



NEW DISTRIBUTION UTILITY SERVICES: OPPORTUNITIES AND RISKS

Presented by:
Ryan Hledik
Carlos Morosoli

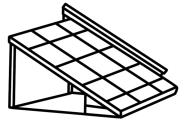
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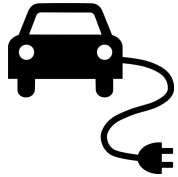
New opportunities

Our review of international experience identified four categories of new services being offered by distribution utilities:



Green services

Green tariffs, green pricing, community generation



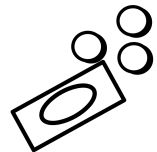
Electric vehicle (EV) charging services

Charging infrastructure deployment, incentives/rebates



Customer information analytics

Platform services, data analytics



Innovation businesses

Venture investment through unregulated subsidiary

Green services

Drivers

- Customer preferences for clean energy
- Declining cost of renewable generation

Examples

- Portland General Electric’s “Green Source” program: 19% enrollment at 10% cost premium
- “100% green” offerings by many European retail suppliers

Opportunities

- Strengthened customer relationship
- Increased investment in renewable generation

Challenges

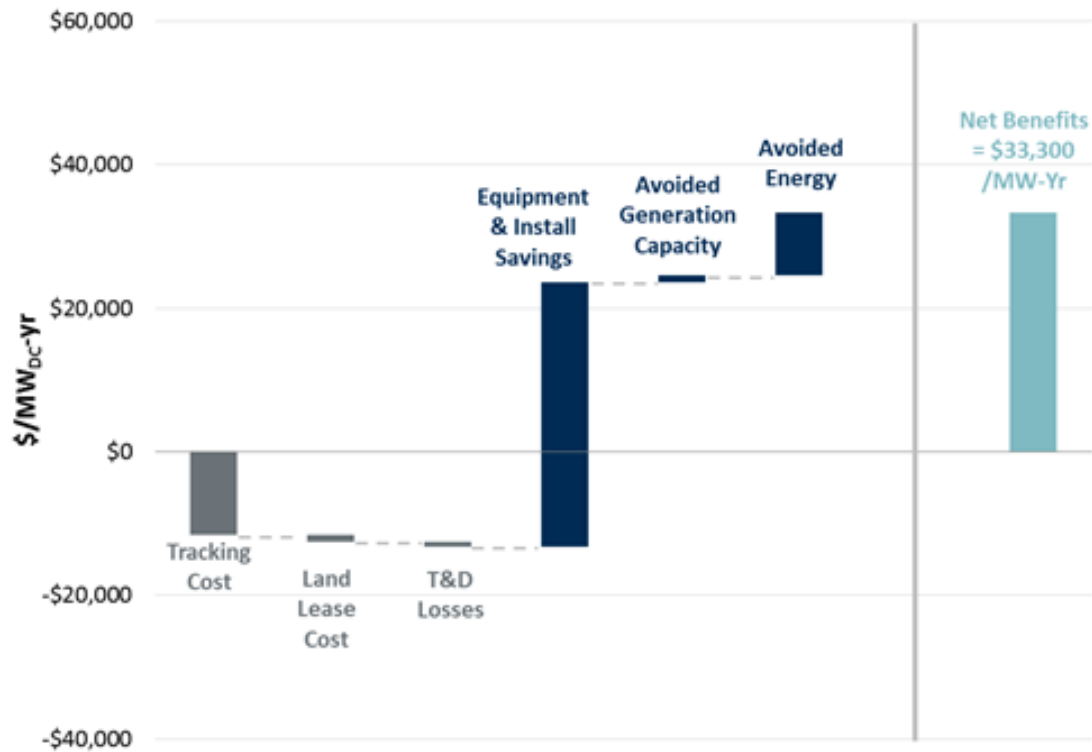
- Undersubscription risk
- Siting challenges
- Competition concerns



Source: TechRepublic

Green services

Incremental Benefits of Community Solar Relative to Rooftop Solar (U.S.)



Powering homes from community solar rather than rooftop solar provides:

- 15% lower project expenditures
- 30% greater energy output

Source: “Beyond Zero Net Energy? Alternative Approaches to Enhance Consumer and Environmental Outcomes,” prepared by The Brattle Group for NRECA and NRDC, June 2018

EV charging services

Drivers

- Massive utility revenue growth opportunity
- Environmental policies pushing toward e-mobility
- EVs increasingly cost-competitive with conventional options

Examples

- California utilities: purchase price rebates and discounted TOU tariffs
- “Own and operate” model common in Germany (75% utility-owned)

Opportunities

- Utility becomes integral part of the climate change solution
- Aligned with utility core strength of infrastructure deployment

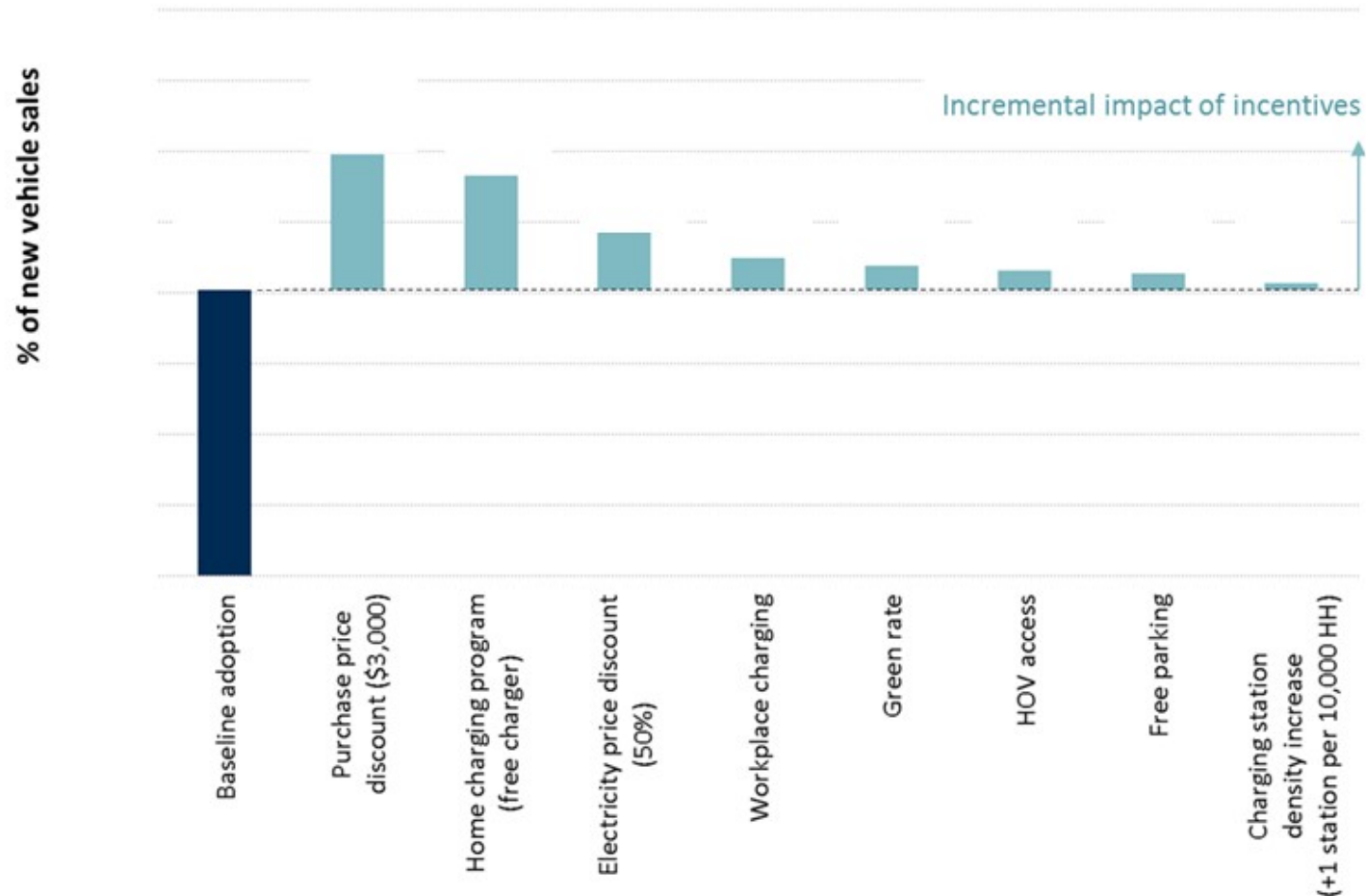
Challenges

- Regulatory concerns about equity/fairness and utility ownership
- Lack of ownership provides only indirect revenue opportunities



EV charging services

2025 EV Share of New Vehicle Sales, with Incentives (US)



- A portfolio of utility incentives could double EV adoption relative to baseline forecasts
- Impacts vary significantly by incentive and across customer segments

Source: "The Impact of Incentives on Electric Vehicle Adoption," prepared by The Brattle Group for EPRI, June 2019

Customer information analytics

Drivers

- AMI deployment
- Growing customer engagement in energy management

Examples

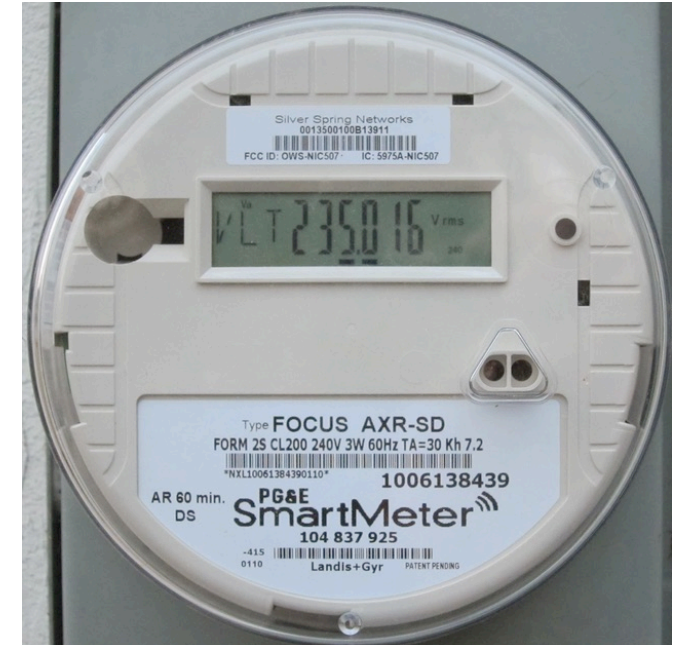
- NRG (US): Holistic energy assessment to help customers achieve EE goals
- National Grid (US): Develop rooftop solar PV offers for customers

Opportunities

- Strengthens customer relationship
- Facilitates adoption of demand response technologies and behaviors

Challenges

- Unproven as revenue opportunity
- Complex relationship with third party providers



Customer information analytics

National Grid's SolarWise is an innovative "platform service"

Program Design

- Gather and validate quotes from a range of solar installers
- Fixed payment to customer for solar output for guaranteed term
- Payment increases if bundled with energy efficiency upgrade

Benefits

- Attractive alternative to net metering
- Can be expanded to other markets and product offerings
- Partnership with solar community, rather than opposition

Innovation businesses

Drivers

- Rapid cost declines and innovation in energy technologies

Examples

- Energy Impact Partners: Venture investment funded by utilities
- Centrica's "Innovation Ventures": Investing in a range of emerging tech

Opportunities

- Unregulated source of revenue
- Stay on top of emerging industry trends
- Facilitate development of industry in beneficial areas (e.g., electrification)

Challenges

- Regulatory restrictions
- Risky investments outside of core competency

Innovation businesses

Energy Impact Partners is more than an investment fund, by facilitating partnerships between utilities and technology companies



Green Tariffs in Brazil

Consumers can only obtain energy from completely renewable sources into the *Free Market of energy*

“Special Customers” in the Free Market, with demand between 500 kW and 3,000 kW can only buy energy (incentivized energy) from renewable sources* and receive a discount in the network usage tariff.

* Small Hydropower Plants, Biomass, Wind and Solar

Community Solar in Brazil

- Shared Generation: groups of consumers within the same concession area with a consumer unit with distributed micro-generation or mini-generation in a location different from the consumer units in which the energy will be compensated.
- Remote self-consumption: the place of generation and consumption are different as long as they are within the same concession area
- Solar condominium: members share the costs of the system according to the rules and percentages established, being the compensation of the solar energy generated carried out independently
- Solar Farms: A person can rent a plant already installed in the region of the distributor, paying the tenant only for the energy generated by the solar system - the tenant created a solar condominium to rent to third parties

Electric Vehicle Charging Services in Brazil

- Government projections consider low penetration of EV (~ 2% - 2027)
- Rota-30 Program: Incentives to the automotive sector can accelerate the diffusion of EV in Brazil (is enough?).
- In 2018, ANEEL established the procedures and conditions for the development of EV charging activities by interested in providing this service (distributors, gas stations, shopping centers, entrepreneurs, etc.).
- Unregulated Services
- When performed by an utility, should be treated as a complementary accessory activity.
- Charging stations are initially promoted by utilities such as COPEL, (730 km long "electric road"), EDP together with BMW (connect the cities of Rio de Janeiro and São Paulo) and the electric stations installed by CPFL.
- Aneel R&D strategic project "DEVELOPMENT OF EFFICIENT ELECTRICAL MOBILITY SOLUTIONS"

Financial incentives in Brazil

- Rota 30 includes tax benefits for automobile companies and requires research and development in new technologies and energy efficiency. (IPI from 25% to up to 7% for hybrid or electric vehicles).
- No specific programs of wide coverage that consider discounts or rebates for the purchase of hybrid or electric vehicles or charging stations.
- No specific tariff offers for owners or users of EV

Customer Information Analytics in Brazil

- Utilities must share with users part of the revenues from services that are not directly related to the distribution service, considered as accessories
- Utilities formed new companies to offer different services, not only for customers in the concession area but also for a wider market, since the services provided are not regulated.
- The services offered by the companies themselves or through third parties range from:
 - Insurance services (home, life and others), care services for homes, vehicles and pets, dental, funeral and other services.
 - Energy efficiency, distributed generation, electrical infrastructure, energy management and trading, O&M services.
 - Electric mobility, public lighting, smart buildings.

Data Analytics and Consulting Services in Brazil

- Some energy companies in Brazil provide consulting services mainly to medium and large customers. However, these services are generally provided by companies that belong to the economic group of which the utility forms part, and not by the utility itself
- Consulting services are offered based on digital intelligence, efficient energy management, intelligent lighting projects, advice on energy contracting, legal, fiscal and regulatory guidance, etc.

Innovation Businesses in Brazil

- GT&D companies must apply part of their revenues in R&D and Energy Efficiency programs, constituting the main public policy to stimulate technological innovation in the electric sector.
- ANEEL R&D Program to promote a culture of innovation, stimulating research and development, creating new equipment and improving the provision of services.
- R&D Programs have evolved from studies and development of prototypes to products and models that effectively contribute to improve the services
- Companies have sought to create innovation environments (ecosystems) that include the private sector, universities, Science and Technology Institutions (STIs), technology-based companies and support for the emergence and development of start-ups.
- Public consultation 17/2019 - New instruments to stimulate innovation in the electric sector.

Innovation Businesses in Brazil - Cases

- CPFL Inova:

- CPFL's innovation and acceleration program selects companies with innovative solutions for the electric sector and corporate management, part of the strategy to create an open innovation platform focused on bringing together the startups and scale-ups ecosystem and prospecting for new products and services aimed at the electric power market.
- The selected companies receive economic support and mentoring from the company's executives and from Endeavor. .

- EDP:

- Entrepreneurial ecosystem through global contests, such as EDP Open Innovation that aims to challenge and stimulate the development of new solutions for the market.
- EDP Starter Brazil, an acceleration program that offers mentoring with specialists and technicians from EDP and the market, in addition to a wide global network of relationships with partners that foster new business.
- EDP created a Venture Capital investment vehicle, EDP Ventures Brazil, to finance start-ups that emerged and were supported by the innovation ecosystem

Thank you!