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Efficient & Secure Smart Grid

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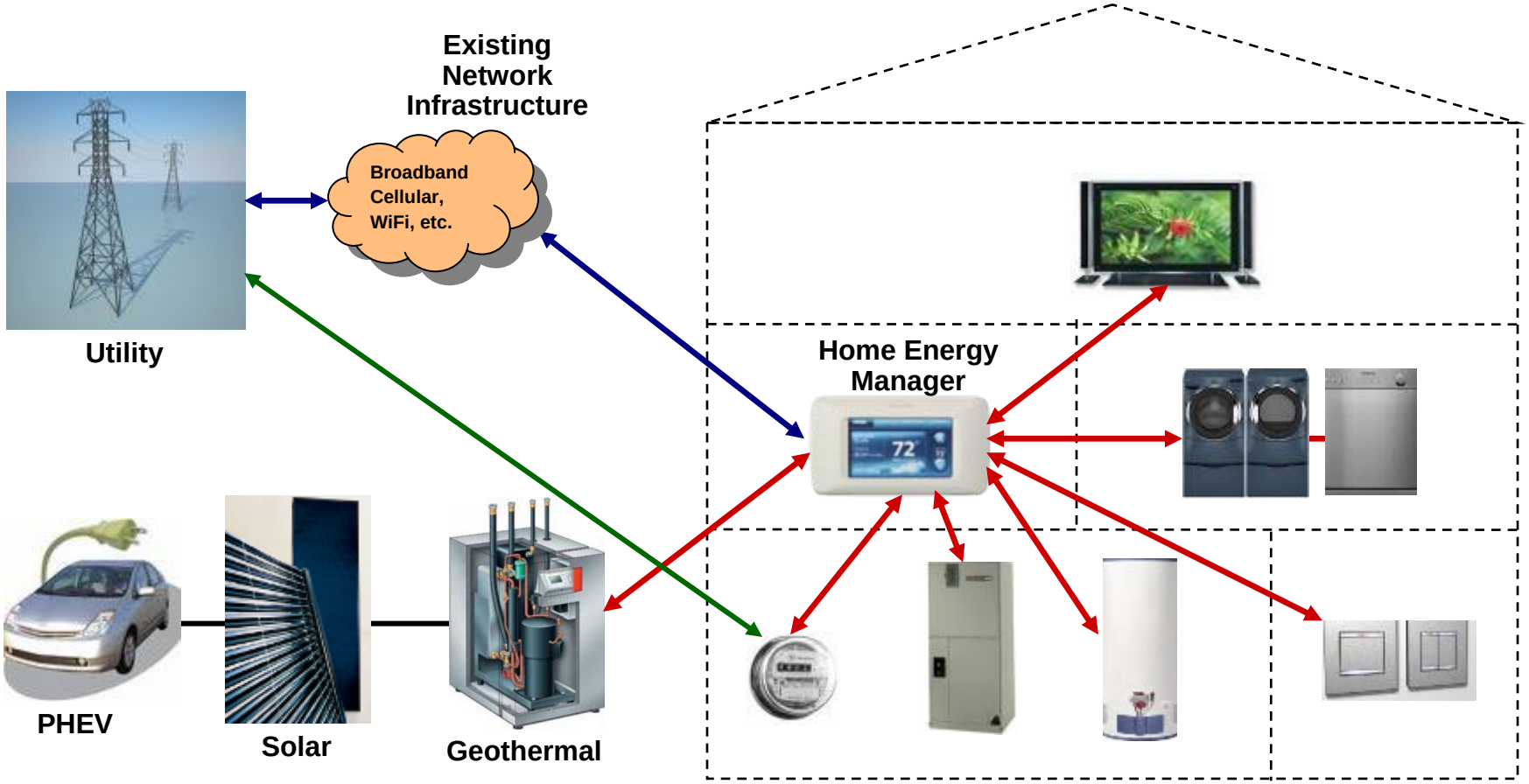
Smart Grid: Residential Perspective



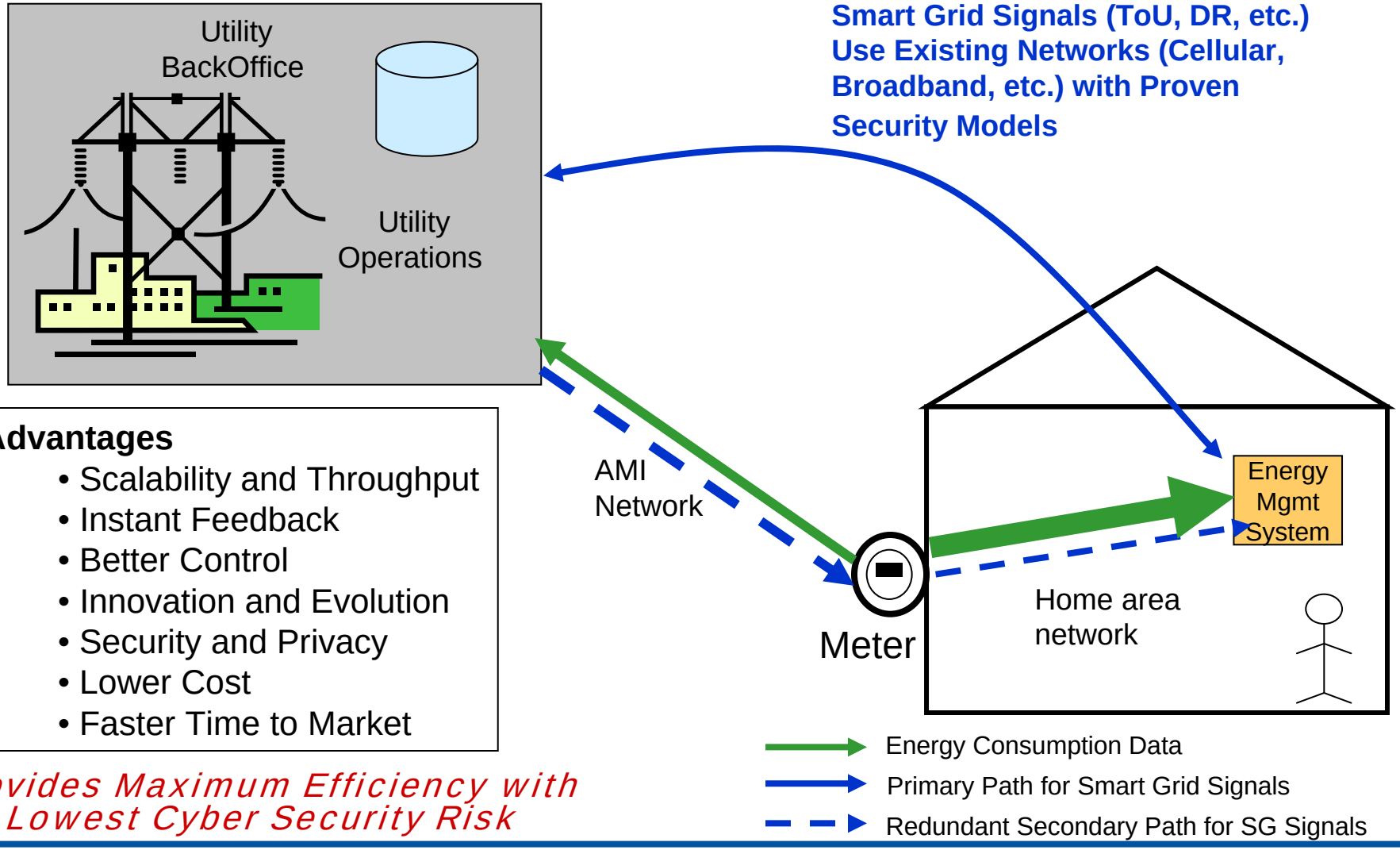
Simple, easy-to-use, secure and efficient solutions using existing infrastructure

Smart Grid Communication Needs

	Optimal Network(s)
• Broadcast data (Demand Response, price signals, emergency events, etc.) – Low volume, infrequent – Can use currently available communication infrastructure (cellular, broadband, WiFi, Pager) with standard internet security measures	Broadband Cellular WiFi, etc.
• Real-time Consumption Data (high volume, frequent) – Useful primarily for real-time control & usage information to consumer – We favor meter → premises where displays & controllers can locally act upon this data along with pricing information • Minimizes risk (privacy & network stability) and maximizes benefit from real time info.	Direct meter to HAN
• Raw Billing Data (reading when price changes) – Utility operations	AMI
• Aggregate Data – Comparison over time & among neighbors, best practices, consumption pattern recognition, suggest corrective actions, etc. • Utility or third party cloud-based applications operating on anonymous summary data • Little risk for privacy or network stability in case of breach of security • Can use standard internet communication with standard security measures	Internet portal
• T&D: relatively few points (substations); mission-critical, but already connected	Existing connectivity

Secure & efficient smart-grid can be built using existing communication infrastructure & cyber-security measures

Optimal Architecture for Smart Grid



Advantages

- Scalability and Throughput
- Instant Feedback
- Better Control
- Innovation and Evolution
- Security and Privacy
- Lower Cost
- Faster Time to Market

Provides Maximum Efficiency with Lowest Cyber Security Risk

Architectural Recommendations

- The Smart Grid Architecture should
  - Include Meter ➔ Home Area Network consumption information exchange over well-defined interface
  - Send smart grid signals (price, demand response, etc.) from utility to customer over existing communication infrastructure (broadband, cell, etc.) and establish a clear demarcation point
- Lessons from past large-scale deployments should be used

Let us not spend unnecessarily
Let us not reinvent the wheel