



Nest Flow

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February 5, 2018



EXECUTIVE SUMMARY

Problem

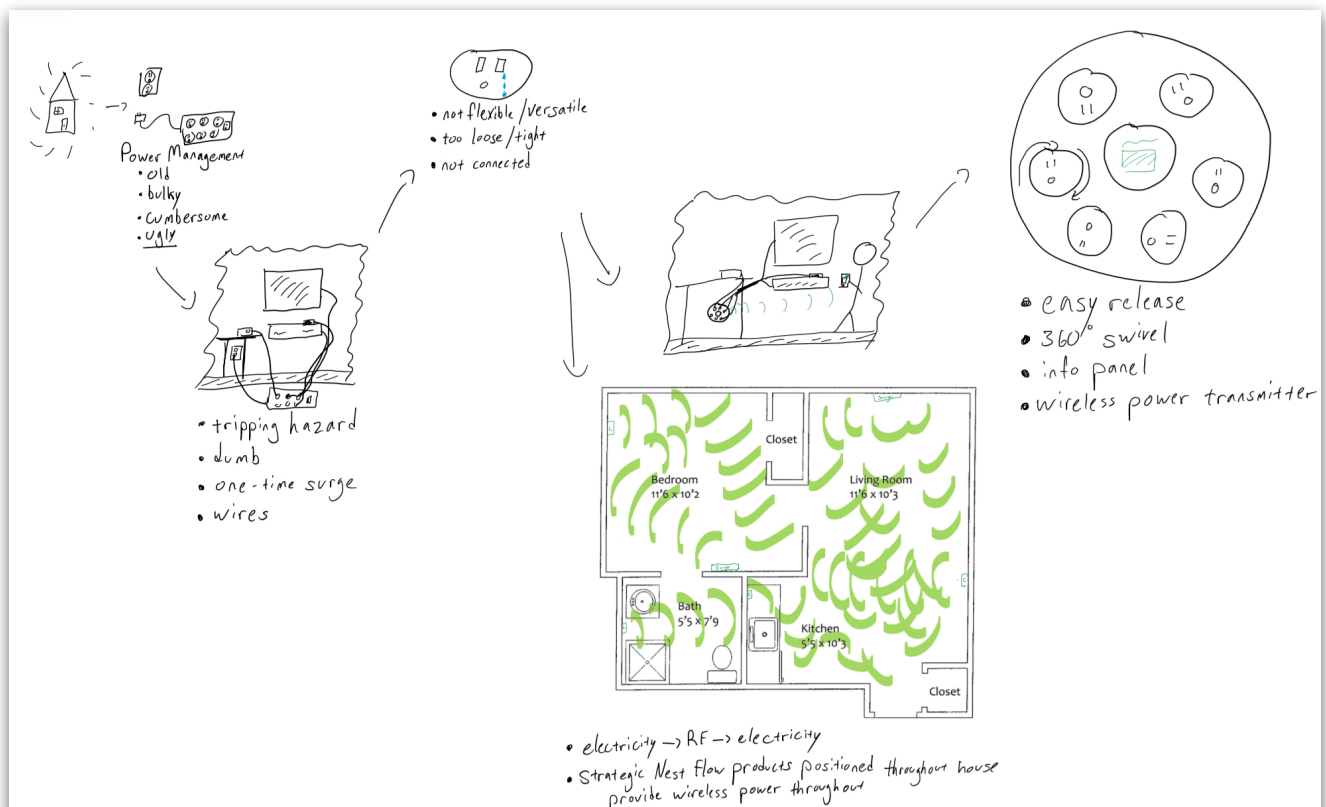
- Wires are everywhere. We design our spaces around plugs and arrange our homes to conceal wires, which tether us to walls and desks, restricting the way we work and play.
- People give little thought to their internal power grid — the surge protectors, power strips, extension cords, and outlets scattered throughout the home.
- Existing IoT solutions, namely smart plugs, are bulky and often require a cumbersome setup process, and well-designed smart solutions for power strips and extension cords don't yet exist.
- Surge protectors currently on the market are clunky, ugly, difficult to use, and offer limited protection that ends when built-in suppressors blow.

Goal

Alternative energy solutions in the home are entering the mainstream, and it's vital for Nest to innovate in the space with IoT in mind. Nest has already created smart thermostats, security systems and smoke alarms that add comfort, safety, and elegance to the home. It's time to do that with power.

Solution

A comprehensive line of Nest Flow products that will make *plugging in a thing of the past*. Nest Flow addresses most pain points people experience when managing their appliances and devices by providing connectivity simply by plugging in... or not.





The Nest Flow solution incorporates the following to provide the smartest power management on the planet:

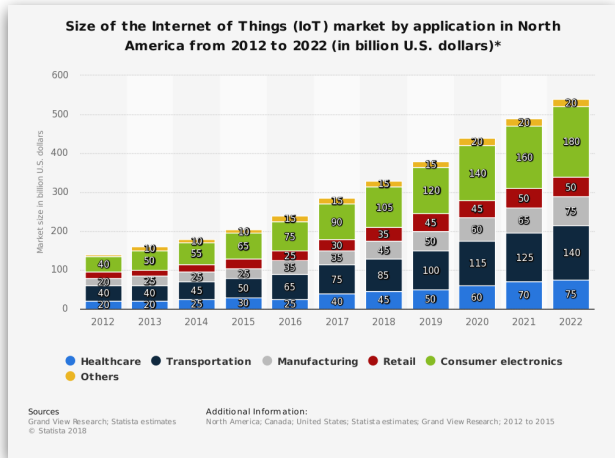
- **Nest Flow:** Power for the wireless age.
 - Wireless power is an inevitability. The Nest Flow products, Surge and Current, provide a network of wireless power throughout each space
 - By leveraging the portfolio of Nest Flow products, Nest can make wireless power approachable and easy to use for everyone.
- **Nest Surge:** Bulky power strips are a thing of the past.
 - As long-range wireless power technology improves, it will take some time for electronics and appliance makers to incorporate the tech into their products.
 - Each Surge can provide wireless power for up to 4 devices, while supporting 8 plugged-in devices.
 - Nest Surge incorporates thoughtful design by bringing the hefty, unwieldy surge protector of today off the ground and onto the wall. Each Surge features replaceable surge units. Rather than replacing the entire device once the surge suppressor has blown, swappable surge units are automatically ordered and sent to the owner's home and billed to the credit card on file. All the Surge owner needs to do is pop in the new unit.
 - Each Surge has 360° swivel outlets for versatile plugging and unplugging. Each outlet features *just right* tolerances such that plugs can be inserted with ease but aren't accidentally removed.
- **Nest Current:** Power outlets need an upgrade.
 - To support the impending wireless charging revolution, each Nest Current will serve as a wireless power access point.
 - Each Current can provide wireless power for up to 2 devices, while supporting 2 plugged-in devices.
 - Nest Currents use either Wi-Fi or Powerline networking to connect to the Nest network.
 - Each Current includes the same 360° swivel functionality and *just right* tolerances found in the Surge.
- **Nest App:** The brains of the operation.
 - It's important that something is behind the scenes managing the complex system of wireless power and numerous devices now connected to the internet.
 - Through the updated Nest app, our customers will be able to configure and monitor all connected Nest products on a dashboard organized by space.
 - Nest already works with 3rd party smart assistants such as Alexa, Google Home, and Apple's HomeKit. The Nest app makes connecting to these even easier.

Value Proposition

Wireless power has numerous advantages and is a leap in innovation and a paradigm shift for our customers. Battery range anxiety will become a thing of the past as devices are continuously topped off. Additionally, connecting non-IoT appliances will become even easier without the use of bulky plugs.

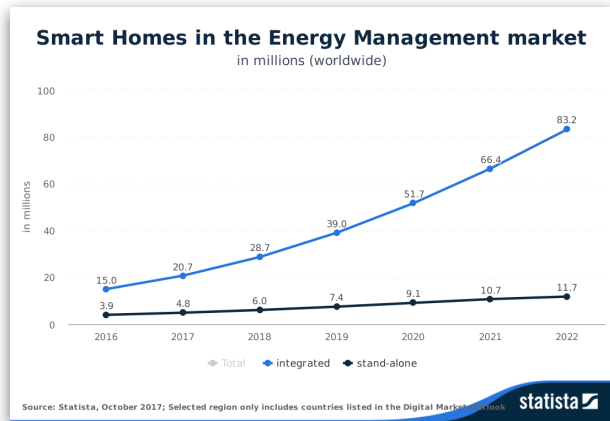
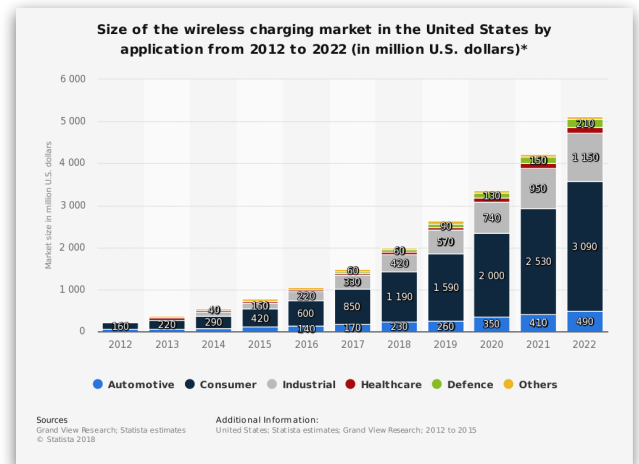


Target Market



Consumer electronics sector of IoT market is increasing at rapid rate and forecast to double in size by 2022 to \$180 billion.¹

Consumer wireless charging is expected to take off in the US over the next five years, increasing nearly 400%.²



In the Energy Management segment, the number of active households is expected to amount to 94.9 million by 2022.³

¹ Statista. (n.d.). Size of the Internet of Things (IoT) market by application in North America from 2012 to 2022 (in billion U.S. dollars)*. In Statista - The Statistics Portal. Retrieved February 4, 2018, from <https://www-statista-com.proxy.library.cmu.edu/statistics/688762/north-america-iot-market-by-application/>.

² Statista. (n.d.). Size of the wireless charging market in the United States by application from 2012 to 2022 (in million U.S. dollars)*. In *Statista - The Statistics Portal*. Retrieved February 4, 2018, from <https://www-statista-com.proxy.library.cmu.edu/statistics/681406/us-wireless-charging-market-by-application/>.

³ Statista. (n.d.). Energy Management Segment Report. In Statista - The Statistics Portal. Retrieved February 4, 2018, from <https://www-statista-com.proxy.library.cmu.edu/outlook/284/100/energy-management/worldwide#>



Risks

Wireless charging is uncharted territory in the industry and for the public. Companies such as WattUp are just now getting FCC approval for their power-at-a-distance solutions. Consumers are becoming more comfortable with ditching cables as large smartphone manufacturers such as Apple and Samsung adopt resonant and inductive charging. While the trend for wireless power is generally positive, it's important to consider the risks of pursuing our own wireless power solution in Nest Flow:

1. **Safety Concerns:** The public has always been concerned about radio waves and their effect on health. Myths about the dangers of Wi-Fi still pervade even in 2018, and those myths will certainly extend to wireless charging.

Mitigant: As power-at-a-distance enters the early majority, it's important for Nest to create strategic messaging around how harmless wireless charging really is.

2. **Efficacy:** Wireless charging of any kind is naturally slower than wired charging. Consumers may become frustrated when their devices don't charge as quickly as they expect.

Mitigant: When marketing Nest Flow, it'll be critical that the key advantage to the technology is the concept of perpetually "topping off." Consumers will never forget to charge their devices, since their devices are *always charging*.

3. **Compatibility:** Consumer electronics companies will likely be reactive to power-at-a-distance and take time to include compatible receivers. This lag will likely lead to slower than desired adoption for this technology.

Mitigant: Working with Google's hardware team to include wireless receivers in the Pixel and Pixelbook will be vital to the success of Nest Flow. Additionally, we'll work to partner with smartphone case manufacturers such as Mophie to develop wireless-ready cases for the latest smartphones.

Conclusion and Next Steps

It's not science fiction. We're closer than ever to a wire-free society, and Nest should play a key role in that transition by providing a simple, elegant solution. The inconvenience of cables is well-known, and getting rid of them is not only thoughtful but necessary. Opportunities for Nest Flow extend outside of the home into the car and business, and the Nest Flow team intends to explore these strategies as the technology develops.
