

# **Commercial Expansion**

## **BAS Integration**

ENGM 178 Interim Presentation – Team 2



# Meet the Team



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Madras



**Pranav  
Chavare**

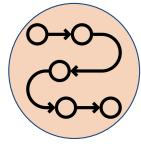
BE in Computer Science  
Ex Associate Intern at ZS



**Executive Summary**



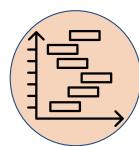
**Technical Assessment**



**Technical Roadmap**



**Market Opportunity**



**Next Steps**

# Alarm.com - Company Snapshot

## Alarm.com Holdings Inc

NASDAQ : ALRM

Leading cloud-based services platform for connected properties and smart homes

### Product Suite

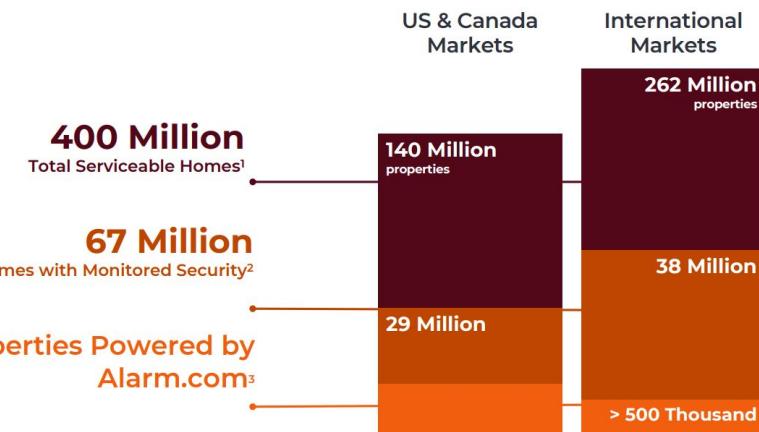
Security and Video Cameras

Analytics platform

Automation & monitoring devices

Commercial grade hardware and software solutions

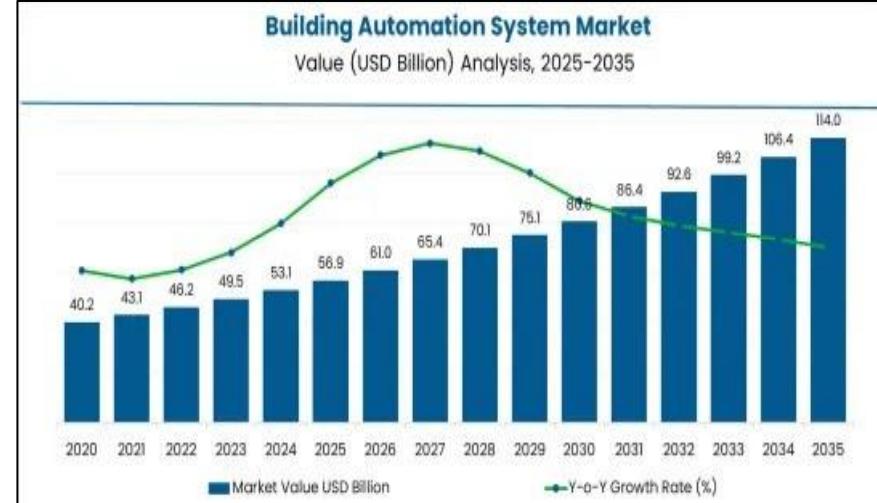
## Global Market Opportunity



There is significant scope for expansion in international markets



# Building Automation System markets are expected to grow significantly



# Executive Summary



## Problem statement

Existing Building Automation System protocols lack necessary features and have varying regional regulations slow commercial deployments and increase integration cost preventing Alarm from getting new customers in Europe.



## Key research question

Which integration approach enables fastest, lowest-risk market entry to meet our clients goal of achieving 5000 net new customers?



# Phased Hybrid rollout using Schneider : Pilot in Europe, followed by the US

Leverage Schneider Electric EcoStruxure as a vendor to deploy a hybrid Building Automation System architecture in Europe, followed by expansion into the U.S to expand into the commercial ecosystem.



Executive Summary



Technical Assessment



Technical Roadmap

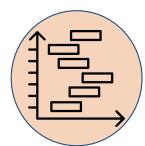
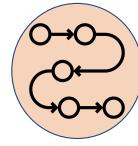


Market Opportunity



Next Steps

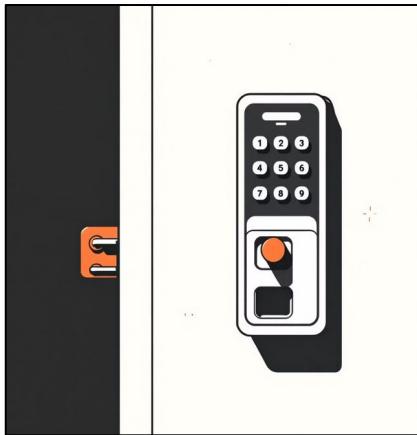




**Executive Summary** **Technical Assessment** **Technical Roadmap** **Market Opportunity** **Next Steps**

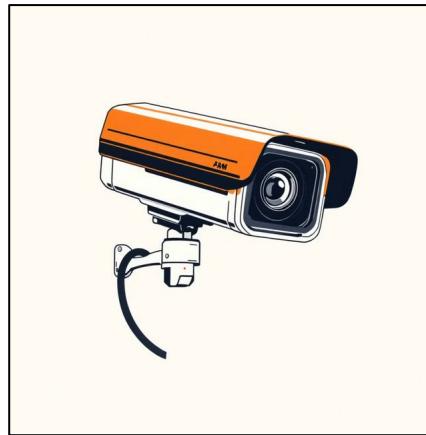


# Access, Video, and HVAC were integration priorities



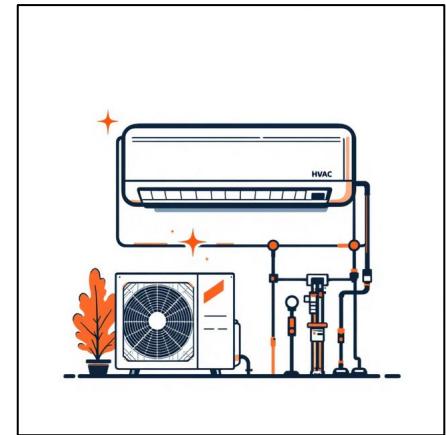
## Access Control

Unified credentials & event correlation



## Video Surveillance

Centralized recording and analytics



## Thermostat & HVAC Control

Occupancy-driven energy optimization



Executive Summary



Technical Assessment



Technical Roadmap



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# Cost, scalability, and compatibility were the key business drivers



## Cost

Cost-light solution to enable a feasible pilot program



## Scalability

Scalable solution to achieve the objective of new customers.



## Compatibility

Retrofit-friendly design to minimize disruption to existing systems



# A hybrid approach is the best market entry

Criterion	Weight	Protocol	Third-Party Middleware	Cloud-to-Cloud	Edge Gateway	Hybrid (Edge + Cloud)
GTM Speed	0.25	5	7	9	8	9
Initial Costs	0.25	7	6	8	7	8
Scalability	0.20	4	7	9	7	9
Latency	0.15	9	7	3	9	9
Operation Costs	0.15	7	6	3	8	7
Total Score	1.0	6.4	6.6	6.95	7.8	8.4



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# Schneider can provide a fast and scalable solution

	Pros	Cons
 Innovation At Every Level	Modular platform Broad protocol support Largest global ecosystem	Regulatory inertia
	Modular integration	Industrial focus Complex API integrations
	User-friendly dashboards Strong HVAC system	Legacy integration issues High-customization cost
	Strong AI analytics Secure	High cost Closed ecosystem Enterprise focus



# Schneider is the best vendor for Alarm.com

Criterion	Weight	Schneider Ecostruxure	Siemens Designo CC	Johnsons Metasys	Honeywell Forge
Market Position	0.2	9	9	7	8
Technical Capability	0.2	10	8	8	7
Integration Ecosystem	0.2	9	8	9	8
Reliability and Support	0.2	8	7	8	9
Regulatory Alignment	0.1	7	9	8	8
Financial Feasibility	0.1	8	5	6	6
Total Score	1	8.7	7.8	7.8	7.8



Executive Summary



Technical Assessment



Technical Roadmap



Market Opportunity



Next Steps

# Schneider fits the bill for tech and ops

## Hybrid Architecture

Combines real-time edge control with cloud analytics for low latency operations and maximum system resilience.

## Broad Interoperability

Native protocol support across Access, HVAC, and Video simplifies integration and ensures future-proofing.



## Robust Ecosystem

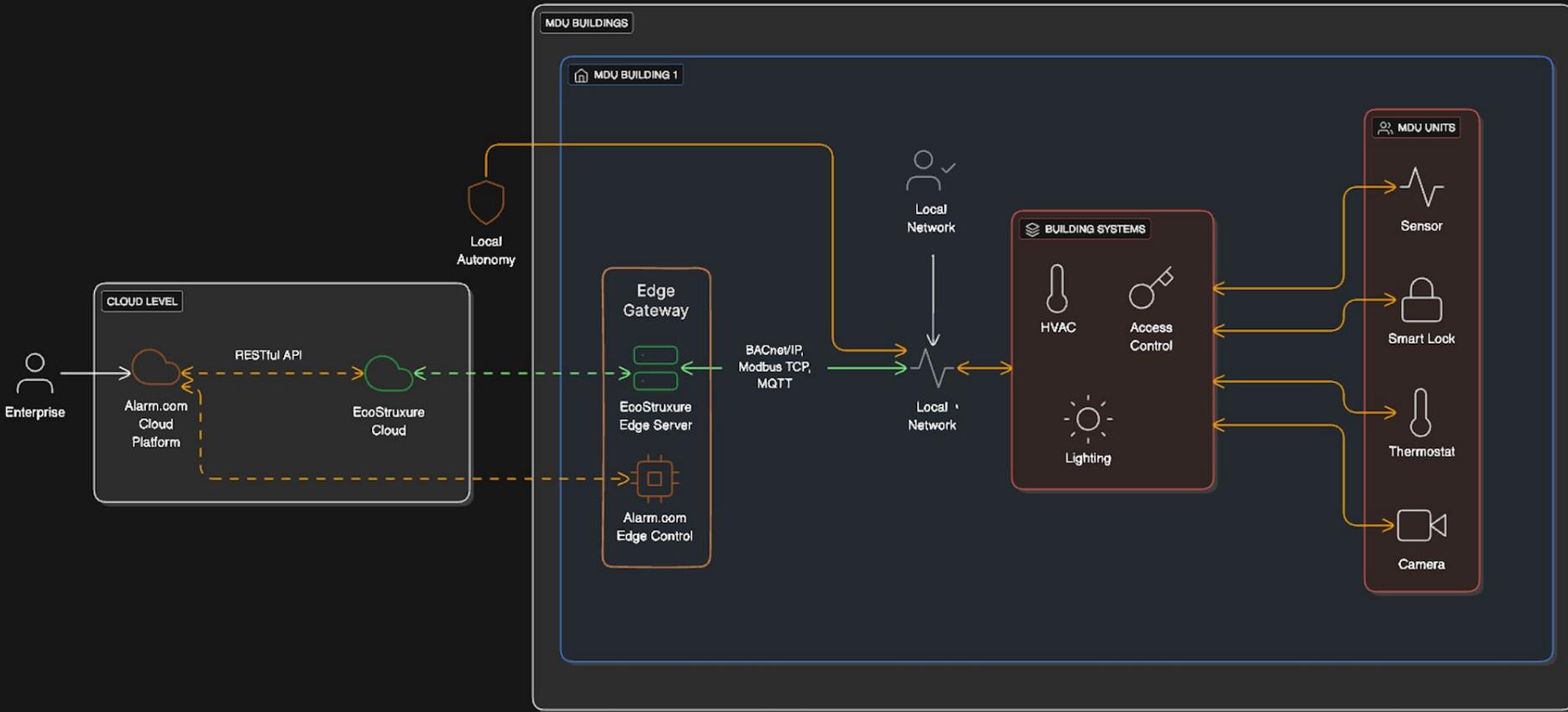
A vast global network of 12,000+ partners and 500+ marketplace integrations provides reliability and choice.

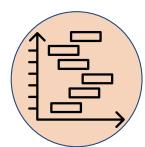
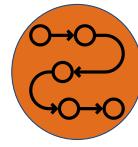
## Regulatory Alignment

Compliant with major mandates like EPBD 2024/1275, GEG, and Local Law 97, reducing compliance risk.



# Architecture Overview





**Executive Summary**

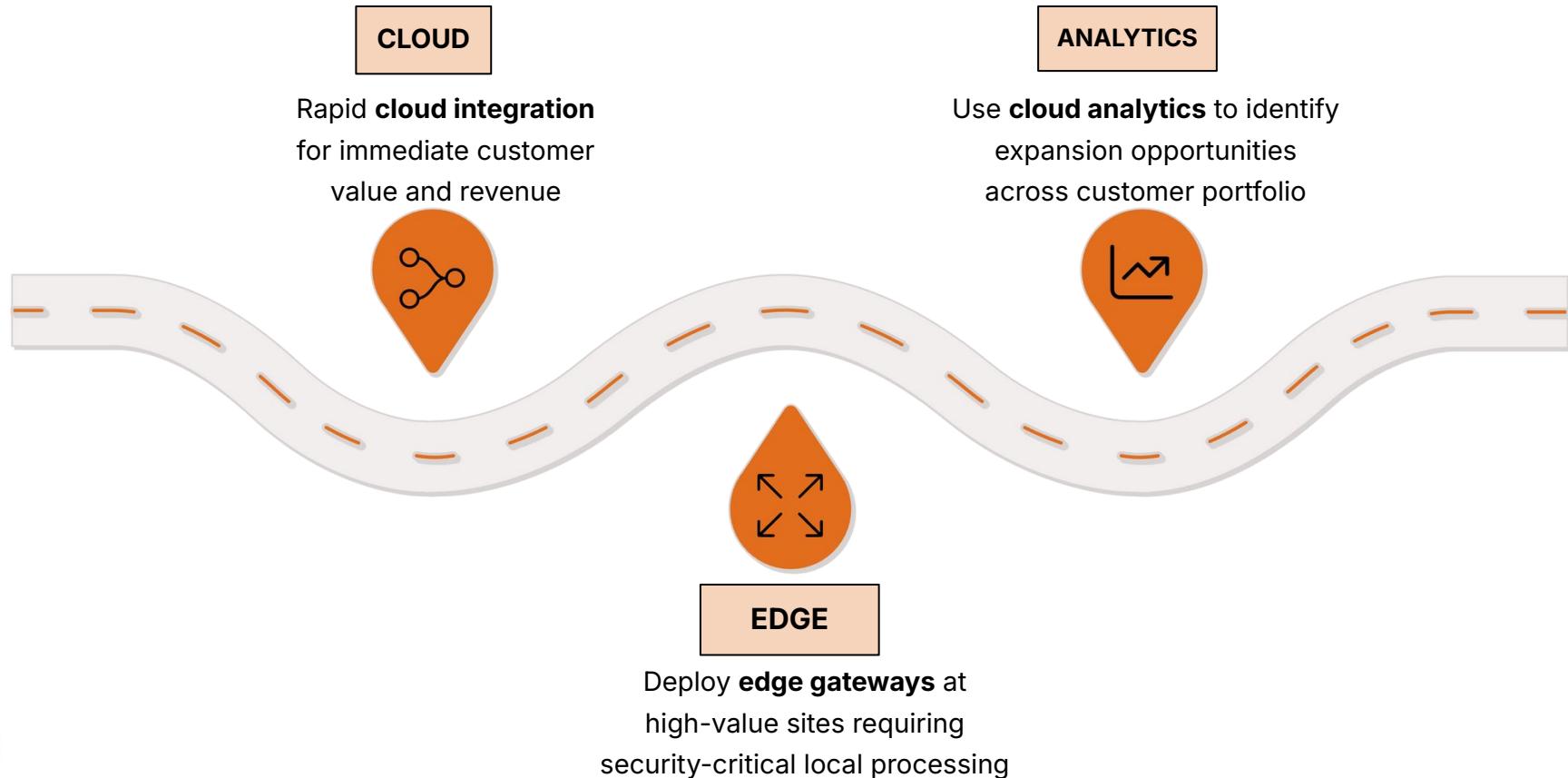
**Technical Assessment**

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# Cloud → Edge → Analytics: A three-phase roadmap to scale smarter



# PHASE 1 – Rapid Cloud Integration (Immediate Customer Value)

**Global cloud analytics growing from  
\$27.7B(2023) → \$104.2B (2032)**

**EcoStruxure built on Microsoft  
Azure**

**Enables fast deployment +  
predictive monitoring**

**Scales across multiple  
industries instantly**



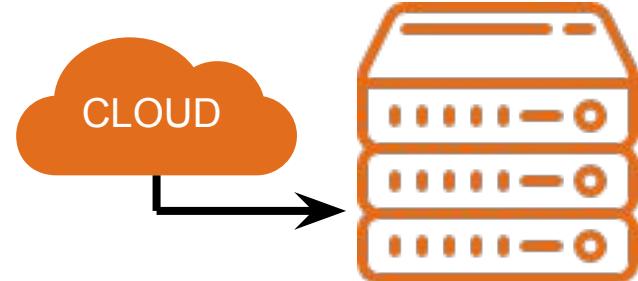
## PHASE 2 – Edge Gateways: Bringing Intelligence Closer To Operations

Large industrial sites may generate 10TB+ of data daily, making full cloud transfer inefficient

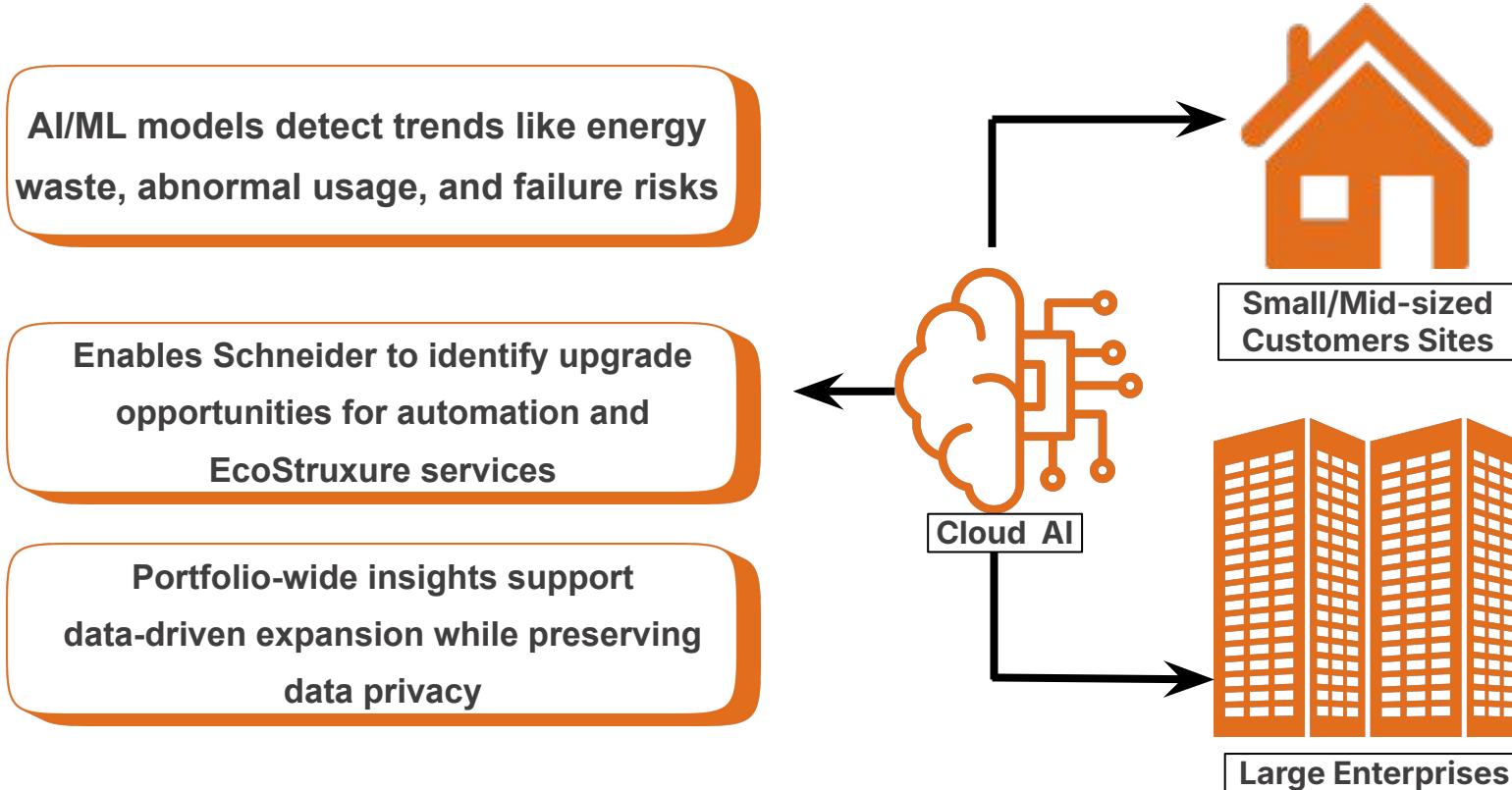
Edge gateways enable millisecond-level local decision-making for critical environments

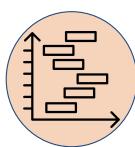
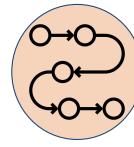
Local processing safeguards data with on-site encryption and industry-standard security

EcoStruxure Micro Data Centers maintain control and automation even during cloud outages



# PHASE 3 – Cloud Analytics: Unlocking Strategic Growth & Portfolio Intelligence





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# **Emerging Markets: United States and Europe**

**Review regions with strong rules  
and steady growth**

**Building automation and energy  
upgrades**



# Pilot in Europe - Germany and France in 2025 Before Expanding to the U.S.

## Faster Market Growth Driven by Regulation

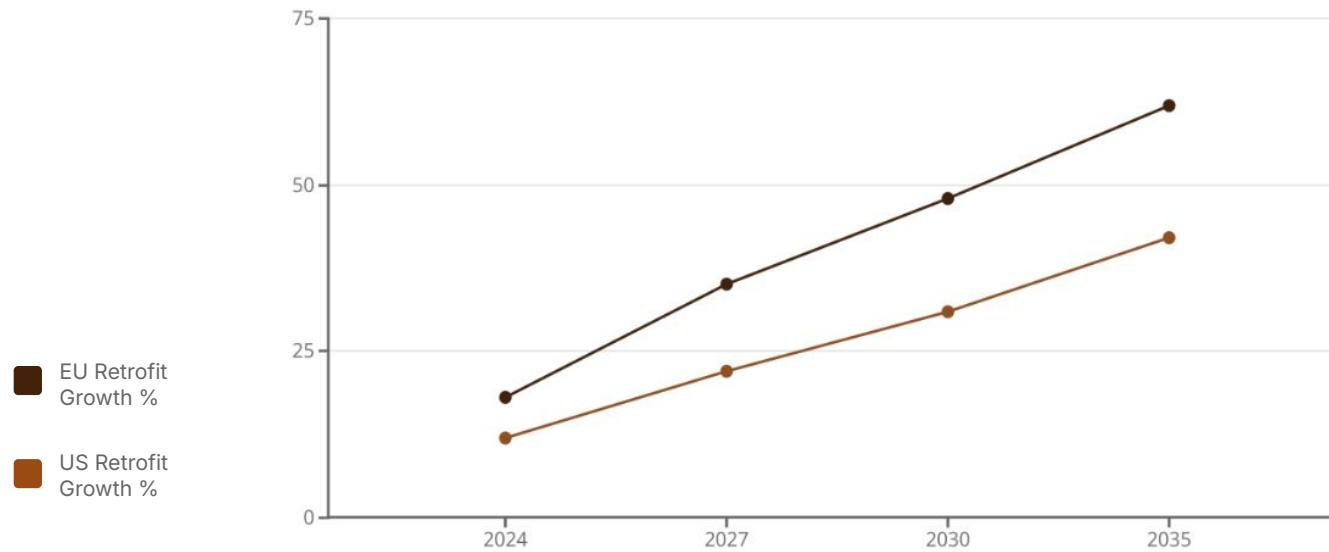
Europe targets **35M** building renovations by **2030** under strict EU mandates

## Larger Public Funding and Subsidies

Retrofit funding for **France** and **Germany** totals approximately **€18 billion** annually

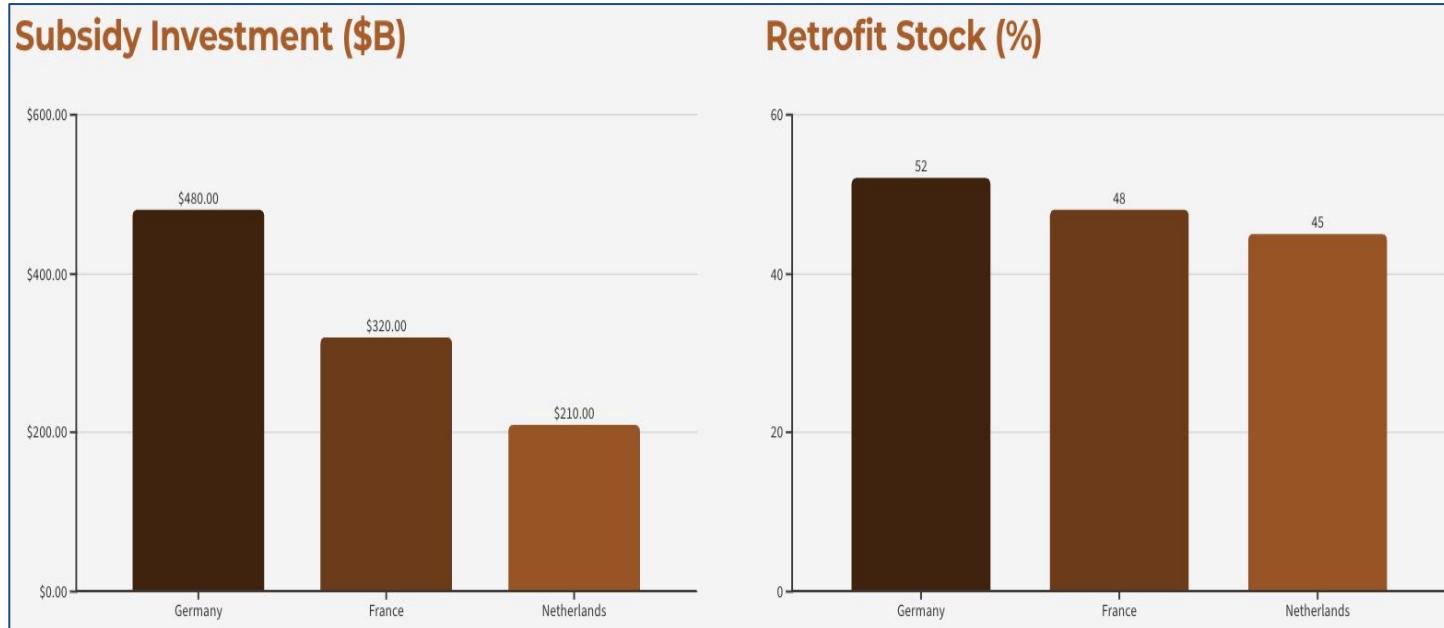
## Market Size and Urbanization Trends

Europe's building automation market is growing at a **12.5% CAGR**, expected to reach **\$15 billion** by 2030



# European governments are supporting energy efficient systems

Europe's energy rules require building owners to upgrade. Germany, the Netherlands, and France have set clear deadlines. Europe is investing over €2 trillion in building improvements by 2035.



# Alarm.com cuts NYC and Boston CO2 fines by \$92K on average

Major U.S. cities have strict retrofit rules. Boston and New York show clear demand for connected building controls.

## Boston: BERDO 2.0

- 2030 emissions reduction target: **50%**
- Escalating noncompliance fines: **\$135–\$575** per ton CO2 equivalent

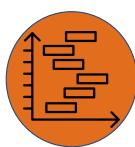
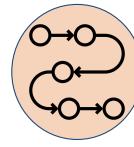
## New York City: Local Law 97

- 2030 emissions reduction target: **40%**
- Penalties reach **\$268+** per ton CO2 overage

## Alarm's Value Proposition

City	Noncompliant Buildings	CO2 Reduction/Building	Fine Saved/Building	Citywide Savings Total/Year
Boston	3,975	150–220 tons	\$86,250–\$126,500	\$343M–\$503M
NYC	3,700	150–220 tons	\$40,200–\$58,960	\$149M–\$218M

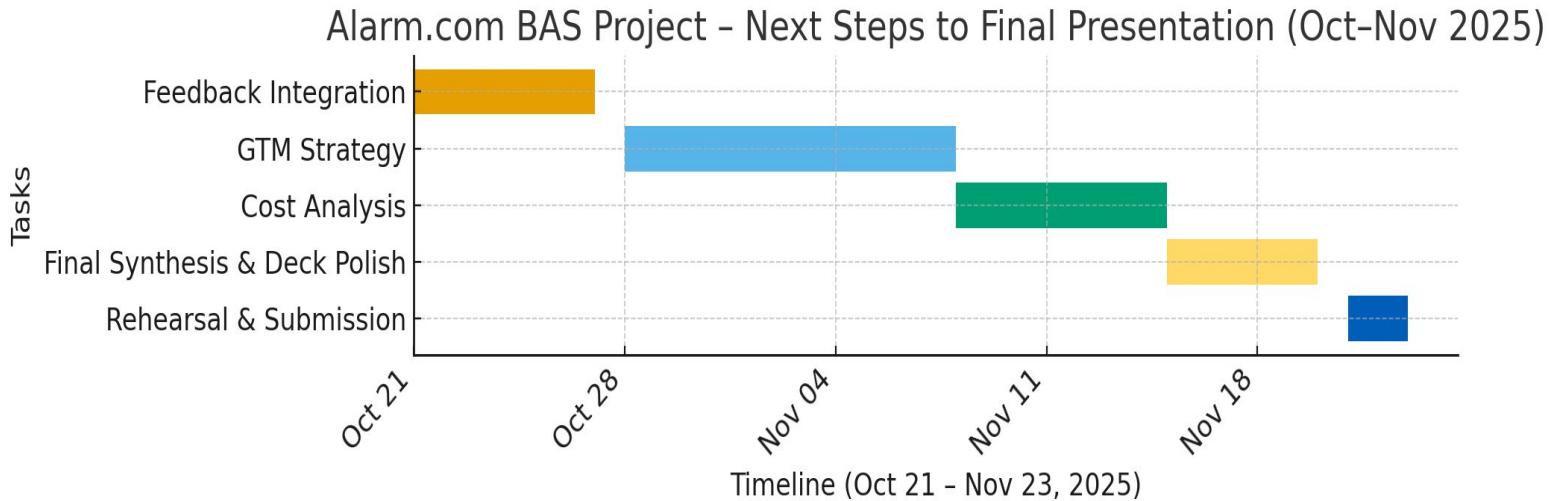




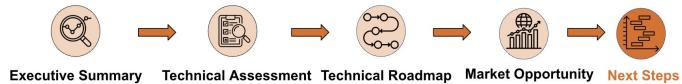
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# Next Steps : Financial Analysis and Market Strategy



**Goal : Capture 5,000 New Customers to generate revenue and expand business lines**



**Thank you**

# Appendix - Table of Content

Sl.no	Team member	Slide Number
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2.	<b>Pranav Chavare</b>	Company snapshot - Pg 22 Technical approach Rubric - Pg 23
3.	<b>Eli Grehn</b>	Why Europe - Pg 36 Q&As - Pg 36-43



# **Alarm.com Company Snapshot**

- 1. Alrm-preso\_3q23\_final.pdf - Company 2023 Communication Material**

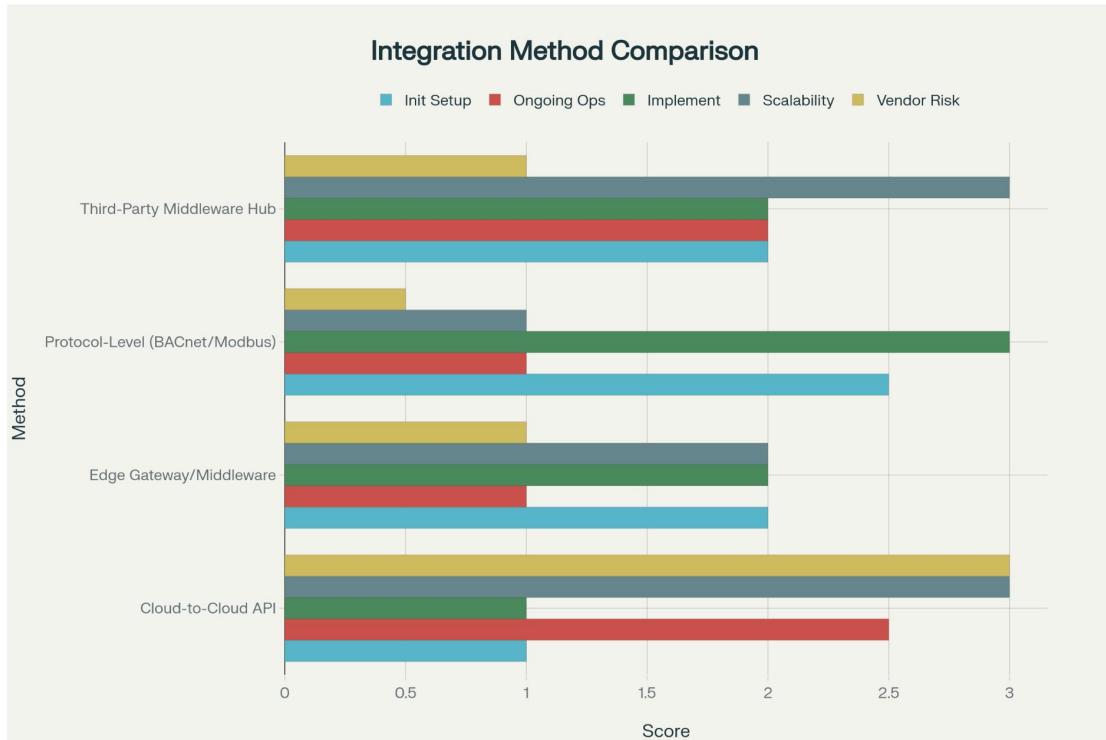


# Approach matrix Rubrics

Score	Scalability	Initial Costs	Operation Costs	Latency	Go-To-Market Speed
1	Single-device only; no multi-site capability	>\$15/ft <sup>2</sup> ; extensive capital expenditure	>\$3/ft <sup>2</sup> /yr; high maintenance and support labor	>1,000 ms; not usable for control	>24 months; full custom development
2	Tens of points; manual expansion required	\$12–15/ft <sup>2</sup> ; heavy hardware and license fees	\$2.5–3/ft <sup>2</sup> /yr; frequent patches and manual updates	500–1,000 ms; only batch monitoring	18–24 months; heavy customization
3	Hundreds of points; frequent bottlenecks	\$10–12/ft <sup>2</sup> ; high consulting and integration costs	\$2–2.5/ft <sup>2</sup> /yr; moderate support contracts	200–500 ms; slow feedback loops	12–18 months; complex integrations
4	~1,000 points; manual planning for growth	\$8–10/ft <sup>2</sup> ; moderate hardware and setup fees	\$1.5–2/ft <sup>2</sup> /yr; standard maintenance fees	100–200 ms; noticeable control delay	9–12 months; established vendor processes
5	~5,000 points; limited automation of provisioning	\$6–8/ft <sup>2</sup> ; mixed CAPEX/OPEX model	\$1–1.5/ft <sup>2</sup> /yr; predictable subscription plus labor	50–100 ms; acceptable for non-critical	6–9 months; some pre-built connectors
6	~10,000 points; basic automated provisioning	\$4–6/ft <sup>2</sup> ; primarily subscription with some hardware	\$0.75–1/ft <sup>2</sup> /yr; automated updates, low support needs	20–50 ms; moderate for most controls	4–6 months; standard templates and guides
7	~25,000 points; elastic within a single region	\$3–4/ft <sup>2</sup> ; low hardware, standard software fees	\$0.5–0.75/ft <sup>2</sup> /yr; managed services with minimal effort	10–20 ms; good for HVAC and lighting	3–4 months; minimal customization
8	~50,000 points; multi-region support with some tuning	\$2–3/ft <sup>2</sup> ; pay-as-you-go, minimal upfront	\$0.25–0.5/ft <sup>2</sup> /yr; largely self-healing operations	5–10 ms; strong real-time performance	2–3 months; largely out-of-the-box
9	100,000+ points; automated global elastic scaling	\$1–2/ft <sup>2</sup> ; almost pure OPEX, little hardware	\$0.1–0.25/ft <sup>2</sup> /yr; negligible operational overhead	2–5 ms; near-real-time control	1–2 months; turnkey solutions
10	Unlimited points; zero-touch, self-healing scaling	<\$1/ft <sup>2</sup> ; pure SaaS, zero upfront cost	~\$0/ft <sup>2</sup> /yr; fully managed, zero operational effort	<2 ms; instantaneous response	<1 month; instant cloud provisioning



# Initial analysis of Integration



**Optimal Approach:**  
Edge Gateway/Middleware  
Integration  
Based on technical requirements  
and cost analysis, the Edge  
Gateway/Middleware Integration  
method provides the best value  
proposition

# Vendor choice matrix Rubrics

Criterion	1 (Worst)	2	3	4	5 (Moderate)	6	7	8	9	10 (Best)
<b>Market Position</b>	Unknown, no market presence	Very small, niche regional vendor	Minor presence in some buildings	Modest share, little brand value	Recognized, some projects	Nationally known, moderate share	Established brand, strong in some regions	Regional leader, sector leadership	Major global brand, wide portfolio	Market leader, dominant presence, globally recognized
<b>Technical Capabilities</b>	Obsolete tech, outdated protocols	Barely supports today's standards	Minimal features, slow upgrades	Partial or slow to adopt new tech	Meets current minimum tech	Mainstream, reliable foundation	Tech advances, releases new features	Innovator, strong roadmap	Industry-setter, best-in-class tech	Cutting edge, first with new tech, setting industry pace
<b>Integration Ecosystem</b>	No developer support, closed system	Minimal API/docs, no certifications	Limited integration, manual process	Some open APIs, little support	Standard integration	APIs + integrations, modest support	Certified partner/developer programs	Large ecosystem, many choices	Highly interoperable, extensive ecosystem	Global open standard, rich API/docs, communities
<b>Operational Factors</b>	Poor support, unreliable, fails SLAs	Slow, unresponsive, lots of outages	Somewhat unreliable, slow fixes	Just meets minimum support needs	Dependable, standard SLAs	Reliable, positive customer reviews	Consistently exceeds SLAs, proactive support	24/7 full support, multilingual teams	Proactive health monitoring, predictive ops	Auto-remediation, predictive ops, zero downtime
<b>Financial Considerations</b>	Severely overpriced, poor ROI	Price premium, few savings	Noticeable higher TCO	Somewhat expensive/average ROI	Average price point	Affordable for most, good value	Above-average value for money	Very competitive; strong ROI	Market best value, clear savings	Lowest ownership cost, rapid sustainable ROI
<b>Regulatory Fit</b>	No compliance, fails audits	Major gaps, compliance delayed	Barely passes current rules	Passes major audits, not future ready	Meets all current rules	Compliant + prepping for new regs	Proactive, supports future requirements	Preferred by authorities, pilots new rules	Compliance partner to regulators	Sets standards, always first to comply



# Market Position

## Schneider Ecostruxure (9/10)

Schneider Electric holds a commanding market position, ranked No. 1 globally in multiple 2025 industry rankings including Guidehouse Research's microgrid integrators and ABI Research's grid digitalization technologies. The company collectively accounts for approximately 60% of the North American BAS market alongside other major players, with EcoStruxure recognized as a comprehensive, market-leading platform. Their global presence, strong brand recognition, and consistent innovation in energy management and building automation justify the high score.

<https://www.marketreportanalytics.com/reports/north-america-building-automation-systems-market-89961>

## Siemens Desigo CC (9/10)

Siemens maintains an equally strong market position with robust revenue growth and digital building solution leadership. The Desigo platform is recognized as one of the best building automation systems available in 2024-2025. Siemens holds approximately 40% combined market share with other top-tier players (Honeywell, Johnson Controls), and demonstrates strong order backlogs and investment in digital twin technologies. The company's comprehensive portfolio across high-performing buildings and data centers reinforces this top-tier positioning.

<https://www.futuremarketinsights.com/reports/building-automation-system-market-share-analysis>

## Johnson Controls Metasys (7/10)

Johnson Controls maintains significant BAS market share, particularly strong in HVAC controls and integrated smart building platforms. As one of the four dominant forces collectively holding 60% of the North American market, Johnson Controls has established leadership in the commercial sector. However, recent cybersecurity vulnerabilities (CVE-2025-26383) and slightly lower innovation ratings compared to Schneider and Siemens justify a marginally lower score. The company's Metasys platform remains highly competitive with strong enterprise adoption.

<https://www.futuremarketinsights.com/reports/building-automation-system-market-share-analysis>

## Honeywell Forge (8/10)

Honeywell demonstrates strong growth momentum with expanding BAS ventures like Honeywell Forge and Connected Solutions. The company holds substantial market position with megatrend alignment in automation and smart buildings. Recent innovations including AI-powered building management solutions adopted by Verizon and Vanderbilt University showcase technological leadership. While strong, Honeywell's market share is slightly behind the top two leaders, warranting an 8/10 score.

<https://electronicsevolution.wordpress.com/2025/06/06/top-building-automation-system-manufacturers-their-market-strategies-2025/>

# Technical Capability

## Schneider Ecostruxure (10/10)

Schneider Electric earns the highest technical capability score due to its comprehensive EcoStruxure platform, which provides core capabilities for connectivity and intelligence, interoperable foundations for smart operations, and cloud-connected digital services. The platform supports open, software-defined automation with UAO.org standards (over 100 members), advanced AI integration through Microsoft collaboration (Automation Copilot), and cutting-edge technologies including edge computing, IoT, and machine learning. The Modicon M660 controller and EcoStruxure Automation Expert Platform demonstrate industry-leading technical depth.

## Siemens Desigo CC(8/10)

Siemens Desigo CC offers scalable, open building management with native BACnet Secure Connect capabilities, supporting 150,000 objects in single systems or 1.5 million in distributed architectures. The platform includes advanced automation devices, AI-enabled applications through Building X, and generative AI capabilities for instant query responses. Modernization pathways support BACnet/SC, cloud connectivity, and cybersecurity enhancements. While technically robust, Siemens scores slightly lower than Schneider due to less emphasis on fully software-defined, open automation ecosystems.

## Johnson Controls Metasys (8/10)

Johnson Controls Metasys demonstrates strong technical capabilities with continuous releases (14.1 and 15.0) featuring advanced energy management, BACnet Advanced Operator Workstation (B-AWS) profile compliance at Protocol Revision 19, expanded architectural flexibility, and enhanced UI features. The system integrates HVAC, fire, security, and lighting into a seamless platform with AI-powered diagnostics and predictive maintenance. Multi-repository data forwarding and expanded OS support (Ubuntu, Debian, Red Hat) demonstrate technical maturity. The score reflects strong but slightly less cutting-edge capabilities compared to top performers.

## Honeywell Forge (7/10)

Honeywell's technical capabilities center on Honeywell Forge and Connected Solutions, featuring AI-powered platforms integrating critical building software into unified interfaces. The platform includes advanced encryption, remote monitoring, predictive maintenance, and energy management supporting decarbonization. AI-enabled installation processes reduce deployment time dramatically. However, compared to competitors, Honeywell shows less emphasis on fully open, standards-based automation and slightly less comprehensive protocol support, justifying a 7/10 score.



# Integration Ecosystem

## Schneider Ecostruxure (9/10)

Schneider Electric's EcoStruxure platform excels in integration with standards-based communication protocols, native analytics, and interoperability foundations. The platform supports BACnet/IP, BACnet/SC, Modbus, KNX (via SpaceLogic gateway), MQTT, and RESTful APIs. Video surveillance integration through IPConfigure's Orchid VMS offers broad device compatibility including ONVIF support. The Microsoft Azure IoT technology backbone enables extensive third-party integrations. The score reflects comprehensive ecosystem support with minor limitations in native ONVIF support.

## Siemens Desigo CC (8/10)

Siemens Desigo supports extensive protocol integration including BACnet, OPC UA, OPC DA, Modbus, SNMP, KNX, IEC61850, and RESTful Web Services. Building X platform integration with Xcelerator enables broader ecosystem connectivity. The system's open architecture and distributed capabilities support complex multi-site deployments. While strong, Siemens scores slightly lower due to less emphasis on video/security integration ecosystems compared to Schneider.

## Johnson Controls Metasys (9/10)

Johnson Controls Metasys demonstrates excellent integration capabilities with BACnet Advanced Workstation profile support, enabling seamless third-party BACnet device integration without additional hardware. The platform supports open APIs, extensive protocol compatibility, and partnerships with major technology providers including Microsoft. Multi-repository data forwarding enhances integration flexibility. The system's proven track record in diverse applications and strong API ecosystem justify the high score.

## Honeywell Forge (8/10)

Honeywell Forge provides unified data models aggregating multi-source data for consistent analytics, supporting BACnet, Modbus, OPC UA, MQTT, and REST/HTTP protocols. RESTful and GraphQL APIs enable third-party integration with microservices architecture. However, the platform shows slightly less emphasis on fully open, multi-vendor integration compared to top competitors, resulting in an 8/10 score.



# **Reliability and Support**

## **Schneider Ecostruxure (8/10)**

Schneider Electric maintains a strong global support network through EcoXpert partners and demonstrates high industry ratings. The company's comprehensive product security certification (IEC 62443) ensures cybersecurity validation, and extensive resources including white papers and guidelines support customer implementations. Cybersecurity and data protection are key pillars of their Trust Charter. While strong, occasional complexity in support structures for legacy systems justifies an 8/10 score.

## **Siemens Desigo CC (7/10)**

Siemens demonstrates consistent financial performance with strong cash flow and customer support structures. Regular modernization guidance and engineering training resources support reliability. However, the complexity of multi-tiered product lines and periodic challenges in coordinating support across distributed automation systems result in a 7/10 score.

## **Johnson Controls Metasys (8/10)**

Johnson Controls maintains a mature cybersecurity culture with ongoing vulnerability management and extensive support libraries. The company provides comprehensive product documentation, performance verification tools, and regular security advisories. Strong sustainability reporting and global presence support reliability. However, recent cybersecurity incidents (CVE-2025-26383) prevent a perfect score.

## **Honeywell Forge (9/10)**

Honeywell achieves the highest reliability score due to certification to highest safety standards ( $10^{-9}$  reliability in aerospace applications), reliable industrial controls, and global service teams. The company's domain expertise in critical applications, 24/7 OT Security Operations Center, and proactive cyber defense solutions demonstrate exceptional reliability focus. Strong track record across building automation and industrial segments justifies the top score.

# Regulatory Alignment

## Schneider Ecostruxure (7/10)

Schneider Electric has been named the world's most sustainable company with multiple regulatory and sustainability leadership rankings. The company demonstrates strong compliance with international standards and ESG best practices. Product security certifications (IEC 62443) ensure regulatory alignment. However, the score reflects room for improvement in specific BAS regulatory frameworks compared to Siemens.

## Siemens Desigo CC (9/10)

Siemens achieves the highest regulatory alignment score due to comprehensive compliance with international standards, ESG best practices, and strong emphasis on cybersecurity with native BACnet Secure Connect capabilities. The company's Building X platform integrates regulatory compliance features, and Siemens maintains leadership in European green building standards and the European Green Deal. Extensive documentation and adherence to building codes across global markets justify the top score.

## Johnson Controls Metasys (8/10)

Johnson Controls reports in accordance with GRI standards and demonstrates alignment with UN Sustainable Development Goals. The company maintains strong sustainability reporting and compliance frameworks. Recent Metasys releases emphasize regulatory compliance features including BACnet/SC support and enhanced cybersecurity. While strong, slightly less comprehensive regulatory leadership compared to Siemens results in an 8/10 score.

## Honeywell Forge (8/10)

Honeywell's aircraft controls and automation systems are certified to highest aviation and industrial safety standards. The company demonstrates strong alignment with industry regulations and maintains comprehensive impact reporting. AI-enabled solutions address evolving regulatory requirements for energy security. The score reflects strong but not leading regulatory alignment compared to Siemens.

## **Financial Feasibility**

### **Schneider Ecostruxure (8/10)**

Schneider Electric demonstrates high profitability, strong organic growth, robust margins, and leading global capitalization. The company's financial performance shows consistent revenue growth driven by data center expansion. Strong market position and financial stability support feasibility. However, potentially higher initial costs compared to some competitors result in an 8/10 score.

### **Siemens Desigo CC (5/10)**

Siemens maintains strong earnings, cash flow, and shareholder returns with streamlined balance sheets. However, the complexity and potentially higher costs of distributed Desigo CC architectures, combined with premium pricing for high-performance building solutions, result in lower financial feasibility scores. The score reflects strong financial health but higher implementation costs.

### **Johnson Controls Metasys (6/10)**

Johnson Controls demonstrates revenue and backlog growth with sustainable dividends and strong cash management. The company maintains competitive pricing but faces challenges from high implementation costs in some scenarios. Financial feasibility is solid but not exceptional, resulting in a 6/10 score.

### **Honeywell Forge (6/10)**

Honeywell shows ongoing portfolio updates aligned with megatrends and stable global growth. The company's building automation segment demonstrates strong performance. However, pricing models and implementation costs comparable to Johnson Controls, combined with premium positioning, result in a 6/10 financial feasibility score.

# Schneider Electric EcoStruxure Architecture

## Edge/On-Premise Layer:

- Edge Server: Containerized software at site, provides local logic, trend logging, alarm supervision, field bus connectivity.
- Runs on Linux containers (Docker) on local hardware.
- Supports 10-300 devices per Edge Server (depending on license tier).
- Autonomous operation if disconnected from cloud/enterprise.
- SpaceLogic AS-P: Physical automation servers similar to Edge Server.

## Enterprise/Cloud Layer:

- Enterprise Server: Central orchestrator for multiple Edge Servers across sites; deployable on-premise or cloud.
- EcoStruxure IT Expert: Cloud monitoring and analytics.

## Protocol Support:

- Native BACnet/IP, BACnet/SC, KNX (local building protocols)
- Modbus TCP, MQTT for IoT connectivity
- RESTful APIs, Web Services

# Siemens Desigo CC Architecture

## On-Premise Layer:

- Desigo CC Server: Windows-based platform, local/distributed servers at sites.
- Configurable as single or multi-server.
- Supports 150,000 objects (single system), 1.5 million objects (distributed).
- Desigo PXC Controllers: Field-level automation for HVAC, lighting, building systems.

## Cloud Integration:

- Desigo CC data can be shared with cloud apps via Building X Platform.
- Integration is optional; can be fully on-premise.

## Protocol Support:

- BACnet, OPC UA, OPC DA, Modbus, SNMP, KNX, IEC61850 (local)
- RESTful Web Services, OPC for cloud connectivity

# **Johnson Controls Metasys Architecture**

## Edge/On-Premise Layer:

- ADX (Application & Data Server): On-premise Windows server, manages building operations.
- NAE (Network Automation Engine): Field controllers at equipment, execute control logic locally.
- NAEs connect to ADX but continue local control if network fails.
- Operates on local IP networks within building infrastructure.

## Cloud Services:

- Cloud-based analytics and remote monitoring are optional.
- Core building control remains on-premise with ADX/NAE.

## Protocol Support:

- BACnet for local systems
- RESTful APIs for integration
- HTTPS/TLS for secure component communication

# Honeywell Forge Architecture

## On-Premise Layer:

- Edge gateways and controllers for local data aggregation, filtering, and pre-processing.
- Supports BACnet, Modbus, OPC UA, and proprietary protocols.
- Enables secure local control with TLS encryption.

## Cloud Integration:

- Unified data model aggregates multi-source data for consistent analytics.
- AI-powered analytics for predictive maintenance and asset management.
- Real-time, customizable dashboards for operations monitoring.
- RESTful and GraphQL APIs with microservices architecture.

## Protocol Support:

- BACnet, Modbus, OPC UA for building and industrial systems.
- MQTT and REST/HTTP for IoT and cloud connectivity.
- Secure communication via TLS.

## **What makes Germany and France stand out as starting points?**

Germany and France enforce strong building energy regulations, set clear renovation targets, and provide substantial public funding for upgrades. Germany's Building Energy Act requires carbon neutrality in buildings by 2045 and mandates retrofitting for many property types. France's new 2025 heating regulations and the Climate and Resilience Act set firm deadlines and widen the scope of required renovations, while offering financial support to owners. (85)

## **How strict are the penalties in Boston and New York?**

Boston's BERDO 2.0 imposes fines of \$135–\$575 for each ton of CO2 emissions above the set limit for buildings over 35,000 sq ft, effective 2025. New York City's LL97 levies penalties of \$268 or more per ton of CO2 over the building's annual limit on buildings over 25,000 sq ft, starting in 2024. (82)(87)

## **Why is Europe projected to grow faster in retrofit rates?**

Europe's growth comes from binding regional energy targets, national laws, steady financial support, and a continent-wide push to decarbonize the building stock by 2050. Each country must submit National Building Renovation Plans with clear 2030, 2040, and 2050 paths. Significant investment and minimum energy performance standards ensure faster, larger-scale renovations. (85)(94)

## **Are rebate programs really making a difference in U.S. cities?**

Yes. Programs like ConEd's incentives and IRA tax credits help lower costs and speed up adoption for building owners in New York and Boston, directly supporting compliance with local laws. (89)

## **What **data** supports the size of the multifamily **retrofit opportunity**?**

Federal and market studies show sustained growth in multifamily upgrades, with billions in potential savings and projected market value climbing from \$265B in 2022 to well over \$500B by 2033.  
(92)(94)(95)

## **How does **Alarm.com** fit these compliance-driven opportunities?**

Alarm.com offers integrated automation—thermostats, access controls, and reporting. These address emission tracking and compliance demands in Boston (BERDO 2.0) and New York (LL97), making the platform well-suited for regulated retrofit markets.  
(82)(87)

## **What are Con Edison rebates?**

Con Edison offers financial rebates for New York City building owners who make energy efficiency upgrades, such as installing controls, efficient HVAC systems, or automated building technologies. These incentives help lower the up-front cost of retrofits that are needed to comply with regulations like Local Law 97. (89)

## **What are the local and federal programs you are talking about?**

Local programs include city-level incentives like Boston's BERDO Equitable Emissions Investment Fund and New York City's Con Edison rebates. Federal programs include the Inflation Reduction Act (IRA) tax credits and grants for energy efficiency projects that apply nationwide, helping property owners reduce the net cost of major upgrades. (89)(94)

## **What are specific US grants and national bonds?**

Specific U.S. examples are the Department of Energy's Weatherization Assistance Program grants, competitive state green building grants, and in some cases, energy efficiency bonds routed through state agencies, which are used to finance multifamily retrofits. (92)(94)

## **Where did you find the retrofit stock percentages?**

Retrofit stock percentages, meaning the share of housing expected to be renovated, were found in market research from Growth Market Reports, the Department of Energy's building stock analysis, and European Commission energy retrofit planning documents. (94)(95)

## **And subsidy investment information?**

Subsidy investment amounts, by country, come from official government press releases (for Germany, France, and the Netherlands), European Commission renovation funding updates, and recent industry market analyses on funding for multifamily building modernization. (94)(95)

## **How do European regulations and industry standards result in easier and faster deployment and integration for building automation systems compared to other regions in terms of simple deployment and open APIs?**

Simple deployment and open APIs make setup easier in Europe because most building automation systems follow open standards like BACnet, KNX, and Modbus. European regulations (EPBD) require systems to support interoperability and easy integration, so vendors publish RESTful APIs and use common data models (like Project Haystack or Brick). This means new platforms and devices connect quickly and securely, with fewer custom integrations needed, making upgrades and compliance less complex.

## **How does public funding in Europe help building retrofit projects reach financial break even faster compared to the U.S.?**

Public funding in Europe, through grants, subsidies, and low-interest loans, reduces upfront costs for building owners. This support shortens the payback period, allowing projects to break even up to two years sooner than in the U.S., where incentives are less coordinated and often smaller. European programs like the Renovation Wave and national subsidy schemes provide consistent, large-scale financial backing that accelerates returns on investment. (94)

## **Harvard Source Methodology**

The report provided baseline data on noncompliant building emissions, local fine rates, and typical retrofit impacts in Boston and New York.

- Used to benchmark:
- Average emission overages for noncompliant buildings.
- CO2 reduction per retrofit.
- Dollar value of avoided fines per building and city.

## Why start with Europe

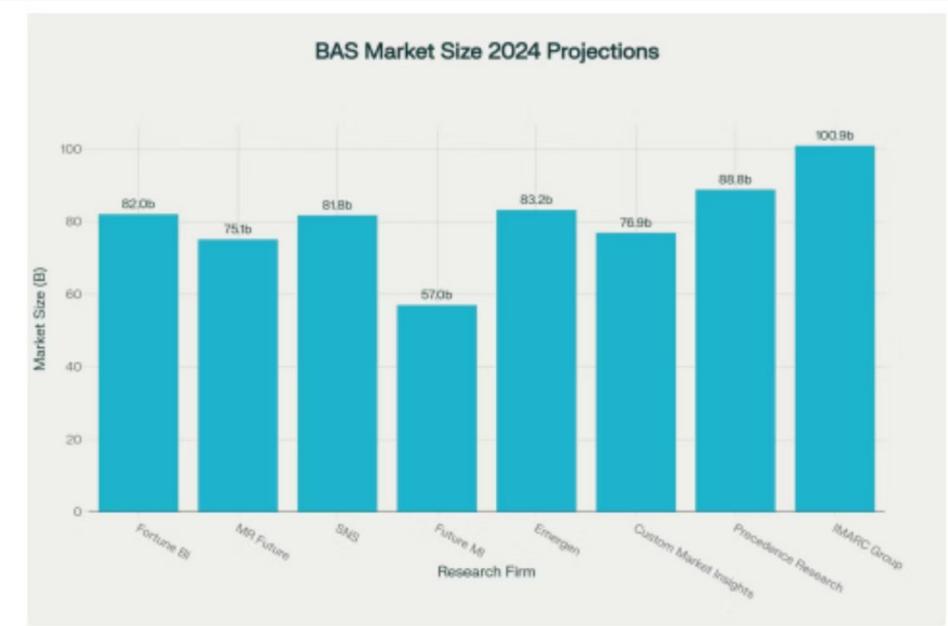
- **Growing market** - The Europe BAS market size is significant and growing steadily with a CAGR around 3.5% to 9.5% for different segments, expected to reach between \$4.76 billion to over \$50 billion by late 2020s and early 2030s depending on scope and segments considered. This growth is driven by rising demand for energy efficiency, smart building technologies, and stringent government regulations for commercial buildings. <https://www.researchandmarkets.com/report/europe-building-automation-market>
- **Untapped commercial market** - The commercial segment, including offices and retail buildings, is a major end user with large market value in countries like Germany, UK, and France having the biggest commercial real estate sector in Europe. This drives BAS adoption for energy savings, security, and operational efficiency. <https://www.researchandmarkets.com/report/europe-building-automation-market>
- **Regulatory tailwinds** - Europe imposes regulatory requirements for building automation systems (e.g., Energy Performance of Buildings Directive) mandating automation functions for large non-residential buildings starting 2025. Such mandates drive accelerated BAS integration across multiple markets. <https://www.mordorintelligence.com/industry-reports/europe-building-automation-systems-market>
- **Unorganised market opportunity** - Europe is characterized by a fragmented and unorganized market landscape with many different regional players, standards, and adoption levels, creating opportunities for integration and standardized solutions from global providers. <https://www.ashb.com/membership/members-directory/name/european-building-automation-and-controls-association-eu-bac/>
- **Increasing IoT adoption** - The market growth is accelerated by increasing integration of IoT, AI, smart sensors, and cloud platforms improving energy efficiency, security, predictive maintenance, and occupant comfort, all critical for commercial clients seeking advanced BAS. <https://www.imarcgroup.com/europe-building-automation-systems-market>

# Executive Summary

Based on comprehensive market research and technical analysis, partnering with existing BAS technologies represents the optimal go-to-market strategy for Alarm.com. The Building Automation Systems market is valued at \$80.7 billion in 2024 and growing at 8.87% CAGR, with established players commanding significant market presence. Rather than developing proprietary solutions, integrating with market leaders like Schneider Electric EcoStruxure, Siemens Desigo CC, and Johnson Controls Metasys provides immediate access to millions of buildings while minimizing development costs and [1] [2] [3] [4] [5] [6] accelerating time-to-market. [7] [8]

The recommended Edge Gateway/Middleware Integration approach offers the optimal balance of cost, control, and scalability for Alarm.com's security-focused value proposition.

# Robust Market Opportunity



Building Automation Systems market size projections for 2024 from eight major research firms, showing market valuations ranging from \$57B to \$101B

The market's substantial size and consistent growth projections across eight major research firms validate the strategic opportunity. Average market valuation of \$80.7 billion in 2024 with 8.87% average CAGR through 2032-2035 represents a significant addressable market for

Alarm.com's  
expansion.

[1] [2] [3] [4] [5] [6] [7] [8]

Johnson Controls leads with 6.98% market share, followed by Honeywell (2.77%) and Siemens (2.67%). These established players collectively control approximately 40% of the total market and offer: [9] [10] [11]

Decades of proven reliability with extensive installed bases [12] Mature integration APIs and development platforms[13] [14] [15] [16] Established distribution channels with certified partner networks [17] [16] Strong financial performance - Siemens (\$83.29B revenue), Honeywell (\$66.28B revenue), Schneider Electric (\$39.68B revenue)[18] [11] [12]

Financial Justification: Partnership Delivers Superior ROI

# Implementation Cost Advantages

Leveraging existing BAS infrastructure provides significant cost benefits compared to proprietary development:

Partnership Benefits:

60-70% lower development costs compared to building proprietary systems<sup>[19][20]</sup>. 18-24 month faster time-to-market versus ground-up development<sup>[20][19]</sup>. Immediate access to proven technology platforms with established reliability<sup>[21][22]</sup>. Lower ongoing maintenance costs through shared platform economics<sup>[23][24]</sup>



# BAS Implementation ROI

## Metrics

Building owners experience measurable returns from BAS implementations:

Energy Cost Savings: 15-50% reduction in operational expenses

Maintenance Optimization: 10-30% reduction in service costs Implementation Cost: \$2.50-\$7.50 per square foot

Payback Period: 2-5 years typical ROI timeline [19] [20] [23]

Schneider EcoStruxure Case Study: Up to 50% energy reduction, <2 year payback [25]



# Technical Advantages:

Low latency performance for real-time access control and video integration [26] [27] [28]

Local processing capability ensuring security-critical functions operate independently[27] [29] [26]

Offline resilience maintaining operation during network disruptions[ 26] [27]

Protocol flexibility supporting BACnet, MQTT, and REST APIs

[30] [27] [26] Vendor-agnostic approach minimizing lock-in risk[27] [26]



# Core Components:

1. Edge Gateway Hardware: Standardized gateways deployed at building locations[26] [27] [29]
1. Protocol Translation Layer: Native support for BACnet/IP, Modbus, and MQTT[27] [28] [26]
3. Security Infrastructure: End-to-end encryption and secure API endpoints[14] [30] [27]
4. Cloud Integration: RESTful APIs connecting to Alarm.com's platform[13] [15] [14]

# Strategic Partner Options

## Schneider Electric EcoStruxure

Market Position: €39.68B revenue, strong commercial presence

Technical Capabilities: Smart Connector APIs enabling real-time security system integration Native ONVIF/MQTT connectors for seamless video surveillance integration [18] [12] Comprehensive BACnet/MQTT thermostat control with advanced scheduling Public API ecosystem through Schneider Electric Exchange platform [13] [14] [15]

Strategic Value: Up to 50% energy cost reduction, 90% remote fault resolution, and <2 year [25] payback period demonstrated in real deployments

## Siemens Desigo CC

Market Position: €83.29B revenue, 2.67%

BAS market share Technical Capabilities: Integrated fire & security module providing unified building management OPC/BACnet-based video alarm integration with advanced analytics Recent AI enhancements with Desigo CC V5.1 including predictive maintenance [11] [12] [31]

Comprehensive building management platform supporting multi-protocol integration [32] [22]

Strategic Value: Strong global presence with advanced integration capabilities and recent AI platform investments [32] [31]

## Johnson Controls Metasystem

Market Position: 6.98% market share, established market leader

Technical Capabilities: BACnet alarm/event mapping for seamless access control integration RESTful API architecture facilitating third-party system integration [17] [11]

Mature partner ecosystem with extensive certified integrator network [17]

Proven commercial building track record with 30% reduction in service truck rolls[ 33]

Strategic Value: Market leadership position with established customer relationships and proven commercial building expertise [11] [33] [17]

# Addressable Market Segments

North America dominates with 37% of global BAS market share, aligning perfectly with Alarm.com's primary geographic presence. The commercial segment represents 58% of total market, matching Alarm.com's

Key Growth Drivers: Smart city initiatives driving municipal and commercial adoption<sup>[2] [7]</sup>

Energy efficiency regulations mandating building automation compliance<sup>[25] [3]</sup>. IoT integration enabling advanced analytics and predictive maintenance<sup>[9] [10] [7]</sup>

Sustainability requirements pushing carbon reduction mandates<sup>[3] [6] [25]</sup>

# Revenue Potential

Cross-selling opportunities between Alarm.com's 6+ million security customers and BAS capabilities create immediate market expansion potential. The \$80.7B BAS market growing at 8.87% CAGR provides substantial long-term revenue opportunity through strategic partnerships.

[1] [2] [3] [4] [5] [6] [7] [8]

# Implementation Roadmap

## Phase 1: Strategic Partnership

Development (3-6 months)

Establish formal partnerships with top 3 BAS providers

Develop technical integration specifications and API documentation Launch pilot program with select commercial customers

## Phase 2: Technology Integration

(6-12 months)

Deploy edge gateway solutions at pilot sites Integrate access control, video surveillance, and HVAC capabilities

Validate energy management and predictive maintenance features

## Phase 3: Market Rollout (12-18 months)

Scale deployment across Alarm.com's commercial customer base

Expand through BAS integrator partner channels Launch integrated marketing campaign targeting smart building segment

# Conclusion

Partnering with existing BAS infrastructure through strategic alliances represents the most cost-effective and strategically sound approach for Alarm.com's building automation expansion. With an \$80.7 billion market growing at 8.87% CAGR, partnerships with established leaders like Schneider Electric, Siemens, and Johnson Controls provide immediate access to proven technology platforms and extensive distribution channels.

The recommended Edge Gateway/Middleware integration approach offers optimal balance of cost, performance, and strategic flexibility while positioning Alarm.com to capture significant market share in the rapidly growing smart building sector.

# Key Success Metrics:

2-3 year ROI timeline for customer implementations

60-70% cost reduction compared to proprietary development

Immediate access to millions of addressable buildings

Integration opportunity with \$80.7B BAS market

This strategy leverages Alarm.com's core security expertise while partnering with established BAS leaders to deliver comprehensive smart building solutions, maximizing market opportunity while minimizing development risk and investment.

# Frequently Asked Questions

Is Schneider Electric EcoStruxure Building Operation a BAS?

Yes, Schneider Electric EcoStruxure Building Operation is a Building Automation System (BAS). It is designed to monitor, control, and optimize various building systems, including HVAC, lighting, security, energy, and fire safety, using an integrated software and hardware platform. The system supports open protocols such as BACnet, Modbus, and MQTT and serves as a centralized control center for smart building management. [59] [60] [61] [62] [63] [64]

What about a technical implementation strategy?

A technical implementation strategy is a valid and necessary direction for expanding into building automation, as it helps assess feasibility, integration options, and operational impacts. Additionally, engaging with industry experts for primary research provides valuable insights into practical requirements, market dynamics, and user expectations, which strengthens decision making and product-market fit. [69] [70] [71]

What does vendor risk mean?

Vendor risk refers to the potential threats or negative impacts an organization might face from working with third-party vendors or suppliers. These risks can include disruptions to business operations, financial losses, cybersecurity vulnerabilities, compliance failures, or harm to your reputation if a vendor experiences problems or fails to meet standards. [72] [73] [74] [75] [76]

## **What makes Germany and France stand out as starting points?**

Germany and France enforce strong building energy regulations, set clear renovation targets, and provide substantial public funding for upgrades. Germany's Building Energy Act requires carbon neutrality in buildings by 2045 and mandates retrofitting for many property types. France's new 2025 heating regulations and the Climate and Resilience Act set firm deadlines and widen the scope of required renovations, while offering financial support to owners. (85)

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