

Integrative Design

Integrative design is a whole systems methodology that radically improves resource efficiency. Design itself becomes a scaling vector for rapid change.

Integrative design provides a framework for the optimization of technologies. That includes the order of their implementation. These technologies cover the gamut—everything from insulation to low-friction plumbing, the physical placement of windows, IoT sensors, building materials and even blockchain. Choreographed properly, they can deliver significantly greater benefits than design-as-usual, often at comparable capital costs, and sometimes less. Operational costs are always less, with savings that drop straight to the bottom line.

Since the 1980s efficiency gains helped slash primary energy use in the US by half of projections. In the process, 150 to 200 ppm of carbon were kept out of the atmosphere.

Leveraging efficiency through integrative design is essential for keeping global temperatures from rising more than 1.5° C over the next decade and dodging runaway climate change.

What follows are notes for a project to help bring integrative design into the mainstream. — J. A. Ginsburg

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OCTOBER 2018

According to [a new report from the IPCC](#), the narrow window of time to take meaningful action to prevent runaway climate change is closing fast. There may be as few as a dozen years left to slash emissions and sequester enough carbon to make a difference. After that it may be all but impossible to keep global warming to a comparatively benign 1.5° C rise (above pre-industrial levels). As was bluntly put in the report backgrounder on [Vox](#), “We need every trick in the book.”

[Integrative Design](#) is one of the most powerful “tricks” and yet “isn’t the book” because it is a methodology. It provides a framework that can be used to dramatically increase the impact of energy efficiency—which historically has had more than 30x the impact of renewables in terms of cutting demand for fossil fuels.

Efficiency, turbocharged by integrative design, and combined with renewables, reforestation, regenerative agriculture and circular supply chains can bring us back from the climate brink. Not only can it do so profitably, but in way that helps strengthen economies.

Efficiency unleashes abundance.

Integrative Design is a proposed supplementary text that would take the form of a special edition magazine supported by a robust digital back-end. Its mission: to mainstream the methodology for engineering, architecture and business, practitioners in the field, and policymakers.

BACKGROUND | MISSION | AUDIENCE [p 3](#)

CATEGORIES [p 8](#)

FORM & CONTENT [p 9](#)

SPONSORS | PARTNERS | DISTRIBUTION [p 11](#)

NEXT STEPS | CONTACT [p 12](#)

BACKGROUND | MISSION | AUDIENCE

Factor 10 Engineering (10xE) is a systems approach for radical resource efficiency. Non-engineers may be more familiar with the term “integrative design,”

Efficiency’s impact is often underestimated because the technologies tend to be hidden from sight: in the walls as insulation, engineered into the wiring of LED bulbs, invisible in the molecular structure of smart windows, buried in the ground in heat pumps or even in embedded in financial models such as blockchain.

It is all the more remarkable then to realize that since the 1980s efficiency gains in the US have kept as much as 200 ppm of carbon from entering the atmosphere, dramatically slowing climate change. Efficiency is by far the most effective way to slash reliance on fossil fuels, delivering more than 30x the impact of renewables. The best way to “keep it in the ground” is to start with efficiency.

The economic ramifications have been equally impressive. Primary energy use in the US today is half of what was projected thirty years ago, even though more electronic devices are used than ever. It is worth noting that when those projections were made, personal computers, smart phones and the Internet weren’t part of the equation.

This savings—hundreds of billions of dollars over time—freed up capital that otherwise would have gone toward paying utility bills. This “found money” helped the American economy more than triple in size over this same period. Businesses had more money to invest in innovation, while consumers had more money to spend on...laptops, tablets, smartphones and other everything else.

Also, since the savings dropped to the bottom line, companies that invested in efficiency were better positioned to weather economic downturns. Resource efficiency is an essential part of a thriving economy.

Integrative design is about efficiency at its most efficient, combining technologies that together can deliver exponentially greater savings.

It is most popularly understood in terms of buildings and infrastructure, but the core principals of integrative design—whole systems thinking and multidisciplinary collaboration—generate similarly impressive results in the design of products, processes and services. Efficiencies in one area lead to improvements in others, too, e.g., reduced demand for electricity means less power needs to be generated, reducing costs all through the system. Good begets better.



[click on video to view](#)

The interplay of engineering and economics speaks to the need to include those in charge of budgets in the process: executives, consultants, managers and policymakers.

It took the vision and leadership of an executive named Ray Anderson to re-imagine Interface, turning a fossil fuel-intensive carpet-tile business into one that today develops products capable of *sequestering* carbon. The savings put the company in a stronger financial position, too, which inspired competitors to follow suit. An entire industry was transformed .

The ***Integrative Design*** publication covers engineering challenges and also management solutions.

Risk is another area of focus. In a climate-changing world where extreme weather events and sea level rise present constant threats to infrastructure and supply chains, measuring benefits against business-as-usual baselines no longer works. Integrative design builds in resiliency, a critical competitive advantage that includes designing for change and also for fast recovery in the aftermath of increasingly common billion-dollar weather-related disasters.

The power of integrative design is the bold statement it makes about the possible: that a more prosperous, equitable, abundant, healthy and altogether better world is *still* well within our reach.

The text-as-magazine format is designed not only for next-generation professionals—college students studying engineering, architecture, business and government affairs—but also for practitioners working in the field today.

With decades of data to analyze and a solid track record of successful standards implementation (Passive House, Net Zero, LEED and Energy Star), energy efficiency is no longer an outlier idea. The mission of this project is to help accelerate the scale up by mainstreaming the practice of integrative design.

In addition to developing original content and accessing the vast archives of organizations such as [RMI](#), [PHIUS](#) and [USGBC](#), **Integrative Design** also provides extensive digital bibliographies on the back end: links to reports, articles, books, videos, conferences, trade publications, podcasts, etc. (Re the latter, podcasts have become the new blog, with all sorts of organizations prolifically producing content. For example, the podcast *NeoConversations*, produced by the large, international contract furnishings conference, includes an [in-depth interview about the new Interface headquarters building.](#))

This is a big beat that requires an eclectic approach to cover projects of every size, from all over the world. Sidebars accent case studies with additional insights on everything from financing to new materials. Back-end digital content can be updated without changing QR codes in the magazine.



CATEGORIES

Overview: Lays the groundwork on integrative design, its impact and its potential to scale.

Backgrounders: 400 to 800 word sidebars on renewables, financing, materials science, mobility, logistics, manufacturing and tech.

Case Studies: Construction, infrastructure, product design, manufacturing, mobility, distribution networks, lighting, microgrids, financing. Includes analysis of upstream / downstream impacts (energy demands, supply chains, etc.).

Circular Solutions: Sidebars on recycling (waste heat, CO2 capture, materials, and adjacent topics such as regenerative agriculture).

FORM AND CONTENT

In 2010 RMI produced a series of 10xE case studies packaged as pdfs. They are still posted on the RMI website . Separately, there is also an “RMIQ” video on 10xE on YouTube. Although some of the material is dated, the bigger issue is that it’s hard to find if you don’t know exactly where to look, or what keywords to use.

Integrative Design is a significant expansion of the original concept, re-imagined as a multi-format publication and aggressively marketed for “discoverability.”

The combination of a special edition magazine (easily slides into a backpack) and a robust digital back-end is designed to appeal to college students, a key audience. Heavy textbooks are a non-starter, though print is still popular in formats that are inexpensive and lightweight, such as workbooks and magazines.

Indeed multi-format publications such as MIT’s Technology Review are doubling down on print. The best answer isn’t either/or but all-of-the-above. Print has the advantage for:

- contextual layouts (versus the digital long scroll)
- certain types of graphics
- novel, multi-media applications such as 3D VR
- promotional distribution
- off-grid: no batteries, outlets or connectivity required



SPONSORS PARTNERS | DISTRIBUTION

“Native advertising” involves journalists working with sponsors to produce high-quality content. Over the last few years, it has become a major revenue source for news organizations, including the *News York Times* and *The Atlantic*. The former opened a special marketing unit, T Brand Studio, specifically for this kind of work.

For ***Integrative Design***, native advertising transforms sponsors into partners. Each partner is given a page in the magazine to tell their story about how they have used integrative design in their buildings and businesses. QR codes will link to additional digital content.

Partners will be asked to distribute magazines to their staff and clients, and also facilitate distribution to public libraries.

Although primary distribution will be through academic and professional networks, magazines will also be available on news stands in part serving as “posters” in a campaign to raise public awareness.

The list of potential partners is both broad and deep. In addition to the obvious—AEC companies from Autodesk to Gensler—it includes insurance companies (Zurich, Swiss Re) financial institutions, professional organizations (IEEE, AIA), cities (NY, Chicago, Vancouver) and academic programs (engineering schools, MBA programs, architecture schools).

There are also discounted and in-kind partners whose value is in their networks such as non-profits and conferences.

NEXT STEPS

To bring the vision into tight focus, the next phase includes developing an editorial plan, a production time line, researching costs and budgets, and identifying potential partners.

— Janet Ginsburg
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