

RESPONSIVE CITIES

DESIGN MATTER(S) FOR DECARBONIZATION

Proceedings for Responsive Cities Symposium 2025

Areti Markopoulou
Fiona Demeur

**RESPONSIVE CITIES
2025**

DESIGN MATTER(S)
FOR DECARBONIZATION

Symposium Proceedings

RESPONSIVE CITIES

DESIGN MATTER(S)
FOR DECARBONIZATION

RESPONSIVE CITIES: DESIGN MATTER(S) FOR DECARBONIZATION
SYMPOSIUM PROCEEDINGS 2025

ISBN-978-84-120885-9-5

EDITORS:

Areti Markopoulou
Fiona Demeur

LAYOUT:

Aleyna Gültekin
Simone Pirani

PUBLISHED BY:

Institut d'Arquitectura Avançada de Catalunya
Pujades 102 baixos, Poble Nou
08005 Barcelona, ES
www.iaac.net

ORGANIZED BY:



PARTNERS OF THE PROJECT:



WITH THE SUPPORT OF:



Copyright, by the Institute for Advanced Architecture of Catalonia 2025.
All rights reserved

The rights to include images and graphics have been permitted by the authors /holders of the copyrights. Images, names and testimonies of persons in the proceedings are published with their consent.

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.



INDEX

INTRODUCTION: DESIGN MATTER(S) FOR DECARBONIZATION, ARETI MARKOPOULOU	14
DESIGN & MAKE	22
PAVILION 1244 Hannah Schürmann, Jonathan Hernandez Lopez, Carl Haufe and Lucio Blandini	24
KITBASHING APPARATUS IN ARCHITECTURE Irem Sezer	40
DESIGNS FOLLOWS AVAILABILITY IN URBAN INFORMALITY Qonita Afrani Firdaus	52
DESERT FOOD FUTURES Andrea Macruz, Gionata Gatto and Mirko Daneluzzo	64

SELECTED PROJECTS	434
THE CHALK INSTITUTE Henry Aldridge	436
METROPOL{IA} Sophie Marandon	440
ECO-METABOLISTIC ARCHITECTURE Paul Nicholas, Carl Eppinger, Gabriella Rossi, Konrad Sonne, Cameron Nelson, Jan Hüls, Ryan O'Connor and Mette Ramsgaard Thomsen	444
POST PAPER STUDIO André Trindade, Davide Onestini	446
ROBOTIC SCANNING FOR SUSTAINABLE DECONSTRUCTION Alexandre Dubor, Yara Tayoun, Huanyu Li and Marita Georganta	450
THE N SWADDLE Parisa Azizi Shamami, Arin Aydogdu, Kayan Patel	452
BEYONDCORK Patricia Sveceny, Ekaterina Starovoitova, Gautam Vohra, Lais Ionna Margiori	456
HONEXT Eduard Mondéjar	460
ENTANGLED DIGITAL TWINS Clarissa Ribeiro, Cristina Maria Aleme Romcy and Diego Paim Silveira	462
RE:NEW Govind Chithrath, Vivek Venkateshappa, Shuotong Zhang	466
CIRCULAR DESIGN (CID)	472



PERFORMATIVE ARCHITECTURES FOR OFF-GRID COMMUNITIES

Design Methodologies for Self-Sufficient Housing Solutions

PAOLO CASCONI

University of Westminster, Architecture and Cities, Politecnico di Milano, DASTU
p.cascone@westminster.ac.uk

MADDALENA LADDAGA

Politecnico di Milano - DASTU, Department of Architecture and Urban Studies, AUID
maddalena.laddaga@polimi.it

KEYWORDS

Off-Grid Communities, Self-Sufficiency, Performative Architectures, Off-Grid Buildings

ABSTRACT

Climate change and rising energy poverty reclaim the urgency for a new connection between design and energy. As a matter of fact, energy justice for vulnerable communities highlights the structural inequalities in the capitalist energy provision worldwide, also considering that 9.3% of EU citizens were not able to heat their homes properly in the last two years. Beyond the political debate on energy price cap and provision, a new approach is needed to generate new performative building typologies towards off-grid communities. Therefore, the article will focus on an interdisciplinary design methodology to shape a new architectural approach based on self-sufficiency criteria. The paper shows the design methodology applied in research, teaching and practice over the years in different contexts.

1. INTRODUCTION

As recently reported in the European Green Deal project, sustainable buildings in European countries will drive to achieve decarbonisation and define a clean energy system. Considering the building stock in Europe scenario, buildings are responsible for about 40% of total energy consumption in the EU and 36% of greenhouse gas emissions from energy. As a matter of fact, 85% of EU buildings were built before 2000, and amongst those, 75% have a poor energy performance. Therefore, it has been highlighted in the EU Green Deal as an essential point to drive energy efficiency in the sector and obtain demanded results. (European Commission, 2020).

10,6% of Europeans were unable to keep their homes adequately warm in 2024, and the last Conference on Energy Poverty confirmed the trend of increasing energy poverty. In the last years, energy poverty was introduced in the literature to outline the indication of domestic energy deprivation or vulnerability (Castaño-Rosa et al., 2019). In 2016, the Commission launched the Energy Poverty Observatory (EPOV) to monitor it and also to spearhead the academic community and start a poverty diagnosis. Energy poverty is a complex and multidimensional issue that lies at the intersection between household income, energy costs and the energy efficiency of household appliances (Faiella et al., 2019). The term “reflects a long history of “on the ground”, grassroots practice and policy proposals that centre on energy and the environment in a changing climate marked by growing social inequalities.” (Jenkins et al. 2016) and “introduce energy justice as a framework that evaluates (a) where injustices emerge, (b) which affected sections of society are ignored, and (c) which processes exist for their remediation in order to (i) reveal and (ii) reduce such injustices.”

With the complex scenario of issues related to climate change and energy crises, in research, as well as in education and practice, the energy topic is crucial if associated with design buildings, starting from the large residential building sector.

A radical approach is needed from the design process to the construction phase, considering the householders not as a single user but as a part of a community to create a shorter energy cycle that includes a process of saving and production. This also develops alternative economic models where communities could become more accountable for saving, producing, and sharing. With an approach to share resources, and self-produce their energy, shifting their role from consumers to producers with the possibility of being off the grid, so with an autonomous system outside the urban water and energy

supply. The paper collects different projects and explains the approach to this topic through practice, research and teaching.

2. TOWARDS OFF-GRID COMMUNITIES

2.1. PRACTICE

The paper is a critical compendium of applied research and projects realized during the years through our practice CODESIGNLAB; such work deals with diverse programmatic agendas from temporary dwellings to affordable housing, cultural centres, etc.

The filouge of these experimentations is addressing the question of self-sufficiency as a design driver for performative architectures. Therefore, if some of the projects mainly deal with a strategy based on reducing energy consumption, the most challenging ones are integrating an energy production approach.

2.2. OFF-GRID ARCHITECTURES

The topic of self-sufficiency was experimented within an inter-scalar approach responding to different climatic and social contexts.

The smart shell project is one of the first investigation on temporary housing for emergency scenarios. Therefore, we have developed a design-to-build protocol for a “smart shell”, a fast-deployment housing solution conceived as a transportable and energetically self-sufficient device. The design process investigated the relation between high-tech design and low-tech construction; the kinetic systems offer a large catalogue of different prototypical shapes and dimensions that could adapt to different needs and contexts. The project is a foldable modular structural system made of timber and covered by tailor made strips of photovoltaic Teflon membrane made out of an amorphous siliceous system. The kinetic movements of the structure are functional to keep the performance of the PV system high, according to different climatic conditions and orientations, to respond to the energy users’ needs. The membrane PV membrane is waterproof and provides some interesting overshadowing performances, filtrating the solar radiation inside the dwelling.

With a similar off-grid logic but more related to a specific context and permanent use we have designed and built the African Fabbers House in Douala (Cameroon). The project was realised in the framework of the Camon project (2019) as part of an applied research agenda developed in collaboration with our African Fabbers School students. The housing prototype is the result of a research on the Logbaba slum housing conditions in relation to energy and water accessibility. Therefore, the prototype was inspired by the local informal dwellings with the aim to upgrade such spontaneous system in relation to their environmental performances for a more healthy and sustainable living based on the self-production of energy, water and food.

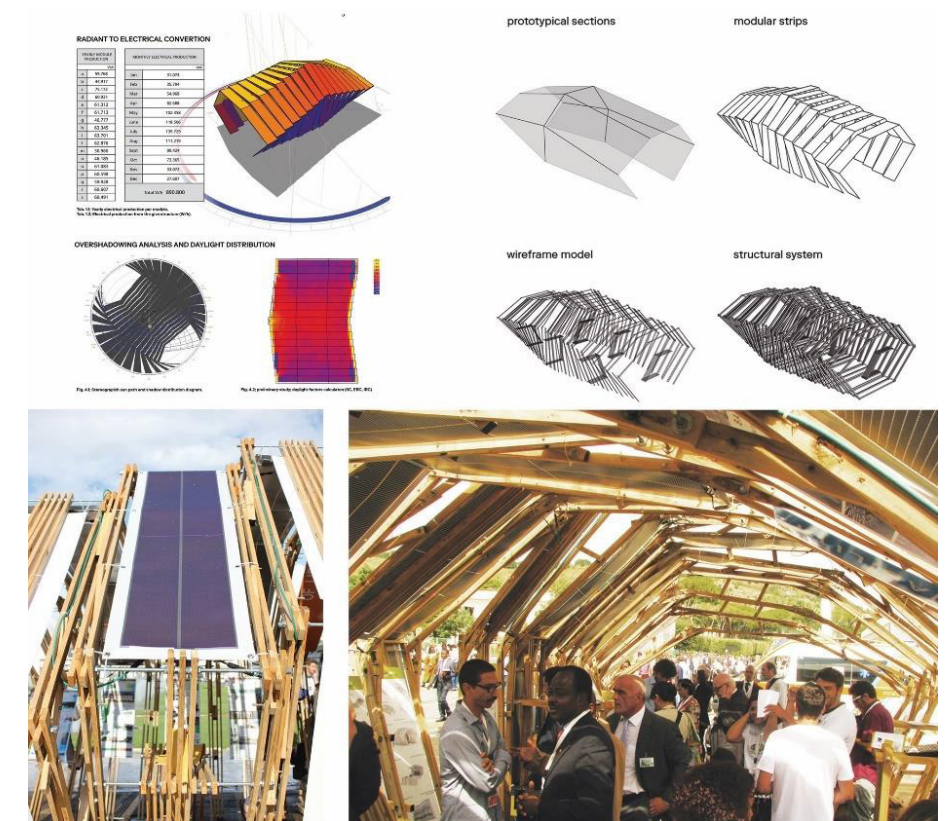


Figure 1:
Smart shell World Urban
Forum (UN-Habitat) /
CODESIGNLAB

The construction system is conceived to develop a circular economy approach and to be entirely realised with local material systems, easy to assemble, customise and replicate. Therefore, the design and fabrication processes were developed in Cameroon through a number of training programmes with local students, craftsmen and partners to evolve indigenous technologies. The project follows some local vernacular bioclimatic principles on passive ventilation to minimise the use of air-conditioned, taking advantage of the local solar radiation dynamics to produce energy out of renewable sources. The off-grid strategy is combining different strategies: the roof is conceived for both collecting rainwater and producing solar energy with affordable photovoltaics, and the façade system is designed as an ecological skin providing passive cooling ventilation for such hot and humid tropical climates. This responds to different informal spatial configurations and users’ needs by processing natural material systems available on site such as wood, ceramics and bamboo.

In year 2020 we have started to develop a similar environmental design approach for another public building typology, the Cultural Hub in Douala. The project was financed by the AICS Italian Agency for International Cooperation; the building project came from a series of self-production workshops for and with the local communities. Working with an evolutionary approach to the traditional techniques and designing work tools to transform raw materials on site.

First of all, we built a fabrication laboratory to process the raw materials through CNC and 3d printing and traditional tools. Local communities of artisans, artists and engineering students work together in our laboratories with different ages and backgrounds, and we include them in the design building. This long process results in a courtyard building designed to breathe and dynamically respond to the climatic issues in the monsoon climate region. The multifunctional building is an urban infrastructure that includes a system of recycled water from the rain and a PV roof system to produce energy from the sun. Furthermore, the facade improved the ventilation inside the building and was self-constructed in our laboratory.



Figure 2:
African Fabbers House /
CODESIGNALB
(bottom right picture by
Francis Tiemni Ongong)

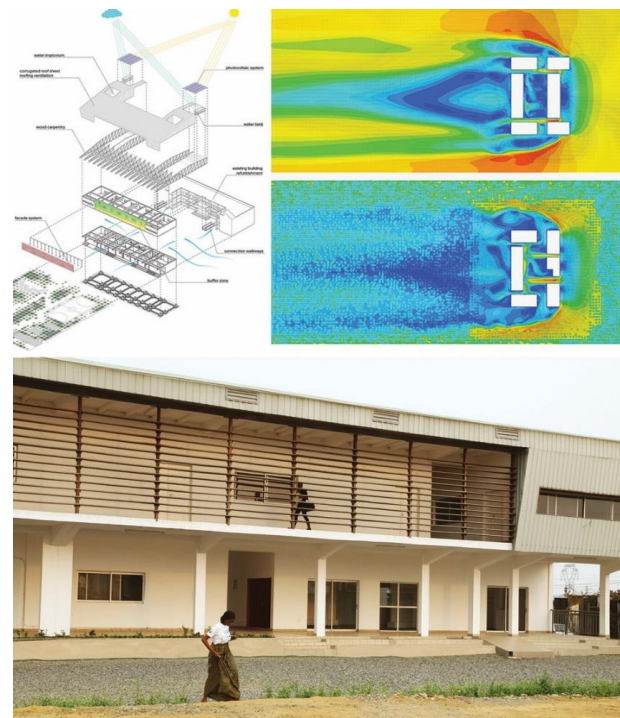


Figure 3:
Cultural Hub Douala /
CODESIGNALB (bottom
picture by Dione Roach)

2.3. OFF-GRID ARCHITECTURAL COMPONENTS

The design and research are also applied at the scale of the architectural component, through an off-grid strategy with the idea of producing or performing for the building.

2.4. CERAMICA PERFORMATIVA

The project explores in an innovative way the relation between computational design, digital fabrication and natural semi-fluid material systems for a performative architecture. The result of such applied research on architectural fabrication and ceramic structural skins generates a porous wall that is able to modulate daylight and natural ventilation. The main goal of such experimentation is to develop a sort of water reuse system to improve the thermal building performances. Therefore, the inner cavities are designed for water circulation, creating an evaporative cooling dynamic in order to regulate thermal comfort performances and improve air quality.



Figure 4:
Ceramica performativa /
CODESIGNALB

3. TEACHING

We applied the research methodology on this topic in many experiences, here is illustrated the Paolo Cascone Masterclass at the ASA - Advanced School of Architecture (2022, Polytechnic of Milan) directed by Prof. Pierre-Alain Croset.

The Master Class at the Politecnico di Milano tested different social and climatic contexts selected by the 20 international students split into four group works. The methodology applies an integrated design approach, developed through digital environmental simulations and physical prototypes, to generate a catalogue of site-specific productive housing solutions based on the following key concepts:

1. Social scenario and housing diversified typologies:

- The housing unit typologies will have to be affordable and respond to the spatial needs of different users, including students, disadvantaged people, migrants, etc.
- The housing cluster would need to be assembled with the aim to generate mixed use programmes and shared facilities. Such social and programmatic mixity will balance the energy needs.

2. Climate and off-grid strategy:

The local climatic context informs site specific off-grid strategy according to the environmental micro-climatic analysis also in relation to local vernacular bioclimatic solutions:

- passive: thermal insulation/passive ventilation/daylight,
- active: renewable energy /water and sanitation.

3. Circularity and material systems:

- Local climate will inform the selection of main construction materials: natural and recycled. The kind of material and its physical properties will change according to what is available onsite in relation to the different climatic regions
- By selecting the different kinds of material, designers have to take into account its embodied carbon with the aim to minimise greenhouse gas emissions for the whole process.

4. Building components and ecological construction systems:

- The building components' dimensions would be related to the chosen material system; its thickness could change according to different strategies.
- The construction and assembly systems will change according to different strategies in relation to the interaction between digital manufacturing technologies and local techniques.
- The construction system could be made by a primary and secondary structure and will have to be easy to mantle and dismantle onsite.

5. Smart prefabrication and mass customisation:

- The design composition has to develop catalogues of possible variations at different scales: building component/panel variation (perforations, joints, etc.), housing units' variations, cluster variations with more units assembled horizontally and vertically,
- Each configuration has to provide an incremental strategy explaining the project's possible spatial and volumetric evolution over time.

The result of this engaging master class was shown in a final exhibition with models and drawings collected in a booklet with all the students' projects. We are developing forward this climate sensitive teaching methodology within a Prototype Fabrication and Testing approach also in the MSc and the BSc courses on Architecture and Environmental Design that we are leading at the University of Westminster.

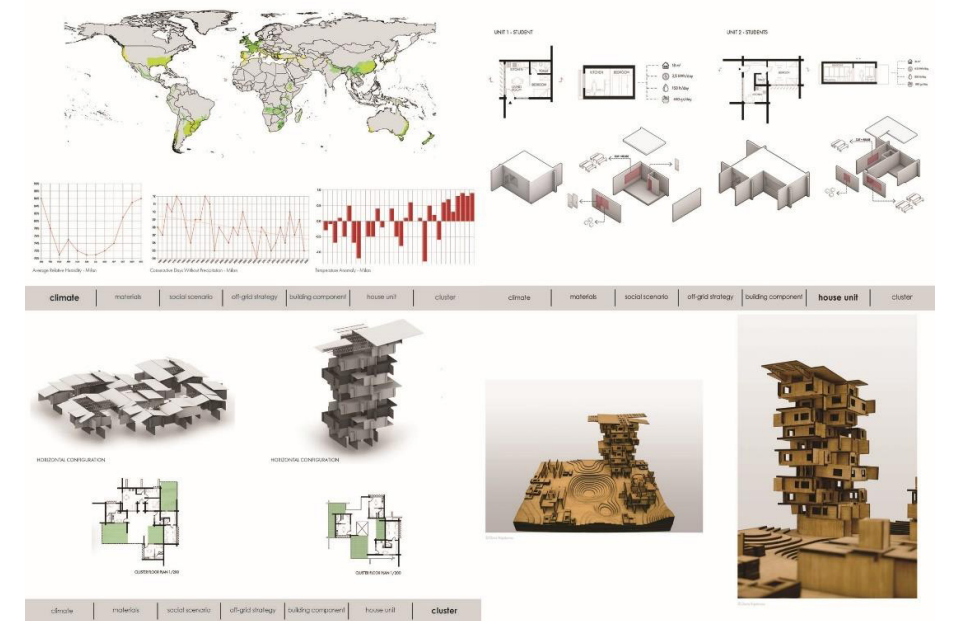


Figure 5:
ASA-politecnico di Milano,
Masterclass P. Cascone 2022.
Temperate climate Milan –
Italy. (Students: Ara Ibrahim,
Alice Miloni, Nehir Özdemir
Selin Yavuz , Andrea Di
Tommaso, Gabriele Licciardi)

4. RESEARCH

4.1. AFRICAN OFF-GRID HOUSING

The off-grid design methodology developed in the above-mentioned case studies was evolved and integrated also thanks to the African Off-grid Housing research project (UKRI funded) in the years 2020-2021. The AOH research agenda was based on the idea of producing innovative knowledge that is able to bridge traditional and advanced design strategies as well as construction technologies in response to the need for sustainable and performative housing in Sub-Saharan Africa. The AOH research by design methodology is based on an evolutionary design approach starting from the analytical study of pre-colonial African dwellings. In particular, we have started to associate a series of vernacular examples of Cameroon vernacular architecture (geometry, material systems, etc.). Therefore, the cause-effect relationship between climate and materiality of Cameroonian vernacular architecture has been considered an architectural paradigm to be adapted and modified according to different contexts with similar climatic conditions. The relationship between the process of integration of the existing technological and material heritage with the innovative systems is based on combining a naturally ventilated system made out of natural fibres for the external skin and a thermal mass skin in terracotta for the internal skin of the core. The research has realised a catalogue of housing solutions based on the Environmental parametric design process; the information-based design methodology is developed parametrically.

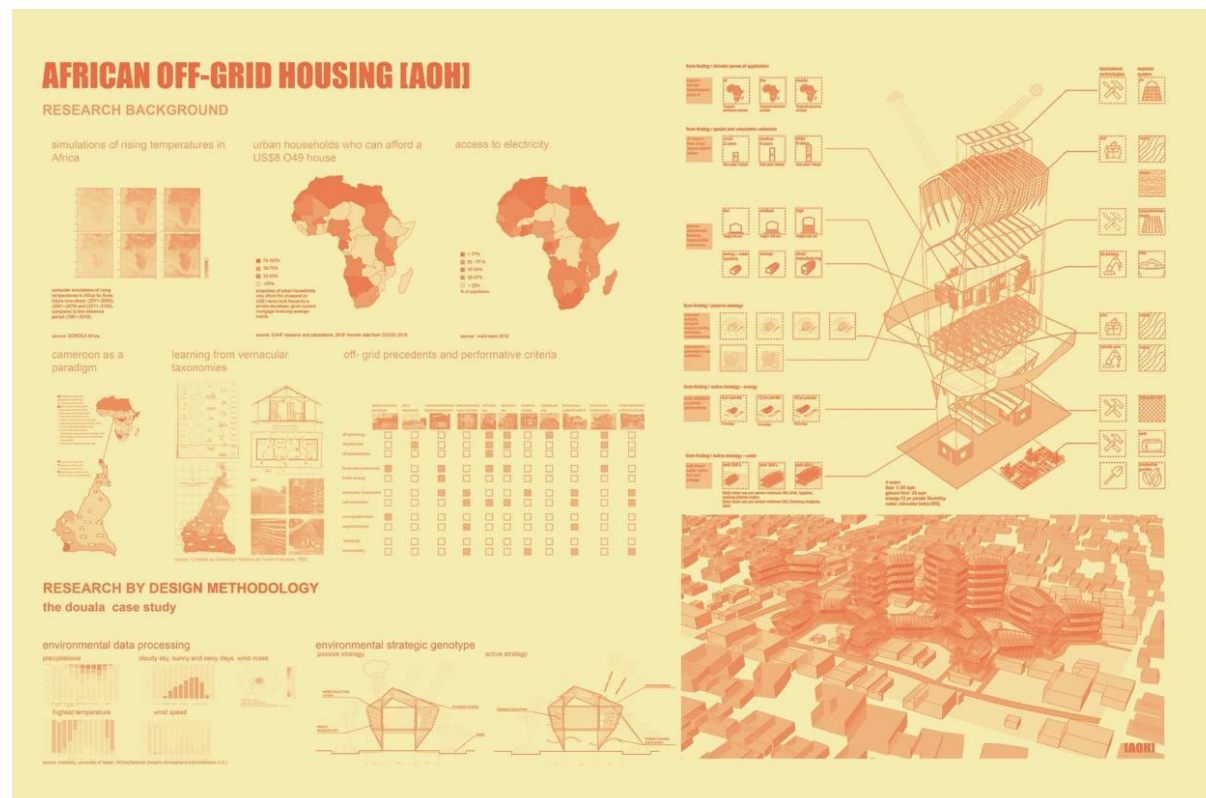


Figure 6: African Off-grid Housing research project /AOH research team

The result of this contextual parametric design process is a catalogue of architectural variations of the initial genotype, providing possible tailor-made solutions to be integrated into informal neighbourhoods and slums.

Furthermore, a bioclimatic strategy with a design focus is conceived as a passive way to minimize energy and water consumption.

The energy strategy is based on the idea of both minimizing the consumption of electricity (for air conditioning, etc.) and providing renewable energy according to the user's needs. With this premise, we have structured our energy parametric modelling based on the site-specific solar radiation analysis on the roof of the house prototype. This is in order to estimate the number of PV panels and localize their best position to achieve such performances. At the same time, we have developed this tool to provide the requested energy according to different possible house orientations for the three different household sizes. Considering the statistics on the heavy precipitation in Douala and the lack of accessibility to clean water.

Therefore, we have integrated a system of rainwater collection from the roof to the tanks underneath the house to be filtered and used for water users' needs.

4.2. RENEWABLE ENERGY PRODUCTION: THE ARCHITECTURAL COMPONENT AS A DEVICE

Thanks to a grant of the QHT we have developed a more focused research project on off-grid architectural components at the University of Westminster. As part of the research-by-design methodology, two building components were developed to produce energy from renewable sources: sun and wind.

The project has involved researcher and PG students of the University of Westminster to design, prototype, test and fabricate both façade components using wasted or recycled materials to develop two productive modules at the scale of 1:1, with a dimension of 60x150 cm.

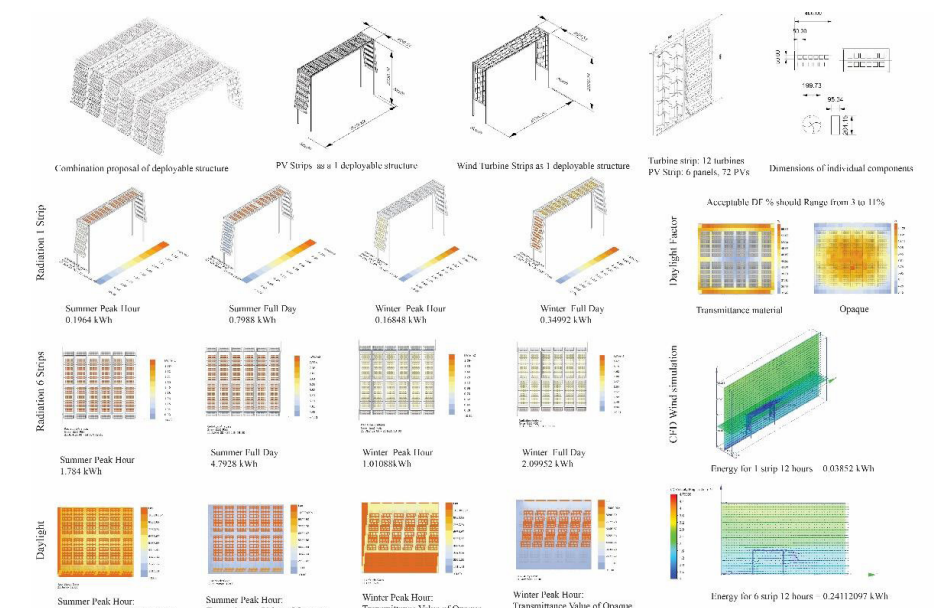


Figure 7: The performance analysis (Images by Anastasia Suzdaltseva and Maddalena Laddaga)

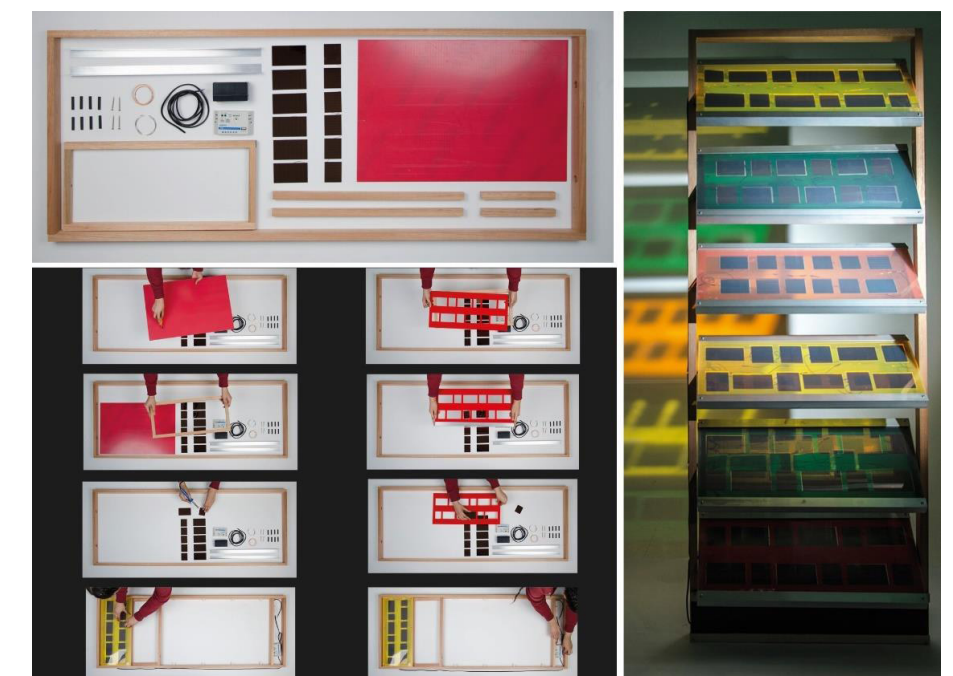


Figure 8: The energy solar component construction kit

4.3. TESTING MATERIAL AND DIFFERENT SHAPES

The design phase was associated with a material testing stage to select the right one, strong enough for outdoor use, to allocate the PV cells for the first module and for the second one to work with the wind and become a wind turbine. Many materials were tested to find the right balance between strongness and lightness, prepared to be tested outside. The component elements are assembled with joints fabricated with CNC and 3d printing.



Figure 9:
The energy wind component
construction kit

4.4. THE SUN COMPONENT

The panels are designed with six small elements as a brise soleil system. The concept is to adapt the module on a building as part of the façade or roof system, working as a brise soleil to produce energy and shadows from the sun. The components work as lighting and heating devices inside the building to improve the building's performance and the user's comfort. Every panel is connected to a circuit and a battery to collect the produced energy; the control panel and the battery are at the bottom of the frame. The system is modular and scalable.

4.5. THE WIND COMPONENT

The component is composed of 12 micro wind turbines that rotate by the wind. The turbines are built with light sheets and bars designed in two turbine columns connected with the timber frame. The two bars are connected at the bottom and with a gears' system to transform the rotation into energy.

The wind generator module was built with a double vertical axis wind turbine connected, through a gearbox, to a motor used as a generator. Regarding the turbine blades, many construction strategies have been tested; the final one is a combination of laser-cut structure and semi-rigid plastic foils.

As a work in progress, the two components are still being tested and monitored, using digital and physical tools, to improve the performance or to build new prototypes. The value of this making experience was combining both the research and educational aspects with a making session with students. The Energy generator modules have been conceptualised as architectural components to be applied to the building system as part of the community energy production system.

5. CONCLUSION

Off-grid architectural solutions offer a pathway towards a more ecological ethic in the field of architecture that prioritises a sharing economy to generate more democratic access to energy and reduce the environmental impact of centralised systems.

As a matter of fact, a new atlas of environmental tectonics is needed to respond to a new generation of householders and citizens ready to develop a shift from consumers to producers. Such an atlas would need an adequate design to build process to fabricate productive components realized by merging different technologies and assembled according to different spatial requirements into one integrated architectural device. To improve such a process, architects and stakeholders would need a more prototypical approach to fabricate and test such devices' performances and scalability. Therefore, the role of applied research will be crucial in the near future to accelerate such transition through physical experimentations in collaboration with the energy and construction industries. Such experimentation would need the creation of interdisciplinary research laboratories involving designers, environmental engineers, economists, etc. Such a change of paradigm will also make users more responsible, allowing them to optimise energy and water and to be independent and conscious about the potential of self-producing and sharing both energy and water in a communitarian system.

6. ACKNOWLEDGEMENTS

The research team would like to express its gratitude to Prof. Harry Charrington, for supporting our proposal for the Global Challenges Research Fund (GCRF) powered by the UKRI. We would also like to thank Arup and Vincent Kitio from UN-Habitat, who helped us a lot with their very useful advice.

The research team would like to thank Prof. Massimiliano Romero (Politecnico di Milano) for their notable contribution to the design, production and testing of the energy components as well as the students involved in the work from the University of Westminster. We would also like to thank the students of Politecnico di Milano and the University of Westminster at ASA, Advanced School of Architecture - Politecnico di Milano for working on off-grid communities during the Paolo Cascone Masterclass 2022; we would also like to thank the director of ASA, Prof. Pierre-Alain Croset. Special thanks also to the QHT for supporting such concrete experimentations and knowledge exchanges.

REFERENCES

- Illich, I. (1974) *Energy and equity*. London: Calder & Boyars.
- Castaño-Rosa, R., Solís-Guzmán, J., Rubio-Bellido, C., Marrero, M. "Towards a multiple-indicator approach to energy poverty in the European Union: A review", *Energy and Buildings* 2019, Volume 193, Pages 36-48, ISSN 0378-7788, <https://doi.org/10.1016/j.enbuild.2019.03.039>.
- European Commission. 2020. *A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives*". Last modified October 14, 2020. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1603122220757&uri=CELEX:52020DC0662>.
- EESC ,2023. *Tackling energy poverty for a just transition*. Last modified July 19, 2023.
- Cascone, P. 2025. *African Fabbers Atalas*. Actar. Barcelona.
- Faiella, I., Lavecchia, L., 2021. *Energy poverty. How can you fight it, if you can't measure it?*, *Energy and Buildings* Volume 233,110692, ISSN 0378-7788, <https://doi.org/10.1016/j.enbuild.2020.110692>.
- EPAH, *Energy Poverty National Indicators Report, 2022*. Energy Poverty Advisory Hub, EU . Available at: https://energy-poverty.ec.europa.eu/system/files/2023-01/EPAH_Energy%20Poverty%20National%20Indicators%20Report_0.pdf (accessed 27 February 2023).
- Jenkins, K. E.H. , Stephens J. C., Reames T. G., Hernández D., 2020. *Towards impactful energy justice research: Transforming the power of academic engagement*, *Energy Research & Social Science*, Volume 67, , 101510, ISSN 2214-6296, <https://doi.org/10.1016/j.erss.2020.101510>
- OIPE ,2020 *La povertà energetica in Italia, Secondo rapporto dell'Osservatorio Italiano sulla Povertà Energetica (OIPE)*, Available at: https://oipeosservatorio.it/wp-content/uploads/2020/12/rapporto2020_v2.pdf (accessed 27 February 2023).

Iaac Advanced
Architecture
Barcelona

.AA ADVANCED
ARCHITECTURE
GROUP

WWW.IAAC.NET

WWW.RESPONSIVECITIES.IAAC.NET

CONTACT OF THE AUTORS

DESIGN & BUILD

PAVILION R44
Hannah Schürmann, Jonathan Hernandez Lopez,
Carl Haufe, Ferhat Kokud and Lucio Blandini
Institute for Lightweight Structures and
Conceptual Design (ILEK) - University of
Stuttgart
hannah.schuermann@ilek.uni-stuttgart.de

KITBASHING APPARATUS IN ARCHITECTURE
Irem Sezer
AIA Virginia
remsezer@gmail.com

DESIGNS FOLLOWS AVAILABILITY IN URBAN
INFORMALITY
Qonita Afnani Firdaus
Institut Teknologi Bandung
qonitaafnani@gmail.com

DESERT FOOD FUTURES
Andrea Macruz¹, Gionata Gatto² and Mirko
Daneluzzo³
¹Tongji University, ²School of the Art Institute
of Chicago, ³Dubai Institute of Design and
Innovation
andrea.macruz@uol.com.br

DECARBONIZE

DECARBONISING WITH CHARCRETE
Nikol Kirova
Institute for Advanced Architecture of Catalonia
(IAAC)
nikol.kirova@iaac.net

INTEGRATIVE HYBRIDITY
Rebeca Duque Estrada^{1,3}, Tzu-Ying Chen^{2,3},
Kalaivanan Amudhan, Laura Marsillo^{1,3},
Samuel Losi, Shirin Shevidi, Jan Knippers^{2,3} and
Achim Menges^{1,3}
¹Institute for Computational Design and
Construction (ICD) - University of Stuttgart,
²Institute of Building Structures and Structural
Design (ITKE) - University of Stuttgart,
³Cluster of Excellence Integrative Computational
Design and Construction for Architecture
(IntCDC) - University of Stuttgart
rebeca.duque@icd.uni-stuttgart.de

UNPACKING CC
Edyta Skiba and Małgorzata Hanzl
Lodz University of Technology
edyta.skiba@dokt.p.lodz.pl

REIMAGINING DECARBONIZATION THROUGH
COUNTER-MAPPING
Erze Dinarama
erzadinarama@gmail.com

REASSEMBLING PARADISE
William Shivers
University of Virginia
wsb3hk@virginia.edu

MAKING DAEGU
John Doyle and Graham Crist
RMIT University
john.doyle@rmit.edu.au

ADAPT TO CLIMATE & PERFORM

TOMATOES, SEA CUCUMBERS, AND AI
Dr. Elisa Fernandez Ramos¹, Andrés Jaque
Ovejero², Eva Hurtado Torán³ and Oz Sahin⁴
¹Escuela Superior de Ingeniería y Tecnología
(ESIT), Universidad Internacional de La
Rioja (UNIR)
²Architecture, Planning and Preservation,
Columbia University
³Escuela de Diseño, Innovación y Tecnología,
Universidad de Diseño, Innovación y
Tecnología (UDIT)
⁴Capability System Centre, UNSW Canberra,
elisafernandezramos.arq@gmail.com

RURAL REGENERATION THROUGH LIVING
SYSTEMS AND SYNTHETIC ECOLOGIES
Laura Guimaraes¹, Mathilde Marengo¹, Ana
Gallego¹ and Erpinio Labrozzi²
¹Institute for Advanced Architecture of Catalonia
(IAAC)
²Politecnico di Milano
laura.guimaraes@iaac.net

PERFORMATIVE ARCHITECTURES FOR OFF-GRID
COMMUNITIES
Paolo Cascone¹ and Maddalena Laddaga²
¹University of Westminster
²Politecnico di Milano, Department of
Architecture and Urban Studies (DASTU)
p.cascone@westminster.ac.uk

REFRONT
Aamlan Mishra, Edmundo Bautista Gonzalez,
Ziyu Wei, Viraj Gavhane, Stefan Bassing and
Marios Tsiliakos
University College London (UCL)
aamlansaswat@gmail.com

BIO-INDICATING MATTER
Jil Berenblum¹, Dana Cupkova¹ and
Robert Heard²
¹Carnegie Mellon School of Architecture
²Carnegie Mellon Material Science and
Engineering
jilberenblum@gmail.com

BIOMATRIX FIELD TEST
Vasily Sitnikov¹, Sahra Khan² and Sara Graf²
¹ETH Zurich, Digital Building Technologies
²ETH Zurich, D-Arch
vasilyisitnikov@gmail.com

ROBOTIC 3D PRINTING OF RECYCLED WOOD
Miran Calmanovici¹, Achiya Livne² and
Shany Barath¹
¹Technion – Israel Institute of Technology
²Ben Gurion University of the Negev
miran.c@campus.technion.ac.il

INTEGRATED SEQUESTRATION
Andreas Koerner^{1,2} and Anete Krista Salmene²
¹University of Innsbruck
²University College London
andreas.koerner.at@gmail.com

DIGITIZE THE PHYSICAL

BIOGENIC DATA-FORMS

Nathanael Myers and Vasiliki Panagiotidou
University College London
nathanaelgregorymyers@gmail.com

PALM BEACH IN REAL TIME

Smaro Katsangelou¹, George Sklivanitis^{1,2,3} and
Dimitris Pados^{1,2}

¹Florida Atlantic University,

²I-SENSE

³Department of Electrical Engineering and
Computer Science
skatsangelou2023@fau.edu

INNOVATIVE COMPOSITE FORMULATIONS FOR THERMAL REGULATION

Roberta Cocci Grifoni, Mohammadjavad
Khodaparast, Chiara Pasqualini and
Graziano Enzo Marchesani
University of Camerino, School of Architecture
and Design "E. Vittoria"
roberta.coccigrifoni@unicam.it

AUXETIC GEOMETRIES IN EARTH-FIBER 3D PRINTING

Penmai Chongtoua, Sherry Aine Te and
Lola Ben-Alon
Columbia University, Graduate School of
Architecture, Planning and
Preservation (GSAPP), Natural Materials Lab
pc2913@columbia.edu

ASSEMBLAGE IS MORE

Chiara Chioni
University of Trento
chiara.chioni@unitn.it

ETHICS & POLICIES

CULTIVATING COMMON GROUND

Seda Zafer-Küçük^{1,2} and Aysen Ciravoğlu¹
¹Yıldız Technical University
²Altinbas University
zaferseda@gmail.com

DEMOCRATIZING DECARBONIZATION

Ymbar I. Polanco Pino¹, Isabel Langlois, Shuchen
Cong, Dr. Greses Perez¹ and Berenice El Gharamti²
¹Department of Civil and Environmental
Engineering, Tufts University
²Monarca Group
ymbarp@gmail.com

WALKWISE

Yichen Lu¹, Chaitali Phulambrikar¹, Deeksha
Kuntoji Onkarappa¹, David Andres Leon¹ and
Gabriella Rossi²
¹Institute for Advanced Architecture of Catalonia,
²Royal Danish Academy, Centre for Information
Technology and Architecture
yichenlu.archi@gmail.com

TECHNOLOGICAL RECONDITIONING

Luís Filgueiras, Samara Braga, Sarah Passos and
Cristina Romcy
University of Fortaleza
luisedufill@gmail.com

SELECTED PROJECTS

THE CHALK INSTITUTE

Henry Aldridge
University College London
henryaldrige28@gmail.com

METROPOL{IA}

Sophie Marandon
Institute For Advanced Architecture of Catalonia,
(IAAC)
so.marandon@gmail.com

ECO-METABOLISTIC ARCHITECTURE

Paul Nicholas, Carl Eppinger, Gabriella Rossi,
Konrad Sonne, Cameron Nelson, Jan Hüls, Ryan
O'Connor, Mette Ramsgaard Thomsen
Royal Danish Academy, Centre for Information
Technology and Architecture (CITA)
paul.nicholas@kglakademi.dk

POST PAPER STUDIO

André Trindade and Davide Onestini
By The End of May
andre@bytheendofmay.com

ROBOTIC SCANNING FOR SUSTAINABLE DECONSTRUCTION

Alexandre Dubor, Yara Tayoun, Huanyu Li and
Marita Georganta
Institute For Advanced Architecture of Catalonia
(IAAC), Robotics Lab
alex@iaac.net

THE N SWADDLE

Parisa Azizi Shamami, Arin Aydogdu and
Kayan Patel
University College London (UCL)
parisa.shamami.23@ucl.ac.uk

BEYONDCORK

Patricia Sveceny, Ekaterina Starovoitova, Gautam
Vohra and Lais Ionna Margiori
Institute For Advanced Architecture of Catalonia
(IAAC)
sveceny.patricia@gmail.com

HONEXT

Eduard Mondéjar
eduard@honextmaterial.com

ENTANGLED DIGITAL TWINS

Clarissa Ribeiro, Cristina Maria Aleme Romcy and
Diego Paim Silveira
University of Sao Paulo (USP)
almeida.clarissa@gmail.com

RE:NEW

Govind Chithrath, Vivek Venkateshappa and
Shuotong Zhang
Institute For Advanced Architecture of Catalonia,
(IAAC)
ar.govindc@gmail.com



Iaac



ADVANCED
ARCHITECTURE
GROUP



Co-funded by
the European Union