CLIMATE CORNER

Highly insulated, floodplain-elevated, demountable biogenic assembly for completely off-grid remote wet laboratory.

Hurricane Island Valley Cove Field Station, OPAL
Photo by David Connover, Compass Light Productions

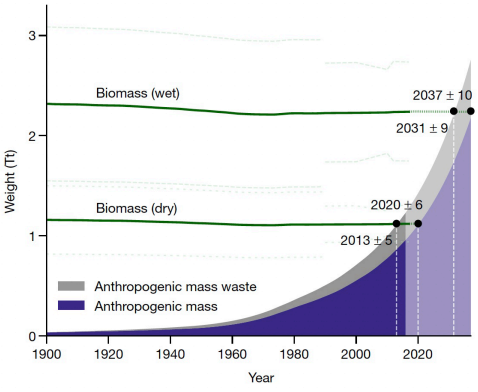
A Resourceful Approach: Sufficiency through Smarter Design

"The ultimate hidden truth of the world is that it is something we make and could just as easily be made differently."[1]

For architects, this idea—that we can make things differently—is what inspires us to practice. As a species, the shelters we design and build are inextricably tied to the ecology, both local and global, that surrounds them. They are ecological tools, allowing us to flourish in all corners of the world. They are our single greatest ecological artifact.

They are drawn from resources—both energy and materials, whether human-made or naturally sourced—and those resources are finite.

While renewable energy and reduced dependence on fossil fuels present an opportunity for abundance, the short-term effort required to extract the necessary materials is immense, and perhaps even impossible, given that the mass of human-made materials has now surpassed that of all natural biomass.[2]



Graph indicating the accelerated growth of human-made biomass in relation to non-human planetary biomass.[2]

But what if we approached design differently?

As designers, we have the capacity to envision a world grounded in resourceful sufficiency. A "just-enough" approach to design is not only efficient and adaptable, it is also equitable and beautiful. A resourceful design ethos calls for fewer materials, simpler operating systems, and the thoughtful reuse of existing buildings. These solutions are crafted to endure, reduce the likelihood of future demolition, simplify maintenance, to be less complicated, and place our clients' well-being at the heart of the design process.

Rethinking Benefit:
Why Using Less is a Great Strategy:

- **Material and Energy Sufficiency as a Design Ethos** – Rather than compensating for excessive consumption with sustainable materials, start with the question: *Can I do nothing? Is reuse an option? Can we design transformative buildings that simply need less?*
- **Resourceful design is equitable** – Design-driven sufficient strategies yield both lower upfront and lower operational costs through simply purchasing fewer materials and less energy.
- **Attractive, healthy, and functional spaces drive sufficiency** – Well-designed buildings that optimize daylight, air movement, and spatial quality reduce reliance on electric lighting, mechanical cooling, and excessive layers of finish materials
- **The Interconnected Impact of Material, Energy, and Space Use** – Every square foot built, every layer added, and every system installed increases the total material resource and energy demand and can complicate the end use.
- **Opportunity to learn from other industries:**

  Apparel & Footwear: Evident in Patagonia's "Worn Wear" marketplace[3] or an emphasis on durable and repairable footwear by Nnormal[4], the contrast between fast fashion and durable, repairable, and second-hand clothing parallels architecture's need to move away from disposable building practices.

  Modular furniture is designed for easy reuse—concepts that architecture can embrace through adaptable buildings and deconstructable assemblies.Focusing on adaptability of program, fewer and simpler materials, and accessible, mechanical connections provides a pathway to circularity.

[1] Graeber, D. (2015). The Utopia of Rules: On Technology, Stupidity, and the Secret Joys of Bureaucracy. Melville House.

[2] Elhacham, E., Ben-Uri, L., Grozovski, J., Bar-On, Y. M., & Milo, R. (2020). Global human-made mass exceeds all living biomass. Nature, 588(7838), 442–444. https://doi.org/10.1038/s41586-020-3010-5

[3] Patagonia. (n.d.). Worn Wear. Patagonia. https://wornwear.patagonia.com/

[4] NNormal. (n.d.). Durability Takes You Places. https://www.nnormal.com/en_ES/content/durability-takes-you-places

AIA

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Design Strategies for Holistic Sufficiency

Concept and Site Strategies

- **Reclaim and adapt instead of rebuilding** – Prioritizing renovation and flexible building strategies extends material lifecycles and minimizes new resource extraction.
- **Design compact, well-Proportioned spaces** – Right-sized buildings, open layouts, and multi-functional spaces reduce overall material and energy needs while improving usability.

Modular living room / guest bedroom provides multi-functional space within a small footprint. OPAL

- **Don't stop at the building(!)** – Limiting "human-only" site footprint and specifying drought-resistant vegetation greatly reduces long-term maintenance requirements.
- **Leverage Passive Performance**– Thoughtful orientation, thermal massing, and proper ventilation naturally regulate indoor conditions, reducing dependence on energy-intensive systems. Integrating vegetation, and shading can reduce thermal loads and material demand while enhancing biophilic benefits for occupants. Certifications such as Passive House and Living Futures can provide frameworks. [5] [6]

[5] Phius. (n.d.). https://www.phius.org
[6] Living Future. (n.d.). https://living-future.org/zero-carbon/

Material and Construction Strategies

- **Material use is linked to cost** – Sufficient assemblies, systems, and buildings are typically cheaper. Designing less lowers upfront costs for our clients.
- **Invest in a good coat** – Energy reducing, well insulated and sealed exterior envelopes will radically reduce expensive, high maintenance, and complex heating, cooling, and control systems.
- **Expose and celebrate structural materials** – Minimizing unnecessary finish layers results in aesthetic, durable, and low-maintenance spaces. Prioritize lower impact structural materials, such as mass timber.
- **Use fewer but better materials** – Opt for durable, versatile materials that provide multiple benefits (e.g., structure + insulation + aesthetics) rather than layered, high-maintenance assemblies.
- **Design for longevity and adaptability** – Simple, repairable, and disassemblable buildings allow for future changes without demolition and waste.
- **Reduce complexity in detailing** – Over-engineered solutions often drive up resource use; streamlined construction techniques can achieve durability and performance with fewer materials.

Measuring and Maintaining Sufficiency

- **Life Cycle Assessments (LCAs)** help evaluate whole-building material efficiency rather than focusing on isolated product impacts. Architects should focus not just on Global Warming Potential in $kgCO_2e/m^2$, but also the total mass of proposed designs.
- **Assessments against numbers of occupants served rather than building area or volume** can help normalize and prioritize necessary emphasis on design that serve larger communities, such as medical facilities.
- **The AIA Framework for Design Excellence** encourages architects to prioritize demand-side solutions by allowing for the reporting in the economy, energy, and resources Measures. Greater weight could be put to the following:

  Overall "new material" mass; further incentivizing adaptive reuse and salvage.

  Global warming potential in the Resources measure should report relative to occupancy in addition to area.

  "Passive survivability" should carry equal weight to full backup power supply when considering the Design For Change measure as it reduces systemic waste and requires fewer resources during emergencies.

Former storage area at the University of Virginia New Cabell Hall became space for students to gather and study with minimal new finishes." Photo by Peter Vanderwarker, Renovation Architect - Goody Clancy

Conclusion

Design appropriate for a rapid drawdown in energy and resource use starts with **resourceful design, not just efficiency**. The best way to reduce environmental impact is to use less from the outset—through intelligent spatial planning, passive strategies, and durable materials. By **designing buildings that simply need less**, the architects can join other industries in providing a model to transform lives and our cultural understanding and expectation for consumption.