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WHITE PAPER



BUILDING FOR THE NEW ELECTRICAL REALITY

How Rising Loads, Evolving Codes, and Labor Shortages Are Reshaping Residential Construction



- Trends defining the emerging landscape
- Three pillars defining modern infrastructure
- Industrial expertise for the modern builder

ENGINEERED
TO OUTRUN

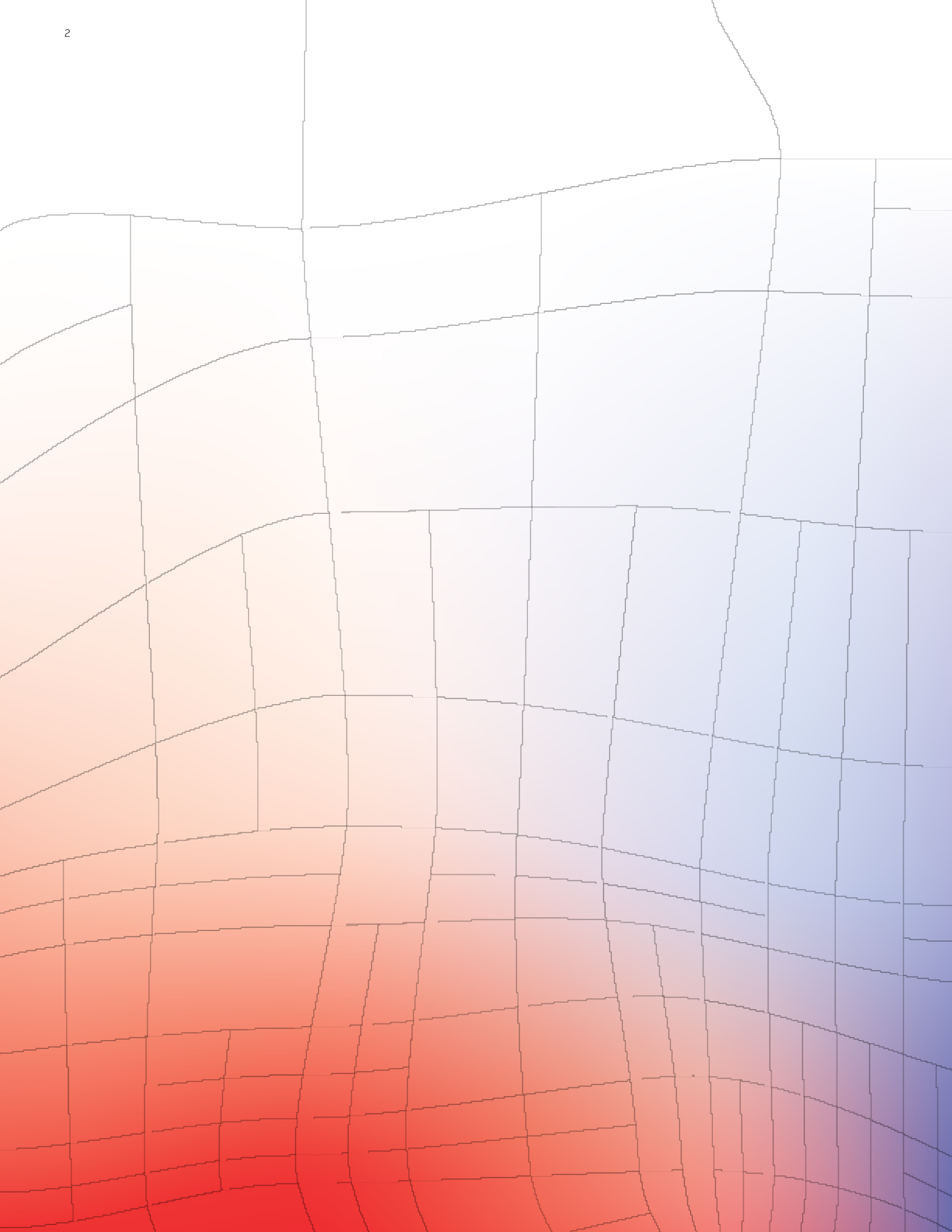


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A MARKET AT AN ELECTRICAL INFLECTION POINT

The U.S. residential construction market is at a turning point. While builders are contending with slower demand and cost challenges, the electrical needs inside new homes are accelerating.

What once counted as “standard” no longer does—and that shift is redefining how homes are designed, built, and equipped.

Homes today are fundamentally different than those built just 15–20 years ago. Electrical infrastructure is now central to comfort, safety, mobility, and energy resilience. Meanwhile, many of the appliances that used to be gas—furnaces, water heaters, cooking equipment, dryers—are becoming electric, especially as states pass new codes and electrification policies.

The result: electrical infrastructure is no longer a passive component of the home. It is a competitive differentiator.

The future of residential living is electric, intelligent, and increasingly modular. Builders who align with this transition now will lead their markets as demand accelerates.

As this shift accelerates, builders face a new set of critical questions:

- **Capacity:** How do we design homes ready for more load without oversizing or under sizing circuits, panels or services?
- **Safety:** How do electrical systems stay stable as more devices depend on them?
- **Labor:** How do we reduce installation time when the labor pool is shrinking?
- **Future-Proofing:** How do we deliver homes that are not just “code compliant,” but future-ready?

This white paper outlines the trends, codes, and three defining themes builders must prioritize to navigate this shift.

THE DATA BEHIND THE SHIFT

60-70%

of U.S. homes have panels rated <200 Amps.¹

+3% / -3%

Electric water heaters rising vs. gas declining.²

4 MILLION

Annual heat pump shipments (surpassing gas).³

72%

of agents say utility costs are now a top priority for homebuyers.

O1 VEIC, "Market Study of Electric Infrastructure Upgrade Alternatives for Electrification," 2022.

O2 RMI, "Tracking the Heat Pump & Water Heater Market in the United States," 2025.

O3 AHRI, "Residential Automatic Storage Water Heaters Historical Data," 2025.

O4 NAR, "Residential Sustainability Report," 2025.

THE NEW ELECTRICAL REALITY

Codes, Loads, and Labor

Residential construction is heading into a new era. Multiple forces are converging to make this moment a strategic inflection point—not just a cyclical shift. As expectations rise and labor tightens, the definition of a "standard" home is being rewritten.

01



Codes & Electrification

The NEC 2023 cycle is now effective in 20 states,⁵ and New York's All-Electric Buildings Act begins phasing in this year.⁶ Future codes (like the 2024 IECC) are designing around electrification, requiring homes to be "electric-ready"—often mandating EV pre-wiring—even if gas is installed.⁷ This means that homes permitted from 2026 onward will require **more capacity**, **greater flexibility**, and **smarter control** than any previous generation.

02



Rising Electrical Demand

Electrification is accelerating. Heat pumps are replacing gas furnaces, high-efficiency electric water heaters are becoming standard, and battery storage and backup power are moving into the mainstream. Even before this wave, household electricity consumption rose 40% over the last 40+ years.⁸ With widespread electrification adoption, demand is expected to grow another 10–15% in the next 5–10 years.⁹

⁰⁵ NFPA, "NEC Enforcement Status," 2025

⁰⁶ New York State Senate, "S1736: All-Electric Building Act," 2024.

⁰⁷ "Electrification and Energy Codes Primer," 2025.

⁰⁸ SolarTech, "Average Household Power Consumption: Complete 2025 Guide & Stats," 2025.

⁰⁹ NERC, "2024 Long-Term Reliability Assessment," 2024; EIA, "Short-Term Energy Outlook," 2025.

O3



Expanding Safety Requirements

Modern codes continue to increase requirements for Arc Fault Circuit Interrupter (AFCI), Ground Fault Circuit Interrupter (GFCI), and dual-function protection. Breakers now need to safeguard more circuits simultaneously and respond with greater precision—minimizing unnecessary interruptions safely while handling larger, fluctuating loads from smart devices.

O4



Labor Pressures

The skilled labor shortage persists, with 70% of builders reporting difficulty finding qualified electricians.¹⁰ This pressure is dictating how homes are built, driving demand for modular panel designs and simplified wiring layouts that speed up installation, inspections, and simplify future upgrades.

The Bottom Line for the Modern Builder

Homes now require smarter, safer, and more flexible electrical infrastructure than ever before. This is not simply about compliance—it's about designing homes ready for the next decade of electrification.

¹⁰ National Association of Home Builders, nahb.org.

THE SOLUTION

Three Pillars Builders Must Prioritize Today

As trends and code shifts reshape the electrical demands of new homes, they also clarify where builders must focus next. The pressures of modern construction are not abstract—they translate into three practical, high-impact priorities that every builder must navigate today and in the years ahead.

These priorities—**Intelligence**, **Circuit Protection**, and **Efficiency**—form the foundation of the next era of residential design. The following section breaks down these critical pillars, what they mean for builders, and how ABB technology transforms them from challenges into solutions.





PILLAR 01

Residential Energy Management Systems

Electrification pushes peak loads past 200A limits. Upgrading to 400A is often cost-prohibitive (exceeding \$20,000) or blocked by utility constraints.¹¹ Builders face a costly dilemma: stall the project for a massive infrastructure upgrade or find a smarter way to manage the load.



Code Insights

Residential codes are shifting from simple safety to active readiness. EV-ready mandates are rapidly becoming standard across major markets, alongside increasing requirements for battery storage prep, load visibility, and prioritization. Builders who fail to integrate these intelligent systems now risk expensive late-stage redesigns and complicated inspection paths.



Builder Pain Points

Beyond the hard costs, the timeline impact of a 400A upgrade is often fatal to project schedules. Upgrading a service entrance frequently triggers utility engineering reviews, new transformer requirements, and trenching permits—delays that can pause a closing for 8–12 weeks or lead to an outright denial from the utility provider.



The Solution

ABB's load management solutions are engineered to intelligently manage and optimize the home's load consumption, avoiding costly service upgrades while saving time and money for both builders and homeowners.

ABB's **ReliaHome™ Smart Panel** integrates active energy management directly into the load center. It monitors and sheds loads (like EV chargers) during peak usage, creating the ideal capacity optimization tool for new construction.

ABB's **ReliaHome™ Flex** offers a modular, retrofit-ready alternative. It adds circuit-level intelligence and control to any existing panel, providing homeowners with a path for adding high-demand loads without creating additional headaches for builders.



01 The system-agnostic ABB ReliaHome™ Smart Panel complements any load center. Ideal for new builds or retrofits, it can effortlessly manage high demand loads or optimize battery backup, making it a simple solution to electrification challenges.



02 ABB's ReliaHome™ Flex brings adaptable energy management to modern homes. Add energy-intensive loads without upgrading the main panel or utility service.

¹¹ ENERGY STAR, "Reducing the Cost of Electrification with Alternatives to Electric Panel Upgrades," 2023.

PILLAR 02

Next-Generation Circuit Protection

Modern homes now support more high-demand appliances and sensitive electronics than ever, which can increase the likelihood of interruptions and homeowner dissatisfaction. As protection requirements continue to expand across the industry, the tension between delivering robust safety measures and maintaining scalable, reliable system performance has become a central challenge for builders.



Code Insights

Recent NEC cycles have expanded AFCI and GFCI requirements across nearly all residential applications, underscoring the industry's commitment to stronger homeowner safety. As future codes push for even greater precision in identifying true electrical hazards without misreading normal operation, builders are now tasked with delivering this elevated level of protection while maintaining the everyday reliability homeowners count on.



Builder Pain Points

Unnecessary service calls related to tripping add labor costs, disrupt schedules, and pull electricians away from new installs to troubleshoot completed homes. After move-in, repeated electrical interruptions often lead to homeowner complaints—even when the system is operating as designed.

Builders and electrical contractors need protection solutions that meet evolving code requirements while delivering reliable performance in today's load-heavy homes, helping reduce post-installation disruptions and service demands.



The Solution

ABB's ReliaHome™ ELITE Circuit Breaker represents a leap forward in residential circuit protection. Engineered to maintain the highest levels of safety while delivering dependable performance in today's power-dense homes, these breakers give builders a new differentiator: high-performance protection aligned with modern residential electrical demands.

Built on ABB's global heritage of powering the world's most critical infrastructure, these circuit breakers use multiple algorithms and machine learning technology to intelligently distinguish between real electrical threats and harmless noise.



03 ABB's ReliaHome™ ELITE Circuit Breakers use advanced algorithms to differentiate between dangerous arcs and harmless appliance signals, providing protection without disrupting the homeowner's life.



04 Reliability by Design. Engineered for immediate reliability, ELITE technology prepares the home for heavy loads like electric vehicles.

PILLAR 03

Modular Installation & Efficiency

Chronic labor shortages have made electrical installation a critical bottleneck, with 70% of builders reporting difficulty finding skilled trades. Legacy load centers are rigid, slow to wire, and often lack field-adjustable meter phasing. To overcome these bottlenecks, builders need modular solutions that reduce on-site installation time without compromising quality.



Code Insights

Evolving NEC requirements—including surge protection, AFCI/GFCI mandates, and accessible disconnects—are driving the industry toward more organized systems. Modular platforms naturally align with these standards by standardizing layouts and minimizing manual wiring errors, making compliance easier to achieve consistently across different communities.



Builder Pain Points

With skilled labor scarce, builders cannot afford the friction of complex, rigid installations. Traditional panels that are slow to wire and difficult to inspect lead to project delays and failed inspections. Furthermore, legacy designs create future headaches when homeowners inevitably want to add solar, EV charging, or backup power.

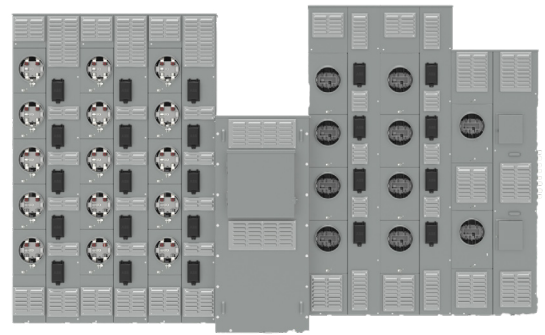


The Solution

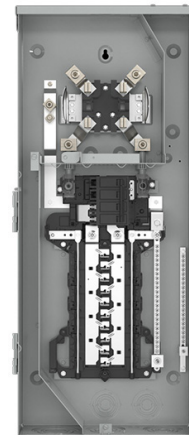
ABB addresses the labor gap by engineering speed and flexibility directly into the hardware.

ABB ReliaMod™ streamlines multi-unit metering with quick-ganging enclosures and built-in mounting rails. This eliminates the need for manual re-measuring and leveling, allowing contractors to install up to six sockets faster while ensuring NEC 2020 compliance. Designed to mitigate voltage drop, the system accommodates various cable sizes and multiple cables per phase, offering flexibility where utility drops are installed.

For single-family applications, **ReliaHome™ Meter Combos** feature **plug-on neutral technology**. This eliminates messy pigtail connections and simplifies breaker installation. The result is a system that cuts wiring time, reduces complexity, and delivers a cleaner, safer service entrance right out of the box.



05 ReliaMod™ features quick-ganging enclosures and adjustable phase balancing, allowing contractors to adapt to site-specific needs without slowing down the install.



06 Wiring Simplified: Meter Combos with plug-on neutral technology eliminate pigtails, clearing the gutter space for a faster, cleaner installation that is easier to inspect and modify.

BRINGING INNOVATION HOME

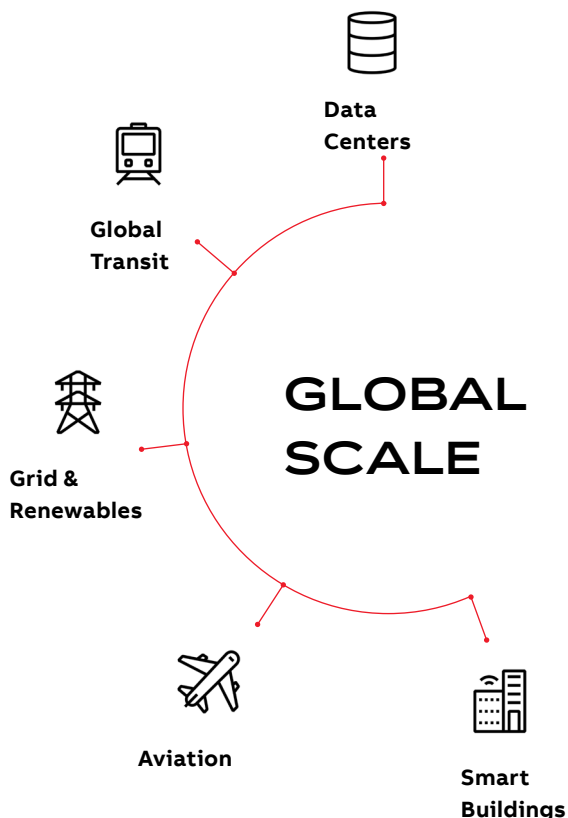
ABB: A Global Leader Bringing Industrial Innovation to Residential Construction

As residential infrastructure becomes more complex, the question becomes clear: **Who is equipped to help builders make this transition with confidence?**

Meeting the demands of modern electrification takes more than incremental product updates. It requires a partner with deep expertise, a global innovation engine, and the ability to translate complex infrastructure into reliable, builder-friendly solutions. That is the role ABB has been preparing for decades.

A Global Electrification Leader with Deep Roots

Founded more than **140 years ago**, ABB has continually set the standard for electrical safety, distribution, and automation across more than 100 countries. Our technologies support:



This heritage gives ABB unmatched insight into how electrical systems must function at scale, under complexity, and with absolute reliability. That same engineering discipline, manufacturing scale, and innovation mindset fuels **ABB's growing leadership in the U.S. residential market**. As homes increasingly resemble micro-grids, this experience becomes essential.

A Strategic Expansion into U.S. Residential—and a Modernized Portfolio

ABB's commitment to the North American residential market accelerated in **2018 with the acquisition of GE Industrial Solutions**. This investment combined a trusted installed base with ABB's global R&D excellence. Since then, ABB has:

- **Re-engineered legacy products** to meet ABB's global performance expectations
- **Upgraded reliability and safety standards** across the low-voltage portfolio
- **Introduced new product families** built specifically for modern homes
- **Expanded modular and smart-energy technologies** to match electrification demands
- **Invested heavily in U.S. production and quality systems** to ensure speed, consistency, and scalability

This modernization is not cosmetic—it represents a fundamental shift in how the residential electrical system is designed, installed, and supported.



07 Bringing the precision of global industrial engineering directly to the residential job site.

Partnering With Leading U.S. Homebuilders

Today, ABB supports many of the **largest homebuilders in the United States**, providing:

- Enterprise-grade reliability
- Simplified installation tools and modular designs
- Smart energy management capabilities
- Future-ready electrical platforms that evolve with homeowner needs
- Load-management features that reduce the need for costly service upgrades
- Breaker technologies engineered to reduce nuisance trips and callbacks

Builders turn to ABB because the company delivers more than products—it brings depth, stability, and long-term partnership to an industry that is transforming quickly.

Bringing Enterprise-Level Technology into the Home

The same engineering rigor that powers high-profile commercial and industrial projects now underpins ABB's residential offerings. Smart energy management, advanced protection algorithms, modular architectures, and data-driven insight systems—all of these innovations have been adapted for homes, making residential electrical systems more intelligent, safer, and more flexible than ever.

For builders, that means confidence. Confidence that the infrastructure behind their homes is not only compliant, but resilient. Not only modern, but future-proof. Not only innovative, but backed by a global electrical leader.

BUILDING FOR THE HOMES OF TOMORROW STARTS TODAY

The residential market is approaching a turning point. Rising load demand, evolving codes, electrification mandates, shifting homeowner expectations, and tightening labor conditions are converging into a new reality: **homes must be designed smarter, safer, and more flexible than ever before.**

For builders, this isn't a disruption—it's an opportunity.

Homes built with intelligent load management, advanced circuit protection, flexible smart-energy systems, and modular electrical designs will stand out in an increasingly competitive market. They will require fewer callbacks, move through inspections faster, adapt more easily to homeowner upgrades, and be more resilient as codes and technologies continue to evolve.

And ABB is uniquely positioned to help builders lead this transformation.

With 140 years of electrification leadership, global engineering excellence, and a fully modernized residential portfolio, ABB offers the solutions—and partnership—required to build the homes of tomorrow. Whether it's enabling EV readiness without service upgrades, reducing unnecessary interruptions with next-generation breakers, simplifying installation through modular platforms, or delivering smart-energy insights homeowners can trust, ABB brings enterprise-level innovation directly to the residential jobsite.

The future of residential living is electrified. It's intelligent. It's modular.

And the builders who embrace these priorities today will shape the communities of the next decade.

ABB is ready to build that future with you.





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