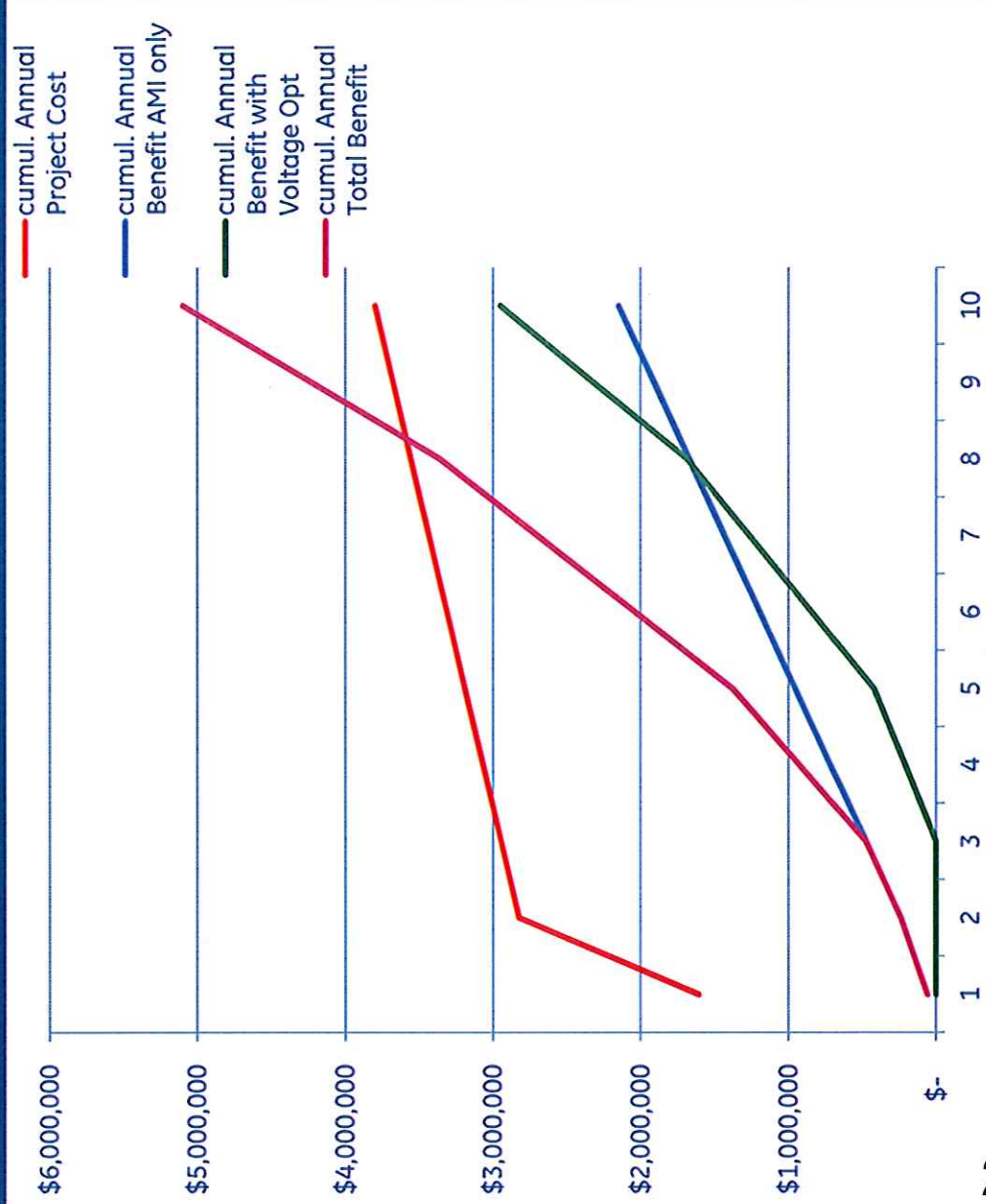
## -Voltage optimization benefits kick in as follows:

- Yrs 4,5- 1%
- Yrs 6,7,8- 2%
- Yrs 9,10- 3%

Does not include system losses, demand response or other applications

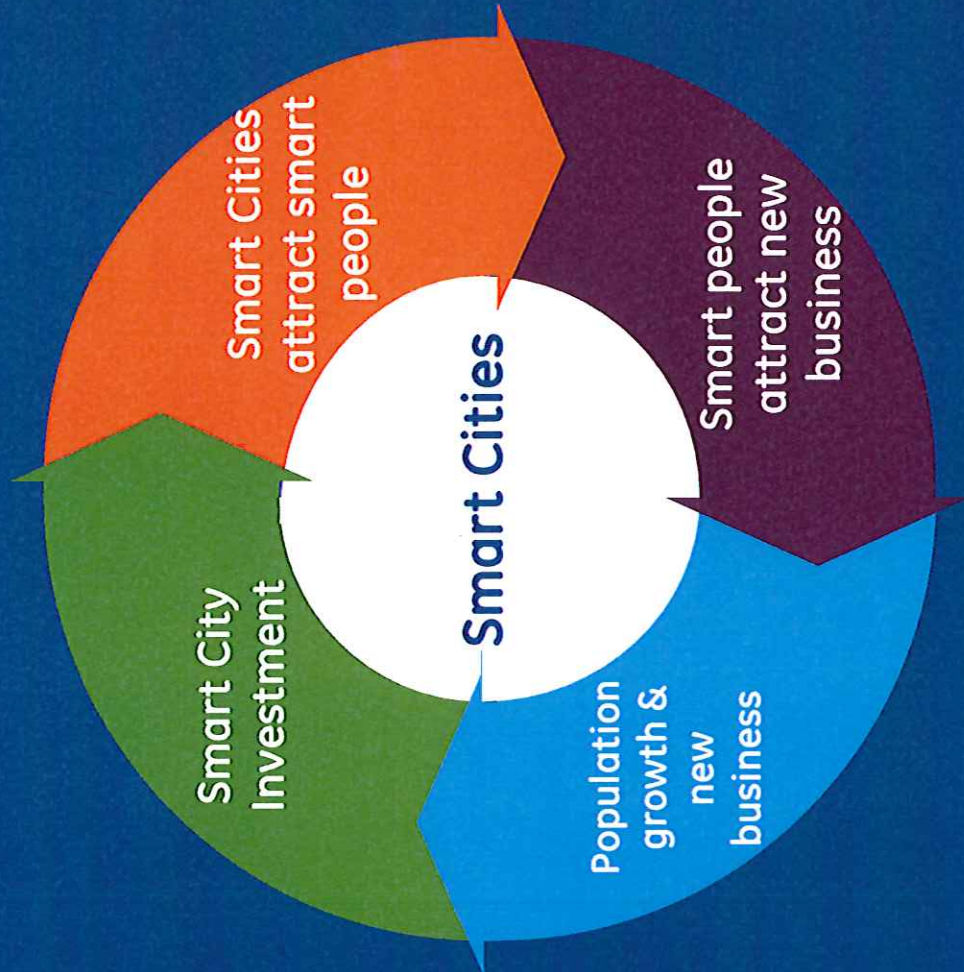
ROI as a preliminary study only, as several other assumptions are made based on estimates.

Estimated price is not a firm quote, but based on market estimates only.





# Benefits to TCLP

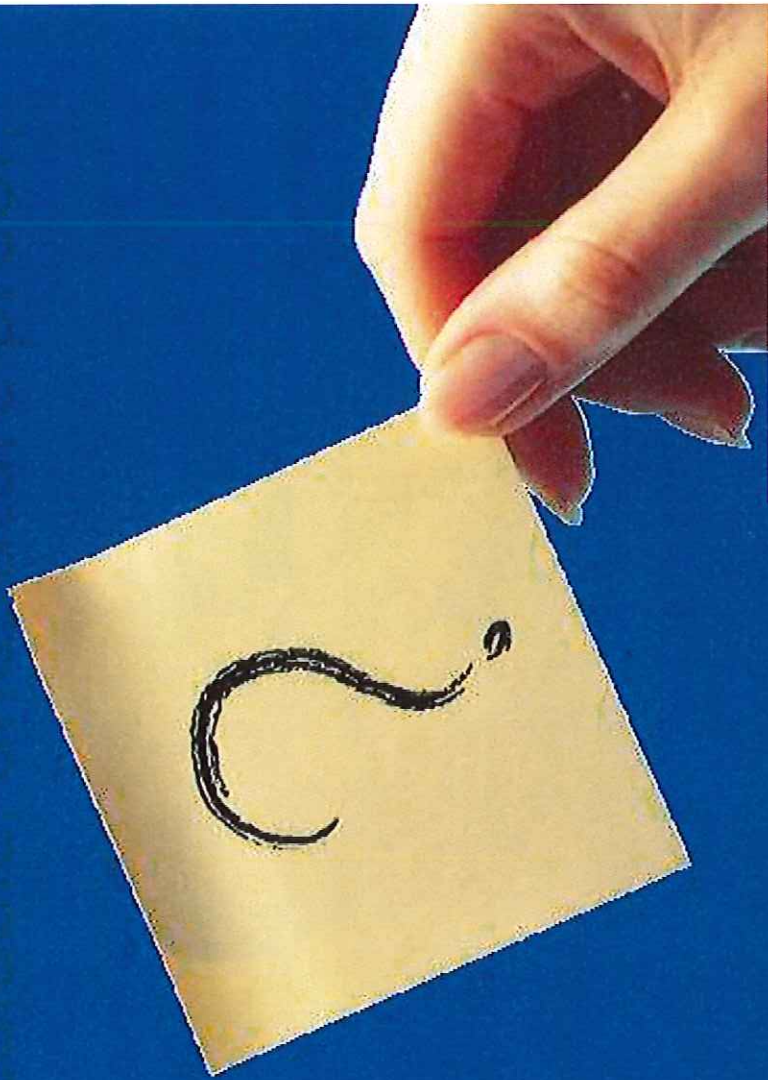


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# Thank you & Questions



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