GROWING RISKS

✕ CHALLENGES TO MAINTAINING HOUSTON'S PROSPERITY AND AIR QUALITY

BY LARRY SOWARD

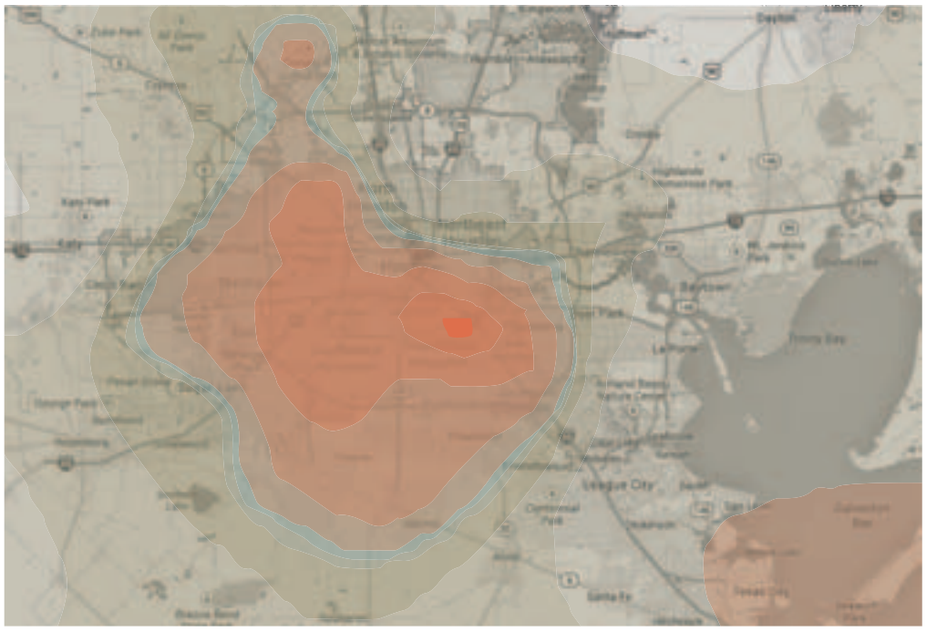
Population and economic growth in the Houston region create a virtuous cycle of business development, cultural vibrancy, and improved quality of life. There are also some significant costs and risks associated with that growth when it comes to our environment and our health. Let's look at **four growth areas** that could significantly inhibit that virtuous cycle by compromising our air quality. The challenges are complex and require the region as a whole to face up to the hard choices ahead.

1
PANAMAX

Unquestionably, one of the most significant growth events in the region involves the Port of Houston. The current expansion of the Panama Canal to accommodate larger vessels will double its capacity in 2014. With the increased container cargo trade resulting from this expansion, the Port of Houston finds itself well-positioned for significant growth and will likely be one of the most positively impacted U.S. ports. The Port predicts up to a 40 percent growth in its shipping activity will come from the Canal's creation of an efficient link between the Gulf of Mexico and the growing markets in East Asia, the west coast of South America, and the southern ports of Central America.

In addition to the Panama Canal expansion, shipping lines are also working with the Port to bring in the largest container vessels ever to call there, requiring significant infrastructure, both at the terminal and in the Ship Channel. To accommodate increased cargo volumes and larger ships, the Port has begun to construct additional or improved terminal facilities. The completion of a substantial portion of the Bayport Container Terminal at approximately the same time as the completion of the Panama Canal expansion is expected to triple the container-handling capacity of the Port. Furthermore, significant improvement or enlargement of the Ship Channel is also planned.

This extensive expansion of Port infrastructure and operations will necessarily have some significant impacts on the environs of the Ship Channel. As the Port expands, additional ship and barge traffic, and attendant support facilities, will raise air-pollutant emission and public health issues for citizens and communities in the area. Truck and rail load increases will not only impact the Port



× LEFT *Houston Clean Air Network Ozone Map; July 4, 2012.*

OZONE PARTS PER BILLION	LEVELS OF HEALTH CONCERN
136+	HAZARDOUS
116–135	VERY UNHEALTHY
96–115	UNHEALTHY
77–95	WARNING
61–76	MODERATE
0–60	GOOD

area, but likely a significant portion of the region. Truck volumes are expected to grow significantly along the major trade corridors serving the area's port and waterway system. In 2007, a majority of all freight (61 percent, or more than 780 million tons) that moved across the region was hauled by truck. By 2035, the truck share is expected to grow to 65 percent, more than 1.2 billion tons yearly.

2
COAL EXPORT TERMINALS

Related to the Port's growth and even further impacting the environs of the Ship Channel are at least three other major development projects. The first involves growing efforts by Gulf Coast ports such as the Port of Houston to further capitalize on the Panama Canal expansion by capturing an exploding coal export market. Significant opposition to the construction and operation of a number of major coal export terminals proposed in the Pacific Northwest to export coal from mining areas in Wyoming and Montana to Asia has led coal producers to look to Gulf Coast ports for greater access. Given the huge economic opportunities presented by increased coal exports, these ports are actively seeking this export business. Where existing capacity is currently limited, the ports are planning necessary expansions to accommodate the projected new export volumes.

Plenty is already happening on the coal export front here in Houston. Kinder Morgan plans to expand its two terminals on the Ship Channel, where it now runs smaller docks for exporting petroleum coke generated by nearby refineries. As part of a $400 million expansion, these two terminals and one in Louisiana will begin exporting Colorado-mined coal in 2014, timed to the Panama Canal expansion completion. Marking the first export of western coal from the Port of Houston, the expanded terminals will handle three 135-car trains daily with an export capacity of over 10 million tons of coal annually. Likewise, down in Galveston, the Texas, Mexico & Pacific Railroad plans to build a railway bridge and tracks out to a new coal export terminal on Pelican Island, where as much as 15 million tons could be exported yearly.

Certainly, this increased coal exportation will bring positive economic impacts in terms of jobs and money. Yet significant environmental hazards and health impacts are also likely to result. By their very nature, coal export terminals are noisy, polluted with diesel fumes and coal dust, and dominated by huge, unsightly piles of coal, all often significantly impacting the environs. Since the cheapest way to get coal to port is by rail, rail traffic will radically increase, crowding out other rail-using commodities and necessarily prompting construction of new rail lines. Extremely long coal trains passing through the area will deposit polluting coal dust everywhere along the routes and bisect urban areas and roadways for hours every day. Finally, the introduction of new or expanded coal export terminals on the Ship Channel will further amplify the Port's own expansion projects.

3
KEYSTONE PIPELINE

Next, there is the Keystone Pipeline—the $7 billion, 1,700-mile, 36-inch pipeline that, if approved, will carry over 700,000 barrels per day of tar sands crude from Alberta, Canada, across six states to the Gulf Coast. The southern portion of the pipeline, known as the Gulf Coast Project, will run 485 miles through 16 counties in

north and east Texas from the Oklahoma border to refineries in Houston and Port Arthur, where coking facilities necessary to refine heavy crude are readily available. The 48-mile Houston Lateral Project will run through the counties of Liberty, Chambers, and Harris, transporting oil to refineries in the refinery/petrochemical complex along the Ship Channel.

Despite the positive economic benefits that the pipeline will bring, there are significant environmental concerns as to both the pipeline's construction and operations, and the refining of the tar sands crude in area refineries. Processing the heavy, molasses-like tar sands oil into useable fuel will release more sulfur, nitrogen oxide, metals, and other toxic pollutants than conventional crude oil refining. Also, given the higher fuel input necessary to refine the tar sands into usable products, about 17 percent more greenhouse gas emissions are expected than with conventional refining. All said, it is only reasonable to expect air pollutant emissions to increase in the region; the only question is how much.

4

PETROCHEMICAL PLANT EXPANSIONS

Finally, on the development front, our region is poised to see the largest petrochemical expansion in Texas since the days of cheap oil in the 1980s. Driven primarily by the natural gas boom, at least a dozen refineries and petrochemical plants in the region are moving forward with expansion projects to capitalize on the abundant supply of cheap natural gas, which is used as chemical feedstock. This has caused a rush of chemical industry investment and a sharp rise in demand for chemical industry employees, thus rejuvenating the petrochemical manufacturing sector and fostering significant exports.

These projects involve big names. ExxonMobil is building a new multibillion-dollar ethane cracker at its Baytown refinery and petrochemical complex. Scheduled to start up in 2016, the new facilities will process up to 1.5 million tons of chemicals annually and provide feedstock for a nearby polyethylene plant. As part of a $4 billion expansion plan also inspired by the shale gas boom, Dow Chemical Company is building a new $1.7 billion ethylene production plant at its huge chemical complex in Freeport. When completed in 2017, it will have an annual ethylene capacity of 3.3 billion pounds. Likewise, Chevron Phillips Chemical Company plans to spend $5 billion to build a new ethane cracker and 1-hexene plant at its Baytown petrochemical plant. And the list goes on!

Unquestionably, all these major expansion projects will create thousands of new jobs and inject billions of dollars into the area economies. However, these enormous projects will also raise significant environmental and public health issues for areas already inundated with petrochemical plants and refineries and overburdened with environmental pollution and health risks. All these planned facilities might not be built, and certainly these newer plants will generally pollute less than plants built just a decade ago, yet those that are built will still add more air pollutants to the total pollution we already experience.

THE COSTS

So, given all this growth and economic development that is happening or about to happen in the Houston region, what are the costs in terms of risks to our environment, our health, and our quality of life?

The most significant costs stemming from all this growth are the impacts on public health. Out of a total population of almost 4.2 million in Harris County, over 93,000 suffer from pediatric asthma; almost 223,000 suffer from adult asthma; 156,000 live with COPD; almost 1 million have cardiovascular disease; and 300,000 have diabetes. At particular risk are the almost 1.2 million residents who are children under age 18; more than 350,000 individuals who are 65 and over; and the more than 800,000 people who live in poverty. Most of the expected major industrial growth will be in communities along the Ship Channel which are already inundated with petrochemical plants and refineries and overburdened with pollution and health risks. Already experiencing higher levels of air pollution, increased incidents of cardiac and respiratory illnesses and increased risks of air toxics-related illnesses, these communities will very likely have their health problems made even worse.

Exposure to elevated levels of ozone and fine particles in the air can cause or aggravate various respiratory symptoms, including decreased lung capacity, asthma, inflammation of lung tissue, and chronic bronchitis. Regular or prolonged exposure can also impair the body's immune system defenses, making people more susceptible to infections and diseases. Increased air pollution levels have been linked to increased cardiac and respiratory-related emergency room visits, hospital admissions, work and school absences, and even higher death rates. A recently released study by Rice University researchers, published in the American Heart Association's journal *Circulation* in February 2013, found a direct link between out-of-hospital cardiac arrests and levels of air pollution and ozone. Based on data collected from Houston's network of air-quality monitors and the more than 11,000 out-of-hospital cardiac arrests logged by Houston Emergency Medical Services between 2004 and 2011, the Rice researchers found that a daily average increase in particulate matter of 6 micrograms per day over two days raised the risk of cardiac arrest by 4.6 percent, and each increase of 20 parts per billion in the ozone level over one to three hours also increased the risk of cardiac arrest up to a peak of 4.4 percent. The study found that 55 percent of these heart attacks occurred during the summer months; that patients died in more than 90 percent of the cases; and that risks were higher for men, African-Americans, and people over age 65. An American Lung Association study also found that children who play active team sports in areas with high levels of ozone are more likely to develop asthma. Studies conducted at the University of Texas Medical Branch in Galveston found that healthy adults experienced increased airway obstruction as ozone levels increased throughout the day, even when those levels remained far below national standards. Exposure to air toxins in high concentrations can precipitate nausea, headaches, confusion, seizures, severe difficulty in breathing, and sometimes death. Other severe health effects that can result include cancer and various immunological, hormonal, neurological, reproductive, developmental, and respiratory effects, depending on the specific air toxin, its

concentration, and exposure time. Many air toxins are neurotoxins and can cause genetic damage.

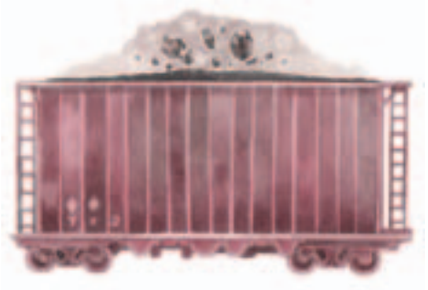
From a regulatory standpoint, the Houston area has consistently failed to meet national air quality standards for ozone. We have failed to meet the 30-year-old one-hour ozone standard of 125 parts per billion (ppb) and the 1997 eight-hour standard of 85 ppb. The Houston area is now classified as "marginal" in nonattainment for the new 2008 ozone standard of 75 ppb. Our ozone levels currently rank seventh highest on the list of major cities, and the American Lung Association recently gave Houston a failing grade for ozone pollution, ranking it eighth worst among all cities. The number of "ozone alert" days yearly continues to be high: 47 in 2011 and 35 in 2012. Yet we are currently relying on control strategies put in place to meet the old ozone standard in order to attain the new standard or create some margin of safety. These facts become even more significant given that the federal Clean Air Act requires that the 2008 ozone standard be reviewed again this year, and it could be lowered even more.

Furthermore, the Houston area hovers perilously close to nonattainment of the new annual standard for fine particulate matter. As with ozone, the American Lung Association has given Houston an F for particulate matter pollution, ranking it 23rd worst in year-round particle pollution. While many predict Harris County can meet the new standard by 2020 without undertaking any further actions to reduce emissions beyond the controls currently required or planned, all the expected population and economic growth in the region, coupled with our already significant air pollution problems, present significant challenges to achieving and maintaining the new standard.

Toxic air pollutants, such as benzene, styrene, 1,3-butadiene, and others, are also significant in certain areas in and around Houston, such as the highly industrialized East Side along the Ship Channel. While we have made progress in reducing these toxic air pollutants, existing or new sources remain of significant concern and we must continue to focus on necessary strategies to address them.

Finally, Texas ranks first in the nation and eighth in the world in greenhouse gas emissions. The Gulf Coast area is the epicenter of these emissions, with Harris County leading all counties in the nation in CO_2 emissions.

Undoubtedly, all the expected population and economic growth in the region is coming at a time when improving our air quality is already the largest environmental and health challenge we face in the Houston area. Again, all the planned major expansion projects along the Ship Channel and among the refining and petrochemical facilities in the region will only make our current air pollution problems worse. Equally significant is the fact that the almost 2.8 million vehicles in Harris County today are predicted to double by 2040. According to Houston-Galveston Area Council regional transportation studies, by 2040 nearly all of the region's major roadways will have more demand than what they are designed for, and most of the future population growth will occur in new and emerging areas of the region that are not currently served by public transit or have no current plans for future transit services. Since vehicles currently account for over 70 percent of ozone-forming nitrogen oxide, more vehicles simply mean more air pollution.



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THE SOLUTIONS

So, what can we do to meet the enormous challenges associated with cleaning up our air at a time of mushrooming population and economic growth? We certainly can't relax our focus or our efforts, saying like Scarlett O'Hara, "Tomorrow is another day." While we have made significant, positive progress towards cleaning up our air, we still have a long way to go.

We have already "picked the low-hanging fruit." Business and industry sectors have already seen an estimated 80 percent reduction in ozone-forming emissions due to control strategies put in place over the past decade. Now we are faced with either looking at deeper and more costly reductions of emissions from industrial sources, or finding ways to reduce other emissions, especially from vehicles. But the latter involves people—area citizens going about their daily lives, traveling to work, grocery shopping, taking kids to school, and so on. Changing these day-to-day habits won't come easy, especially in our sprawling, vehicle-dependent county where, again, there are almost 2.8 million vehicles today. And that number is predicted to double by 2040. Nevertheless, that kind of change is necessary if we are to ensure that this region remains a healthy and prosperous place to live.

Furthermore, simply meeting minimal air quality standards likely will not achieve our goals. We have no room for complacency, no room for the status quo. We will have to push harder and stretch further than we ever have to make a significant difference. Changing our driving behavior to reduce air pollution and ensure a cleaner, healthier environment now and in the future will require new thinking and open minds in order to develop new and creative strategies. For example, we should encourage strategies like increased mass transit ridership, telecommuting to allow employees to work from home instead of driving into work, or creating more flexible four-day work weeks to eliminate one day's commute. We must also continue the development of cleaner-burning, less-polluting fuels, and should expand upon strategies such as idling reduction.

Houston is an excellent example to dispel the inevitable "doom's day" claims that enhanced environmental protection will surely stall an economic engine and cause our economy to suffer. We have experienced tremendous economic growth and prosperity in recent years and are enjoying one of the strongest and most extensive economic development eras in history. All this has occurred while making significant efforts in every sector to deal with the major and far-reaching environmental issues and challenges of improving our environment. We have shown we can continue to improve our environment, our health, and our quality of life while ensuring a sound and growing economy. We must continue that sound approach. C