

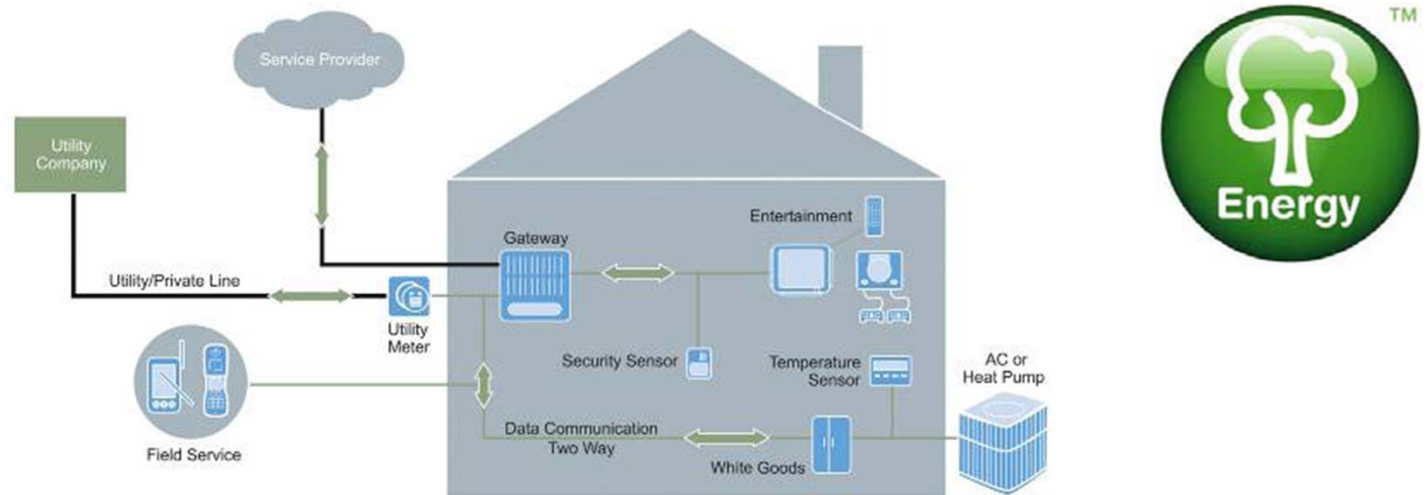


## Smart Grid: Seizing the Opportunity



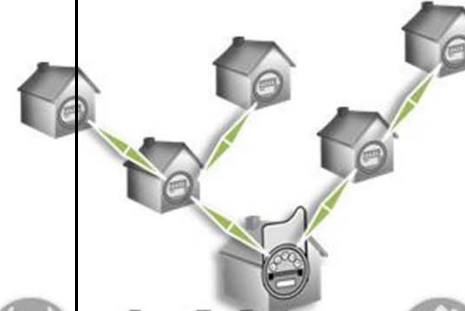

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## Wireline networks can play a crucial role in Smart Grid

- ▶ National Broadband Plan goal: Every American can track and manage energy usage in real time by 2020
  - ▶ *To achieve this goal utilities will have to leverage communications networks that already exist*
- ▶ Smart Grid requires both an access network and an interactive home network



Source: Zigbee Alliance

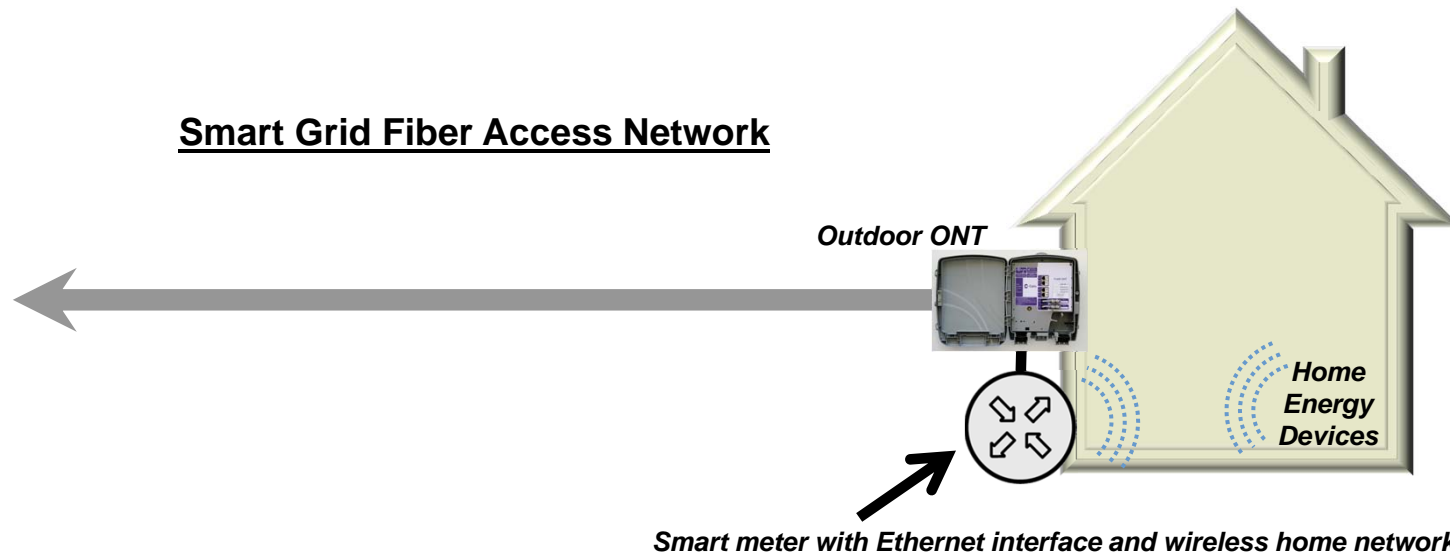
<b>DESIGN CRITERIA</b>	<ul style="list-style-type: none"> <li>• Scalable</li> <li>• Easy integration with back office applications</li> <li>• Processing power</li> </ul>  <p><b>NS</b> Network Server</p>	<ul style="list-style-type: none"> <li>• Scalable</li> <li>• Public &amp; private comms options</li> <li>• Standards based</li> <li>• Redundancy</li> </ul>  <p><b>WAN</b> Wide Area Network</p>	<ul style="list-style-type: none"> <li>• Strong security</li> <li>• Priority driven messaging</li> <li>• Utility lifecycle</li> </ul>  <p><b>LAN</b> Local Area Network</p>	<ul style="list-style-type: none"> <li>• Appliance connectivity</li> <li>• Simple management</li> <li>• Isolate HAN lifecycle</li> <li>• Customer signaling</li> <li>• Evolutionary design</li> </ul>  <p><b>HAN</b> Home Area Network</p>
<b>ATTRIBUTES</b>	<ul style="list-style-type: none"> <li>• Application interfaces - simple TCP/IP links</li> <li>• Two-way communications interoperability:             <ul style="list-style-type: none"> <li>- SCADA</li> <li>- CIS / Billing / etc.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Multiple platforms - wired or wireless</li> <li>• Standards based - WiFi, WiMAX, GSM</li> <li>• Public/private</li> <li>• Right-sized capacity</li> <li>• Cost-effective migration path</li> <li>• Rapid deployment</li> </ul>	<ul style="list-style-type: none"> <li>• Surgical deployment</li> <li>• Self-initiating &amp; self-healing network</li> <li>• Standard radios</li> <li>• Meter endpoints for - electric / water / gas</li> <li>• Multiple meter types supported</li> </ul>	<ul style="list-style-type: none"> <li>• Over-the-air programming</li> <li>• Access via meter / load control</li> <li>• DR modules:             <ul style="list-style-type: none"> <li>- load control</li> <li>- IHD / smart thermostat</li> </ul> </li> <li>• Time-stamped</li> <li>• Opt-in &amp; out</li> </ul>

## **Reach out to your local utility with ideas for cooperation**

- ▶ Offer Ethernet Transport Service (defined under NECA tariff) to utilities leveraging your existing broadband network
- ▶ Provide fiber access to wireless base stations for smart grid wireless WANs
- ▶ Joint fiber trenching
- ▶ Assistance with management of fiber electronics and core router network
- ▶ Assistance with IT and backoffice OAM, such as database management and metered billing systems
- ▶ Offer the utility transport services to remote locations that already require power from the utility in your existing network-remote cabinets, cell towers, etc.
- ▶ Provide fiber access to sub-stations (utilities generally want to control this portion of their infrastructure due to reliability concerns)

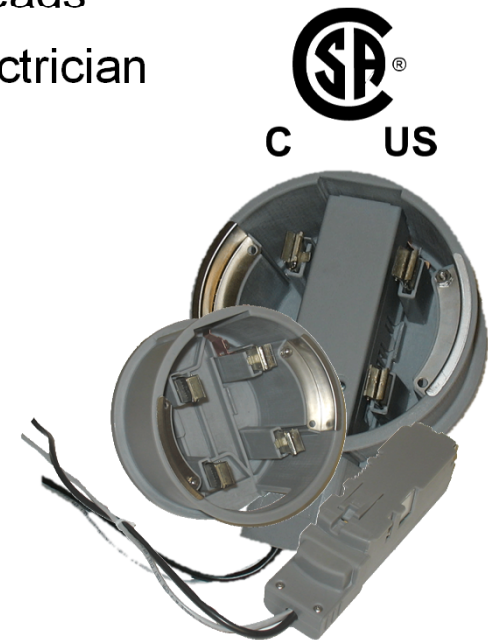
## Outdoor ONTs interface directly to smart meters via Ethernet

- ▶ ONTs with two or more Ethernet ports: One is connected to the smart meter and the others enter the house for communication services
- ▶ ONTs with one Ethernet port connect to the smart meter and then connect to devices in the home via a second Ethernet port on the smart meter
- ▶ ONT UPS is powered off the electric meter



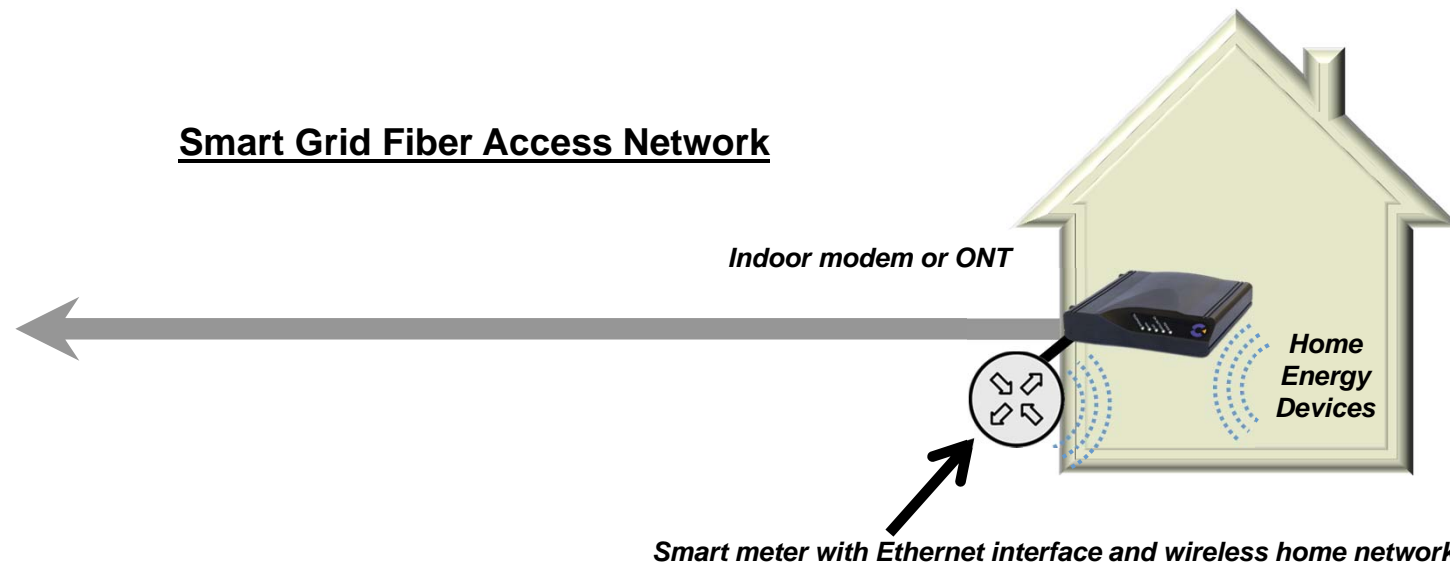
## Smart meter connects an ONT via 10BaseT to a home wireless network

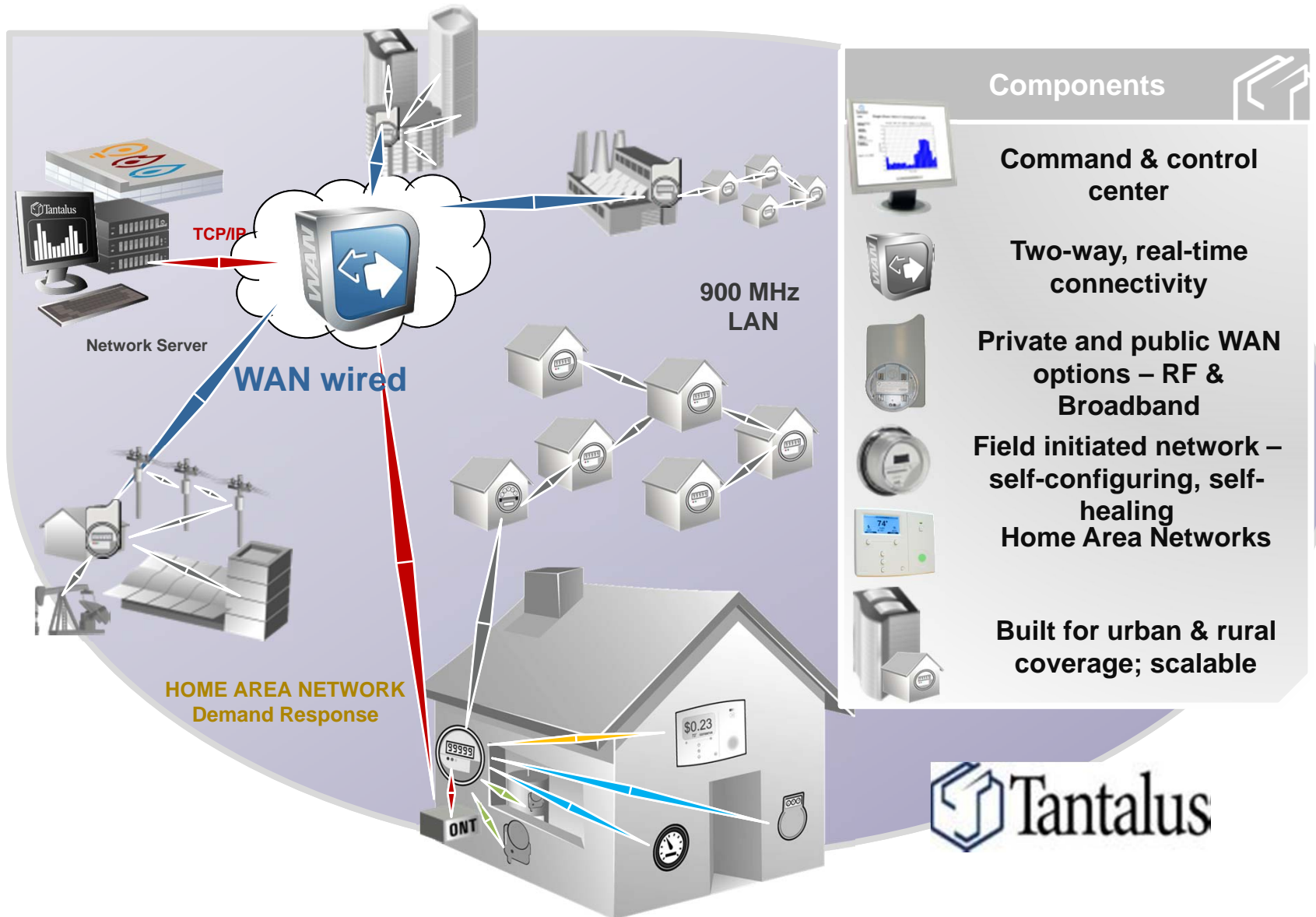
- ▶ Zigbee wireless protocol connects devices within the home
- ▶ Gathers data and issues commands
  - meter readings, power quality data and outage alerts, remote disconnect
- ▶ Supports on-demand reads or scheduled interval reads
- ▶ Simple installation in Form 2S meter socket; no electrician required
- ▶ System wide safety certifications from registered nationally recognized test lab



### Indoor ONTs and modems are connected to outdoor smart meters via Ethernet

- ▶ One of the Ethernet ports on the indoor ONT or modem must be wired out to the outdoor smart meter
- ▶ ONT or modem utilizes indoor UPS or wall wart





### Ensures reliable & efficient two-way wireless communication between a wireless base station and home smart meters

- ▶ Provides long-range, terrain hugging communication in rural & urban environments via 220 MHz
- ▶ Gathers data from multiple LAN endpoints
  - meter readings, power quality data, and outage alerts
- ▶ Issues commands to single or multiple meters
  - remote disconnect or time-synched reads
- ▶ Read on request or interval reads
  - 15-minutes, hours, days, weeks, or months
- ▶ Delivers interval data for advanced metering
  - TOU, CPP, RTP pricing
  - load control & demand response
- ▶ Simple installation in Form 2S meter socket
  - solid state & electromechanical meters



## **Ethernet Transport Service (ETS)**

- ▶ Low bit rate virtual network, no change in bandwidth required of existing broadband service
- ▶ Effective November 12, 2010
- ▶ ETS available in X times 64kbps increments
- ▶ \$.50 per month for every 64kbps increment
- ▶ Non-recurring charge of \$7.00 for each 64 kbps of ETS service
- ▶ 12 month minimum; term discounts of 36 months (10%) and 60 months (20%)
- ▶ \$6 for ETS change order, such as bandwidth

## **256 kbps symmetrical service (SDSL)**

- ▶ Lower cost service for customers not already on broadband
- ▶ Effective November 12, 2010
- ▶ Low cost means of introducing broadband for smart grid type services

## **Leverage the strengths of your organization to enable comprehensive end to end solutions for utilities**

- ▶ Utilities reduce their need for capital and operational costs by not having to build and manage their own access network
  - ▶ *Utility requires reliable, secure and low latency network*
  - ▶ *Speeds deployment by using an existing access infrastructure*
  - ▶ *Leverages technical skills of communications provider staff*
- ▶ Communication service providers leverage their core asset – the network – as well as IT capabilities to provide utilities with the communications fabric over which the smart grid can be deployed
  - ▶ *Expands service revenue streams*
  - ▶ *Justifies deeper fiber deployment to electric sub-stations, wireless base stations and perhaps all the way to the home*
  - ▶ *Possible access to new sources of capital*

## **Some utilities are more likely than others to cooperate**

- ▶ Focus on utilities that do not produce their own power-those that buy all their power are more incented to implement Smart Grid
- ▶ The more territory overlap the better-but non-overlap may provide you with good CLEC opportunities
- ▶ Utilities that are existing or potential RUS borrowers may be more likely to cooperate and leverage programs for Smart Grid at the RUS
- ▶ Utilities with small IT and telecom staffs are more likely to be willing to work with communications service providers



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