Abstract

Athens is shaped by the postwar climate it experienced in the early 20th century. Left socially and economically destabilized from World War I, World War II, the Greco-Turkish War, and the Greek Civil War, the city was in dire need of housing for the influx of refugees from the surrounding diaspora. In order to resolve this issue, building developers stepped in to construct multistory apartment buildings, called *polykatoikies*, quickly and cheaply, with the help of the surrounding community. The system of *antiparochi* emerged, in which single-family homeowners "exchanged" their property for one to two apartment units in the new construction. Utilizing a column and slab system, the new homeowners had autonomy over the infill, allowing for the renovation of the unit before it was even constructed. Faced with a plethora of societal and economic issues, the Greek government turned the other way, allowing for this appealing system to sprawl. However, since this system was developed as a quick solution, the emphasis on the enclosure was minimal. In the present day, 30% of Greek households report energy poverty, caused by both the privatization of land and the lack of thermally driven façade systems.

This thesis addresses the social, environmental, and economic downsides of the *polykatoikia* archetype, by reviving the radical, socially driven, bottom-up system that created it. The typology is renovated into a community-led and energy-driven housing model that reframes domestic relationships based on temperature organizations. Working at Leoforos Alexandras 31, in Gyzi, Athens, the existing polykatoikia is transformed into two distinct floor plans, each with their own unique thermal characteristics. This new system focuses on shared resources, thermally gradient floor plans, and movement as means to achieve comfort, and foster a less fragmented way of cohabitation.

Executive Summary

Athens is an informal city. In comparison to Paris, Barcelona, and Vienna, Athens never received formal urban planning organization and instead remained untouched. Fueled by postwar capitalism, the development of the city boomed, driven by the need for a resolution to numerous housing crises that arose. Global political climates in the early 1900's forced Greece into a series of consecutive wars. In a span of 40 years, Greece was involved in World War One, World War Two, the Greco-Turkish War, and the Greek Civil War, all leaving Greece economically, socially, and governmentally ridden. The influx of refugees, primarily from the Greek diaspora returning home, required a quick, reasonable, solution. This solution was the *polykatoikia*, a new multifamily housing model that rapidly expanded across the city.

In the reconstruction efforts, land development became an important asset in rebuilding both the city and the economy. In order to begin the process, the economic incentive of *antiparochi* emerged, under which single family homeowners gave up their land, in exchange for ownership of one or two units. Simultaneously, however, this system was also a link to housing affordability. The antiparochi movement allowed for the construction of cheaper apartments, due to the division in construction fees between developer and tenant. Thus, developers trained in and developed various efforts of "bottom-up" construction that gave agency to the tenants, which they found within the concrete column and slab construction method. Within such system, the infill (the in-between) became crucial.

One of the greatest appeals of the polykatoikia laid in the possibility to manipulate the plan as desired. Prior to purchase, homeowners, primarily the housewives, removed walls, enclosed rooms, and renovated their homes before they were even constructed. Such tenant agency allowed the polykatoikia to become a symbol of status in the 1960's for the booming middle class. The building was a transformation of social relationships within the home, densifying extended familial life into a single footprint. The core, thus, became an agent of movement from family apartment to family apartment.

Despite the many successes of the typology, one of the greatest detriments is found in the façade. Due to the focus on speed, the enclosure was given little attention to ensure thermal comfort. Consequently, in the

present day the majority of Greek households report energy unaffordability, caused by extreme temperature patterns caused by global warming. This thesis, “Energy Sobriety,” delves into this issue and proposes ways to climatically update the Athenian polykatoikia. As such, the building is transformed into a stage of energy efficient domesticity, through shared resources, thermally gradient floor plans, and the redefinition of familial life. Through the activation of both the plan and section, thermal comfort becomes an act of collective labor, sparking negotiations and discourse.

The polykatoikia privatized the home and divided family life into floors, separated by friends and strangers in between. In making the private public again, the home becomes a communal, heat generating space, in which domestic activities have the common goal of energy production. Thus, movement becomes a critical aspect of the project, as moving from room to room depending on the desired temperature changes the way we understand domestic living. Comfort is no longer automated, and discussions with parents, friends, siblings, or strangers must occur to achieve it.

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Σας λατρεύω.

Figure 01: *Kallithea*. Photograph by Manolis Baboussis, 1987. M. Baboussis personal archive.

I. GLOBAL POLITICS: THE POLYKATOIKIA EMERGES

The *polykatoikia*, translated to "multi-dwelling," is a building typology of multifamily housing that is primarily found in Greece. It emerged in the 1930's as a solution to the lack of housing that was needed to host the increased number of expatriates and refugees who returned back to Greece in the postwar era.[1] In 1923, Greece lost the Greco-Turkish war,[2] which in combination with the fall of the Ottoman Empire the year prior, forced nearly 1.5 million citizens of the Greek diaspora to return home. Their return strengthened the Greek state, causing a grand population increase in the major cities.[3] The construction boom of refugee housing allowed for "*horizontal ownership*," emerging by law in 1927,[4] which provided a segue into apartment living.

[1] Kyriakos Kyriakou, "Three Athenian Apartments: Resetting the Free Plan in the Athenian Polykatoikia." *Interiors 14*, no.1–3, (2024): 168–84.
[2] Harrison Blackman, "Ioanna Theocharopoulou on 'Builders, Housewives, and the Construction of Modern Athens,'" April 13, 2023.
[3] Stelios Michalopoulos, "Greek Refugees: The Socioeconomic Consequences of the 1923 Population Exchange between Greece and Turkey," *National Bureau of Economic Research,* 2017-2022.
[4] Alexander Tzonis and Alkistis Rodi, Greece: Modern Architectures in History (London: Reaktion Books, 2013), 101

Antiparochi is a system in which developers obtain a piece of land, typically a single-family home, to construct a polykatoikia. In return, the tenants of the home would receive the keys to one or two of the new apartments and the possibility for personalized design choices within their units.[5] The systems predecessor, the *afthereto,* originated in August of 1923, and quickly established legislations for illegal construction outside of city limits. Unauthorized buildings became a grand source of income, which incentivized the post-war government to neglect the system's legality.[6] The economy encouraged the production of real estate, allowing uncontrolled developments to flourish throughout Athens.[7] Such system brought in money, privatization of land, and increased real estate ownership into a post-war society.

Figure 02: *Construction Site*. Photograph by Manolis Baboussis, 1985 -1996. M. Baboussis personal archive.

[5] Kyriakou, "Three Athenian Apartments."
[6] Andreas Angelidakis, "Unauthorized," Positions – Andreas Angelidakis*, E-flux Magazine*, September 2017.
[7] Kyriakou, "Three Athenian Apartments."

As Platon Issaias, a researcher and professor at the Architectural Association in London, states: "What appears to be a spontaneous and unplanned urban typology is in fact the result of a meticulously detailed regulatory structure that evolved strategically through time." He divides this system between formal and informal urbanization. *Formal Urbanization* is viewed as development that involves the state, through formal "decision making and planning." On the contrary, *Informal Urbanization* is done through a "lack of government control," promoting an unconstrained urban sprawl.[8] Athens, I argue, grew as a combination of both. The Greek government was aware of the development but didn't have the possibility to implement financial control. Hence, the system was funded by the people, in need of housing, reconstruction, and change. Formally informal, the polykatoikia was always bound to emerge.

On a social level, the emergence of the polykatoikia instilled confidence in the citizens of post-war Athens. Land investment became increasingly popular for the middle class, as societal structures emerged and were exemplified by ownership.[9] Issaias continues to write: "The polykatoikia materialized the "social contract" of the post-war reconstruction, being the machine with which Greek society exchanged the possibility of social change with material wealth, overwhelmingly entering the imaginary of private property." In short, the emergence of this new system not only altered the urban fabric of the city but also severely influenced the perception and structure of social norms. In an interview with Ioanna Theocharopoulou, author of "Builders, Housewives, and the Construction of Modern Athens," we discussed the contribution of housewives in the modernization of Athens. The privatization of housing forced the reorganization of the domestic realm, in which women had authority of the layout. Working side by side with architect developers, the home was designed meticulously for the efficiency, aesthetics, and spatial organization of domestic labor.

[8] Platon Issaias, "The City as a Project: On Conflict, Generic and the Informal: The Greek Case," *The City as a Project*, January 27, 2016.
[9] Platon Issaias, "The City as a Project."

"If modern architecture was about the notion of 'type,' the polykatoikía was reduced to a stereotype."

Ioanna Theocharopoulou

II. LA MAISON

Architects were proponents of the polykatoikia, as it not only densified the city but also reduced urban sprawl. Architecturally, architects and designers alike were calling for the transformation of the city, from neoclassical to a metropolis "like other European capitals." Inspired by the Modernist movement that swept Europe in the 1920's, the typology was originally introduced "as a future housing model." The modern package included updated technical systems, built in furniture, central heating, and more, all found behind a geometric, and unassuming façade.[10]

While modernism in Greece is rarely discussed in architectural history books, there was a large influence by the movement. The Congres Internationaux d'Architecture Moderne (CIAM,) an organization that emphasized and discussed modernist architecture, held its fourth ever charter in Athens in 1933. Popular Greek architects such as Alexandros Dragoumis, Issak Saporta, and Dimitris Pikionis, were also part of this group, specifically calling for "Greekness" within modernism.[11] John Gold from Oxford University, describes the agenda of the charter as one of urban cartography. He describes how the "national member groups were asked to provide written and cartographic analyses of major cities in their home countries on a standardized basis that would allow cross-national comparisons." Specifically, three maps were proposed, one showcasing "areas for work, residence, and recreation," one showing "the transport system," and one showing "the city's relationship to its region."[12] In the case of Athens, the cartographical analysis of the city was one that emphasized postwar city reconstruction and alternative ways to modernize from ruins. Compared to other European cities like Paris, Barcelona, and Vienna, Athens' modernization lacked the meticulous geometric urbanism of large boulevards and organized housing blocks and instead was found in the building scale.

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[10] Richard Woditsch*, The Public Private House: Modern Athens and Its Polykatoikia* (Zurich: Park Books, 2018), 9

[11] Schmitz-Hubsch, *Athens Polykatoikias*, 10

[12] John R. Gold, "Athens Charter (CIAM), 1933," 1

While modernism never took charge of Athens' urban planning, multiple examples emerged from independent architectural work. For example, the Villa Fakidis, designed by Stamos Papadakis in 1933, is a contrast of volumes and cantilevers, demonstrating the openness and force of reinforced concrete construction.[13] To some, the building is a modernist wonder of Greek innovation, while to others, it is reminiscent of an ocean liner.[14] Another example is the Primary School on Kalisperi Street, designed by Patroklos Karantinos in 1931. The setting, directly underneath the Parthenon, offers distinct architectural conversations between the two. The façade includes nine columns and eight panels to replicate the columns of the temples, meanwhile the plan was open and symmetrical.[15] Additionally, the entrance of the building was to the side façade rather than the front center, in order to avoid breaking the continuation of the paneling. Siegfried Gideon, part of CIAM VI, visited the site as part of the Charter, but rarely mentioned it in any of his writings or records, and instead only wrote about the classical influences of the city. Consequently, there was little to no recording of the visit or of modernism overall.[16]

Figure 03: Villa Fakidis by Stamos Papadakis, unknown photographer, 1933-1935.

[13] Tzonis and Rodi, *Greece: Modern Architectures in History*, 104.
[14] Tzonis and Rodi, *Greece: Modern Architectures in History*, 106.
[15] Tzonis and Rodi, *Greece: Modern Architectures in History*, 97.
[16] Stylianos Giamarelos, "Greece, the Modern Margin in the Classical Centre: Seven Points for Critical Regionalism as Historiography," *The Journal of Architecture* 25, no. 8 (November 16, 2020): 1055–88

Figure 04: Primary School on Kalisperi Street, Patroklos Karantinos, 1931. Photographed by P.M.Bardi (1933) for Quadrante n.5.

To architects and historians, the superstructure of this typology was influenced by Le Corbusier's 1914 Maison Dom-Ino. This model, composed purely of prefabricated concrete columns and slabs, was meant to provide openness and flexibility to the user, allowing it to be infilled in any way. In reality, developers selected this model for its efficiency, timing, and adaptability, all of which provided a distinct selling point. The wall detaching from the structure highlighted this possibility, allowing the building to become a site of experimentation. From a broader context, this type was originally theorized to be used on an urban scale, allowing for the quick construction of the same typology to multiply across a city.[17] This is exactly what occurred in Athens.

[17] Kyriakou, "Three Athenian Apartments."

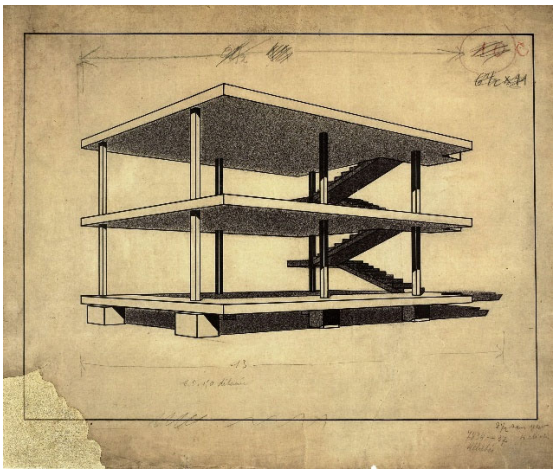

Figure 05: *Drawing of the Maison Domino*. Le Corbusier, 1914-15.

Typology compared to informal construction found in the outskirts of Athens:

Figure 06: Photograph by Dimitris Phillipides. Found in *Modern Architecture in Greece,* Athens: Melissa Publishers, 2001, p.73.

In the present day, the polykatoikia engulfs the city of Athens from the coastline to the mountains.[18] A concrete city, the metropolis currently lacks green spaces, causing extensive heat waves every summer.[19] In the 1980's, this typology was abandoned for suburbia, which allowed students, workers, and immigrants to move into the homes. In 2008, when the crisis hit, the apartments were seen as an asset for people to escape the financial burden through renting. However, these apartments quickly became desired by tourists, thus raising prices for the locals.[20] Ioanna Theocharopoulou, a historian and architect at Columbia University, argues that the apartments still offer contributions to the communities and neighborhoods they inhabit. The mixed-use ground floor, midrise height, and outdoor spaces have added a sense of elegance, making them very desirable for foreign

[18] Kyriakou, "Three Athenian Apartments."
[19] Eirini Makarouni, "The Complicated Case of Polykatoikia, Athens' Famous Postwar Apartment Blocks," *Architizer Journal*, August 28, 2024.
[20] Kyriakou, "Three Athenian Apartments."

tourism, thus assisting in economic crisis relief.[21] However, most Athenians still dream of the former, neoclassical Athens, before the wave of mass modernist construction. [22]

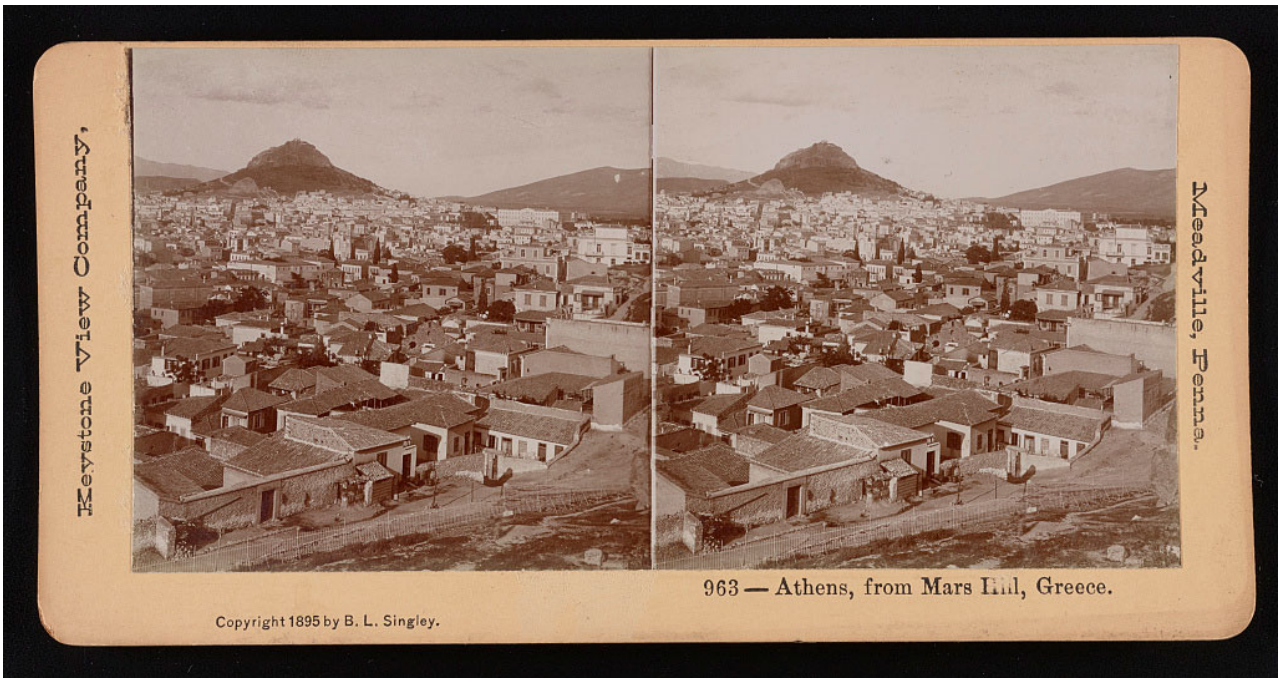

Figure 07: *Athens, from Mars Hill, Greece.* Photograph by Benjamin Lloyd Singley, 1895. Published by the Keystone View Company (Meadville, PA.) Library of Congress Prints and Photographs Division. LC-DIG-ds-12760.

[21] Blackman, "Ioanna Theocharopoulou on 'Builders, Housewives, and the Construction of Modern Athens.'"
[22] Makarouni, "The Complicated Case of Polykatoikia."

"Elegant neoclassical Athens was bulldozed in the 1950s for the concrete hell of apartment boxes whose design is the aesthetic equivalent of a garbage dumpster."

Stephanos Papadopoulos

III. THE FIVE POINTS OF THE ATHENIAN POLYKATOIKIA

While analyzing the typical floor plan, five distinct elements are seen in nearly every single variation. These elements were developed over time, influenced by social relationships, changing family dynamics, and new relationships between building and ground.

Point One: The Hall

Upon entering an apartment within this distinct building type, the first space encountered is the ***hall,*** developed from vernacular systems of living and hosting. In the classical period, the relationship between community and individuality was established through a series of rooms attached to an open space.[23] This allowed for privacy within the interior of the home, hosting the bedrooms and other private spaces, while maintaining the outdoors for entry and socializing. In the neoclassical era, this exterior space was shifted indoors into the entrance hall, which linked rooms to one open space. There was also a tripartite zoning system in the floor plans, adopted from the hotel particulier[24], which included the living, private, and service zones. The hall assisted in their division, guiding people to each zone from one central space. Architecturally, the hall was always a rectangular or square space, providing distinct proportion to other rooms in the house.[25]

[23] Schmitz-Hubsch, *Athens Polykatoikias*, 97.
[24] The hotel particulier was a typology of design for French nobles that involved discourse between public, private, and the showcase of wealth.
[25] Schmitz-Hubsch, *Athens Polykatoikias*, 97.

Point Two: The Wall

The ***wall*** has been constantly viewed as a partition- it divides and unites accordingly.[26] Since the structure of the polykatoikia released its additional role of providing structural support, its new role and definition was influenced by composition, materiality, and location.[27] Joana Pinheiro describes the four main formulations of a wall as the wall that articulates, references, emplaces, and inhabits. The wall that references is viewed as an expression, one in which the architecture is a signifier. The wall that emplaces determines the location on the floor plan, meanwhile the one that encloses organizes the interior spaces and programs. Finally, the wall that inhabits allows for usability, utilizing width and depth to provide an additional use.[28]

Point Three: The Core

"The right to housing should include well-designed, well-lit, well-formed, accessible circulation spaces."

Hilary Sample

In looking at the broader scale of the polykatoikia, one of the most distinctive features of the building typology was the ***core***. In the early stages, there used to be a core for each apartment, as the idea of a common entrance was widely unfamiliar.[29] The introduction of the staircase and elevator within architecture allowed for the repletion of complex wayfinding and simplified the means of direction.[30] However, within the polykatoikia, the shift from single family to multifamily created a new way of experiencing the home, as suddenly, the single pathway to the front door changed to a pathway to the ground floor lobby. The only simplification was seen on

[26] Robin Evans, "Figures, Doors, and Passages," in *Translations from Drawing to Building and Other Essays* (1978), 55–90.
[27] Thomas Thiis-Evensen, "The Wall," in Archetypes in Architecture (January 1987), 115–298.
[28] Joana Pinheiro, "The Wall That Articulates: Characteristics and Operability in Space," *The Plan Journal* 7, no. 1 (2022)
[29] Schmitz-Hubsch, *Athens Polykatoikias*, 185.
[30] Andreas Bernard and David Dollenmayer, *Lifted: A Cultural History of the Elevator* (New York: NYU Press, 2014), 35.

the floor scale. The core provided the "most direct route"[31] between floors, allowing for a linear pathway from elevator to front door.

The staircase is a public space. One of the few public passages in apartment complexes, staircases offer shelter, interaction, exercise, and play within the same typology. Most importantly, they also offer circulation, designating spaces for passage and movement. Within real estate, circulation spaces are reduced to a minimum, as they aren't defined as "rentable" or "purchasable."[32] Consequently, within the polykatoikia, the corridor spaces are minimal, both within the unit and the floor plan. Even in the public corridors, there is only a central space to enter each respective apartment, rather than a series of doorways. In some plans, there is only a core for 2-3 apartments per floor, increasing the amount of open circulation and open interaction spaces.

A prime example of the staircase as a means of interaction exists in the Logothetopoulos apartment complex in the Athenian suburb of Exharchia, designed by Kyprianos Biris. Commissioned between 1930-1932, this building was designed to host a low-income housing model. Offering two apartment types, the individual units surrounded three central atria, with four staircases scattered in proximity. Due to the building's scale taking up the entire city block, two passageways pierce the ground floor as a means to promote openness and engage with the community. Consequently, tenants also selected their own passage that correlated with their respective core staircase.[33] The design of this complex emphasizes the lack of non-sellable circulatory space. For every two apartments, the central core's floor space is found to compose primarily of the staircase, with 1/3 of allowable space to be the landing. As such, the core's possibility for social interaction is reduced to the minute landing.

[31] Bernard and Dollenmayer, *Lifted: A Cultural History of the Elevator*, 37.
[32] Hilary Sample, "Notes on Staircases," *Housing – Hilary Sample*, July 2020.
[33] Schmitz-Hubsch, *Athens Polykatoikias*, 18.

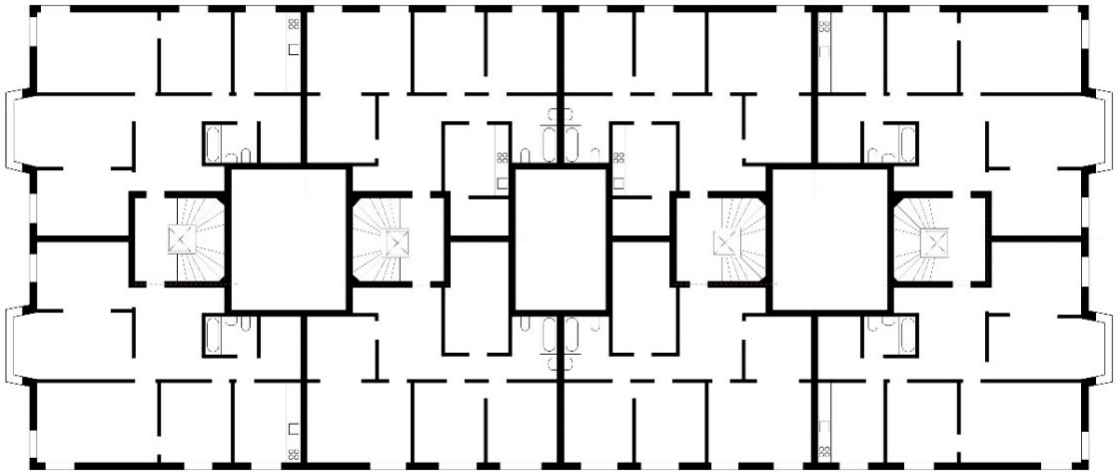

Figure 08: Logothetopoulos Apartment Building, Kyprianos Biris, 1930-32. Redrawn by self, 2026. Found in *Athens Polykatoikias*, Dortmund, Germany: Druckverlag Kettler, 2024, p. 18.

From a design standpoint, the core also caused a shift in architectural design. With the introduction of a structural shaft piercing through the floors, the openness of the Dom-Ino is heightened, further contributing to the modernist ideals of the time. Such activation of the floor plan also led to various variations of the ground floor. New entrance models emerged, known as the Hallway type, the Classical Receiver, Lobby I, and Lobby II by Killian Schmitz-Hubsch. The hallway type, the most simplistic of the types, included a single corridor to the lift and staircase. The façade of the building exemplified the modern inspiration of the polykatoikia, through carvings of niches and other "incisions."[34] Such incisions were in conversation with the street, by guiding the visitor through the hallway to the core. This typology transitioned to the classical receiver type, which was larger and less linear than its predecessor. Reminiscent of a lobby, this entrance was a large open space, with segments of movement and elevation changes through platforms and staircases.[35] In the timeline of the models, the Lobby type I heightened the idea of openness into a semi-private, semi-public space. Lobby I was directly on ground street level, setting the building line back and providing the lobby with additional outdoor space.[36] Schmitz-

[34] Schmitz-Hubsch, *Athens Polykatoikias*, 185.
[35] Schmitz-Hubsch, *Athens Polykatoikias*, 187.
[36] Schmitz-Hubsch, *Athens Polykatoikias*, 189.

Hubsch describes this new change as a "a space for creative collaboration," which simultaneously sends a political message of forced social interaction between interior and exterior. The Lobby II transformed the lobby to a reception space, following the 1955 Stoa Legislation. This new law allowed commercial stores on the ground floor, thus hiding the staircases and elevators from street view.[37]

Point Four: The Corridor

Within the unit, the ***corridor*** connects rooms and spaces to each other. This element has always been an element of domestic architecture, especially in the 18th century England, in which it was rarely seen in commercial or public buildings.[38] The corridor, over time, evolved from a space of ornamentation and grandeur, to a sterile, dark part of the home.[39] Thus, it was shifted into being used for servant use, additional circulation, and efficiency for movement.[40] In the Athenian typology, it can be speculated that the corridor was primarily used for service, due to its proximity to the service zones. However, over time, the corridor became associated with "the shallowness of modernity rather than it's grandeur."[41] Throughout history, architects and historians have attempted to eliminate the corridor in its entirety. In post-war Germany, the Anticorridic Movement emerged to counteract the American office model and promote a "non-hierarchical environment."[42] Similarly, Sigfried Gideon was optimistic about the obliteration of the corridor in a modern context, through the argument of materiality. The use of glass broke the stigma of the corridor being dark and depressive, and large openings proposed the argument of spatial divides between room and hallway.[43]

Point Five: The Balcony

Finally, the ***balcony*** emerged as a way to adapt to "Greek climate and Greek living habits," but was originally given a small footprint. Bay windows emerged to provide opportunities to extend past the property

[37] Schmitz-Hubsch, *Athens Polykatoikias*, 190
[38] Mark Jarzombek, "Corridor Spaces," *Critical Inquiry* 36, no. 4 (June 2010): 728.
[39] Jarzombek, "Corridor Spaces," 765.
[40] Robin Evans, "Figures, Doors, and Passages," in *Translations from Drawing to Building and Other Essays* (1978), 71.
[41] Jarzombek, "Corridor Spaces," 766.
[42] Jarzombek, "Corridor Spaces," 765.
[43] Jarzombek, "Corridor Spaces," 768.

line, but due to the illegality of many of these developments, they were often exploited to shift farther past the allowed distance. The balconies were constructed as either cantilevered attachments to the buildings or carved into the façade.[44] Despite their original attempt to be a connection between the privacy of the home and outside society, they ended up being merely a disconnect. These spaces became used for storage, shying away from the face of the public. Attempts were made to connect the building with the general public, including design decisions such as "bay windows, seating niches, balconies, loggias, exterior topographical corridors, and open-air staircases" as seen in the building on Benaki Street, designed by Souzana and Dimitris Antonakakis' building façade.[45]

Figure 09: *Apartment Building on Em. Benaki Street*. Photograph by Atelier 66, 1973.

[44] Schmitz-Hubsch, *Athens Polykatoikias*, 289.
[45] Schmitz-Hubsch, *Athens Polykatoikias*, 295.

In reimagining the balcony, the primary focus is rebuilding the connection between interior and exterior. One of the most successful projects come from the French firm Lacaton and Vassal. In their project "Transformation of 530 Dwellings" in Bordeaux, France, they convert the recessed balconies of three social housing projects into wintergardens.[46] This conversion provided an extension of the home to the tenant, shifting the exterior space from storage to a place of gathering, activity, sunlight, and movement. [47] Various analyses conducted before and after construction revealed that the seemingly simple addition of the wintergardens improved indoor air quality, maintained an internal temperature threshold of 22-24 °C, and allowed tenants to still live in the apartments during construction.[48] Thus, the balcony is a tool for thermal regulation within the home, when the right materials are used. The project took advantage of the thermal properties of wool, concrete, polycarbonate, and glass, in order to heat and cool the spaces accordingly.[49] From a social aspect, the wintergardens expanded the living space of the tenants, providing a space of flux that can be transformed into any space necessary. The autonomy provided counters the idea that affordable housing needs to be small, dark, and inflexible, and instead, can be bright, sustainable, and expansive.

Figure 10: *The Transformation of 530 Dwellings*. Photograph by Philippe Ruault, 2017.

[46] Paula Pintos, "Transformation of 530 Dwellings / Lacaton & Vassal + Frédéric Druot + Christophe Hutin Architecture," *ArchDaily*, April 18, 2019.
[47] Anne Lacaton and Jean-Philippe Vassal, "Lacaton & Vassal," accessed March 14, 2026.
[48] Lacaton and Vassal, *It's Nice Today*.
[49] Ibid

The Five Points

Hall, hall, core, corridor, and balcony. All of these points are architectural elements with the possibility of transformation in order to update the polykatoikia into a thermally efficient domestic space. The building therefore is transformed into a more organic version of this typology, as the elements work in tandem with each other rather than separate entities. For example, the balcony can *also* be the corridor, the core could be *linked* to the hall, etc. Reconfiguring the five points also reconfigures the way we experience domesticity.

"With skillful cascading, there are more opportunities to gradually un-skin a structure, because total thermal enclosure isn't necessary everywhere."

Salmaan Craig

IV. COLLECTIVE LABOR = THERMAL COMFORT

Form follows energy. This is what Elisa Iturbe discusses in Log Magazine, on the topic of "carbon forms." She describes them to be the infrastructures that emerged following industrialization and other carbon-based energy systems.[50] She describes: "*...as part of a consumerist development model, low-density and largely residential neighborhoods became a new expression of carbon form."*[51] The polykatoikia, as also expressed by Platon Issaias, intensified the idea of consumerist private property and capitalist building financing.[52] Driven by a desire for ownership and economic boom, I argue that the concept of antiparochi is a testament to such economic development in replacing older, single-family homes into a urban blanket of midrise blocks. From an environmental standpoint, Iturbe argues that the climate crisis that surrounds both society and the construction sector needs to also address carbon modernity.[53] As such, both building and form can be changed to undo the effects of carbon forms and reshape the city's urban fabric from the monotonous industrialization boom. This concept of reconfiguration is the primary aim of this thesis, while simultaneously redeveloping social relations within the home.

"While the Dom-ino approach encourages the individual house owner to become an independent entrepreneur who fills in, organizes and manipulates his part of the skeleton, the forms we propose all imply a form of ***collective will and collaboration****. The courtyard, the block, the street, and the ground floor become figures that can be rescued from the polykatoikia carpet. Our proposal radicalises these figures into distinct architectural archetypes."*

Pier Vittorio Aureli

[50] Elisa Iturbe, "Architecture and the Death of Carbon Modernity," Log, no. 47 (Fall 2019.): 10–24
[51] Elisa Iturbe, "Architecture and the Death of Carbon Modernity," Log, no. 47 (Fall 2019.): 18.
[52] Issaias, "The City as a Project."
[53] Iturbe, "Architecture and the Death of Carbon Modernity," 17.

Platon Issaias, Pier Vittorio Aureli, and Maria Guidici conducted a study at the Berlage Institute, identifying ways to reshape the polykatoikia and its effects on Athens. Their proposition included altering certain aspects of the typology to reconnect the dwelling into its larger context. Through the new activation of the courtyard, the block, the street, and the ground floor, the new version of the polykatoikia counteracts the private developmental history and instead promotes collectivism and community exchange.[54] From an urban planning standpoint, these four elements are the most effective in promoting close neighborhood relations and strengthening the identity of the housing blocks. In taking away the preexisting gardens of single-family homes, today's citizens rely on the urban infrastructure to fulfill the desire for interpersonal relationships. While the interior was designed to be infilled according to tenant desire, this new proposal for exterior altering uplifts these elements to contribute back to the urban fabric of the city. The interior may remain private, but the exterior architecture and larger urban planning is still a testing ground for collaboration.

Figure 11: Left: *Cloister*. Rendering by Ji Jyun Woo, Berlage Institute, 2011.
Right: *Platform*. Rendering by Ivan K. Nasution, Berlage Institute, 2011.
Source: DOMUS.

The city, at present, is unaffordable in terms of heating and cooling. Speculations on the quality of construction of these postwar apartments have been confirmed by studies conducted by the Hellenic Open

[54] Maria S. Giudici, Pier Vittorio Aureli, and Platon Issaias, "From Dom-Ino to Polykatoikia," *DOMUS*, September 14, 2017.

University, revealing a lack of sufficient insulation.[55] Nearly two decades after the 2008 crisis, 20% of households continued to report an inability to pay energy bills, resulting in a widespread "energy poverty." This resolution is what this project tackles. The Greek government itself understands the potential benefits of demolition for the energy affordability of Athens. Through this, the new urban planning makes space for projects with vegetative infrastructures, sustainable materials, and passive designs, in order to improve efficiency and reduce heating and cooling loads.[56]

Liz Galvez, an academic, researcher, and director of the (Im)Material Matters Lab within her firm Office for example, produced an installation at Rice University named "Of Envelopes and Air." The 2018 project argues that our current enclosures are merely suffocating and pull us farther away from the natural world. The division of the interior and exterior using the building envelope is purely an isolation, as relying on active systems forces us to seek alternatives for natural processes. Therefore, by punching openings in her model, she proves that we don't need active systems to achieve the same end goals of heating and cooling.[57] Such research confirms the possibility of maintaining thermal comfort within the home through passive interventions.

Figure 12: *Of Envelopes and Air*. Photograph by Liz Galvez, 2018. Rice University School of Architecture.

[55] Eleftheria Alexandri, "From the Building to the Building Stock: Investigation of the Transformations of the Building Stock of the City of Athens for Its Conversion into a Carbon Neutral City," *Green Energy and Sustainability*, January 20, 2022, 1–42.
[56] Makarouni, "The Complicated Case of Polykatoikia."
[57] "Office e.g.: Of Envelopes and Air," *The Architectural League of New York*, October 7, 2021.

Similarly, the project Polypartment by AREA Office in Athens, Greece, fragments the polykatoikia into smaller energy saving zones, while maintaining the original structure. This proposal incorporates external insulation, solar panels, and heat pumps for alternative methods of thermal comfort, retrofitting the existing Dom-Ino superstructure.[58] This project is the most similar to the end goal of this proposal. The reconstruction of the low-rise apartment into a single unit removes the established privatization and instead opens it up for use for one nuclear family to live in. The difference between the two projects, however, is the intended audience. The nuclear family shifts to a new definition of domestic living that includes extended members of the family, such as aunts, uncles, cousins, and grandparents.

Figure 13: *Polypartment*. Photograph by AREA Office, 2014.

One of the most prominent researchers on the topic of microclimatic design is Salmaan Craig, an engineer and professor at UCLA. He discusses the concept of *thermal thresholds,* a spatial organization of *microclimates* within the home. The current norm in building construction is to have one sharp transition in the

[58] AREA Office, "Polypartment," *AREA*.

envelope, dividing hot/cold, inside/outside, and public/private. However, with *cascading* microclimates this sharp division can be expanded to allow for opportunities of passive ventilation and autonomy in the realm of thermal comfort. Various conditions, such as moisture, enclosure, air movement, and materiality, all contribute to the qualities of each microclimate. Additionally, the adjustment of the program based on the climatic conditions of each space is also dependent on the season and how all the above qualities affect the internal temperatures.[59] I had the pleasure to interview Professor Craig as part of this research. Within our fruitful conversation, he placed immense emphasis on the "semi-interior" space, which is the most important volume for thermal regulation. Lying in between the exterior and interior, the semi-interior acts like an air and thermal barrier, which can be used for a plethora of programs.

For example, the materiality of the wintergardens is inspired by greenhouse design, which passively controls the internal temperature to maintain a comfortable environment. Lacaton and Vassal design their spaces as follows: on the interior of the winter garden, standard glazing is placed in the interior partition. To provide additional insulation, a thermal curtain is placed on the interior of the glazing to withhold heat to the inside of the home. The floor area of the wintergarden provides an air barrier between the interior and exterior, promoting a space of thermal flux. On the exterior, the architects utilize polycarbonate as the partition, due to their thermal qualities and easy availability. Followed by a solar curtain in the interior of the garden, the number of solar rays is controlled through the opening or closing of the curtain. When it is open, the concrete flooring can trap heat and slowly release it in the nighttime. Multiple combinations have been developed by the firm to ensure both heating and cooling possibilities.[60]

[59] Salmaan Craig, "Thermal Thresholds," *Log*, no. 64 (Summer 2025): 53–60.
[60] Anne Lacaton and Jean-Philippe Vassal, *It's Nice Today: On Climate, Comfort, and Pleasure* (Berlin: Ruby Press, 2025).

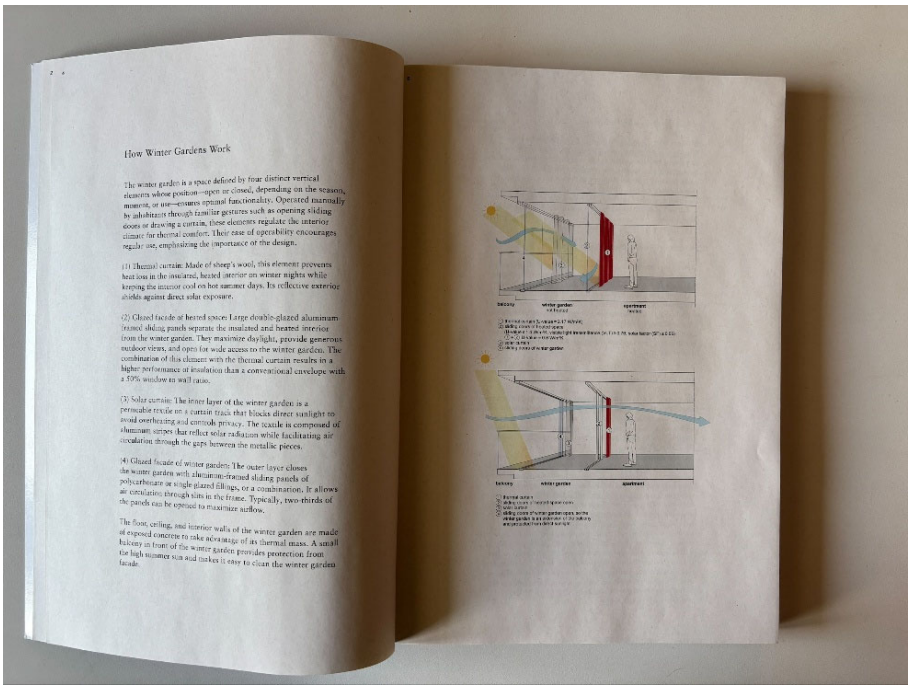

Figure 14: *How Winter Gardens Work*. Photograph by Omar Ali, Diagrams by Lacaton and Vassal. Found in "It's Nice Today: On Climate, Comfort, and Pleasure," Berlin: Ruby Press, 2025, p. 4.

A prominent example of microclimatic design is the Day After House by the Spanish firm, TAKK. The home utilizes a nested spatial organization in order to efficiently heat and cool. Organized into a summer home and a winter home, openings such as interior windows, sliding doors, and varying materiality of walls creates distinct temperature profiles for each home. The "summer house" is 50 meters squares, whereas the winter house" is 60 square meters. This division composes a 110 square meter total footprint. Additional design decisions include a northern orientation to reduce direct sunlight and a communal bedroom. The decision to divide the bedroom into its own space was made for thermal and emotional purposes. Utilizing body heat, the bed automatically becomes the warmest space in the house, while simultaneously promoting collective living.[61] Mireia Luzarraga, founder of TAKK, discussed the project in greater detail while giving a lecture to our Directed Research group. She discussed the importance of materiality and their own thermal qualities, which in tandem with curtains, screens, and windows, contributed to the thermal comfort of the project. Vegetation was also a key aspect of the design, as the incorporation of plants allowed for additional stabilization of temperatures in the

[61] Mireia Luzárraga and Alejandro Muiño, "The Day After House," *TAKK's Archive.*

summertime in a passive way. In discussion of my proposal, Luzarraga emphasized the main focus of the climate was on how to heat the home rather than cool it. She echoed the means of ventilation as a main success of the home, which allowed for quick cooling in extreme temperatures.

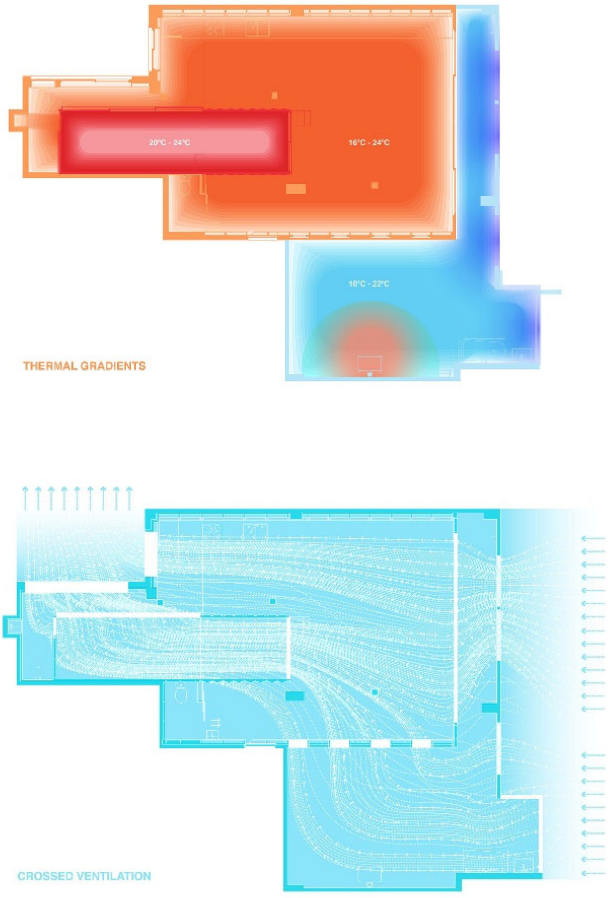

Figure 15: *The Day After House*. Diagrams by TAKK, 2021.

Similarly, the Antivilla by Brandlhuber+Emde, Burlon (b+) uses the same summer/winter home division. The home, a former factory, was retrofitted as an experiment for alternative ways of living. The use of materiality, specifically shortcrete, insulates the home while providing an affordable and cost-efficient alternative to construction. PVC curtains were added to create microclimates, expanding and contracting the available usable area based on the season. In the summertime, the home utilizes a 10 square meter bedroom and

230 square meter living space, meanwhile in the winter, the home contracts to 60 square meters of combined living and sleeping. This move also involves moving the bed closer to the central hearth, ultimately shifting the spatial relations further.[62]

Figure 16: *Antivilla by b+*. Photographed by Erica Overmeer, 2014.

[62] Cristian Aguilar, "Antivilla / Brandlhuber+Emde, Burlon," *ArchDaily*, November 30, 2019.

Figure 17: *Alexandras*. Photographed by Andreas Gehrke, 2018.
Found in *The Public Private House,* Zurich: Park Books, 2018, p. 158

V. HEAT SOBRIETY

Utilizing the theoretical and technical research accumulated, many applications are possible to reinvent the Athenian polykatoikia into a space of energy-driven domesticity that reinvents the way we collectively live and work. Ultimately, communal living and thermal sustainability go hand in hand. Sharing resources is not only economically and environmentally sustainable, but is also a catalyst for new social relationships, daily rituals, and spatial organizations to emerge. Following the concept of "degrowth," a term coined by Mireille Roddier describing the individual reduction of resource use,[63] this proposal echoes that collectively utilizing electricity, water, heating, and cooling, is a form of communal degrowth.

In the preliminary stages of the project, a study on the Dom-Ino was conducted, as a means to explore the superstructure's relation to various domestic practices. The study revealed numerous possibilities of spatial organization found utilizing the column grid, which provides the tenant with the autonomy to design the space as desired. In the end, a kit of parts was produced, that allowed adaptability, movement, and experimentation on a playful scale. Presenting a variety of furniture, curtains, and partitions, the user has the opportunity to configure

[63] Roddier, "Lessons on Energy Sobriety."

a “home” between the columns, that reflects their needs. The exercise also introduced a series of HVAC ducts that collect body heat and convert it to usable energy via a thermoelectric generator. This project was the beginning stage of the proposal, experimenting with different methods of changing domestic living through alternative thermal frameworks.

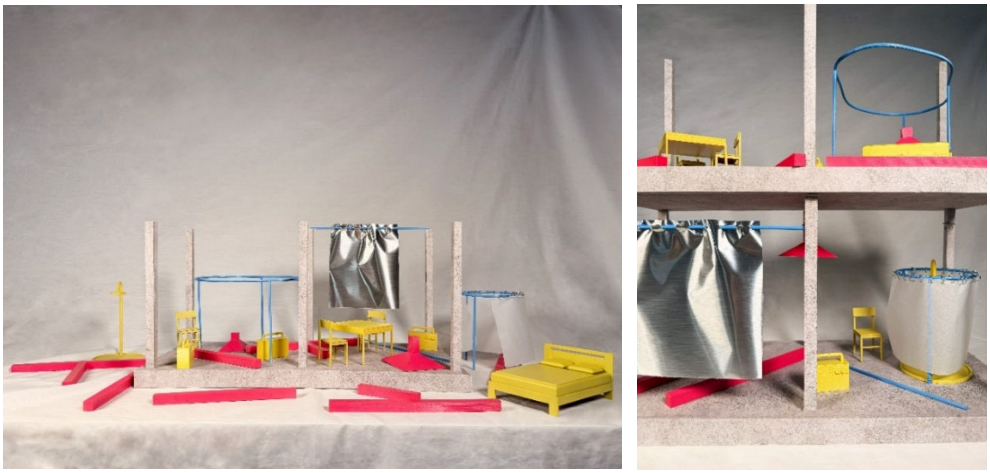

Figure 18: Dom-Ino Case Study, 2026. (Self)

In further development, the final selected site is located in the suburb of Gyzi, directly on Alexandra’s Avenue 31 (Leoforos Alexandras 31.) It is a corner unit constructed in 1982, composed of 6 floors, and located on a footprint of 91m². The existing floor plan alludes to two studio units on each floor, as seen by the large flex space that is attached to a combined bathroom and kitchen zone.[64] The remainder of the block is composed of a single-family home to the left, that is found in between the site and a neoclassical office building. On the ground floor, the site follows the traditional composition of the polykatoikia, complete with a mixed-use ground condition. Currently a café, Leoforos Alexandras 31 sprawls to the edges of the city block with umbrellas, tents, and tables for visitors. Additionally, based on the sign on the fifth floor of the building advertising a housing developer, some of the floors may be used as office spaces. For the purposes of this proposal, the ground floor remains untouched to maintain the spirit of the typology, and instead floor 2-6 will be “hacked” and transformed.

[64] Woditsch, *The Public Private House*, 159-161

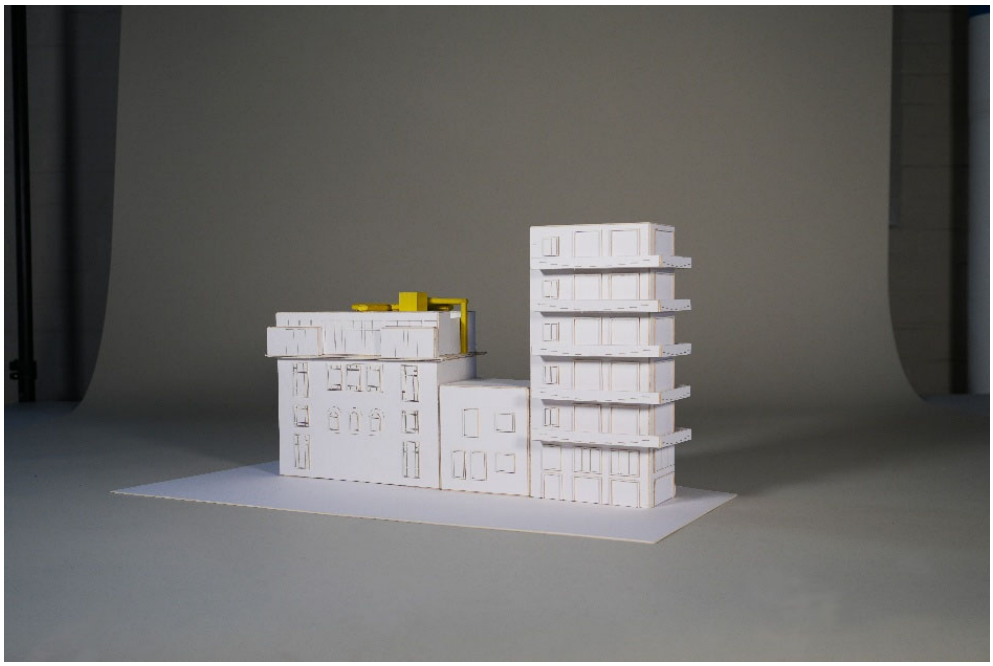

Figure 19: Existing Polykatoikia Case Study, 2026. (Self.)

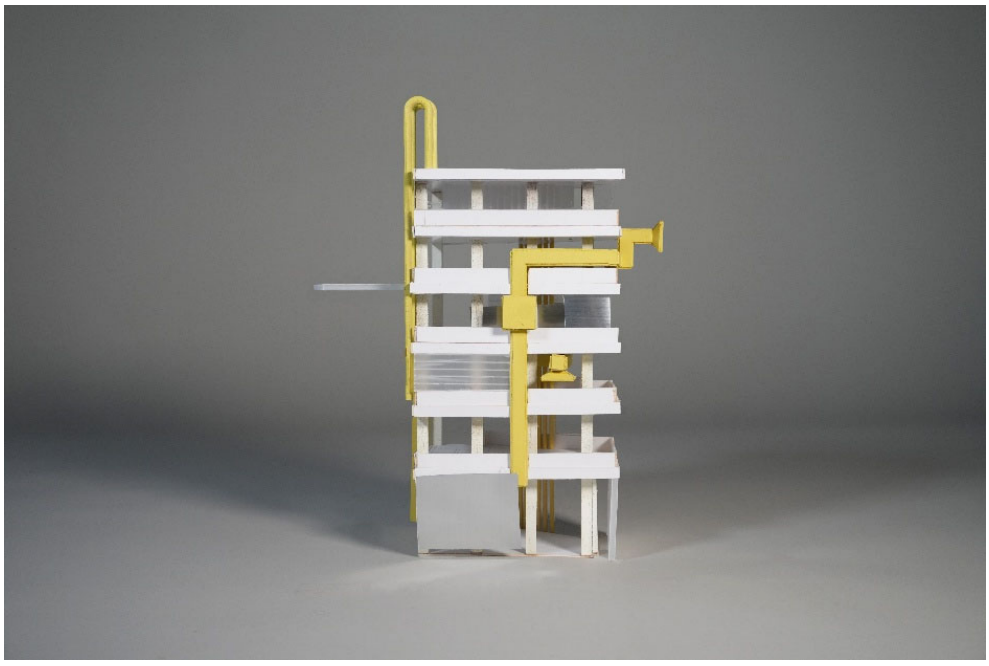

Figure 20: Reimagined Polykatoikia Case Study, 2026. (Self.)

In order to emphasize adaptability and infill, the primary move of the project was to remove the façade and study the existing column and slab construction. Through the removal of the skin, interventions such as pipes, curtains, and polycarbonate panels could be experimented with establishing a visual language of altering the building in an informal manner. Architecturally, strategies such as nested rooms, wintergarden additions, and cross ventilation were launched to create microclimatic zones, in which collective practices were promoted. The form of the building was transformed by expanding the main staircase, pulling the core to create additional moments of interaction. Additionally, to the south, a 5-foot winter garden was integrated into the structure to expand the usable floor area and allow for the development of semi-interior space. This space expands the living area of the home, while providing a comfortable interior temperature. Finally, to the east, a spiral staircase links the public space of each floor for tenant use, meanwhile to the west, the building is further expanded to an additional semi-enclosed space. Such addition appears to float above the single-family dwelling, with lightweight structural members subtly protruding downwards.

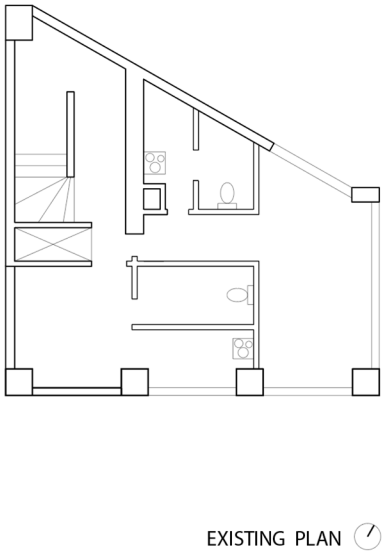

Figure 21: Existing Floor Plan, Redrawn by self, 2026. Found in The Public Private House, Zurich: Park Books, 2018, p. 160.

The study of microclimatic design manifested itself into the production of two distinct floor plans, one for heating and one for cooling, which are settled into floors two through six. The heating floor plan emphasizes the façade, through the reinforcement of insulation in the interior. By thickening the existing façade, the exterior walls R-value increases, and thus have the capacity to hold heat better. The southern orientation of the building receives the most sunlight. In order to maximize the number of rays in the building, the southern end of the building's exterior is composed of predominantly polycarbonate, utilizing Lacaton and Vassal's greenhouse system. Nested within the semi-interior space exists the main heat core. The bedroom, bathroom, and kitchen, the three most heat-producing programs in the domestic sphere, are adjoined to radiate additional heat to the remainder of the floor plan, when curtains are drawn and doors are opened. However, in extreme temperatures, the floor plan can also condense to the heat core, taking advantage of the thermal qualities that exist within communal living.

Within the cooling floor plan the opposite approach is taken. Composed of primarily polycarbonate, the semi-interior space constitutes majority of the floor plate, with access to the exterior balconies. By taking advantage of northern winds, cross ventilation becomes the primary form of cooling within the home. Windows and balconies correlate with the winter gardens to promote the labor of opening and closing select openings for the desired end goal. Furthermore, the heat core is transformed into a cooling core, through the removal of the kitchen walls to promote an open floor plan. Socially, the open kitchens also promote collectivism, through the visibility of actions.

This visibility becomes crucial in the social dynamics within the home. After antiparochi, it became quite typical to find multiple members of both the nuclear and extended family living in the same building. Consequently, the polykatoikia and its circulation core became agents of domestic relations promoting intergenerational living. Cooking smells, loud conversations, and playful cousins are constantly inhabiting the central staircase of the building. Within the reimagination of the polykatoikia, the family utilizes the entire volume. The grandparents may inhabit two units, while their child lives on the floor above. The staircases, wintergardens, and open kitchens strengthen family relations, an aspect that is crucial to Greek culture.

Figure 22: Winter and Summer Floor Plans, 2026. (Self.)

At its center, this thesis is addresses the unaffordable energy consumption of Athens, that is influenced by the widespread social impact of the city's densification. Thus, by implementing collective housing initiatives within existing structures, not only does the polykatoikia become a social condenser for shared domestic practices but simultaneously create sustainable living conditions that allow tenants to have autonomy over their thermal conditions. These properties further strengthen domestic relations, promoting intergenerational living and collectivity within a single building footprint. The Athenian polykatoikia continues to be a testing ground, as it was for the postwar developers in the 1930's, for energy efficient domesticity that is reframed utilizing new microclimatic conditions.

Bibliography

1. Aguilar, Cristian. “Antivilla / Brandlhuber+Emde, Burlon.” ArchDaily, 2019. https://www.archdaily.com/627801/antivilla-brandlhuber-emde-schneider.
2. Alexandri, Eleftheria. “From the Building to the Building Stock: Investigation of the Transformations of the Building Stock of the City of Athens for Its Conversion into a Carbon Neutral City.” Green Energy and Sustainability, 2022, pp. 1–42. https://doi.org/10.47248/ges2202010002.
3. Angelidakis, Andreas. “Unauthorized.” Positions - Andreas Angelidakis, September 2017. https://www.e-flux.com/architecture/positions/151178/unauthorized.
4. AREA Office. “Polypartment.” AREA. https://areaoffice.gr/projects/polypartment.
5. Bernard, Andreas, and David Dollenmayer. Lifted: A Cultural History of the Elevator. NYU Press, 2014.
6. Blackman, Harrison. “Ioanna Theocharopoulou on ‘Builders, Housewives, and the Construction of Modern Athens.’” Ioanna Theocharopoulou on “Builders, Housewives, and the Construction of Modern Athens,” 2023. https://www.theusonian.com/p/the-usonian-interviews-no-17-ioanna.
7. Craig, Salmaan. “Thermal Thresholds.” Log, no. 64 (Summer 2025): 53–60.
8. Evans, Robin. “Figures, Doors, and Passages.” Essay. In Translations from Drawing to Building and Other Essays, pp. 55–90, 1978.
9. Fakhari, Milad, Andre St-Hilaire, and Richard Martel. “Thermal Refuge Modeling: A Short Review.” Environmental Reviews 33 (2025): pp. 1–10. https://doi.org/10.1139/er-2025-0106.
10. Giamarelos, Stylianos. “Greece, the Modern Margin in the Classical Centre: Seven Points for Critical Regionalism as Historiography.” The Journal of Architecture 25, no. 8 (2020): 1055–88. https://doi.org/10.1080/13602365.2020.1854328.
11. Giudici, Maria S., Pier Vittorio Aureli, and Platon Issaias. “From Dom-Ino to Polykatoikia.” DOMUS, 2017. https://www.domusweb.it/en/architecture/2012/10/31/from-dom-ino-to-em-polykatoikia-em-.html.

12. Gold, John R. Athens Charter (CIAM), 1933. Accessed March 15, 2026. https://architecture-history.org/library/AJ/The%20Wiley%20Blackwell%20Encyclopedia%20of%20Urban%20and%20Regional%20Studies,%20Athens%20Charter%20.pdf.
13. Issaias, Platon. “The City as a Project: On Conflict, Generic and the Informal: The Greek Case.” The City as a Project RSS, 2016. http://thecityasaproject.org/2016/01/on-conflict-generic-and-the-informal-the-greek-case/.
14. Iturbe, Elisa. “Architecture and the Death of Carbon Modernity.” Log, no. 47 (Fall 2019): 10–24.
15. Jarzombek, Mark. “Corridor Spaces.” Critical Inquiry 36, no. 4 (June 2010): 728–70. https://doi.org/10.1086/655210.
16. Kyriakou, Kyriakos. 2024. “Three Athenian Apartments: Resetting the Free Plan in the Athenian Polykatoikia.” Interiors 14 (1–3): pp. 168–84. https://doi.org/10.1080/20419112.2025.2531676.
17. Lacaton, Anne, and Jean-Philippe Vassal. It’s nice today: On climate, comfort, and pleasure. Berlin: Ruby Press, 2025.
18. Lacaton, Anne, and Jean-Philippe Vassal. “Lacaton & Vassal.” lacaton & vassal. Accessed March 14, 2026. https://www.lacatonvassal.com/.
19. Luzárraga, Mireia, and Alejandro Muiño. “The Day After House.” takk’s archive. Accessed March 14, 2026. https://takksarchive.cargo.site/the-day-after-house.
20. Makarouni, Eirini. “The Complicated Case of Polykatoikia, Athens’ Famous Postwar Apartment Blocks.” Journal, 2024. https://architizer.com/blog/inspiration/stories/polykatoikia-athens-famous-postwar-apartment-blocks/.
21. Michalopoulos, Stelios. “Greek Refugees: The Socioeconomic Consequences of the 1923 Population Exchange between Greece and Turkey.” NBER. https://www.nber.org/programs-projects/projects-and-centers/7226-greek-refugees-socioeconomic-consequences-1923-population-exchange-between-greece-and-turkey.
22. “Office e.g.: Of Envelopes and Air.” The Architectural League of New York, 2021. https://archleague.org/article/office-e-g-of-envelopes-and-air/.

23. Pinheiro, Joana. “The Wall That Articulates: Characteristics and Operability in Space.” The Plan Journal 7, no. 1 (2022). https://doi.org/10.15274/tpj.2022.07.01.9.
24. Pintos, Paula. “Transformation of 530 Dwellings / Lacaton & Vassal + Frédéric Druot + Christophe Hutin Architecture.” ArchDaily, 2019. https://www.archdaily.com/915431/transformation-of-530-dwellings-lacaton-and-vassal-plus-frederic-druot-plus-christophe-hutin-architecture.
25. Roddier, Mireille. “Lessons on Energy Sobriety.” After Comfort: A User’s Guide - Mireille Roddier. https://www.e-flux.com/architecture/after-comfort/6783001/lessons-on-energy-sobriety.
26. Sample, Hilary. “Notes on Staircases.” Housing - Hilary Sample, 2020. https://www.e-flux.com/architecture/housing/333722/notes-on-staircases.
27. Schmitz-Hubsch, Kilian. Athens’ Polykatoikias 1930-1975. Dortmund, Germany: Druckverlag Kettler, 2024.
28. Thiis-Evensen, Thomas. “The Wall.” Archetypes in Architecture, 1987, pp. 115–298. https://doi.org/10.18261/9788215046419-2020-4.
29. Thompson, Victoria E. “The Eighteenth-Century Hôtel Particulier: Luxury, Social Status, and the Public Good.” French Historical Studies 46, no. 4 (2023): pp. 491–524. https://doi.org/10.1215/00161071-10713933.
30. Tsakopoulos, Panayotis. “The Formation of the Athenian Polykatoikia: Models and Inventions.” ResearchGate. https://www.researchgate.net/publication/380035806_The_formation_of_the_Athenian_Polykatoikia_Models_and_inventions.
31. Tzonis, Alexander, and Alkistis Rodi. Greece: Modern Architectures in History. London: Reaktion Books, 2013.
32. Woditsch, Richard. The Public Private House: Modern Athens and its Polykatoikia. Zurich: Park Books, 2018.