Recycling Wasted Electricity, an Intelligent Solution

The Problem

According to a 2009 report, aptly titled, "Keeping the Lights On in a New World," by the USDOE's Electric Advisory Committee which stated that:

"The current electric power delivery system infrastructure will be unable to ensure a reliable, cost-effective, secure, and environmentally sustainable supply of energy for the next two decades is nearing the end of its useful life."

That was 8 years ago. We have 12 years left, and nothing has been done to address these issues.

Steven Collier explains why, in his "Top 10 Challenges for Electric Distribution Utilities":

"Costs of generation, both fixed and variable are rising. Costs of transmission and distribution are rising. The costs of doing business are rising. On the other hand, utility revenues from energy sales are declining as a result of conservation, energy efficiency, distributed generation and retail competition. The traditional solution, raise rates to ensure recovery of costs plus a margin only further incentivizes customers to find alternatives.

Utilities generally collect a majority of their revenue through charges for energy usage, a variable quantity, yet the majority of their costs are due to capacity, a fixed quantity that doesn't diminish with diminished energy consumption. In other words, their costs don't drop as much as their revenues..."

To make matters worse, the grid is constantly operated near failure, which we are always reminded of during hot summer months. One article in *FORBES* describes how Texas summer heat has the potential to cause blackouts, due to an excessively low reserve margin, a lack of generation, but then...

"And even if there is sufficient power within the state, sometimes transmission lines get too congested to carry it where it needs to be."

Congested power lines reduce the reliability of the grid, damages the infrastructure, and ultimately leads to power outages.

We have come to expect power outages, and some operations even need backup generators for critical functioning of their enterprises. Even in the light of more energy efficiency products and buildings than ever, electricity demand has still increased by 10% over the last decade. Furthermore, in the last 20 years, **the incidence of major outages has doubled every five years**, and according to federal data from 2013, referenced in a great article, "Aging US Power Grid Blacks Out More Than Any Other Developed Nation":

"The U.S. electric grid loses power 285 percent more often than in 1984…costing American businesses as much as $150 billion per year…"

In order to improve the longevity and reliability of the electric grid, the issue of congested power lines has to be addressed. Simply building more power lines is impractical and costly. Doing more with what we have already is the whole aim of efficiency. So "congestion" provides a clue to where exactly electricity is being wasted, and where the opportunity exists to help the problem correct itself. Now, more than ever, utility companies need a technology that can:

- Reduce the strain on the grid
- Increase operating reserve margin to reduce the occurrences of outages
- Extend the useful life of the grid
- Complement existing technologies aimed at efficiency and conservation

A technology that could do all that would still have to pay for itself, and create significant cost savings that could be re-invested on the needed infrastructure upgrades. ***Fazync has created that technology*.**

The Solution

Intelligent Electricity Recycling

Fazync's Phase Angle Synchronization (PAS) is the world's first electricity recycling technology.

Wasted Electricity – Inherent Inefficiency, or Multi-Billion Dollar Opportunity?

Where exactly is electricity wasted? Not all the electricity provided by the utility is consumed. This is because the electric motors used to power equipment like HVAC, refrigeration, industrial machinery, pumps, and lighting ballasts, consumes about 80% of the power provided—80% is usable (in-phase) and is consumed. The other 20% initially supplies the needed torque or leverage to the motor, but then becomes unusable (out-of-phase) and travels back toward the utility. So, 20% more power is generated and delivered than what is actually consumed.

The inefficiency problem compounds itself further when the wasted 20% of unusable (out-of-phase) power travels back toward the utility, it requires an additional 20% of otherwise usable power to "burnoff" this backward flowing electricity (more waste). On average then, 40% of power generated wasted, plus the back-and-forth travel of this unusable and wasted electricity creates line congestion, leading to power outages.

The electric motor and its inefficient use of delivered energy has existed since electricity was discovered, and therefore is considered an inherent inefficiency. The electrical industry has become complacent over the years, since not all electricity that is generated, transmitted, and distributed is fully used, and they have simply accepted this inherent inefficiency as a problem with no solution.

re·cy·cle | rē ˈ sīk(ə)l/ | *verb*
Convert (waste) into reusable material.
Return (material) to a previous stage in a cyclic process. [8]

PAS captures this unusable and wasted electricity before it travels back to the utility, recycles it to be usable again (in-phase) to the end-user. By recycling the electricity, PAS technology can:

- Reduce the needed generation capacity by 40%

- Improve the efficiency of all delivered electricity, regardless of fuel source
- Improve the reliability of the grid by lowering line congestion and increasing reserve margin
- Reduce the incidence and economic cost of power outages
- Protect the grid from excessive wear and damage to infrastructure

Where Phase-Angle Synchronization (PAS) describes the process used in recycling electricity, a name that describes what the product does is Power Synchronized-In-Phase, or PowerSIP—literally "sips" power from the grid—while performing the same amount of work—compared to the way power is currently "guzzled".

Recycled energy is not a new concept… Recycled electricity is.

Other examples of recycling energy are out there already, such as Combined Heat and Power (CHP) and Hybrid automobiles.

CHP captures energy in the form of heat that is wasted from normal industrial operations (including the burning of fuels to generate electricity) and recycles that wasted heat energy for productive uses.[9]

Hybrid cars convert the wasted kinetic energy from the brakes in a system called "regenerative braking". Traditional brakes use friction to slow a car and dissipate it as heat, whereas the regenerative brakes convert some of that kinetic energy into electricity that recharges the battery.
PowerSIP, using PAS technology, is recycling electrons from a wasted to a usable form, complimenting all current efficiency measures.

Though conservation and energy efficiency measures have allowed utility companies to defer capital investments in generation, transmission, and distribution infrastructure, those same measures have reduced revenues reduction in sales. PowerSIP is very different from other measures because it is aligned with the utility company's goal to eliminate the waste on electricity generated and delivered. Since the utility charges only for what is consumed, they have lost revenue on the 20% of electricity delivered and not consumed, as well as lost revenue on the 20% of otherwise-usable power sent to "burn-off" the unusable power. The 40% inefficiency is a total loss for the utility. PowerSIP allows the consumer to use the same amount of electricity, but the utility will send less, which maintains steady revenue while at the same time lowering the utility's costs.