

# Everything must Scale

Architecture at the dawn of the autonomous factory.

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Graduate School of Architecture, Planning and Preservation  
Arch 4105 / FALL 2018

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GSAPP <https://bit.ly/2nW6mCQ>  
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**Studio Site** **TRIC: Tahoe Reno Industrial Center** / 12 Miles fronting I-80 the Lincoln Highway <http://tahoereno.com/>  
TRIC encompasses 107,000 acres / 167 sq. miles. \*\* This equals 54% of New York City.

**Programming** *Energy Station: electric charging station for trucks/automobiles with food, retail, showers and short-term hotel for transit.*

**Research** Travel for Site Visit + workshops @  
**Xerox Parc, Palo Alto** <https://www.parc.com/>  
**Stanford University**  
**Archeology Center / d School:** Professor Michael Shanks <http://www.mshanks.com/>  
**Center for Design Research, Engineering;** Professor Larry Leifer <https://stanford.io/2EYsKXa>

## Abstract

As the Nevada desert expanse emerges on the eastern outskirts of Reno our studio will explore architecture's capacity in a landscape characterized by natural formations and newly immense technological/commercial outpost that hybridizes Silicon Valley and advanced manufacturing. The studio confronts the *near* placeless automated factories and aspiring "lights out" manufacturing and data centers of Google, Tesla, Switch and Blockchains LLC.

The studio site is within the 167 sq. miles, 107,000 acres TRIC development and desert adjacent the nation's first trans-continental highway, US I-80 – Lincoln Highway.



While emerging technologies drive the real-estate development the topology of the vast interiority of the industrial concerns coupled with the enveloping expanse of desert beyond recalls an entire genre of art that had taken the western deserts as their spatial genesis. Our studio will seek to understand the current site and its technological / financial basis while also re-exploring key works from art and architectural history that were based in issues of scale, and perception of immense scale. In particular how a *small* work of art or architecture becomes a lever on immense spaces.

## The City and the Autonomous Factory

As new forms of industrial and urban development take shape in the context of Internet based commerce and retail; electric and

possibly autonomous mobility; artificial intelligence, machine learning and robotic labor; and a rapid increase in local renewable energy production where and how we live and work are changing. The breadth and layering of technological change that are converging escape disciplinary boundaries and now deeply affect how we organize cities, social life, economic activity and increasingly settlement and architecture. We long ago reached the limits of the software economy and are instead deep into a new version of the "valleys" mantra of scale; one that is becoming newly enmeshed with material, with architectural space and human experience, and one that might have architectural forerunners in the art of the 1970's earthworks. This new desert occupation east of Reno portends a newly robotic factory – a world apart from public spaces of all kinds but one that nonetheless demands a class of human workers who have full or part time residency.

There is a clear evidence of a new form of territory emerging: a zone where work (and post-work) and domestic consumption (of all kinds) are for most of the population un-anchored and increasingly (if not severely segregate) from manufacturing and the physical-social aspects of retail space. Today Amazon runs more than 120 fulfillment and sorting centers in the United States and as of 2017 operated out of more than 240 million sq. feet of offices, warehouses and data centers. Their expansion of their real estate footprint has been in part fueled by the acquisition of Whole Foods creating a new presence in the everyday life of people and blurring the boundary between net-based commerce and the physical architectural world. The wider physical presences of Internet based commerce is by its very nature often hidden and private – indeed often based in a cartography divorced from historical forms of urban settlement and realized in distant relation to urban centers of the past. How the net meets the existing urban

world is no longer a nascent matter – it is at immense scale. TRIC dwarfs the scale and its urban partner Reno.



### Hiding in Plain Sight

Our studio site is based at an emerging, remote and yet *hidden in plain sight* (anti) epicenter of this form of development. An immense but also deeply private business park.

At the **Tahoe Reno Industrial Center** we will explore how new forms of industrial interiority, newly automated sorting stations, data centers and advanced manufacturing, increasingly place new economy jobs and housing needs on the outskirts of even the extended suburbs and sprawl of past half century. While some of the companies are well known (Amazon, Tesla Giga Factory, Wal-Mart.) others are less known yet increasingly based in the matrix of the new remote developments.

The studio will investigate this as an architectural prompt – a new mode of architectural plastic space and experience.

Trade, commerce, fields of economic geography and technological or industrial change are not new to cities, but what is new in this era is a question of scale – both literal scale such as that of measure, but also in terms of the rapid expansion of a new product or technique. Scale as the key denominator in industrial development and product marketing is here also driven by the deep integration of Internet based logistics, automation, communications and data processing.

Taken as a whole, Amazon is one indicator of the emerging conflation of the Internet and urbanism – a reorganization of social relations of all kinds and in any number of extrapolated indices. The wider picture of a burgeoning disruption of the economy has a deep well of scholars and analyst, but the issues of scale and new visible urban impacts breach a threshold of everyday experience – we see side effects of change before us even when the drivers are hidden as it is in an Amazon warehouse or data center.

Our studio will take on a site and program at the center of this evolution as a test case.

The site is a transit vector -- one of the earlier and still most important national highways. We will look at two forms of transit stops, for passenger cars and trucks. Both are being redefined in the new internet/physical nexus—to electric and possibly autonomous mobility and shipping.

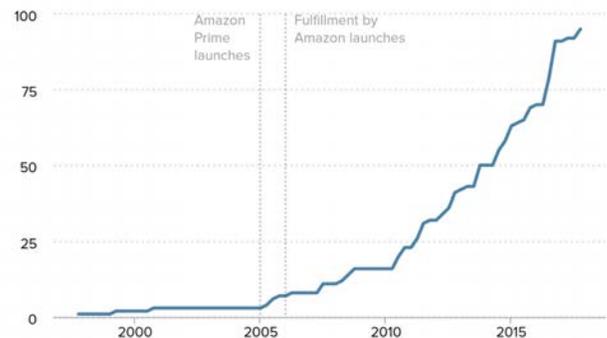
Our focus will look towards new themes and mechanics of scale (in business models, in commerce, in geography +) and what remains or is newly possible in terms of architectural plasticity and human spatial experience in this realm.

### Data Things

Amazon sells things and data services. While this may indeed be an era where manufacturing, distribution and consumption are more tightly woven it is an era that will increasingly rely less on stores, or retail and be less engaged with all form of intermediary between consumer and maker. This trajectory as it is portrayed to date upends a near century of suburbanization that gave rise to a single family house (79 million in the United States) that was supplied by a Venn diagram of retail spaces, schools, churches and public parks, fire houses – architectural and social spaces the were between the home and the work place.

Do remote distribution and manufacturing sites such as TRIC portends a world of home and office. With little in between?

**Total number of Amazon fulfillment centers**  
Cumulative openings, 1997–2017



Source: Fulfillment center opening dates compiled from Avalara ("Amazon Fulfillment Center Locations," accessed October 2017), Guided Imports ("The Complete List of Every Amazon Warehouse and Distribution Center in the World," last updated April 2017) and MWPVL International ("Amazon Global Fulfillment Center Network," accessed October 2017).

The United States means of Distribution and Consumption is Changing (fast).

Amazon.com fulfillment centers

We find ourselves in a world where the intermediary of shipping and manufacturing are seemingly increasing disconnected from settlement patterns.

### Amazon Is Changing the Labor Market

As shoppers shift more of their spending from stores to websites, department store jobs once spread around the country are being replaced by warehouse jobs in fewer locations.

● = Amazon warehousing facility<sup>1</sup>    ● = Recently closed KMart, J.C. Penney, Macy's or Sears<sup>2</sup>



1 — Includes announced Amazon warehouses  
2 — Includes all announced closings for 2017  
Sources: Amazon, JCPenny's, Macy's, Sears

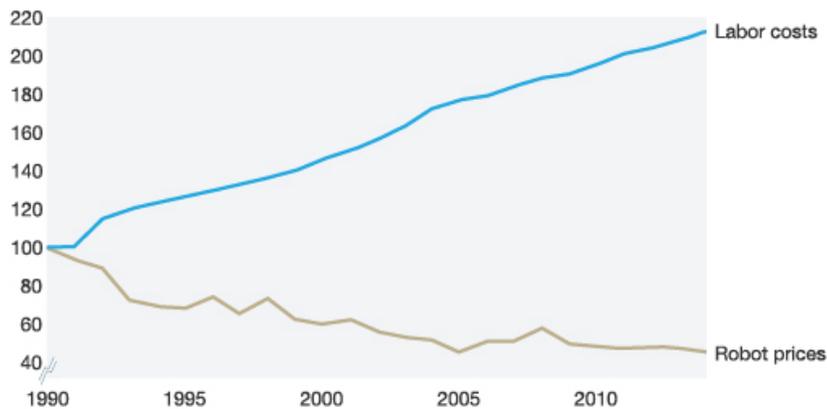


## A Digital – Industrial – Robotic Desert



### Cost of automation

Index of average robot prices and labor compensation in manufacturing in United States, 1990 = 100%



Source: Economist Intelligence Unit; IMB; Institut für Arbeitsmarkt- und Berufsforschung; International Robot Federation; US Social Security data; McKinsey analysis

We are not seeing the first installment of advanced industry in desert landscape. The aerospace and defense industries have been based in the desert regions of California, Nevada, Arizona and New Mexico for a century. The Tahoe-Reno industrial development is at its outset not based in overt defense or the mechanics/physics of aerospace, but instead hosts private logistics centers and data centers and aspiring autonomous manufacturing. Four hours northeast of Silicon Valley they form a structure for *perpetual delivery* — a distant means to sustain residential life without the Venn diagram of retail or other “social spaces.” If the suburban matrix of home/retail/work spaces further collapses into home/work — as consumption commerce architecturally disappears we are left with a form of private domestic space and another of workspace that is likely more private (if not autonomous). Does work become less reliant on place and geographic locations that historically drove industry (to a river, a bay, a lake—to ice in the Great Lakes as a cooling means or food stabilizer)? Does housing continue to follow industry to remote locations where land is cheap and indeed barely part of the logistics save for privacy concerns? The Tahoe Reno Industrial Center coalesces around lower cost robotics and forms of digitally scaled commerce — yet it also converges with the hardware of the past century: highways, trucking, railroads and warehousing.



Master of Scale, Pod Cast by Reid Hoffmann, founder LinkedIn.

Site: Instant Permitting – 12 Miles of I-80



Here are our competitive advantages that no one in the United States can match:

- > The vast majority of industrial **uses are pre-approved**; rarely are special use permits ever required
- > **Grading permits** issued within **7 days** of application
- > **Building permits** issued within **30 days** of application  
Yes, you read that right! Just imagine, you could have your site graded, built and open for business within 180 days following close of escrow.
- > **Roads** and all **utilities** (power, gas, fiber, water, wastewater, reclaimed water) are in place and built for industrial capacity



- > A Berkshire Hathaway owned **power plant** is in the park with a capacity of 1100 megawatts
- > Ample **water rights** secured and banked
- > 12 Miles of dedicated frontage on the **I-80 corridor** and Union Pacific Intercontinental **rail line**, which is the central logistics corridor to and from the east coast
- > Located in Nevada where there is **ZERO state income tax!**
- > All land in the development is **owned free and clear**

Home to the Tesla Gigafactory . . . the Switch/Supernap data storage campus . . . and soon the Google data storage campus.



## Studio Programming

Our program is broad and also specific. We will study the Tahoe Reno Industrial Center and the nature of the companies who form its economy and industrial technologies. Our focus at the architectural scale will be a specific new form of a re-fueling stop, lodging for travelers and some form of commerce and social space and programming. Our initial studies will focus on the future of re-fueling stations for trucks and cars - for professional drivers and individuals and families.

One example we will study in depth - the Flying J truck stops: recently Berkshire Hathaway has purchased a controlling interest in the national chain of outlets anticipating their reinvention.

### Giving shape to the new Industrial Economy: Berkshire Hathaway has increasingly moved into holding that essential resemble the United States economy:

- Berkshire Hathaway purchases majority interest in Pilot Flying J truck stops.

*Pilot Flying J has more than 750 locations in 44 U.S. states and Canada selling gas, diesel fuel, and convenience goods, and offering trucks more than 70,000 parking spaces and 5,000 diesel lanes.*

*While terms for Tuesday's transaction were not disclosed, Pilot Flying J is 15th-largest private company in the United States, with annual sales of \$19.6 billion, Forbes magazine said. The family-run company employs more than 27,000 people.*

<https://reut.rs/2zzPTJP>

- Berkshire Hathaway purchases Precision Cast Parts

*Warren Buffett is paying a hefty price for the biggest bet of his career as his Berkshire Hathaway Inc. (BRK.a.N) has agreed to buy Precision Castparts Corp PCP.N, valuing the maker of aerospace and other parts at \$32.3 billion.*

*The purchase is Berkshire's largest, and accelerates its transformation from a company largely dependent on insurance businesses into one resembling the broader U.S. economy, including a railroad, several industrial companies, utilities, a car dealership and consumer goods businesses.*

*The merger eclipses Omaha, Nebraska-based Berkshire's \$26.5 billion purchase in 2010 of the 77.4 percent of the Burlington Northern Santa Fe railroad that it did not already own.*

<https://reut.rs/2w2kHSX>

Programming needs: pragmatic

### Energy Source: power generation.

- Fuel for Truck Stop
- Fuel for automobiles

### Travels Rest Stop

- Restaurant
- Shopping

### Hospitality

- Showers
- Rooms / Hotel
- Meeting rooms

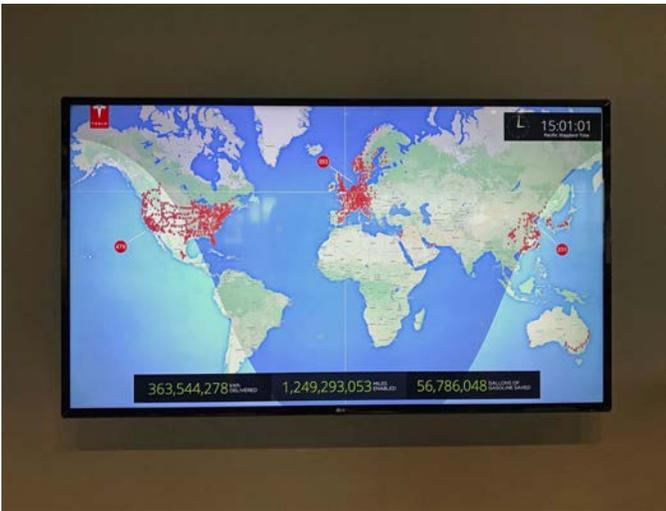


**Prototype Site:** Private Fueling Station / Rest Stop

Today: Kettleman City, California, Tesla Supercharger: *The gas station becomes an airport private lounge.*



Rending / Model available @ Turbo Squid.



The customer is an advocate in global energy monitoring.

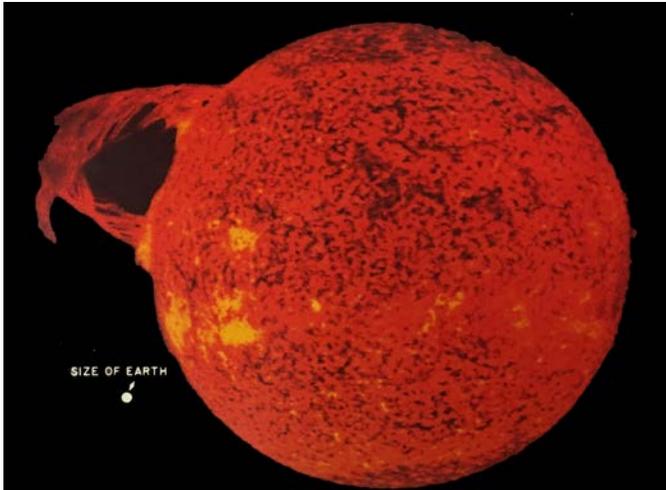


A former fast-food franchise becomes an elite “energy” lounge. Safety, privacy, security – with ownership and transit.



Rending / Model available @ Turbo Squid.

0 - Energy Site: DESIGNING ENERGY (post scarcity)



“Unique electronic photograph of the sun in the extreme ultraviolet radiation from ionized helium (304 angstrom wavelength) taken 19 December 1973 by the Naval Research Laboratory’s spectroheliograph aboard Skylab. The massiveness of the sun and its eruption is indicated by the comparison of it to the size of the earth. Theoretically, if it were possible to harness the energy of this eruption, it would have provided for all of mankind’s power needs for the year 1 A.D. to the present – perhaps the next 2000 years

8 minutes from the Sun

Solar energy from the sun reaches the earth’s surface in 8 minutes. Fossil fuels, oil and gas form over 250 – 350 million years. How do we imagine the 8-minutes as architecture?

Anyone involved in sustainability and energy knows these measurements and has long sought a transformation of our energy regimes. Whatever the goals the compensatory challenges have seemed intractably staged to stop change (and thus stage environmental calls for change as “revolts”). Blocking sustainability has been market based; there is too much easy money to make in the old energy regimes, too many assets based in fossil fuel protocols, too many stakeholders dedicated to the past. Whatever the source energy expenditures, as we know, are bound to the very nature of modern life. Divided into nomenclatures of housing / office / retail or mobility / production / leisure. Embedded or transitory. Communications and (solid-state) electronics (chips / transistors and batteries). Energy is our basis and every move removes something from the earth and re-releases it into the literal and social atmosphere. If sustainability has been an ethical question we may concern ourselves with doing the right thing; if sustainability is a matter of survival, we had better find a path. Ethics tied to every step—*anxiety and conflict*. At the moment, however, most of us cannot stop moving or consuming. *Anxiety and conflict* have often been sustenance of sustainability debates, yet, today, the global turn to renewable energy is not only mature but also perhaps bound to cause more change than we are prepared to imagine. Will a deep implementation of a renewable

energy economy shore up old assets (houses, cars, offices et all) or will possibly instigate entirely new asset classes?

The economy of the past century dramatically reduced and induced scarcity of all kinds; from food to housing; fuel to land; education to medicine. It simultaneously opened immense branches of low cost communication and global communication.

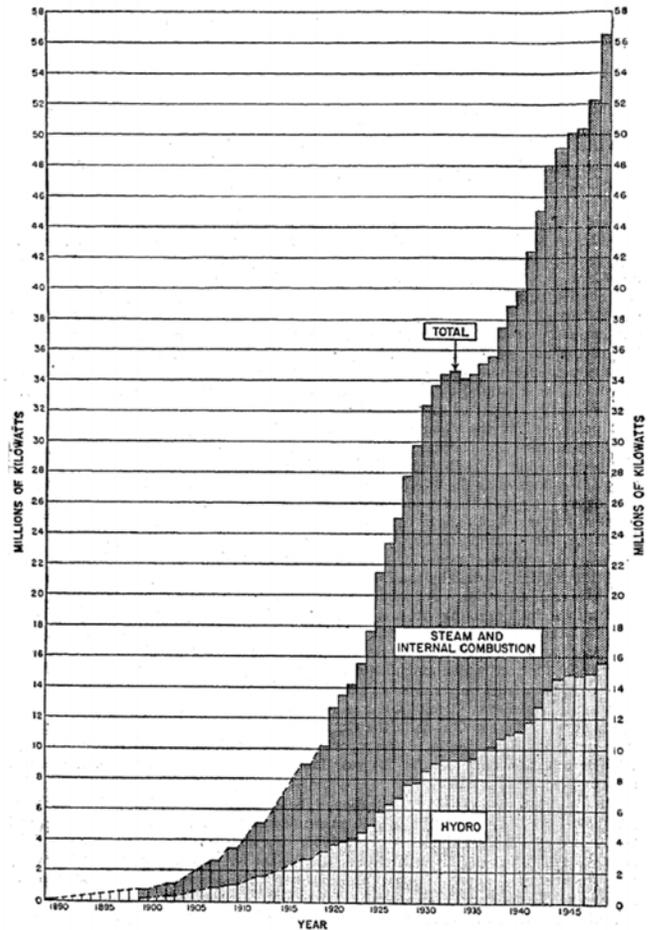
How will the new renewable energy means meet new forms of intelligence, new networks for trade—they will allow us and reallocate energy as we have known it this past century.

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POWER

FIGURE R.—INSTALLED CAPACITY OF ELECTRIC UTILITY GENERATING PLANTS IN THE UNITED STATES: 1889 TO 1948

[See table 356]



Source: Federal Power Commission.

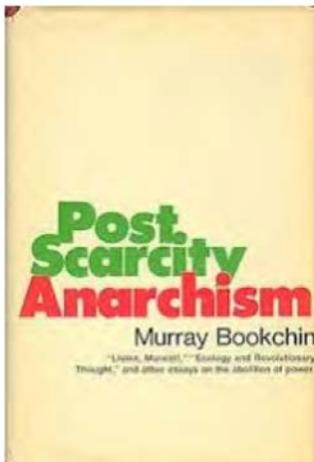
Above: the rise of eclectic power in the United States and the means of generating it.

## THE REDEMPTIVE DIALECTIC

Is there a redemptive dialectic that can guide the social development in the direction of an anarchic society where people will attain full control over their daily lives? Or does the social dialectic come to an end with capitalism, its possibilities sealed off by the use of a highly advanced technology for repressive and co-optative purposes?

We must learn here from the limits of Marxism, a project which, understandably in a period of material scarcity, anchored the social dialectic and the contradictions of capitalism in the economic realm. Marx, it has been emphasized, examined the *preconditions for* liberation, not the *conditions of* liberation. The Marxian critique is rooted in the past, in the era of material want and relatively limited technological development. Even its humanistic theory of alienation turns primarily on the issue of work and man's alienation from the product of his labor. Today, however, capitalism is a parasite on the future, a vampire that survives on the technology and resources of freedom. The industrial capitalism of Marx's time organized its commodity relations around a prevailing system of material scarcity; the state capitalism of our time organizes its commodity relations around a prevailing system of material abundance. A century ago, scarcity had to be endured; today, it has to be enforced—hence the importance of the

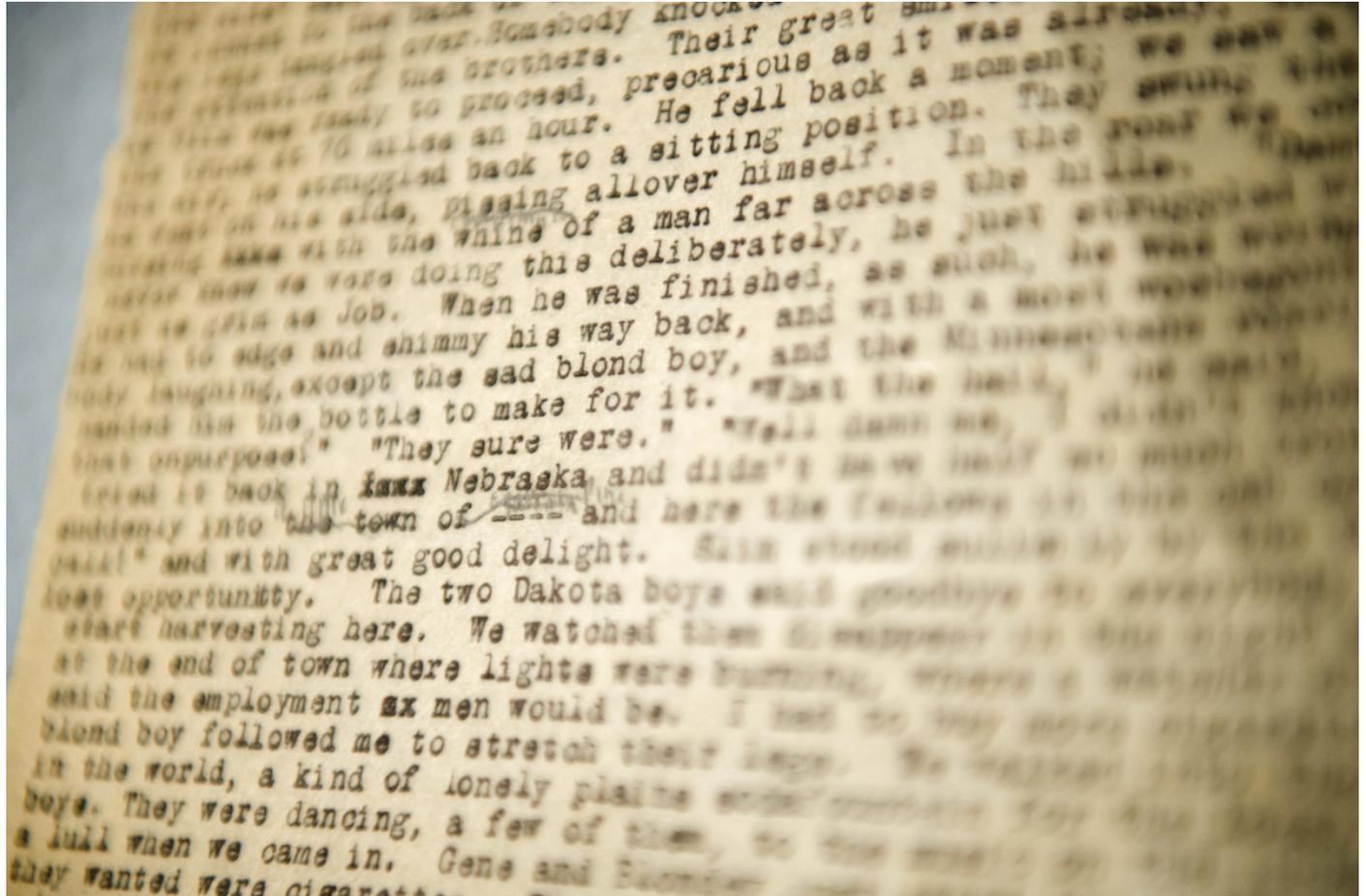
Will energy remain scarce – or does an era of deep renewable energy alter how we allocate energy, of all kinds. In the 1970's Murray Bookchin forecast a world where energy was not scarce. Foreseeing an era of energy abundance – and its potential affects.



# 1 - Literary Site - Historical Context: On Jack Kerouac's *On the Road* was released on Sept. 5, 1957

Our studio site front US I-80 for 12 miles. I-80, also known, as the Lincoln Highway is the nation's first coast-to-coast highway.

Originating in Trenton, New Jersey and ending in San Francisco, California the highway encompasses the eastern industrial cities; Midwestern farms; near South Chicago and on to the great plains; deserts and mountains of the west. Released in 1957, Jack Kerouac's "On the Road" was written on Teletype paper – a continuous scroll of text. Kerouac's perpetual motion back and forth across the nation on the nation's coast-to-coast highways was in part enacted as the writing of the book.



On Jack Kerouac's *On the Road* ; manuscript as photographed by Time magazine. <https://ti.me/2eGCl9r>



The Lincoln Highway: Trenton NJ to San Francisco, CA

## 2 –Energy Density: Architectural Physics + Chemistry

**Energy Density:** Tesla's Giga Factory is a major presence at the Tahoe Reno Industrial Center. The factory's primary mission is to produce lithium-ion batteries for its automobiles. The larger context for this work, however, comes from physics in particular research into **energy density**. Simply put this is a concern for the amount of energy available or stored in a given system or volume/space. The scale of the Giga Factory links energy density in lithium-ion batteries with the commercial and manufacturing scale needed for Tesla to achieve mass production of electric automobiles. If taken to its larger context of matter and energy—that is, away from mobility or batteries the term energy density becomes available to architecture in ways that are distinctly historical and essential to our field. The Giga factory is an experiment in manufacturing and architectural density.

**Architectural Physics:** Aldo Rossi opened his 1981 book, *A Scientific Autobiography*, with an existential concern and in reference to physicist Max Planck's 1949 publication *Scientific Autobiography and Other Papers*. Rossi refers his architectural reader to Planck and the physicist reaction to a story he had been told as a young student enunciating the principle of the conservation of energy. Planck learns the principle by way of a story of a stone falling to the earth from its place within an architectural wall. The latent of energy accrued in lifting the stone to its height within the wall was released to tragic effect—it killed a passerby.

Rossi's autobiography characterized by a generation of academics as "melancholy" was shaped within a disillusionment with technical progress and the potential of society to change from within its later day scientific/technical, capital driven means. Rossi's manuscript nonetheless infused or one should say witnessed in architecture a latent and unrevealed energy. In the face of a visually fragmented, inchoate, then late modern city--forged by a century of industrial evolution—architecture and the city were in large part revealed by their own disregard for human presence. The energy stored inside architecture (at its making) may allow a semblance of shelter of human life (within its walls) but it also disregards its inhabitants in the seeming monotony of its own self-perpetuation. Building do fail—decay--aside the passage of life but in Rossi's appraisal the city was virtually autonomous; a self-regulated entity that ran parallel to but disregarded its inhabitant's lives--buildings endure beyond and precede human presence registering generations but seemingly withholding the promise of their making and embedded energy and labor. While not his goal, Rossi often was seen as a force that instigated a deep distrust of technology in architecture, and more so, a turning away from the capital or scientific aspects of materials in architecture.

Rossi described his awareness of Planck and more so his understanding of the term conservation of energy and entropy. Our studio will return to this writing to gage how it might open up new readings of our current world – that is the race towards new forms of energy density.

From-Aldo Rossi: *A Scientific Autobiography*. MIT Press, The Institute for Architecture and Urban Studies, 1981, Page 1.

*Certainly, a very important point of reference is Max Planck's Scientific Autobiography. In this book, Planck returns to the discoveries of modern physics, recapturing the impression made on him by the enunciation of the principle of the conservation of energy; he always recalled this principle in connection with his schoolmaster Mueller's story about a mason who with great effort heaved a block of stone up on the roof of a house. The mason was struck by the fact that expended energy does not get lost; it remains stored for many years, never diminished, latent in the block of stone, until one day it happens that the block slides off the roof and falls on the head of a passerby, killing him.*

**Rossi:** *It may seem strange that Planck and Dante associate their scientific and autobiographical search with death, but it is a death that is in some sense a continuation of energy. Actually, the principle of the conservation of energy is mingled in every artist or technician with the search for happiness and death.*

*In architecture this search is also undoubtedly bound up with the material and with energy; and if one fails to take note of this, it is not possible to comprehend any building, either from a technical point of view or from a compositional one. In the use of every material there must be an anticipation of the construction of a place and its transformation.*



Robert Smithson, *Map of Broken Glass (Atlantis)*, 1969, DIA Art Center  
"Deeply informed by science in its popularized forms (such as science fiction literature and cinema, encyclopedic collections, even natural history museums), his art focuses on processes of accumulation, displacement, and entropy in order to reveal the contradictions in our visible world."

## 3 - Historical Context – Art without Frame

Did the earthworks of the 1970's predate the decentered subject of the new industrial desert fortifications? A person on the sidelines of something that they are thwarted from occupying.

Rosalind Krauss' writing on Michael Heizer and the wider movement of earthworks by Heizer, and Robert Smithson but also Donald Judd's installations at Marfa point towards a landscape where the plastic energy or presence of a body fails to be shored up by classical framing devices. The art invokes a new reading of the body in relation to the expanse of the art and the desert.

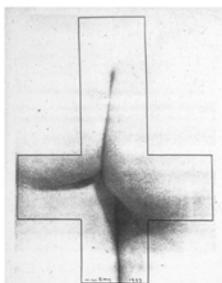


Rosaline Krauss on Michael Heizer, Double Negative, <https://goo.gl/maps/z5bGEeJS9br>

*The Double Negative (figs. 206a and 206b), an earthwork sculpture by Michael Heizer, was made in 1969 in the Nevada desert. It consists of two slots, each forty feet deep and a hundred feet long, dug into the tops of two mesas, sited opposite one another and separated by a deep ravine. Because of its enormous size, and its location, the only means of experiencing this work is to be in it — to inhabit it the way we think of ourselves as inhabiting the space of our bodies. Yet the image we have of our own relation to our bodies is that we are centered inside them; we have knowledge of ourselves that places us, so to speak, at our own absolute core; we are wholly transparent to our own consciousness in a manner that seems to permit us to say, “I know what I think and feel but he does not.” In this sense the Double Negative does not resemble the picture that we have of the way we inhabit ourselves. For, although it is symmetrical and has a center (the mid-point of the ravine separating the two slots), the center is one we cannot occupy. We can only stand in one slotted space and look across to the other. Indeed, it is only by looking at the other that we can form a picture of the space in which we stand. By forcing on us this eccentric position relative to the center of the work, the Negative suggests an alternative to the picture we have of how we know ourselves. It causes us to meditate on a knowledge of ourselves that is formed by looking outward toward the responses of others as they look back at us. It is a metaphor for the self as it is known through its appearance to the other. The effect of the Double Negative is to declare the eccentricity of the position we occupy relative to our physical and psychological centers. But it goes even further than that. Because we must look across the ravine to see the mirror image of the space we occupy, the expanse of the ravine itself must be incorporated into the enclosure formed by the sculpture. Heizer’s image therefore depicts the intervention of the outer world into the body’s internal being, taking up residence there and forming its motivations and its meanings.*

### Density Unframed

In the context of an essay published in *October* Krauss suggested that the frame of a picture provides a reciprocal supportive reaction to that which it contains. Krauss’s frame supports the dissipating body in the Man Ray photomontage *Monument to de Sade*. In her essay “*The Photographic Condition of Surrealism*,” she writes:



Rosalind Krauss, *October*, Vol. 19 (Winter, 1981), pp. 3-34

*“Two further aspects of this image bespeak the structural reciprocity between frame and image, container and contained. The lighting of the . . . subject is such that the physical density drains off the body as it moves from the center of the image, so that by the time one’s gaze approaches the margins, flesh has become so generalized and flattened as to be assimilated into the printed page. Given this threat of dissipation of physical substance, the frame is experienced as shoring up the collapsing structure . . . and guaranteeing its density.”*

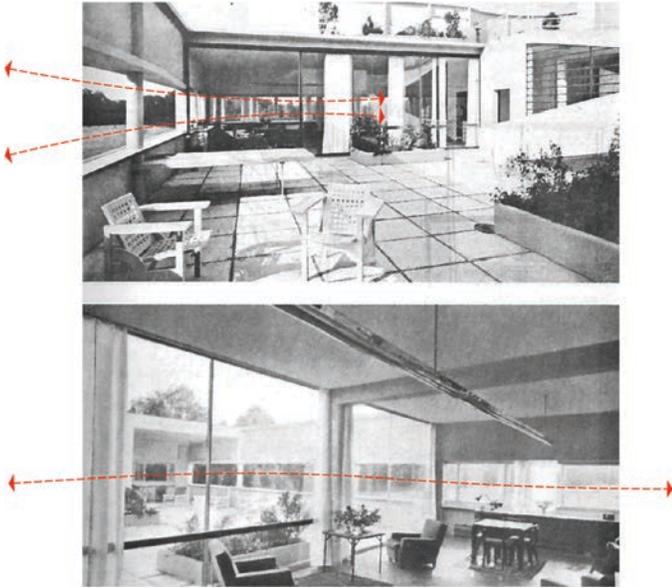
### 4 – Historical Context - Topological Window - Architecture Inside Out

What kind of window does the desert invoke? What kind of window creates a new horizon?

Is there another design evolution possible inside the architectural nomenclature of window or doorway? Of roof or wall or floor—in foundations? Historically we can point to pivotal moments when terms have changed and where new technologies instigated changes and innovation to the very DNA of an architectural element.

Today relatively inexpensive software offers a technology to examine (to see) materials and structural behavior in ways that could render old categories obsolete. Structural analysis allows us to see stress/strain but the computer is modeling chemical behavior and showing molecular stressing of chemical materials in geometrical mesh. Can we model our way out of the past and indeed find new architectural elements? Architectural work is deeply rooted in geometry and form: we are reminded of the emergence of the “ribbon window” and of Bruno Reichlin’s later declaration of its extended horizon, a topology of space, that curves and threatens the vertical reciprocity with a standing person. Reichlin’s reading of the ribbon window still allowed the term window to persist, but he saw Le Corbusier’s window as threatening the stability that his mentor, Auguste Perret, saw as essential to the very term window. For Perret, the vertically proportioned aedicule window delineated a threshold between inside by way of its tense and short horizon line. Yet the ribbon window was still called a window. Was it? Formally, perhaps this is the case but what of the experience?

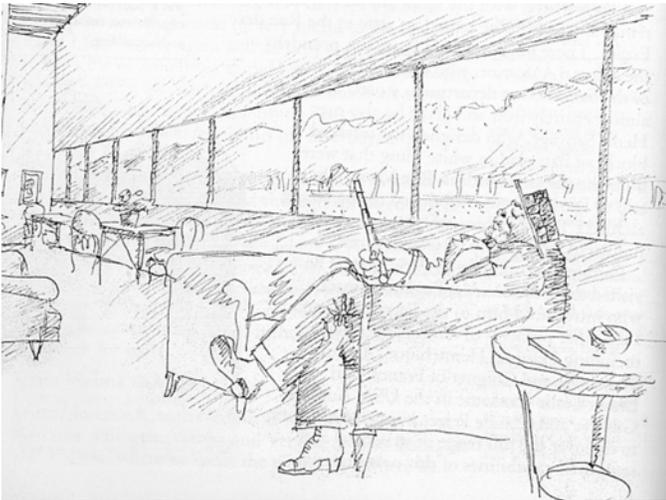




### The strip window: an anti-perspectival device

Unlike the traditional opening, the strip window performs best as a link between the inside and the outside when the threshold effect is attenuated. The photograph of the interior of the *petite maison* published in *Almanach*<sup>13</sup> makes this point most graphically. All that belongs to the building is reduced to a dark background, against which the euphoric image of one of the world's most beautiful panoramas stands out, stretching from edge to edge of the image. The caption for the photograph confirms the effect of sitting in the living room: "le site 'est là' comme si l'on était au jardin."<sup>14</sup> [The site "is there" as if we were in the garden.] The traditional window cuts out a picture from the landscape and thereby manipulates it, giving it the aura of a view. But the strip window satisfies the demands of objectivity so dear to the Purists and the Modern Movement. It renders nature just as it is: "La fenêtre de 11 mètres introduit l'immensité du dehors, l'infalsifiable unité d'un paysage lacustre avec tempêtes ou calme radieux."<sup>15</sup> [the 11 meters window makes the imensity of the outside enter the house, the majesty of a lake landscape with its tempests and radiaus calm.]

A topological horizon turns inside out – nearly one hundred years ago a small work of architecture unfolded itself into the landscape.



## 5 – Historical Context - SF in cinema: Seeing Outside the Frame



Gene Hackman, *The Conversation*. Architecture thwarts surveillance. Seeing around corners. Harry Caul, audio surveillance specialist cranes to see inside a

hotel room he is staking out. The camera watches as he struggles to fill in what he can't see – and what he can't believe he is hearing.

In the 1974 film *The Conversation* two actors pace Union Square in San Francisco. Fragments of the conversation are being recorded by three distant parabolic microphones. The camera follows them as we lose sight of them between people and monuments. They are being watched and recorded - at distance. Using three microphone sources, two parabolic and one up close carried by a contract agent the actual statement was only assembled later in the film. Assembled by correlating the divergent array of recordings and their sound waves into a decipherable whole. Two otherwise wholesome seeming characters utter "he'd kill us if he had the chance" setting into motion a film where vision fails the director and audience and

listening driving the plot. We watch the main character listens to things we (as audience) cannot verify by sight—the words are only partially present as limited spectrums of the sounds waves being recorded. In the mix of fragments captured is a comment on how a person ends up homeless, empathy? But also, an incantation of a criminal plans and covers up.

The actress in a few phases causes deep anxiety in the mind of the person listening to her – or quasi-listening. Our studio will take the film, written and directed by Francis Coppola as a starting point – as a juncture in art's estimation of surveillance and more so surveillance as creating deep unease in what was the privacy and intimacy of what we colloquially call home. Our private lives lead in public spaces and inside our homes. *The Conversation* was released in the immediate wake of Watergate and at a time when theory and criticism of television and media were a vivid component of intellectual life. In 1963 Michel Foucault's *The Birth of the Clinic* was published; in retrospect, one could imagine a time when the concern about surveillance was both intense and real but also still being explored and perhaps nascent in scale.

*The Conversation* starred Gene Hackman but also relied on two nearly silent characters played by Cindy Williams and Harrison Ford. Williams, strolling Union Square and Ford inhabit a kind of silent motion picture. The issue here is that Coppola has made a film – about listening more than looking. A film that undermines what you can learn by looking. So much so that the main character privy to the entire body of audio surveillance he acquires and constructs is unsure if what he hears actually happened. The audience is left to construct the would-be film in their own imagination – in their own gray matter and brain. We are the makers of the actual visual film.

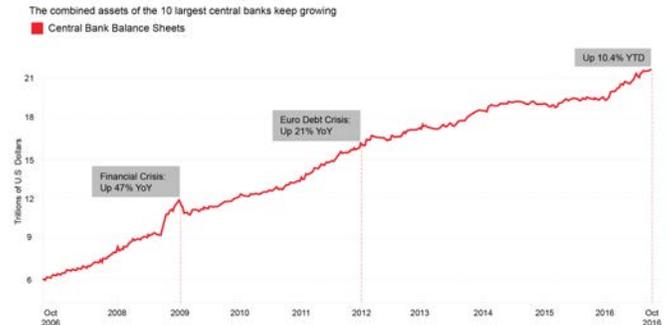


*The audience completes the film. We watch an actor assembles a partial whole from diverging spectrum of sound waves. They reveal events in an adjacent, unrevealed hotel room. The verification of what occurred in his audio surveillance is never confirmed and indeed may not have happened at all.*

At the Jack Tar Hotel, San Francisco, Harry Caul, master of audio surveillance is confronted by what he imagined but is not sure actually happened – according to his audio surveillance. Caul eventually breaks into the then empty hotel room: a drop of water on the tub drain convinces him evidence of a crime has been erased before a toilet overflows with blood in a surreal flood that to the audience is made to seem a dream. In other words, we are left like Harry unsure of any occurrence. The film's trajectory is negated and its only presence is in our imagination. Caul ends up dismantling his own domestic life—his apartment is torn apart as he seeks evidence of his own being bugged

Today these ideas of surveillance are narrow by this measure but if you put them in perspective with a more limited mobility were people in 1973 easier to surveil then they are today? And does architecture have a sense of where it fits in the pan project of making visible our every move. More importantly are there larger changes in what underpins architecture and development today that would altogether alter how we imagine the place of architecture in this equation?

## 6: The Desert Industrial Complex: the end of risk?



Central Banks worldwide are holding immense sums of debt off the markets -- effectively shoring up weak assets and their markets. Between 2006 and 2016 the world's top 10 central banks holdings rose by more than 400% -- from approximately 6 trillion to 24 trillion dollars. In the wake of 2007-08 financial crisis central banks entered an unprecedented role in stabilizing markets.

Markets for real estate and virtually every form of production and consumption were sustained by global quantitative easing. Near-zero interest rates. Personal housing debt and household debt as a percentage of the GDP has over the last century seen immense expansion. Will the architecture of the future rely on debt the same way and if not what can sustain it? Architecture today has become very adept at modeling risk and economy. Does this portend a new architectural nomenclature; a new asset?

Markets and reconciliation with scarcity have often gripped the architectural imagination—is this the norm for our future? We are increasingly advanced agents in modeling risk and opening new means—what will this enable?

Architecture and development are to a tremendous extent realized inside financial and economic risk models. Will this continue to the case in our future?

At the annual Berkshire Hathaway shareholders meeting (which is often seen more as a state fair) Jack Bogle, the founder of Vanguard Group, and a confidante of Warren Buffett offered a proclamation on risk by discussing the state of index trading—a use of algorithms to essentially trade the probability and momentum of an entire stock exchange. Indexing removes stock picking or the discrete, strategic, construction of a portfolio (as a means to hedge risk) and instead seeks to harvest the movement of the intelligence evident in the broader trading of the exchange itself. It harvests what everyone else is figuring out via artificial intelligence, machine learning or simply immense computational and stochastic modeling. For many index trading is a low-cost

way to diminish trading risk and yet harvest the collective insight of the market itself.

Indexing, while far from mathematically total, aspires to limit risk associated with accessing a small (minute) or even large sector of the exchange. Bogle seemed to be seeing this aspiration to the removal of risk as a disincentive to trading—if there is not risk and no unrealized opportunity (that is identified by the trader as opportunity) there is not a need to trade. Indexing relies on an active underlying market—it models a propensity that it then seeks to mine. Without real traders there is no risk to mine according to Bogle.

According to Bogle about 1/3 of United States' stock trading is done by indexing; he predicted a turning point, a threshold at which markets would freeze as indexing would arm everyone with a same ability to react to and forecast risk—each trader would in effect thwart the trajectory of the other. "If everybody indexed, the only word you could use is chaos, catastrophe," he said. "There would be no trading, there would be no way to convert a stream of income into a pile of capital or a pile of capital into a stream of income. The markets would fail."

*Bloomberg, Jack Bogle in Markets and Stock Indexing: Risk*<https://goo.gl/88bmj0>

Artificial intelligence, machine learning and robotics are often proclaimed to be a threat to labor markets. What do they portend in financial or economic markets? Aside from displaced jobs what do they incentivize or indeed make almost inevitable in development and the distribution of economic resources. What will be built in such a world if, for example, A.I. alters job migration, or collapses asset values?

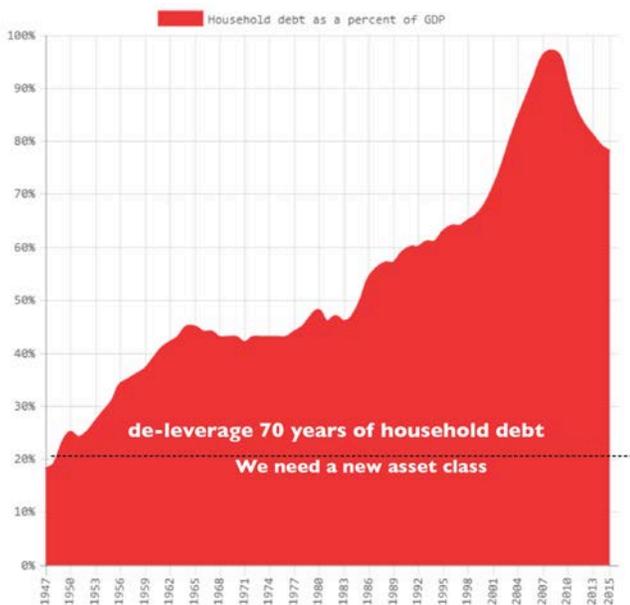
Markets may fear uncertainty but risk is a driver and motivation and it is the unseen or undervalued asset that has historically been a source of future wealth production—if you can see a potential and you are (nearly) alone in knowing its existence the

trade is yours. The wealth could be yours—it could belong to a nation, a city or a state--or neighborhood and constituency.

Today we see new means to model risk of every kind. But we also increasingly imagine ourselves less at the brunt of some forms of risk while others form immense crisis and undermine stability of all kinds. From structural mechanics to chemical engineering to fluid dynamics and geography and economics. Risk as its forecast within relatively low level computational systems is today increasingly made transparent to analysis and thus adjudication. Inside realms of engineering or medicine, advertising or banking or autonomous mobility and safety the prospects of a world driven more by choice than necessity is often depicted as offering a new model of liberty and indeed freedom. From social media to personal delivery—limits seem diminished even as crisis of all kinds still exists. Counter the immediacy of some forms of risk control vs. the global migration from war or climate change.

Much of the confidence (when it occurs) seems to rise from a new and more granular scale to modeling. Risk modeling has opened a finer parsing of the value of what have been seen as stable or older assets: indeed, often exhausted assets. A re-monetization of private housing (Airbnb) or the private automobile (Uber, Lyft)—risk models made possible by anonymous but secure transactions (peer to peer) in effect begin to revise the privacy and value of entire asset classes. You can share a latent temporal value in your home. But do they change the assets themselves and when, if at all, will these new models give rise to entirely new assets. After all, the private car – relied upon by Uber or Lyft – is only a century old as a human invention—an entirely new asset that drove 100 years of urbanization (and de-urbanization).

What are the next assets, how do we find them and more so do we trade them?



*The new matrix of commerce: Can we invert the debt and leverage curves of the past century? Or will new forms of manufacturing and commerce simply extend our uses of leverage and debt in creating the settlement of the future?*

In 2006 the United States household debt rose to nearly 95% of the national GDP. In 1947, it totaled only 18% of GDP.

7 – Historical Context – Designing from Coast to Coast.

70 years of intellectual history and industrial/technological difference and coincidence. Occupy the distance.

A riff	A riff
<b>West</b>	<b>East</b>
Gold rush	Stock Market NY and Banking and Real Estate
Wood / Douglas Fir/ Redwood	Stone, Steel, terra cotta, concrete
The "valley" Solid State electronics Transistor, processor The PC Software, code Linguistics (not literature) GUI-anthropology Xerox Parc Keyboard / mouse	Glass  NY and modernism NY and density NY and Cubism NY Five The Grays Abstract Expressionism
FROG design	NY and anxiety NY and psychoanalysis NY and anomie NY and privacy NY and independence
Operating system Internet Java Jini Social Media	Journalism / Editor / Curators
Epicurean food Epicurean social media Mirror communities - echo chambers	Subways  NY and centralized heating / steam
Fog BAY Pacific Mexico Asia Russian River	Grid  Rivers Bays Atlantic
The "Well" net community Whole Earth Catalog Apple SAP / VM Software	NYC / Boroughs  Frances Fox Piven / Sociology / Public Housing / Rent Control
Tesla	The managed city Silicon Alley Offices Hotels
Stanford/Berkeley/Cal Tech Lawrence Berkeley Labs	Ivy League Columbia / Manhattan Project
Joan Brown, figurative art	City College
Victorian Maybeck	G Village, east vs. west
The Castro	Central Park
The Hills Dark Red Suspension Bridges	Bankruptcy 1975 Trade
Hand held Touch screen	Humidity Ice
A.I. Machine Learning Clouds of all kinds Self realization	Institutions: MoMA - Lincoln Center, Columbia, FED, Goldman, Met, Whitney....92nd Street Y....
Venture Capital Algorithm	Mondrian  Taxis
North Face-Fleece Hike Kaiser Ships / later medical care	Immense cultural engines of exchange.
Foucault at Berkeley Post Structuralism at Berkeley Rabinow and Dreyfus host Foucault	
Stanford Hoover Institute	
Burning Man	

## 8 – Historical Context – Art is everywhere

Agnes Martin, a painter, migrated from Canada to the United States and New York City in 1957 for ten years. She later stopped making art and over a period of six years traveled across the United States before settling in the New Mexico desert. Martin's spare works done until her death in 2004 are often seen as in part allowed by the crisp air of the desert, and the expanse around her. Having worked in the desert nearby on a house in 1992 I always felt the remote home and studio allowed her to remove her work from overt social speculation and instead allow a focus on the precise act of making the painting – it in effect reveals her state of mind and distance from the cosmopolitan realms of deep urban life and instead is a kind of embodiment of the distance she occupied. Today as manufacturing turns deeper inwards and we move people to remote work places how do artist such as Martin open our mind to the desert?



*I Love the Whole World, 1999*