

## Instructions

*This year's format is slightly different from last year. If you participated last year, you will remember that each case had one case partner and was written from their specific perspective. This resulted in solutions that were very useful to the case partner, but not necessarily replicable to other organizations. This year, many case partners were consulted to give a broader perspective on endemic energy efficiency implementation barriers. **Accordingly, this year's cases describe "typical" versions of problems, and your solutions will be judged on innovation and replicability.***

*Each case provides information that reflects the most common elements of the problem and some contextual assumptions. But in real life, every instance of a problem can be different. Therefore, you have two options for developing your solutions:*

- 1) You can select one or more real-world examples, and use the specifics of their situation to inform your solution OR*
- 2) You can propose a general solution based on the assumptions provided in the case text and create additional assumptions as needed.*

*Under either option, solutions will be judged for innovation and replicability. Therefore, if you choose to focus on a specific real-world example, you should indicate where aspects of your solution might be adapted or changed to be more broadly replicable.*

*In addition, any assumptions that you change or add must be clearly stated, and the sources cited in your case solution. If you use an example(s) that has different parameters than the assumptions in the case, or if your proposed solution requires changes to the case parameters, you must explain the impact of these differences on the solution's success or replicability.*

## Introduction

As part of his Climate Action Plan, President Obama set a goal to have 100 megawatts of renewable energy capacity installed at federally subsidized<sup>1</sup> housing by 2020. Distributed energy generation<sup>2</sup> is also receiving increased public attention as a strategy for infrastructure resiliency, particularly in the wake of Hurricane Sandy, which left over eight million customers without power.<sup>3</sup> But multifamily housing, and in particular, non-profit or privately owned housing that receives federal assistance, has a reputation for being one of the most difficult building segments to reach for any kind of energy efficiency or renewable energy investment.

## The Challenge

The Secretary of the U.S. Department of Housing and Urban Development (HUD), one of three federal agencies with subsidized housing implicated by this goal, is seeking an action plan to help achieve the President's goal in HUD's privately-owned, assisted housing portfolio, that will also help HUD to promote sustainable communities and offer quality, affordable homes to all who need them. You have been chosen to lead a team at HUD to develop this strategy.

Your solution should include the aspects of a comprehensive program for HUD, including, but not limited to: (1) recommendations for selecting priority sites, (2) a replicable process for executing individual projects, (3) identification of actions that HUD can undertake to accelerate installation of renewable capacity, and (4) ways to engage and motivate other key stakeholders. You may recommend changes to HUD's policies and programs, new HUD programs, or that HUD provide specific tools, templates, technical assistance or other resources. For example, HUD could determine how to adjust its subsidies, capital reserve requirements, component selection process and other policies to accelerate on-site generation. A successful solution will also consider how to incentivize the participation of other relevant stakeholders such as building owners, their investors or lenders, building staff, and tenants. You may wish to focus on how your proposed solution would work for a specific site or project type that meets your priority criteria, but you should also include content addressing how the process would need to be modified to apply more broadly.

Your team has been asked to focus on typical HUD-assisted multifamily housing complexes in urban settings<sup>4</sup>. These complexes often have 40-80 units, and are likely to have been constructed (or had their last significant renovation) more than 30 years ago. Some equipment may have been replaced at time of failure, but there are likely substantial unmet capital needs (and it's likely that the unmet capital needs include one or more major systems at the property). The complexes may vary in terms of whether they are one or more buildings, low or high rise, and whether they have central HVAC systems or units in each tenant space.

While energy efficiency is not the main goal of the assignment, HUD management is interested in how energy efficiency measures could be included in this effort. Many rental properties still

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<sup>1</sup> The focus of this case is specific to subsidies offered by HUD, not all federal housing subsidies

<sup>2</sup> HUD defines distributed generation to include combined heat and power systems (CHP) and on-site renewables, such as solar panels and geothermal systems.

<sup>3</sup> See <http://energy.gov/articles/hurricane-sandy-noreaster-situation-reports>.

<sup>4</sup> You have been asked to focus on properties that are not going through refinancing.

lack basic energy conservation measures such as air sealing, insulation, and heating unit controls, as well as opportunities to upgrade major systems. Other aspects that HUD management would like to see explored include: infrastructure resiliency such as energy storage, emergency capacity, the potential to provide energy services beyond the boundary of the physical property<sup>5</sup>, and the ability for the to be self-sustaining or “island” from the grid.

### The U.S. Department of Housing and Urban Development

President Lyndon B. Johnson established HUD as part of his “Great Society” program; its mission begins with the goal to “create strong, sustainable, inclusive communities and quality affordable homes for all.”<sup>6</sup> HUD has programs that apply to multifamily properties owned by both Public Housing Agencies (PHAs) and for-profit/non-profit owners supported by one or more HUD funding sources or finance assistance.<sup>7</sup>

HUD has implemented a variety of programs to help implement capital improvements and energy efficiency measures across its portfolio, such as Energy Efficient Mortgages and the Partnership for Advancing Technology in Housing, both for single-family homes. In 2007, HUD initiated the Mark-to-Market Green Initiative Program, which encourages owners to rehabilitate and operate their multifamily properties using sustainable Green Building principles. HUD has also issued several one-time grant opportunities, including the ARRA-funded \$250M Multifamily Housing Green Retrofit Program, and the 2011 Multifamily Energy Innovation Fund that provided \$25M in grants to 12 selected organizations to implement, document and disseminate scalable approaches to retrofitting affordable multifamily properties. In December 2013, HUD will be launching the expansion the Better Buildings Challenge<sup>8</sup> to multifamily housing, which may include increased program flexibility or new incentives that could be used for energy efficiency and renewables.

### The Assisted Multifamily Housing Sector

Motivations for undertaking energy efficiency, renewable energy, and distributed generation projects have proven difficult to align across HUD, building owners, tenants, and investors. While building owners will eventually make the investment decisions, their existing lenders must approve new debt, and tenant behavior shapes much of a buildings’ day-to-day energy use.

Assisted multifamily buildings may have master meters, sub-meters, or direct meters covering tenant spaces. Major energy-using equipment (like HVAC) can either be located centrally or in individual units. The owner always pays for the common area heating, cooling, lighting, and plug loads, but depending on the equipment and metering configurations, either the owner or the tenant could be responsible for any combination of the energy uses in the tenant apartments, including hot water, heating, cooling, and electric. This is the classic split incentive,

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<sup>5</sup> If you do consider distributing power off-site, you will need to propose how HUD would treat this revenue in terms of how it calculates subsidies to the property.

<sup>6</sup> Mission/U.S. Department of Housing and Urban Development (HUD). Portal.hud.gov. Retrieved on 2013-11-13.

<sup>7</sup> **For the purposes of this case, you should focus on for profit and non-profit owned housing (not PHAs), which utilize HUD’s mortgage financing assistance, Section 8 and/or other forms of housing assistance vouchers.**<sup>7</sup>

<sup>8</sup> <http://www4.eere.energy.gov/challenge/>

in which the control over energy consumption may not align with the responsibility to pay for related operating or capital costs. The split incentive is even more complicated in multifamily buildings with project-based assistance, because currently HUD often subsidizes the building's operating costs.

Rents can be set in two different ways: based on market rents or based on the owner's budget (budget-based rents). In this latter way, the owner must provide their operating budget to HUD, and HUD then sets a rent level for the apartments that enable the owner to cover the expenses and achieve a limited return. Energy costs and equipment maintenance are both significant budget items that could be impacted by installation of distributed generation. But it is possible to get a project's utility allowances modified by HUD as part of a rental rate recalculation process.

Currently, improvements that reduce energy consumption in common areas (where the utility costs are paid by the owner) may benefit the owner; depending on how the rents are set. Improvements that reduce energy costs related to the tenant units generally do not benefit either the owner or the tenant. This is because, regardless of whether the tenant pays for their own utility bills, HUD sets the subsidy to the owner such that the resident's share of rent and utilities does not exceed 30% of the household's monthly income. So if an improvement is installed in Year 1 that lowers the energy expenses, currently HUD will reduce its subsidies in Year 2 to account for the difference. In Year 2, HUD pays less, the tenant pays the same, and owner sees no difference in their returns. Tenants with Section 8 vouchers may see their rent go up, because as the utility portion of their monthly housing costs decreases (due to energy improvements), the rent portion of their payment increases by a like amount.

Therefore, HUD is responsible for most of the costs and benefits of fluctuations in energy consumption. In fact, according to HUD's Energy Task Force, HUD spent over \$6.4 billion in combined energy expenditures across all of its programs in 2009.<sup>9</sup> We can expect that amount has only increased in the succeeding four years. HUD therefore has an incentive to lower its own program implementation costs and exposure to energy consumption and price fluctuations, given an increasingly constrained Federal fiscal environment (as well as the government-wide drive to reduce energy consumption).

### Capital Investments

The approval process and financing structure for capital investments are often more complex for HUD-assisted housing than in a typical multifamily housing complex. Assisted multifamily properties have strict procedures for managing their capital reserves, and complex "capital stacks" that finance the property's debt. As a result, it is very difficult to obtain additional capital between refinancing opportunities, which may only happen once every 20-30 years.

All properties with project-based assistance from HUD have a capital reserve fund for equipment replacements. HUD approves the amount that the owner regularly contributes to the reserve, based on a projection of 20-year capital needs for the property. The owner is not allowed to reserve more than this amount annually. When the owner wishes to utilize the reserve, HUD must approve the expense. This is a fairly straightforward process when the

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<sup>9</sup> HUD Energy Task Force. *Implementing HUD's Energy Strategy*. December 2008.

capital reserve is used at the time of failure (e.g. an emergency replacement when the boiler breaks), but currently it is much more challenging to get approvals to proactively save for and implement upgrades. Reserves are often inadequate and the owner must make tradeoffs in how they use the funds.

In order for the owner of a building with mortgage assistance to take on debt to fund an improvement, a large number of entities must acknowledge the transaction and give permission to proceed. Both FHA rules and GSE (Fannie & Freddie) rules prohibit subordinate financing that could otherwise be used to retrofit a property or install new technologies, even if those would improve the cash flow of the property and make the first mortgage repayment more secure. Some private lenders have similar views on subordinate loans. This is even more complicated in the case of “stacked” transactions where layers of financing for a single building prevent any new borrowing absent refinancing the entire project. A building’s “capital stack” may include several mortgages, tax credit equity, and other forms of debt and equity from state and local entities, and mission-driven organizations. If an owner wishes to finance an improvement based on projected savings, all of these entities must provide some form of permission or consent – a daunting addition to transaction costs, particularly for smaller loans.

While obtaining the permission of lenders and investors may not be impossible, the due diligence, administrative and transaction activities are time consuming and costly, and these costs do not scale relative to the size of the investment. For example, if an owner only needs a couple hundred thousand dollars, the transaction costs can easily be more than 10% of the loan amount, making it less feasible. Also, there are far less lenders interested in making small loans.

Some HUD-assisted properties may also have Low Income Housing Tax Credit (LIHTC) equity. Tax credit investors will be concerned about any improvements that change the building’s tax basis, because it could impact the value of the annual tax credit. Investors monitor the first 10 years post-renovation for credit delivery, and the first 15 years (minimum) for compliance with LIHTC rules.

State and local governments and utilities may have incentive programs that can be used for distributed generation and energy efficiency, but they are usually focused on quick-return measures. A few building owners have started to explore On-Bill Repayment, Property Assessed Clean Energy, Energy Service Agreements and other forms of clean energy-specific financing. These mechanisms may be able to address some capital budget issues by structuring the payment as an operating expense, but may have limits on the building size, project size, payback period, etc. In addition there are still open questions as to the impact of these types of financing mechanisms on the capital stack and needed approvals. Several jurisdictions are piloting potential solutions to these issues.

#### The HUD-Building Owner Relationship

Ultimately, owners will need to be motivated to make energy-related investments and operate buildings efficiently. Owners of assisted multifamily buildings tend to have low risk tolerances, and prefer well established, proven technologies. Because they are capital constrained and operate on thin margins, it’s hard for them to take on the risk of emerging technologies or unreliable payback periods.

HUD must think about how to incentivize all the relevant actors through its policies and program structures. With this in mind, HUD has asked that you propose in your strategy: changes to the structure of HUD subsidies and calculation methodologies, new program ideas for HUD, ways to encourage owners to change their tenants' metering and lease contracts, or ways to encourage lenders to change their practices. Outreach, education and training can also be critical to achieving buy-in and then successfully implementing a project, especially for more sophisticated or cutting-edge equipment.<sup>10</sup>

By using your plan to improve the HUD-assisted multifamily building stock, HUD hopes to generate economic and environmental benefits that can be shared with building owners, tenants, and the community.

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<sup>10</sup> Again, you may focus your proposed solution on a specific site or project type that meets your priority criteria, but you should also include content addressing how the process would need to be modified to be utilized more broadly.

## Resources

- [HUD Energy Task Force. \*Implementing HUD's Energy Strategy\*. December 2008.](#)
- [Housing Choice Voucher Program Guidebook](#)
- [Section 8 Renewal Guide](#)
- [Multifamily Asset Management and Project Servicing Handbooks](#), including:
  - 4350.1 [Multifamily Asset Management and Project Servicing](#)
  - 4350.3 [Occupancy Requirements of Subsidized Multifamily Housing Programs](#)
- [U.S. Census Bureau. Multifamily Housing Data](#)
- [Multifamily Energy Efficiency: Reported Barriers and Emerging Practices](#)
- [ACEEE Multifamily Homes](#)
- [Bank of America Announces Recipients of \\$55 Million Energy Efficiency Finance Program](#)
- [Enterprise: Utility Allowances](#)
- [Utility Allowance Options for Investments in Energy Efficiency: Resource Guide](#)