

The institutional dynamics of land use planning: Urban industrial lands in San Francisco

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Abstract

Problem, Research Strategy, and Findings: Manufacturing and industrial activity can contribute to sustainable economic development, but this potential is lost to urban industrial rezonings. This is particularly the case in strong market cities where pressures to develop higher-value residential and office space are strong. The literature documents the industrial displacement process but has yet to probe the institutional factors behind industrial rezonings or the conditions that may catalyze supportive industrial land use policy. We contribute to filling this research gap by exploring how institutional dynamics shape industrial land use planning in San Francisco. Drawing on interviews and document analysis, we show how formal governance institutions, locally embedded intermediary organizations, and policy *imaginaries* shape policy change. Despite success in redefining and promoting the value of urban industrial lands, ongoing pressures remain around balancing competing land use agendas and priorities.

Takeaway for Practice: This research highlights the trade-offs and pressures involved in creating urban industrial land use policy in high-cost cities. The case draws attention to the importance of considering how the local institutional context for policymaking intersects with industry and urban development dynamics rather than assuming market logic alone dictates land use. Planners can better balance competing land use agendas and achieve positive outcomes when they focus on controlling policy narratives and work with intermediary organizations that possess specialist knowledge and connections.

Keywords: industrial land, industrial planning, institutions, urban manufacturing, zoning

High-cost cities across Australia, Europe, and North America face persistent conflicts around rezoning urban industrial lands to higher-value uses (Chapple, 2014, 2015; Curran, 2010; De Boeck & Ryckewaert, 2020; Ferm & Jones, 2016, 2017; Gibson et al., 2017; Grodach & Martin, 2021; Lester et al., 2013; Sprague & Rantisi, 2019; Wolf-Powers, 2005). Despite planning efforts in some cities to protect urban industrial land, strategic policy often considers such areas “functionally obsolete” and therefore prime candidates for mixed-use residential and office redevelopment (Ferm & Jones, 2016; Leigh & Hoelzel, 2012, p. 91). This results in a loss of industrial land and the economic development benefits that they may provide.

The literature documents the industrial displacement process but has yet to probe the institutional factors behind industrial rezonings or the conditions that may catalyze supportive industrial land use policy. We contribute to filling this research gap by exploring how local institutional dynamics shape industrial land use planning in San Francisco. San Francisco’s reputation as “ground zero of the new economy” (Walker, 2006, p. 113) and posterchild of the creative class (Florida, 2002) has depended on rezoning industrial land. Yet, amid tech-driven gentrification and sky-high housing costs, industry advocates and city officials attempted to negotiate the pressures of industrial displacement and develop a robust urban industrial land use framework. While successful in many ways, the creation and preservation of stronger Production, Distribution and Repair (PDR) industrial zones came with trade-offs that eroded industrial land and may only slow industrial gentrification.

We begin with a literature review on urban industrial lands and the institutional dynamics behind urban industrial planning. We next describe the research approach. The case shows how land use decisions and agendas are not simply a product of market-driven urbanism but intersect with the web of institutional decision-making. We emphasize that policy hinges on formal governance institutions, locally embedded intermediaries, and policy *imaginaries*- narrative frames that policymakers adopt to promote specific interests. Further,

policy shifts often stem from changing industry and urban development dynamics. In conclusion, we argue that planners may better promote the value of urban industrial lands and balance competing agendas when they focus on controlling policy narratives and work with intermediaries that possess specialist knowledge and connections. While there is no ideal strategy, and findings may not be transferable to weaker markets cities, the case sheds light on the opportunities and trade-offs behind planning urban industrial lands.

Institutional dynamics and industrial land use policy

The last decade has seen growing attention to the contributions of urban manufacturing and industrial land to sustainable and equitable economic development (Chapple, 2014, 2015; Leigh & Hoelzel, 2012) and in strategically planning for industrial land (Howland, 2010; Lester et al., 2013). Studies have found that on average manufacturing supports employment with comparatively higher wages and varied skills, encourages design and production innovations, and develops products and processes with low environmental impact (Clark, 2014; Fang, 2019; Friedman & Byron, 2012; Helper et al., 2012).

Much of this activity centers on a growing and diverse set of small and specialized manufacturing and local-serving businesses that rely on urban industrial land (Fox Miller, 2017; Gibson et al., 2017; Grodach et al., 2017; Hatuka et al., 2017; Schrock et al., 2019; Wolf-Powers et al., 2017). Numerous international studies show that central industrial zones provide low-cost space and flexible buildings that support business start-up and expansion, employment diversity, and essential services and supplies to local industries (Chapple, 2015; Hill, 2020; Gibson et al., 2017; Howland, 2010; Leigh and Hoetzel, 2012). A handful of cities have implemented protective industrial zoning including Portland, Chicago (Danilo, 2018; Fitzgerald & Leigh, 2002), New York (Davis & Renski, 2020), and San Francisco (Chapple, 2015; Grodach and Martin, 2018).

In the main, however, many cities- these included- have rezoned a significant amount of urban industrial land to deliver new residential and office space (Leigh & Hoelzel, 2012).

Many cities justify redevelopment based on an outdated vision of the post-industrial economy. They assume urban industrial zones are redundant because industrial activity has been offshored or relocated to the suburban fringe (Balsas, 2020; Grodach & Gibson, 2019). Under this logic, rezonings enable property investors to capitalize on the suppressed land values in underutilized industrial zones. This provides a means to address housing shortages or expand office space for growing professional services and knowledge economy jobs in denser transit-oriented places (Dierwechter & Pendras, 2020). While this appears to align with sustainability goals, rezoning industrial land also encourages property speculation, which perpetuates the displacement of industrial activity in the first place (De Boeck & Ryckewaert, 2020; Curran, 2004; Wolf-Powers, 2005).

While the market processes behind industrial displacement are understood, we know less about the institutional dynamics that affect industrial zoning decisions. Zoning is a fundamental tool of local government that stems from the competing set of values, norms, and discourses that define the local institutional context (Sclar et al., 2020; Sorensen, 2018; Storper, 2013). Zoning is not simply a product of neutral decision-making or purely market-driven, but a “socially dynamic and deeply embedded and contested collective project” that supports varied agendas (Sclar et al., 2020, p. 5). Through the regulation of land, governments may steer investment to particular areas, influence property prices, or address social goals tied to housing and employment.

While formal institutions, like zoning, share common features across places, application is shaped by the local environment of “inherited politics, networks, norms, and established rules of thumb about land use” (Baird-Zars, 2020, p. 176; Hirt, 2014; Sorensen, 2018). Yet, as Rodríguez-Pose (2013, p. 1042) argues, overturning certain features that define the institutional environment (e.g. norms such as the logic of highest and best use that justify industrial rezonings) is difficult because they are entrenched in local practice. Rather, successful policy intervention is more likely when targeting specific institutional barriers or

problems (such as poor awareness of industrial displacement or enforcement of regulations). Further, policy proposals are more likely to take hold “during critical junctures or moments of crisis,” when potentially path shaping events may create opportunities for actors to pursue new directions (Sorensen, 2018, p. 24).

Drawing on this work, we explore how three features of the institutional context influence policy outcomes around urban industrial land. This includes examining 1) how formal governance institutions channel support to actors and directives, 2) how locally embedded intermediary organizations work across divergent groups and negotiate local power structures, and 3) how actors promote policy imaginaries or the frames of meaning policymakers employ to support their goals. Further, we seek to determine if actors are more likely to redirect policy paths during critical junctures that emerge specifically from changing industry and urban development dynamics.

Governance institutions provide the framework for public and private action through the establishment, modification, and enforcement of planning and land use regulations (Yuan, 2019; Sorensen, 2018). They also make strategic policy and commit resources to support particular agendas. However, the ability to achieve objectives is constrained by prior regulations and investments, and the expectations these actions generate around land use and property values. For instance, a government may seek to retain urban industrial activity, but face challenges in passing new regulations due to the perceived property value and nuisance impacts fixed under previous zoning regimes.

The impetus for policy change may also emerge from *embedded intermediaries*, organizations outside formal government structures that possess the knowledge and capacity to navigate the local institutional context. Intermediaries facilitate communication and collaboration across different interest groups and provide varied support roles to constituents (Clark, 2014). Recent research suggests that intermediary organizations may be important for urban manufacturing given the high number of small firms with limited resources. Schrock et

al. (2019), Schrock & Wolf-Powers (2019, p. 375), and Wolf-Powers et al. (2017) show how maker intermediaries contribute to a “collaborative social infrastructure” by providing space, technical assistance, and a “local brand platform.” However, they find that intermediaries possess limited ability to address key institutional barriers. This includes bridging connections between new and established manufacturers and forging a policy narrative around the preservation of industrial lands in the face of development pressure.

This suggests that the ability to craft a *policy imaginary* is crucial. An imaginary is the set of discourses and practices policymakers employ to frame meaning and promote their goals (Grodach, 2012; Jessop, 2012; Planey, 2021). Successful policy imaginaries provide a coherent narrative that prioritizes policy agenda items and, ultimately, legitimizes a policy path while warding off competing interests. For example, Planey (2021) examines how conservative interest groups in the Chicago area adopted a manufacturing discourse that closed off potentially more progressive interests. Yet, policy imaginaries may be appropriated for other uses as well. Jessop (2012) explains how the imaginary of a Green New Deal, initially useful in building progressive alliances, is a floating signifier increasingly taken over by neoliberal interests. Conversely, Grodach (2012) shows how cultural planners in Austin, TX adopted the creative class imaginary to promote their policy objectives.

The following case study draws on this work to examine industrial land use planning in San Francisco. We ask: *how do formal governance institutions, embedded intermediary organizations, and policy imaginaries influence planning for industrial lands?*

Examining the institutional dimensions of planning for industrial lands

We draw on document analysis and expert interviews to study the institutional dimensions of planning for urban industrial lands in San Francisco from the late 1980s to 2018. We selected San Francisco as a case study due to the persistent conflict around rezoning industrial lands for higher-value uses and the associated tension between preserving employment lands and creating affordable housing. The city’s limited land area and lower

value industrial zones near Downtown and the gentrifying Eastern Neighborhoods have made these zones a target for redevelopment for decades (Fig. 1) (Hartman, 2002). This become particularly acute from the 1990s as the tech economy expanded (Solnit & Schwartzberg, 2002; Stehlin, 2016). By 2018, PDR/industrial zones covered just 3.9% of developed land in the city, down from 12.6% in the 1990s (San Francisco Planning Department, 2014, 2019).

Tech-led gentrification has contributed to the city ranking as one the wealthiest and most highly educated in the country. Yet, it is home to sizeable lower-income and minority populations. It also supports a diverse and growing industrial base of predominately small enterprises (Appendix 1). City officials and the manufacturing advocacy organization SFMade claim this base is an important source of employment for these demographics (San Francisco Mayor's Office, 2016; San Francisco Planning Department et al., 2014; SFMade, 2016). Alongside this, the San Francisco Bay Area is home to the maker movement and early makerspaces (workspaces that provide affordable, shared access to tools, equipment, and technical knowledge).¹

These conditions make San Francisco a unique and complex case to study how the three institutional features of interest shape industrial land use planning. While representative of the pressures and conflicts surrounding planning for urban industrial land in high-cost cities internationally, San Francisco is an extreme case. Compared to representative cases, extreme cases are useful for highlighting insights that are less pronounced in more typical cases (Flyvbjerg, 2006; Yin, 2012). As such, the intention here is to better understand the institutional dimensions and challenges inherent in this context and findings may not apply where market pressures are weak.

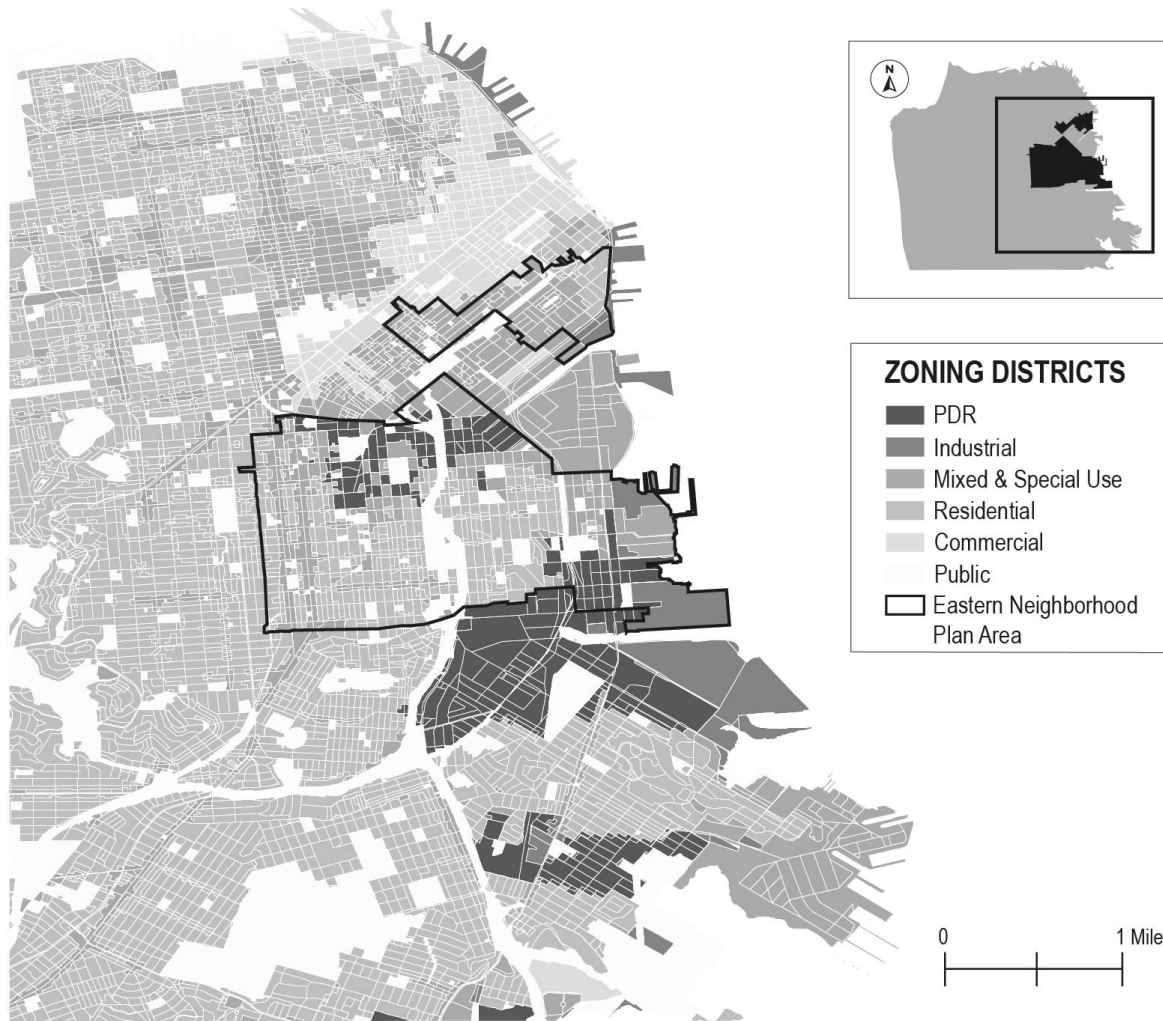


Figure 1. San Francisco Zoning Districts

Source: <https://data.sfgov.org/Geographic-Locations-and-Boundaries/Zoning-Map-Zoning-Districts/3i4a-hu95>.

Note: For legibility, this map shows primary zoning district types based on current zoning. Map by Emily Campbell

The case study involved an analysis of over 30 policy documents as well as media reports on industrial zoning. Sources included neighborhood plans, industry plans and reports, planning codes, and other regulatory documents from public and private entities involved in industrial land use planning. Document analysis enabled identification of the major policy milestones and actors, and the issues, debates, and events driving policy imaginaries over time. It also provided the foundation to develop interview questions.

Following the document analysis, we conducted 12 expert interviews with individuals in formal governance institutions and intermediary organizations closely involved in San Francisco's industrial land planning. This included all lead planners responsible for PDR and

area plans, Directors and all individuals responsible for industrial development at the Office of Economic and Workforce Development (OEWD), and the lead personnel at SFMade (See Appendix 2 for a detailed description of the methodology).

Interviewing people with specialized knowledge, experience, and decision-making powers is a common approach in sociology and planning studies because it can provide access to privileged information and insight into the motivations of policymakers (c.f. Bogner et al., 2009; Hirt, 2007). While this is useful to study formal governance decision-making including the crafting of policy narratives, it is limited because it biases policymaker viewpoints and does not capture different community voices affected by the planning process. Future work can strengthen this study by putting a community lens on the institutional dynamics of urban industrial land use planning.

Industrial land use policy and institutional change in San Francisco

In San Francisco, four policy imaginaries frame how planners and other key actors respond to the question of industrial lands over time. From the mid to late 1980s to the peak of the dot-com bubble in 2000, the City viewed industrial lands as a means of *controlled gentrification*. They intended to slow displacement by allowing specific non-industrial uses in industrial zones. From the early 2000s, community groups reimagined industrial lands as a source of *neighborhood preservation*. They called for stricter regulation of industrial zones to resist gentrification. This engendered a drawn-out planning process in the Eastern Neighborhoods that attempted to balance employment alongside longstanding housing challenges. During this time, planners started to view industrial lands as *essential for city functions*. This imaginary culminated in the introduction of protective PDR zoning. Finally, following the 2008 recession and the emergence of the maker movement, the intermediary organization SFMade promoted a new imaginary of industrial lands for *local production*. The layering of these policy imaginaries raised the significance of manufacturing and industrial land in San Francisco although ongoing competition for industrial zones remains (Fig. 2).

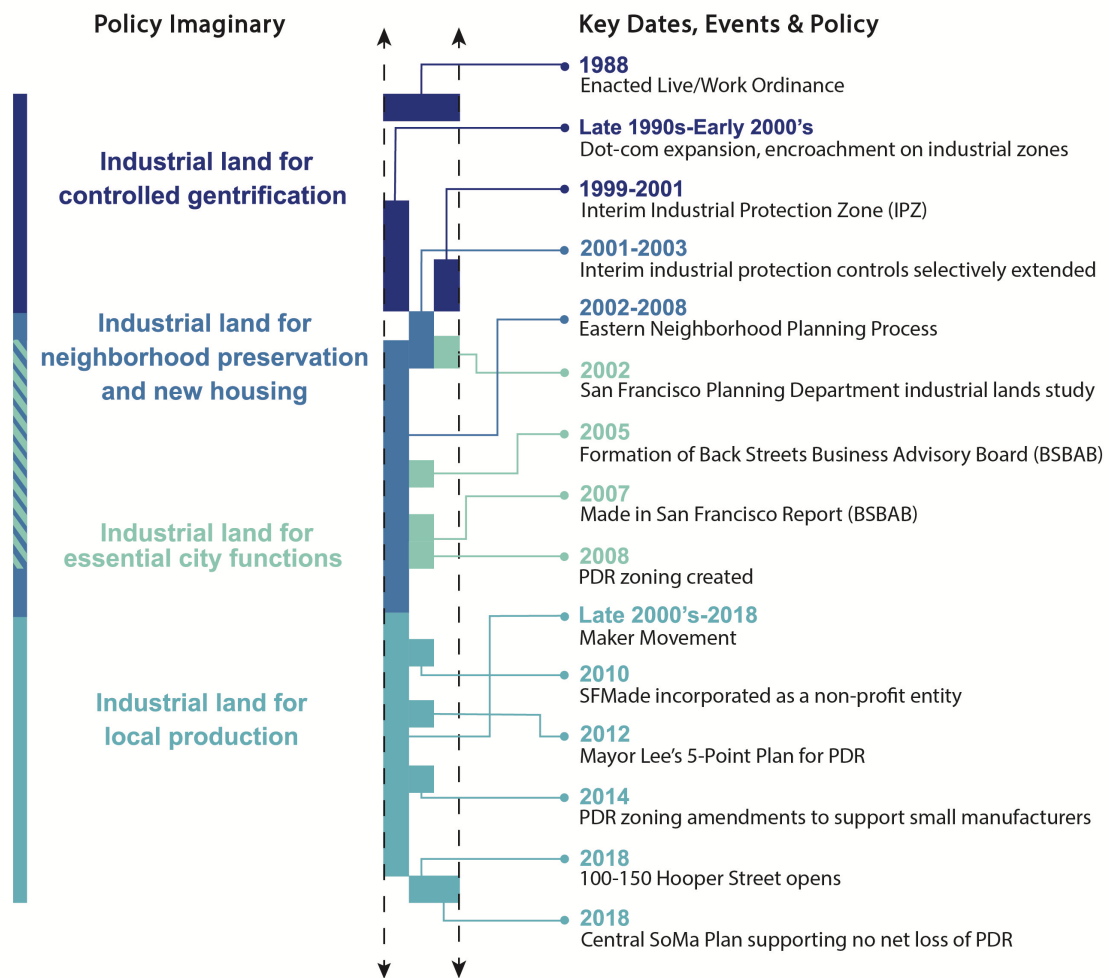


Figure 2. Timeline of key industrial planning milestones in San Francisco

Note: Left column denotes the four main policy imaginaries along a timeline from 1988-2018. The right column shows key dates, events, and policy that align with each policy imaginary. Hatched lines indicate overlaps. Graphic by Emily Campbell

Industrial land for controlled gentrification

From the 1960s, central industrial areas were targeted by the city's growth machine for large-scale redevelopment to expand the downtown (DeLeon, 1992; Hartman, 2002). By the mid-1990s, this shifted to smaller-scale residential and office projects under a soaring dot-com economy driven by the growth of new internet-related firms (Solnit & Schwartzberg, 2002). Tech-induced growth, along with weak planning for industrial lands, put pressure on existing occupants and began to change the land uses and business mix in central industrial areas. This set in motion new approaches that aimed to go beyond treating

industrial land as a reserve of undervalued real estate.

San Francisco planners readily admit that the city lacked any real protection or recognition of industry through most of the 1990s. As is the case in many cities, San Francisco's industrial zones were not set up to protect industrial activity. Rather, they stipulated where certain types of industrial operations could locate but did not prohibit competing uses. As one planner put it, "there was industrial zoning, but it allowed anything. It allowed housing, it allowed office space, it allowed anything to both economically outcompete it, and just create conflicts" (Interview 5). Well-located industrial land was therefore a target for nonindustrial uses, which would bid up industrial rents and displace existing businesses.

From the mid-1980s, the City approached industrial land as a means of slowing and steering gentrification. Foremost, a 1988 code amendment legalized artist residences and workspaces in industrial zones. What started as controlled gentrification to support affordable housing and workspace for artists, enabled the dot-com redevelopment boom of the 1990s (Parker, 1994). Developers took advantage of unspecific code language to build market-rate live-work units. From 1997-2000, over 1,400 new live-work units were completed and over 3,100 were in the planning process (San Francisco Board of Supervisors, 2002)² at rents up to 30% above the city average (San Francisco Planning Department, 2002). Additionally, the construction of new office space primarily for web and software services increased. These uses were allowed under a conditional approval process for business services although planners intended the code to permit services like printing in industrial areas. As industrial rents rose, artists and industrial businesses were priced out and existing industrial spaces were demolished (Interview 3, 4).

This overdevelopment acted as a critical juncture that catalyzed a new industrial policy path. Toward the peak of the dot-com bubble, the planning commission responded to the loss of industrial space by creating an interim Industrial Protection Zone (IPZ) (San

Francisco City Planning Commission, 1999). This prohibited the construction of new housing including live-work units in industrial zones from August 1999-February 2001. However, illegal conversions went on unabated because the City had no code enforcement team until the mid-2000s (Interview 4). Moreover, the IPZ set aside a 650 acre “mixed-use housing development encouragement zone” that further reduced the remaining industrial land (San Francisco Board of Supervisors, 2002; San Francisco Planning Department, 2002, p. 39).

Industrial land for neighborhood preservation and new housing

Simultaneously, these changes in the area gave way to residents organizing around the protection of industrial lands as a bulwark against rising rents and preserving the existing character of the area (San Francisco Board of Supervisors, 2002; Mission Coalition for Economic Justice and Jobs, 2003). Community organizations were less concerned with the job loss or even traditional residential-industrial conflicts like noise, as they were with residential displacement driven by the growth of dot-com businesses.

Changing governance institutions partly enabled this attention. The reintroduction of district-based Board of Supervisor elections from at-large elections in 2000 encouraged candidates to run more neighborhood-focused campaigns. In District 10, where the majority of San Francisco’s industrial land is located, this turned attention toward industrial gentrification and changing neighborhood character (Interview 4, 7).

The combination of localized governance and community activism sparked the Eastern Neighborhoods Plans (ENP). At the start of the planning process, the City attempted to cool development by placing a six-month moratorium on construction of live-work units after the expiration of the IPZ. Shortly thereafter, the City formally adopted interim zoning controls in some industrial zones that were proposed by the Mission Anti-Displacement Coalition, a group of community organizations and housing advocates (Interview 1; Mission Coalition for Economic Justice and Jobs, 2003; San Francisco Board of Supervisors, 2002; Woo, 2017).

The ENP process was multifaceted and complex, lasting not six months as intended, but seven years. Still, planning was primarily driven by housing and related objectives not industrial development. The ENP process was established to develop a rezoning proposal that “reflect(ed) local values” for residential and industrial land uses and to “identify appropriate locations for housing in the City’s industrially zoned land to meet a citywide need for more housing” (San Francisco Planning Department, 2003, p. 19).

Adopted in December 2008, the ENP responded to the neighborhood preservation and affordable housing objectives by dividing the Eastern Neighborhoods industrial zones into two new zoning designations: Production, Distribution, and Repair (PDR) and Urban Mixed-Use (UMU). On just under half of the industrial lands, PDR zones were a response to the overdevelopment of the last 20 years. This designation was meant to resolve prior development conflicts and establish an “industrial reservoir” (Interview 2). PDR zoning prohibited residential uses, allowed very limited office and retail space, restricted nonconforming uses, and aimed to halt illegal conversions (Economic and Planning Systems 2005; San Francisco Planning Department 2007).³ Alongside PDR zoning, the City established a new business development position in the Office of Economic and Workforce Development dedicated to industrial business (Interview 6, 8).

In contrast, UMU districts allowed residential and office space alongside industrial activities. UMU was “intended to promote a vibrant mix of uses while maintaining the characteristics of this formerly industrially-zoned area” and to buffer residential areas from PDR zones (City and County of San Francisco, 2021, Sec 843). This effectively sacrificed industrial lands for higher dollar uses as under prior policy. Planners admit that the incursion of live-work units into industrial areas influenced UMU zoning because some industrial areas were “surrounded and infiltrated by housing and they were in certain pockets of certain neighborhoods that it just didn’t make sense anymore to try to hold the line” (Interview 3, 4, 5).

Planners understood this would mean that UMU zones would transition away from industrial to housing as prices appreciated. They sought to leverage the value uplift for the development of more affordable units through higher affordability requirements on new development, but these have since been removed (Interview 2, 4, 5). UMU was also a concession to landowners who feared that PDR would depreciate the value of their property (Interview 2, 5). However, as a planner explains, “there were a lot of skeptics that said we were zoning [PDR] for...the past and there was no need for this in San Francisco...And now, ten years later...we have a crisis. We are losing industrial businesses because they can’t find any place to go” (Interview 3).

Industrial land for essential city functions

The new zoning designations represented a compromise across two competing policy paths. One that essentially continued the trajectory of controlled gentrification and another that represented a “sea change in mentality,” which framed industrial businesses and jobs as essential to the city’s future (Interview 2). These policy directives competed over the subsequent decade.

The development of a policy imaginary that framed industrial lands as essential to the city rather than a reserve of undervalued real estate evolved out of the ENP process. This occurred because planners faced “all kinds of land use conflicts. Businesses were being pushed out and...in a city as small as San Francisco, we couldn’t really allow that to keep happening, because they were businesses that we wanted, that were necessary” (Interview 2).

This positioning first emerged in a 2002 industrial lands study by the San Francisco Planning Department (2002). It was reinforced by the 2005 formation of the Back Streets Business Advisory Board (BSBAB) and its report, *Made in San Francisco* (BSBAB, 2007). These advocacy documents shifted the discussion around industrial lands, planting the seeds of direct industry representation and cultivated a new narrative to counter the long-standing argument that industrial lands were obsolete.

The 2002 industrial land study promoted the term PDR over industrial to “avoid conjuring images of heavy, ‘smoke-stack’ industry, such as large manufacturing plants, smelting operations, and refineries” (p. 4). The report emphasized that contemporary manufacturing is geared toward:

specialized goods with a significant design component rather than standardized, mass-produced items. They are in San Francisco because it allows them access to a specialized market and labor force and they are able to pay a premium to be here (San Francisco Planning Department, 2002, p. 19).

Consequently, “PDR businesses often locate in close proximity to one another, creating clusters of related activities” (p. 41). Additionally, these businesses are important because they provide “higher overall wages than jobs in other sectors” including “higher wages for workers with the lowest levels of skills and education.” However, these employment clusters were being squeezed between the “‘dot-com’ explosion and the City’s need for new housing” (p. 4).

These themes were underscored by the Back Street Businesses report (BSBAB, 2007), released toward the end of the ENP process. However, the report directs the focus towards business that:

help make the city economy and residents function on a day to day basis...and jobs we do not usually see from the vantage point of the downtown core or the tourist zones or the shopping districts—kind of like the engine room on a ship, often unseen and often underappreciated, but always relied upon by the top deck to keep things moving (BSBAB, 2007, p. 7).

According to the report, the “hidden” nature of back streets businesses- and the lack of an industry advocacy voice- mean that important businesses and quality jobs go overlooked by the public and city officials. This is “exacerbated by extensive land use pressure in this land-constrained city to convert traditional industrial areas and building stock into housing and

non-Back Streets business uses” (BSBAB, 2007, p. 5).

Surprisingly, however, PDR and ENP planning left manufacturing out of the decision-making process. According to some participants, although PDR stemmed from the ENP process, it was “something that the vast majority of manufacturers didn’t even know was happening” (Interview 9). This is likely because, although the 2002 industrial lands study recognized a specialized manufacturing sector, planners created PDR primarily to support essential city services:

We basically did [PDR zoning] for distribution because you can’t offshore UPS- and repair- you can’t offshore your auto repair...but you can offshore your manufacturing.

Nothing has to be made in San Francisco (Interview 2).

Industrial land for local production

The City’s attitude toward PDR zoning changed shortly after the enactment of the new code. The establishment of SFMade alongside the rise of San Francisco’s maker movement following the 2008 recession provided a critical juncture to focus more directly on industrial lands for production.

The emergence of San Francisco’s makers was something city planners and economic development officials alike did not anticipate:

We weren’t really thinking about manufacturing staging any kind of comeback necessarily. And then you have the maker movement that starts to happen. It was a really lucky coincidence (Interview 3)

The big surprise for me...was that there was so much growth and appreciation for things that were locally made. No one I think saw that coming, the maker trend...that benefited us hugely (Interview 6).

The City's knowledge of and approach to makers as a mode of manufacturing was shaped in part by SFMade. SFMade was founded by a local handbag maker and 11 other San Francisco manufacturers as the ENP process closed. However, its genesis was largely separate from the City's work on PDR and the ENP. The organization initially aimed to promote local manufacturing and create an inter-firm support network to help survive the recession and high-cost real estate market (Selna, 2010). The organization formally incorporated as a nonprofit in 2010 "at a time when the city had seemingly forgotten it even had much manufacturing left" (Interview 9). It quickly grew to represent 650 firms and expanded its remit beyond branding to workforce development, business and site assistance, industrial policy advocacy, and industrial property development.

SFMade also played a key role in making Production the core focus of PDR zoning by driving a new policy imaginary around a renewed and growing local manufacturing sector (SFMade, 2011). From early on, they promoted a specifically urban brand of manufacturing defined by small, specialty production born from- and integral to- the city's image of "creativity and alternative social and cultural identity" (Selna, 2010, para. 7). Garment manufacturers, food and beverage producers, home furnishings, and others merged "the craft-based skills of urban and immigrant communities with prowess in the design and creative sectors" (Interview 9, 10; SFMade, 2011, p. 1, 2014, 2015; Appendix 1).

SFMade also promoted urban manufacturing as an "equity engine" supporting "artists, skilled union craftspeople, formerly low-income women, immigrant families, and...individuals from other at-risk populations (SFMade, 2015, p. 1). This imaginary resonated with the City's recessionary employment concerns and tapped into the growing political discourse around economic inequality (Doussard, 2015). Doing so gave PDR zones new relevance despite ongoing housing challenges. It provided a justification to counter the city's post-industrial gentrification and the old logic behind rezoning albeit at a time when the city had already lost much of its industrial lands. Further, the focus on artisan

manufacturing risked continued industrial gentrification as small-scale makers could bid up industrial real estate prices.

SFMade helped to steer industrial land use policy by directly brokering communication across government and manufacturers. From early on, the intermediary organization claimed to represent 80% of the city's manufacturing sector (SFMade, 2011). This evolved into a more formal partnership with the OEWD under Mayor Ed Lee. To this end, the City committed funding to SFMade through Federal stimulus and CDBG funding sources (Interview 8, 9). Further, Lee's 2012 plan for PDR aligned with the SFMade platform focused on the preservation of existing industrial buildings and incentivizing the development of new manufacturing space (San Francisco OEWD, nd).

To realize these objectives, the City with SFMade developed a 2014 overhaul of PDR zoning (City and County of San Francisco, 2021, Secs. 210.3c, 219.1). The code amendments strengthened support for contemporary manufacturers, which were facing difficulty securing appropriate PDR space due to existing size and use restrictions and low vacancy rates (San Francisco Planning Department, 2014; Interview 2, 3, 9). The amendment addressed these issues by 1) allowing conditional uses such as food and beverage that are clustered in PDR zones as-of-right, 2) permitting multi-tenant industrial buildings to share limited accessory retail space, and 3) revising the size limits on Small Enterprise Workspaces (multi-tenant workspaces in a larger building) to better fit demand.

The amendment also 4) encouraged construction of new PDR space by allowing office or institutional uses on vacant or "substantially underutilized" properties if the development includes a minimum of 33% floor area for PDR (City and County of San Francisco, 2021, Sec. 210.3c). This aimed to incentivize the development of new PDR space by allowing higher-value uses to take advantage of comparatively lower industrial rent levels. The provision responded to the space needs of small manufacturers by allowing subdivided space for multiple, small tenancies rather than a single large industrial tenant. The first

project completed under the new code was 100-150 Hooper Street developed in partnership between SFMade and UrbanGreen Devco on a former self-storage site. The complex includes a multi-story industrial building with 56,000sf of below-market PDR space and two other buildings with ground floor PDR and upper floor offices leased to software giant Adobe (San Francisco Planning Department, 2015). PDR tenants range from cut and sew operations to specialty food producers.⁴

The future of urban industrial land?

While Hooper Street provides new manufacturing space on vacant sites, it nonetheless depends on the incursion of higher-value uses into industrial zones. This may bid up land prices and facilitate industrial gentrification within protected PDR zones even as it creates new space for local production and employment. Despite the equity emphasis in the new manufacturing imaginary, this is how the City seeks to address the competing trade-offs around housing, tech growth, and local production and employment. The Central SoMa Plan is the latest example (San Francisco Planning Department, 2018). Adopted just after the Hooper Street opening, the plan rezoned a pocket in the northeastern end of the Eastern Neighborhoods PDR as mixed-use to capitalize on “the potential for dense transit-oriented development” and respond to an office and housing shortage (Fig. 1) (Interview 4, 5). The plan allows significant height and density increases for new office projects near a planned subway and promotes affordable housing construction through streamlined permitting (City and County of San Francisco, 2021, Sec. 249.78, Sec. 343).

While rezoning PDR, the plan aims to “ensure the removal of protective zoning does not result in a loss of PDR in the Plan Area” (San Francisco Planning, 2018, p. 38). It supports this paradoxical goal through a transfer of development rights (TDR) scheme requiring commercial projects that remove PDR to replace the space on site or nearby (City and County of San Francisco, 2021, Sec. 249.78).

The fact that the City aims to protect industrial space in an area with considerably

higher potential land value is significant. However, this approach resembles the earlier Urban Mixed-Use zone, which does not prohibit industrial activity but effectively subsidizes its displacement by opening the zone to higher-value uses. This will likely price out all but high-end maker-manufacturers. As a lead planner behind the Central SoMa Plan acknowledged, this experiment in industrial mixed-use development will likely produce “boutique PDR space...these are [not] going to be autobody shops or even print shops, or warehousing. It will probably be some kind of maker space or brewery” (Interview 5). As a result, although planners aim for “no net loss of PDR space” (Interview 2), they are consciously prioritizing certain types of PDR activity that are compatible with market demand. While surrounding PDR remains protected, Central SoMa could be the test case for future mixed industrial rezoning.

Further, the TDR scheme may not support the goal of preserving PDR. As SFMade representatives cautioned, infill developers often lack experience in constructing appropriate industrial space. This is particularly the case where noise, odor, and truck traffic impact tenants in poorly constructed residential buildings. As a result, new PDR spaces may become occupied by low-impact uses like art galleries or remain vacant (Interview 10).

Nonetheless, SFMade’s Hooper Street project and its policy imaginary that returns industrial land to local production may very well be a model for future industrial areas in high-cost settings. The building demonstrates that diverse types of manufacturing can exist alongside other uses in multi-story buildings. It dispels the standard practice of blunt industrial zoning and encourages more nuanced designations that consider location and type of use. Yet, while Hooper Street is a clear product of this policy imaginary and redirects attention to the possibility of urban manufacturing, it may not address the wider challenges around industrial gentrification.

Conclusion

Strong market cities will likely face ongoing pressure to rezone urban industrial land

even after the recent collapse in demand under Covid-19.⁵ While researchers have explained the market-driven logic behind rezonings, little work has studied the institutional dimensions of industrial land use planning. We respond to this research and practice gap by examining how institutional factors and changing industry and urban development dynamics affect industrial land use planning in San Francisco over thirty years.

San Francisco's approach to industrial lands evolved out of a failure to slow illegal conversions under 1990s tech-driven gentrification. The Eastern Neighborhoods planning process presented a compromise. It approached industrial lands as an opportunity to develop new housing and preserve neighborhood character while simultaneously implementing PDR zoning, which preserved industrial areas. Recessionary employment concerns alongside the emergence of the maker movement provided a critical juncture for intermediary SFMade and City officials to reimagine industrial lands as a source of local production. SFMade mediated the process of reworking institutional arrangements to be more responsive to industrial businesses- particularly small manufacturers that could survive the city's high-cost environment.

While the case does not offer a template for best practice, it nonetheless has three important implications for cities facing similar pressures. First, the San Francisco experience highlights the trade-offs and pressures that planners face in creating supportive urban industrial land use policies. Planners faced a balancing act across competing agendas concerned with employment and production space, affordable housing, and feeding the insatiable appetite for office space in an ever-growing tech economy. While local production and employment have become more relevant to policymakers, PDR uses cannot compete with other uses in central areas. PDR zoning was therefore a landmark for San Francisco. However, despite low vacancy rates, the zone did not incentive the upgrade of older industrial properties or construction of new space- a challenge in other industrial land retention programs (Davis & Renski, 2020). This encouraged strategies to support new PDR

development like the Central SoMa TDR and SFMade's Hooper Street complex but did so through introducing higher-value uses that could perpetuate industrial gentrification.

Second, the study highlights how policy imaginaries, or the frames of meaning policymakers employ to support their goals, are crucial in shaping planning agendas. The four policy imaginaries guided how actors responded to industrial lands and provided the means to justify changes to land use regulations. Policy imaginaries defined the values behind land use, which in turn rationalize the application of specific regulations. Current PDR zoning, which attempts to balance protection with the need for new space for small manufacturers, would not exist but for SFMade's industrial policy imaginary. This evolved out of the initial protective PDR zoning, which planners created to support essential and cost-sensitive city functions, but without deep knowledge of the specific space needs of urban industrial land uses. Prior imaginaries were similarly tied to the way policy articulated the value and purpose of industrial lands as a source of controlled gentrification or neighborhood preservation when concerns revolved more around residential than industrial gentrification.

Stemming from this, policy imaginaries seem more likely to stick when the narrative arguments emerge during critical junctures at the crossroads of changing industry and urban development dynamics (Sorensen, 2018). Industrial policy imaginaries for controlled gentrification and the preservation of neighborhood character were responses to overdevelopment and gentrification during the dot-com bubble. The 2008 recession and rising attention to a maker economy paved the way for actors to frame industrial lands as a source of local production and employment.

Third, planners should recognize the importance of working with intermediary organizations. Intermediaries can bring specialist knowledge that planners lack and the ability to foster institutional synergies across sector lines. SFMade developed relationships with city departments and manufacturers alike, thereby lending legitimacy to planning and economic development efforts and assisting officials in better responding to local manufacturing needs.

Their connections and knowledge encouraged Planning and OEWD to support local production as a viable and necessary urban land use. SFMade also strengthened the capacity of these agencies to push a PDR agenda in a challenging high-cost context.

These lessons may assist planners in negotiating the market pressures on urban industrial land in high-cost cities into the future. Yet while planners may develop more convincing policy imaginaries and work with intermediary partners to promote urban industrial zoning, they cannot expect to evade the market entirely. Planners must be mindful of the types of manufacturing and other industrial activity that are feasible in a given market and institutional context and think strategically about negotiating policy that is responsive to urban and industry change.

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Appendix 1. San Francisco Demographic and Industry Employment Profile

Appendix 1 presents basic descriptive statistics for San Francisco City (and County) compared to the US. Although San Francisco contains a considerably larger share of high-income households, the proportion of those earning under \$25,000 per year is close to the national level (Table A1). Similarly, while the city claims a much higher share of people with a Bachelor's degree or higher, the proportion without a high school diploma is about on par with the US (Table A2). In contrast to the country as a whole, San Francisco is a non-white majority city primarily due to its large and diverse Asian population (Table A3).

Table A4 shows PDR industry employment and establishment data for 2010-2019 and compares employment growth to Professional employment and total employment. PDR and Professional industries growth rates are equivalent and have outpaced San Francisco's total employment. However, PDR employment is boosted by the inclusion of 511 Publishing Industries (except Internet), which experienced substantial growth.

According to the San Francisco Planning Department (2019), construction and transportation (48.9%) and manufacturing (23.7%) account for the majority of industry employment in PDR industrial zones specifically. City-wide, manufacturing industries account for only about 8% of PDR employment while construction, transportation and warehousing, and wholesale trade make up nearly 50% combined. Food, apparel and computer and electronics manufacturing make up the largest manufacturing employment industries (San Francisco Mayor's Office et al., 2016). The vast majority of PDR industries are comprised of predominately of small establishments (<20 employees).

Appendix 2. Methodological Appendix

The case study relies on document analysis and interviews to study the institutional dimensions of planning for urban industrial lands in San Francisco from the late 1980s to 2018. Document analysis is an "iterative process" that involves "skimming (superficial examination), reading (thorough examination), and interpretation" (Bowen, 2009, p. 32). The

researcher organizes information related to the research question into categories for more focused review and refines this information into pertinent themes in relation to the object of analysis. We selected documents for analysis based on a web search for publicly available plans, reports, and regulatory documents pertaining to industrial zoning and planning in San Francisco over the study period. We identified over 30 sources primarily from the websites of the San Francisco Planning Department, Office of Economic and Workforce Development (OEWD), Mayor's Office, and the manufacturing advocacy organization SFMade. The purpose of the document analysis was two-fold. First, these sources allowed us to construct a timeline of key industrial planning milestones based on significant events, issues, policy, and policy discourse (Fig. 2). Second, documents were essential in identifying interviewees and developing the interview questionnaire to enable deeper insight into formal governance, embedded intermediaries, and policy imaginaries over time.

We began with an initial scan of documents to identify recurrent issues and debates identified in the documents in relation to strategic policy and regulatory proposals and changes. This also included examination of policy discourse and issue framing that may indicate formative events or critical junctures that influence decision-making. The review helped to establish an initial chronology of policy milestones and supporting thematic narratives in which to categorize policy outcomes and influences. This process was refined through deeper, more comprehensive reading to confirm details that comprised the timeline and, ultimately, develop an initial version of the four thematic phases used to structure the analysis of the three institutional dimensions under study (Fig. 2).

Document analysis also provided a foundation to develop interview questions and identify interviewees. We conducted 12 interviews and selected people due to their specialized knowledge, involvement, and influence in industrial land use planning. This included plan and report authors and other key people from the San Francisco Planning Department, OEWD, and SFMade. We also conducted interviews with two local community

organizers and an industrial property developer involved in PDR projects (see interview list below). While this is a small cohort of individuals, it represents virtually all lead actors within government and SFMade, which were involved in industrial land use planning.

Semi-structured interviews lasted between 45 minutes and two hours and took place in interviewee's workplaces except for two telephone interviews. Questions focused on the individual's involvement in and opinions surrounding industrial land use planning in San Francisco. The interviewer organized questions around five topics to gain the interviewees' perspective on:

- the factors encouraging policy attention to urban manufacturing
- definitions of manufacturing and how this shaped PDR policy
- the relationship of neighborhood planning efforts to PDR policy
- how competing land use pressures including housing, office and tech-based development influenced strategic approaches to and framing of PDR policy
- the impacts of specific policies and policy documents and the current and future challenges in realizing policy objectives.

During interviews the interviewer took notes on emerging themes for later comparison to the document analysis and to pursue follow up lines of inquiry. This assisted in developing a better understanding of the relationships across the three institutional features under study and in interpreting the influence of particular events and frames behind policy. It also confirmed or provided additional detail on key policy debates and decision-making gleaned from document analysis. Particularly in terms of policy imaginaries, interviews helped to probe how and why actors frame key issues and attempted to address competing interests and debates.

Interviews were recorded and transcribed for analysis using NVivo software. Initial analysis began with a preliminary reading of all transcripts to identify key words, concepts, and phrases. These were entered in NVivo and grouped under the five question areas above

by one researcher. Another researcher continued to review and refine the groupings to support the four themes in Fig. 2. Following this process, we re-reviewed documents to confirm responses, follow lines of inquiry suggested by interviewees, and finalized analysis under the four thematic areas.

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Anonymous Author Interviews

Interview 1. Community organizer, January 11, 2019, San Francisco.

Interview 2. Planner 1, January 8, 2019, telephone.

Interview 3. Planner 2, January 9, 2019, San Francisco.

Interview 4. Planner 3, January 10, 2019, San Francisco.

Interview 5. Planner 4, January 11, 2019, San Francisco.

Interview 6. Economic Developer 1, January 8, 2019, telephone.

Interview 7. Economic Developer 2, January 11, 2019, San Francisco.

Interview 8. Economic Developer 3, January 11, 2019, San Francisco.

Interview 9. SFMade 1, January 10, 2019, San Francisco.

Interview 10. SFMade 2, January 10, 2019, San Francisco.

Interview 11. Non-profit Community Organization Director.

Interview 12. Industrial Property Developer.

Table A1. Household Income (annual), 2010-2019

	San Francisco		United States	
	2010	2019	2010	2019
Less than \$24,999	22.0%	15.6%	24.9%	18.1%
\$25,000 to \$34,999	7.3%	4.9%	10.8%	8.4%
\$35,000 to \$49,999	8.8%	6.2%	14.2%	11.9%
\$50,000 to \$74,999	13.1%	9.8%	18.3%	17.4%
\$75,000 to \$99,999	11.7%	9.0%	11.8%	12.8%
\$100,000 to \$149,999	16.7%	15.6%	11.8%	15.7%
\$150,000 to \$199,999	9.1%	11.9%	4.2%	7.2%
\$200,000 or more	11.3%	27.0%	3.9%	8.5%
Total households	336,012	362,354	114,567,419	122,802,852
Median income (dollars)	71,745	112,449	50,046	65,712

Source: U.S. Census Bureau (2010, 2019)

Table A2. Educational Attainment (25 years and older), 2010-2019

	San Francisco				United States			
	2010		2019		2010		2019	
No High school diploma	87,421	14.1%	81,348	11.6%	29,417,606	14.4%	25,618,541	11.4%
Bachelor's degree or higher	315,275	50.9%	415,124	59.2%	57,609,479	28.2%	74,501,651	33.1%

Source: U.S. Census Bureau (2010, 2019)

Table A3. Race and Ethnicity, 2010-2019

	San Francisco				United States			
	2010		2019		2010		2019	
White	336,025	41.7%	351,010	39.8%	196,929,412	63.7%	196,789,401	60.0%
Black	47,899	5.9%	46,063	5.2%	37,897,524	12.3%	40,596,040	12.4%
Asian	267,357	33.2%	304,721	34.6%	14,566,264	4.7%	18,427,914	5.6%
Amer. Indian	1,924	0.2%	2,465	0.3%	2,074,523	0.7%	2,236,348	0.7%
Other	30,068	3.7%	42,981	4.9%	7,141,877	2.3%	9,708,074	3.0%
Hispanic	122,190	15.2%	134,309	15.2%	50,740,089	16.4%	60,481,746	18.4%
Total Pop.	805,463		881,549		309,349,689		328,239,523	

Source: U.S. Census Bureau (2010, 2019)

Table A4. San Francisco Production Distribution and Repair (PDR) Industry employment and establishment size share

Industry of Employment (NAIC Codes 2017)	2010		2019		% Emp. Change, 2010-2019
	Employment	% est. < 20 Employees	Employment	% est. < 20 Employees	
Construction (236-238)	16,022	87.1	23,246	83.6	45.1
Transport and Warehousing (481, 483-488, 491-493)	6,792	80.5	12,431	75.4	83.2
Utilities (221)	3,469	62.5	3,840	100.0	10.7
Information (515, 517, 562)	6,740	75.9	7,696	70.9	14.2
Wholesale (423-425)	12,419	91.8	15,398	91.6	24.0
Food Manufacturing (311- 312)	1,567	86.6	2,861	79.3	82.6
Apparel Manufacturing (313-315)	1,344	94.1	801	96.0	(40.4)
Printing and Publishing (323, 511)	9,687	79.5	26,545	84.1	174.0
Other Manufacturing (316, 321-322, 324-327, 331-335, 336-337, 339)	3,133	93.3	3,866	87.1	23.4
Repair Services (811)	2,220	96.8	2,200	96.5	(0.9)
Building Supplies (444)	1,529	91.5	1,876	90.0	22.7
Film and Sound Recording (512)	3,590	87.4	3,715	89.3	3.5
Total PDR employment	68,512		104,475		52.5
Professional, Scientific, and Technical Services (54)	79,641		121,844		53.0
Total employment	490,701		706,852		44.1

Source: U.S. Census Bureau (2010, 2019). PDR industries definition from San Francisco Planning Department (2019).

¹ The maker movement describes the rise in “the design and fabrication of consumer products, often via newly accessible technologies...by learners, do-it-yourselfers...and new small-scale manufacturing enterprises that integrate design with production” (Wolf-Powers et al., 2017, p. 365).

² Data on the loss of industrial land is not available for this period. Growth in live-work units is the best proxy for the pressures on industrial land through quasi-legal conversions.

³ In limited areas, PDR zoning also allowed two types of hybrid industrial-office space. Integrated PDR (IPDR) allowed no more than 1/3 non-PDR use in an existing building containing a single PDR enterprise and Small Enterprise Workspaces comprised shared workspaces within a single building. Neither were applied due to large space requirements (San Francisco Planning Department, 2014).

⁴ Additionally, because the project is partially funded through New Market Tax Credits, tenants must hire at least 60% of employees that qualify as low-income (Interview 10). In 2019, developers broke ground on a second project incorporating 43,000sf of PDR space for nonprofit Humanmade to run an advanced manufacturing training center in a 130,000sf building and a handful of other proposals are under review.

⁵ If history is a guide, this will be a short reprieve like the 2001 dot-com bubble (Florida et al., 2020). Covid may nonetheless provide a critical juncture to again rethink industrial lands as fractured global supply chains stimulate calls to focus more on domestic production and develop a better understanding of the varied geographies and character of industrial activity (Gibson et al., 2021).