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FOREFRONT

Can "America's Greenest City" Also Be a Shale Oil Powerhouse?

The Shale Gas Boom Hits Nutter's Philadelphia

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The trip from Philadelphia's international airport to Center City is a short but fascinating journey through the city's economic past and into its promising post-industrial future. One of the first scenes greeting visitors is an aging oil refinery, a 1,400-acre behemoth at the southern terminus of the Schuylkill River. The refinery — a vast and byzantine network of pipes and towers — is the very embodiment of industry. Steam billows from countless release points. Flames dance from flare towers high above the facility. Dozens of oil tanks line both banks of the river, sitting round and squat atop barren land that has hosted refining operations since the 1870s.

The scene is borderline dystopian, the kind of image that gives city tourism marketers fits.

But at highway speeds, the tableau passes quickly enough. Just as the refinery moves into the rear-view mirror, the towers of hospitals, universities and research centers appear on the western banks of the Schuylkill, while the brownfields and asphalt yield to waterfront bike lanes on the east. And soon, Center City's skyline dominates the view. There, beneath those towers, is Philadelphia's future: A walkable downtown, blessed with outstanding transit connections and handsome architecture, all built on a very human scale. It is an old model of sustainable urban living made new.

Despite what the trip from the airport might suggest, the big business in Philadelphia today isn't manufacturing, a sector that has been in steady and steep decline since the 1950s. Philadelphia's contemporary economy is built on higher education, medicine, hospitality and the service industry, just as in so many other big U.S. cities in this post-industrial age.

Indeed, less than a year ago, the sprawling refinery complex was on the verge of shutting down. The homegrown Sunoco oil company had decided to get out of the refining business altogether. By this time last year, it had already idled its Marcus Hook refinery, and there looked to be no viable buyer for the Philly refinery either. A few months earlier, ConocoPhillips had shut down operations at yet another local refinery, in the borough of Trainer. Taken together, these had produced half the gasoline made on the East Coast.

Even so, few were surprised by the developments. Jobs would be lost, which was unfortunate, but the economics of oil refining are difficult, gasoline demand is slipping in the U.S. and, well, perhaps there were better, higher uses for prime waterfront space so near the core of a recovering city. If nothing else, the optimists suggested, the closings might help the city make a better first impression.

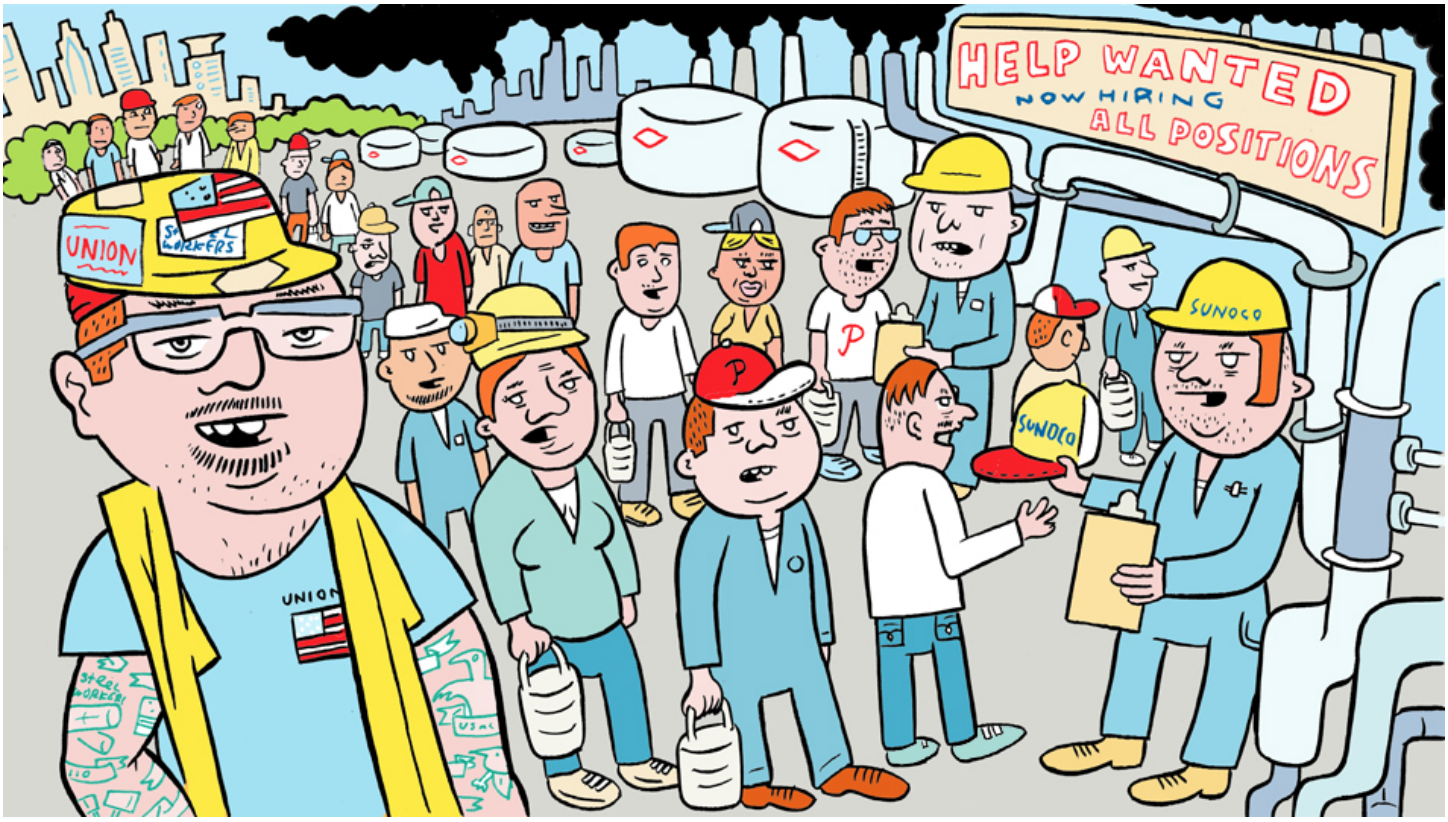
But then something altogether unexpected happened. The refineries didn't close. New owners acquired two of the sites, and a third is being converted into a holding and (in time) processing facility for natural gas from Pennsylvania's vast Marcellus Shale fields. Keeping the facilities open took some political acrobatics and an uncommonly impressive display of public and private sector cooperation. But none of that would have been sufficient were it not for a dawning recognition of just how massive Pennsylvania's shale gas boom actually is, and what it could mean not just for the gas fields far to Philadelphia's north and west, but for the city itself.

"We're not rescuing anything," said Philip L. Rinaldi, CEO of Philadelphia Energy Solutions, the new entity formed to purchase and run the South Philadelphia refinery, when the acquisition was announced last year. "We're coming in here to build industries."

All of a sudden, the national fracking boom has arrived in Philadelphia, and its impact on the city could be profound.

This doesn't look like empty CEO bluster. All of a sudden, the national fracking boom has arrived in Philadelphia, and its impact on the city could be profound.

With tax breaks and public support, Philadelphia Energy Solutions is building a high-speed rail unloader (with the help of a big taxpayer funded grant), the better to offload oil from trains that have rumbled all the way to Philadelphia from the Bakken oil fields of North Dakota. Sunoco Logistics, meanwhile, is already modifying a pipeline that runs from the gas fields in the west of the state to Marcus Hook, the old refinery site 17 miles south



of Philadelphia. Once finished, that project would give all Philadelphia area facilities — already connected by pipeline and rail to Marcus Hook — direct access to the Marcellus Shale.

Remarkable as it may seem, a growing number of business and government leaders now contend that the Philadelphia region has the potential to become a major national energy hub: Refining oil, processing shale gas and providing feed stock for petrochemical companies.

"Pennsylvania sits on top of the second largest shale gas formation to the world. Linking that field to facilities in Southeastern Pennsylvania — the refineries, the port — I liken it to the golden spike at Promontory Point," said Michael Krancer, the former secretary of Pennsylvania's Department of Environmental Protection and an ardent supporter of fracking. "It's that dramatic an opportunity."

Overwrought though Krancer's metaphor may be, the analogy works. The linking of Western Pennsylvania's resources to the markets and manufacturing capacity of the eastern seaboard is a significant economic development.

But the opportunity is a complicated one for a city that has spent decades trying to turn the page on its industrial past, not because manufacturing was unwelcome, but because it seemed so clear that industrial jobs were never coming back. Not in large numbers, anyway.

That assumption — built on 60 years of folding factories and outward migration — may actually be proven wrong by the shale boom. The question is: Would that actually be a good thing for Philadelphia?

The biggest opportunities created by the shale gas boom are, to put it bluntly, ugly ones. Cheap and abundant gas lowers costs for all fossil-fuel dependent businesses, but especially heavy industry: Think petrochemicals, fertilizers and plastics. These industries create jobs, but they also generate air pollution, require huge and hideous physical plants, and make for undesirable neighbors.

It is a sector utterly at odds with the new image Philadelphia has struggled to craft: A city not of industrial brawn, but of brains; town where old warehouses are converted into lofts, and the decommissioned Naval Yard into a business campus featuring impossibly hip headquarters for companies like Urban Outfitters and GlaxoSmithKline.

"Philadelphia and Naval Yard is the locale where leading-edge, worldwide companies build their

workplaces of the future in a modern and sustainable way," Mayor Michael Nutter said in a February event at the site, which is not only a booming jobs center but also the show pony of Nutter's oft-proclaimed goal to make Philadelphia "the greenest city in America."

The massive refinery grounds begin just a half-mile northwest of where Nutter made those remarks, and they are – if economic development experts are right – ripe for a heavy industry boom bigger than anything Philadelphia has witnessed in at least 60 years.

Can these two visions for Philadelphia be reconciled?

WHITHER INDUSTRIAL PHILADELPHIA

"That's a complicated question," said Katherine Gajewski, director of sustainability for the City of Philadelphia.

Gajewski heads up the city's Greenworks initiative, a program Nutter put in place after taking office in 2008. The agenda is sweeping: Energy efficiency in the public and private sector, enhanced stormwater management, promotion of transit, bicycle and pedestrian travel, and development of the clean economy.

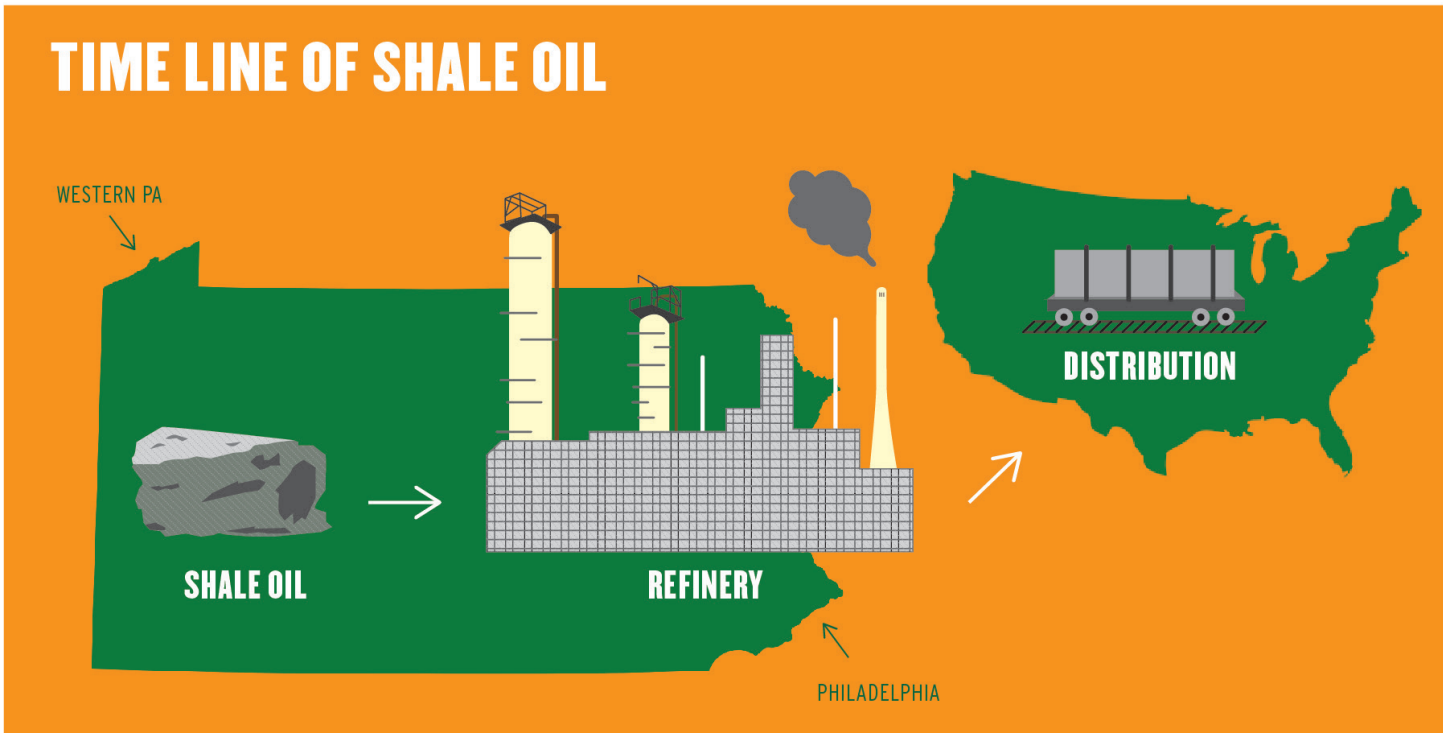
Putting a dollar figure on the city's investment in sustainability is difficult. Greenworks doesn't track that information, and the spending is divided between myriad departments and employees with multiple responsibilities (some of which are Greenworks-related, and some of which are not). But this isn't window dressing. The stormwater management budget alone stands at $2.4 billion over the next 20 years.

In some of these areas, Philadelphia is already a national leader. A January report from the Natural Resources Defense Council recognized the city's leadership on stormwater management and explored how its approach could lead to greater private market investment in green infrastructure.

This kind of high-profile, progressive leadership on sustainability only heightens Philadelphia's appeal for a younger demographic that seems more susceptible to urban charms than past generations.

For most of the last 100 years, the city's fortunes were inextricably linked to the health of its industrial sector. In 1950, Philadelphia's population was at its peak, and so was its 20th-century manufacturing workforce. About 33 percent of all working residents labored in the factories of that era, according to federal statistics. By 2000, that number had dwindled to 10 percent. Not coincidentally, Philadelphia hemorrhaged half a million residents over those 50 years.

More recently, however, that link between the city's health and the health of its manufacturing sector has grown more tenuous. Manufacturing employment



continues to decline, standing at just 5 percent in 2010. But Philadelphia is growing again, albeit slowly. Since 2006, its population nadir, the city has added nearly 59,000 residents, a 4 percent increase, according to census estimates.

It's a trend driven by low-income immigrants, empty-nesters and relatively affluent young people, a growing number of whom are staying in the city after graduating from local universities. Very few of these people are getting jobs in the manufacturing sector. Indeed, job growth in Philadelphia has been constrained almost entirely to two comparatively clean industries: Education and health care (up 48 percent since 1990), and leisure and hospitality (up 38 percent over the same period), according to federal labor statistics.

But jobs are only part of the lure, and for many new Philadelphians they are a secondary consideration. Just as important is the lifestyle the city offers. Relatively affordable and spacious housing. A lively artistic and cultural scene. Great food. The intangible allure of a block lined with quintessentially Philly rowhomes.

Another important part of the package is sustainable living: Walking to work, biking to the store, buying food grown from a nearby farm. None of this is particularly unique to Philadelphia, of course. But it is nonetheless now central to the city's appeal, particularly for a younger generation brought up in the suburbs and sick of them.

"The question is, can this commitment to sustainability, to urban livability, serve to enhance the competitiveness of a city?" Gajewski asked. "We think it can. We think it makes a lot of sense. We think Philadelphia stands to benefit."

Gajewski said the city is hearing anecdotally from suburban employers struggling to recruit young workers to their low-slung office parks off the expressway. More employers are feeling the city out, not necessarily because it's their first choice do to business here but because cities, increasingly, are where the talent pool prefers to live and work.

And yet, while this is a demographic that clearly enjoys the aesthetic of decommissioned industry (see: the Reading Viaduct project, ruin porn), it is not at all clear that new Philadelphians will embrace the growth of real, live, large-scale industry, particularly if it takes the form of fertilizer factories, cracking facilities and plastics plants.

These are not boutique manufacturing operations. They are "big, heavy and not pretty," acknowledged John Grady, head of the Philadelphia Industrial Development Corporation, a public-private non-profit that acts as a citywide economic development agency.

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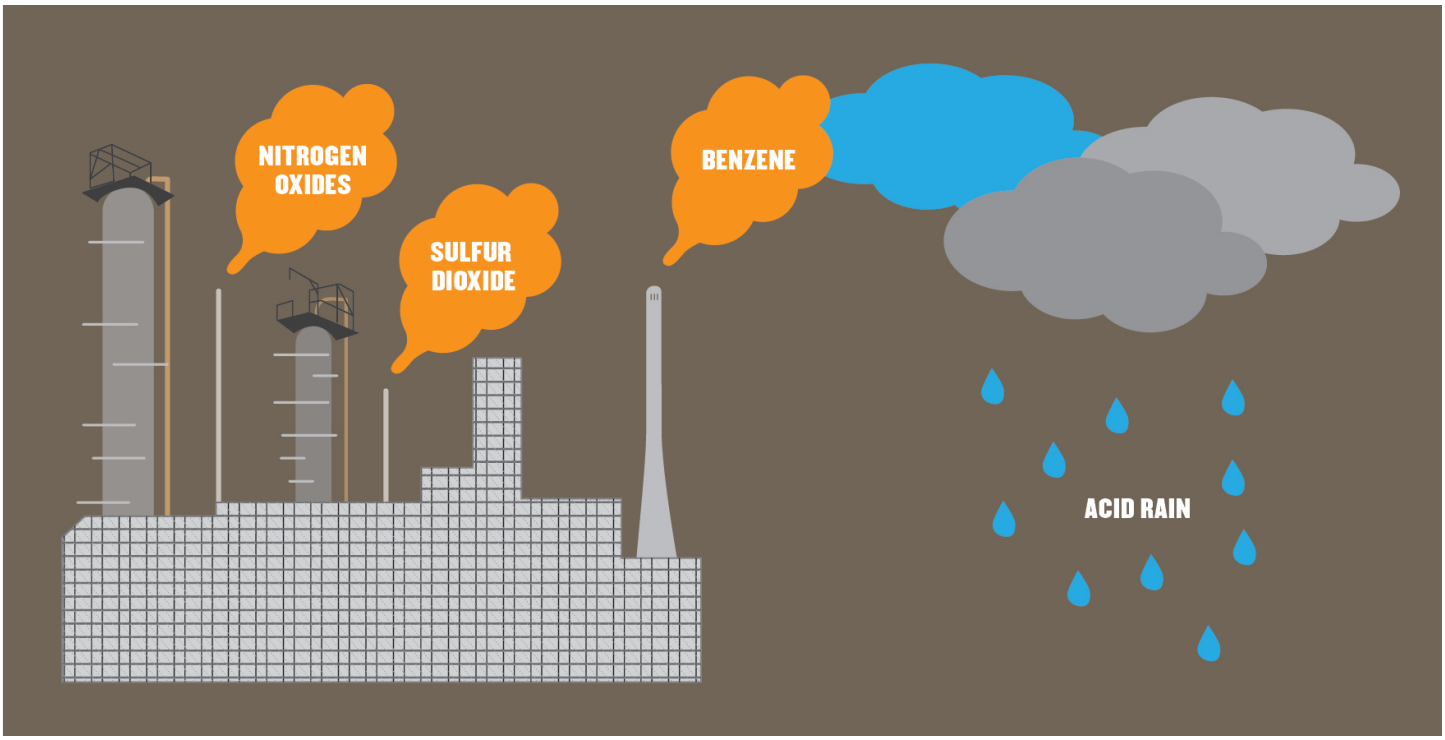
Some of the likely objections are obvious. If the shale boom really does fuel a gas-powered revitalization of Philadelphia's industrial waterfront, there will be valid concerns about pollution and air quality.

The deal that saved the South Philadelphia refinery included an unusual provision that, in essence, gives Philadelphia Energy Solutions the ability to emit more pollution than the refinery has in the past. Emission credits from Sunoco's old Marcus Hook site were transferred to Philadelphia, using the somewhat strained logic that the two refineries – 17 miles apart – operated as a single facility.

For the region it's an air quality wash, as the same emissions ceiling applies. But for Philadelphia proper, it could well mean more pollution, if the emissions once generated in Marcus Hook are added on top of those already produced at the South Philly site. Oil refining is a cleaner business then it was in decades past, but it still has impacts on environmental health, even under ideal circumstances. Refineries are significant producers of ground level ozone, which creates smog. They release toxic chemicals such as benzene, and generate sulfur dioxide and nitrogen oxides, which create acid rain. Given the riverfront location of these industrial facilities,



the potential for water contamination is always there. A broken pipe and runoff problems at the Suncor refinery in Denver in 2011 contaminated the waters of the South Platte River for more than a year.

The full effects of refining and petrochemical activity on public health are less clear, but the link between asthma and air quality is well established. And there is always a risk of major accidents in big refining and petrochemical operations.

And yet, for all of that, the Nutter administration signed off on the deal transferring emissions credits from Marcus Hook to Philadelphia without hesitation. Gajewski was not a party to the city's deliberations, but, she said, "jobs were a driving consideration in that decision."

The jobs are seen as critical by all sides. For the administration of Pennsylvania Gov. Tom Corbett, which also had to sign off on the emissions transfer, saving the refining jobs was paramount.

Even the Clean Air Council, which is challenging the emission credits transfer before the Pennsylvania Environmental Hearing Board, is not arguing the refinery ought to be closed.

"We aren't trying to shut them down. We just want to maximize the pollution controls," said Joseph Minott, executive director of the Clean Air Council.

Minott has good reason to want tight controls. Sunoco was, for many years, a very poor neighbor.

Just ask Joanne Rossi, who sued the company for its polluting ways in 1994 and again in 2005. A resident of Southwest Philadelphia, Rossi can see the flares of the refinery from her rear window. And for years she was convinced that refinery emissions explained why neighborhood kids were always out of breath, and why so many neighbors seemed to get sick.

But both times Rossi and other activists sued, they got results. Since 2005 (when Sunoco also agreed to a consent decree with the U.S., state and local governments) the company has invested hundreds of millions in pollution controls. And the controls have worked. Refining pollutants dropped by more than 50 percent after Sunoco made the investments, according to air quality readings. And Rossi said the new refinery operators, Philadelphia Energy Solutions, have been exemplary in their communication with neighborhood organizations and residents.

"The dialogue is open and frank," said Rossi, who heads a group called the Community/Labor Refinery Tracking Committee. "They've been very forthcoming."

Even so, Rossi is concerned by the company's talk of expanded operations and the potential for new petrochemical activity around the Marcellus Shale gas. "It

worries me," she said. "The community is very vigilant about this."

In the past, anti-refinery activism was largely limited to the neighborhoods immediately surrounding a facility. That may not be the case this time, if the predicted petrochemical boom materializes. The most likely sites are invisible from the sidewalks around Rittenhouse Square, but they are located just over a mile from the heart of University City's hospital and research complex, and equally close to the rapidly gentrifying Point Breeze neighborhood.

Even if environmental concerns are addressed or prove overblown, there is an unmistakable ick factor associated with the belching, massive, industrial facilities common to the petrochemical industry. Freight trains loaded with North Dakota crude rumbling alongside the city's picturesque Schuylkill riverfront trail seem sure to generate complaints, for instance.

ABSTRACT PLUSES, ABSTRACT MINUSES

The shale gas boom can now be seen from space. Satellite views of the once-dark North Dakota countryside now reveal a blotch of light as bright and as wide as a major metropolitan area. As recently as 2005, the gas fields could not be spotted.

Yet even now, the scale of this modern-day resource rush is poorly understood outside of those communities where fracking has become a way of life. Depending on the estimate, the Marcellus Shale contains enough natural gas to meet all domestic demand for the next six to 17 years at current consumption rates. In Pennsylvania alone, there are nearly 9,000 drilled wells.

In Marcellus Shale country, fracking's effects, good and bad, are intimately known. There's the money and the jobs, but also the prospects of contaminated water tables and even manmade earthquakes.

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"Let's assume for the sake of argument the new owners will do everything right. Put on the best controls do everything that's asked of them," Minott said. "It still raises the question, is this what we want the future of Philadelphia to be?"

For now, at least, that's a question the city just isn't prepared to answer. The prospect of a petrochemical boom is so new, and so unexpected, that the city has barely begun to wrestle with the possibility.

"We're in the early days of understanding this," Gajewski said. She added that as the city gains a more comprehensive grip of the issues involved, it will weigh opportunities for economic development with potential consequences for the environment. Then she echoed Minott.

"We're going to have to decide as a city over time what's important to us," Gajewski said.

For Philadelphians, however, all of that remains an abstraction. The nearest natural gas well is more than 100 miles northwest. Supporters of natural gas extraction hope and expect that once Southeastern Pennsylvania gets a taste of the prosperity fracking generates, political support will improve.

"Philadelphians have already had some benefit from the Marcellus Shale, because their gas prices are going down a little bit. But you don't see that, you don't think about that," Corbett said. "What you'll see in time is that this is going to create jobs. The energy business is going to be a statewide business. We're going to get the gas to the Philadelphia area, where it can be used for a number of different purposes."

He cited the prospective $1 billion ethane cracker facility that Shell Oil Company is considering building in Beaver County, northwest of Pittsburgh. Such crackers create ethylene from oil and natural gas. Ethylene, in

turn, is used to produce such commonplace products as Saran Wrap and those ubiquitous plastic shopping bags that Philadelphia (and other cities) have considered banning.

"Those refineries in Southeastern Pennsylvania are perfect locations for something like that," Corbett said.

From a simple land use point of view, Corbett is probably right. There are 3,700 industrially zoned acres in and around Philadelphia's refinery, much of it vacant or underdeveloped. Rail, highway and port access is all immediately at hand, and there are comparatively few residential neighbors to placate.

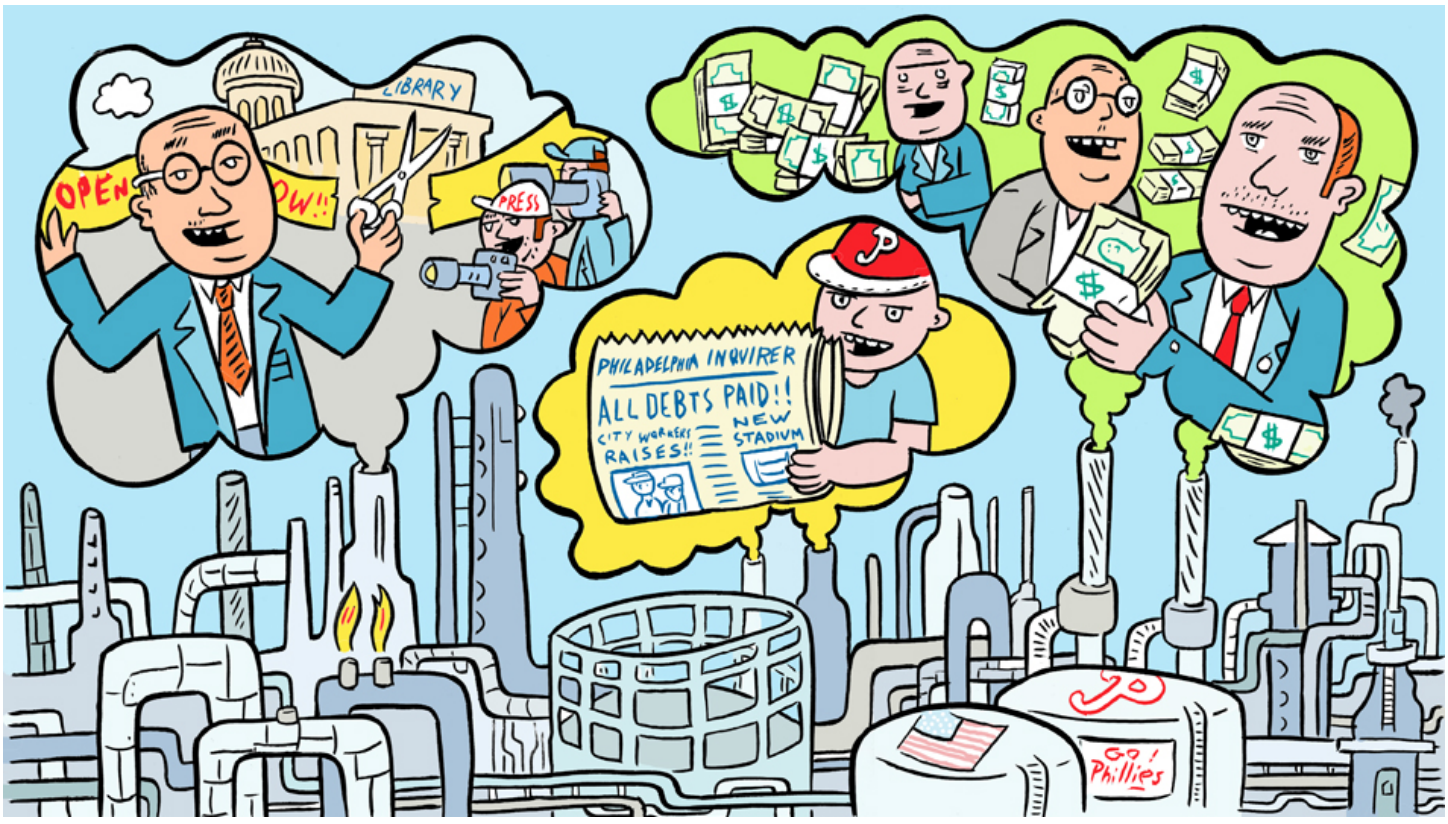
"It's vast, inaccessible, under-utilized," Grady said. "It's the last unplanned part of Philadelphia. We have parts of the city that we think haven't reached their potential. Well, nobody has ever tried to express a potential for this place."

Yet if the shale boom continues, and Philadelphia becomes the energy and petrochemical hub that some now predict, that area could be consumed by more of the same: More vast industrial plants that generate jobs and taxes, but are fundamentally incompatible with just about every other conceivable use, from recreation to research and development.

Another model exists just a short distance from the refinery. Wedged between an active shipyard and the Port of Philadelphia, the PIDC-run Navy Yard — so named for its history as the first U.S. Navy shipyard — has developed into Philadelphia's answer to suburban business competitors, an increasingly mixed-use campus that gives companies room to build off the urban grid, while remaining close to the desirable residential neighborhoods of Center City.

There are 130 companies with offices at the Navy Yard, and 10,000 employees — about the same number that worked there in 1996, when the Navy shut down most of its operations. There are plans to begin developing rental units and even some limited nightlife in the years to come.

There were quiet whispers when the refineries seemed destined to close that, perhaps, something similar could be done on those sites. That was probably not a realistic hope. Philadelphia's refinery is the oldest continually operating plan in the nation. Nobody really knows just how much remediation would be required to make the site suitable for other uses. But even under a best-case scenario, the expense would almost certainly be exorbitant, and potentially prohibitive.



THE CHALLENGING TRICK

Whenever Jim Savage, president of the United Steelworkers Local 10-1, hears about some of the post-refining uses people imagine for the South Philadelphia refinery, he gets a little angry.

"We can make it green space, you know, we can have this walkable riverfront property. I heard that, and I'm like, 'are you fucking kidding me?'" Savage said in his typically unrestrained fashion.

As much as anyone, Savage deserves credit for keeping the refinery up and running. His union, which represents Philadelphia's refinery workers, mounted a sophisticated and exhaustive lobbying campaign in Harrisburg and Washington, D.C., applying judicious pressure to politicians and Sunoco alike. It was a desperate fight for Savage and the workers he represents.

"If it had closed, that's it. I'm out of work. I'm 48 years old, I'm out looking for a job. And I have a skill — working at a refinery — that I can't transfer to any other job in the world," Savage said between drags on a Marlboro menthol.

Maybe he would have found other work eventually, but it almost certainly wouldn't pay the rate Savage was accustomed to, which he describes as "$40-something an hour." With overtime, some oil workers make more than $100,000 a year.

"These are the best jobs a guy like me can get, a working-class guy with a high-school education," Savage said. "It comes with its risks and downsides, but my son has had a pretty trouble-free life because of the money I've made."

This is the flip side of heavy industry: jobs. And not just minimum wage service jobs, but high-paying jobs, the kinds that sustain a middle class and smooth out income inequalities. Philadelphia has far too few decent jobs for low-education workers, particularly given the comparatively low educational attainment rate of its workforce. Indeed, Philadelphia has far too few jobs of any kind. Since 1990, the city's unemployment rate has, on average, been 1.7 percentage points higher than the national average.

And there's no sign that Philadelphia is gaining ground, despite the modest increases in its population. Right now, the city's unemployment rate stands at 10.6 percent, nearly three percentage points higher than the national average. And that rate greatly understates the scope of the employment problem, given the large numbers of adults who have simply dropped out of the workforce for lack of opportunity.

For a year or two there, the national hubbub surrounding green jobs suggested that the clean economy might be able to produce the employment chances that the fading fossil fuel economy could not. Low-skilled workers were supposed to find new opportunities making homes energy efficient or building solar panels. So far, though, the actual job creation has not come close to matching the hype, either in Philadelphia or nationally.

A lot of federal stimulus money was thrown at clean economy job training, in Philadelphia and elsewhere, to little effect.

"There was a lot of money from the federal government for programs that weren't that impactful," Gajewski said. Part of the problem was that the city — like the rest of the country — really had no good handle on what the clean economy sector actually looks like. How big is it? What opportunities are there? Are there real opportunities for growth?

The city is just about finished with a comprehensive clean economy survey, one of the first of its kind in the country, which should shed some light on those questions.

When it comes to well-established industrial jobs, however, there's a lot less uncertainty. Refining jobs, in particular, are enormously valuable to a local economy, with huge multiplier effects because of the large support systems and downmarket positions associated with maintaining a refinery and selling and distributing products. Last year, when it looked as though all three Philadelphia-area refineries would shut down for good, Pennsylvania's Department of Labor and Industry produced an internal economic impact study that found the hit to Southeastern Pennsylvania's total economic output could have reached $27.9 billion, if no new uses for the refinery were found. Lost tax revenue — to the state, local governments and school districts — would have topped $560 million.

Such dire predictions represent the ultimate in worst-case scenarios, but there is little question that a mass refinery shutdown would have dealt a serious short-term blow to Philadelphia's economy. And there is equally little question that a spike in shale gas-related manufacturing activity would generate short-term returns for the city.

All of which means Philadelphia must pull off a challenging trick: Opening the throttle on a fossil fuel industrial expansion without damaging the city's sustainable appeal.

There aren't a lot of good lessons to be learned from other cities. There are a number of urban refineries, such as Chevron's massive facility in Richmond, Calif., or the Suncor site in Denver. And Houston – called the PetroMetro by some – has no fewer than four refineries within its massive city limits.

Like Philadelphia, Houston is making of a serious bid to go green where it can, but fossil fuels are so central to the economy, and to the culture, that the refining and petrochemical interests seem sure to trump sustainability whenever the two conflict. Chevron's embattled Bay Refinery in Richmond is at the other end of the spectrum, surrounded by hostile neighbors and politicians. Expansion there is a nonstarter, and anyway, there is no ready supply of shale gas available.

In time, Denver may well be forced to wrestle with the same questions Philadelphia has begun asking. There are large supplies of oil and gas alike in Colorado's shale formations, but the shale exploitation economy in that state is far less developed than Pennsylvania's.

"It was one thing to say we wanted to save the jobs at the refinery," Minott said. "It's something else entirely to say, 'yes, let's become a fossil fuel hub, and go *mano a mano* with Louisiana and Texas.' We need to have an intelligent debate. I understand the immediate appeal of jobs. But what is the end goal for our urban areas? What is the legacy that we really want?"

ABOUT THE AUTHOR

Patrick Kerkstra has covered Philadelphia and the region for 12 years, including a decade at the Philadelphia Inquirer, where his beats ranged from City Hall to real estate development and the Iraq war. Now a freelancer, Patrick is a writer at large for Philadelphia magazine, a special projects reporter for PlanPhilly and a guest columnist at the Inquirer, where he writes about urban affairs. Patrick was raised in Oakland and San Francisco, but fell in love with Philadelphia after moving to the city for an internship in 1999. He lives with his wife and two children in a West Philadelphia row home, and is unreasonably proud of the fact he refinished its hardwood floors.

ABOUT THE ILLUSTRATOR

Hawk Krall is an illustrator, cartoonist and former line cook known for food paintings that have appeared in magazines, restaurants and hot dog stands all over the world. In Philadelphia, he is known for his "factually creative" drawings and paintings of the city's neighborhoods, most recently exhibited at Space 1026.