Fostering a Future for Multifamily Solar

A Market Profile

Santa Monica, CA

Prepared by: Center for Sustainable Energy, Interstate Renewable Energy Council, and California Solar Energy Industries Association

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Overview

Solar markets are growing across the country as more governments, businesses and homeowners turn to solar photovoltaic (PV) systems to reduce energy costs, improve the environment and help meet climate action goals. While residential solar installations on single-family homes have soared, averaging a 68 percent annual growth rate for the past 10 years, most multifamily dwellers are still unable to access solar power. The multifamily housing sector faces several specific barriers to solar adoption that require more specific tools and approaches to overcome.

In California, various policies showcase the state's efforts to deploy energy efficiency and renewable energy in the multifamily sector. Recent examples include Assembly Bill (AB) 802 (Williams) that allows building owners to secure aggregated whole-building energy data to assist in assessing building performance and AB 693 (Eggman) that provides the foundation for a new solar incentive program for multifamily affordable housing complexes. California also has set aggressive zero net energy (ZNE) goals for residential and commercial buildings, including making all new residential construction ZNE by 2020.[1] These goals are achieved through the state's building energy efficiency standards, Title 24, Part 6 and Part 11, as well as Title 20, addressing appliance standards and plug loads. Importantly for multifamily solar, California has implemented **virtual net energy metering (VNEM)** for multitenant buildings, including residential multifamily buildings and commercial complexes. VNEM is currently available in California's three largest investor-owned utility (IOU) service territories,[2] which include two subprograms: one designed for the affordable housing sector and the other designed for the general market. VNEM allows for the installation of a solar energy system on a multitenant building's roof and for electricity bill credits associated with that system to be shared among property owners and tenants.[3]

[1] Multifamily buildings are considered residential for the sake of energy modeling and assessing ZNE compliance. There is a distinction in the energy code for low-rise residential and high-rise residential, with low-rise being multifamily dwellings with three stories or less and high-rise multifamily dwellings having four or more habitable floors.

[2] California's three largest investor-owned utilities are San Diego Gas & Electric (SDG&E), Southern California Edison (SCE) and Pacific Gas and Electric (PG&E). VNEM may be offered in additional service territories in the future.

[3] For a more detailed description of VNEM, see the Virtual Net Metering Market Development Project website, which has numerous information resources, including the Virtual Net Metering Policy Background and Tariff Summary.

While the state provides underlying support for a strong multifamily solar market across California, additional actions by cities and communities are needed to ensure residents living in multifamily housing have equitable access to solar and other clean energy technologies. The following elements at the local government level are key to providing a strong foundation for a multifamily solar market.

- ✓ Local enabling policies and/or incentives for solar/clean energy
- ✓ Sufficient solar resource and ample multifamily building stock
- ✓ Strong solar workforce
- ✓ Motivated community

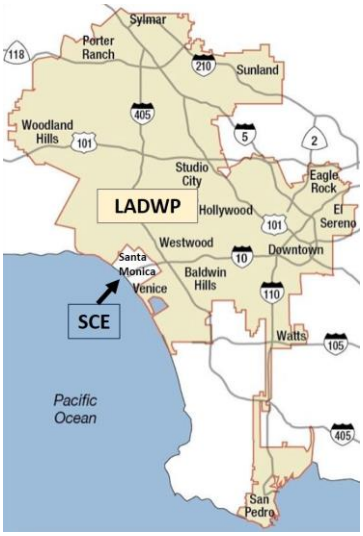

Figure 1. Image showing utility service territory. Original image courtesy of UCLA Energy Atlas.

The City of Santa Monica, a coastal community in Los Angeles County and home to more than 90,000 residents, is one example of a community with all the above elements in place. Santa Monica's utility provider is Southern California Edison (SCE), an IOU, although the city is surrounded by communities served by the Los Angeles Department of Water and Power (LADWP). Santa Monica is a highly motivated community with a strong environmental stewardship ethic and is well situated to encourage a more robust multifamily solar market in its area. As shown in Figure 2, Santa Monica already has some multifamily solar installations and has continued to explore ways to grow its multifamily solar market.

Santa Monica served as a pilot research location for the Virtual Net Metering Market Development Project, a U.S. Department of Energy Solar Market Pathways project led by the Center for Sustainable Energy (CSE), the Interstate Renewable Energy Council (IREC) and the California Solar Energy Industries Association (CALSEIA) aimed at bolstering the adoption levels of virtual net metering in California and expanding solar access to renters and tenants.[4] This market profile showcases Santa Monica's experience working to support the adoption of solar on multifamily housing. This case study highlights the actions and characteristics present in Santa Monica that other cities can replicate, or emulate, when looking to bolster local multifamily solar markets.

Enabling Policy and Programs

Local Actions and Resources Regarding Utility Policy and Programs

Although they are outside of a city's direct control, there are various utility program options that can be used to enable multifamily solar, including VNEM. While VNEM may be applicable in many multifamily scenarios, the most appropriate tariff may depend on factors such as on-site meter configuration and ownership structure, as well as program availability. Notably, VNEM currently is only available in the IOU service territories. Detailed discussion and comparison of VNEM and other California shared solar

[4] Additional detail regarding the Santa Monic Pilot Project is available in the Pilot Study Summary.

policies to enable solar access for multifamily customers are available in two past reports: Virtual Net Metering Policy Background and Tariff Summary and the Multifamily Solar Market Development Plan.

Local governments can play an important informational role in educating their residents about how multifamily solar may be developed in their area and some of the challenges and opportunities, including available utility or other programs. Solar Santa Monica's website offers a good example of how a city might undertake such education and information sharing.

To the extent other communities are seeking to advance multifamily solar, early consultation with the local utility is important to understand the availability of enabling programs and multifamily customer eligibility.

Local Codes & Ordinances

Building Standards

Many cities within California have chosen to adopt local ordinances that exceed the state's building code (Title 24). This process to adopt ordinances that exceed the state's minimum requirements includes an approval process administered by the California Energy Commission and must prove that the required measure is cost-effective.

In 2016, the Santa Monica City Council approved an ordinance requiring rooftop solar systems for all new residential and commercial construction in the city.[5] The city also developed the Santa Monica Sustainable City Plan setting a goal of installing 7.5 megawatts (MW) of solar by 2020 citywide. As of October 2017, 5.8 MW have been installed in Santa Monica.[6]

Virtual Net Metering in Santa Monica

The first two general market VNEM projects in Santa Monica were installed in 2017 by Absolutely Solar.

90404 Project	
System Size	9 kW AC
Building Size	6,633 ft²
Benefitting Accounts	9 tenants, 1 common area
Modules	(36) Canadian Solar 280-watt panels
Inverter	(1) Fronius IG Plus 10-kW inverter
System Cost	$27,000

90403 Project	
System Size	13 kW AC
Building Size	9,200 ft²
Benefitting Accounts	8 tenants, 1 common area
Modules	(52) Canadian Solar 280-watt panels
Inverter	(52) Enphase microinverters
System Cost	$42,000

Figure 2. Two VNEM projects in Santa Monica.

[5] City of Santa Monica, "Santa Monica City Council Votes in Aggressive Renewable Energy Requirement on New Construction; Implementation Begins in 30 Days," https://www.santamonica.gov/press/2016/04/28/santa-monica-city-council-votes-in-aggressive-renewable-energy-requirement-on-new-construction-implementation-begins-in-30-days.

[6] Solar Santa Monica citywide installed capacity data pulled from solar permits in the city. Solar permits are reviewed biannually. These data include installations through Q2 of 2017.

Rent Control

While cities across California, including Santa Monica, have been proactive in setting impressive environmental standards and renewable energy goals, other city policies may present obstacles to clean energy expansion, such as rent control. Rent control is a local ordinance that provides protective measures for tenants against evictions and limits or caps the amount a landlord can increase a tenant's rent from year to year in certain buildings. Rent control policies aim to preserve affordable housing stock by protecting tenants from large and unpredictable rent increases.

For a multifamily solar project using VNEM, however, the landlord may be responsible for financing and other costs associated with the solar project's generation and may need to recoup some of those costs from tenants through increased rents or separate charges. While the landlord may recover some of its costs through electricity bill credits for common area accounts, these cost savings may not be sufficient to make the installation financially sound for the landlord. Tenants also will be receiving electricity bill credits and, thus, even with increased rents or charges, the tenants may see net cost savings when electricity bill savings are considered. Rent control policies could come into play because they may limit or deny a landlord's ability to raise rents or levy extra charges on tenants.

Rent control policies vary from city to city and may require a variety of steps to alleviate this potential barrier to rent-controlled multifamily buildings installing a shared solar PV system. Possible options for cities to consider include implementing forms and other process changes, changing their rent board regulations, amending their rent control ordinances and/or educating stakeholders about multifamily solar and rent control implications.[7]

Within California's three large IOU service territories, where VNEM is offered for multifamily facilities, Santa Monica is one of 13 cities with a rent control policy.[8] The majority of residential rental buildings in Santa Monica are subject to rent control, which includes 70 percent of the multifamily building stock and may include units not yet constructed.

The city's rent control code, Chapter 3, Section 3201, states that a property owner cannot collect any monies from a tenant beyond the maximum allowable amount for rent and utilities.[9] However, the San Monica Rent Control Board will allow a separate voluntary tenant-landlord agreement, outside of rent, to enable a property owner to collect a fee from tenants to recoup the investment or pay the monthly solar lease payment, if such system is leased. The Santa Monica Rent Control Board does not associate

[7] This issue was addressed in detail in a webinar on November 8, 2017. The presentation and recording are available at https://vimeo.com/242165412.

[8] Cities include Berkeley, Beverly Hills, East Palo Alto, Hayward, Los Gatos, Mountain View, Oakland, Palm Springs, Richmond, San Francisco, San Jose, Santa Monica and West Hollywood. Los Angeles also has rent control, but is served by a municipal utility, LADWP.

[9] Santa Monica Rent Control Law and Regulations Code, "Chapter 3: General Rent Adjustments," https://www.smgov.net/uploadedFiles/Departments/Rent_Control/Rent_Control_Law/03,%20GA.pdf.

such solar fees with a tenant's rent,[10] deeming this tenant-landlord voluntary solar agreement as a solution to the rent control barrier in Santa Monica.

Interested parties, including CSE, IREC, CALSEIA, EcoMotion, representatives from the city's Office of Sustainability and Environment and local property owners engaged with the Santa Monica Rent Control Board to address this potential barrier and confirm the allowable solution.

Other jurisdictions' rent control codes will vary and city rent boards may not interpret their regulations to allow the solution available in Santa Monica. Other codes may include different language and definitions of "rent" or may include a cost pass-through process for certain capital improvements, potentially including VNEM solar, which could be applicable. Rent control codes should be assessed on a case-by-case-basis to understand their impact on multifamily solar arrangements and to develop solutions to ensure they are not hindering the multifamily solar market in their communities. Model agreements similar to the one available in Santa Monica could be considered by a city to help ensure that tenants are protected while still enabling multifamily solar installations. If it is deemed that a local rent control code or regulations as written do not allow a landlord to raise rents or collect solar-related fees from tenants and, as such, impedes solar access to those tenants, cities are encouraged to take steps to modify the code or regulations. For example, a city could consider a special solar provision, or other allowance that will enable on-site shared solar projects in multifamily communities. It is important for cities to find the balance between policy that ensures rent stability and affordability and policy that helps to expand solar access and support local sustainability goals.

Building Stock Landscape and Solar Potential

For multifamily solar to flourish in a region, there must be sufficient local multifamily building stock. Assuming the area can pursue on-site solar for multifamily buildings (versus off-site, remote solar), the existing buildings should have sufficient space to accommodate on-site solar installations of a size large enough to make the economics work for landlords and tenants. Having such solar resources in the area is important to the success of not simply multifamily solar but the solar market generally. While cities may have limited ability to change their building stock and cannot control their solar resource, it is important to be aware of these two factors in assessing the opportunities and challenges for multifamily solar in a particular jurisdiction.

The City of Santa Monica has a dense multifamily building stock made up of an estimated 4,429 apartment and condo buildings in the 15.9 square miles of the city.[11] An online, interactive map

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[10] Santa Monica Municipal Code, Rent Control Law, Section 1801 defines rent as, "all periodic payments and all nonmonetary consideration including but not limited to, the fair market value of goods or services rendered to or for the benefit of the landlord under an agreement concerning the use or occupancy of a rental unit and premises including all payment and consideration demanded or paid for parking, pets, furniture, subletting and security deposits for damages and cleaning."
http://www.qcode.us/codes/santamonica/view.php?topic=the_charter_of_the_city_of_santa_monica-xviii-1801

[11] Building number estimates were obtained from analyzing county assessor data (Secured Roll), utilizing information on parcel owner name, land use code, tax parcel code, number of units and address. Read more on the Notes tab: http://energycenter.org/solar-market-pathways/toolkits/contractors/map.

showcases the multifamily building stock within Santa Monica's five ZIP codes and details the total number of apartments and condos based on building size. Building sizes are subcategorized by "small buildings" (2-9 units), "medium buildings" (10-19 units) and "large buildings" (20 or more units). Using certain assumptions, it is estimated that there are 62,535 individual units in multifamily housing in Santa Monica.

Studies show that an apartment household in the western U.S. has an average electric consumption of 5,442 kilowatt-hours (kWh) per year,[12] equating to an annual load of roughly 340,000 megawatt-hours (MWh) per year for all multifamily units in Santa Monica. Using an average annual production value for a solar PV system in Southern California of 1,700 kWh per 1 kW per year, the City of Santa Monica's multifamily building sector calls for an approximate total installed solar capacity of 200 MW to cover the total annual multifamily load. Other factors such as adequate roof space and shading would reduce this capacity need, but this baseline helps to expose the city's untapped potential for multifamily solar.

Assumptions, formulas and methodology is detailed in Appendix A.

In addition, as the following figure from the National Renewable Energy Laboratory shows, Santa Monica's solar resource is strong and thus highly conducive to a robust solar market, including a multifamily solar market. [13]

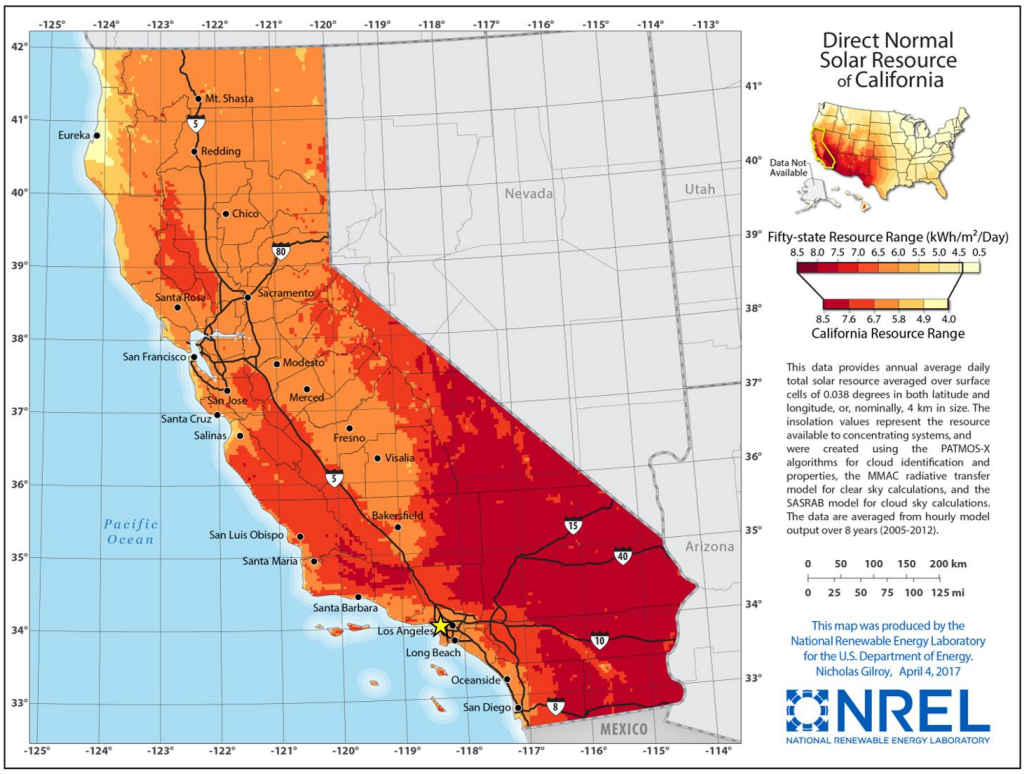

Figure 3. Solar Resource of California Map from the National Renewable Energy Laboratory (NREL).

[12] Average energy consumption data provided by the U.S. Energy Information Administration, Office of Energy Consumption and Efficiency Statistics, on Forms EIA-457 A and C-G of the 2009 Residential Energy Consumption.
[13] Source: https://www.nrel.gov/gis/solar.html.

Strong Solar Workforce

In addition to the requisite building stock and solar resource, a multifamily solar market also must have a workforce capable of installing the solar systems. To assist, state agencies and local governments can work collaboratively with educational institutions and organizations to provide access to training, education and licensing for solar workers and contractors. Further, cities can play a valuable role in supporting the solar workforce through expedited permitting and streamlined interconnection processes.

Santa Monica has a robust solar contractor workforce. According to public interconnection data, 151 contractors have installed more than 750 solar systems in the city.[14] Training and education are key to ensure that contractors can provide quality service and installations and are familiar with any local interconnection nuances and design considerations. The latter point is particularly true for the multifamily sector, which can entail more complex structural, contractual and logistical elements.

The City of Santa Monica offers the *Solar Santa Monica* program, which offers a directory of qualified solar contractors and provides technical assistance for residents considering solar. Contractors can be considered for this list by submitting an application with requested company information, job experience and references.[15] The city offers a level of quality control by requiring participating contractors to uphold specific terms and responsibilities, including but not limited to transparent pricing and proposals, a 10-year workmanship warranty and on-site guidelines to maintain a professional project site. While the status of qualified contractor is not exclusive, customers can be reassured that selected contractors uphold a level of service and reliability approved by the city.

The Virtual Net Metering Market Development Project created a contractor toolkit for multifamily solar, featuring resources on VNEM and interconnection process, multifamily density maps, credit allocation forms and other resources to facilitate more streamlined customer outreach. This toolkit and the accompanying toolkits for Apartment and Condo Owners can be used as templates for other communities seeking to educate the multifamily sector on local solar opportunities.

In addition, the project team developed an online multifamily solar marketplace (available at www.MultifamilySolarCA.com) to assist multifamily property owners match up with local contractors for their solar project. Contractors interested in participating in this online marketplace should contact EnergySage.

Efforts to further develop the local solar workforce are widespread throughout the city. Santa Monica College offers a solar photovoltaic certificate program that provides students an understanding of solar power technology and its relationship to the environment and economy; sales, design and installation training; and skills to advance the solar energy industry. Additionally, GRID Alternatives, a nonprofit

[14] CA Distributed Generation Statistics, "NEM Interconnection Applications Data Set," http://www.californiadgstats.ca.gov/downloads/.

[15] https://www.smgov.net/uploadedFiles/Departments/OSE/Categories/Energy/Solar/Qualified_Solar_Contractor_Application.pdf.

organization offering job training programs and hands-on installation experience, is active in California and throughout the country.

Motivated Community

Local community residents with interests in sustainability are key to building a successful multifamily solar market. Santa Monica has a long history of being a leader in ecological conservation and activism. The city aims to advance environmental prosperity, clean energy and social and economic well-being throughout Santa Monica. Programs such as the city's Green Building Certification and drought-tolerant landscaping trainings stemmed from the momentum of engaged citizens.

The City of Santa Monica's Office of Sustainability and the Environment has been key to navigating local challenges and identifying outlets for information sharing to promote the opportunities and challenges of deploying solar in the multifamily building sector. As a valuable partner in the Virtual Net Metering Market Development Project, the city supported a pilot to further understand the barriers and solutions to advance the multifamily solar market. The city offered outreach and engagement support through press releases, online promotions and telephone calls to engage potential property owners and contractors.

Figure 4. UCLA Health System rooftop solar.

Generally, Santa Monica is a motivated community regarding solar. Residential and commercial solar installations can be seen across the city. Residents, business owners and commercial and municipal entities have installed more than 5,800 kW of solar energy. More than half of that, nearly 3,300 kW, comes from the residential sector. Other local projects include the UCLA Health System's 78-kW PV system and Santa Monica College's 408-kW carport PV system, which is the largest installation in the city.[16]

Figure 5. Santa Monica College carport.

Continuing Efforts

The solar market in Santa Monica will continue to grow as city support and community engagement remains strong. California has seen increasing interest in community solar programs, including VNEM, and Californians continue to seek pathways to accessing renewable energy. The City of Santa Monica's Task Force on the Environment, established in 1991 by the city council, meets regularly each month to advise the council on environmental programs and policy issues. The city also is actively implementing their Electric Vehicle Action Plan to improve public charging infrastructure. Additionally, the city has established, and will continue to develop, energy reach codes to help buildings achieve energy efficiency targets and zero net energy goals that align with, or exceed, state goals and requirements.

[16] Santa Monica citywide installed capacities were derived from permitting data provided by *Solar Santa Monica*.

This market profile seeks to provide guidance to cities looking to learn from Santa Monica and establish the foundational characteristics to spur the growth of multifamily solar in their region. Local jurisdictions and city officials are encouraged to utilize existing resources, such as the Multifamily Solar Market Development Plan, co-authored by CSE, IREC and CALSEIA, which offers insight into approaches for fostering a multifamily solar market with a strong focus on education and outreach. Additionally, IREC's Access for All: Pathways to Expand Solar Options to Renters and Multifamily Households in the City of Seattle provides additional guidance and inspiration. Engaging with other communities, cities or organizations who have similar motives and values can spark momentum and may lead to collaborative opportunities.

Appendix A

Method for Calculating the Number of Multifamily Building Units in Santa Monica

The City of Santa Monica Multifamily Interactive Map categorizes the number of apartments and condos based on building size. This assessment includes both general market and affordable housing sector buildings. Building sizes are subcategorized by small buildings (2-9 units), medium buildings (10-19 units) and large buildings (20 or more units). The city has 3,157 small buildings, 837 medium buildings and 435 large buildings. To estimate the number of units per category, we took an average within the small and medium building size and multiplied that by the number of buildings in each category.

Small buildings: $\frac{2\ units + 9\ units}{2} = 5.5\ units$ $5.5\ units \times 3{,}157\ buildings =$ $17{,}363.5\ units$

Medium buildings: $\frac{10\ units + 19\ units}{2} = 14.5\ units$ $14.5\ units \times 837\ buildings =$ $12{,}136.5\ units$

The large buildings average would have high variability if this method was applied, since the subcategory encompasses all multifamily buildings with more than 20 units. Rather, for large buildings, a sample of large buildings was taken from Apartments.com that listed the number of units per property. One of those listings (Living) is for a collection of 15 separate buildings, so the average was calculated to find how many units might be in each building.

Large buildings

Listing Name	No. of Units
Chelsea	53
San Vicente	92
1410 SM	62
1420 SM	50
1430 SM	50
Gibson	106
Living	52*
Pacific Plaza	288
Sway	122
NMS 1539	62
SeaCastle	198
425 Broadway	101

[A] Units	[B] Bldgs. per Bin	[C] Percent [B]/26	[D] Avg. Units per Bin	[E] Bldgs. [C] x 435	[F] Total Units [D] x [E]
50 – 60	18*	0.69	55	301	16,563
61 – 80	2	0.08	71	33	2,359
81 – 100	1	0.04	91	17	1,514
101 – 150	3	0.12	126	50	6,299
151 – 200	1	0.04	176	17	2,936
201 +	1	0.04	201	17	3,363

**There are 15 buildings accounted for in the Living listing with 52 units per building.*
Total Buildings in Sample: 26
Total Large Multifamily Buildings: 435

Bins [A] were created for different building sizes and the number of buildings for each size bin was counted [B]. The proportion (percentage) of all buildings in each building size bin was calculated [C]. The average number of units in each bin size was calculated [D]. Since there are a total of 435 large multifamily buildings in Santa Monica, the total number of buildings was calculated [E] based on the bin proportions [C]. The total number of units in each bin [F] was calculated by multiplying the average

number of units [D] by the number of buildings [E]. The total number of units in large multifamily buildings is 33,035 units (sum of [F]).

Formulas for Determining Annual Load of Multifamily (MF) Units in Santa Monica

5,442 kWh/year consumed by a single unit x 62,535 units = 340,315,470 kWh

340,315,470 kWh/1000 = **340,315 MWh consumed, annually, by all MF units**

Formulas for Determining Solar Capacity Needed to Serve all MF load

340,315,470 kWh consumed by all MF units /1,700 kWh produced annually per 1 kw = 200,185 kW

200,185 kW / 1000 = **200.2 MW needed to serve all MF units**