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## Paradoxical Efficiencies

### Efficiency and Exorbitance in Architecture

#### Introduction

**“It is obvious that the utilitarian role of an object never completely justifies its form, ... that the object always exceeds its instrumentality. Thus is it possible to discover in every object an irrational residue...”**

**-Caillois**

Efficiency regulates architecture in a multiplicity of forms – witness net to gross ratio's, fast track construction, the aesthetics of the minimal, net zero buildings and mass pre-fabrication to name just a few. There is structural efficiency, spatial efficiency, energy efficiency, material efficiency, and so on. Efficiency is ingrained in the language of architectural discourse. Efficiency is seen as a moral imperative. Efficiency even defines production in the academic studio – how much work in how little time.

More and more, instead of less is more, we want more from less. And perhaps this is as it should be in a world increasingly defined by a sustained crisis of economic and ecological scarcity. However, it is necessary to ask whether a positivist application of efficiency – more often driven by the ruthlessness of market forces than principles of enlightened stewardship – results in an unquestioned privileging of the quantitative over the qualitative. If efficiency is the overriding imperative in a contemporary culture predicated on the bottom line – on ever faster and cheaper – then what is lost and what is gained in the exchange? Whereas the Taylorization of labor and mass production were considered unambiguous advancements at the beginning of the 20th century, they also reveal the double-edged nature of efficiency. The streamlining of work flows intended to minimize drudgery often compounded it – necessitating new forms of control and devaluing the individual worker. At the same time, the rise of industrialized production stimulated the consumption of a proliferating array of disposable goods, magnifying the depletion of resources and the generation of waste.

But what if efficiency itself was interpreted as a paradox? If efficiency entails the coupling of any maximum to any minimum, then how might a reconsideration of efficiency become conceptually generative rather than restrictive? This studio will be driven by a critical re-evaluation of notions of efficiency in architecture – recognizing that every efficiency paradoxically implies a corresponding excess, exorbitance or waste. Efficiency of movement implies a surplus of circulation, optimization of daylight might generate a superabundance of apertures, efficiency of structural footprint might create an extreme density of structural members and so forth. This coupling of efficiency to its opposite creates a fertile contradiction – an irrational residue – that can be used to hijack a narrow functionalist conception of efficiency. In an era of performance-driven optimization, we will pursue extreme, perverse, or satirical efficiencies as a means of generating new programmatic and spatial opportunities. If the value of architecture exists to the precise degree that it transcends the strictly utilitarian, then we will seek the point at which efficiency folds back on itself, to the point where it generates a productive exorbitance.

**Background:**

An early critique of efficiency can be found in William Jevons 'The Coal Question' from 1865, an appraisal of Britain's coal-based iron industry. Jevons contended that, contrary to intuition, an increase in technological efficiency results not in the conservation of resources but rather in their accelerated depletion: stimulating demand and increasing use. The Jevons paradox, as it is now known, can be found in a wide variety of disparate phenomenon. For example, over the course of the last 25 years the efficiency of air conditioning in the U.S. has improved by more than 30%. However, rather than reducing consumption, energy use for cooling has nearly doubled over that same time period. Today, despite ever more stringent codes we use more electricity to air condition our buildings than the sum total of all electrical use at midcentury. At a minimum, such phenomena call into question a simplistic understanding of efficiency and point to the way that economies of scarcity are often implicated within systems of overproduction and obsolescence.

At least since the emergence of modernism however, the valorization of efficiency within architecture has been virtually complete: from Mies' famous dictum to Le Corbusier's *machines for living in*, from the aesthetics of structural optimization to the streamlining of transportation flows in the multi-layered networks of contemporary cities. Principles of efficiency gradually permeated every facet of architectural production, encompassing both the application of scientific management to the intimate spaces of the home and the standardization of the American building industry in the aftermath of World War II. Emblematic of this imperative toward efficiency, the repetitive floor plate building provided a means for both accelerating construction and maximizing the financial return on limited plots of urban land. Aligning perfectly with the demands of capital, the development of the Chicago Frame and Domino system prefigured a sectional efficiency that threatened to cancel out the very potentials of section as an architectural technique, relegating the vertical elaboration of buildings to the ad nauseum repetition of generic space. Paradoxically, however, the very limitation presented by the standardized stacked section provoked a proliferation of invention, from variations in height to complexly sheared, perforated and inclined assemblies that reasserted a diversity of spatial strategies and effects. Simultaneously accepting and diverting the logics of the stack, these techniques demonstrate the potentials of an imaginative engagement with efficiency.

Today, we see a resurgence in ideas of efficiency as new forms of computation promise the optimization of performance as a driver of architectural form. Mass customization and bespoke manufacturing processes seek to further speed and individualize production – increasing temporal and material economies. Meanwhile, the focus on sustainability reasserts the ethical necessity of conserving resources and minimizing energy consumption – spawning an entire architectural sub-industry predicated on new standards of environmental efficiency. At the same time, the bulk of building is subject to market driven formulas– generating a taxonomy of building types – from micro-hotels to big box stores, from automated parking structures to just-in-time distribution centers – typically outside of the purview of architects. This studio will examine the multiple forms that efficiency takes in contemporary architecture, analyzing its role in current practices in order to gen-

erate alternative tactics and speculations.

**Process:**

An example of the unpredictable consequences of efficiency can be found in Invernizzi's Villa Girasole, built just outside of Verona in 1935. Here a simple imperative – to maximize exposure to daylight – produces an intricate series of decisions resulting in an exorbitant though not illogical whole. In order to maintain optimal solar orientation during the course of the day, the house rotates on a massive landscape turntable supported by fifteen train wheels driven by a series of low horsepower motors. This mechanical contrivance triggers a series of repurcussive effects: the house is split in two – a spinning machine-like top over a solid masonry base- connected by a revolving circular stair and elevator core which combines vertical ascent and rotational motion. In the rotating portion of the house, domestic features are distorted according to the demands of mobility – plumbing is connected to tanks slung from the underbelly of the house, while furniture and cabinetry are absorbed into the walls. Conventional distinctions between front, back and side yards no longer apply as the house continually changes it's relation to the surrounding landscape. Doors may open onto different locations at different times of day and the sun can rise and fall in a single window, freezing shadows and warping the perception of time. Eminently logical given the initial premise, Villa Girasole demonstrates the pursuit of rational trajectories extrapolated to the point that they render a precipitate of unanticipated architectural effects.

While taking seriously the conservation of energetic and material resources that underwrite impulses toward efficiency, we will deploy a paradoxical understanding of efficiency to generate precise architectural proposals. This process will be governed by three interrelated constraints: 1.) the isolation of a specific category of efficiency, 2.) the selection of a programmatic type and 3.) the limits of a physical site located within New York City. In these speculations, efficiency will be shadowed by its opposite in the form of the excessive, the residual, and the wasteful. Rather than seeking the elimination of these negative terms, we will leverage them to challenge dominant narratives of optimization, catalyzing unforeseen couplings of form and program, function and inhabitation; opening up new, imaginative potentials within the rationalized spaces of contemporary systems.