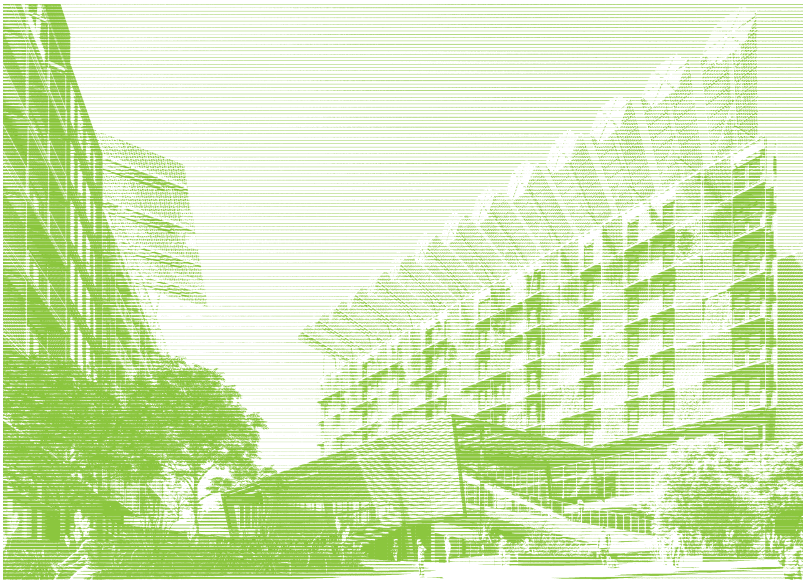
Peer Review: Key Findings and Proposed Improvements

FUTURE HOUSING INITIATIVE



FUTURE HOUSING INITIATIVE

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Peer Review:
Key Findings and Proposed Improvements

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Disclaimer

Executive Summary

The **Future Housing Initiative** (FHI) Peer Review was conducted to strengthen the framework as a practical, resident-centered approach to defining and measuring building performance. Reviewers from a range of fields, including policy, health, financing, data science, real estate development, and property management, evaluated the framework's metrics, scoring methods, and approach to presenting findings to ensure the approach is robust, transparent and holistic.

Overall, reviewers supported the direction of Future Housing and viewed its integration of resident experience and health risks with traditional energy and carbon measures as a valuable contribution to how building performance is defined. They saw the framework and scoring methodology as a strong foundation, and identified opportunities to improve the scope and precision of the metrics, increase transparency in data collection and analysis, and make findings easier to interpret and act upon.

Three overarching areas of feedback emerged:

1. **Metrics Framework**: *Expand the framework's scope, especially around resilience, while refining metric definitions, reducing overlap, and balancing objective building conditions with resident perceptions.*

2. **Data Collection, Analysis, & Scoring**: *Increase transparency around data sources, methodology, and weighting, strengthen approaches to improve data quality and account for bias, and refine scoring so results are reliable, consistent, and intuitive. Reviewers expressed varying perspectives on the appropriate balance between resident-centered and more objective measures.*

3. **Presentation of Findings:** *Make reports more comprehensible and actionable by providing clearer context, highlighting key findings and drivers of performance, tailoring information to audiences, and balancing transparency with resident and property privacy.*

In response to the constructive feedback, the FHI team has identified improvements spanning near-term revisions, future enhancements, items requiring further research and evaluation, and recommendations already addressed. Near-term changes include refining metric definitions, strengthening data collection guidance, increasing methodological transparency, improving qualitative analysis, and redesigning report content and scoring to make results more intuitive and actionable. Longer-term opportunities include developing new metrics related to topic areas such as resilience, exploring alignments with complementary climate and housing initiatives, and developing additional data sharing infrastructure. Overall, the peer review reinforces FHI's core direction while providing a practical roadmap for continued development.

Reviewing the Future Housing Framework

Future Housing Initiative

In recent decades, the building industry has made significant progress in measuring and improving energy efficiency and reducing carbon emissions. Building design standards, including LEED, Passive House and Enterprise Green Communities award points for choices that support occupant health, yet traditional approaches to measuring building performance have largely focused on technical indicators such as energy use, carbon intensity, and operational efficiency. As the housing sector advances toward decarbonization, there is growing recognition that building performance should also take into account such factors as resident health, quality of life, and lived experience.

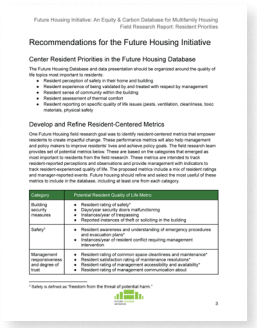
To address this discrepancy, the Future Housing Initiative (FHI) proposes a more holistic, resident-centered definition of building performance. The initiative seeks to contextualize and translate building data into meaningful insights that can support better decision-making and accelerate the transition to low-carbon multifamily housing. The framework brings together traditional building performance metrics with data on residents' experiences and potential health risks to provide a more complete picture of housing quality.

Over the past few years, the Future Housing team has developed this framework through a series of research and pilot projects. Initial work explored what residents identify as important aspects of their housing experience and used those findings to develop resident experience metrics. Additional research established health-risk metrics to assess building conditions associated with negative health outcomes, including the presence of mold and pests. Energy, carbon, and utility cost metrics were also expressed on a per-person basis to support comparisons across buildings of different sizes and occupancy levels.

The team subsequently developed approaches for collecting and validating this data through resident surveys, focus groups, in-unit observations, property management information, and utility data. Pilot projects then tested these approaches within a variety of multifamily properties, testing both the feasibility of collecting resident-centered data and how to present experience, health risk, and energy/carbon data together. These efforts culminated in the development of a scoring methodology and building performance reports designed to communicate the expanded definition of building performance to building owners and residents in an accessible way.

Future Housing Initiative: Projects to Date

Equity, Health, and Carbon Database for Multifamily Housing


Future Housing Initiative: An Equity & Carbon Database for Multifamily Housing
Field Research Report: Resident Priorities

Recommendations for the Future Housing Initiative

Center Resident Priorities in the Future Housing Database

The Future Housing Database and data presentation should be organized around the quality of life home most important to residents:

- Resident perception of safety in their home and building
- Resident experience of being validated by and treated with respect by management
- Resident sense of community within the building
- Resident assessment of thermal comfort
- Resident reporting on specific quality of life issues (pests, ventilation, cleanliness, toxic materials, physical safety

Develop and Refine Resident-Centered Metrics

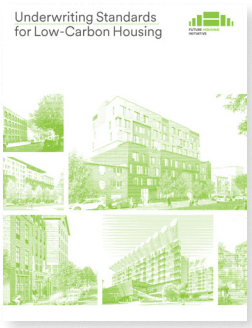
One Future Housing field research goal was to identify resident-centered metrics that empower residents to create impactful change. These performance metrics will also help management and policy makers to improve residents' lives and achieve policy goals. The field research team identified a preliminary set of metrics that are the most relevant and actionable and as most important to residents from the field research. These metrics are intended to track resident-reported perceptions and observations and provide management with indicators to track resident-experienced quality of life. The proposed metrics include a mix of resident ratings and manager-reported events. Future housing should refine and select the most useful of these metrics to include in the database, including at least one from each category.

Category	Potential Resident Quality of Life Metric
Building security measures	• Resident rating of safety[1] • Days/year security doors malfunctioning • Instances/year of trespassing • Reported instances of theft or soliciting in the building
Safety[1]	• Resident awareness and understanding of emergency procedures • Instances/year of fire • Instances/year of resident conflict requiring management intervention*
Management responsiveness and degree of trust	• Resident rating of common space cleanliness and maintenance* • Resident satisfaction rating of maintenance resolutions* • Resident rating of management accessibility and availability* • Resident rating of management communication about

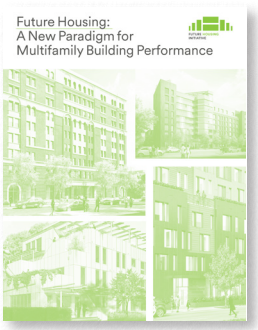
[1] Safety is defined as "freedom from the threat of potential harm."

3

Underwriting Standards for Low-Carbon Housing



Resident and Health Data Toolkit and Pilot



Conducting a Peer Review

The peer review represents the latest stage in the evolution of FHI. The project's primary objective was to obtain structured feedback from experts across multiple sectors to strengthen the Future Housing framework and inform its continued development. Reviewers with backgrounds in relevant areas such as policy, health, financing, data science, equitable engagement, real estate development, and property management were asked to consider both the conceptual foundation of the framework and its practical implementation.

The peer review also provided an opportunity to test key assumptions, identify implementation challenges, and build confidence in the framework among practitioners and other stakeholders. Engaging reviewers with expertise across different disciplines provided an opportunity to surface insights that may not have emerged through FHI's development process alone.

Reviewers provided feedback through multiple channels, including written comments on specific project documents, completing a detailed feedback questionnaire, participating in group discussions, and engaging in follow-up correspondence. Feedback was then analyzed to identify recurring themes, areas of consensus, and opportunities for improvement. A detailed description of the peer review methodology and participating reviewers is provided in the Appendix.

The FHI team assessed the feedback, identified key themes, and developed a proposed strategic plan to address reviewer comments, distinguishing between near-term changes, future enhancements, areas for further research, and recommendations already addressed or not being pursued at this time.

Timeline of Review Process

Key Feedback from the Review

Feedback collected through the peer review process is organized around three topic areas that reflect the core components of the Future Housing approach:

1 Metrics Framework

What are we measuring?

Feedback on what is being measured and how the framework is structured, including the definition and organization of metrics and submetrics across resident experience, health risks, and carbon/energy performance.

2 Data Collection, Analysis, & Scoring

How do we evaluate the data we collected?

Feedback on how the data is collected and translated into results, including data quality, analysis, weighting, scoring, transparency, and approaches to minimizing bias.

3 Presentation of Findings

How do we communicate our assessment?

Feedback on how findings and scores are communicated—particularly through building reports for residents and property owners—including the language, visuals, level of detail, and actionability.

The following sections summarize the major themes unearthed within each topic area and supported by selected review quotes. The feedback both validates the framework's core direction and provides a roadmap for strengthening its methodology and practical application.

1 Metrics Framework

Reviewers broadly supported the Future Housing metrics framework, particularly its effort to move beyond traditional energy and carbon measures to incorporate resident experience and health risks to create a comprehensive assessment of building performance. The breadth of the framework and its resident-centered focus were considered inherent strengths. Reviewers also identified opportunities to strengthen the framework's scope and precision. Feedback largely centered on expanding coverage of important aspects of housing quality, clarifying metric definitions, reducing overlap, and ensuring that measures accurately distinguish between objective building conditions and resident experiences.

Three Main Metrics: Scoring Example

Resident Experience Score Composite score (out of 50 points)	Health Risk Score Composite score (out of 50 deductions)	Carbon Performance lbs CO2e/person/year
32 (Close to average)	**18** (Close to average)	**2,375** (Better than Average)

Example of Metric and Submetric Components

	Metric	Value
Resident Experience Score	Overall Quality of Life	6 / 8
	Management Responsiveness	5 / 10
	Cleanliness and Maintenance	7 / 10
	Safety and Security	8 / 10
	Sense of Community	2 / 8
	Thermal Comfort	4 / 4

	Component (Assessment Question)	Source	Point Range	Total
Sense of Community	How do residents rate their sense of community? (1-10)	Resident survey	2 to 5	8
	How often do residents greet neighbors?	Resident survey	0 to 1	
	Sentiment score: Resident Sense of Community	Qualitative source	-1 to 1	
	Sentiment score: Do staff treat residents with respect?	Qualitative source	-1 to 1	

Metrics Framework

What We Heard

- Refine existing metrics to reduce overlap, clarify intent, and better distinguish between objective building conditions and resident perceptions.
- Define key concepts (e.g., ventilation, safety, security, quality of life).
- Add resilience metrics, including climate hazards, emergency preparedness, backup power, flooding, fire safety, and other resilience features.
- Add or strengthen measures related to housing stability, displacement risk, accessibility, resident services, social cohesion, and additional health and safety indicators such as cooking ventilation, lead hazards, building inspection history, and utility disruptions.

What Reviewers Valued

- **Strong foundation and broad scope.** Reviewers expressed general support for the proposed framework, noting that it provides a strong starting point for assessing building performance across multiple dimensions.
- **Resident-centered approach.** Reviewers valued the inclusion of metrics that capture factors affecting resident health and well-being alongside traditional building performance metrics.

Reviewer Perspective

"Expanding the scope to health and experience tells a much richer story than pure energy which is great. Centering some metrics on per person metrics also does a good job account for large vs. smaller apartments and higher occupancy."

Areas for Refinement

- **Expand the scope of building performance measures.** Reviewers encouraged expanding the framework to capture additional dimensions of building performance, particularly resiliency and accessibility, as well as housing stability, displacement risk, resident services, social cohesion, and additional health and safety indicators.

Reviewer Perspective

"Given the focus on affordable housing and inclusion: it's important that we wrestle with displacement."

- **Improve the clarity and precision of what each metric is intended to measure.** Reviewers recommended defining key concepts such as ventilation, safety, security, and quality of life more precisely. In addition, reviewers emphasized the need to refine metric definitions, reduce overlap, and ensure that metrics accurately capture what they are intended to assess. In particular, reviewers highlighted the need to clearly distinguish between measurable building conditions and resident experiences.

- **Consider the balance of resident-centered and objective measures.** While reviewers generally supported the inclusion of resident experience and health, some questioned whether these dimensions currently receive too much emphasis relative to other aspects of building performance.

  Reviewer Perspective

  "Resident experience and health has been a gap for a long time, but I do feel like that the assessment is now weighted too much in that direction to thoughtfully capture all of the aspects that make a property high-performing."

  Reviewer Perspective

  "The central gap I see in the redefinition concerns building resiliency and its impacts on the resident experience and health."

Overall, reviewers viewed the proposed methodology as a strong foundation, particularly the approach of reducing points for health risks to generate scores. At the same time, they identified opportunities to strengthen the methodology by increasing transparency, refining approaches to scoring and weighting, and clearly communicating the purpose of this work.

Data Collection, Analysis, & Scoring

What We Heard

- Increase transparency by publicly sharing data sources, methodology, scoring approaches, sub-metric weighting, and qualitative analysis methods, including plain-language definitions and educational materials.
- Refine methods to reduce response and interpreter bias, account for low participation rates, and potentially unreliable responses, particularly for difficult-to-observe health risks.
- Ensure scoring focuses on factors within a building owner's control and account for contextual factors that may influence outcomes, such as utility costs, neighborhood factors, and other external conditions outside an owner's control.
- Improve sentiment scoring to better reflect the severity of feedback and distinguish mixed sentiment from neutral responses. Consider using automated text and sentiment analysis to improve efficiency and consistency.
- Simplify language and provide clearer guidance to help residents accurately report conditions. Refine question design to capture meaningful experiences (e.g., repeated vs. one-time exposures, quality of neighbor relationships).
- Tailor data collection so inspectors and residents evaluate the issues/respond to questions they are best suited to assess.
- Clearly communicate FHI's intended purpose and what data will be shared, with whom, and for what purposes. Include the benefits, risks, and expectations of participation while providing education and support throughout the process.
- Consider alignment with emerging industry standards to strengthen credibility and adoption.
- Use high-quality, representative datasets to improve reliability and scalability.
- Incorporate opportunities for residents and property owners to validate findings before finalizing scores.
- Analyze relationships between building conditions, demographics, and health outcomes to identify populations that may be disproportionately affected.

What Reviewers Valued

- **Multidimensional scoring.** Reviewers saw the scoring approach as a useful way to synthesize complex, multidimensional information into an accessible assessment.

Reviewer Perspective

"This overall scoring system helps tell a clear story about a building's overall performance for residents that incorporates complex, multi-dimensional data."

Areas for Refinement

- **Strengthen data quality and hone the approach.** Reviewers emphasized the importance of using high-quality and representative data, while refining data collection methods. They recommended simplifying resident-facing questions, providing clearer guidance, and ensuring that residents and inspectors are asked to assess conditions they are best positioned to evaluate. Reviewers also recommended accounting for low participation rates and potentially unreliable responses, particularly for health risks that may be difficult to observe, and incorporating opportunities for residents and property owners to validate findings before scores are finalized.

Reviewer Perspective

"While the methodology and evaluation methods seem sound, this also seems like a very time and resource consuming process..."

- **Refine scoring and weighting while acknowledging differing perspectives.** Reviewers generally saw value in the scoring approach but expressed differing views about how individual metrics and categories should be weighted. For example, there were different thoughts about the balance between qualitative resident experience versus quantitative building performance measures. Some recommended placing greater emphasis on resident quality of life and other resident-centered metrics, while others favored increasing the weight of more concrete outcomes, such as carbon performance.
- **Increase transparency around methodology, data, and intended use.** Reviewers highlighted the importance of transparency around the scoring methodology, as well as how data will be collected, used, and shared. In addition, reviewers noted the importance of clarifying the intended purpose of this work and for building trust among both residents and property owners.

Reviewer Perspective

"Not only must the data collection and analysis process be transparent, but the objectives of the initiative must be transparent."

- **Strive to reduce potential bias and improve fairness.** Reviewers encouraged refining the methodology to minimize potential sources of bias and encouraged additional consideration of how these biases could affect results. They also recommended accounting for contextual factors that may influence outcomes but fall outside a building owner's control.

Reviewer Perspective

"I think addressing sample bias (resident survey) and analyst bias (IA scores) could use some additional thought..."

Reviewers generally supported the approach to communicating Future Housing findings, particularly the combination of quantitative building performance metrics with qualitative insights from residents. They found the visual presentation of scores useful and saw value in providing a more complete picture of performance. Reviewers also identified the benefits of tailoring content to different audiences and highlighting key findings.

In addition, reviewers identified opportunities to make findings easier to interpret and more actionable, such as through strategic recommendations. They also emphasized the importance of providing sufficient context around scores and maintaining trust through appropriate protections for resident and property privacy.

Presentation of Findings

What We Heard

- Revise the first page of the report to provide an executive summary highlighting overall performance, resident impacts, and key actions.
- Tailor reports to different audiences and focus property-level findings on actionable factors within owner control while accounting for building context. In addition, frame the reports to help users understand the likely drivers behind poor performance.
- Ensure qualitative insights support quantitative results or provide greater context where residents had different opinions on a theme, using summarized insights rather than individual quotes where privacy, representativeness, or consistency may be concerns.
- Collect feedback from property owners and managers on report usefulness to support continuous improvement.
- Maintain communication with residents after data collection to keep participants informed and engaged.
- Consider anonymizing building identities in public reports or datasets where appropriate to encourage participation while mitigating perceived risks.
- Address owner concerns related to liability, insurance, and potential impacts on rents while addressing resident privacy concerns.
- Highlight high- and low-performing sub-metrics and reduce reliance on a single composite score by providing more detailed explanations and actionable recommendations.
- Consider alternative scoring approaches to improve clarity, such as using letter grades or replacing qualitative labels (e.g., “Better than Average”) with numeric averages, standardizing scoring formats (including percentile displays and score direction), and using intuitive visual cues (e.g., color coding, symbols, or other indicators).
- Provide additional context for interpreting results, including participation rates, broader comparison benchmarks, and context for newer metrics such as per-person carbon performance.

What Reviewers Valued

- **Clear visual and accessible presentation of scores.** Reviewers found the inclusion of scores, including maximum and average values for Resident Experience and Health Risk, helpful for interpreting results. Visualizations were seen as particularly useful for helping readers navigate multidimensional findings.

  However, reviewers also expressed mixed views on how overall scores should be communicated, providing a range of perspectives on the effectiveness of letter grades, composite scores, or qualitative labels.

  Reviewer Perspective

  "Showing the score maximums and averages in the Resident Experience score and Health Risk score graphs is highly effective, and I like including the quotes connected to specific sub-metrics on the graphs."

- **Integration of quantitative and qualitative insights.** Reviewers valued the combination of objective data with residents' experiences and perspectives. They viewed resident input as an important complement to traditional building performance information and a way to preserve the lived experience within the assessment.

  Reviewer Perspective

  "...the integrity of the voice of residents is preserved when it is meaningfully included alongside traditional data resources."

Areas for Refinement

- **Make scores easier to interpret and compare.** Reviewers identified opportunities to make the scoring system more intuitive for readers, particularly when comparing metrics with different scoring directions or scales. Suggestions included standardizing score presentation, exploring letter grades or other common visual indicators, and providing clearer benchmarks or context for interpreting results. Some reviewers also recommended including participation rates and additional context for metrics such as per-person carbon.

  Reviewer Perspective

  "...I think it's a little tough for a reader to compare side-by-side scales that have the opposite valence from each other.."

  Reviewer Perspective

  "...the scores as presented are difficult to digest. You find yourself doing math in your head to judge how good or bad they are."

- **Tell a deeper story than the composite scores alone.** Reviewers encouraged FHI to look beyond aggregate scores when communicating findings. Highlighting the highest- and lowest-performing submetrics could help readers understand what is driving overall performance and provide a more nuanced picture of housing quality.

  Reviewers supported continuing to integrate qualitative resident insights with quantitative findings. At the same time, they noted that resident feedback may sometimes diverge from quantitative measures and recommended careful consideration of how these differences are presented and interpreted.

  Reviewer Perspective

  "I'd also highlight…the top and bottom performing submetrics to tell a richer story than the aggregated scores do."

  Reviewer Perspective

  "[Resident quotes] are helpful but may conflict with the quantitative findings."

- **Make findings more useful and actionable.** Reviewers encouraged FHI to make reports useful not only for understanding performance, but also for identifying opportunities for improvement. Suggestions included providing an executive summary, highlighting key findings, identifying factors that may influence performance, and tailoring information to different audiences.

  For property owners and managers in particular, reviewers emphasized that reports should focus on factors within their control and frame findings as opportunities for improvement rather than judgment. Recommendations should be appropriately scoped to what the available data can support.

  Reviewer Perspective

  "Ideally, the system would have a report card that says for each submetric: you received this score and by doing x, y, and/or z, you can improve your score."

  Reviewer Perspective

  "For owners: Be clear that the framework is designed to be collaborative and show areas for growth not to shame."

- **Strengthen transparency while protecting privacy and trust.** While noting the difficulty in doing so, multiple reviewers emphasized that reporting should balance transparency with participant privacy to maintain trust while still providing useful information.

  Reviewers emphasized that reporting needs to balance transparency with the privacy and interests of residents, property owners, and managers. Suggestions included considering anonymization of buildings in public-facing reports or datasets, clearly communicating how findings may be used, and addressing concerns related to liability, insurance, rents, and resident privacy.

  Feedback emphasized the importance of continuing communication with residents after data collection and ensuring that the presentation of resident perspectives does not inadvertently compromise privacy or misrepresent the experiences of participants.

Plan for Improvement

The peer review provided a range of recommendations for strengthening the Future Housing framework. The FHI team assessed this feedback in the context of the initiative's goals, available resources, and experience implementing the assessment. The resulting plan distinguishes between the following:

- **Near-Term Improvements**
  Changes that would meaningfully improve the framework, process, results, or presentation and can be incorporated going forward with existing capacity and relatively limited effort.

- **Future Enhancements**
  Proposed revisions that have value but would require significant additional time, capacity, funding, data, and/or strategy to implement.

- **Further Research & Evaluation**
  Suggestions that warrant additional research, discussion, and/or testing before determining whether or how to implement them.

- **Already Addressed / In Progress**
  Feedback that is already reflected in the current approach or is being addressed through ongoing work.

- **Not Pursuing at This Time**
  Suggestions that the team has considered but does not plan to implement based on the project's goals, methodology, feasibility, or other considerations.

These categories reflect FHI's current direction and are intended to guide continued development of the framework. As additional research, testing, and project experience inform the work, some elements may evolve.

Near-Term Improvements

The following changes can be incorporated into the current framework or ongoing research efforts with relatively limited additional effort.

For instance, the FHI team has developed a "Report Reviewer Checklist" that incorporates many of the recommendations identified within this section and the Already Addressed section. The checklist serves as an additional quality-control step, prompting the team to consider these issues as reports are reviewed and finalized.

Metrics Framework:

- Give greater weighting to components within an owner's or manager's control and ensure buildings are not penalized for factors outside their control (e.g., utility costs).
- Define metrics more clearly and include plain-language definitions where needed (e.g., physical safety, poor ventilation). Add guidance to the survey to help residents identify mold beyond visible black mold (e.g., musty odors).
- Specific changes to metrics include:
  - Revise Sense of Community metric to emphasize functional outcomes (e.g., mutual support among neighbors) rather than perceptions alone.
  - Add additional financial trade-offs (e.g., foregoing necessities) into the Safe Temperatures metric.
  - Separate objective and subjective metrics where appropriate.
  - Incorporate information on gas range presence and ventilation use to Ventilation metric.
  - Add the presence of fire extinguishers to the Perceived Risk of Accident or Injury metric.

Data Collection, Analysis, & Scoring:

- Develop an owner onboarding checklist to ensure informed consent. Review and update owner and resident recruitment materials to more clearly explain how information will be collected, used, and shared as well as why it is shared, and who the intended audiences are.
- Add qualitative definitions to the survey scale to make responses more consistent and meaningful.
- Add "Other" and a comment field as an option of health conditions since moving into their home to allow residents to describe additional health concerns in their own words.
- Make methodology, scoring approach including weighting, and data sources, and other materials publicly available. Clarify the distinction between health outcomes and quality-of-life impacts throughout the methodology.
- Automate qualitative text and sentiment analysis to improve consistency and efficiency. Refine sentiment analysis to better distinguish neutral sentiment from offsetting positive and negative responses and account for response severity.
- Clarify what an IA score of 0 represents (neutral sentiment versus offsetting positive and negative sentiment).

Presentation of Findings:

- Provide recommendations that emphasize actions that building owners and managers can directly influence.
- Simplify language and improve readability and overall organization of report content.
  - Add a Key Takeaways section to Page 1 summarizing overall building performance and resident impacts.
  - Add an Actions Likely to Improve Performance section to Page 1 highlighting practical actions building owners and managers can take.

    - Ensure report content is relevant and useful for residents, site staff, and building owners/managers.
    - Remove or define all acronyms.
- Ensure narrative explanations align with scores, comments, and qualitative findings, including explaining any seemingly contradictory information.
    - Ensure individuals cannot be identified through specific quotes used.
    - Provide additional context where resident opinions diverged.
- Add additional context explaining why neighborhood demographics are included alongside building characteristics. Contextualize building performance by incorporating neighborhood conditions (e.g., historic disinvestment, environmental and energy burdens, and Racially Concentrated Areas of Wealth).
- Highlight the insight that residents frame health as quality of life as a key methodological takeaway.
- Frame Future Housing as one lens for understanding building performance rather than a comprehensive replacement for existing evaluation systems.
- Better explain the relationship between resident-reported quality-of-life issues and the Health Risk section of the report.
- Ensure comparisons and benchmarking are transparent and avoid vague comparisons.
- Clarify Future Housing's intended role as a research dataset that can also inform policy.
- Improve top-level dashboards so performance can be understood at a glance using consistent colors, labels, and visual cues. Use a shared color spectrum and descriptive performance categories across Resident Experience, Health, and Carbon. Highlight high- and low-performing sub-metrics.
- Simplify how metrics and metric explanations are presented. Replace percentile ranges with more intuitive scoring approaches. Redesign the Health score so health risks reduce an initial high score rather than accumulate from zero, creating a more intuitive interpretation. Reweight each score to go up to 100.
- Ensure comparisons and benchmarking are transparent and avoid vague comparisons.
- Provide context, including the total number of building residents, participating residents, and participation rate.

Future Enhancements

The following revisions are supported in principle but will require additional time, capacity, funding, data, and/or strategy before they can be incorporated into the framework.

Metrics Framework:

- Clarify that subjective measures (e.g., quality of life, illness) represent resident perceptions rather than objective facts.

Data Collection, Analysis, & Scoring:

- Expand benchmarking beyond comparisons with high-performing buildings to provide broader performance context.
- Publish the following documents online, guide report readers to documents.
    - Data Collection Tools
    - Resident Event Guide
    - Analysis Spreadsheet
    - Qualitative Analysis Guide
    - Qualitative Analysis Code Book (if still relevant)

Presentation of Findings:

- Develop example reports and web-based displays to help prospective participants understand how data may be presented and shared.

Other:

- Explore partnerships with organizations working on complementary initiatives, including collaboration around resiliency metrics and public health data integration. This could include working with state and local governments to align Future Housing with broader climate resilience and housing initiatives.
- Develop the Future Housing Data Hub with clear user authorization levels and data-sharing permissions.
- Conduct legal review of reports and data-sharing practices to assess potential real estate liability or insurance implications.

Further Research & Evaluation

The following suggestions require additional research, testing, and/or a larger body of data before the FHI team can determine if and how they should be incorporated into the framework.

- Integrate neighborhood-level public health data into the Property Context report section.
- Add resiliency, and potentially as a fourth overall score, including measures such as climate hazards, flooding, fire safety, roof and drainage conditions, backup power, utility outages, etc. Consider incorporating accessibility into this work.
- Explore adding property financial health as an additional performance metric.
- Explore adding resident services as a future performance metric.
- Explore adding stability and anti-displacement as a metric that includes resident turnover, length of residence, displacement risk, etc.
- Incorporate mechanisms for residents to validate owner responsiveness and management practices.
- Explore integrating information on recent building inspections from housing agencies where applicable.

Already Addressed / In Progress

The following recommendations are already reflected in the current methodology or have been incorporated into ongoing work. The “Responses” below provide additional context on how these recommendations are being addressed and, where relevant, how the approach has evolved in response to the feedback.

- Expand resident health questions to capture building-related illnesses beyond predefined conditions.
  - *Response: There is an open-ended discussion during the focus group asking if people have noticed any changes in their health since moving into this building, and if yes what those changes are. The survey provides space for residents to select specific comment housing-related health concerns.*
- Break down “security” into distinct dimensions (e.g., safety in the unit, building, and neighborhood).
  - *Response: The metrics use “Safety and Security” for feeling safe from crime and violence in a resident’s home (the building and the unit). Future Housing is focused on the building and aspects that owners can control, so context about the surrounding neighborhood is presented in the overview section of the report but not part of the scoring.*

- Refine how pest sightings are measured to better distinguish between isolated and recurring issues.
  - *Response: The pest sighting questions ask people if in the last 12 months they've seen pests including mice, rats, cockroaches, bed bugs or other insects, and if yes how many times they saw pests in the last 30 days and offer a range from none to 5 or more times, as well as an "Other" option with space for comment. The Leasing, Operations, and Maintenance survey includes similarly structured questions, plus asks how many units have notified management of pests in the unit or required pest management in the last 12 months.*
- Develop additional approaches for identifying and managing outlier or unrealistic survey responses.
  - *Response: Analysis cross-references the Leasing, Operations, and Maintenance survey, the resident responses, and the on-site visual assessments by the facilitator to evaluate consistency across data sources and penalize underreporting by management. The analysis has also expanded validation checks between different data sources, and excludes outliers before calculating the average.*
- Collect feedback from property owners and managers on report usefulness and implementation.
  - *Response: The Future Housing Initiative team has collected feedback from property owners and managers on the report usefulness on past projects and will continue to build that into future project scopes.*
- Tailor reports to different audiences while providing appropriate building and neighborhood context.
  - *Reason: It is a project goal to provide a single report to all site-specific stakeholders. However, the revised report is designed to integrate content relevant to residents, owners, and managers.*
- Consider approaches to anonymizing building identities, where appropriate, to encourage participation.
  - *Reason: Future Housing Initiative plans to anonymize building identifiers in the public data hub, once launched.*
- Better align assessment responsibilities by having inspectors verify observable building conditions while residents report lived experiences.

Not Pursuing at This Time

The following recommendations were considered but are not planned for implementation at this time. These decisions reflect the current goals, methodology, available resources, and intended use of the Future Housing framework and may be revisited as the initiative develops.

- Pair carbon performance per person per year metric with more recognized ones for context.
  - *Reason: We include other more commonly used energy and carbon metrics in the detailed section of the reports, but will continue to use a Carbon Per Person score in the top line alongside the Resident Experience and Health Risk scores. We will also adjust the carbon/person score to match the 1-100 scale of the other two top-line metrics.*
- Adjust methodology to avoid interpreter influence skewing certain metrics
  - *Reason: The interpreter assessment is the mechanism for representing the qualitative data in the scores by categorizing the resident-provided data. The process for coding qualitative data is being revised to reduce reviewer bias.*
- Increase/decrease weighting of resident quality of life in the Resident Experience Score.
  - *Reason: We received comments to weigh resident perspectives both less and more heavily. On balance it appears that the current weighting is appropriate. Current weighting is based on research of what residents prioritize.*
- Increase emphasis on carbon performance, as a more objective metric.
  - *Reason: A core principle of Future Housing is to surface resident experience and health alongside more traditional building performance metrics around energy and carbon. All three performance dimensions (Resident Experience, Health Risks, Carbon/Energy) receive equal weight in the report presentation and will be available for users in the database.*

- Add survey questions about utility disconnect notices to better measure housing affordability.
  - *Reason: We believe the intent of understanding holistic affordability will be met by a revised question focused on residents forgoing necessities to pay energy bills.*
- Remove duplicate resident survey questions that are already captured during the in-unit inspection.
  - *Reason: The questions are distinct as the in-unit tour asks residents to show facilitators examples of issues.*
- Explore testing for additional environmental hazards, such as lead-based paint.
  - *Reason: The visual assessment completed by facilitators includes signs of lead-based paint. Testing-intensive assessments would increase the survey budgets beyond what we believe is scalable.*
- Add accessibility as a new sub-metric, including corresponding survey questions and scoring methodology.
  - *Reason: The current data collection and scoring methodology assesses sites for several ADA measures. We aim to explore ways accessibility impacts residents' sense of community. We decided, however, not to include accessibility as an independent sub-metric.*
- Create structured opportunities for residents to review and validate findings before scores are finalized.
  - *Reason: Given the challenge of connecting with residents, a separate validation step before scores are finalized appears impractical within the budget and timeline allocated for surveys and analysis.*
- Identify which building features truly impact outcomes to prioritize cost-effective design choices.
  - *Reason: This recommendation would require additional research across data from many building surveys. This may be a long-term use for the Future Housing data set but is not something we can implement now.*
- Create ongoing communication channels with residents beyond data collection to share findings and project updates.
  - *Reason: Based on this feedback we will offer residents the option of joining the Future Housing newsletter moving forward. Additional communication would require additional funding and is beyond our current team capacity.*
- Assess whether particular demographic groups disproportionately experience health risks or negative resident experiences and incorporate these insights where appropriate.
  - *Reason: This recommendation would require additional research across data from many building surveys. This may be a long-term use for the Future Housing data set but is not something we can implement now.*
- Pilot and test revised surveys with residents to improve clarity, consistency, and reliability before implementation.
  - *Reason: Future Housing has already piloted and tested resident surveys and will continue to pay attention to feedback from residents, owners/managers, and facilitators on potential future refinements.*
- Use diverging horizontal bar charts where appropriate to better illustrate opposing concepts (e.g., resident experience vs. health risk).
  - *Reason: Redesign of scoring makes this recommendation no longer relevant.*

Looking Ahead

The peer review provided an important opportunity to test the Future Housing framework at a critical stage of its development. Bringing together experts with different perspectives helped validate the direction of the initiative while identifying opportunities to strengthen how building performance is measured, evaluated, and communicated.

The collected feedback will inform the continued refinement of the Future Housing framework as the initiative moves forward. Near-term improvements can be incorporated into ongoing activities, while other refinements will require additional testing, research, and resources. Together, these next steps will help FHI continue developing as a practical and credible approach to help drive the transition to low-carbon, multifamily housing with real-world data and a resident-centered approach to building performance.

Appendix

Appendix A: Peer Reviewers

- **Grace Adcox**, Senior Climate Strategist, Data for Progress
- **Lauren Baumann**, Director of Sustainability and Climate Initiatives, Massachusetts Housing Partnership
- **Michael Brod**, Sustainability Project Manager, Jonathan Rose Companies
- **Abby Corso**, Chief Strategy Officer, Elevate
- **Meshayla Cox**, Equity Training Manager, CoEquity Consulting
- **Sachaly De Leon**, Energy & Housing Justice Coordinator, Association for Neighborhood & Housing Development (ANHD)
- **Krista Egger**, VP, National Initiatives, Enterprise Community Partners
- **Nick Hernandez**, Energy Engineer II, New Ecology
- **Alexander Jarrah**, Energy & Sustainability Manager, Stewards of Affordable Housing for the Future
- **Marty Josten**, Principal Director, Building Decarbonization New Ecology
- **Conor Laver**, CTO, AtomicPE
- **Jen Leone**, Assistant Commissioner/Chief Sustainability Officer, NYC Housing Preservation & Development (HPD)
- **Jamal Lewis**, Director of Policy Partnerships & Equitable Electrification, LISC
- **Josh Lomot**, Senior Project Manager, Jonathan Rose Companies
- **Kevin McGrath**, Senior Consultant, VEIC
- **Adam Meier**, Director, Green & Healthy Communities, Housing Partnership Network
- **Tomasine Reyes**, Woodside Houses TA
- **Lindsey Robbins**, Vice President of Market Development, The Community Preservation Corporation
- **Erin Rose**, Vice President, Social Equity, Three3 Inc.
- **Kim Stevenson**, Chief Executive Office, New Ecology
- **Lotte Schlegel**, Principal Consultant, Schlegel Collaborative
- **Jonathan Wilson**, Deputy Director, National Center for Healthy Housing (NCHH)

Appendix B: Peer Review Methodology

The Future Housing Initiative (FHI) used a peer review process to strengthen the quality, consistency, and practical relevance of its building level analysis and presentation. The peer review methodology is designed to incorporate perspectives from individuals with relevant expertise and experience, while also creating opportunities to identify questions, assumptions, methodological limitations, and areas for improvement that may not be apparent to the project team.

Reviewer Engagement & Feedback Collection
Future Housing engaged reviewers to provide structured feedback on the assessment methodology, interpretation of results, and presentation of findings. Feedback was collected through written comments, facilitated discussions, and a comprehensive survey.

The review process was designed to give reviewers sufficient information to evaluate both the methodology and the resulting findings. Review materials included a content guide, an example building report, a document describing the qualitative analysis process, a Resident Experience & Health Risk Analysis table, and publicly available content produced by the Future Housing Initiative.

Reviewers were asked to attend three virtual workshops, independently review the materials provided, and submit feedback. The workshops provided opportunities for discussion and clarification, while independent review allowed reviewers to develop and document their perspectives without relying solely on group discussion. These questions were categories as the following:

<u>Redefining Performance</u>
Future Housing includes resident experience and health risks as well as carbon and energy metrics in the definition of building performance.

- What gaps exist, if any, in our redefinition?
- In what ways is our redefinition useful?
- Have we adequately centered residents in our approach to redefining performance? Why or why not?
- Is this redefinition filling a gap in the building industry, particularly regarding resident health and experience? Are there other existing policies, programs, or frameworks—e.g. housing quality inspections and specific standards—that fill this need?
- What additional feedback or comments would you like to share regarding our approach to redefining building performance?

<u>Establishing the Metics</u>

- Does the methodology and metrics that we put forth put the needs of the residents at the center?
- Does our analysis approach result in a representation of resident experience and health risks?
- What feedback do you have about our weighted methodology that rolls up into a score?
- What revisions would you suggest to our methodology and/or metrics?
- What additional feedback or comments would you like to share regarding the metrics we established and how we analyzed the data?

Presenting the Findings

Data Visualization

- Is the way we present the synthesized data—e.g. scores and detailed sections—effective? Why or why not? How could it be improved?
- How well do the qualitative insights—in the form of quotes and takeaways—enrich the data and scores by providing additional context and voice to the residents?

Data Sharing

- The two proposed methods for sharing data include 1) a building-specific report for owners, managers, and residents and 2) a publicly available database.
- Is the way we share the synthesized data in the individual building reports effective? What could be improved?
- What information should be available to everyone via the proposed data hub? What should be excluded? Why?
- How can we help owners and residents feel comfortable to share information and results in a public platform?
- What additional feedback or comments would you like to share regarding our approach to visualizing and sharing the data?

Feedback Analysis

Peer review feedback was then collected into a master spreadsheet and analyzed by the Future Housing team to identify recurring themes, specific methodological concerns, recommended changes, and issues requiring additional investigation.

Multiple members of the Future Housing team reviewed each comment and documented whether an action was warranted and, when applicable, whether the action should be addressed in the short term, long term, or through further discussion and research. When team members disagreed about how to respond to a comment, the broader team discussed the feedback during internal team meetings and sought to reach alignment on the appropriate response.

In addition, the feedback was organized into several rough categories to help identify common overlaps after various rounds of review. The initial categories included:

- Clarifying language
- Edits/Additions to metrics
- Accounting for bias
- Scoring/interpretation/analysis
- Data/weighting categories
- General feedback for presenting building reports
- Presenting final data/scores
- Transparency in sharing data
- Tailoring reports and actionability
- Providing context for scores and explaining how metrics and data are used
- Scaling the work
- How data can be used

Following several rounds of review and consolidation, comments were reorganized into three overarching categories:

- Metrics Framework
- Data Collection, Analysis, & Scoring
- Presentation of Findings

This final categorization was intended to create a clearer connection between peer feedback and the major components of the Future Housing methodology, while reducing overlap among individual comment categories.

Balancing Conflicting Feedback

Peer review necessarily involves perspectives from individuals with different areas of expertise and different experiences with housing, energy performance, resident engagement, and evaluation. As a result, reviewers sometimes shared different or conflicting recommendations.

Future Housing addresses conflicting feedback by considering the rationale, evidence, and implications underlying each recommendation rather than treating reviewer comments as equivalent votes. Where multiple reviewers identified a similar concern, the consistency and prevalence of that concern were considered in determining whether a response or methodological change was warranted.

Resident Experience

Submetric	Analysis Question / Components of the Sub-Metrics	Data Source
Resident Overall Quality of Life	Rate overall experience	Resident Survey
	Resident Overall Quality of Life	Interpreter assessment
Management Responsiveness	Rate Management responsiveness	Resident Survey
	How satisfied are residents with management responsiveness	LOM Survey
	How satisfied are residents with management responsiveness	LOM vs Resident Survey
	Always can speak to management in comfortable language	Resident Survey
	Average turnaround time for maintenance request	LOM Survey
	Maintenance (Do things get fixed, in a reasonable amount of time, by respectful people?)	Interpreter assessment
Cleanliness / Maintenance	Rate Cleanliness	Resident Survey
	Cleanliness (are the common spaces clean?)	Interpreter assessment
Safety and Security	Rate Security	Resident Survey
	How many days were security locks broken	LOM Survey
	Safety and Security	Interpreter Assessment
Sense of Community	Rate Community	Resident Survey
	How often do you greet neighbors?	Resident Survey
	Resident Sense of Community	Interpreter assessment
	Staff Interactions? (Do staff treat residents with respect?)	Interpreter assessment
Thermal comfort	Thermal comfort	Default
	"Yes" to Summer Thermal Comfort	Resident Survey
	Do you use a secondary method for heating in winter?	Resident Survey
	Thermal comfort	Interpreter assessment

Health Risk

Submetric	Analysis Question / Components of the Sub-Metrics	Data Source
Presence of mold or mildew in the home/building	Current or previous signs of mold	InUnit Tour
	Is there mold in your home?	Resident Survey
	Yes/No (LOM survey)	LOM Survey
	Is mold being underreported?	LOM Survey vs InUnit Tour
Presence of pests	How many pest sightings in your home in last 30 days?	Resident Survey
	Have you seen pests in your home in the last year?	Resident Survey
	% of units reporting pests	LOM Survey
	Are pests being underreported?	LOM vs Resident Survey
Residents experience respiratory ailments or allergy symptoms	Are your symptoms related to the building?	Resident Survey Interpretation
Evidence of water damage, moisture, or leaks	Are there any water leaks today?	InUnit Tour
	Is there evidence of water damage?	Resident Survey
Affordability of maintaining safe temperatures in the home	Do you need to choose between paying bills or keeping safe temperatures?	Resident Survey
Physical safety or structural risks in the home/building	Identify physical safety concerns in last 3 months	Resident Survey
	Physical safety reports / units / year	LOM Survey
	Are physical safety issues being underreported?	LOM Survey
	Do you use a secondary method for heating in winter?	Resident Survey
Presence of adequate ventilation	Presence of adequate ventilation	Defult points
	Does your home have excess humidity/dampness?	Resident Survey
	Is there cooking ventilation?	InUnit Tour
	Is there poor ventilation?	InUnit Tour
	Presence of adequate ventilation	Interpreter assessment

Carbon Performance

Submetric	Units
Emissions per person	lbs CO2e/person/year
Emissions per square foot	lbs CO2e/SF/year
Resident energy cost per square foot	$/SF/year
Resident energy cost per unit	$/unit/year
Owner energy cost per square foot	$/SF/year
Owner energy cost per unit	$/unit/year
Energy per person	mmBTU/person/year
Energy Use Intensity (EUI)	kBTU/SF/year

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Acknowledgements

This report synthesizes and was informed by work from multiple projects funded by NYSERDA and Bank of America and in-kind funding from project partners. Bright Power, Building Energy Exchange have led project work and initiative fundraising to date. Kinetic Communities Consulting (KC3), ERM, CoEquity Consulting, and Simpson Strategic, have challenged Future Housing to reconsider assumptions and always focus on residents. NYC HPD, NYS HCR, Community Preservation Corporation, Bank of America provided invaluable feedback from the perspective of lenders, agencies and affordable housing. Steven Winter Associates provided technical advising and review. Our advisory group has convened for multiple focus groups and virtual workshops and includes representatives from 36 organizations. Special thanks to Jen Leone for her persistent questions about low-carbon multifamily and to Amy Brusiloff for her enduring support for innovative approaches to financing energy efficiency.

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October 2026
be-exchange.org

The Future Housing Initiative is a new endeavor launched by Bright Power and Building Energy Exchange to help drive the transition to low-carbon, multifamily housing with real world data and analysis of building performance.

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