Utilities already know how to promote new electrification technologies

By Tom Lienhard
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This guest blog post was written by former efficiency engineer Tom Lienhard, who recently retired from Avista Utilities after more than 25 years with the utility.

A good service provider will underpromise and overdeliver. But if the opposite is true, it can have a negative effect on customer experience. On the other hand, consumers who receive better service than expected become champions of the product. The same should be true in electrification and efficiency initiatives.

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There are four potential reasons why a carbon-free energy alternative or cost-effective efficiency investment is readily available but not adopted in the market. Jonathan Garo Koomey outlined these four issues in his dissertation, Energy Efficiency in New Office Buildings: An Investigation of Market Failures and Corrective Policies:

- Calculations with hidden costs not included
- Incorrect parameter specification in the calculations
- Time lags between the introduction and acceptance of this technology
- Market failures that are impeding the adoption of this option

While it's been 30 years since this study, these issues haven't changed for consumers. If today's electrification policies, codes, or standards ignore any of the four items above, then there may be political disagreement or consumer pushback.

Learning from past problems with technology adoption

Early efficiency technologies had issues with longevity, usefulness, and satisfaction that should have been addressed before releasing or mandating the technology. This was true whether the technologies were policy driven or market driven.

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We've also seen issues of time lag and market failure around past movements to save energy and reduce carbon. Environmental movements in the US are often political and polarizing. In the 1990s, some utilities wouldn't use the term "green" because environmentalism wasn't widely popular among Americans. Saving energy was all about saving the customer money.

Combating climate change will require action from more than half the people, states, and countries on the planet. To achieve this, those on the front lines of carbon reduction need to understand the concerns of those who aren't early adopters of carbon-reduction technologies. And for any new decarbonization technology, we need to first make sure that there aren't any hidden costs, wrong parameter specifications, technical time lags, or market failures that we haven't addressed.

The burden to be an energy adviser and remove barriers to adoption falls heavily on utilities. But the setbacks of early technologies and movements can provide insights into how we can more effectively implement new electrification initiatives today.

Early technologies that struggled to gain traction

Occupancy sensors

Occupancy sensors that turned off the lights when someone was sitting still in a room caused users to reject the technology. This issue fell into nearly every technology failure bracket.

Incorrect parameter specification. Infrared technology couldn't see through the stalls in a bathroom to be able to sense if people were using the facilities.

Time lags. Radar, volumetric, and vacancy sensors were late to the market. Too much time passed before manufacturers could develop new sensors that fixed the parameter issues.

Market failure. Not all contractors were properly trained on how to set the timing on the sensors to avoid problems.

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Electronic ballasts

Early issues with electronic ballasts caused some institutions to wait 10 years longer than necessary to switch to T8s, which were the most efficient option at the time.

Hidden costs. Electronic ballasts failed in the market because their actual longevity was misunderstood.

Incorrect parameter specification. Contractors were installing the ballasts in high-temperature locations.

Market failure. Contractors installed the ballasts with the wrong lamps or the wrong number of lamps.

Low-flow toilets

Historically, technology failures fed into political motivations to cast doubt on efficiency. This was the story around the introduction of low-flow toilets.

Hidden cost. Early low-flow toilets used half the water per flush. But sometimes it took multiple flushes to fully clean a low-flow toilet.

In 1991, President George H. W. Bush signed the 1.6-gallon flush standard into law. Twenty years later, a legislator who didn't realize that it wasn't the US Department of Energy but Congress that codified the 1.6-gallon flush law, stated that he wanted big government to get out of his bathroom. The legislator felt he hadn't had a toilet that worked properly in two decades, and he was happy to share his complaints in a hearing that week before the Senate Committee on Energy and Natural Resources.

Market failure. The early models of low-flow toilets weren't designed well. While I don't always agree with political leaders about conservation, I believe this legislator uncovered a real problem of market failure and the impact on consumer dissatisfaction. In this case, market failure caused by a poorly designed early product created a bad image for low-flow toilets.

LED exit signs

Sometimes a fully qualified technology hits the market without any customer education about why it's happening or how to implement it. This happened with the introduction of LED exit signs. The integrated LED exit signs had few technical problems, but they caused problems for utility demand-side management programs.

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Incorrect parameter specifications. The first issue was that some city and county building codes required green lights in exit signs. The first LED exit signs had only red lights.

Time lag. In some jurisdictions, utilities successfully lobbied to change the code to allow for red LED exit signs. But others had to wait to replace old exit signs until green LED exit signs became available. This was a time lag issue because red LEDs reached technical acceptance a few years before green LEDs.

Market failure. The second issue was that utilities were often replacing exit signs that were either burned out or not connected to electricity. While the code called for lighted exit signs, enforcement was rare. This was a market failure because of policies without enforcement. We warned customers about not following the codes and helped them put in working exit signs. But we wanted to avoid taking on a policing role, constantly monitoring and enforcing the code.

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