

The Adaptive Reuse Toolkit. How Cities Can Turn their Industrial Legacy into Infrastructure for Innovation and Growth

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## THE ADAPTIVE REUSE TOOLKIT

How Cities Can Turn their Industrial Legacy  
into Infrastructure for Innovation and Growth

MATTEO ROBIGLIO

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On the cover: Detroit. ©Matteo Robiglio

# The Adaptive Reuse Toolkit

## How Cities Can Turn their Industrial Legacy into Infrastructure for Innovation and Growth

2016 | No. 38  
MATTEO ROBIGLIO<sup>1</sup>

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# 1 About this Toolkit

This toolkit is for post-industrial cities and their residents. Industrial activity has deeply shaped these places in physical and economic terms, but the prefix “post” means that this industry belongs more to their past than to their present.

This could be the case in your city. It might be full of closed factories. Maybe you or one of your family members has spent some time working in one those factories. Or perhaps you were not even born when your city was bursting with industrial energy. Yet you can still feel this energy in the air. Part of this is the collective memory of what used to be, but an equally significant part is identity and physical legacy.

All over in the world, industrial infrastructure is being creatively repurposed. Culture, leisure, sport, research, education, design, services, production, residences, and even agriculture are bringing life back to abandoned factories. This process is called adaptive reuse.

Adaptive reuse can be sparked by whomever feels the power of the industrial past and dares to imagine a future for its legacy. Whether you are a professional, an activist, a decision-maker, an investor, or simply a committed citizen, if you feel that an abandoned factory might become part of your community’s future, this toolkit is for you.

This adaptive reuse toolkit is the final product of a 2015 Urban and Regional Studies fellowship granted to the author by The German Marshall Fund of the United States. During his fellowship, the author explored a wide range of adaptive reuse examples in industrial cities, including Chicago,

Pittsburgh, Philadelphia, and Detroit.<sup>1</sup> The toolkit pulls from these examples to illustrate how many U.S. communities, despite often still facing hard post-industrial crises, have managed to reuse their industrial legacy and to make it into a positive asset for their future development. Cities and cases have been selected to illustrate the power of innovative processes and projects based on private-public partnership, bottom-up initiative, community involvement, and smart design despite difficult conditions (declining demography, local welfare crisis, weak real estate values, or scarce investment perspectives).

The toolkit provides a basic definition of adaptive reuse and then examples of how places in the United States have implemented this concept locally, activating industrial spaces to become new community assets. The experience of U.S. post-industrial cities is rich in providing lessons for European communities. These cities faced unprecedented challenges in reviving large industrial spaces. They also did it without the safety nets of European urban policy and public spending, but also with fewer constraints than the European planning system and a stronger tradition of civic commitment. Finally, while European cities can rely on a rich historical legacy and rooted social capital, higher mobility within the United States compels cities to innovate in order to retain and attract individuals, families, and investment.

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<sup>1</sup> Though this toolkit focuses on cities that are shrinking or growing slowly, adaptive reuse cannot be simply constrained to cities in crisis. I learned during a recent —teaching experience in China that in spite of mainstream narratives focused on booming new cities, adaptive reuse is a growing practice. Chinese cities are left with incumbent relics of planned industrialization and places like the famous Beijing 798 art district — hosted in an abandoned state-owned electronics industrial compound in the Dashanzi area that since 2002 has been the capital’s most attractive alternative and contemporary cultural venue — inspired similar reuses of old factories for cultural and creative uses in many Chinese metropolitan areas.

*This toolkit provides a basic definition of adaptive reuse and then examples of how places in the United States have implemented this concept locally, activating industrial spaces to become new community assets.*

This toolkit draws from this experience in creating an eight-step approach for how to make adaptive reuse work in your community. Written from a transatlantic comparative perspective, the toolkit outlines some specific features of adaptive reuse projects in North American post-industrial cities that could inspire European policymakers and U.S. practitioners to make adaptive reuse an ingredient of successful city remaking.

# 2 Background: What is Adaptive Reuse?

**R**euse happens when individuals or groups introduce new content into an existing container (building, infrastructure, place, area), content that differs from the one for which the container was originally designed. Adaptive reuse is carried out by adapting the content to the container rather than the converse; it involves maximum conservation and minimal transformation. It is the most radical approach to reuse: instead of keeping what still fits, you make it fit so that you can keep all.

Although the term “adaptive reuse” is related to industrial crisis and thus is relatively new, the concept itself is not. For example, as Robert Rubinstein of Pittsburgh’s Urban Redevelopment Authority explained, Pittsburgh’s first post-industrial strategy dates back to 1945, when the city administration and business community started to deal with the end of the peak war production and factories required repurposing. The practice has been the rule in cities for centuries: most buildings underwent multiple reuses, as the building process required huge amounts of scarce resources. It was only in the later 20th century that the notion of obsolescence was extended to buildings, partly reflecting the belief that form had to follow function and that cities had to be regulated through functional zoning that separated out land uses that had previously coexisted.

Throughout the 1980s and 1990s urban industrial sites were mostly cleared and cleaned without much, if any, attempt to reuse the existing structures. There was little awareness about their potential value, as discussed with Brian Goeken of the National Park Service Technical Preservation Services. Notions like “industrial heritage” first appear in the preservation debate in the 1970s with the birth of the North American (1971), British (1973), and International (1978) associations for industrial archaeology. However, it was not until the beginning of the current century that the first

comprehensive and widely diffused methodological approaches were developed, and only in 2011 were the first international standards for industrial preservation and reuse established.

Additionally — as David Lloyd and Matthew Dalbey of the U.S. Environmental Protection Agency explained in an interview — the first approach to the environmental recovery of industrial sites dating back to the mid-1970s was dominated by an emergency, large-scale, top-down approach that had as its first, and often only, goal the elimination of an environmental hazard, often under huge pressure from public opinion. The EPA only began a more “complex” approach that integrated clean-up, preservation, redevelopment, and community involvement in the late 1990s. This cultural shift within EPA holds precious lessons for EU countries like Italy that still see industrial areas more as a risk than as a potential opportunity.

Thus, in the late 20th century, adaptive reuse was more practice than theory, a process in which communities in the United States and Europe took advantage of the cheap availability of large, free unused spaces for underground or marginal activities, sometimes by simply squatting in abandoned industrial buildings. In this do-it-yourself, piecemeal, and bottom-up process — first becoming an urban policy in Soho’s revitalization led by Chester Rapkin, New York City planning commissioner from 1969 to 1977 — reuse generally involved what you might consider “easy” targets: urban mills and warehouses, located in stable or growing cities with high market demand, and which had been previously used in non-polluting ways such as textile or food production or storage. Nevertheless, the experience of these “early adopters” created a new aesthetic that eventually became marketable as loft living, which helped communities, investors, and local authorities to see industrial sites as opportunities rather than risks.

*Adaptive reuse is the most radical approach to reuse: instead of keeping what still fits, you make it fit so that you can keep all.*

The challenge of the North American industrial cities examined here is by far tougher. Philadelphia, Chicago, Pittsburgh, and especially Detroit have to pursue reuse at a larger scale and in weaker markets, especially in the wake of the 2008 real estate market crisis. This makes their achievements and strategies more relevant for the European context.

# 3 Why Adaptive Reuse?

Examples from the U.S. cities discussed here prove that existing form can host new functions through adaptive reuse. Reuse often proves better than demolition and reconstruction for a number of reasons. It is good for local culture, because the industrial legacy is part of the urban landscape, is rooted into the city's identity, and offers astonishing spaces and structures. It draws investment, as innovative activities seem to be attracted by the flexibility of space and freedom of use offered by existing industrial buildings. Reuse is better for the environment since "the greenest building is the one that is already built" as claimed in a 2005 National Trust for Historic Preservation campaign, reflecting the amount of energy and resources required to construct new buildings. Finally, reuse strengthens a community feel by positively linking a city's past to its future, and offering cheap and robust infrastructure to emerging needs, which can spark wholesome renewal processes.

Cases throughout Philadelphia, Chicago, Pittsburgh, and Detroit prove these points.

First, the ambitious Navy Yard Master Plan by Robert A.M. Stern Architects stretches over the 522 acres once occupied by the U.S. Navy docks along the Delaware River, four miles south of Philadelphia's City Center. It was planned in 2004 after the failure of state and city efforts to avoid the dock's closure, and illustrates the investment potential that post-industrial buildings offer. The project exemplifies the investment potential of adaptive reuse as a driver of economic investment. Today, even though the Master Plan as not yet been completed, the area has attracted over 125 companies, with an employee base exceeding 10,000 and occupying more than 6.5 million square feet (sq. ft.) of facilities, most of which is in recovered buildings. The centerpiece of the redevelopment is the 350,000 sq. ft. Urban Outfitters (UO) headquarter designed by Meyer

Scherer & Rockcastle, which was completed in 2011. The building unites a workforce that was previously scattered in five different locations and is credited with preventing UO from leaving Philadelphia. The space is a unique layering of old and new, and customized spaces of various size and shape are freely inserted in existing halls thanks to the building's size, free span, lighting and load capacity. These features make industrial architecture unique: halls whose height and width dwarves current civil buildings, large glass surfaces with excellent natural light, solid construction materials and simple engineering details that meet modern purism, and robust structures with distanced footing designed to support heavy loads. These features were required for specific production needs, and now allow great flexibility in use and freedom in design, and have a specific aesthetic value that is growingly appreciated both by experts and public.

The overall Navy Yard site offers a vibrant urban experience, something few industry parks can claim and that – as project manager Will Agate of PDCI (the private-public partnership steering the development process) explained – was decisive in attracting such prominent companies as the drugmaker GlaxoSmithKline, even though they eventually chose to locate in new buildings. This vibrancy was so decisive that the 2013 Master Plan Update considerably extends the "historic core" perimeter in order to attract residential users to its existing buildings and enhance and extend its diversity and liveliness.

A few blocks away, the Penn State and Carnegie Mellon Universities' joint initiative for an Energy Innovation Hub attracted nearly \$160 million in federal and state funding. The site of a former athletics facility has been redesigned into an advanced research center in a green building, itself proof that adaptive reuse can achieve high energy efficiency and optimal comfort performances

*Reuse strengthens a community feel by positively linking a city's past to its future, and offering cheap and robust infrastructure to emerging needs, which can spark wholesome renewal processes.*



The inside of the Navy Yard Urban Outfitters headquarters offers soaring ceilings but also intimate spaces.

without losing the historical charm of industrial construction, as Mark B. Stutman explained. More importantly, this example shows the potential of industrial sites to attract innovative activities.

Institutional actors such as universities are also key parts of the ingredient list that have helped to remake places like Pittsburgh. You can see evidence of it by visiting the former Nabisco Bakery on Penn Street, which local developer Todd Reidbord is turning in one of the city's new locations for business, research, leisure, and residences. The Bakery Square Project is a \$350 million initiative by Walnut Capital that has already created 2,200 jobs by attracting on the site Google's second most important headquarters in the United States, the UPMC Technology Development Center, the University of Pittsburgh Department of Rehabilitation Sciences, and the Veterans Administration Human Engineering Research Laboratory, all located in a Platinum LEED-certified reused industrial building. The location



The entrance to the Urban Outfitters headquarters mixes new and old.



Onion Flats in Philadelphia, a small-scale development that blends seamlessly with the rest of the neighborhood.

is rounded out by a Tech Shop, gym, hotel, cafes, shops, and housing. Google also plans to double its size, bringing the total amount of created jobs to 5,000.

The previous examples show the potential of adaptive reuse to attract mixed-use, economic activity. But how can adaptive reuse strengthen a community? Seven miles up the Delaware River from the Navy Yard, Fishtown is a different world. The neighborhood has a fine grain of small workshops and warehouses interwoven with tiny working class row houses. Here too, environmental sustainability and adaptive reuse go hand-in-hand, as several LEED certificate plaques testify. They mostly refer to the same designer and builder's commitment to reuse and sustainability. For almost two decades, Fishtown has been the

preferred playground of the McDonald brothers, also known as Onion Flats, a practice joining architectural design, real estate development, and construction that recently expanded into a network of autonomous yet cooperating brands, as Tim McDonald, the firm's leading architect, explained.

The McDonalds buy derelict buildings and abandoned plots, redeveloping them into highly livable eco-efficient-certified yet affordable housing. Their projects mix adaptively reused parts and new insertions that complement and build upon the neighborhood's urban fabric. On the opposite end of the spectrum from the huge top-down Navy Yard Master Plan, the McDonalds' small developments are having a large-scale effect on the neighborhood in attracting a new breed of urbanites back to Fishtown and gradually convincing other developers of the viability of the neighborhood, proving the role that adaptive reuse can play in stitching a community together.

A few blocks away along Penn Ave in Pittsburgh's Strip District is having a similar impact but with no mainframe policy or big developer. This is now one of the liveliest parts of town, where delis and restaurants cluster around the reuse of the old food warehouses on the former railway docks in the area. The regeneration of this district was not planned or designed, yet is a proof that adaptive reuse can be flexible in size and variable in grain, from large scale top-down projects to incremental bottom-up processes.

A different type of example of how adaptive reuse can create new cultural value and strengthen a community can be found in places like the Monongahela Valley near Pittsburgh, where coal, steel, oil, gas, and chemical industrial processes were heavily polluting and required huge scale plants and infrastructure. The Great Allegheny Trail, a 150-mile bike trail that follows the Monongahela River up to McKeesport and



A pedestrian bridge along the 150-mile Great Allegheny Trail.

then crosses the mountains to Washington, DC, is a great example of how an industrial linear infrastructure can become a tourist attraction and a potential cultural asset for the rebirth of places like Braddock. In this small Pennsylvania city, a young and determined “Mayor of Rust” John Fetterman is vying to attract investors and residents to a community that for four generations flourished under the chimneys of steel mills and then lost 90 percent of its residents when these mills closed. The West Shop Industrial Mall at Keystone Commons, with its industrial storefronts and internal driveway, hosts 40 new companies under the roof of a former Westinghouse plant.

Some of the original construction techniques in the Monongahela Valley were inherently provisional — a light steel shed is not as easy to reuse as a multi storey brick warehouse and also decays much faster. But some examples the author visited with Deborah Lange of Carnegie Mellon University’s Western Pennsylvania Brownfield Centre prove that even very large steel sheds can be reused. Not far from Pittsburgh’s downtown, buildings that once housed

steel lamination lines along the Allegheny River today host some of the most innovative firms in the United States, such as Carnegie Robotics, a spin-off of CMU’s National Robotics Engineering Centre, which uses the cranes from old industry to move the intelligent machines that pick strawberries in California or clear mine fields in Iraq. A few blocks away, the same kind of structure hosts the 31st Street Studios, part of Pittsburgh’s growing movie production infrastructure, under its large spans and high roofs.

Though declining population implies low real estate values, this might be a positive asset in attracting innovative activities and creative people.<sup>2</sup> For example, the Meatpacking District of Manhattan was mostly abandoned in the early 1990s, and its elevated railway was scheduled for demolition. Only the obstinacy of local activists saved it, proving the power of place-making in attracting money and people. The High Line railway today is the third most visited tourist attraction in Manhattan and a driver for investment in the area.

The same could potentially apply to the 3.5 million sq. ft. multistorey concrete grid of the Packard Automotive Plant in Detroit, a site where production ceased in 1958. Though much of the

<sup>2</sup> Indeed, the fact that many of these industrial sites have lost their value could be regarded as a positive step. Drastic repricing helps lower the threshold for acceding asset ownership, allowing for the concentration of resources on reuse costs rather than property reward. This process is particularly evident in U.S. post-industrial cities, where fall and rise dynamics in urban markets are not biased by extensive public funding or pervasive public planning as in Europe. Once property is made affordable and accessible to new users, a new cash flow is generated, urban energy circulates again, and both progressively grow. At Russell Industries, yearly cash flow could equal the purchase cost within five years with more than half of the property still awaiting reuse, only because the site had been auctioned and bought by developer Dennis Kefallinos at the incredibly low price of \$1 million for 2.2 million sq. ft. — less than 50 cents per square foot. In most projects visited, assets were either foreclosed and auctioned or dismissed and acquired at prices that one would associate with agricultural land rather than urban estates. The Packard 3.5 million sq. ft. sold for \$405,000, little more than 12 cents per square foot.



The High Line in New York City is a linear park built upon a disused rail line.

site is in ruins, the first building will soon undergo reconstruction. The ambitious vision is a holistic place-making strategy that begins with community and small business — keywords read “autonomy, trust, creativity” — and ends in a new dawn of “Design, build, manufacture of quality craft goods.” This is a vision that aims to put Detroit in the league with New York City, Silicon Valley, and Chicago as cities where America “makes.” How many “self-startups” would it take to fill the Packard Building?

Flexibility of space can be particularly integral in attracting innovative activities. A transformation not too different from the vision of the Packard

Plant has already occurred with the Russell Industrial Center in Detroit. The 2.2 million sq. ft. plant was bought a few years before in 2003 by Boydell Development, another player on Detroit’s real estate scene. It is now home for an unique mix of artists, tech geeks, craftsmen, small businesses, and musicians that live in and use the space. Long-term tenants choose their location in the huge site and have it roughly refurbished. Temporary events such as markets and festivals, the shooting of last Batman movie, or the United States’ main erotica art fair contribute to making this one of Detroit’s hot spots.



A view inside one of the studios in Detroit's Russell Industrial Center.

Someone who believes that Detroit is already a place where “America makes” is the determined founder of Shinola, Texas-born Jacques Panis. Though it was founded only in 2011, Shinola is now a mid-size company with more than 400 employees making watches, bikes, and accessories. It occupies 30,000 sq. ft. — the whole fifth floor — of Midtown's Alfred A. Taubman Building, a former automotive research lab still mostly vacant. Its claim “Where American is made” pays respect to Detroit's legacy, while the company's products make it alive and successful again.

If manufacturing and start-ups are not an option, you might adapt to larger, low-intensity, space-consuming functions such as athletics and recreation. Sometimes the rediscovery of abandoned industrial buildings begins with often illegal urban activities like parkour; large spaces and high ceilings make industrial buildings a perfect place for indoor practice, with little

investment. This was the case with the recently completed Brooklyn Bridge Park, a 85-acre post-industrial waterfront site stretching 1.3 miles along Brooklyn's East River edge, which has rapidly become a popular destination for leisure and free time in New York City. The old docks halls host football fields and basketball and volleyball courts.

Agriculture is another option. In Chicago, John Edel's “The Plant” project reuses a portion of the former meatpacking district with the visionary ambition of feeding the city with fresh local food. Its “closed” production cycle integrates fish and shrimp breeding, hydroponic and vertical agriculture, mushroom caves, community gardens, composting, and biogas production on the same site. New food business are already gathering at The Plant, including Chicago's first organic bakery and an organic brewery.

What if the size of the task seems to outscale resources? Consider shifting from intensive to



Inside The Plant in Chicago, an urban farm in a former meatpacking warehouse..

extensive. In Detroit, Hantz Farms is a corporation converting blighted properties into productive woodland just a few blocks from Midtown. Turning abandoned plots into large exploitable fields, Hantz Farms is bringing wood production back to the city, with the ambition of becoming the world's largest urban farm. In 2014, more than 1,500 volunteers — some of them coming from as far as Boston — gathered to plant the first 15,000 trees. The project will expand to 150 acres and is based on an effective brew of community engagement and market strategy. By doing so, they also contribute to Detroit Future City (DFC), a daring city-wide vision that recognizes that there will be no return to the industrial past and advocates for a sustainable shrinking of the city. DFC actively encourages and supports agricultural reuse of abandoned plots with the field guide *Working with Lots*, a web-based tools and grant program that has already funded 15 grassroots urban farming initiatives.

These cases prove that in spite of the challenges, regeneration through adaptive reuse has been and can be the most effective ingredient in post-industrial urban regeneration, bringing together the powerful elements of investment, sustainability, community, and culture. The infrastructure is out there, idle but powerful, cheap, and attractive. All you need is creativity and courage, the same virtues that made the first loft dwellers endure Manhattan's cold winters in barely heated warehouses 40 years ago.

There is an eight-step approach to making adaptive reuse possible in your community, a sequence that begins with exploring and assessing the site, establishing a vision, making the first moves to occupy a site, bringing partners onboard, and brainstorming possible design options. The approach also includes an explanation of financing and funding options and how reuse projects can evolve over time.

# 4 The Approach of Adaptive Reuse

## Explore Possibilities

- *Use available tools, such as mapping services, to find potential reuse opportunities.*

**D**eindustrialization leaves cities with a large stock of opportunities. To minimize required resources and costs, an adaptive reuse project starts with the selection of the appropriate infrastructure or building to reuse. This phase is important to building community awareness around potential opportunities, but there does need to be some structure to support this exploration.

Some cities keep track of private and public assets and their current status in order to prevent blight and promote reuse. In Pittsburgh, the Urban Redevelopment Authority constantly updates an online map of vacant properties based on tax foreclosures. Any individual, local group, entrepreneur, or developer can freely browse the map to select opportunities for reuse and

redevelopment projects. In 2014, the Detroit Blight Removal Task Force produced a similar dynamic online tool, Motor City Mapping. It is a mix of public authority data such as tax foreclosures and a web-based collaborative assessment named “blexting” in which anyone can contribute photos and data to build a complete and an accurate resource of the city’s 380,217 vacant properties.

These examples show that blending “cold” knowledge from public databases with “warm” local experience supported by open source or free web-based tools is enormously effective. The possibility of constant improvements and updates, the availability on portable devices, and the possibility of adding other relevant geo-referred data layers offer unprecedented transparency and knowledge to city actors at all levels. This bridges the historical gap between city planners and on-the-ground citizens.



A view down Pittsburgh’s Strip District, which been steadily renewed the reuse of the once-industrial buildings concentrated in the area.

Mapping in itself can become a task that aggregates community energy around a reuse project. Urban explorers all over the world often break into abandoned industrial sites to explore them and share their knowledge through social media. Participatory tools such as urban transect walks can be used not only to map but also to raise awareness and promote commitment in local communities. For example, the celebrated High Line in New York City was saved by the bottom-up action of local activists — the Friends of The High Line — that fought in court against scheduled demolition, promoting community and heritage walks on the abandoned railway to win support.

#### Assess Potential

- ***The success of the reuse will depend on a mix of factors, including location, the scale of the property, and the extent to which the building(s) can support certain activities.***
- ***Be careful to assess potential hazards, especially contamination from previous production.***

Any abandoned industrial area or building has its unique features. Before falling under the spell of an industrial icon — and investing time and energy in a reuse project — it is important to understand what its specific positive and negative features are and how they can influence the reuse process. Successful projects the author visited during this research were all based on deep understanding of the existing market reality and clear strategic preliminary choices.

First, one must chose the right place. Location plays a central role in reuse, as in any city-making process. Location includes accessibility, connections, services, neighboring areas, visibility, and views. All these factors are incorporated into the site and have to be carefully weighed in advance. Some of these factors might be potential negative influences, while others will be positive.

Bakery Square is along a main city axis, near to already-existing public transport, between low-income and wealthy neighborhoods. Russell Industries is near an important highway junction, and is therefore visible and accessible to the larger public. The Plant might seem to be in the middle of nowhere, in a place where land is cheap enough to experiment, but it is just 15 minutes by car from downtown Chicago and a ten-minute walk from two main bus lines.

Second is the determination of the appropriate scale of intervention. Context and goals define the right size and form of projects. Where property is fragmented and multiple small actors will be engaged in a long-term incremental strategy, reuse will be a sort of “urban acupuncture” by tenths of square feet as in Corktown or Fishtown. Where assets have a single owner and investor, you can foresee massive engagement in steps measurable in acres, as at the Packard Plant. Where the goal is extensive and complete reuse of a whole section of a city, reuse will assume the form of a comprehensive area master plan, as at the Navy Yard in Philadelphia. Where, on the contrary, reuse should be the catalyst of a more general regeneration process, as along the Monongahela, a line as thin as a walking and biking lane is enough to reconnect and revive different sites over an extended region.

A third consideration is can the potential of existing structures be maximized? The specific qualities of any existing industrial infrastructure offer opportunities for their reuse. Load bearing capacity is what makes old multi-story industrial buildings attractive for artists and makers. Serial spaces can be easily portioned to fit users as different as Google and a local artist. Small plots are perfect for incremental reuse, either at urban scale — as in the Pittsburgh Penn Ave regeneration — but large spaces can be reused by inserting small-scale sub-structures for multiple users, such as the food stalls at Union Market in Washington, DC,

*Successful reuse projects were all based on deep understanding of the existing market reality and clear strategic preliminary choices.*



Food vendors in Washington DC's Union Market.

the former food delivery hub of the capital that has become a destination for foodies and will soon be at the core of an ambitious redevelopment plan. Large spaces can accommodate new forms of working and/or living; high ceilings can host oversized art or industrial production, but also allow the insertion of minor volumes and intermediate spaces such as the URBN HQ at the Navy Yard; bridge cranes that once lifted raw steel beams can now lift high-tech, but still heavy, machinery at Carnegie Robotics.

A fourth point is the art of linking a contemporary story to a powerful memory. In most industrial cities, civic identity has been shaped through and by industrialization, which involves a constant process of creative destruction, innovation, economic growth, and social change. These are the ingredients of a legacy that can sustain new narratives. In 1962, Pittsburgh-born Andy Warhol labeled his New York City creative platform experiment “The Factory” and located it in a former firehouse in East Midtown Manhattan that he rented for \$100 per year, with no heating or running water. Nearly all the places the author visited for this research openly link the future to the past by reusing an industrial legacy. Their communication uses industrial imagery, adopts

vintage graphics, echoes factory culture in slogans and style, and offers a reconstruction of the past, often a photographic archive enriched with interviews and original documents.

At the same time, potential can also be negative and even turn into hazard. A site could be polluted, and clean-up might prove an unsustainable burden for any reuse project since inexpensive space is a key factor in the reuse process. Regulatory burdens in both the United States and Europe often discourage reuse in sites that have been contaminated.

Decontamination can and must be incorporated in the reuse process, for instance, by defining a development timeline that allows the use of slower but cheaper techniques such as phytoremediation, or by laying out new uses according to the cleaning requirements they impose on existing spaces, as was the case in the Navy Yard master planning. If communicated well, organizers can even generate related public funding for decontamination.

To get a preliminary understanding of contamination from past production processes, local knowledge by retired workers or neighbors can prove useful, and can be easily collected through interviews, focus groups, and public walks. This collection of local knowledge is also an opportunity to reconnect to the history and culture of a place. To evaluate its possible impact at this preliminary stage, technical support to communities and local governments by external bodies such as the EPA is a great resource when no previous assessment or general mapping has been carried out.

### Envision the Future

- ***Create a positive vision of the future that aligns with local and global trends and interests.***

What attracts users, residents, entrepreneurs, innovators — and eventually investors — to reuse



Inside the production facility of Shinola's Detroit headquarters.

projects is a compelling positive vision of future rooted in the past. This positive projection of legacy into future is not exclusive to post-industrial cities; it is inherent to physical permanence and the living continuity of all cities and urban communities. In industrial cities, the predominance of a recent, homogeneous, and pervasive past over any other identity layer makes this process clearer than elsewhere.

Industrial cities and communities have often endured a long period of negative narratives: decline, blight, and unemployment. The future was uncertain and dark, as it was for New York City from the 1970s to the 1990s, when the city's story was industrial decline, economic stagnation, white and middle class flight, and crime.

An industrial legacy often brought clean-up and demolition costs: visit the Pittsburgh Technology Center along the Monongahela, redeveloped by the Regional Industrial Development Corporation

(RIDC) in the 1990s, and you will now see no trace of its previous use, either on site or in architecture. Reuse was simply not on the agenda. No potential was seen in industrial material legacy. Often sites were cleared and cleaned before any redevelopment project was in sight: it was simply a way to get ahead of schedule by getting rid of the past, as URA's Robert Rubenstein explained during an interview.

What brought Shinola and Jacques Panis to Detroit was more than the possibility of having vast space for little money; it was the possibility of reviving a mythology of U.S. industry and marketing it. Material and immaterial legacy were equally relevant, and the Taubman Building significantly embodied both. Shinola adaptive reuse was the right way to link this rich legacy to profound trends in society and consumption. Being at the Taubman connects Shinola to the desire for well-designed, carefully crafted, robust, and durable goods — like the best U.S. cars in the 1950s and 1960s. Being in



Bakery Square in Pittsburgh.

Detroit shows Shinola's commitment to socially responsible production modes that create jobs in deprived communities. No new building could deliver this message as effectively.

Not all visions fit all places. East Market in Detroit is the natural location for food innovation, as Union Market is in Washington, DC, but both would brand poorly as "tech" locations. The Plant is about feeding the city since industrialized meatpacking was in the same district around 1900. John Edel's previous project, the Chicago Sustainable Manufacturing Center a few blocks away, builds on a different narrative but is still rooted in the place, one of production innovation.

Building an appropriate vision thus links the existing infrastructure and its potential to local and global large-scale trends and challenges. Renewed attraction for urban life, extended active life expectancy, attention to quality food, and new family structures are general drivers you can explore in creating a vision for a site. What

do people want? What do people love? What do they fear? What do they dream of? You can look for evidence in references, and draw inspiration from examples and comparables. You have to root this to the specific place you work on, and include its legacy in your vision: project future on past, build future upon past. Better to be foolish than reasonable, visionaries always are.

### Involve Partners

- *Once a vision is established, involve partners that can help make your vision a reality.*
- *To maximize the potential mix of activities, involve partners at all scales, i.e., from citizens to government.*

Another aspect all projects the author visited have in common is a kind of "snowball effect," or the capability of attracting forces and gaining momentum over time. It might simply be something that happens — as in the incremental regeneration of the Strip District in Pittsburgh or the attraction of activities at Russell Industries — or something that is designed deliberately as in the redevelopment of Packard or Bakery Square. Successful projects have to be able to convince early adopters such as start-ups, artists, innovators, creative businesses, young families, and users, and welcome established joiners — big firms, universities, major investors, middle-class wealthier residents.

Todd Reidbord's key to successful reuse of the Bakery Square area was his ability to build a broad and inclusive "growth coalition." Bakery Square effectively partnered with public bodies. The Urban Redevelopment Authority of Pittsburgh (URA), the Housing Finance Agency, U.S. Bank, the Building Trades Union Pension Funds of Western Pennsylvania, and the Pennsylvania Department of Community and Economic Development — and involved the local community in the planning process through regular public hearings and

meetings. In a process that took about three years, it also attracted private equity from Walnut Capital and RCG Longview Fund and gained early interest from big players such as Google Inc., UPMC Technology Development Center, University of Pittsburgh Department of Rehabilitation Sciences, the Veterans Administration Human Engineering Research Laboratory, and established brands such as Marriott and Anthropologie. Most important, when Google asked Reidbord to double the project's capacity, he could rely on the established private-public partnership to gain approval of the city, county and school district of Pittsburgh to buy an abandoned school building just across Penn Ave to tear it down and build the Bakery extension — the two buildings will be linked by a pedestrian bridge over the street. Bakery Square 2.0 doubles the project's extension, the size of investment, and the jobs output, and diversifies its function mix by introducing housing and services.

In a positive exchange between top-down planning and bottom-up initiatives, grassroots projects such as the community gardens of Latham Street Commons on a side street of Penn Ave contribute to the picture. Temporary uses occupy vacant lots and unused properties, providing residents with tangible signs that regeneration processes will not leave them behind. Along Penn Ave, lots cleared after tax foreclosures and the demolition of abandoned houses are being reused for open air public art projects, and vacant shops are given over to community services such as thrift shops and child care; some are occupied by trendy cafes. During a recent tour, Carnegie Mellon University Architecture Dean Steve Lee pointed out — while we slalomed through the street works that enlarge and beautify sidewalks, the properties that some of his former pupils recently acquired to open their offices.

The involvement of partners at all scales is inherent to reuse projects much more than it is to greenfield

development. Reuse happens in existing urban space; even when a place is abandoned, there is a community around it. The fate of existing places mobilizes opinion leaders, decision-makers, possible donors and investors, and media. The issue these places are facing is the loss and lack of uses and activities, so there is no need to be exclusive; in an abandoned factory or industrial area, there is usually room for more than one story, and mixed uses grant liveliness, vitality, and resilience to projects. Sharing must be incorporated in the design process by using community design tools, profiting from the fact that place and space are already there. On-site activities promote deeper understanding of the site in participants, generate shared creativity from reaction to the site, and show that reuse is already going on.

#### Colonize the Place

- ***As soon as it is feasible to do so, carve out a space on your site and bring people to it to attract attention, resources, and experimentation.***

Bring people to your space as soon as it is feasible to do so. This recommendation is rooted in the very early phases of adaptive reuse when it was a bottom-up practice promoted by marginal communities seeking cheap spaces nobody else was interested in. Adaptive reuse is a tactical art that occupies abandoned spaces, as squatters often did in the 1970s in cities such as London and New York. Colonization can start from scratch and at the very beginning of a reuse process: street art painting and temporary events are enough to open the way. Some uses might be feasible now, some later; some users could be “early adopters” that give way to more established tenants later, or themselves become more established.

Informality can stimulate experiments, especially in the early phases. The challenge of winning back derelict iconic spaces can mobilize local and urban

*Bring people to your space as soon as it is feasible to do so.*



Mess Hall in Washington, DC, an incubator for food entrepreneurs.

communities. Reuse of Russell Industries started with the “People’s Art Festival” organized by The Russell Center for Creative Arts, a non-profit where early artist tenants volunteered, subsidized by the developer. The group’s communication and program explicitly referred and appealed to urban “off” cultures; the highway front of Russell displays a bold full-height manga-style robot chimera by street artist Kobie Solomon, roaring at drivers. Street art was a winning low-cost way for keeping the Eastern Market in Detroit alive and attractive even in the city’s worst years. The area is becoming a lively cultural district where street food and fancy restaurants mix with art galleries and residential lofts; the Murals in the Market public art festival contributes to the process while continuing a 45-year-old strategy.

In Washington, DC, Ward 2 Neighborhood Planning Coordinator Andrea Limauro led the author on a tour through the booming food industry of the capital where old warehouses and docks are used as catering infrastructure. This is the case in the Mess Hall culinary incubator and the temporary restaurants in the 40 stalls of the Union Market, a location where food has been the core business for more than 200 years and will soon become the anchor of a huge mixed development that promises the creation of 20,000 new jobs. In both cases, real estate developers adopted guerrilla tactics learnt from underground practices to create a sense of place, make it a destination, test attractiveness, brand the site, and create value through place-making. This is a process that creates cultural and social value and later fully develops it into market value.

Some critics might label this artwashing. In cases where real estate pressure is high, art could be regarded as a subtle way to spark gentrification — although one should not forget that neighborhoods such as Chelsea in New York City or Shoreditch in London were derelict only 20 years ago. But in the places the author visited, no economic value was in sight when place-making started through art and culture: early adopters and seed investors were daring enough to bet on places and visions that many would have dismissed as unrealistic.

In addition, even if success were eventually to induce early adopters to move, there will always be room enough for new experiments in post-industrial cities. Detroit-based architect Charlie O'Geen, through an art project supported by the Kresge Foundation, is turning abandoned detached houses in the working class neighborhood of Klinger Street into small community facilities like a theater or a squash court. His ingredients are abandoned houses, passionate volunteers, scrap materials, community engagement, and personal commitment. His results prove that creativity can ignite urban regeneration even where you least would expect it to happen, including an ordinary blighted street in Detroit.

### Design to Reuse

- **Design a comprehensive plan for the reuse of the site that mutually benefits use, users, and spaces.**
- **Take advantage of any industrial features that might help lower costs or attract attention.**

After the reuse process has begun — the abandoned industrial site has been explored and assessed, a new vision has been shared, a network of partners committed to its revitalization has been activated, and colonization by early adopters, temporary uses, and events has started — a more comprehensive design approach is needed to create a successful

reuse and make it permanent. You now need a clear understanding of what is specific to reuse planning and design.

When you plan new, you start from a program and draw an urban scheme for it. When you reuse and adapt, you start from specific site conditions and infrastructure and create an appropriate program for them. In the early steps, an open program and undefined project are inherent to reuse: framed by a clear and bold vision, keeping goals relatively loose can attract new and unexpected players, allow for incremental development, and keep the process open, flexible, and reversible. This is something major top-down developments such as Navy Yard or Bakery Square have in common with minor bottom-up regenerations as in Corktown or Penn Ave. In most cases, planning might come after reuse processes have started, to sustain and upscale them in a new urban vision.

In the United States — as in Europe — up to the late 1990s, industrial infrastructure was assumed to be an obstacle that should be removed. Pittsburgh offers clear examples. The agenda of its urban redevelopment authority focused on clearing brownfield sites and then cleaning them up, often without any solid redevelopment plans. Projects such as the Pittsburgh Technology Center show how the existing structures of the Jones and Laughlin Steel Company, built in 1886, were completely demolished in 1983 to give way to a suburban high-tech campus. It was only in 2007 that the redevelopment authority launched a densification scheme to inject new energy into the location; the only surviving infrastructure, the Hot Metal Bridge that originally carried crucibles of molten iron from the blast furnaces to the open hearth furnaces to be converted to steel on the opposite bank, was restored as a pedestrian and bicycle bridge.

*The reuse project has to find the best adaptation between use, users, and spaces.*



The Bloomingdale Line in Chicago, an elevated trail built on a former railroad.

When you design for reuse, you use a completely different mindset. Place is already there, encumbered by existing structures, sometimes polluted, always loaded with dense memories, old pride, and new hopes, and often without any actual economic value. In reuse, the potential is central to program definition. The given situation — location, existing buildings, site specific assets, and infrastructure — is the starting point, as outlined in the first steps of this toolkit. Instead of being an obstacle, this is the frame in which reuse will happen and that will make reuse possible.

To make the most of this potential, the reuse project has to find the best adaptation between use, users, and spaces. This includes questions such as:

- What use might most profit with this space?

- What is to be done today with this triple height, this double span, this moving crane?
- What space can best host this use?
- Who can adopt this space?
- Whose future can this place incubate?

Many of the sites visited by the author had a specific adaptive reuse aesthetic and similar design tactics. For example, URBN HQ at Navy Yard in Philadelphia — fully professionally designed — has smaller “boxes” that occupy the large dock buildings, thereby confining the usable environments and allowing the structure to meet comfort requirements without requiring general heating of the huge, triple-height halls. Examples such as the main Nabisco building at Bakery Square or the infill housing schemes of Onion Flats

in Philadelphia — all LEED certified — provide further evidence that smart reuse design can revive existing industrial structures and achieve top energetic performances and comfort standards. Elements that are usually hidden in civil buildings — as pipes, wires, cables, panes, shades etc. — can be openly integrated in a post-industrial aesthetic, which simplifies construction and reduces costs.

Layering styles gives a tasteful vintage look and also avoids unnecessary finishings. Huge graphics define a bold urban image, and are also the cheapest way to brand a blind wall. Thus, industrial appearance is part of the charm of reused places but also sets the stage for low-cost construction techniques. Oversize buildings and infrastructure can be “frozen” and landscaped for extensive leisure and open-air uses, as the inspiring example of German Ruhr Emscher Park coal and steel district proves.<sup>3</sup>

### Place-Making and Funding

- **Use events to help raise money and draw attention to the your site.**
- **Long-term, take advantage of public and private funding opportunities.**

Funding of reuse projects can also profit from the inherently incremental structure of the reuse process. Existing infrastructure can be progressively activated without requiring big money in the early steps of place-making.

Community events, cultural festivals, art installations, and temporary markets are all

activities that can be organized by or with bottom-up players to temporarily occupy existing assets. One needs only to carry the costs of making the best preserved parts of a site accessible and safe, while other parts can await the larger budgets needed for full reuse. Early and partial occupation creates a positive micro-economy made of rents, fees, tickets, crowd-funding, donations, sales, and initial maintenance work. This generates economic and organizational resources that will be valuable for the subsequent phases and draws attention to formerly forgotten places, thereby creating value through place-making.

Public funding is often available to support the very early phases of reuse processes. This happens through small seed grants handed to local players. During the author’s talks with NPS and EPA officers in Washington, it was clear that both bodies pay attention to community engagement. For the EPA, the lackluster results of the so-called “Superfund” launched in the 1980 — a top-down program that involved huge sums of money — has led to an alternative approach that mainly prizes bottom-up actions. Projects start with small grants and technical support, and from this beginning adopt a holistic approach that sees cleanup as part of a more general sustainable redevelopment. At EPA, they call this “work with the willing”: no matter who takes the initiative — a local committee, a determined mayor, a neighborhood group, or a school director — EPA provides on-demand technical advice and seed grants to local actors.

After the early colonization phases, large reuse projects often require a private-public partnership and become eligible for more extensive public funding. In an age of shrinking public budgets on both sides of the Atlantic, it is important to understand how this can be done. While in Europe there is still a solid belief that the state or the European Union should extensively fund urban regeneration through general grants, as was the

*Large reuse projects often require a private-public partnership and become eligible for more extensive public subsidies.*

<sup>3</sup> Further, condemned parts and structures can become second-life raw materials and ready-made details for original design medleys that incorporate old pieces into new settings. In interiors such as at Russell Industries or Carnegie Robotics, or in the landscaping at Navy Yard, a labor intensive procedure can become a business in itself. Since 2009, the Rebuilding Exchange in Chicago since 2009 has diverted 10,000 tons of building materials from the landfill, made over \$2 million worth of quality reuse materials available for reuse, and hired 82 people with barriers to employment.

*The makers of reuse should create a story they are able to transmit to others to bring them in.*

case for decades from post-war reconstruction to the 1990s, the projects visited in the United States prove that public funding can be more effective if targeted at earlier phases and provided as a loan or tax credit rather than as a grant. Public funding works as seed investment in the most delicate phase of a redevelopment process, when the risk is higher and private funding cannot yet be guaranteed by mortgages, and is clearly related to the achievement by private beneficiaries of agreed and measurable goals of general interest such as heritage preservation, site remediation and environmental improvement, public transport and sustainable mobility, and water management.

This becomes clear when examining the funding for a successful private-public partnership project such as Bakery Square in Pittsburgh. Direct public funding (grants) was modest, comprising only 6 percent of total funding. It compensates local public agencies for public works, environmental protection, and site reclamation. Tax credits and public mortgage loans make up a further 10 percent of total funding. But in the first step of the project, they contribute to 27 percent of funding, declining in later phases. Public support is thus mainly used not to lower private investment but rather in order to reduce risk in early project phases. Public support is also mainly revolving: payback over time rebuilds finances for future projects, multiplying the impact of public money.

Restoring sustainable environmental conditions and preserving industrial heritage are public goals in U.S. and European policies, bringing further possible funding for reuse projects to be fully developed and completed. In most of the projects examined, tax credit for heritage preservation — managed at the federal level by the National Park Service — and brownfield cleanup funding from the EPA (in form of tax incentive up to 2011, afterwards as revolving loan) make up the difference by encouraging preservation over

demolition and sustaining brownfield rather than greenfield development.<sup>4</sup>

### **Run, and Evolve**

- **Reusing a site is a long-term process, so find a champion that will steer the project through uncertainty and opportunity.**

Eric Novak is the manager of the Russell Industrial Center in Detroit. His business card reads “manager of nothing,” but day-by-day he is turning “nothing” into value by running the 2.2 million sq. ft. plant with a lean team of three people. They welcome potential tenants and new settlers, assign them a location, survey required refurbishments, organize temporary uses and events, negotiate conflicts, and fix problems. Three simple rules apply at Russell: “respect the place, respect the people, pay the rent.” But Novak’s task is not simple at all.

With no exception, all adaptive reuse projects visited have somebody running them: whether a professional manager or an activist volunteering his/her time. Adaptive reuse is a long-term process of evolution rather than a pre-set project, and most processes see their goals change completely along the way. Even at larger sites with more established investors, institutional partnerships, and structured strategies, we see that these have been constantly adapted and modified to grasp opportunities and incorporate uncertainty. To see this process through and take advantage of opportunities, an inspirator, a caretaker, and an enabler is needed, either one

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<sup>4</sup> Both financing tools — tax-increase financing and tax credits — are not unknown in Europe. In Milan, underground public transport was financed in the 1950s with value capture, and the recently inaugurated Fondazione Prada — an example of adaptive reuse by Dutch OMA architects — benefitted from consistent tax credit for brownfields cleanup and for cultural investments. What makes them more effective in the United States is the possibility of turning them into equity by “selling” them to banks once assessed by tax authorities. This is the missing link in Europe, where tax credits are entitled only to final users, not assessed in advance, and cannot therefore be transferred nor be anticipated as equity funding. Fixing this point could fuel a new season of adaptive reuse in Europe.

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person or a team. Often steering is more important for a successful reuse than design. Always this role encompasses more tasks than would be covered by a standard development or facility management.

The makers of reuse should create a story they are able to transmit to others to bring them in. This narrative appears to be the most effective tool to steer a complex, uncertain, and pluralistic process. Each new settler, tenant, user, visitor; each event; each new achievement has to fit in and add to the story. Public events, press, and a strong digital presence should disseminate this story while building a virtual community around the reuse process and the real community involved in it. A

successful reuse process often means that some of the preliminary assumptions have to be reviewed on the fly, for instance by intensifying some spaces or redefining some uses. A successful reuse brings in new players that add new layers to the story and change the needs and goals of the project itself.

The abundance of space is a key resource in this evolutionary process. Reuse can profit from redundancy to allow future expansion of activities and uses within existing frames. This inherently incremental and fluid structure is what makes even the most daring reuse schemes feasible and reasonable.

# 5 Conclusion

**N**one of the reuse processes observed during the author's visits could be considered concluded. Within the fences of reused factories, acres of built space were still available. Around reused industrial sites, more areas awaited reclamation. Around rebuilt properties in industrial neighborhoods, boarded buildings and foreclosed plots were available for those wishing to join. A simple tour (even virtual) within and around the areas described would measure the potential still waiting to be activated and the possibilities lying ahead. Fortunately, industrial buildings are mostly well made and can wait many years for reuse.

The complex interplay of infrastructure, community, and place makes adaptive reuse projects long-term tasks offering both early short-term outputs and lasting benefits to cities. This toolkit shows the high degree of value that adaptive reuse can provide, and the process that individuals should go through when considering reuse of an industrial site. Because adaptive reuse is an evolution, the eight-steps path traced can often be relevant more than once for the same site, from exploration to evolution, to reclaim more space, welcome new users, and readapt what was already adapted.









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