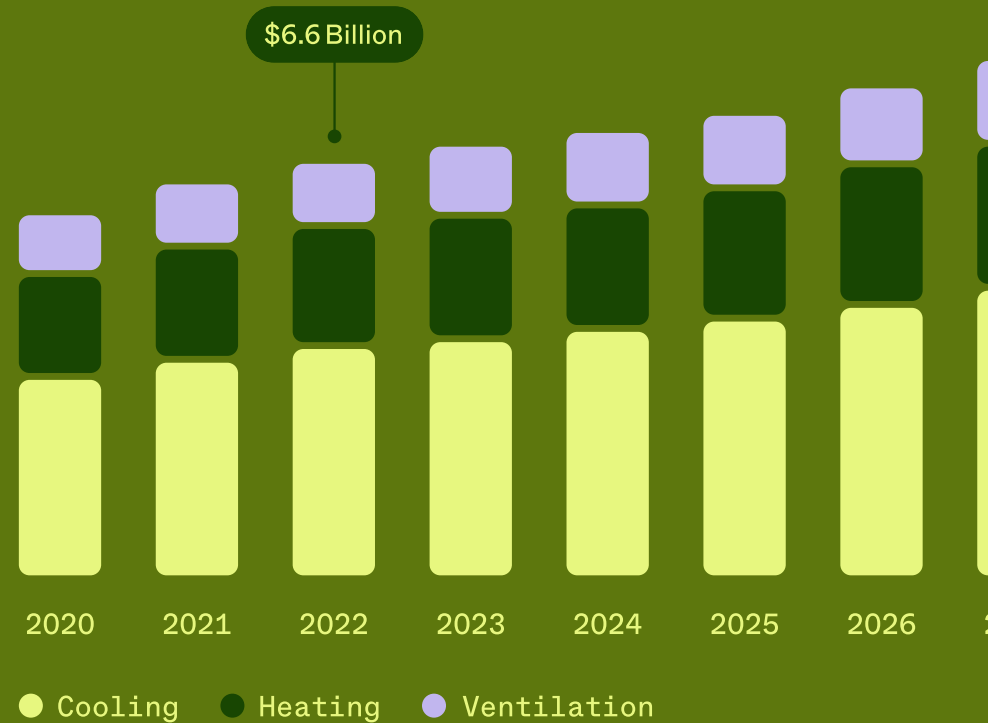


Guide

How DERMS providers can build better HVAC experiences

US Residential HVAC Systems Market



Introduction

As the world moves towards electrification, we're reducing our reliance on fossil fuels that create harmful carbon emissions. But the increased demand for electricity is putting strain on our grid systems.

It's not just that there's more demand for electricity: that demand is also harder to meet with intermittent renewable energy sources. Take electric vehicles (EVs). They're rapidly becoming more popular, and because they have large batteries, they require a lot of energy to charge.

Most charging happens in the early evening – but by sunset, solar power is no longer available. If the sun isn't shining, we can't simply generate more energy to meet spikes in demand. But we don't want to fall back on fossil fuel generation, either.

So what's the alternative?

The time is now for DERMS

To even out the growing imbalance between demand and supply, we urgently need demand-side energy management solutions. These solutions

empower consumers to take control of their consumption, so they can work around the limitations of the energy system, and contribute positively to the energy transition.

It's a win-win. Demand-side solutions help bring the grid into balance, so we can continue to integrate renewable energy sources as we decarbonize major sectors of the economy. They also help consumers cut their own carbon emissions, and keep control of their energy costs as more electricity-powered devices enter their homes.

Today, there's an enormous opportunity for distributed energy resource management systems (DERMS) that can aggregate residential energy devices, and manage their consumption in response to grid conditions.

But building a market-winning DERMS platform is challenging. The energy system is fragmented: there are thousands of energy devices, emerging technologies and competing standards to contend with. That makes it very difficult to develop solutions that work for everyone, which is critical.

“To even out the growing imbalance between demand and supply, we urgently need demand-side energy management solutions.”

Making solutions available to the widest possible market is not only a massive revenue opportunity, but also a chance to encourage consumer uptake, and drive positive change at scale.

HVACS offer untapped potential

HVACs are the obvious place to focus. They're already a huge revenue stream for DERMS providers, and with more units entering American homes every day, it's about to get bigger.

But customer expectations are increasing, too. To win and retain market share, HVAC platforms need to double down on expanding functionality for HVACs, and build value-adding experiences that perform perfectly every time.

It starts with connectivity. In order to offer advanced functionality to the largest possible market, DERMS providers first need to be able to connect to all the different makes and models of HVACs.

Application Programming Interfaces (APIs) are the secret sauce that enable this connectivity.

Whether building or buying, DERMS product managers should focus on three key criteria – API coverage, reliability and functionality – to uplift the customer experience and unlock scale.

Read on to learn why HVAC optimization matters, what users really value, and how quality APIs can help.

Why HVAC optimization matters

Demand for residential heating and cooling equipment is already enormous – and it’s growing:

- Nearly 90% of American homes use some form of air conditioning
- The US HVAC systems market is expected to nearly double in the next decade
- State governors are targeting 20 million heat pump installations by 2030

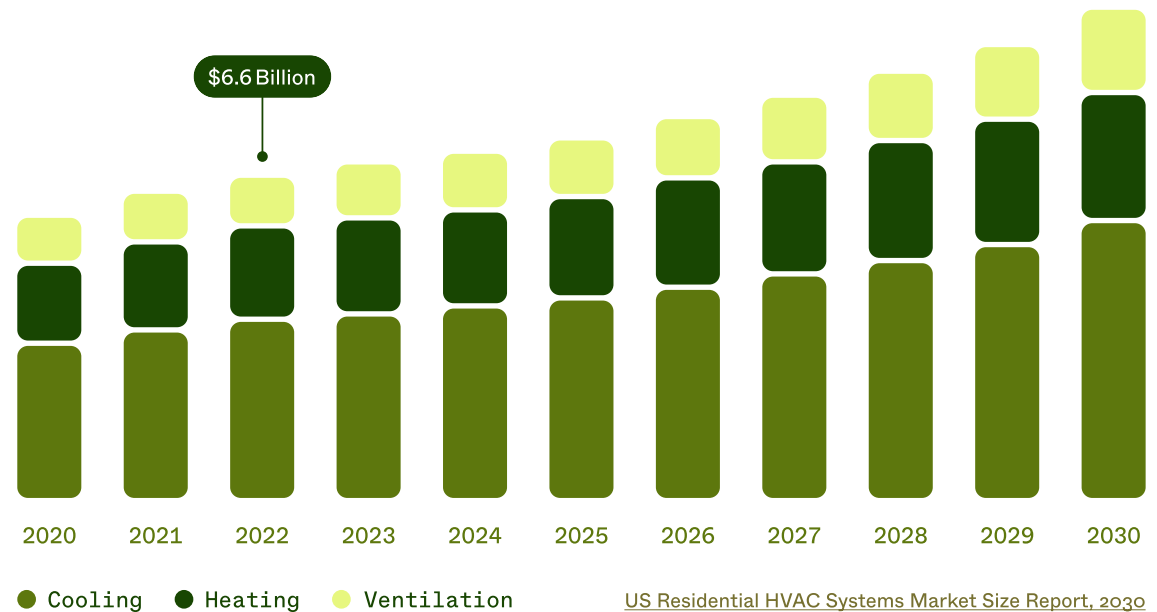
A few interconnected trends are driving this growth. Extreme weather events are becoming more common, so consumers are investing in equipment to keep their homes comfortable. There were a record-breaking 28 climate and weather disasters across the USA in 2023.

As decarbonization efforts step up, consumers are being incentivized to invest in electricity-powered heating and cooling solutions. In 2022, the US federal government passed a federal tax credit of up to 30% for residential heat pump installation.

Fig.1 US Residential HVAC Systems Market
Size, by Product, 2020 – 2030 (USD Billion)

+ 5.6%

US Market Compound Annual Growth Rate (CAGR), 2023 – 2030



But the explosive growth of HVAC is putting strain on the grid. Residential HVACs like thermostats, heat pumps and water heaters make up 8% of total global energy consumption.

If we don't find ways to manage their consumption, the extra demand for electricity puts the grid at risk of blackouts. Most parts of the United States face blackout risks over the next 10 years.

HVACs are also driving up energy costs for consumers. Residential HVACs accounts for a third of home energy consumption. In 2020, electricity consumption by AC systems alone accounted for about 19% – 254 billion kilowatt hours (kWh) of electricity consumption in US homes. That puts the cost to run AC at around \$324 per year, and much more in some cases.

The fact is that most HVACs are limited in their functionality, unable to respond to changing energy prices, or connect to other energy devices in order to optimize energy usage. **DERMS providers can change that, and help mitigate risks to the grid while lowering consumer electricity bills.**

≈90%

of American homes use some form of air conditioning

8%

total of global energy consumption made up by residential HVACs like thermostats, heat pumps and water heaters

2x

expected growth for US HVAC systems market in the next decade

1/3

of home energy consumption attributed to residential HVACs

20M

US Climate Alliance target for heat pump installations by 2030

254B kWh

electricity consumption by AC systems in US homes in 2020

What HVAC users really value

So, how can DERMS providers work with HVACs to make them less taxing on the grid, and more valuable to consumers?

Relieving pressure on the grid means enrolling as many devices as possible into demand-side energy management solutions. The more devices and the greater energy load we can optimize, the less the strain on the grid.

Enrolling as many devices as possible depends upon delivering the best user experience. Delivering the maximum functionality and value, and in the most seamless way, will encourage more users to sign up – and stay engaged.

There are three things HVAC users really care about:

1. Cutting energy costs

2. Reducing carbon emissions

3. Easy-to-use features and functions

There are lots of flexibility use cases that can be built on top of HVACs to deliver this value to consumers, ranging from the simple to the more sophisticated:

1. Read

Access real-time data from HVAC units for insights on current temperature, consumption and more.

2. Control

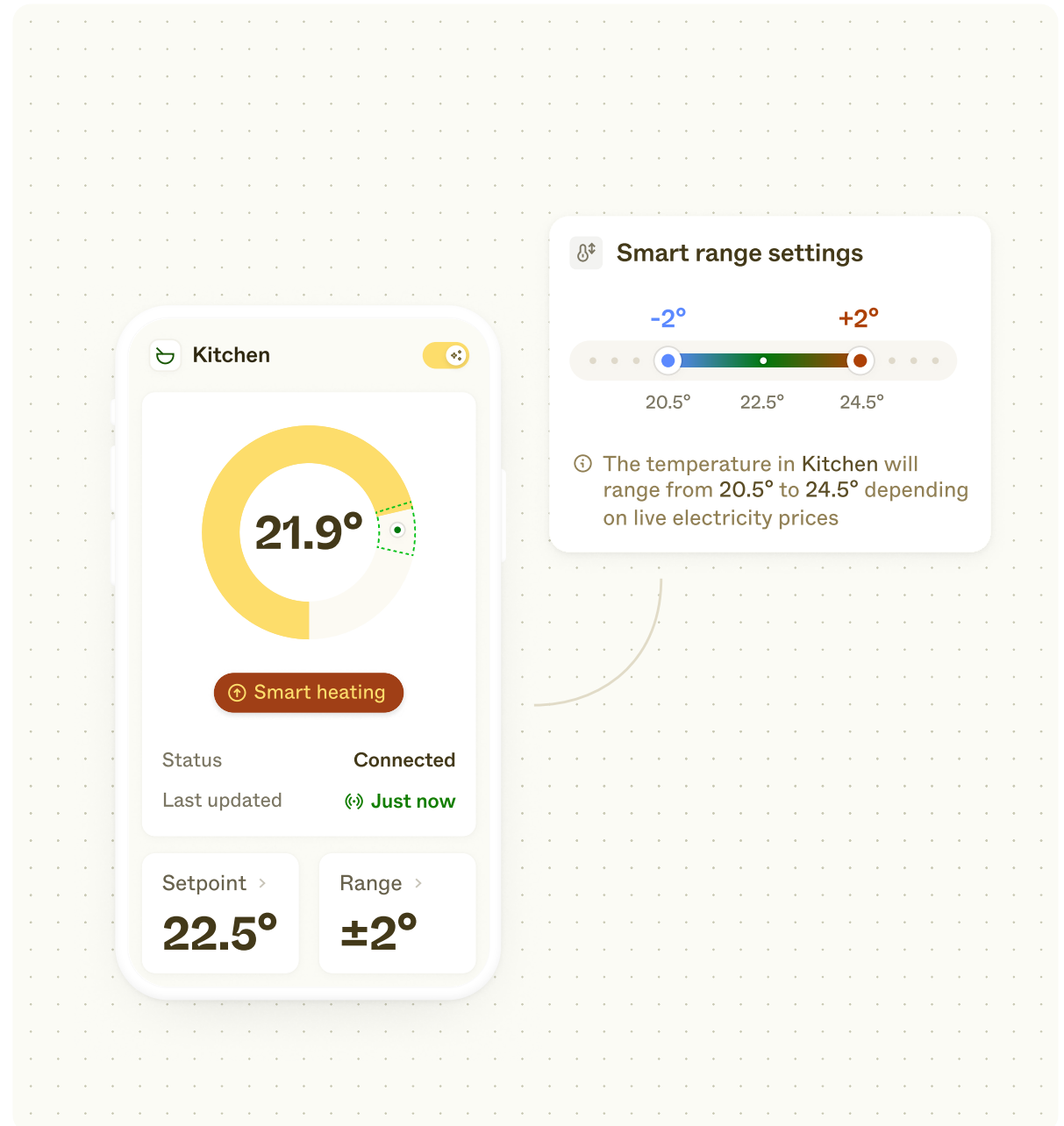
Send commands to HVAC units to adjust temperature or turn on and off remotely.

3. Enrich

Use data and controls to build custom schedules for commands.

4. Optimize

Execute on smart schedules in response to signals from the grid.



How connectivity impacts experience

The first step in building any of these use cases is connecting to HVACs. Connectivity is key – without it, DERMS providers won't be able to reach or retain users as the market becomes increasingly competitive. But connecting to HVACs isn't quite as straightforward as it might seem.

Connectivity is delivered by APIs (Application Programming Interfaces), which allow the exchange of data between users' devices and energy management software, without the need for additional hardware.

But there are hundreds of different HVAC devices, manufacturers and models. Each of these is controlled by separate platforms, with unique APIs. Each API has different capabilities, data standards, and methods for communicating with the device.

That makes integrating with each of these individually a complex and resource-intensive task. Not only does it require a lot of effort on the part of engineering teams, it can have a negative knock-on effect to the user experience, too.

When integrating with HVAC APIs, there are three common challenges that hinder the customer experience, and limit the scalability of DERMS platforms:

1. Coverage

2. Functionality

3. Reliability

1. Coverage

In order to address the whole market, separate integrations need to be built for each model of HVAC. Those integrations require constant, ongoing maintenance to keep on top of new releases and updates.

This can prove a major blocker to scalability. Each new integration adds engineering time and costs. As overheads start to spiral, many DERMS platforms find themselves forced to limit the number of assets with which they integrate.

That means a lot of HVAC owners get left out, limiting uptake and impact.

2. Functionality

The more energy devices enter consumers' homes, the greater the opportunity for innovative DERMS platforms to add value. Leveraging those assets to create a wide range of use cases that deliver cost-savings, emissions reductions and holistic home energy management will put them ahead of competitors.

Not all HVAC APIs offer a full range of functionality and control. But use cases like smart heating and cooling are becoming table stakes. DERMS platforms that can't deliver them risk missing opportunities to win the market.

3. Reliability

Above all, the user experience needs to be consistent and seamless – across every asset and every use case, every time. The success rate of DERMS solutions (how often they successfully execute programs) is pivotal, especially in a competitive market. They can't afford to fail.

The stakes are especially high when it comes to HVACs. They can help keep users comfortable even in the middle of blackouts. Success rate is entirely dependent upon the quality of APIs – meaning APIs could make all the difference between users sitting in a dark, cold house and a bright, warm one.

Best practice for better experiences

Clearly, connectivity is critical to winning the lion's share of the market, delivering a premium experience and getting the maximum value from HVACs.

So, how can DERMS providers overcome connectivity challenges and give their platform the best chance of success?

API quality should be the first priority, with coverage, functionality and reliability the key assessment criteria.

Build or buy?

Building direct integrations that meet all three criteria isn't realistic for every DERMS provider –as mentioned, creating and maintaining integrations with every brand of HVAC is difficult work.

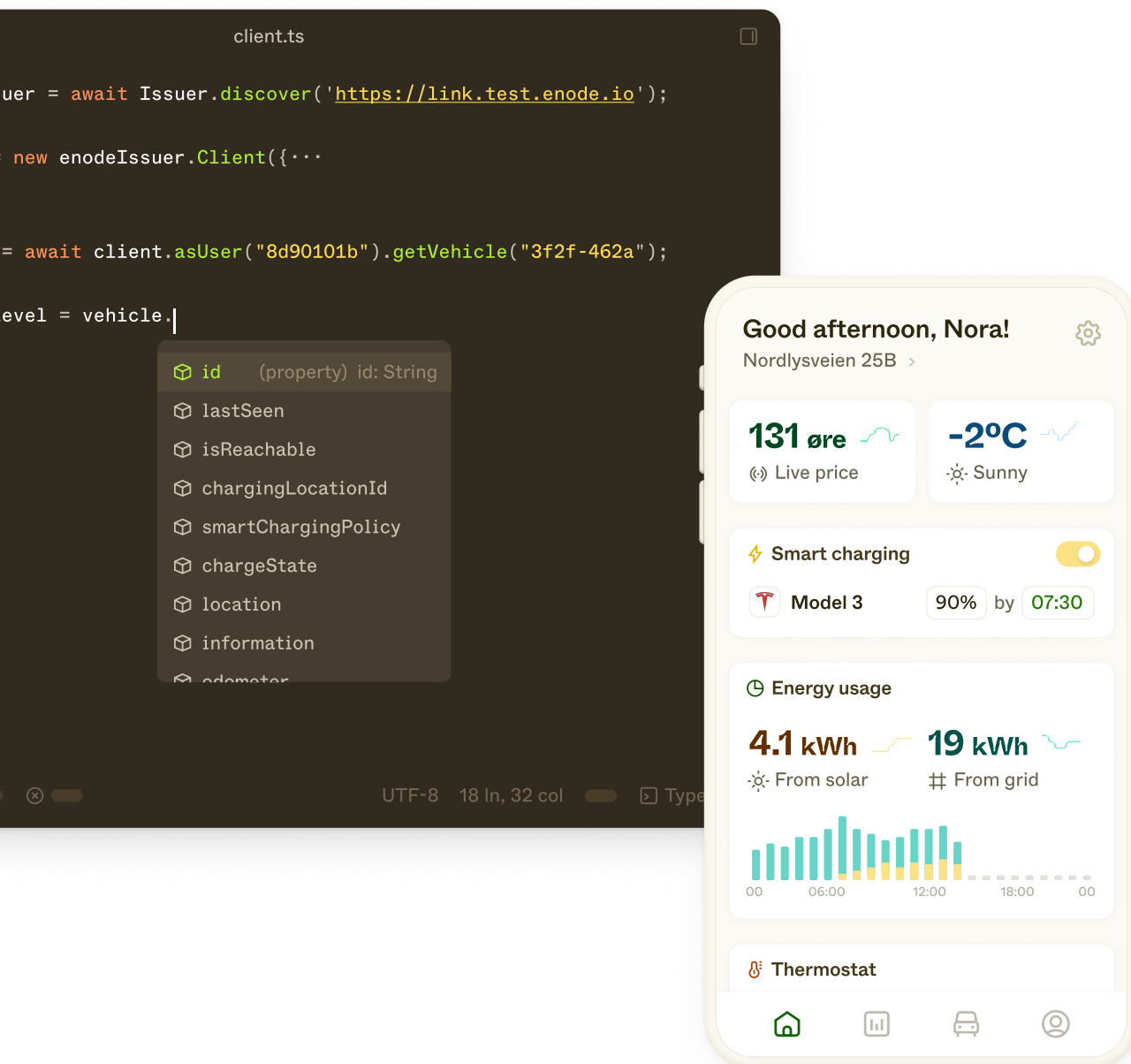
On top of that, there's the challenge of standardizing the data returned and building bespoke capabilities to ensure that the user experience is the same across all devices. This can cause development costs to mushroom, and push out time to market.

Besides cost and time considerations, there's also the question of expertise. Not every team is equipped to manage the technical aspects of connecting to HVACs. It requires specialist knowledge, and can add complexity to system architecture and database organization.

Expecting non-expert engineers to take on the work pulls their focus from the core task of designing a best-in-class app and once again, puts customer experience at risk.

Specialist, third-party APIs can help. They unify a wide range of integrations into a single API. **This helps reduce cost, risk, and time to market, while protecting the user experience.**

“API quality should be the first priority, with coverage, functionality and reliability the key assessment criteria.”



About Enode Connect

Enode is the leading API for energy devices including HVACs, home batteries, EVs and more.

Our Connect API is purpose-built for energy management use cases, offering expanded coverage across 1000+ energy devices.

Connect to a single API

Get up and running with our Connect API in minutes, and get access to hundreds of HVACs and other energy devices in one place.

Integrate your customers' hardware

Guide customers through hardware connection with our Connect UI flows for web and mobile, making integrations a breeze.

Build powerful features

Access and control your customers' hardware through carefully unified endpoints to build your own custom functionality.

ENODE API

One integration, 1000+ energy devices

Interested in learning more about Enode or getting access to our API? Tell us how we can help and we'll reach out to you shortly.

Contact sales