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# WHITE PAPER PEARL SCORE™ METHODOLOGY

## A TECHNICAL FRAMEWORK FOR ASSESSING HOME PERFORMANCE

*A science-driven, 1,000-point system to evaluate U.S. single-family home performance across Safety, Comfort, Operations, Resilience, and Energy (SCORE) that reveals how building science and standards empower homeowners with actionable performance insights.*

[www.pearlscore.com](http://www.pearlscore.com)

# Executive Summary

Pearl SCORE™ is a standard, U.S.-wide metric that creates transparency into the performance of U.S. homes – that is, provides insights into how a home ensures the safety, health, and comfort of its occupants, uses energy and water resources efficiently, withstands natural disasters, and generates, stores, and manages energy. It is a simple, yet comprehensive, indicator that provides actionable insights to homeowners and occupants, home buyers and sellers, and all other stakeholders in real estate and refinancing transactions. Pearl SCORE™ is refined, enhanced, and expanded continually on the basis of incoming data on the performance of U.S. homes. New scientific knowledge, technologies, and standards drive scoring changes and improvements. Pearl itself generates scientific knowledge through the analysis of data from bills, monitors, sensors, and other real-time measurement devices to generate high-resolution insights into what drives excellent home performance that are also incorporated into the SCORE algorithms.

Pearl's mission is to help homeowners and the real estate market accurately value homes' performance. We created Pearl SCORE to serve as a key metric in this transformation.

## 1. Why Pearl SCORE™ Exists

Home performance has a direct impact on the lives and well-being of all U.S. residents – yet very few people have any knowledge of what it is. Pearl SCORE™ was created to address this problem by making the performance of all U.S. homes transparent to homeowners, renters, and buyers, and to give them actionable insights on how to improve the performance of homes.<sup>1</sup>

### 1.1. Home Performance Defined

“Home Performance” describes a home's capacity to:

- Support an optimal physical quality of life for its occupants,
- Optimize the resources needed for its operations,
- Enable energy to be generated, stored, and managed, and
- Maintain the home's physical integrity and ability to safeguard its occupants during disasters.

A home's performance profoundly impacts occupants' lives in multiple ways. It affects their comfort, finances, health and physical well-being, and resilience in times of disaster. A *high-performance* home will keep its occupants safe, healthy, and comfortable; use energy and water efficiently; generate and store energy; and durably provide these benefits over time and in

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<sup>1</sup> In 2017 Pearl issued a 1,200-point energy efficiency scoring and certification system. Renewables badging was added in 2019. Pearl's experience with this earlier scoring system directly informed the Pearl SCORE.

the face of natural and other disasters. Conversely, a home with performance problems can cost them money, make parts of their home so uncomfortable as to be unlivable, contribute to occupants' illness or even death, and/or be severely damaged or destroyed when disasters occur.

## *1.2. The Performance Visibility Gaps*

The idea that homes “perform” is rarely conceptualized, discussed, or written about in everyday life. Everyone who lives in a home is profoundly affected by their home’s performance, yet most home occupants do not usually explicitly think or talk about how their homes perform. As a result, performance issues are typically normalized: millions of Americans live with comfort, health, and high bill problems that could be solved relatively easily because they don’t fully recognize the problems and don’t know how to address them.

The home sale process is one of the most important ways that home buyers become educated about homes. Home performance, however, is rarely discussed during this process. The interactions between agents and buyers during the transaction and the information provided by the real estate Internet Listing Service portals like Zillow and Realtor.com focus almost entirely on location and aesthetics rather than on performance-related issues. As a result, the features that influence how well a home performs are effectively invisible during the sale, and home buyers routinely make purchase decisions without even a basic idea of how the home performs and how that performance will affect their well-being.

Broad popular lack of understanding of home performance persists despite the fact that the knowledge and resources to improve a home’s performance have never been more effective, available, and affordable. Scientific advances have resulted in a wealth of knowledge about how to build and upgrade homes that was not available even twenty years ago. Technological advances have made it easy and inexpensive to improve many aspects of a home’s performance. A significant number of improvements that increase home energy and water efficiency pay for themselves and generate savings within a three- to ten-year period. Other home performance improvements, like solar and storage, are still expensive, but have seen dramatic price declines.

The result is that home performance is invisible in two ways. First, the **Performance Visibility Gap**: although every resident of a home experiences its performance in multiple ways, a home’s actual performance is very often invisible and unnoticed unless a performance-related problem becomes very severe. Many homeowners routinely experience comfort issues, health problems, and high bills that they could be addressed, but are not. A homes’ lack of resilience to disasters is also typically misunderstood: typical owners and buyers do not recognize how vulnerable a home may be to fires, floods, and winds. Performance only becomes a recognized issue when a serious problem occurs, such as equipment breakdown or a disaster. In some cases, even when homeowners have problems like respiratory issues, they never make the connection between illness and the performance of their home. Similarly, during the home sale, performance issues and features are rarely identified or discussed.



Second, the **Performance Opportunity Gap**: most people have little or no understanding of the many ways they could improve their homes. They also do not recognize that many of these improvements are relatively inexpensive, and in some cases, pay for themselves through energy and water savings.

### *1.3. The Need for a Standardized Metric*

Home performance may be invisible, yet assumptions about it are baked into decisions about credit, insurance, and purchase decisions. When lenders evaluate a home for mortgage risk, when insurers assess disaster vulnerability, or when buyers compare properties, they rely on available data—primarily public records. This data infrastructure, while comprehensive for basic structural information, provides only limited visibility into a home's performance characteristics. Equipment efficiency ratings, air sealing quality, ventilation systems, and resilience features are rarely documented in accessible databases.

As a result, the market's view of any given home's performance is based on incomplete information, and the lack of information results in assumptions that home performance is generally poor. The evidence indicates that mortgage performance, insurance payouts, and home occupant experience are correlated with performance. But without transparency into the performance of homes, the market does not have the tools to develop appropriately priced finance and insurance products, or mechanisms that ensure sellers obtain full value for their homes, or to properly deploy them when they are developed. To address this problem, home performance needs to be made visible. U.S. residents need ways to learn about the performance of their homes and how this performance affects their lives. They need to be able to incorporate performance into their home purchase and sales decisions. They also need easy access to knowledge about the many ways they could improve their homes' performance.

Pearl SCORE was designed to address this gap, delivering transparency for stakeholders and empowering homeowners with agency to update or correct inaccurate public records. Pearl has generated a Pearl SCORE for every single-family home in the U.S.<sup>2</sup> The SCORE takes into account multiple dimensions of home performance and over 150 different features and characteristics, summarizing them in a single numeric indicator.

Every home receives an initial SCORE generated from public records and Pearl's proprietary data sources. This baseline is an accurate reflection of how the home's performance is portrayed across the real estate, financial, and insurance sectors. Recent validation studies demonstrate that Pearl's remote modeling approach—even without homeowner input—matches the predictive accuracy of on-site assessments and is strongly correlated with mortgage performance, underscoring its reliability and financial relevance.

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<sup>2</sup> The first version of the Pearl SCORE v2.0 applies only to single-family homes. The SCORE will be expanded to multi-family homes in a subsequent release.



The baseline SCORE serves two critical functions. First, it reveals how the market currently sees a home based on available data. Second, it provides a consistent, standardized starting point that enables meaningful comparisons across the housing stock. Because all homes are scored using the same data sources and methods, the relative rankings are meaningful even before homeowners add documentation.

The baseline SCORE itself represents genuine market intelligence: it reflects how homes are already being evaluated, whether the homeowner realizes it or not. Just as important, it empowers homeowners to enhance their SCORE's accuracy by documenting actual features and verified improvements—transforming an algorithmically generated estimate into a comprehensive performance profile.

The SCORE's universality makes it relevant for all home occupants, sellers, and buyers. It introduces them to the concept of home performance and provides a starting point for learning more. It provides an easy way for buyers to compare homes and find a home that meets their needs. It also provides baseline information that can be used to develop detailed improvement plans that homeowners can use to improve one or more of the dimensions of their home's performance.

## *1.4. Points and Pillars Overview*

Pearl SCORE assigns each single-family home in the U.S. a point value on a scale from 1 to 1,000. Each home's point value depends on the high-performance features in the home. High performance features receive point values correlated with the degree to which they help address specific performance problems. The more high-performance features a home has, the more points it receives, and the higher its SCORE. The Pearl SCORE's 1,000-point scale is divided into eight levels. Homes that achieve more than 500 points are eligible to earn Pearl's Silver, Gold, and Platinum medallions.

The Pearl SCORE is constructed from five “pillars,” each of which represents a dimension of home performance. The first letters of the pillars create the acronym SCORE.

- Safety
- Comfort
- Operations
- Resilience
- Energy

How points are assigned, how levels are defined, and how the pillars are constructed are addressed in subsequent sections of this document.

## 1.5. The Behavioral Dimension

Pearl's mission is to help all U.S. residents understand why home performance matters to them (i.e., to address the Performance Visibility Gap) and to take action to improve the performance of the homes they own and/or live in (i.e., to address the Performance Opportunity Gap). Pearl SCORE is designed to achieve these goals through education and motivation.

Pearl SCORE is a simple number that introduces U.S. residents to the concept of home performance and provides an easy way to compare the relative performance of homes that they own, rent, or are considering buying or renting. As home residents engage with Pearl SCORE, it serves as the departure point for an educational journey: through the Pearl Registry and the Pearl App, they can learn more about the general concept of home performance, and about the specifics of the performance of any home they are interested in, including how the home performs in each of the five performance pillars, and which specific features drive its performance.

Education leads to action. When homeowners understand the impact that home performance has on their lives, they become interested in improving their Pearl SCORE, both because they want to address one or more performance issues in their home and because they want the satisfaction and status of a higher SCORE, level, and/or medallion. Pearl provides home residents with a range of tools, including Home Improvement Plans, to help them solve specific performance problems and achieve their performance goals.

Pearl SCORE is designed specifically to motivate through gamification. The eight levels in the Pearl SCORE's scale provide an incentive for homeowners to "level up" by making improvements. Once a home reaches 500 points (the "Very Good" level), it also qualifies for Silver, Gold, and Platinum medallions; Pearl's research indicates that medallion status is a powerful incentive for many homeowners.



An important feature of the Pearl SCORE is that it is focused on providing actionable information to the vast majority of homeowners whose homes have few or no high-performing features. The lower levels in the Pearl SCORE's 1,000-point scale are designed so that homeowners can move up through the lower levels with modest investments (many of which have relatively quick payback periods through energy or water savings). The Pearl SCORE scale is also designed to maximize visibility at the lower end of the scale.

The Pearl SCORE is designed to achieve a balance between showing how much opportunity most homes have for improvement, while not unduly stigmatizing the vast majority of homes with few high-performing features. It is constructed using a baseline of a home built in 1979 that

has received typical upgrades. A home with these characteristics receives a 250 point Pearl SCORE. This baseline is the starting point for most homes: to the extent that a home has high-performance features, it will receive points and SCORE above 250.

The point system creates pathways that a home could achieve more than 1,000 points: in theory, a home with every possible performance feature could score 1,500 points. However, we estimate that fewer than two thousand U.S. homes currently score above the 1,000-point level. Accordingly, the Pearl SCORE scale only displays points from 1 to 1,000 so that the point values of lower-performing homes are not visually compressed. The exceptional homes that exceed 1,000 points are rewarded through Pearl's badging system.

The SCORE identifies some performance issues that will bring a home below 250 points, but it does not exhaustively inventory "poor-performing features." The SCORE is primarily designed to make visible the extent which a home has moved *above* the baseline. This approach is designed to prevent homeowners from being discouraged to take action. Behavioral research indicates that people tend to avoid measurement systems that cast them in a negative light. Assigning many homes a SCORE that seems pejorative would make many homeowners lose interest in the subject of home performance. Further, this approach does not unduly stigmatize homes of low-income households and households of color.

Pearl SCORE™ is refined, enhanced, and expanded continually on the basis of incoming data on the performance of U.S. homes. New scientific knowledge, technologies, and standards drive scoring changes and improvements. Pearl itself generates scientific knowledge through the analysis of data from bills, monitors, sensors, and other real-time measurement devices to generate high-resolution insights into what drives excellent home performance that are also incorporated into the SCORE algorithms.

## 2. What Pearl SCORE Measures

### 2.1. *The Baseline Home*

The baseline home in Pearl's SCOREing system is a home built in 1979, the median year of construction for the U.S. housing stock.<sup>3</sup> Homes built in this year typically have few high-performing features, even after upgrades. The equipment in a 1979 home typically does not exceed Federal minimum equipment standards, for example, and shell improvements in these homes typically fall short of contemporary energy code.<sup>4</sup> Other types of performance

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<sup>3</sup> The median age of a U.S. home as per the 2022 American Community Survey (ACS), U.S. Census. [American Community Survey Data](#)

<sup>4</sup> [U.S. Department of Energy Standards and Test Procedures](#)



features, such as high-efficiency appliances, renewables, and those for disaster resilience, are uncommon in 1979 homes.<sup>5</sup>

Features incorporated into the baseline home model include:

- air infiltration
- roof exterior materials and insulation
- ceiling insulation
- wall exterior materials and insulation
- foundation type, insulation
- rim joist insulation
- windows (frame type, number of layers, coating type, gas fill type)
- exterior doors
- cooling system type and efficiency
- heating system type and efficiency
- distribution type and efficiency
- thermostat type
- water heater type and efficiency
- refrigerator
- dishwasher
- cooking appliance fuel and type
- clothes washers and dryers
- lighting (% LED)
- faucets
- bathroom showerheads

These performance features in homes with baseline characteristics frequently results in occupants experiencing one or more performance-related problems, such as:

- Poor indoor air quality, resulting in respiratory and other illnesses;
- Thermal comfort issues;
- High utility costs (including electricity, gas, and water);
- Lack of resilience in the event of disasters such as extreme storms, flooding, or wildfire.

Although the Pearl baseline is modeled on the median characteristics of a 1979 home, individual homes built in that year do not necessarily or even typically receive a SCORE of 250. This occurs because the Pearl system assigns points for features that exceed the baseline, but, as discussed above, does not generally deduct points for features that fall below it.

As a result, a home may have some characteristics that perform below the 1979 median (for example, minimal insulation or poor ventilation) and others that perform above it (such as upgraded HVAC equipment), yet it will only receive positive points for the latter. The SCORE

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<sup>5</sup> The prototypical 1979 home used as the baseline for Pearl SCORE was developed using public data supplemented with assumptions based on the National Renewable Energy Laboratory ResStock database of home performance characteristics.

therefore reflects how far a home has progressed *above* the baseline, rather than how far it falls *below* it. This design choice encourages improvement and engagement by focusing attention on achievable performance gains rather than on penalizing deficiencies, and avoids undue stigmatization of the lowest-performing homes.

## 2.2. *Code and Base Points*

Pearl SCORE does not address basic performance issues that are already addressed through general building code and building code inspections. The idea that public building codes can ensure the basic safety, welfare, and structural integrity and durability of homes has been broadly understood and practiced in the U.S. for a century, and was codified by the 1990s in the International Building Code. Building codes cover the structural integrity of the building, plumbing, electrical safety, and other core elements of the home. Most homes in the U.S. were built to such a code at the requirement of the local jurisdiction, and were subject to a code inspection process at completion. Building inspections at the time of subsequent sales provide buyers with visibility into code violations, and the mortgage lending and insurance industries require many violations to be fixed.

Homes that fail the basic standards of building code, such as homes that have been structurally compromised, will receive a SCORE lower than 250 points. However, Pearl does not assign points for issues related specifically to basic building code, e.g. the building's basic structural integrity, plumbing, basic electrical wiring, etc. because these building elements are already subject to inspection and review through the processes described above.

Pearl SCORE does assign points to features covered by a number of specialized or recently developed areas of building code, including building energy codes, building code provisions designed to ensure the structural integrity of the home during high winds, and the provisions of building electrical codes that concern the installation of renewables, energy storage, and electric vehicle charging. All of these areas of code were developed recently and govern new technologies not present adequately (in the case of insulation and advanced electrical wiring) or at all (in the case of storm-resistant structural elements) in the vast majority of homes.<sup>6</sup>

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<sup>6</sup> The National Association of Insulation Manufacturer,,s of America (NAIMA) estimates that over 90% of U.S. homes are under-insulated.

## 3. How Pearl SCORE Works

### 3.1. *Feature-Level Scoring*

“Features” are building components, equipment, and devices installed in the home; “performance features” affect the home’s performance. High-performance features improve one or more aspects of the home’s performance above average, i.e., above the performance of the 1979 baseline home.

High-performance features typically do not have significant cosmetic or aesthetic characteristics, although a small number of high-performance features, such as windows, may also contribute to the aesthetic appeal of the home.

Pearl SCORE v2.0 evaluates over 150 high-performing features in a home. Points may be assigned to these features for three different reasons:

- **Threshold Eligibility:** Points are assigned to performance features that exceed the performance characteristics of features in the 1979 baseline home. That is, the performance features and their associated characteristics most common in 1979 homes are not average, but not high-performing, so they do not score, but serve as the threshold at which scoring starts. The most common insulation R-value in 1979 homes in moderate to cold climates, for example, is R-19. As a result, homes in these climate zones with attic insulation with an R-value of 19 or less do not receive points; points accrue to the home when the insulation levels are higher than R-19.
- **Feature Characteristics:** Additional points are assigned above the point value for threshold eligibility according to the feature’s characteristics, such as its rated efficiency or specific functionalities. For many features, points are assigned on the basis of a third-party scale that measures efficiency, filtration capacity, or some other performance characteristic: the higher the feature scores on this third-party scale above a threshold, the more points it receives.<sup>7</sup> Most features scored in this way also have a target that is set at a level associated with the highest efficiency, which is a cost-effective investment (i.e., an investment for which energy savings exceed incremental expenditure). Fewer additional points are assigned for incremental efficiency or quality above the target than are assigned for incremental improvement between the threshold and target levels. Not all high-performance features are eligible for Feature Characteristic points because some do not have characteristics relevant for scoring.

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<sup>7</sup> Nameplate efficiency HVAC ratings (AFUE, HSPF, SEER2), nameplate water heater and appliance ratings (UEF, CEE tiers), filter ratings (HEPA and MERV), measures of thermal resistance for insulation and windows (R-value and U-factor), and blower door readings (ACH50) are examples of third party scales used to assign points.



- Installation Quality: Additional points are assigned above the point value for threshold eligibility according to the quality of the installation process. This point assignment is made because installation quality has a significant impact on performance. Typically, these installation Points are assigned if the installation is documented to have been installed and/or performance tested according to protocols recognized by industry or authorities having jurisdiction (AHJ).<sup>8</sup> Not all high-performance features are eligible for Installation Quality points because installation quality does not always have a significant impact on performance.

The scoring for central air conditioners illustrates how these scoring methods function.

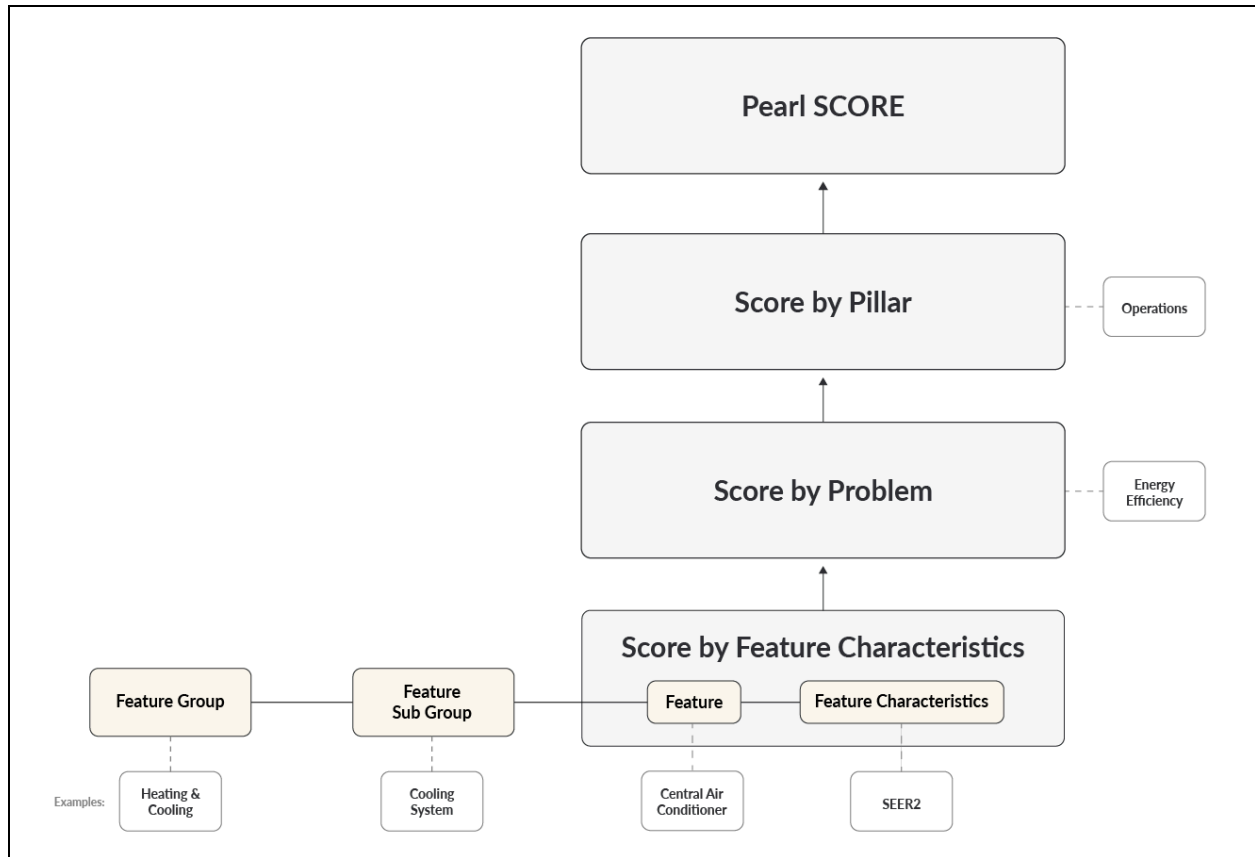
- Threshold Eligibility: A central air conditioner that has been installed and is functional in a home is assigned Threshold Eligibility points if it meets the Federal minimum standard (i.e. 13.4 SEER2).<sup>9</sup>
- Feature Characteristics: For each incremental increase in SEER2 value, the air conditioner is awarded Feature Characteristic points, up to 17.0 SEER2, the target value. Air conditioners with two-stage and variable-speed compressors receive additional Feature Characteristic points.
- Installation Quality: Central air conditioners receive additional points if they have been designed and installed, and/or if their performance has been tested and verified by approved protocols.

Figure 1: Pearl SCORE Components

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<sup>8</sup> The Air Conditioning Contractor of America's (ACCA) Manuals D and J, the National Comfort Institute's performance testing methodologies, and the Pacific Northwest National Laboratory Quality Installation checklists are examples of approved protocols for documenting quality installation of heating and cooling equipment.

<sup>9</sup> For split air conditioners, SEER2 of 13.4 in the north of the U.S., 13.8 in the southwest and southeast if capacity is less than 45,000 BTU, and 14.3 in the southwest and southeast if capacity is greater than 45,000 BTU.



For each of these types of feature points, effectiveness at addressing a particular problem or enabling the homeowner to take advantage of a particular opportunity is the primary consideration for point allocation: the more effective a feature is at contributing to resolution of a problem, the more points it receives.

Affordability is a secondary consideration in point allocation. The Pearl SCORE is designed to avoid encouraging installation of features for which the expense outweighs the benefits. For example, target values for Feature Characteristic points related to energy efficient equipment are set at the highest efficiency level at which the incremental cost of installation of a more efficient feature is offset by energy savings from the higher efficiency. Conversely, efficiency levels that do not generate offsetting energy savings receive fewer points. As a result, highly efficient installations that are not cost effective are not strongly incentivized through the point system. Assessing the point at which benefits are not offset by cost requires an element of subjective evaluation for many features, but evaluation, even if partly subjective, is important because it provides a screen against technologies which provide relatively little benefit at high cost.

### 3.2. *Features That Do Not Meet Threshold Eligibility*

Because Pearl sets the bar for threshold eligibility relatively high, many performance features in U.S. homes do not meet threshold criteria, and do not score points; they are performance features, but not high-performance features.

The Pearl scoring system does not generally differentiate regarding the quality of performance features that do not meet threshold eligibility; that is, the point system does not indicate the difference between different types of non-high performance features. The threshold eligibility for central air conditioners in the Operations Pillar, for example, is a nameplate efficiency rating of SEER2 of 13.3: air conditioners with efficiencies of SEER2 of 13.4 or greater will score points, while less efficient units will score 0 points, regardless of whether their nameplate efficiency is a SEER2 of 10 or 13.

This scoring approach is designed to focus homeowners on identifying and installing high performance equipment, rather than becoming concerned about gradations between poorly-performing equipment.

## 4. The Five Pillars of the Pearl SCORE

Pearl SCORE has five constituent “Pillars,” each of which corresponds to a particular dimension of the home’s performance. The first letters of these pillars create the acronym SCORE. The sum of the points in each Pillar equals the home’s total Pearl SCORE.

The five Pillars are:

- Safety
- Comfort
- Operations
- Resilience
- Energy

Four of the five Pillars in Pearl SCORE are constructed as solutions to a set of related home performance problems. The Safety Pillar, for example, addresses:

- Health problems from poor indoor air quality (including particulate matter, carbon monoxide and other combustion byproducts, and radon);
- Health problems from moisture-induced mold growth;
- Health problems from exposure to hazardous materials;
- Health problems from unsafe potable water;
- Safety problems from an inaccessible environment.



For each of these home performance problems, the high-performance features that would significantly mitigate or eliminate the problem are identified. If a home installs all these features, with the appropriate characteristics and installation quality, the problem should be minimal and on a spectrum between controllable to non-existent. The Comfort Pillar, for example, identifies a set of performance features related to acoustic comfort: if a home has all these features, with the requisite characteristics and installation quality, acoustic comfort should be a minor problem except in cases of extreme noise.<sup>10</sup>

The fifth Pillar, Energy, addresses issues that are typically experienced as opportunities rather than problems. Most homeowners do not see the fact that their home does not generate electricity as a problem. Many, however, see solar panels and battery storage as opportunities to improve their homes.

This problem- and opportunity-based framework is designed to make home performance accessible to home occupants. For the average occupant, performance is most noticeable through their experienced problems, such as respiratory issues, uncomfortable rooms during summer or winter, high utility bills, and vulnerability to damage during natural disasters. Structuring the SCORE around these problems makes it easier for a home occupant to understand why performance matters, and engages them to solve problems, rather than simply increasing their SCORE.

## 4.1. Safety

The Safety Pillar scores homes on the extent to which they have features that address the following safety- and health-related problems:

- Poor indoor air quality:
  - Particulate matter
  - Carbon monoxide and other combustion byproducts
  - Radon
- Moisture-induced mold growth
- Unsafe potable water
- Exposure to hazardous materials
- Accessibility

These performance problems are significant. 28 million U.S. residents suffer from asthma caused partly or entirely by poor indoor air.<sup>11</sup> Over 5 million homes have high radon exposure, resulting in approximately 21,000 deaths a year.<sup>12</sup>

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<sup>10</sup> Several of the “problems” have not been developed in version 2.0 of the SCORE. Pearl plans to complete scoring for these problems in version 2.1 of the SCORE, to be released later in 2025.

<sup>11</sup> [Asthma and Allergy Foundation of America](#)

<sup>12</sup> See U.S. [Centers for Disease Control and Prevention](#); [U.S. Environmental Protection Agency](#)

Each of these problems is assigned a proportion of the Safety Pillar's points. This proportion of the Pillar's total points is correlated with the extent to which the problem is associated with severe illness and mortality, i.e. the more deaths or severe illness caused by the problem, the larger the proportion of the total Safety Pillar points that problem constitutes.

Each problem is associated with a number of features that contribute to mitigating and resolving the problem or ensuring it will not occur. If all these features are installed, the home receives full points for that particular problem. For example, the performance features in the SCORE that address the problem of particulate matter in indoor air include air sealing, duct sealing, mechanical ventilation, and filtration: if a home that has all of these performance features, of the right quality and installed the right way, the airborne particulate matter, and problems associated with it, will be significantly mitigated.

Ensuring that a home will *never* experience a problem is virtually impossible: mold, in particular, can be very difficult to safeguard against with 100% certainty, particularly in humid climates. However, a home with full points in the Safety pillar will have features that would greatly reduce the chances of any of the problems listed above from occurring, and make them much easier to address if they do occur.

The point allocations in the Safety Pillar are based in part on the following third-party standards and guidance:

- U.S. Environmental Protection Agency [Indoor Air Plus](#);
- U.S. Environmental Protection Agency [Radon Standards of Practice](#)
- ANSI/ASHRAE's [Standard 62.2-2022](#): Ventilation and Acceptable Indoor Air Quality in Residential Buildings
- U.S. Environmental Protection Agency. [Drinking Water Regulations](#)
- BPI and RESNET Standards for combustion safety testing and moisture management

## 4.2. *Comfort*

The Comfort Pillar addresses three potential performance problems:

- Lack of thermal comfort
- Lack of acoustic comfort
- Lack of visual comfort

The percentages of points within the Comfort Pillar are allocated by problem according to data on homeowner preferences.<sup>13</sup>

Thermal comfort is widely recognized as a common residential problem, and features related to thermal comfort constitute the largest percentage of points available in this pillar. However, auditory and visual discomfort are also significant issues for millions of homeowners. Auditory

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<sup>13</sup> [How much is the indoor comfort of a residential building worth? A discrete choice experiment](#)

comfort typically involves exposure to loud noise; visual discomfort involves inadequate light and/or poor quality light that is uncomfortable or even harmful.

Humans have a preference for temperatures, noise, and light quality within a relatively narrow band. Most humans, for example, are most comfortable in temperatures ranging between 64 and 75 degrees Fahrenheit, and experience discomfort and eventually health issues outside of this range.<sup>14</sup> Within these ranges, however, comfort is subjective: between 64–75 degrees Fahrenheit, for temperature preferences vary by culture, gender, age, and individual preference.

A home with comfort-related performance features reduces the chance that its occupants will be exposed to extreme temperatures, noise, and light, and provides them with important controls to fine-tune conditions in their home to match their subjective preferences.

The point allocations in the Comfort Pillar are based on the following third-party standards and guidance:

- ANSI/ASHRAE's [Standard 62.2-2022](#): Ventilation and Acceptable Indoor Air Quality in Residential Buildings
- ANSI/ASHRAE [Standard 55](#): Thermal Environmental Conditions for Human Occupancy
- WELL Building Standard [Light Concept](#)
- WELL Building Standard [Sound Concept](#)

### 4.3. *Operations*

The Operations Pillar scores homes on the extent to which they are energy and water efficient, as indicated by their utility costs. A high score in this pillar indicates an energy- and water-efficient home.

Most homes in the U.S. consume more energy and water than is necessary. The performance features that can reduce this consumption are often good investments, in that they cover their costs through energy savings over a three- to ten-year period. Energy efficiency improvements like insulation and air sealing, for example, are relatively inexpensive and typically result in significant energy savings with a payback in approximately five years – and also improve occupant comfort and health. Similarly, inexpensive water control and leak detection equipment can reduce water bills.

The point system in the Operations Pillar for the energy cost problem is based on best-in-class energy modeling technology, including the National Renewable Energy Laboratory's EnergyPlus modeling software, but does not generate an interactive energy model for each individual home. As a result, the point values in the Operations Pillar is closely but not precisely correlated with the energy costs.

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<sup>14</sup> See [WHO Housing and Health Guidelines](#) 2018 for a discussion of the relationships between health, comfort, and indoor temperature



The point allocations in the Operations Pillar are based on the following third-party standards and guidance:

- International Code Council: [2024 International Energy Conservation Code](#)
- U.S. Environmental Protection Agency: [ENERGY STAR Residential New Construction](#)
- U.S. Environmental Protection Agency: [Energy Star Energy Efficient Products](#)
- U.S. Environmental Protection Agency: [WaterSense](#)
- U.S. Energy Information Administration: [Residential Energy Consumption Survey \(RECS\)](#)
- Code of Federal Regulations: [Subpart C-Energy and Water Conservation Standards](#)

## 4.4. *Resilience*

The Resilience Pillar scores homes on the extent to which they are prepared to withstand natural disasters. The scoring system recognizes vulnerability to five natural disasters as problems:

- Flooding
- Storms (including hailstorms, hurricanes, tornadoes)
- Wildfires
- Earthquakes
- Extreme temperatures

Lack of resilience to natural disasters is an increasingly significant problem. Approximately 21 million homes in the U.S. are estimated to be at [high risk of flooding](#), for example: there is an 80% chance that these homes will be flooded at least once by 2053. And almost 50 million residential buildings are located in areas that are at a high or very high [wildfire risk](#).

Resiliency mitigation measures focus on withstanding and recovering from natural climate hazards and the uncertainties that come with hazard events and their associated disruptions. For the insurance industry, closing the protection gap (difference between the amount of insurance coverage and the amount of coverage that is needed) includes a pre-disaster risk mitigation strategy of hardening properties.<sup>15</sup>

Scoring for the Resilience Pillar is based on the extent to which the home is resilient to these potential natural disasters. Homes are scored primarily according to the natural disasters to which they are vulnerable. Though some homes will have less exposure to climate hazard events compared to others, the Resilience pillar focuses on the assessment of features that enable risk mitigation, rather than risk exposure. One consequence is Pearl treats risk exposure as binary: homes are identified as at risk or not at risk. A home located in a 500-year floodplain, for example, is scored according to the extent to which it has features like an elevated foundation made from water-resistant materials, pumps, and drainage systems. Conversely, a

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<sup>15</sup> National Association of Insurance Commissioners. [NAIC Adopts First National Climate Resilience Strategy for Insurance to Close Coverage Gaps and Improve Recovery from Natural Disasters](#)

home not at risk to flooding (i.e. located in an area above a 500-year flood plain) is not penalized for not having flood resistant features, and will receive fewer points for such features if it does have them.

A perfect resilience SCORE indicates that the home has taken all reasonable mitigation measures to protect itself (home hardening) against the disaster to which it is vulnerable, and should thus withstand those disasters much better than an average home.

One feature of all of the natural disaster scoring systems is a set of points allocated for sheltering in place. During many natural disasters, injury and loss of life often occur in the hours or days following the disaster. In the case of flooding or severe storms, survivors may experience injury or loss of life while stranded in their homes during the period when floodwaters abate and before help arrives. A home with features that support sheltering in place will keep the occupant buffered from temperature extremes, even if the heating and cooling systems are not working, and may provide power through independent solar or storage systems.

The point allocations in the Resilience Pillar are based on the following third-party standards and guidance:

- Insurance Institute for Business & Home Safety (IBHS):
  - [Wildfire Prepared Home](#) designation
  - [Home Disaster Guides](#)
- National Fire Protection Agency:
  - 2022 [Standard for Wildland Fire Protection \(NFPA 1140\)](#)
  - [Firewise USA](#)
- International Code Council. [2021 International Wildland-Urban Interface Code](#) (IWUIC)
- American Society of Civil Engineers: [ASCE 24](#)
- American Society of Civil Engineers: [ASCE 7-22](#)
- Federal Emergency Management Agency (FEMA)
  - [Community Rating System](#)
  - [Flood maps](#)
  - [National Flood Insurance Technical Bulletins](#)
  - FEMA P-361: [Safe Rooms for Tornadoes and Hurricanes](#)
  - FEMA P-1100: [Seismic Retrofit Guidelines for Existing Residential Buildings](#)
- Building America Solutions Center: [Disaster Resistance](#)
- Federal Alliance for Safe Homes (FLASH): [Buyers Guide to Resilient Homes](#)
- International Residential Code (IRC)

## 4.5. *Energy*

The Energy Pillar scores homes on the extent to which they are able to generate, store energy, and manage energy usage. These technologies are still so new that a home's inability to

generate or store energy is not typically seen as a problem. As a result, scoring for this pillar is framed around four “opportunities” (rather than problems):

- The capacity to generate energy
- The capacity to store energy
- The capacity to charge electric vehicles safely and use their storage capacity for energy management purposes
- The capacity to monitor and manage a home’s energy, including in ways that involve interconnection with the electric grid.

A home with a perfect Energy SCORE can be virtually energy independent from traditional electric grids: it generates and stores its own energy, and has sophisticated controls that enable this energy to be used as efficiently as possible. It also has the ability to support the electrical grid and to withstand grid outages.

The point allocations in the Energy Pillar are based on the following third-party standards and guidance:

- U.S. Environmental Protection Agency: [Building Electric Vehicle-Ready Homes](#)
- U.S. Department of Energy: [Solar Integration: Inverters and Grid Services Basics](#)

## 5. SCORE Levels

### *SCORE Levels*

A home can score a potential 300 points in each Pillar: 50 base points, and 250 feature points. The sum of points in each of the five Pillars equals a home’s total Pearl SCORE.

The base points, as discussed above, are assigned because the home was built to standards acceptable to the local jurisdiction, but may be removed as the result of issues that compromise its integrity.

Theoretically, a home could earn 1,500 points. However, the Pearl scale only represents 1,000 points because, as discussed above under the heading of Feature Prevalence, many features included in Pearl SCORE have not yet been widely adopted, with the result that only a tiny number of homes are currently eligible to receive more than 1,000 points.<sup>16</sup> Showing the spectrum above 1,000 points is not meaningful for the overwhelming majority of homes, and compresses the area of the scale where most homes are currently located, thus reducing visibility into differences between most homes.

The point value of a home’s Pearl SCORE determines its SCORE level. There are six levels:

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<sup>16</sup> Of the 60 million single-family homes in the U.S., Pearl estimates that fewer than 2,000, or 0.003% of the housing stock, have features that would result in a Pearl SCORE of over 1,000 points.

0-124: Compromised  
125-249: Needs Improvement  
250-374: Typical  
375-499: Good  
500-624: Very Good  
625-749: Excellent  
750-874: Exceptional  
875+: Outstanding

### Compromised (0-125)

A score below 125 indicates that a home has serious issues that seriously affect its performance and ability to provide basic shelter and wellness.

### Needs Work (126-250)

A score below 250 indicates a home that was built to local standards, and has very few or no high-performance features. The vast majority of these homes experience some performance problems, such as poor indoor air quality, the presence of hazardous materials, discomfort, high energy bills, and/or mold and moisture issues.

### Typical (251-375)

Typical homes have some high-performance features, and thus usually perform slightly better than the average home. The quality of life for home occupants should be somewhat above average, as the performance features should mitigate one or more typical performance problems. Conversely, a typical home may still experience some performance issues, which could range from poor indoor air quality to the lack of resilience to climate disasters. Typical homes usually have few or none of the performance features from the Resilience and Energy Pillars.

### Good (376-500)

Good homes have several high-performance features; typically in multiple pillars. The home occupants will typically notice a significant improvement in quality of life, resulting from mitigation of several common performance problems. The home may still experience certain types of performance issues, such as the lack of resilience to natural disasters which may be a common performance problem in many Good homes.

### Very Good (501-625)

Homes that score above 500 are considered “high-performance homes” in Pearl’s scoring system. Very Good homes, the first tier of home-performance homes, have many high-performance features in multiple pillars. They provide significant quality of life benefits for residents, and many performance problems are significantly mitigated or eliminated. Very Good homes qualify for Pearl’s Silver Medallion status (described below).

### Excellent (626-750)

Excellent homes have many high-performance features in most or all pillars. They provide a very high quality of life for occupants by addressing many performance problems. Significant performance problems are relatively uncommon in Excellent homes, although resilience to natural disasters may be a partial exception. Excellent homes qualify for Pearl's Gold Medallion status.

### Exceptional (751-875)

Exceptional homes employ cutting-edge technology. They deliver an extremely high quality of life in multiple dimensions – fewer health issues as a result of better indoor air and improved comfort as a result of high-quality HVAC, envelope, and monitoring systems. Exceptional homes are well prepared to address almost all performance problems and have frequently taken advantage of the technological opportunities in the Energy Pillar. Exceptional homes are eligible to receive a Pearl Platinum Medallion status.

### Outstanding (876+)

Outstanding homes are like exceptional homes, but have gone further in applying cutting edge technology. Outstanding homes almost always have significant performance features in each of the four pillars. Outstanding homes are eligible to receive a Pearl Platinum Plus Medallion status.

## 6. Pearl Medallions and Badges

### 6.1. *Purpose*

#### Medallions

Pearl offers homes with a SCORE above 500 (i.e., in the Very Good level or above) the opportunity to earn a Silver, Gold, or Platinum medallion. To achieve the medallion status, the home must also achieve criteria that ensure the entire home will meet or exceed a threshold level of performance.

To achieve a Silver Medallion, a home must have a SCORE of 500 points or more, and have confirmed high-performing features that support basic energy and comfort performance, including adequate attic insulation and above-average efficiency heating and cooling systems. A Silver home is significantly better than an average home.

To achieve a Gold Medallion, a home must have a SCORE of 625 points or more, and have high-performing heating and cooling equipment and an above-average building shell, as well as mechanical ventilation if a required blower door test indicates it is needed. If the home has fossil-fuel heating, cooling, or hot water equipment, combustion appliance zone (CAZ) testing

must confirm that harmful gases are not released into the home. Homes built to ENERGY STAR standards are typically eligible for Pearl Gold.

To achieve a Platinum Medallion, a home must have a SCORE of 750 points or more, and have high-performing heating and cooling equipment, an above-average building shell with fewer than 5 air changes per hour (as confirmed by a blower door test), whole house ventilation, home “hardening” features that enhance the home’s ability to withstand natural disasters to which it is vulnerable, and other high-performance features. Homes that qualify are often built to a very high standard, like Zero Energy Ready or Passive House. Today, fewer than 1% of U.S. homes qualify for Pearl Platinum.

To achieve a Platinum Plus Medallion, a home must have a SCORE of 875 points or more and meet all the requirements of Platinum. Homes that qualify are typically built to a very high standard like Passive House or Net Zero Ready, *and* have substantial energy and/or resilience features.

### Pearl Badges

Pearl recognizes other specific performance achievements with badges. At present, Pearl offers an Electrified Home Badge, which documents when a home has been fully electrified, with an exception for dual-fuel heat pumps in cold climates. A home with an Electrified Home Badge is aligned with the definition of a Zero Emissions Building issued by the U.S. Department of Energy.<sup>17</sup>

Pearl will be releasing additional badges in 2026.

## 7. Standards and Versioning

Pearl maintains a SCORE Standard that documents:

- The overall logic of the SCORE design;
- The SCORE algorithms;
- Rationale for the algorithms.

### 7.1. Algorithm Version Control and Updates

Pearl SCORE™ is a living algorithm that is continually refined, enhanced, and expanded on the basis of incoming data. Each update refines the model’s ability to characterize home performance with greater precision and resolution. New technologies and new standards drive scoring changes and improvements. Feedback from bills, monitors, sensors, and other real-time measurement devices indicators drive refinements based on higher-resolution insights into the determinants of poor and excellent home performance.

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<sup>17</sup> U.S. Department of Energy. 2024. [National Definition of a Zero Emissions Building](#).



Like credit-scoring or weather-modeling systems, the more general aspects of the Pearl algorithm are made transparent to the public, while details about how the SCORE is calculated are not. This balance is designed to enable stakeholders to understand the scientific rigor that underpins the SCORE, while maintaining the underlying algorithms as proprietary information.

Version control ensures that this evolution remains systematic and traceable. Major, minor, and patch releases (e.g., v2.0.1) indicate the scale of updates, from foundational recalibrations to incremental refinements. Together, these processes maintain Pearl’s credibility as a continuously improving national standard—one that users can rely on to keep pace with scientific progress and market change. The numerical versioning system works as follows:

- The first number (i.e. the “2” in 2.0.1) indicates a major version that includes non-backwards compatible changes to the SCORE;
- The second number (i.e. the “0” in 2.0.1) indicates a minor version that includes primarily backwards-compatible changes to the SCORE;
- The third number (i.e. the “1” in 2.0.1) indicates a patch that includes only minor backwards-compatible improvements, enhancements, or corrections.

In general, Pearl releases a new major version of the SCORE in each calendar year. Minor versions are released as frequently as once per quarter, as necessary. Patches are made as required. Any version update may impact any or all pillar scores that make up the Pearl SCORE.

The annual major SCORE versions are the primary vehicle for ensuring that Pearl is aligned with third-party standards and with new developments in building science. Pearl monitors the development of all key third-party standards, such as the triennial IECC updates, major one-time Federal efficiency standards changes, and the issuance of new third party health and resilience standards. Pearl also monitors and makes changes to the SCORE on the basis of new technologies that become commercially available, the practical implications of new scientific findings, and changes to the cost-effectiveness of home features driven by technological and regulatory changes.<sup>18</sup>

Because major version changes may affect individual homeowners’ SCORES, each major version change is accompanied by a public description of the changes that is posted on Pearl’s website, and communicated to users through the Pearl app.

Quarterly minor SCORE revisions provide opportunities for smaller but potentially important changes, including fixes to issues identified through stakeholder and user feedback. These changes are backwards-compatible to the greatest extent possible; if the changes require modifications to the SCORE such that individual homes’ SCOREs will be affected, Pearl provides appropriate notification to the general public and to app users.

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<sup>18</sup> As an example of SCORE changes resulting from shifting costs, Pearl has reevaluated its approach to both rooftop solar and storage over time because costs for both technologies have fallen dramatically since Pearl’s v1.0 scoring system was first developed.

Patches are made on an ad hoc basis to make minor corrections and improvements. They are backwards-compatible and do not require any public notification.

Because the algorithms are proprietary, Pearl does not make its standards public. Summaries of the standards are made available in white papers.



## About Pearl

Pearl is on a mission to make home performance matter. Through Pearl SCORE™, the national standard for rating home performance, Pearl has scored every home in America across five key areas: Safety, Comfort, Operations, Resilience, and Energy management (SCORE). By making performance visible and giving homeowners agency over their score, Pearl empowers better decisions about buying, improving, and selling homes.



Learn More

### The Facts

HOME SCORED

92M

HOME CERTIFIED

250K

DATA POINTS PER HOME

700+

### Certified Benefits Corporation

As a certified B-Corporation, Pearl is held to high standards of accountability and impact. Fewer than 4,000 companies worldwide have earned this distinction. For us, it means we answer not only to shareholders, but also to the homeowners and communities we serve.