



### **Back to the Future: Lookout for these 5 Post-COVID Supply Chain Trends**

As individual states slowly begin to relax rules regarding nationwide COVID-19 quarantines, most are venturing back out a little more dazed and confused than before. One-third of the S&P 500 has withdrawn guidance with many cutting or suspending dividends. As [CNBC's Bob Pisani](#) noted at the end of last month, "The dispersion — the difference between analyst estimates from the high to the low estimate — has never been higher." Increasingly views of the future have as much to do with pandemic and political factors as with where you are today on the curve.

McKinsey recently compared the perceived effectiveness of the public-health response to that of economic policies in their April [survey](#) of global executives. Almost 60% of respondents now expect more muted world growth with some virus recurrence. China was an interesting outlier in that they were decidedly more optimistic. This seems consistent with a later McKinsey [consumer survey](#) whereby, somewhat unsurprisingly, sentiment shows increasing levels of optimism as countries move along the curve. This bodes well for the broader economy longer-term.

Nevertheless, most do not anticipate a return to business as usual – and supply chains will be no different. Over the course of the next couple weeks we will share with you some thoughts on key trends likely to influence the evolution of US supply chains in the coming months and years. Interestingly, most of these trends were already gaining momentum prior to the pandemic. Perhaps that is what makes them so compelling. For now, here is a brief overview of five supply chain trends for which to be on the lookout:

1. E-Commerce: Most agree that e-commerce will likely benefit from the recent disruption, but accelerated growth in this space will also highlight challenges in their supply chains.
2. Global Sourcing: Changes in consumer behavior along with political pressures will continue to weigh on global supply chains in particular, with equally disruptive consequences across domestic modes of transportation.
3. Trucking: Near-term volatility combined with the potential for structural changes in freight flows will favor industry consolidation and higher prices, but leave shippers wanting more.
4. Rail: The tension between the Precision Scheduled Railroading (PSR) model and the need for growth, both for its own sake and to keep regulators at bay, will make partnerships with short lines and transloaders all the more important.
5. Technology: Longer term, new manufacturing technologies have the potential to change how we respond to these supply chain challenges with even more radical implications, especially in large urban centers.

That said, timing is everything. The pace at which these trends manifest themselves is important not only for planning purposes, but also because the relative timing of each can affect the magnitude with which other trends are realized. Just look at how volatility in truck capacity affects market pricing for all modes. In such an environment, shippers more than ever will need to partner with supply chain providers that can help them navigate these uncertain waters while designing resilient solutions that respond to their needs today and tomorrow.

If you are interested in learning more about our thoughts on this and other topics, follow [American PetroLog](#) on LinkedIn. In our next article, we will explore in more depth our first trend regarding changes in consumer behavior and discuss some of the challenges for e-commerce supply chains.





### Post-COVID Supply Chain Trends: Need for Speed Will Drive Blended e-Retail Solutions

Major disruptions often provoke fundamental shifts in customer behaviors, which in turn determine how value is created and lost across supply chains. While it seems certain that COVID-19 is one such example, it is still difficult to say which changes will endure.

For instance, a growing chorus (much of it backed by speculative investors) is again arguing, as they have periodically since the late 1960's, that the time for telehealth has finally arrived. Yet serious concerns persist from the over-prescription of antibiotics to misdiagnoses, undermining both quality of care and attempts to reign in overall healthcare costs. Dr. Jeremy Greene of John Hopkins University observed in his [recent article](#) that we appear to be embracing telehealth as "good enough medicine." Harvard Medical School professor Ateev Mehrotra further warned in an [interview](#) last month that "telehealth could be overutilized to the point of hurting the target population." So despite the hype predicting a new normal in every area of our lives from healthcare to auto sales, we should be cautious not to draw too many conclusions too soon.

The same prudence is warranted when we think about similarly hyped expectations regarding e-commerce in a post-COVID world. Indeed, the predictions at times seem over-stated considering that e-commerce only accounted for [16% of total retail sales](#) last year. Already there are a number of experts arguing that "permanent [dark stores](#) are the future" with curb-side pickup and delivery replacing traditional store formats. Yet at least one [survey](#) suggests that recent gains in certain areas may not be as long lasting, including the grocery segment.

Nevertheless, e-commerce sales were already forecasted to realize double-digit growth in the foreseeable future, albeit at a declining rate, prior to the current pandemic. Experience also suggests that increased penetration of online platforms during quarantine should favor some longer-term adoption and growth. Consequently, it seems reasonable to anticipate an acceleration of prevailing trends in e-commerce growth, though the details by segment remain somewhat nebulous.

However, accelerated growth will inevitably resurface challenges in e-commerce supply chains that started emerging in recent years. Consider the significance of same day deliveries to better compete with the instant gratification of shopping in brick-and-mortar stores – something in which Amazon is investing billions of dollars. [RBC Capital](#) predicted that Amazon shares would rally approximately 50% on 1-day Prime shipping; this gives whole new meaning to the old adage “time is money.”

The nascent *See Now, Buy Now* phenomenon demands rapid order fulfillment. Realizing this initially relied heavily on smaller, faster shipments using more costly air freight and LTL. Increasingly, however, we see a greater reliance on [smaller warehouses](#) closer to major urban centers, possibly favoring traditional modes like trucking. Some even anticipate a resurgence in third parties like [industrial distributors](#) to bring inventories closer to end-customers.

Where these [redundancies](#) already exist, they have proven successful during the pandemic at hardening supply chains compared to traditional models with just two national fulfillment centers, one in the east and one in the west. Glenn Gooding, president of iDrive Logistics summed it up best: “In the most simplistic terms possible, the more fulfillment options within a network, the less the risk the network will lose core fulfillment capacity.” Consequently, inventory carrying costs for online retailers unfortunately seem destined to rise. This poses the greatest challenge to just-in-time inventory management since Apple CEO Tim Cook’s famous maxim that inventory is “[fundamentally evil](#).”

Ironically, the solution to forward deploy more inventory means that the e-commerce supply chain will increasingly resemble traditional brick-and-mortar thereby narrowing some of its cost advantage. Indeed, what we are now observing is a convergence of the two in a blended format that provides both in-store shopping with convenient e-commerce pick-up and delivery options. So just as Amazon is acquiring traditional retailers like Whole Foods, traditional retailers are now acquiring e-commerce capabilities to leverage their existing storefronts. News of Target’s possible acquisition of technology company [Deliv](#) for the batching and routing of orders after expanding its delivery network with the acquisition of Shipt and Grand Junction in 2017, exemplifies this propensity for convergence.

The current pandemic will accelerate these trends towards a blended e-retail format in all probability with far-reaching implications not only on inventories and modal choices, but ultimately on production and sourcing decisions as managers try to reduce lead times in pursuit of more responsive supply chain models. After all there is precedence for retailers requiring that manufacturers contribute to, if not carry, the cost of the inventory through JIT fulfillment, listing fees, joint warehousing arrangements and the like. Ultimately expect this to shine a light on the cost of inventory in transit. We will delve into this in more detail in our next article. So be certain to follow [American PetroLog](#) on LinkedIn and look for it in your newsfeed.



## 5 Post-COVID Supply Chain Trends: Remapping of Global Supply Chains

Manufacturing has long enjoyed a privileged position in supply chains with an almost singular focus on efficiency. The need for flexibility was largely relegated downstream to logistics and distribution – at least until now. Production and sourcing decisions are garnering an ever-greater degree of interest in more recent years for a variety of reasons.

First, China is less and less desired as the “world’s factory.” On the one hand, China’s manufacturing competitiveness has been eroding in key areas for some time, especially for those [segments](#) in which it had enjoyed early success due to low labor costs. This was to be expected as a growing urban population inevitably led to higher wages. Consider that [Nike and Adidas](#) had already shifted over half of their footwear production to Vietnam as far back as 2010 and 2013 respectively. On the other hand, there has been a growing realization that supply chains need to be more diversified in an effort to mitigate disruptions: Don’t put all your eggs in one basket. The current pandemic has only served to reinforce this conviction.

Meanwhile, China’s trade practices have undermined their credibility abroad. Five years ago the Chinese Communist Party (CCP) adopted the [Made in China 2025](#) program, which not only sought to quickly climb the value chain of emerging technologies (like [Huawei](#) in the 5G sector) but also to dominate markets at home and more importantly abroad. The program was even

more protectionist than prior economic policies, explicitly instructing Chinese companies to reduce their reliance on foreign multinationals with date-specific [targets](#) for domestic content.

After drawing criticism from the Trump administration in 2018, the CCP quickly dropped any official mention of the program. Unfortunately the [Belt and Road Initiative](#) appears to repackage many of the worrisome components of the prior program under a different name. This has attracted renewed criticism of China's predatory trade practices, commonly exemplified by its seizure of the [Hambantota Port Development Project](#) in Sri Lanka.

China's mishandling of the current pandemic is further complicating the situation, as a growing number of participating countries approach China about renegotiating [Belt and Road loans](#) as their economies falter with every new COVID-19 outbreak. Misguided propaganda efforts and poorly conceived threats are not helping either. For how long can executives and boards ignore the rapidly deteriorating risk profile of doing business in China? So it seems inevitable that supply chain managers will increasingly look elsewhere whether of their own volition or at the urging of governments and [consumers](#) back home. Indeed, 40% of Americans now do not want to buy products from China.

Thinking ahead, potential winners and losers start to come into focus. First and foremost, US West Coast ports are increasingly less attractive as the preferred gateway for imports and may even consolidate at some point in the future. Although they will continue to play an important role in US trade, their best days are probably behind them. Attempts to accommodate megaships through investments in larger gantry cranes and automation will not be enough. Lower intermodal rates will not make the difference. The bottom line is that much of the utility of these ports lies in their ability to be a gateway for primarily Chinese imports destined to the two-thirds of the US population living east of the Mississippi River. The US consumer, more than China, is the most important driver in the global economy – and for the most part lives on the East Coast.

Now consider some of the potential winners. Canada's [Prince Rupert](#) is growing share thanks to fewer sailing days to China and North Asian countries like Japan and Korea as well as to transcontinental rail networks that are increasingly penetrating south of the border, such as Canadian National's acquisition of the Massena Line earlier this year. But as freight is more likely to arrive direct via the Suez Canal the deeper production moves into Southeast Asian countries from India to Vietnam, East Coast ports, especially New York with its large local and regional populations, will continue to grow their share of imports. Interestingly, even costly and highly polluting air freight has been growing its share of the pie, though future availability of [passenger planes](#) for surge capacity seems less certain given changing attitudes about travel in a post-COVID world. Regardless, all three of these alternatives enjoy the same competitive advantage over US West Coast ports, irrespective of trade wars and production leaving or staying in China – speed to markets along the US East Coast.

But what if this is just the beginning? The pandemic has brutally exposed the “[fragile efficiency](#)” of global supply chains. Economist [Mohamed El-Erian](#) summed it up recently saying that “companies now will put greater emphasis on resilience versus efficiency.” The situation is compounded by public demands that politicians take an active role in ensuring supply chains of

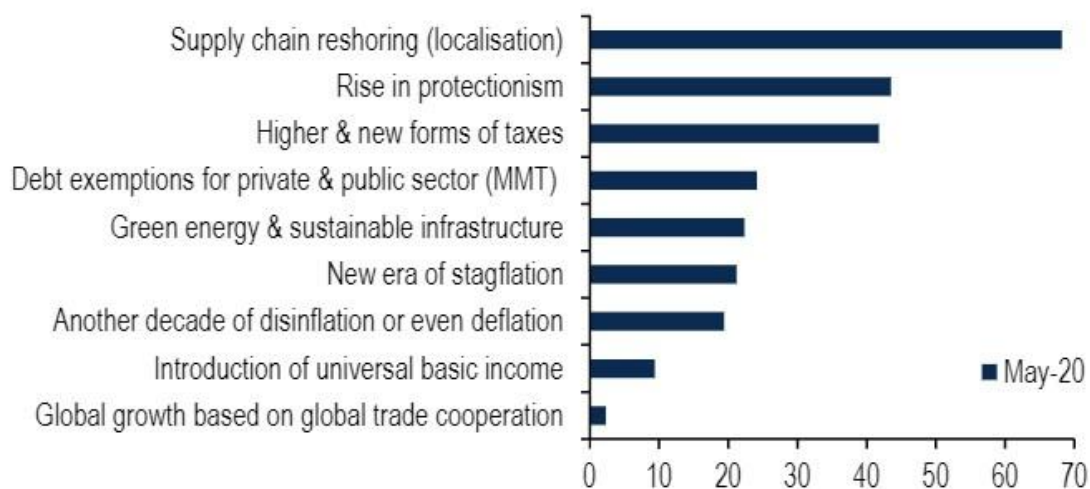


national interest. Consistent with this growing sentiment, President Trump is mulling an [executive order](#) to require that vital drugs and medical devices be produced in the US. That said, the US government response is not unique. One might even say that it is tame compared to [Japan's](#) decision to invest \$2.2 billion to help Japanese companies shift production out of China.

More importantly, as the consumer prevails on upstream interests, supply chains must evolve towards a more responsive pull model of fulfillment from a traditional push model. In a world where speed to market is paramount to the seemingly unassailable rise of e-commerce as discussed in our previous [article](#) in this series, manufacturers will not only better diversify sourcing but also strive to employ shorter and faster supply chains. They will explore strategies of regional sourcing and even partial reshoring of production. Heightened concerns regarding China will simply amplify the sense of urgency, even if some companies will need more time. In fact 64% of companies contacted in a recent [Thomas survey](#) indicated their likelihood to bring production and sourcing back to North America. Results from Bank of America's Global Fund Manager survey released earlier this week confirm their findings in the chart below.

All this should bode well for manufacturing not only outside China but especially in the US and neighboring countries like Mexico. It will further entail far-reaching implications across supply chains at home. In the next couple articles, we will take a closer look at what this might mean for domestic modes of transportation, starting with the trucking industry. Be certain to follow the [American PetroLog](#) page on LinkedIn and look for the article in your newsfeed. If you have not yet had a chance to read them, check out some of the other articles in this [series](#).

Exhibit 9: Which of the following are the likely structural shifts post pandemic crisis?



Source: BofA Global Fund Manager Survey, Bloomberg



## Post-COVID Supply Chain Trends: Reshaping the Trucking Landscape

The current pandemic has taken the trucking industry on a roller-coaster and the ride will not be over any time soon. After an initial surge, volumes fell off dramatically sending [rates](#) plunging to five year lows. Truckload linehaul [data](#) dropped to 15-year lows. ATA's Chief Economist Bob Costello noted in an interview with [Transport Topics](#) that "the U.S. economy is likely in the midst of its deepest recession since the end of World War II." He notes that the chronic driver dearth has now become a surplus, illustrating the wild swing in volumes over the last couple months.

Demand destruction due to the pandemic will again cull the herd of owner operators. Last year the trucking industry experienced a "[bloodbath](#)" due to rising insurance costs and trade tensions especially with China. The ongoing war of words between owner operators and brokers is indicative of how desperate the situation has become during the pandemic. Many carriers already pushed to the brink will not make it.

As previously [noted](#), most business executives expect an eventual return to more moderate growth. Historic government bailouts should enable consumers to resume spending more quickly. The market will start to tighten. The survivors will see rates rise and soar exponentially, as we again approach full capacity. That is why we must position ourselves now for success later, even as we just try to get through today. Neglect long-term strategic relationships at your own peril. Understanding this is critical for carriers and shippers alike.

However, you must first understand the long-term. For starters, the recovery will probably be uneven. What and who brought you this far, may not be able to carry you in the future. In previous articles, we discussed how the current pandemic will likely accelerate already strong growth in [e-commerce](#). Then we examined possible impacts on [global supply chains](#) in particular, noting a bias for speed-to-market that seems to favor deglobalization whether through more regional sourcing or even partial re-shoring of production. Again, these developments predated the current crisis. We simply conclude that they will gain momentum in a fuller recovery.

For trucking, this means that service parameters will continue to become more demanding. Delivery windows at major retailers like [Walmart](#) have already gotten tighter. But it also implies a further decline in the [average length-of-haul](#) that has shrunk to just 500 miles or 62% of what it was in 2005. Worse still, this trend has been accelerating in more recent years.

The day will come when trucking capacity expands once more – some things never change. But it will not simply return to where it was lost. For example, if more import flows keep shifting to East Coast ports, then the market will need less trucking capacity in the west and more in the east. The trucks will also tend to move shorter distances, since two-thirds of the US population already lives east of the Mississippi River. Instead trucking will continue “to pivot toward that [last-mile need](#).” To the extent that we experience a reshoring of production in the US, this, too, would favor shorter lengths-of-haul in the east. As for bulk freight trucking specifically, this development would be very auspicious in a resurgent economy, even as the near-term remains mixed with an [uptick](#) in some commodities and a [downturn](#) in others.

Drivers would still be needed, just on a different route. Perhaps this change in traffic flows could finally help mitigate a number of the most vexing [issues](#) in the trucking industry. Shorter lengths-of-haul could lessen the impact of Hours of Service (HOS) rules and improve the safety profiles of carriers. If drivers are able to get home most nights, this would dramatically improve their lifestyle thereby enabling companies to recruit and retain more drivers. It may even help to improve their overall health, which is receiving increased attention from [regulators](#).

If the near-shoring of production to Mexico increases as long anticipated, then cross-border trucking must expand in kind with its own unique set of challenges. Indeed, manufacturing consultants at Kearney revealed that Mexico stands to benefit after the pandemic in its annual [Reshoring Index](#) released last month. Such a development may even partially reverse some of the overall decline in lengths-of-haul.

Be it a matter of months or years, truck rates will eventually turn higher as capacity will have fallen too far to support a fuller recovery. Ironically, the final HOS [ruling](#) will probably make things worse in the near-term by generating additional capacity. Know that the longer it takes the trucking market to turn, the sharper the rebound. At that point shippers will be looking for alternatives like the railroads. In the next article, we will examine what all this may mean for railroads and more importantly how they are likely to respond. So be certain to follow [American PetroLog](#) on LinkedIn and look for it in your newsfeed. In the meantime, be certain to check out some of the other articles in this [series](#).





### Post-COVID Supply Chain Trends: Less Intermodal, More Third-Party Rail Partnerships

“Every major industry was once a growth industry. But some that are now riding a wave of growth enthusiasm are very much in the shadow of decline.” Such is the unsettling introduction to Harvard Business School professor Theodore Levitt’s 1960 paper simply entitled [Marketing Myopia](#). Levitt quickly identified the railroad industry as his poster child for marketing myopia adding that “they let others take customers away from them because they assumed themselves to be in the railroad business rather than in the transportation business.” This is particularly noteworthy in the current context.

On the one hand, the adoption of Hunter Harrison’s Precision Scheduled Railroading (PSR) model as the industry standard invites a whole new level of scrutiny. [Critics](#) argue that operational effectiveness is measured primarily in short-term financial performance, no longer customer satisfaction. Ironically, this is happening at the same time that the nearly 200 CEO’s of the [Business Roundtable](#) issued a statement saying that shareholder value is no longer their main objective. Railroad analyst Tony Hatch regularly derides the prevailing group-think as the “Cult of OR,” a [measure](#) comparing operating expenses to revenue.

Such criticism is directed as much at investors as it is at the railroads themselves. After all, Wall Street – not customers and railroad executives – established PSR as the industry standard either through activist investors or risk of the same. Indeed, the only railroad not to have formally adopted the PSR operating model is Warren Buffet’s privately held BNSF. David Nahass of



[RailwayAge](#) echoed this sentiment when he recently asked, “By applying outsized multiples to railroad stocks, is Wall Street unintentionally ‘preventing’ the railroads from growing their franchise and increasing loadings—growing the top line—in pursuit of the lowest OR?”

On the other hand, the pandemic has dramatically hit already struggling rail volumes, despite record-setting financial performance. At last [reading](#), total US year-to-date traffic was down 12.5% to nearly 9.1 million carloads and intermodal units. In fact, last week it was reported that U.S. weekly carloads had declined over 30%, their largest percentage decline ever since AAR began collecting rail volume data in 1988. The need to stay close to customers is greatest at times like these. Unfortunately, this month railroads and their customers are instead squaring off in front of the [Surface Transportation Board](#) over demurrage and other supplemental charges. At the root of the problem is the pressure on railroads to focus increasingly on more profitable linehaul movements while taking an up-or-out approach to lower margin value-added services and operations on which many shippers have come to rely.

Understanding these dynamics is critical to evaluating how the railroads will respond to supply chain challenges in a post-COVID world, as laid out in previous [articles](#).

For example, intermodal rail service with its emphasis on finished goods may very well follow coal into a [secular downturn](#) of sorts, particularly in the US. Recall from our previous [article](#) that two-thirds of the US population lives east of the Mississippi River, and US West Coast ports have historically been the best way to get there from China. As production leaves China, US West Coast ports will lose share. Meanwhile, what remains of Chinese exports will continue to divert to growing Canadian ports to the extent possible, thanks to fewer sailing days. That said, intermodal volumes from south of the border should grow, if Mexico can capitalize on near-shore production trends. US East Coast ports are also likely to see an increase in intermodal traffic destined for the American heartland, as production shifts deeper into Southeast Asia or even relocates regionally. The potential for the reshoring of some US manufacturing should further bolster domestic intermodal. All of this would significantly reshape the intermodal landscape for years to come.

As industry observer [Larry Gross](#) of Gross Transportation Consulting recently observed, this “dispersal” of freight flows has the potential to upend intermodal supply chains reliant on lane volume density. He writes, “The current intermodal focus on running the simplest possible network of the largest trains will also need to change in the years to come in order to adapt to this new reality.” Unfortunately, the net effect on intermodal rail volumes is likely to be negative so long as [short-haul intermodal](#) remains elusive. The fact is that most people live near the coasts and so near the ports with Chicagoland being the main exception. Just think of where all the lights are in a satellite image of the US at night. Trucks have always enjoyed a competitive advantage in shorter lengths-of-haul for finished goods. Meanwhile, intermodal networks have curtailed service lanes and shuttered terminals with the PSR roll-out. Unlike other countries such as [Australia](#), there simply is not the same appetite of years past at US railroads to invest in a short-haul solution for a segment with less compelling margins.

More promising are the prospects for traditional carload service. Any increase in manufacturing in the US or neighboring countries should generate incremental bulk shipments. Unlike finished goods, dry and liquid bulk shipments often favor rail transportation. (Though Oliver Wyman's [Rod Case](#) warns that potential changes in technology could swing the competitive advantage to truck, stunting carload growth through 2045.) Rail is more suitable than truck for such commodities in terms of modal efficiency and safety. Rail is also more flexible than barge and pipeline. Furthermore, mother nature has the first word in supply chain design for these commodities, from crops and trees to aggregates and petroleum products. This dictates not only length-of-haul but also the need for significant capacity often in remote places. More interestingly, carload linehaul service seems to benefit most in the [PSR model](#).

Even so, other aspects of the PSR model pose challenges to capitalizing on this opportunity. The Surface Transportation Board review of demurrage and other supplemental charges specifically regard carload policies affecting the overall cost of rail service, not to mention ease of doing business. As railroads focus increasingly on more profitable linehaul, similar issues may arise with other value-added operations and services.

Consider the willingness of railroads to spin-off portions of their network to Short Lines. These smaller rail segments typically lack the density necessary to deliver the same asset utilization as the "core" network. In this way, the railroads retain more profitable linehaul operations while outsourcing the complexity and inefficiencies of local service in low density rail branches.

We may see a similar evolution in value-added logistics services in the moment that they no longer generate sufficiently attractive returns. Union Pacific's recent decision to close its [Rotterdam](#) warehouse and shipping center acquired in 2017, driven by a sharp decline in demand for fresh produce during the pandemic, is one such example. Perhaps Canadian Pacific's [announcement](#) last year to enlist the support of a local transload provider at their railyard in Montreal suggests a more sustainable path forward.

Despite the impressive financial results of the PSR model, service defined by Hunter as "doing what we say we'll do" fails to ask what customers need and want. Levitt certainly would not be impressed. Yet collaborations like these with Short Lines and other third-party providers may indicate a way to reconcile PSR demands with market demands – at least in part. Expect these strategic partnerships to figure ever more prominently in the future.

Admittedly none of this is new. As in previous articles, we simply conclude that certain prevailing supply chain trends prior to the pandemic are likely to gain momentum in a post-COVID world and then give our perspective on what that means going forward. In our next and final article, we will instead consider still emerging technologies in manufacturing and how they might reinforce these supply chain trends through a more radical disruption of production planning. Be certain to like the [American PetroLog](#) page on LinkedIn and look for the article in your newsfeed. We also invite you to read the other articles in this [series](#).



## Post-COVID Supply Chain Trends: Industry 4.0 & the Rise of Distributed Manufacturing

Thus far in the course of this six-part [series](#), we have examined four supply chain trends that are likely to prevail in a post-COVID world. Let us quickly review them here:

1. The need for speed in [e-commerce](#) is fast evolving towards more distributed warehousing closer to consumers, suggesting an increase in forward deployed inventory carrying costs.
2. As [sourcing and production](#) diversify away from China, US West Coast ports will lose share to both US East Coast and Canadian ports. More importantly, the need for shorter, faster supply chains encourages near-shoring of production in Mexico and elsewhere in this hemisphere, as well as the re-shoring of production in the US.
3. All this will ultimately reshape traffic flows and have a dramatic impact on domestic modes of transportation. Expect an increase in shorter lengths-of-haul off the East Coast for [trucking](#) along with continued emphasis on the last-mile.
4. Similarly, [railroads](#) will experience significant volume declines in intermodal potentially offset by an increase in carload volumes. Third party partnerships will be critical to their capitalizing on the opportunity given constraints imposed by the PSR operating model.

What all of these trends have in common is that they were already emerging prior to the current pandemic. That is what makes them so compelling. Yet author and business executive Seth Godin would remind us that “Change is never perfect. Change means reinvention, and until something is reinvented, we have no idea what the spec is.”

Perhaps the greatest challenge to emerge as a result of these four trends would be a begrudging rise in inventories. Indeed, it seems to be as unassailable as the rise of e-commerce itself. As already anticipated, online retailers will again push as much of this cost as possible onto manufacturers. More difficult still, the current generation of business leaders that rose through the ranks thanks to their embrace of just-in-time inventory management will struggle to adapt to this new normal. Thus far, they have been able to stomach costly and highly polluting air freight to meet the ever-greater demands of e-commerce while maintaining longer supply chains. Nevertheless, in recent years [air freight](#) has started to struggle to keep pace.

Out of this necessity will eventually come our fifth and final supply chain trend likely to emerge after the current pandemic: distributed manufacturing. This form of decentralized manufacturing typically entails small-scale production closer to end consumers that is capable of churning out smaller batch quantities on demand. The long-term consequences for the manufacturing sector seem somewhat analogous to the impact of “mini-mills” on the domestic steel industry, which catapulted [Nucor](#) to a leadership position that it still holds today. Just as the invention of the electric-arc furnace was critical in the transformation of the steel industry, technology will be crucial to the evolution towards distributed manufacturing.

Indeed, [Deloitte](#) refers to it as the fourth industrial revolution or more simply *Industry 4.0*. Just do not look for a silver bullet. This vision relies on complex, tailored systems of interconnected digital and physical technologies. Value is created by combining real-time insights from big data, cloud computing and the Internet of Things with the small-scale efficiencies of robotics, automation and 3D printing.

The textile sector in particular is worth considering as this transformation unfolds. Thanks to both a heavy reliance on manufacturing and strong customer engagement with their products, these industries frequently serve as harbingers of trends to come. Indeed, textile industries have typically been among the early movers ever since the first industrial revolution. Their manufacturers were among the first to move production off-shore eventually finding their way to China. Then they were among the first to leave China for other countries like Vietnam. Even in the vast world of e-commerce, nowhere is the need for speed greater than with the emergence of the [See Now, Buy Now](#) phenomenon that has upended the way the fashion industry operates – and generated many inventory woes in the process.

The smaller scale of distributed manufacturing operations brings production closer to end-consumers. Not only does this cut down on the cost of inventories, but also helps to reduce and optimize transportation costs across the supply chain. After all, boxes of finished goods often contain a lot of air. Just think about a truck full of sneakers. However, distributed manufacturing would favor more shipments of bulk commodities and intermediate goods in lieu of finished products. After all, the final product can then be created or assembled just around the block.



The impact on supply chain costs will be akin to the shrinking of electronics and the reduced water content of detergents and household cleaners. Once these technologies and systems of technologies come of age, one could image a world of *See Now, Buy Now ... Produce Now*.

Manufactures are already getting an early glimpse of the potential value of product customization made possible by better data combined with better technology. [Nike](#) is a great case in this regard starting with the launch of NikeID in 2000. The program has since expanded from being offered only online to over 100 in-store “studios” worldwide. Last year Nike rebranded the initiative as *Nike by You* in an effort to better communicate this notion of collaborative product development, helping to grow e-commerce sales by 42% in its first fiscal quarter. Daniel Edmundson, Strategy Director at Gretel, sums up the trend as such: “The next generation of consumers is setting a high bar for customization to express all facets of their identity and individuality.”

Again the textile sector is at the forefront of this still emerging trend, though you can already formulate your own bespoke [fragrance and cosmetics](#) to complement your personalized clothes and sneakers. Meanwhile, the practical potential of *Industry 4.0* is also fast emerging in other sectors, like [healthcare](#) where these technology systems are currently being leveraged for everything from personalized implants and prosthetics to workable models of tumors and organs for tailored treatments.

To a large extent, the advent of distributed manufacturing will be symbiotic with that of the other four trends. Digital e-commerce platforms play a crucial role in generating data insights critical to developing distributed manufacturing systems, in turn helping to drive further penetration and growth for online retailers. Whether producing or simply assembling the product closer to the consumer, distributed manufacturing takes the concept of faster, shorter supply chains to a whole new level. Consequently, the trucking industry will continue to focus on the last-mile, whereas railroads and their strategic third-party partners will instead focus more on carload shipments of dry and liquid bulk commodities and intermediate products.

Although private enterprise and national policies will be important to realizing the *Industry 4.0* revolution, local governments and organizations must be willing to play a vital role in order to ensure its success. After all, the genius of distributed manufacturing is precisely the fact that it is local. The first forays will likely occur in the largest urban centers.

Watch for New York City to be an early winner. In addition to a large local and regional population of consumers, city government is already actively promoting distributed manufacturing to support local industries and entrepreneurs. The [NY Economic Development Corporation](#) frames the opportunity as follows: “Technological advances and new ways of doing business are shaping a new manufacturing system, with a focus on smaller, more flexible production.” Meanwhile, the Port Authority of New York and New Jersey has actively worked to ensure that the city’s infrastructure satisfies both short and long-term needs. On the one hand, investments like raising the Bayonne Bridge to accommodate larger ocean carriers have proven critical to facilitating the shift in imports to the US East Coast. On the other hand, recent upgrades to NYNJ Rail’s carfloat operations and the opening of a new transload site right in the

heart of Brooklyn at the 65<sup>th</sup> Street Railyard, guarantee that the local infrastructure can efficiently serve manufacturers in the big city. Not only do investments like these support existing industries in areas like the North Brooklyn Industrial Business Zone, but also lay the foundation for future growth through distributed manufacturing.

In closing, we would be remiss if we did not acknowledge the immense human and economic suffering caused by the pandemic. Specifically, New York City is among the hardest hit. The devastation in the Big Apple has captured the attention of the nation and the world. At times uncertainty about the future abounds. As one [New York Post](#) opinion writer wrote earlier this week, “NYC’s urban model faces existential crisis in post-pandemic world.”

Yet as we reflect on the implications of these five post-COVID supply chain trends identified in this six-part [series](#), we cannot help but to think that the city’s best days are still ahead. New York, like many urban centers, is well positioned to capitalize on these five post-COVID supply chain trends. Rest assured that the impact of these trends is more enduring than that of the virus.

# All-Water Solutions: The Role of Intermodal

April 21, 2011

Michael Rutherford  
CSX Transportation



*How tomorrow moves*

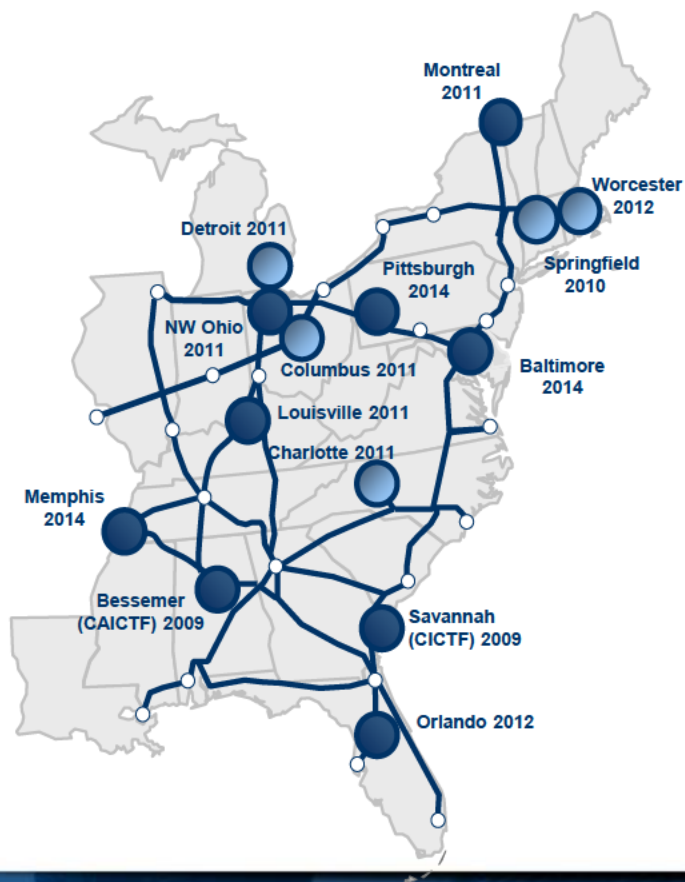


# Intermodal is a key component of the all-water solution





# New and expanded terminals support and drive growth



- New terminals create opportunities for incremental growth
  - Opening terminals in Louisville and NW Ohio
- Terminal expansions support ongoing growth through conversions
  - Adding capacity in Columbus and Charlotte
  - Leveraging the New England I-90 Corridor



## Clearances increase network throughput capacity



- Double-stack network creates efficiencies and capacity
  - Reduce intermediate handlings
  - Increase train densities
- Eastern connectivity near complete
  - Liberty Corridor Freightway
  - New England I-90 Corridor
  - Trenton Line Corridor
  - National Gateway

— Current double-stack network — National Gateway and New England I-90



## Clearance Examples: Bergen Tunnel



## Clearance Examples: Waldo Tunnel





# Trenton Line Corridor improves Philadelphia services



- Encompasses track lowering and overhead structure modifications
- Double-stack efficiencies improve overall service competitiveness
  - Eliminates 37 unnecessary miles
  - Increases service reliability
- Planned Completion: 2012

# National Gateway connects freight to inland markets



Creates new market opportunities

Provides faster, more reliable service

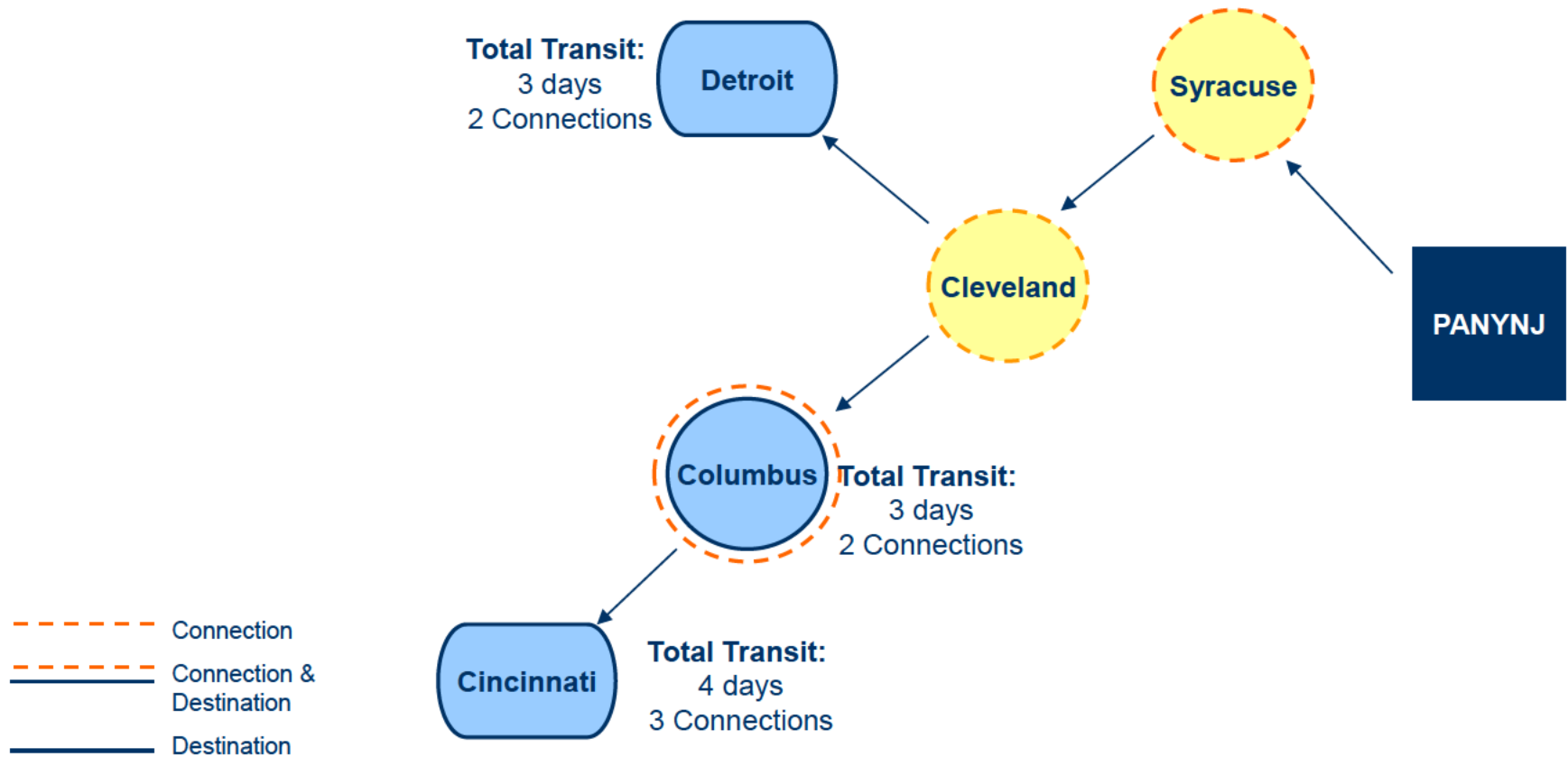
Simplifies interchange with western rails

## NW Ohio is a total network initiative



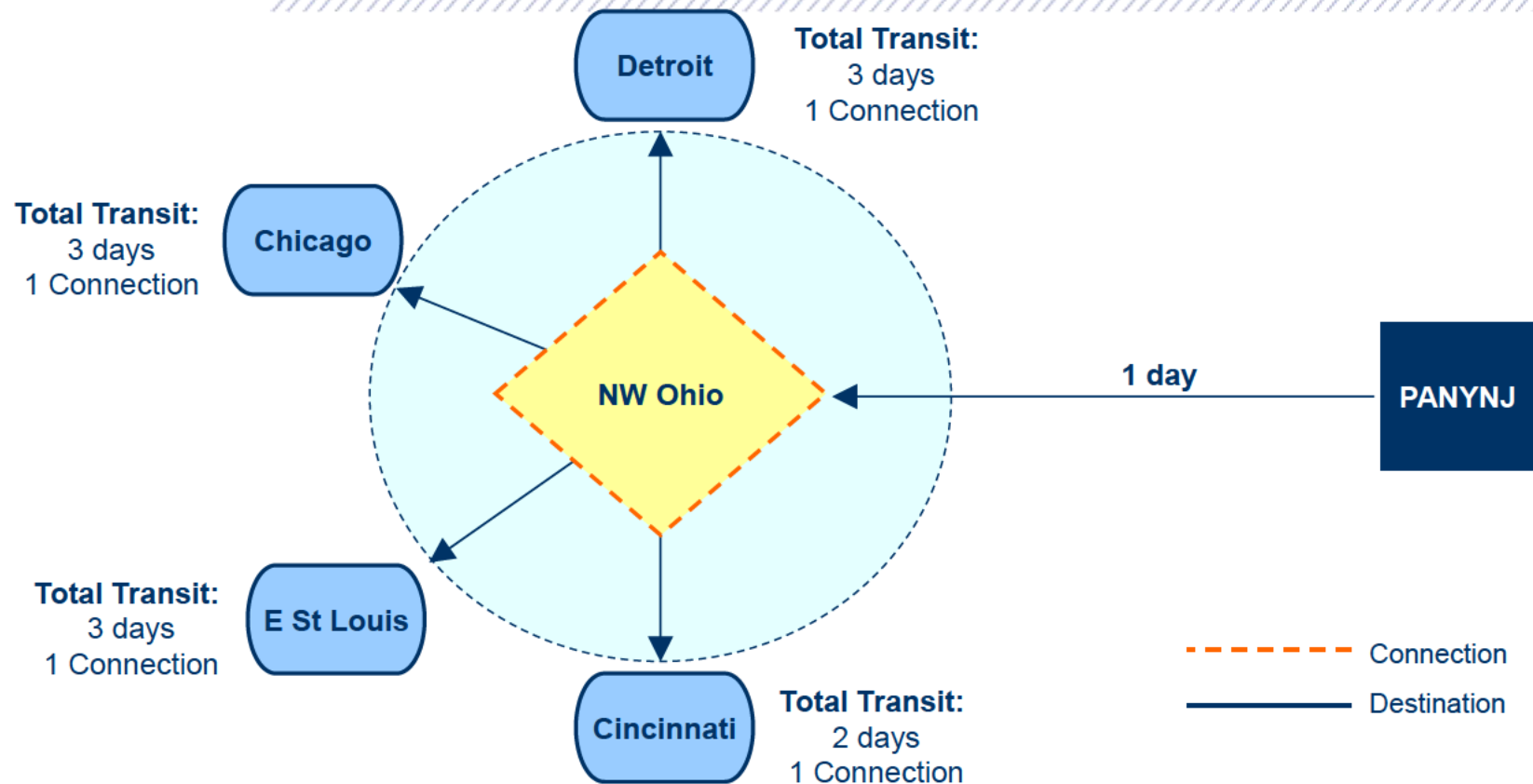


# PANYNJ: Current intermodal service is more circuitous

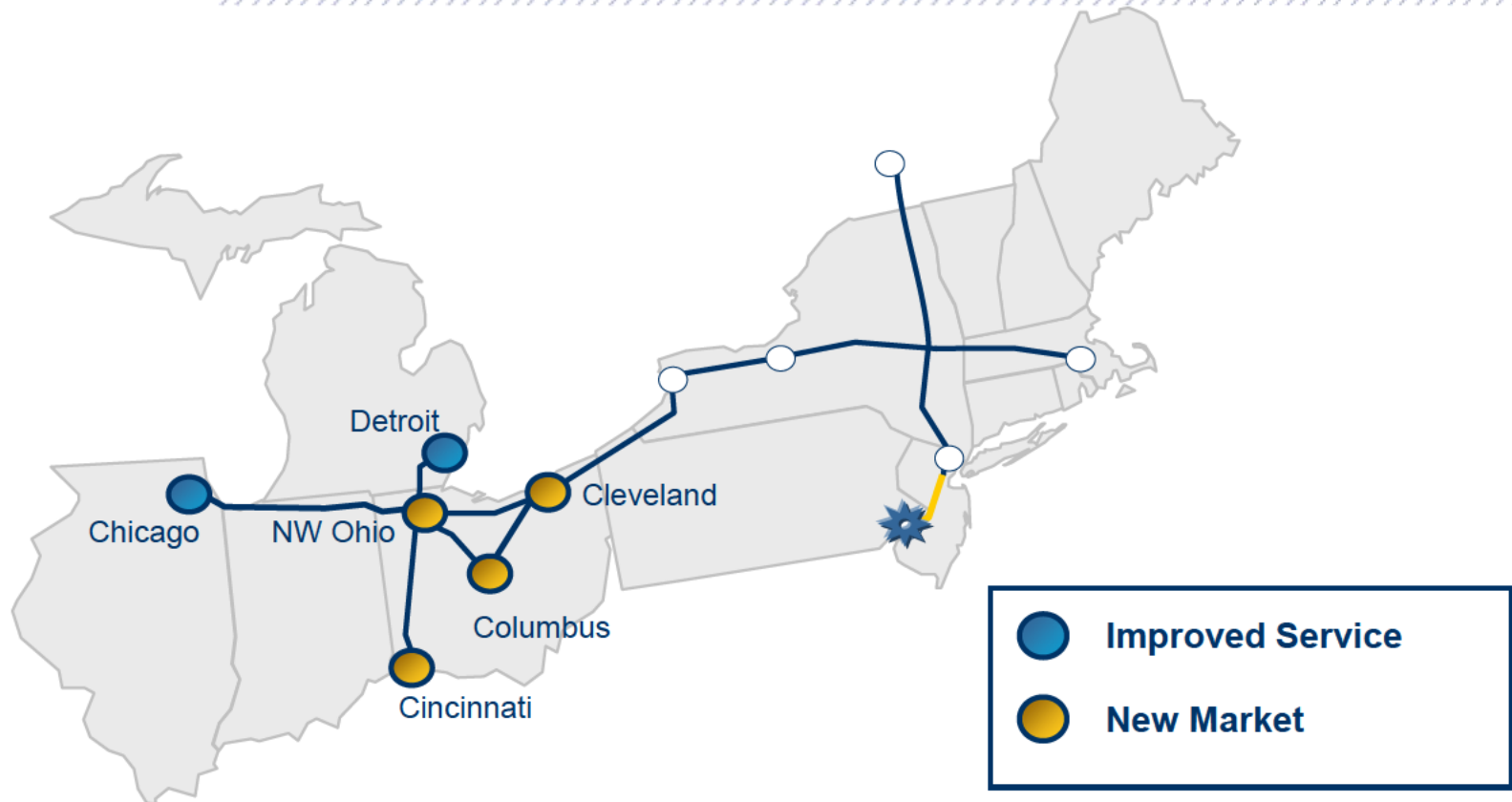




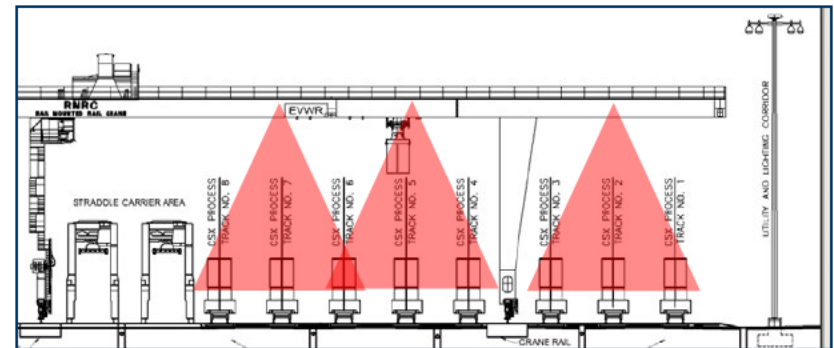
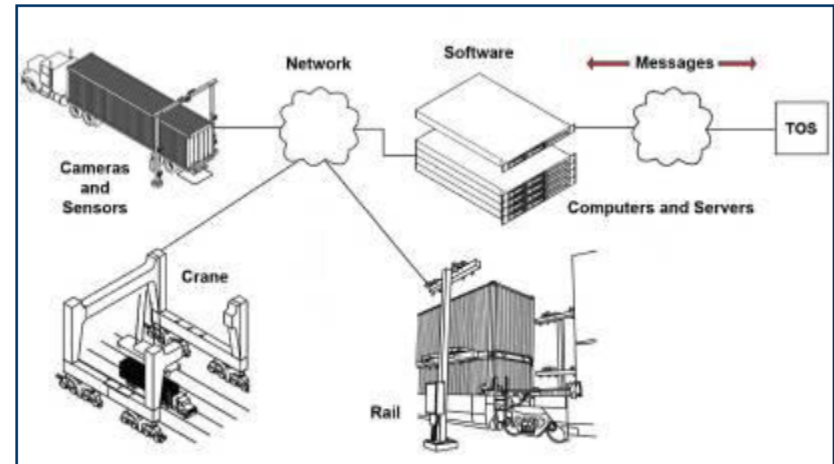
# PANYNJ: New service design is faster and more reliable



## NW Ohio connects Philadelphia to the Ohio Valley



# TOS enhances overall terminal performance





# Wide-span cranes set new standards in efficiency



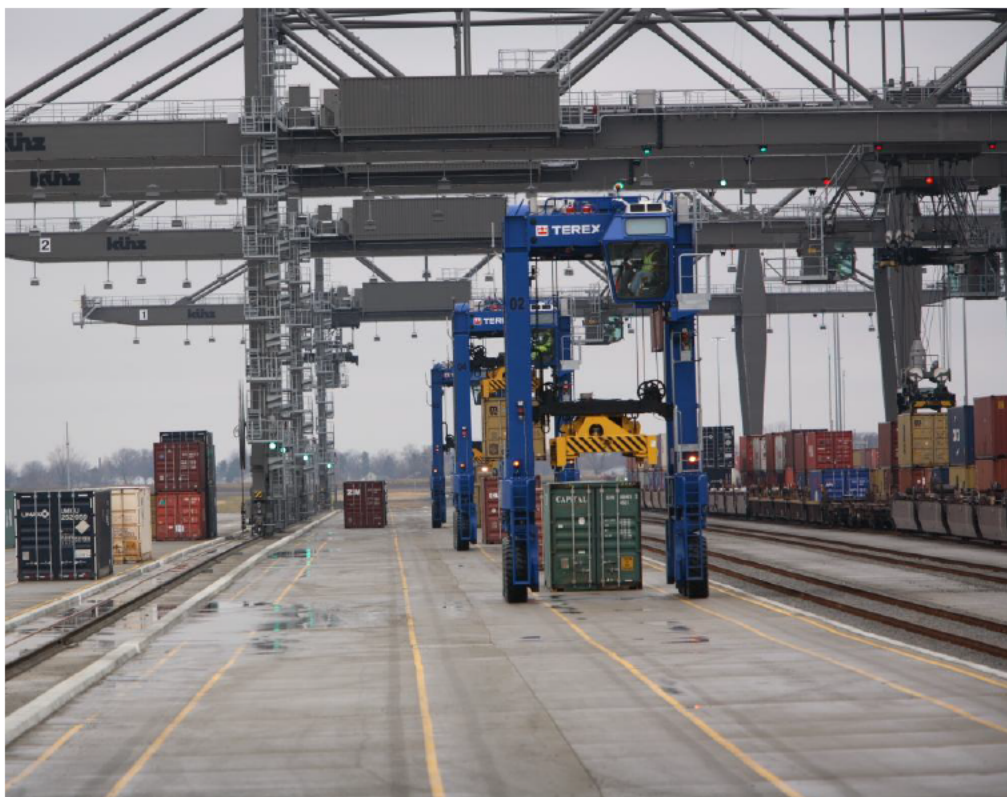
- Environment
  - Reduce emissions
  - Almost silent operations
- Network
  - Increase terminal throughput
  - Connect more markets
- Operations
  - Improves facility safety
  - Semi-automation

Operation	Pollutant (grams/lift)			
	HC	CO	NO <sub>x</sub>	PM
WSC	1.8	8.3	23.9	2.1
Reduction vs. conventional	84%	83%	84%	82%

HC=Hydrocarbons , CO=Carbon Monoxide, NO<sub>x</sub>=Oxides of Nitrogen, PM=Particulate Matter, 454g/lb., 2000 lbs/ton

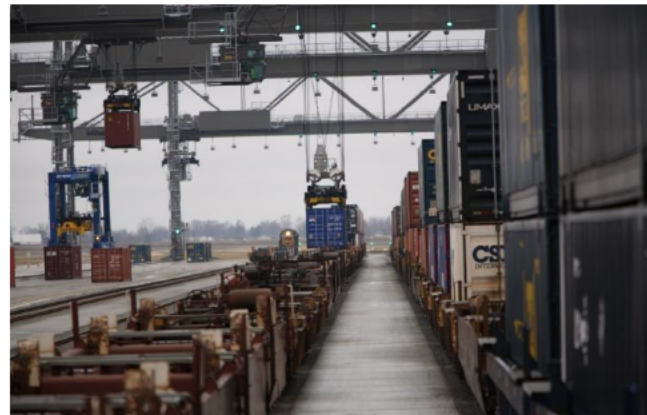
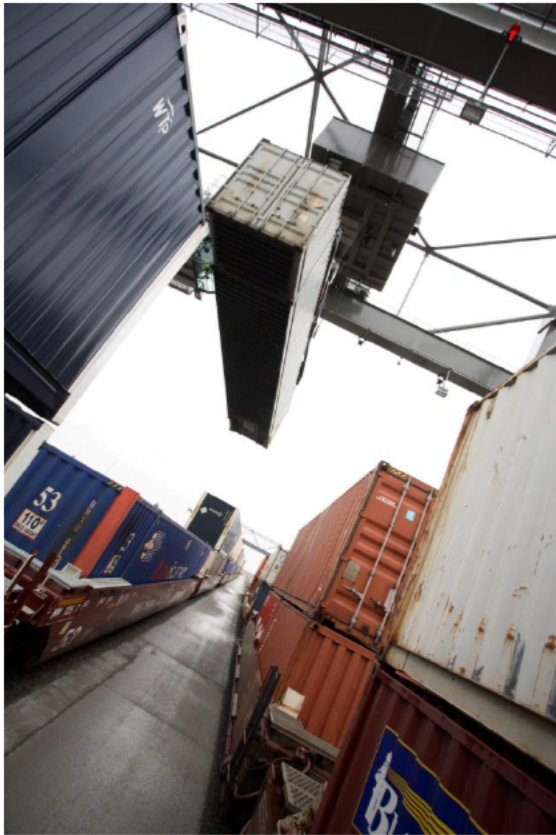


# Grounded operations support more fluid operations





# The future is here today in NW Ohio



# CSX investments support all-water solutions



## Network Capacity

- New and expanded terminals
- Double-stack clearances



## Capacity Management

- Innovative terminal design
- State-of-the art technologies
- Hub-like operations











# Rail Capacity: Pioneering the Rail Renaissance

*Michael Rutherford*  
*AVP Industrial Products*  
March 13, 2014



# Forward-looking statements

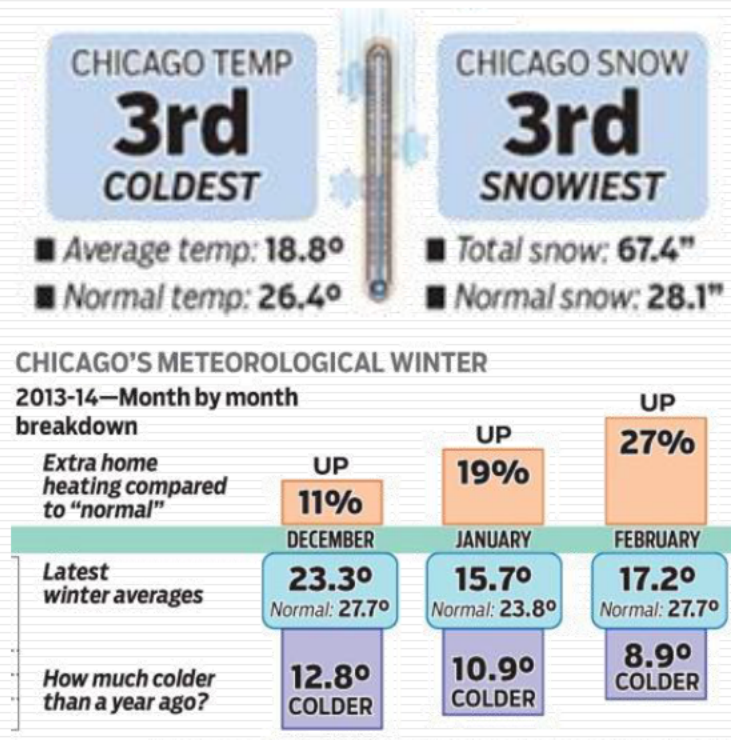
This information and other statements by the company may contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act with respect to, among other items: projections and estimates of earnings, revenues, margins, volumes, rates, cost-savings, expenses, taxes, liquidity, capital expenditures, dividends, share repurchases or other financial items, statements of management's plans, strategies and objectives for future operations, and management's expectations as to future performance and operations and the time by which objectives will be achieved, statements concerning proposed new services, and statements regarding future economic, industry or market conditions or performance. Forward-looking statements are typically identified by words or phrases such as "will," "should," "believe," "expect," "anticipate," "project," "estimate," "preliminary" and similar expressions. Forward-looking statements speak only as of the date they are made, and the company undertakes no obligation to update or revise any forward-looking statement. If the company updates any forward-looking statement, no inference should be drawn that the company will make additional updates with respect to that statement or any other forward-looking statements.

Forward-looking statements are subject to a number of risks and uncertainties, and actual performance or results could differ materially from that anticipated by any forward-looking statements. Factors that may cause actual results to differ materially from those contemplated by any forward-looking statements include, among others; (i) the company's success in implementing its financial and operational initiatives; (ii) changes in domestic or international economic, political or business conditions, including those affecting the transportation industry (such as the impact of industry competition, conditions, performance and consolidation); (iii) legislative or regulatory changes; (iv) the inherent business risks associated with safety and security; (v) the outcome of claims and litigation involving or affecting the company; (vi) natural events such as severe weather conditions or pandemic health crises; and (vii) the inherent uncertainty associated with projecting economic and business conditions.

Other important assumptions and factors that could cause actual results to differ materially from those in the forward-looking statements are specified in the company's SEC reports, accessible on the SEC's website at [www.sec.gov](http://www.sec.gov) and the company's website at [www.csx.com](http://www.csx.com).



# *Just how bad has the winter been in Chicago?*

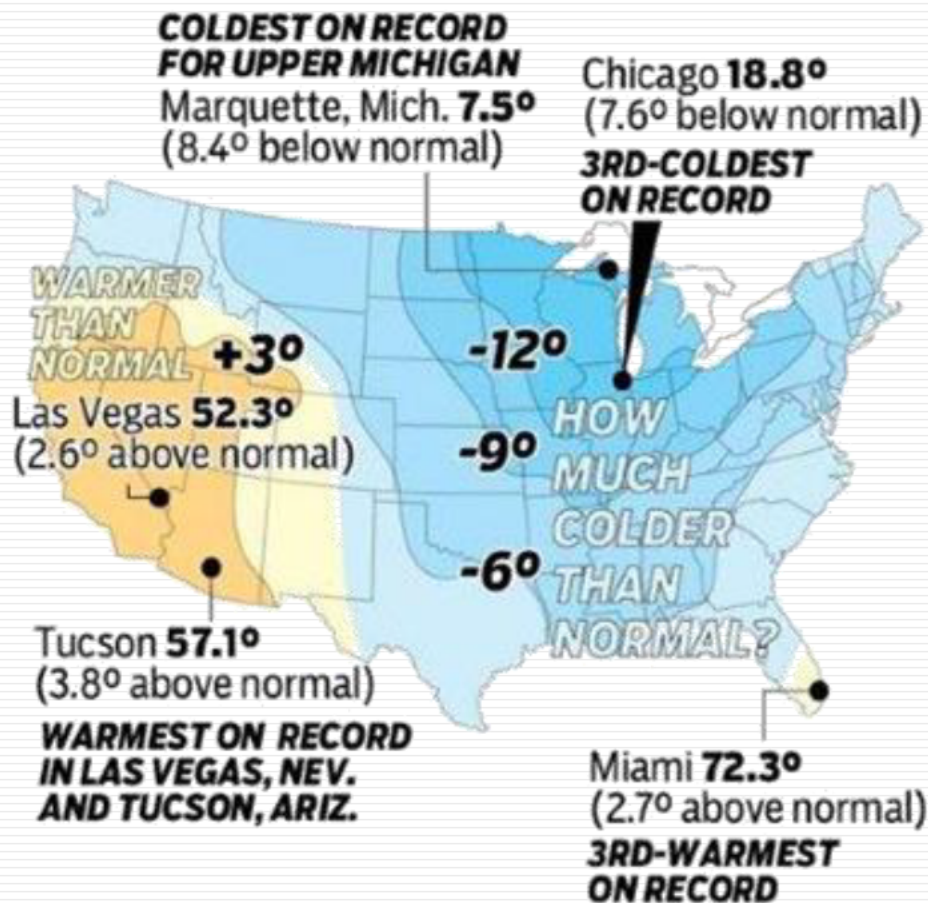


- The National Weather Service adopted the Twitter hashtag #ChiBeria
- Even polar bears were being kept indoors at the Lincoln Park Zoo
- Coldest January 6<sup>th</sup> on record at 16° below zero, colder than the South Pole
- Set a new all-time record for the most days of measurable snow

Source: Frank Wachowski, National Weather Service archives; J. Kohnke, B. Merleau, K. Hollon / WGN-TV.



# *This winter has been harsh, relentless, widespread*



## NEW INDEX QUANTIFIES WINTER'S COLD SEASON

The ultimate gauge of winter 2013-14's severity

The 'AWSSI' Index—pronounced like the "Aussie" Index—Accumulated Winter Season Severity Index

■ Index developed by: National Weather Service Meteorologist, Barbara Mayes Bousted

■ Midwestern Regional Climate Center Meteorologist, Steven D. Hillberg

■ Index tallies all temps, snowfall, snow depths

■ **#1 most miserable winter: DETROIT**

■ **#3 most miserable winter: CHICAGO**

■ **In the top 5 most miserable: INDIANAPOLIS, PHILADELPHIA, NEW YORK**

■ **#18 worst winter: ATLANTA**

■ **#28 worst winter: WASHINGTON, D.C.**



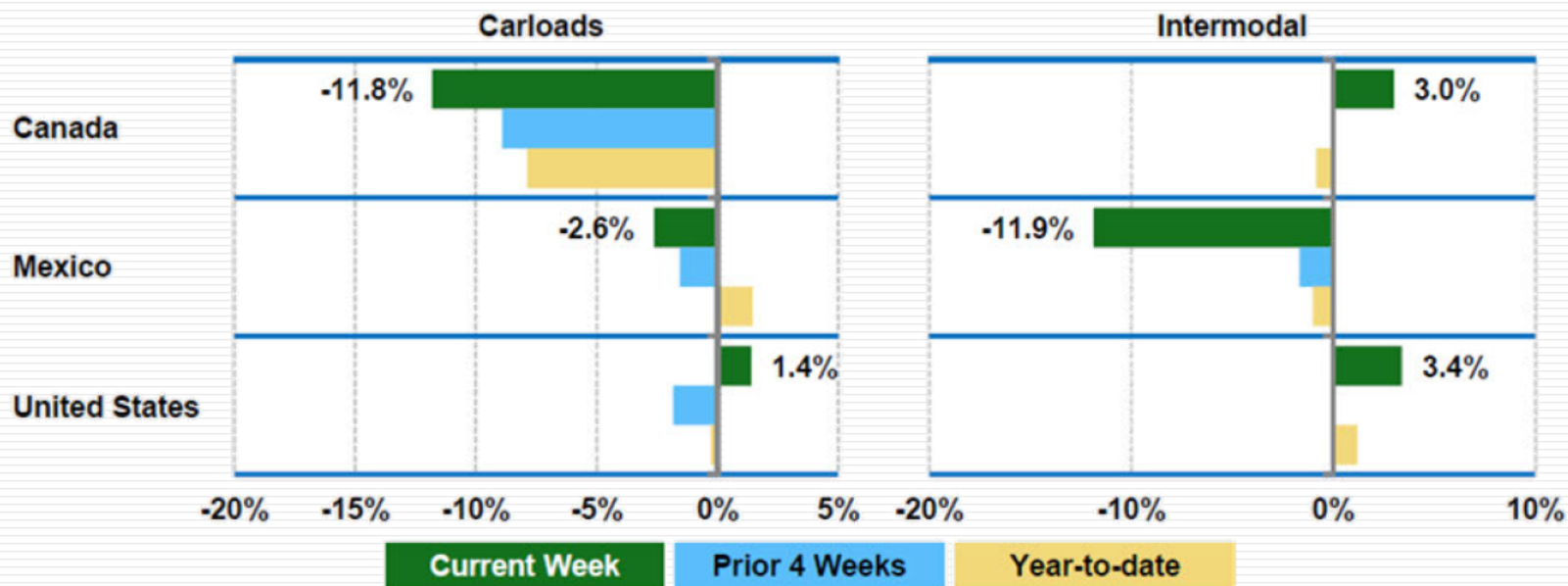
Source: Frank Wachowski, National Weather Service archives; T. Valle, M. Randich,, K. Hollon / WGN-TV.

# *The winter has also impacted transportation*



- Employees marking off to care for family and home
- Taxi services suspending operation
- Impacts to signal systems
- Postponement of car repairs
- Ice on the tracks and frozen switches
- Broken rails
- Locomotive failures

# 2014 has gotten off to a challenging start



Source: AAR, YOY% North American Rail Traffic Summary, Week 9 2014.

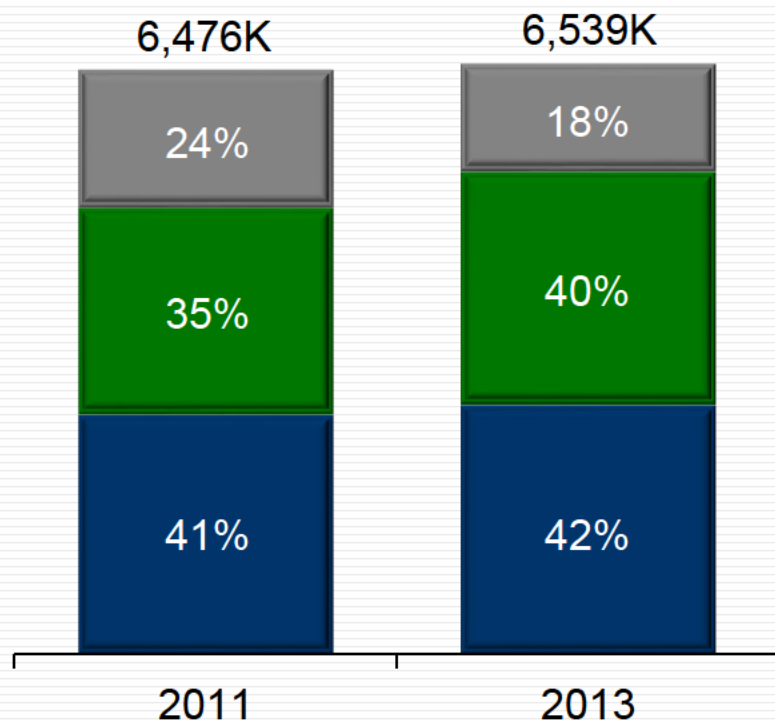




# Broad-based strength helps offset coal headwinds

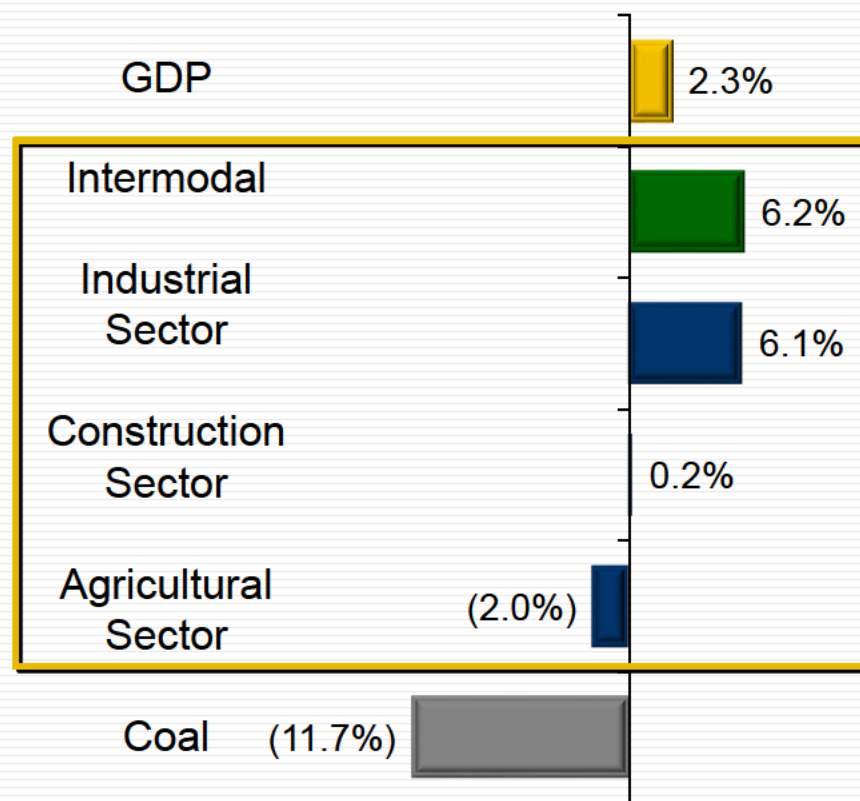
## CSX Portfolio Mix

■ Merchandise ■ Intermodal ■ Coal



## CSX Volume Change versus GDP

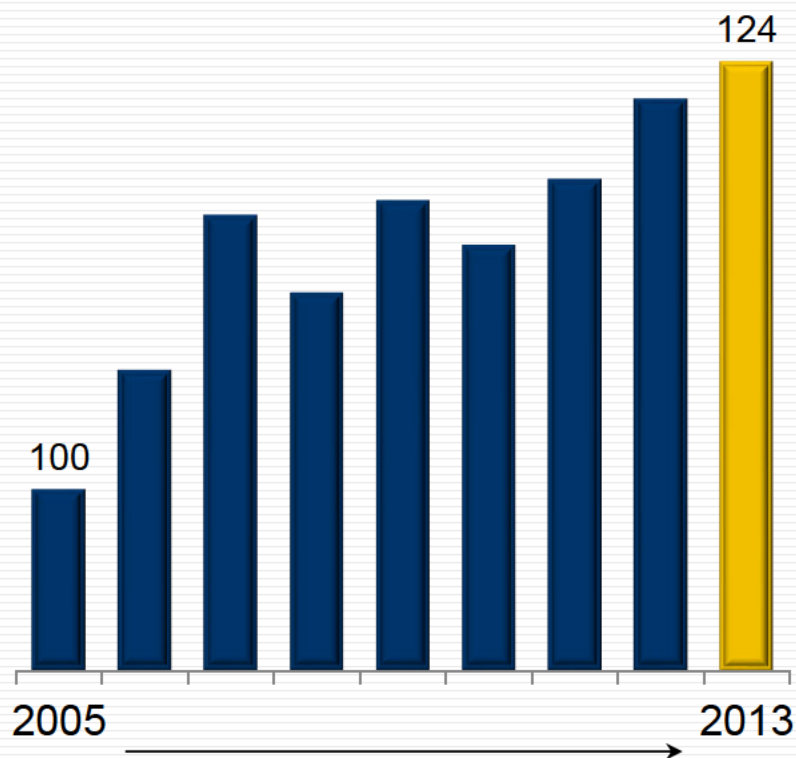
2011 through 2013 CAGR



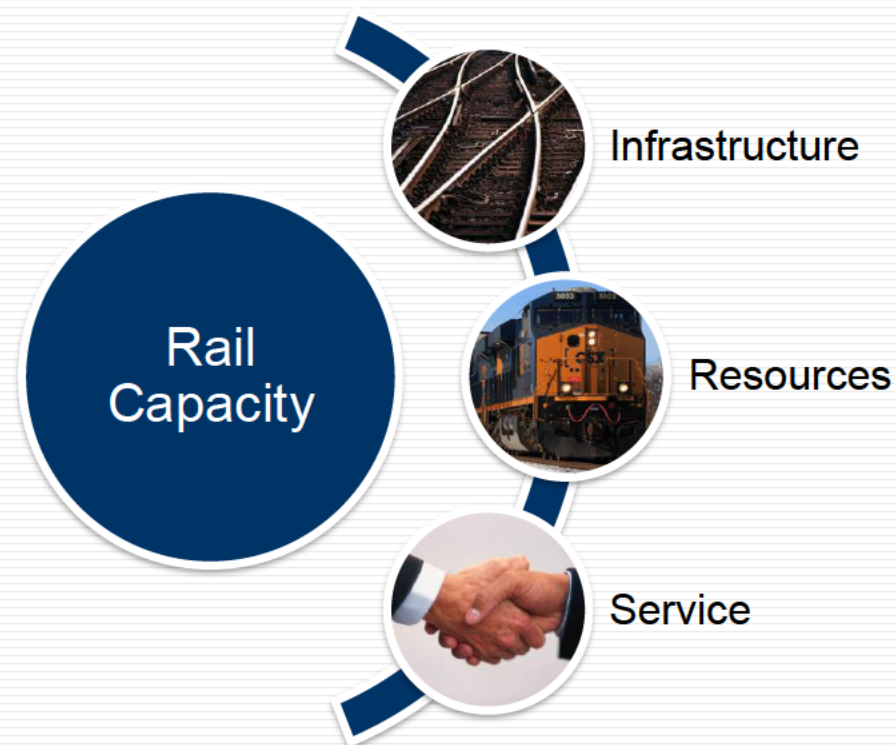
# Well positioned for long-term growth

## CSX Customer Satisfaction

*Indexed: 2005 = 100*



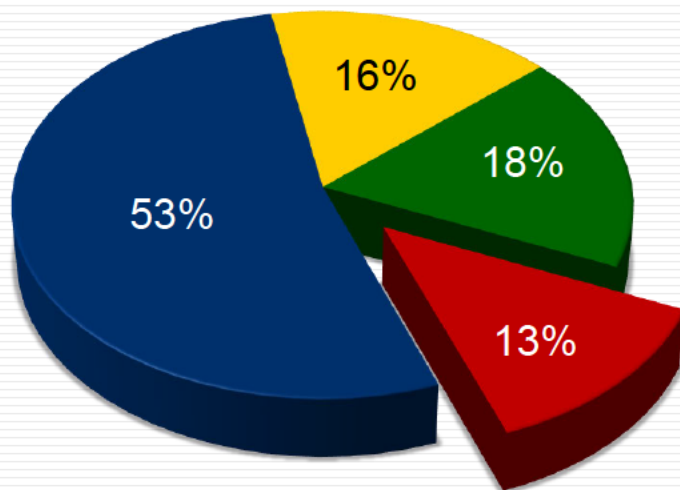
Source: CSX Proprietary Customer Survey, 2013.



# Targeting \$2.3 billion of capital investment in 2014

## Capital Investment \$2.3 billion

■ Infrastructure ■ Equipment ■ Strategic ■ PTC



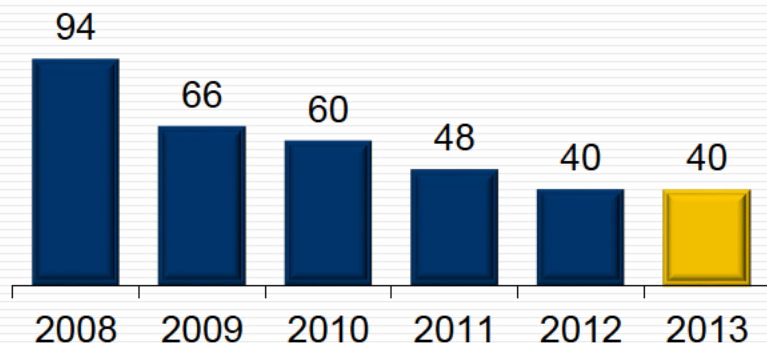
- Core investment remains at 16% – 17% of revenue for 2014
  - *Infrastructure spend maintains a safe and reliable network*
  - *Equipment investment driven by commercial demand*
  - *Strategic investments support growth and productivity*
- PTC investment of \$300 million targeted for this year

Note: Capital investment excludes investments related to public-private reimbursable projects

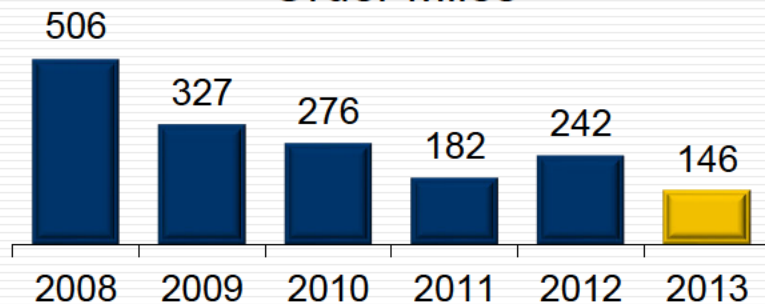


# Continue to strengthen track infrastructure

FRA Reportable Track  
Caused Derailments



Average Daily Slow  
Order Miles

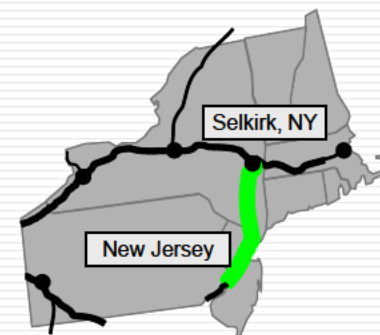


- Investment in track infrastructure is driving higher service levels
- Track caused derailments and slow order miles have declined significantly since 2008
  - 57% improvement in derailments
  - 71% improvement in slow order miles
- Robust rail testing program is further mitigating risk
  - Testing 125K-140K miles of track each year

# Network investment enhances throughput capacity

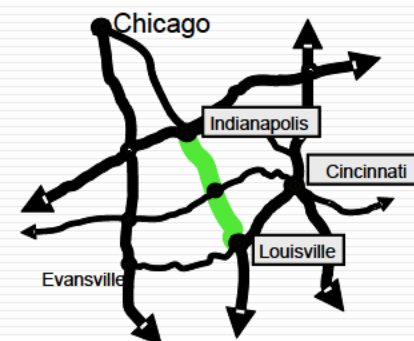
## River Line / Trenton Sub

- Enables efficient movement from Chicago to New York
- Supports growth in crude oil, intermodal, automotive markets



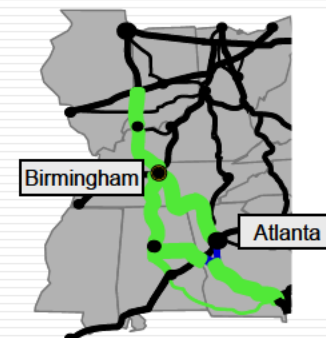
## LIRC

- Easement between Indianapolis and Louisville creates routing options
- Alleviates congestion and supports volume growth

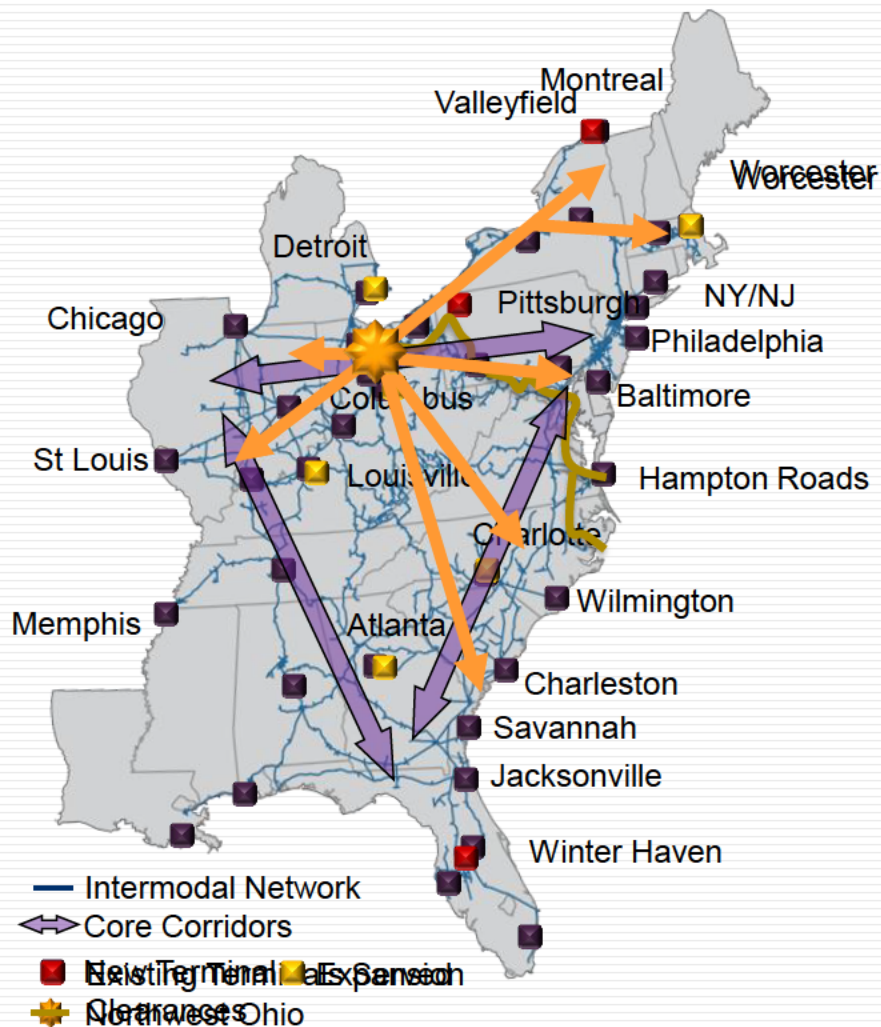


## Southeast Corridor

- Casky Yard investment supports IL Basin coal shift
- New sidings add capacity for business growth



# Intermodal investments drive growth and efficiency

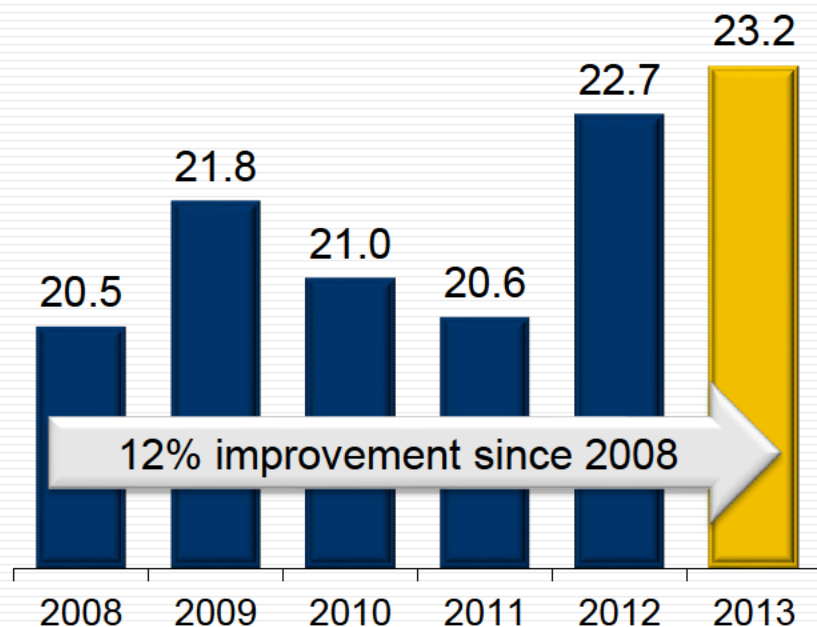


- Reaching growing population centers and new markets
  - *CSX investing to support growth*
- Intermodal traffic in double-stack lanes is 90% of current volume
  - *With National Gateway completion, up to mid-90%*
- Hub and spoke addition to network is a key differentiator
  - *Regularly scheduled through trains with flex capacity as needed*

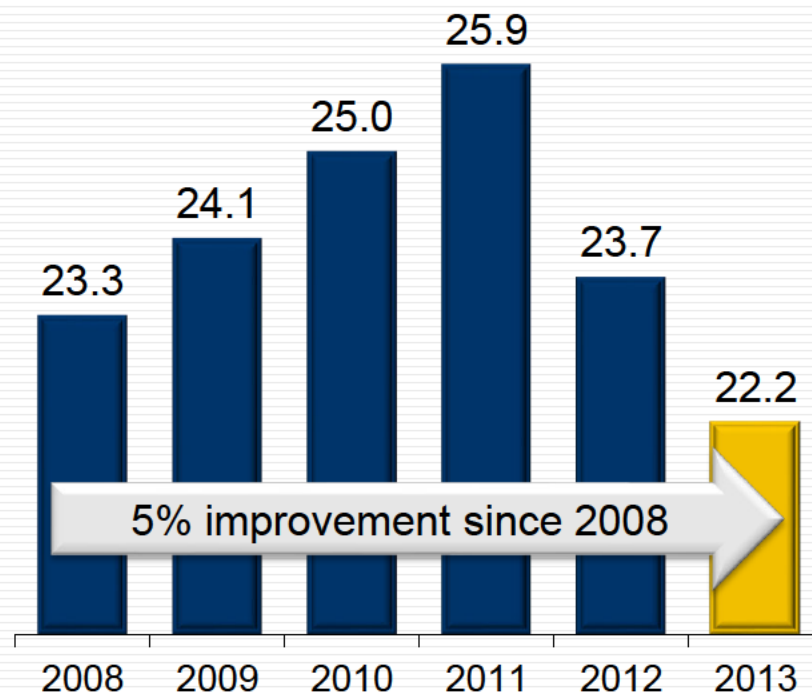


# *Network fluidity improves overall asset utilization*

**Train Velocity**  
*Miles per Hour*

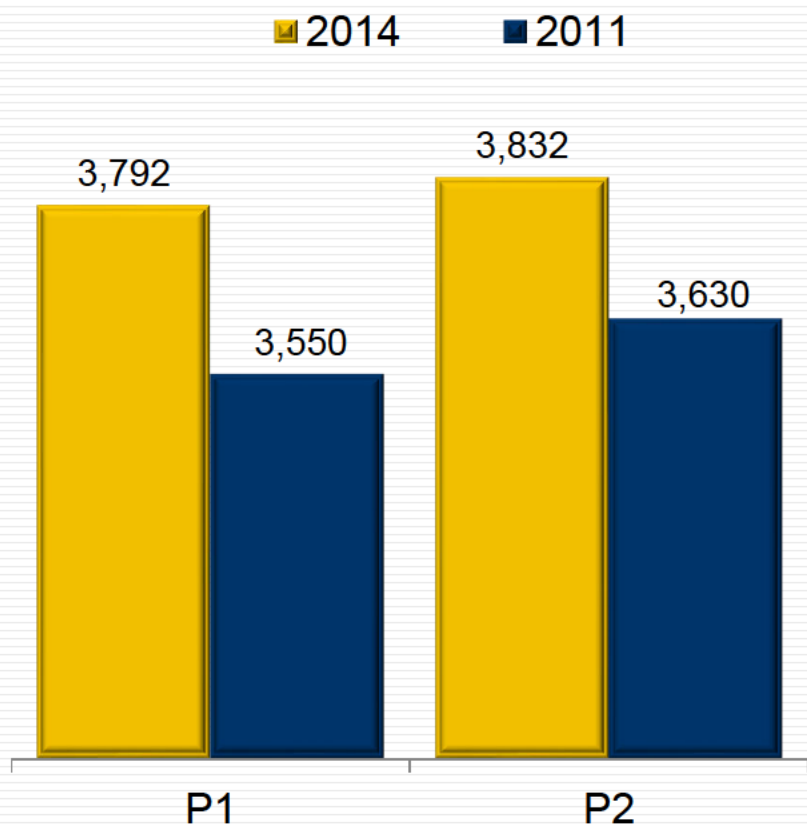


**Terminal Dwell**  
*Hours*

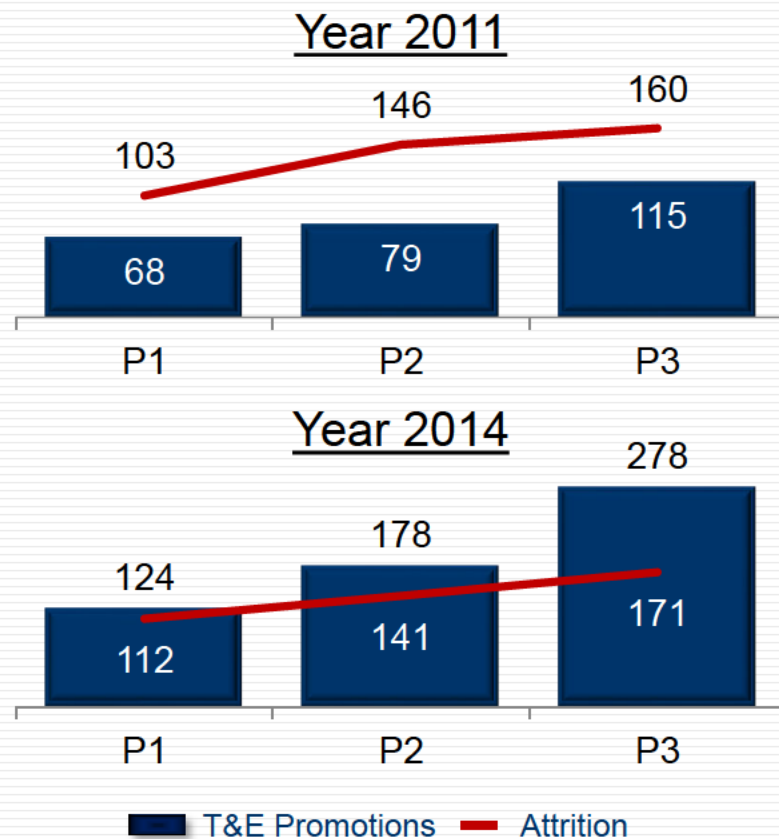


# *CSX is also better resourced today than in the past*

## Active Locomotives



## Crew Resources



# *Equipment plans help sustain and grow the business*



- Coal, Coke & Iron Ore rebuilds provide cost-efficient capacity
- Merchandise acquisitions and leases offset retirements while providing higher capacity
  - *Expand fleet of both 50 and 60-foot boxcars as needed*
  - *Recently added centerbeams to the national pool*
  - *Deploying larger jumbo covered hoppers*
- Ongoing mechanical programs improve fleet condition to support the business



*Service Excellence is key to expanding rail capacity*

**“First Mile”**



**“Last Mile”**

***Deliver First and Last Mile Service Excellence to Customers Enabling Profitable Carload Growth***


# On-Board Devices improve field communications



- Puts key information for a location at the finger tips of the crew
  - *Customer restrictions*
  - *Track details and close clearances*
  - *Local operations comments*
- Keeps substitute crews better informed to ensure consistent service
- Crews can update systems on-site
  - *Service day training focused on complete, accurate and timely updates in 2013*

# Proactive alerts improve supply chain visibility

From: ShipCSX@csx.com  
Subject: Train Y210 for today will not be serving you  
Sent: Friday, June 1, 2012



Company: EASTSIDE WAREHOUSE CORP  
Address: 2934 SYCAMORE PARKWAY NORTH  
City: BALTIMORE, MD

Normally, train Y210 is scheduled to serve your location today. While you may or may not have planned work, as a courtesy, we want to let you know that the train will not operate.  
If you have work for today, it will be completed by your next scheduled train.

To learn more about the Yard/Local Annulment/Notification process, read this [Frequently Asked Questions document](#).

The email address of this email cannot be replied to. If you have any questions, please contact our Customer Service group at 1-877-ShipCSX, options 5 then 6.

## Train Annulment / Service Exception Notice

A proactive alert that is sent informing you that your local industrial train for that date will not be working your location

Switch Summary					
Customer Switch Request			Work Order Summary		
	Loads	Empties		Loads	Empties
Places	0	0	Places	0	5
Pulls	5	0	Pulls	0	0
IntraPlants	0	0	IntraPlants	0	0
Off Spot	0	0	Off Spot	0	0

Work Order: WO644702 Rev: 00 06/06/2012 07:23					
Instruction	Equipment	L/E	Car Type	STCC	Description
PLACE TO INDUSTRY	CSXT 260815	E	C113		
PLACE TO INDUSTRY	CSXT 252440	E	C113		
PLACE TO INDUSTRY	CSXT 251753	E	C113		
PLACE TO INDUSTRY	CSXT 251643	E	C113		
PLACE TO INDUSTRY	CSXT 260247	E	C113		

[\*] Denotes car has been added to the Work Order.

## My Work Order Notice

A proactive notification of the planned work at your facility with a list of cars the crew plans to switch

CSX CUSTOMER - JACKSONVILLE, FL - AZA908555								
Work Order : 314024				Issued : 2012-10-02 08:56				
Train ID : 079802								
NOTE: The following cars DO NOT require a new plant switch request to be submitted.								
Equipment	L/E	STCC	PS Request	Instruction	Exception	Reason	Date / Time	Comment
CEFX 13616	E	1051311	PS862299	Full From Industry	Instruction Not Performed	Railroad Reason	2012-10-02 21:33	Our train crew reports they were unable to pull this car. The reason reported was attributable to CSXT. The requested pull of this car will be rescheduled to your next service date.

## Work Order Exception Notice

A proactive alert that the CSX Crew is unable to perform some portion of the scheduled work at your location



# Proactive alerts improve customer service



## Overload Notice

*A proactive notification when you shipment has been flagged as an overload or when it's released from overload status*

## Bad Order Notice

*A proactive notification when and where your car has been placed or released from bad order status*

## ETA Change Notice

*A proactive notification when a shipment ETA has changed by 24 hours or more*

## No Bill Notice

*A proactive notification when a shipment has been pulled from your industry and moving without billing*

# New reporting tools improve supply chain visibility

Plan ▾ Ship ▾ **Trace ▾** Pay ▾ Resources ▾

**Shipment Management Suite**

Waybill Retrieval

Shipment Problem Resolution

J1 (Gate Receipt) Retrieval

- Monitor inbound or outbound pipeline by location for the current week and up to 4 weeks in the future
- Pull reports for inbound or outbound shipments for your location that are currently in jeopardy for bad order, overload, No Bill, or had an ETA change of 24 hours or more than the previously reported ETA.

Railcar Tracking

Historical Trace

Custom Reports

**Pipeline & Jeopardy Reports**

Shipment Tracking Map

Transit Times

Waybill Retrieval

## Pipeline Report Search

\* Report Type:

Pipeline Report ▾  
Pipeline Report  
Jeopardy Report

Saved Pipeline Searches:

▾

\* Traffic Direction:

\* Load/Empty:

Both ▾

\* Location:

Select One ▾ 🔍

STCC:

Save this search:

**Save**

Set as Default?:

☐

**View Pipeline Report**

How tomorrow moves



# *Providing the capacity to grow your business*

[*Network*]  
.. ..

- Investing in infrastructure and technology

[*Service*]  
.. ..

- Resourcing for high service levels, with flexibility

[*Efficiency*]  
.. ..

- Focus on asset utilization targeting \$130M+ in savings

[*Solutions*]  
.. ..

- Developing solutions that satisfy customers' needs

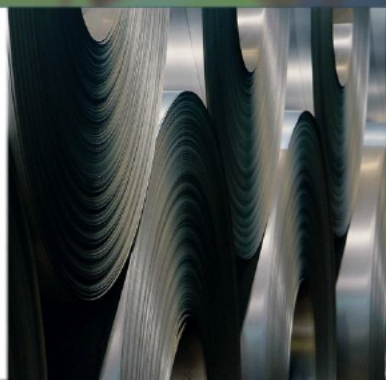


*Thank You*



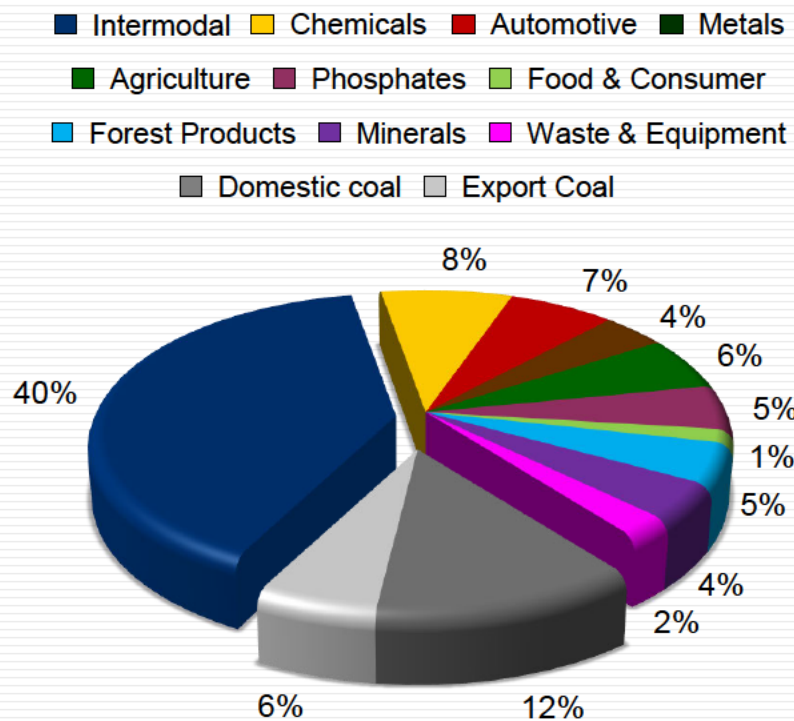
# Investing for Tomorrow in a Dynamic Marketplace

October 28, 2014



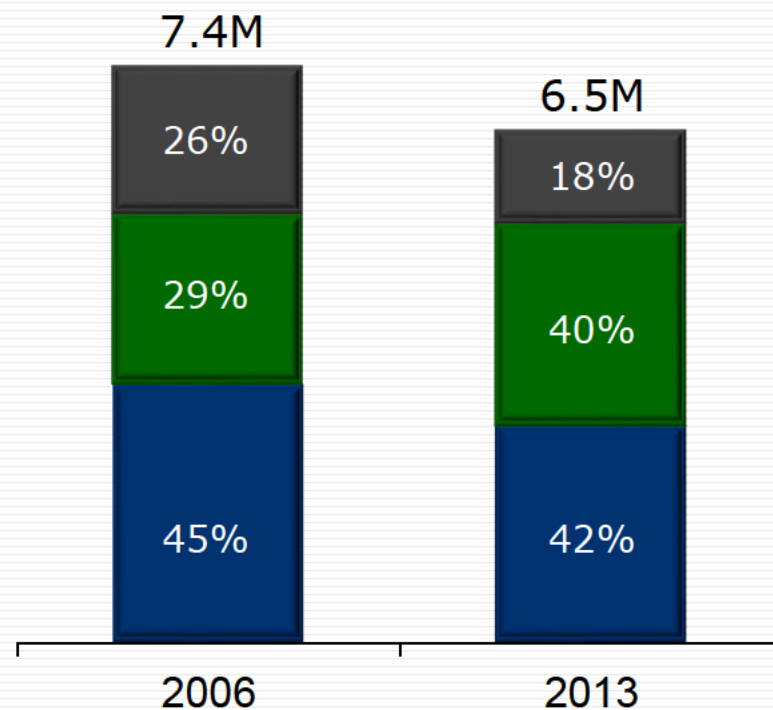
# CSX portfolio reflects a dynamic marketplace

## 2013 Volume by Market 6.5 Million Units



## CSX Volume and Portfolio Mix

■ Merchandise ■ Intermodal ■ Coal

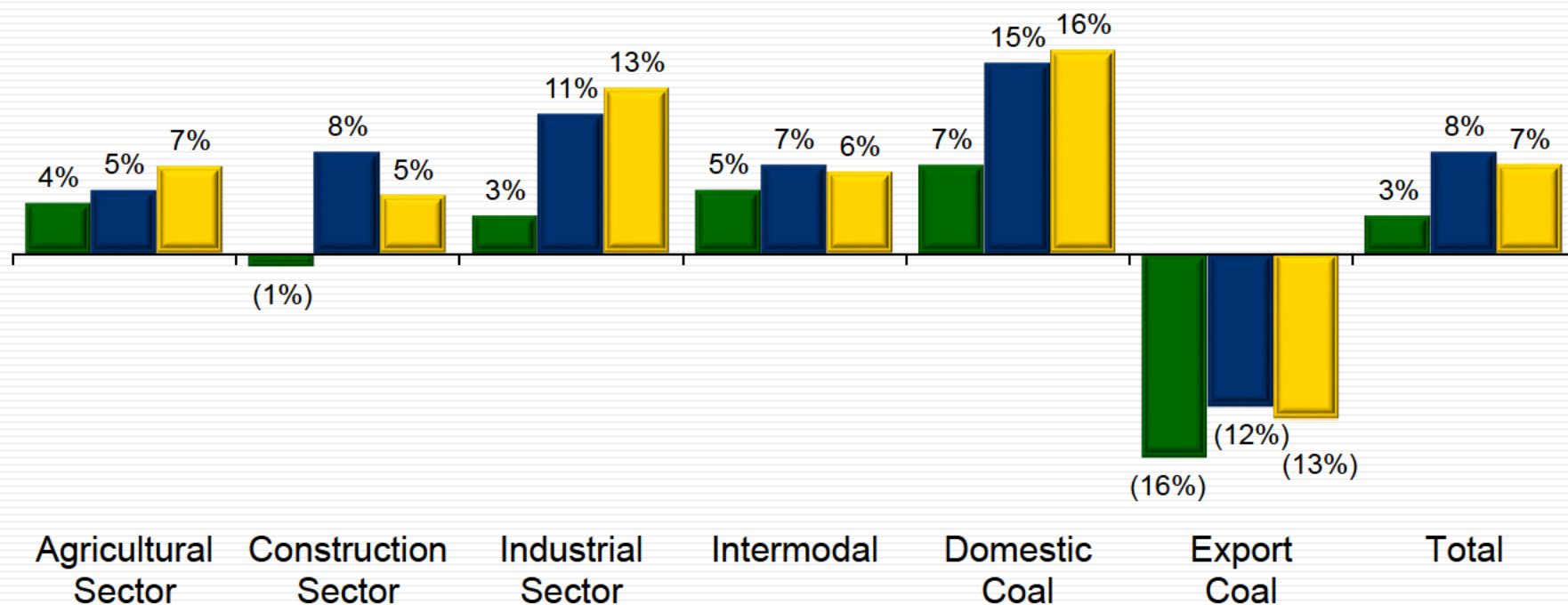




*This year has been no different*

## Year-Over-Year Change in Volume

■ First Quarter ■ Second Quarter ■ Third Quarter



Source: CSX Third Quarter Financials, 2014.

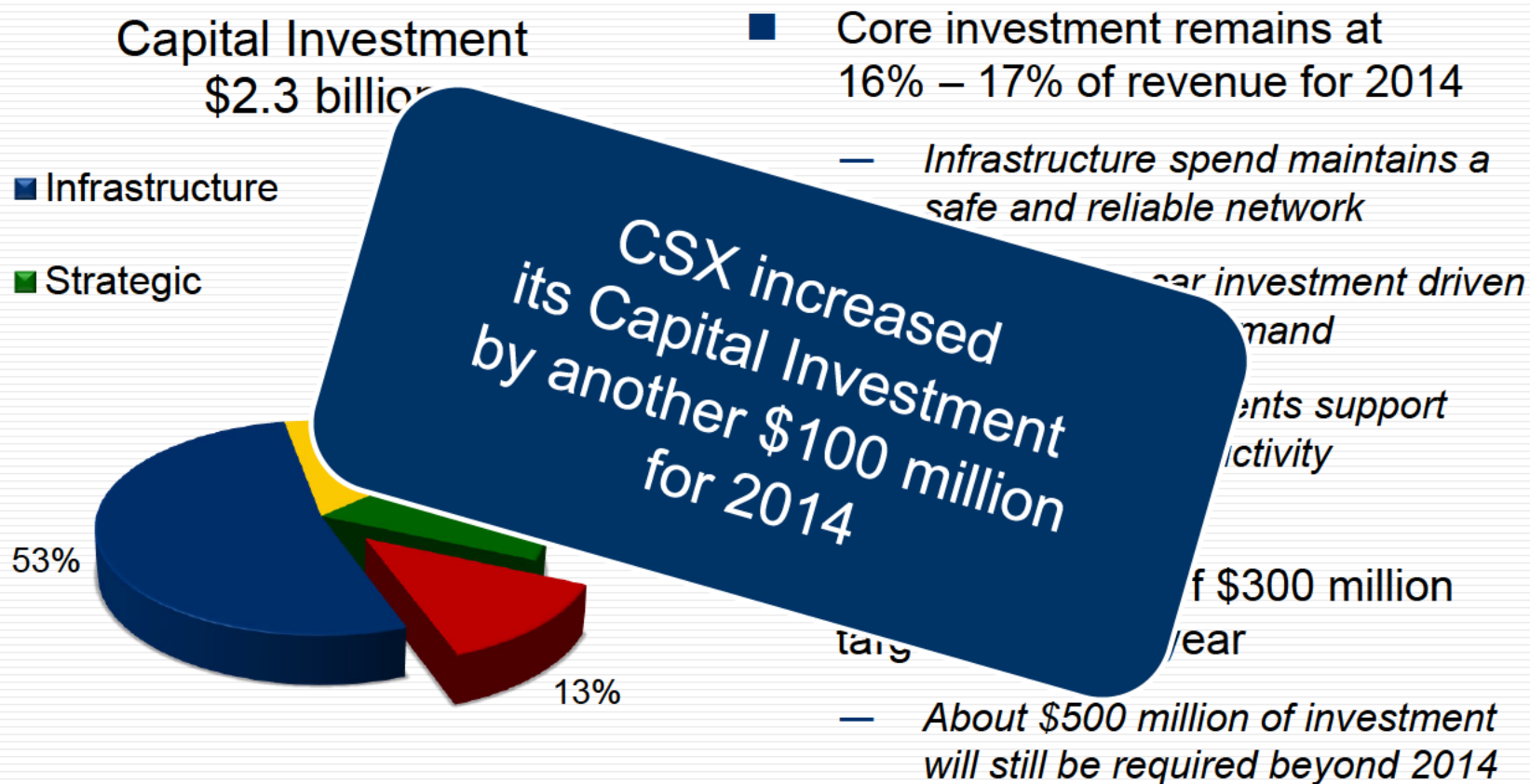
# Long-term trends in trucking evident in 2014



- BB&T Capital estimates that winter likely removed 2-3% of TL capacity
- ATRI study highlights the negative impacts of HOS rule change
  - *Reduced TL productivity in US by 1-2%*
  - *Eroded quality of life for 83% of drivers, including lower wages for 67%*
- The current dearth of 30K drivers is expected to rise to 240K by 2020

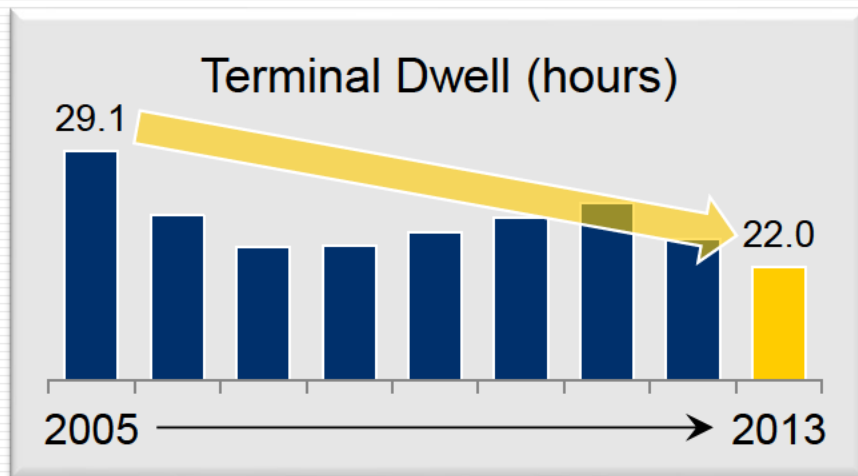
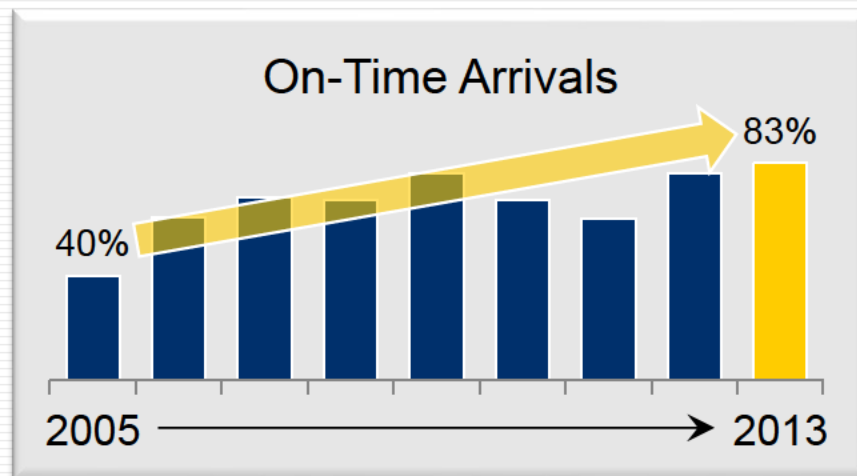
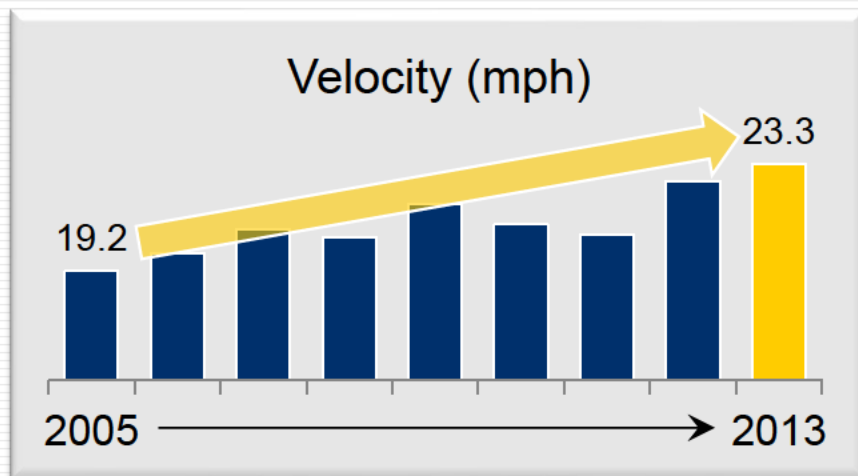
Source: Logistics Management; FleetOwner; JOC; ATA.

# Capital investment supports growth and service



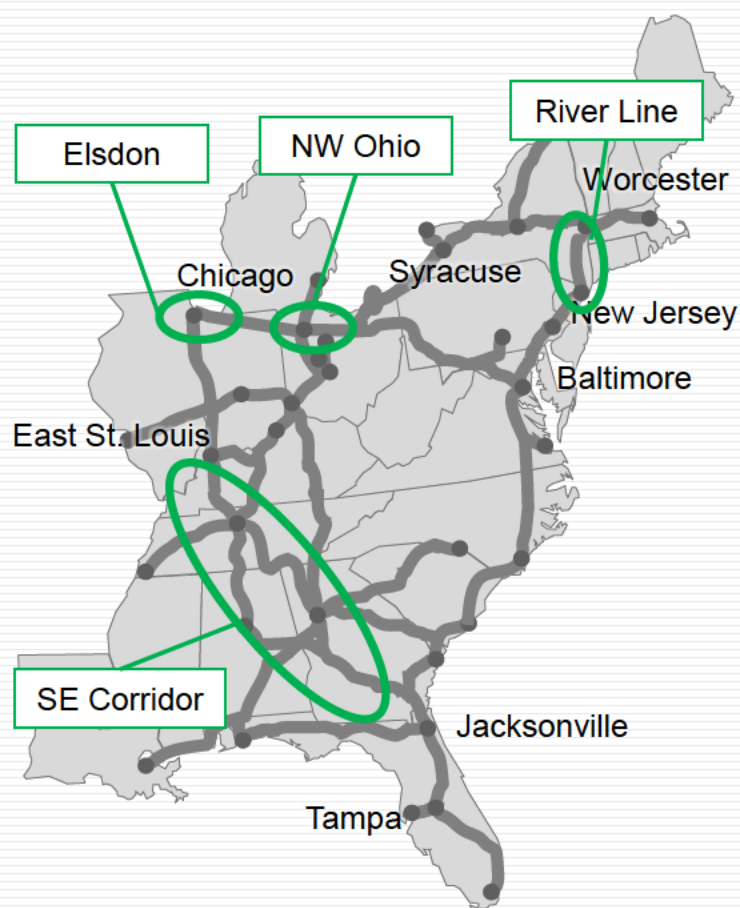
Note: Capital investment excludes investments related to public-private reimbursable projects

# *Service Excellence drives long-term improvements*





# Capacity additions underway across network



## River Line / Trenton Sub

- Adds 11 miles of double track for efficient movement from Chicago to NY
- Supports growth in crude oil, intermodal, and automotive markets

## Chicago Area Projects

- Elsdon Sub acquisition adds capacity and flexibility to the network
- New north-south connection helps expedite interchange traffic

## Northwest Ohio

- Project to extend terminal processing should finish by the end of 2014
- Adding 18,400 feet of processing track and increasing lift capacity by 300,000

## Southeast (SE) Corridor

- New Casky Yard investment will support Illinois Basin coal shift
- New sidings add capacity for business growth

# *CSX investing in an even better tomorrow*

- CSX operates in a dynamic marketplace
  - *Energy markets create both challenges and opportunities*
  - *Modal conversions drive growth in some segments*
  
- Sustainable growth support capital investment
  - *CSX will continue to invest 15-17% of revenue longer-term*
  
- CSX remains committed to Service Excellence

# LOGISTICS: WHAT ARE THE CHALLENGES BEING FACED BY TRANSPORT PROVIDERS?

## A Railroad Perspective

---

Michael Rutherford  
Vice President – Sales & Marketing  
Industrial Products

HOW TOMORROW MOVES



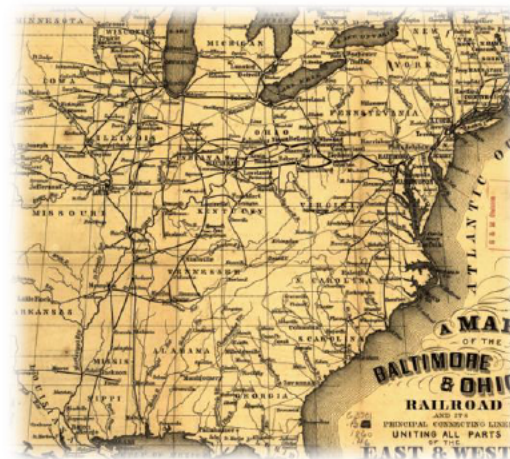
# THE BIRTHPLACE OF AMERICAN RAILROADING



*The Founders of the Baltimore and Ohio Railroad by F. B. Mayer (1891)*



*Peter Cooper's First Steam Locomotive called Tom Thumb*



*"Linking 13 Great States with the Nation"*





# CSX REMAINS KEY TO MANY SUPPLY CHAINS

CSX SYSTEM MAP



- Nearly two-thirds of US population
- 21,000 route miles in the East
- 23 states, DC and 2 Canadian provinces
- 70 ocean, river and lake port terminals
- Over 240 short-line railroads
- Interchanges to all Class I rails
- Extensive carload network
  - 260+ classification yards
  - 12 hump yards



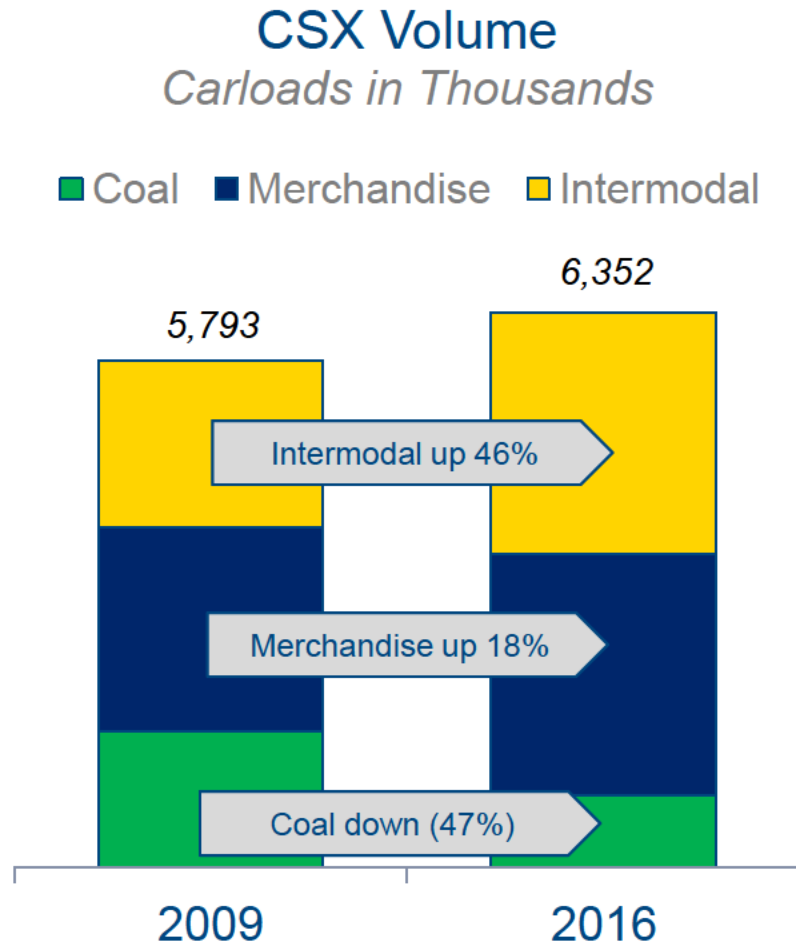
# CSX BENEFITS FROM A DIVERSE PORTFOLIO

Outlook	Markets	Drivers
<b>Favorable</b> (29% of volume)	<ul style="list-style-type: none"> <li>■ Agriculture &amp; Food</li> <li>■ Automotive</li> <li>■ Export Coal</li> <li>■ Fertilizers</li> <li>■ Metals &amp; Equipment</li> <li>■ Minerals</li> </ul>	<ul style="list-style-type: none"> <li>■ Record grain harvest and new business ramping up</li> <li>■ North American light vehicle production remains strong</li> <li>■ Near-term favorability continues from global supply constraint</li> <li>■ Phosphate movement picks up against soft comparables</li> <li>■ Improving steel market and small lift in energy-related goods/machinery</li> <li>■ Sustained strength in aggregates demand</li> </ul>
<b>Neutral</b> (49% of volume)	<ul style="list-style-type: none"> <li>■ Forest Products</li> <li>■ Intermodal</li> </ul>	<ul style="list-style-type: none"> <li>■ Modest housing starts growth offset by ongoing paper demand decline</li> <li>■ Secular domestic growth offset by prior losses</li> </ul>
<b>Unfavorable</b> (22% of volume)	<ul style="list-style-type: none"> <li>■ Chemicals</li> <li>■ Domestic Coal</li> </ul>	<ul style="list-style-type: none"> <li>■ Continued crude oil decline more than offsets non-energy growth</li> <li>■ Competitive losses partially offset by modest uptick in winter demand</li> </ul>

Overall first quarter volume outlook is flat to slightly up



# CSX VOLUMES HAVE GROWN BY 10% SINCE THE GREAT RECESSION



- Transformational declines in Coal
  - *Natural gas substitution*
  - *World coal oversupply*
- Solid 2% CAGR Merchandise growth since 2009 recession
  - *Industrial and housing sectors have partially suppressed recovery*
- Strong, secular Intermodal growth
  - *Highway-to-rail conversions*
  - *New customers and services*



# TRUCK MARKET DYNAMICS CONSTRUCTIVE FOR RAIL GROWTH OVER LONG-TERM

## Active Truck Utilization %



Source: FTR Associates

## Diesel \$/gal



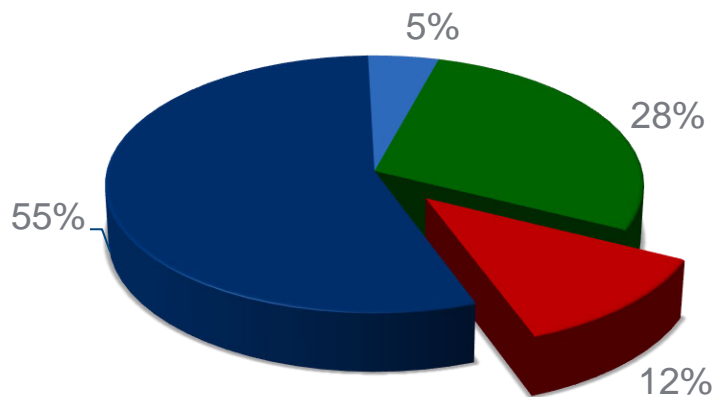
Source: Energy Information Administration



# CSX CONTINUES TO INVEST IN GROWTH

## 2017 Capital Investment \$2.2 billion

■ Infrastructure ■ Equipment ■ Strategic ■ PTC

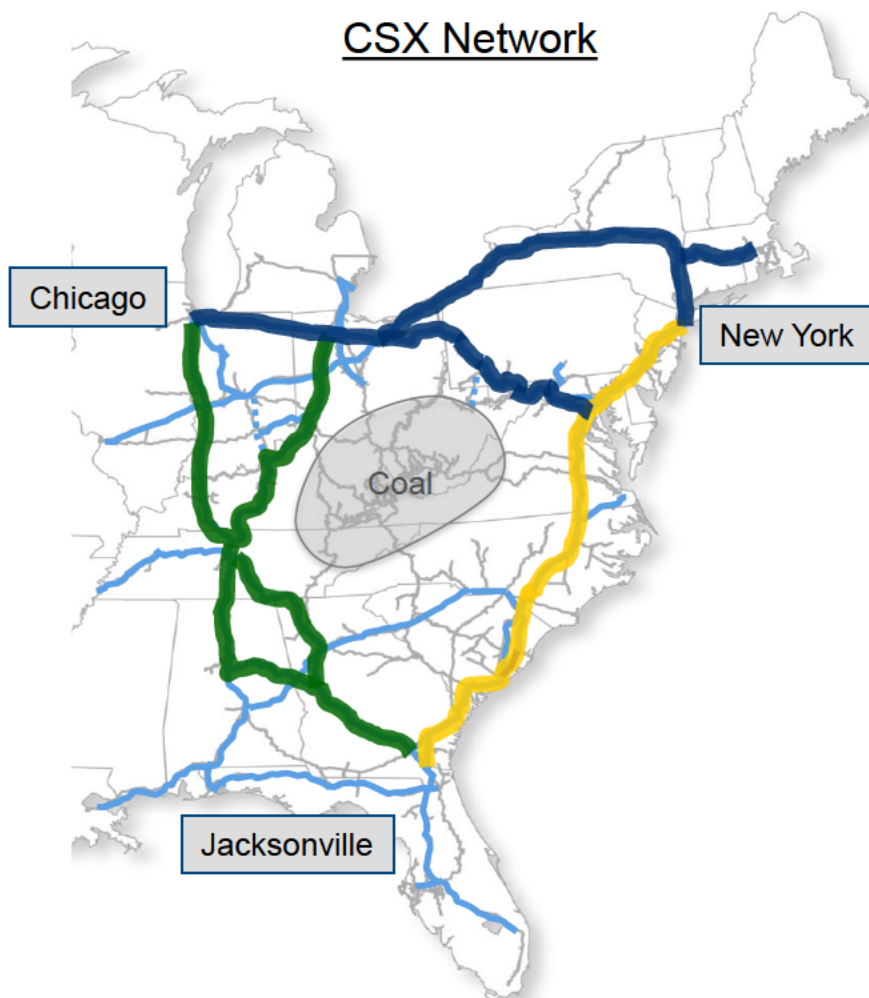


- Core investment expected to decline to \$1.97 billion this year
  - *Infrastructure investment targets rail safety and performance*
  - *Equipment budget moderating with completion of locomotive purchase*
  - *Strategic investments increasing to fund CSX of Tomorrow initiatives*
- PTC investment of about \$270M
  - *Total cost of PTC implementation now estimated at about \$2.4 billion*



# MERCHANDISE AND INTERMODAL GROWTH EMPHASIZE CORE TRIANGLE CONNECTIVITY

## CSX Network



## Key Growth Routes

### Northern Tier

- Double-Track infrastructure supports premium service
- Chicago investments support interline traffic

### I-95 Corridor

- Particularly important for Intermodal port connectivity
- Virginia Avenue Tunnel underway, analyzing further clearances / capacity needs

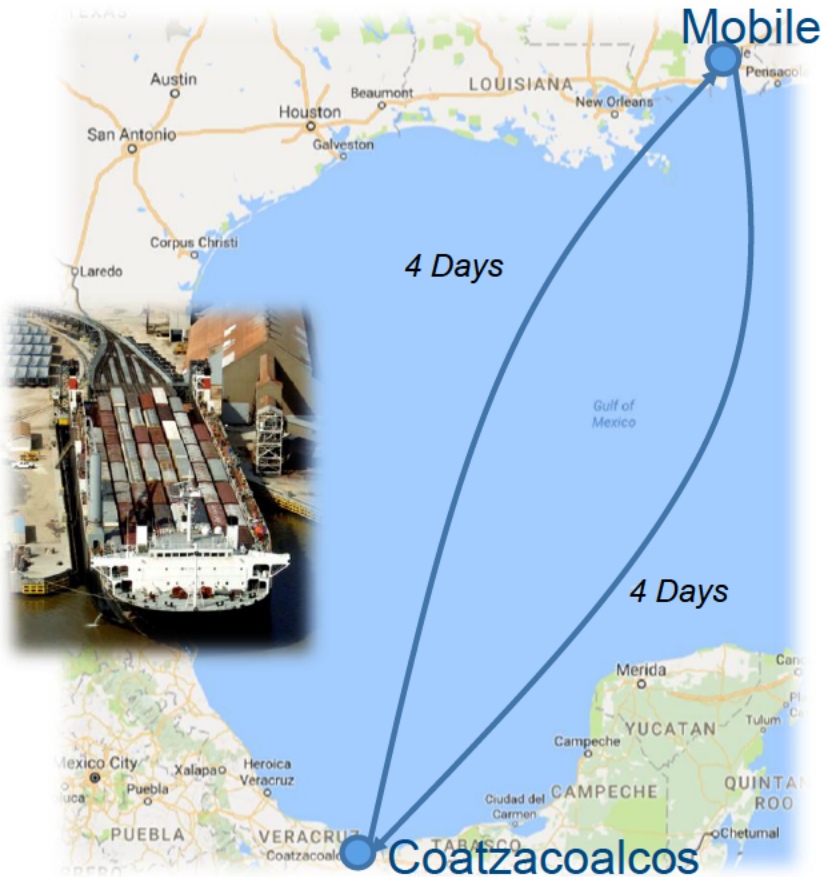
### Southeast Corridor

- Gateways to UP, KCS, BNSF
- Building out sidings to support growth and longer trains

# CGR PROVIDES COMPETITIVE CONNECTIVITY TO SOUTHERN MEXICO

## CGR Railway Vessels

Bali Sea & Banda Sea



- CGR has two vessels sailing every four days between Mobile and Coatzacoalcos
- Direct rail connections provide efficient solutions and can be packaged on a single bill
  - *USA: Alabama State Docks*
  - *Mexico: Ferrosur (FSRR)*
- Successful handling of pipe, long product and flat roll
  - *Includes furtherance to other Class I railroads*



# TRANSLOADS CONNECT TO NON-RAIL SERVED ORIGINS AND DESTINATIONS

1



Bulk shipment travels by rail to a transload facility near its destination market

2



Product is unloaded with specialized equipment

3



Product can be packaged and stored for later truck delivery OR

4



Product is processed and scheduled for delivery in smaller quantities OR

5



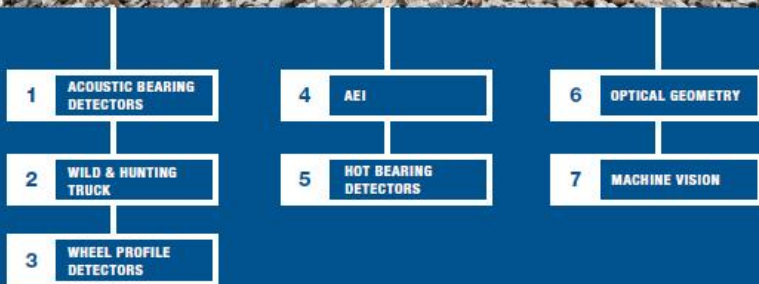
Product is loaded directly onto a truck and delivered to its consumer

- Facilities capable of handling most products
  - *Coils, pipe, rod, slabs, sheet, beams, structurals, bar, plate and over-dimensionals*
- Single-factor, truck competitive rates for door-to-door movements
  - *Immediate delivery by truck, or*
  - *Warehousing for later delivery, or*
  - *Processing prior to furtherance*
- CSX has many years of experience
  - *Helping shippers identify viable transload locations already existing on CSX*
  - *Supporting shippers and transloads in locating and developing new locations*





# 8 SUPER SITES USE PREDICTIVE ANALYTICS TO PROVIDE SAFER, MORE RELIABLE SERVICE



## DIAGNOSTIC SUPERSITES

Many of these detectors are concentrated at locations that CSX calls "supersites," where a combination of several specialty detectors take many different measurements during a single train pass.



### ACOUSTIC BEARING DETECTORS

listen to passing trains for roller bearing and locomotive gear defects. These detectors are trained to actually hear a potential issue before it becomes a failure.



### AUTOMATIC EQUIPMENT IDENTIFICATION (AEI)

uses radio frequencies to read car and locomotive tags to relate any recorded defect information to the correct bearing or wheel.



### WHEEL IMPACT LOAD DETECTORS

measure horizontal and vertical forces on the wheels to detect overloaded or imbalanced loads, truck instability and flat wheels.



### HOT BEARING DETECTORS

measure roller bearing temperatures, looking for abnormal values - for example, an elevated temperature could indicate that the bearing's internal components are damaged. Trending these temperatures also allows earlier identification of stressed bearings.



### WHEEL PROFILE DETECTORS

use a laser and camera system to measure the precise shape of the wheel to analyze for FRA and AAR defects such as flange height and thickness, and hollow worn tread.



### MACHINE VISION

gives us new views of passing cars that human inspectors could never see, from top-of-car views to undercarriage shots - all taken at track speed, so the train doesn't need to slow down. Machine vision allows us to pinpoint potential problems

and quickly address them before they grow into larger issues. For example, the algorithms within a machine vision system can count the bolts present in coupler securement area. Missing bolts increase the risk of coupler-pullout events. Brake shoe machine vision systems use different camera views and algorithms to measure the thickness of brake shoes.

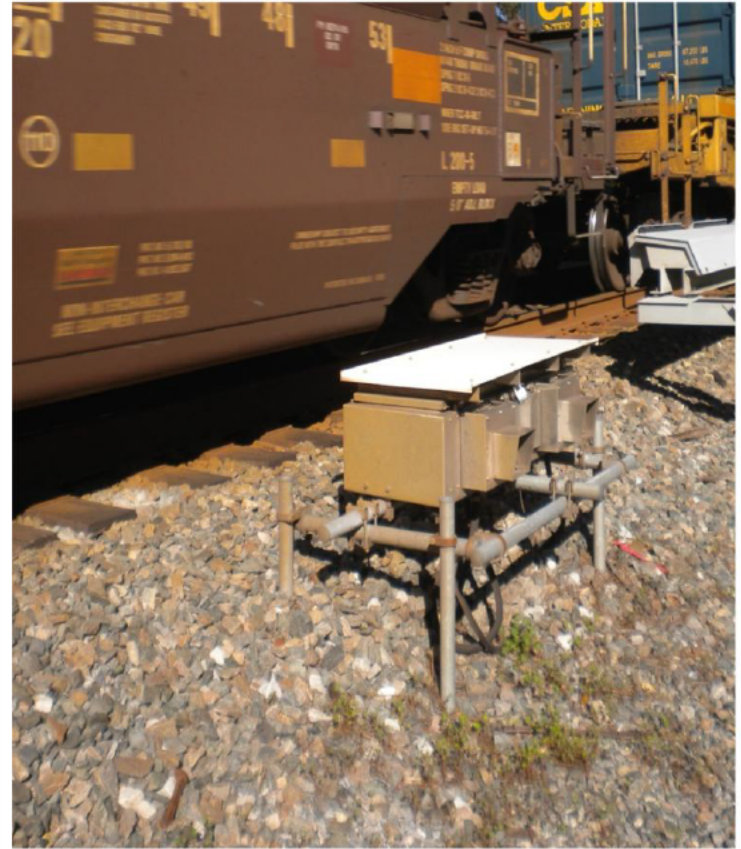


### OPTICAL GEOMETRY DETECTORS

measure the relationship between the wheel and the rail to gauge truck performance and wheel condition.



# OPTICAL GEOMETRY DETECTORS





# WHEEL PROFILE DETECTOR



# COUPLER SECUREMENT





# ACOUSTIC BEARING DETECTOR



# SHIPCSX HELPS TO KEEP EQUIPMENT MOVING

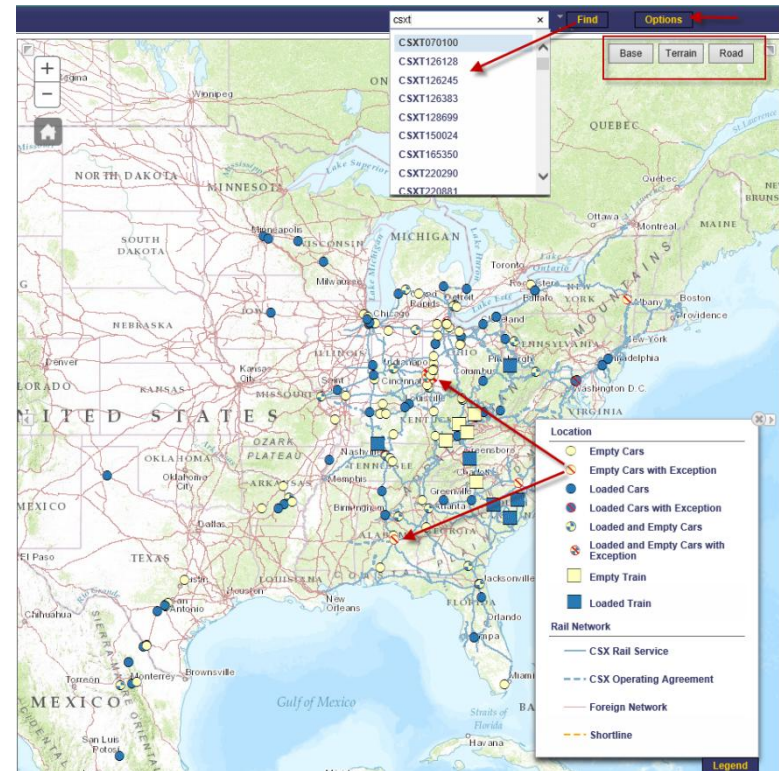


- Proactive notifications keep you informed on how your shipments are progressing
  - *Bad Order Notice*
  - *ETA Change Notice*
  - *In-Transit Curfew/Service Advisory*
- Shipment management suite allows you to estimate and track your shipments
  - *Transit Time including dwell information*
  - *Railcar Tracking*
- Enhanced reporting features allow you to process trace metrics quickly and easily
  - *NEW Shipment Tracking Map*



# SHIPMENT TRACKING MAP

- Opportunity to personalize filters to display traffic for specific shipments and trains in specific geographies
  - *Search for specific Train IDs or Equipment numbers*
  - *Use filters to refine map results*
  - *Click on markers for detailed info*
- Easily see jeopardy shipments for exceptions such as Bad Order
- Links to other tracking tools





# SHIPCSX FIRST IN INDUSTRY TO GO MOBILE



- Free application for registered ShipCSX users
- Key features available include:
  - *Trace Equipment & Trains*
  - *Get Equipment Specs*
  - *Shipping Instructions (Quick Ship)*
  - *Plant Switch and Plant Inventory*
  - *Shipment Problem Resolution*
  - *Unit Train Management*
  - *Pricing Documents coming soon*
- New features added as they are developed and refined





# NEW RESOURCE LIBRARY

## Welcome to ShipCSX Resource Library

### Watch Tutorial Videos

### Learn About Our Tools

- Discover the Value of CSX eBusiness Tools
- Carload vs. Intermodal - Which ShipCSX Tools Do You Need?
- Get the Most Out of ShipCSX
- ShipCSX Public Tools
- View Pricing Information
- Order Equipment for Loading
- ShipCSX Email Notifications
- Shipping Instructions / Bills of Lading
- Manage Your Inventory
- Track & Trace Equipment
- Contact Customer Service
- Retrieve Waybill Information
- Track Demurrage Charges
- Manage Your Invoices
- File a Claim
- Unit Train Management System (UTMS)
- Rail Partners Tools
- ShipCSX Mobile Tools
- EDI/B2B Tools
- Other ShipCSX Resources

[View More](#)

### Keyword Search

### Follow Us On Twitter

Tweets by @ShipCSX

**CSX eBusiness @ShipCSX**

Click the image below to read important information on EDI bills of lading that contain errors. [#GetToKnowShipCSX](#)

[Embed](#) [View on Twitter](#)

### Contact Information

- 1-877-ShipCSX (744-7279), option 2 (M-F 7:00 AM-6:00 PM EST)
- [eBusinessHelp@csx.com](mailto:eBusinessHelp@csx.com)
- [Request Scheduled Training](#)
- [Update your ShipCSX profile](#)

### Explore FAQs

- What eBusiness training options are available and how can I request scheduled training?
- What types of track and trace reporting options and tools are available?
- Why don't I have access to certain ShipCSX tools and how can I request additional tools?
- Who do I contact when I am having a shipment problem and what's the best way to contact them?
- How do I update my email address and other contact information in ShipCSX?
- Where can I go to get signed up to receive new CSX invoices via email?
- Who can I contact if I need help with the website or want to provide feedback?
- Is there a place to get a list of all tools and electronic offerings available for download?

[View More](#)

### Read the Latest Updates

- 07-20-2016 [Shipment Problem Resolution Enhancements Now Available](#)
- 07-20-2016 [New ShipCSX Video Available! Learn about Plant Characteristics](#)
- 06-29-2016 [New HazMat Federal Regulation: Emergency Response Phone Number Must Be Numeric Only \(49CFR 172.604\)](#)
- 06-01-2016 [Quick Communication in a Click](#)
- 06-01-2016 [CSX HTF Fuel Surcharge/Fuel Index Rate Adjustment update for July 1, 2016](#)
- 05-19-2016 [Shipment Information and Track Sorting Enhancement Now Available in ShipCSX Manage Inventory](#)
- 04-15-2016 [New Unit Train Management Features Now Available](#)
- 03-16-2016 [Correct your EDI Bills of Lading with Errors in ShipCSX!](#)

[View More](#)



# THANK YOU FOR YOUR BUSINESS

- A DIVERSE PORTFOLIO OFFERS BOTH CHALLENGES AND OPPORTUNITIES FOR RAILS
  - *Capitalizing on Merchandise and Intermodal growth even as Coal struggles*
  - *Truckload market dynamics constructive for OTR conversions long-term*
- CONNECTIVITY EXPANDS MARKET REACH AND RELEVANCE
  - *Investments on Core Triangle drive efficiencies, including at ports and gateways*
  - *CGR option supports rail solutions in southern Mexico*
  - *Transload solutions make rail relevant for non-rail-served locations*
- TECHNOLOGY HELPS DRIVE SERVICE TO THE NEXT LEVEL
  - *Predictive analytics to providing ever-safer and more reliable service*
  - *Online tools facilitate integration with broader supply chains*
  - *New reporting like CDR's to help customers better manage equipment*



# HOW TOMORROW MOVES



# HOW TOMORROW MOVES



Fall / Winter 2017



# CSX & DELIVERING THE CHEMICAL RENAISSANCE

## American Chemical Council

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Michael Rutherford  
Vice President – Sales & Marketing  
Industrial Products

HOW TOMORROW MOVES



# FORWARD LOOKING DISCLOSURE

THIS INFORMATION AND OTHER STATEMENTS BY THE COMPANY MAY CONTAIN FORWARD-LOOKING STATEMENTS WITHIN THE MEANING OF THE PRIVATE SECURITIES LITIGATION REFORM ACT WITH RESPECT TO, AMONG OTHER ITEMS: PROJECTIONS AND ESTIMATES OF EARNINGS, REVENUES, MARGINS, VOLUMES, RATES, COST-SAVINGS, EXPENSES, TAXES, LIQUIDITY, CAPITAL EXPENDITURES, DIVIDENDS, SHARE REPURCHASES OR OTHER FINANCIAL ITEMS, STATEMENTS OF MANAGEMENT'S PLANS, STRATEGIES AND OBJECTIVES FOR FUTURE OPERATIONS, AND MANAGEMENT'S EXPECTATIONS AS TO FUTURE PERFORMANCE AND OPERATIONS AND THE TIME BY WHICH OBJECTIVES WILL BE ACHIEVED, STATEMENTS CONCERNING PROPOSED NEW SERVICES, AND STATEMENTS REGARDING FUTURE ECONOMIC, INDUSTRY OR MARKET CONDITIONS OR PERFORMANCE. FORWARD-LOOKING STATEMENTS ARE TYPICALLY IDENTIFIED BY WORDS OR PHRASES SUCH AS "WILL," "SHOULD," "BELIEVE," "EXPECT," "ANTICIPATE," "PROJECT," "ESTIMATE," "PRELIMINARY" AND SIMILAR EXPRESSIONS. FORWARD-LOOKING STATEMENTS SPEAK ONLY AS OF THE DATE THEY ARE MADE, AND THE COMPANY UNDERTAKES NO OBLIGATION TO UPDATE OR REVISE ANY FORWARD-LOOKING STATEMENT. IF THE COMPANY UPDATES ANY FORWARD-LOOKING STATEMENT, NO INFERENCE SHOULD BE DRAWN THAT THE COMPANY WILL MAKE ADDITIONAL UPDATES WITH RESPECT TO THAT STATEMENT OR ANY OTHER FORWARD-LOOKING STATEMENTS.

FORWARD-LOOKING STATEMENTS ARE SUBJECT TO A NUMBER OF RISKS AND UNCERTAINTIES, AND ACTUAL PERFORMANCE OR RESULTS COULD DIFFER MATERIALLY FROM THAT ANTICIPATED BY ANY FORWARD-LOOKING STATEMENTS. FACTORS THAT MAY CAUSE ACTUAL RESULTS TO DIFFER MATERIALLY FROM THOSE CONTEMPLATED BY ANY FORWARD-LOOKING STATEMENTS INCLUDE, AMONG OTHERS; (I) THE COMPANY'S SUCCESS IN IMPLEMENTING ITS FINANCIAL AND OPERATIONAL INITIATIVES; (II) CHANGES IN DOMESTIC OR INTERNATIONAL ECONOMIC, POLITICAL OR BUSINESS CONDITIONS, INCLUDING THOSE AFFECTING THE TRANSPORTATION INDUSTRY (SUCH AS THE IMPACT OF INDUSTRY COMPETITION, CONDITIONS, PERFORMANCE AND CONSOLIDATION); (III) LEGISLATIVE OR REGULATORY CHANGES; (IV) THE INHERENT BUSINESS RISKS ASSOCIATED WITH SAFETY AND SECURITY; (V) THE OUTCOME OF CLAIMS AND LITIGATION INVOLVING OR AFFECTING THE COMPANY; (VI) NATURAL EVENTS SUCH AS SEVERE WEATHER CONDITIONS OR PANDEMIC HEALTH CRISES; AND (VII) THE INHERENT UNCERTAINTY ASSOCIATED WITH PROJECTING ECONOMIC AND BUSINESS CONDITIONS.

OTHER IMPORTANT ASSUMPTIONS AND FACTORS THAT COULD CAUSE ACTUAL RESULTS TO DIFFER MATERIALLY FROM THOSE IN THE FORWARD-LOOKING STATEMENTS ARE SPECIFIED IN THE COMPANY'S SEC REPORTS, ACCESSIBLE ON THE SEC'S WEBSITE AT [WWW.SEC.GOV](http://WWW.SEC.GOV) AND THE COMPANY'S WEBSITE AT [WWW.CSX.COM](http://WWW.CSX.COM).



# NON-GAAP MEASURES DISCLOSURE

CSX REPORTS ITS FINANCIAL RESULTS IN ACCORDANCE WITH ACCOUNTING PRINCIPLES GENERALLY ACCEPTED IN THE UNITED STATES OF AMERICA (U.S. GAAP). CSX ALSO USES CERTAIN NON-GAAP MEASURES THAT FALL WITHIN THE MEANING OF SECURITIES AND EXCHANGE COMMISSION REGULATION G AND REGULATION S-K ITEM 10(E), WHICH MAY PROVIDE USERS OF THE FINANCIAL INFORMATION WITH ADDITIONAL MEANINGFUL COMPARISON TO PRIOR REPORTED RESULTS.

NON-GAAP MEASURES DO NOT HAVE STANDARDIZED DEFINITIONS AND ARE NOT DEFINED BY U.S. GAAP. THEREFORE, CSX'S NON-GAAP MEASURES ARE UNLIKELY TO BE COMPARABLE TO SIMILAR MEASURES PRESENTED BY OTHER COMPANIES. THE PRESENTATION OF THESE NON-GAAP MEASURES SHOULD NOT BE CONSIDERED IN ISOLATION FROM, AS A SUBSTITUTE FOR, OR AS SUPERIOR TO THE FINANCIAL INFORMATION PRESENTED IN ACCORDANCE WITH GAAP. RECONCILIATIONS OF NON-GAAP MEASURES TO CORRESPONDING GAAP MEASURES ARE ATTACHED HERETO IN THE APPENDIX OF THIS PRESENTATION.

## **FORWARD LOOKING NON-GAAP MEASURES**

CSX PRESENTS NON-GAAP OR ADJUSTED OPERATING RATIO AND ADJUSTED NET EARNINGS PER SHARE, ASSUMING DILUTION ON A FORWARD-LOOKING BASIS. THE MOST DIRECTLY COMPARABLE FORWARD-LOOKING GAAP MEASURE IS OPERATING RATIO AND NET EARNINGS PER SHARE, ASSUMING DILUTION. CSX IS UNABLE TO PROVIDE A QUANTITATIVE RECONCILIATION OF THESE FORWARD-LOOKING NON-GAAP MEASURES TO THE MOST DIRECTLY COMPARABLE FORWARD-LOOKING GAAP MEASURE, BECAUSE CSX CANNOT RELIABLY FORECAST THE TIMING AND AMOUNT OF FUTURE RESTRUCTURING CHARGES AND OTHER CHARGES RELATED TO THE CHANGE OF LEADERSHIP AND STRATEGY WHICH ARE DIFFICULT TO PREDICT AND ESTIMATE. PLEASE NOTE THAT THE UNAVAILABLE RECONCILING ITEMS COULD SIGNIFICANTLY IMPACT CSX'S FUTURE FINANCIAL GAAP RESULTS.



*EVEN IF YOU'RE ON THE RIGHT TRACK,  
YOU'LL GET RUN OVER IF YOU JUST SIT THERE.*

- WILL ROGERS

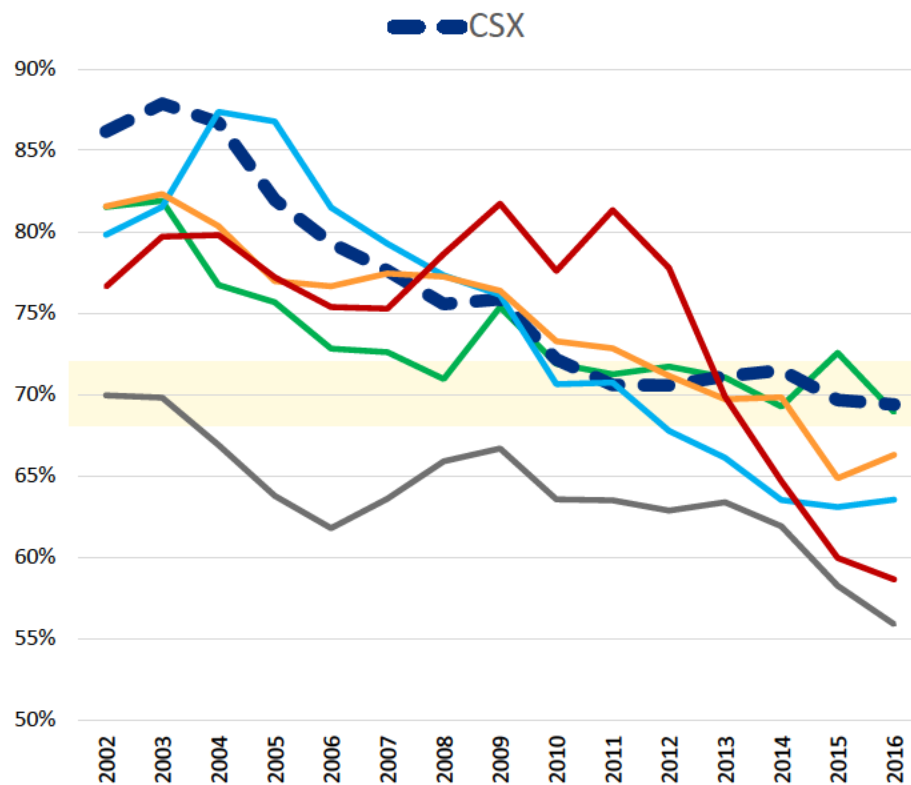
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# THE CASE FOR TRANSFORMATIVE CHANGE

Operating Ratio Trends  
Class I Railroads

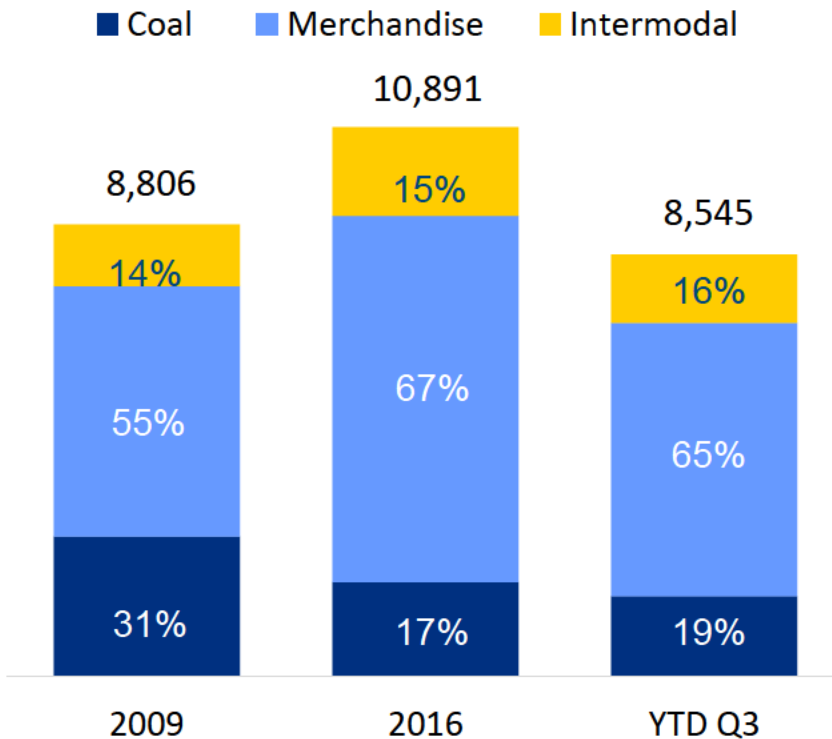


- Operating Ratio is the preferred measure to evaluate railroads
  - Reflects high ongoing capital expenditures and exposure to inflationary pressures
  - Measures overall efficiency of both operations and capital deployment
- Recent CSX performance has been range bound
  - Significant gains under the One Plan
  - Despite continuous improvement with focus on train productivity, OR moved sideways in more recent years



# TRAFFIC MIX HAS SHIFTED RADICALLY

CSX Revenue  
*Dollars in Millions*



- Coal expected to decline longer-term, despite recent gains

- *Natural gas prices remain the key driver of domestic coal consumption*
- *Export coal volatility driven by supply and demand on global markets*
- *Industrial segment smaller but more stable*

- Network implications have been significant in recent years

- *Rationalized some coal assets in the central portion of the network*
- *Growth shifting focus to assets supporting Merchandise and Intermodal on the triangle*



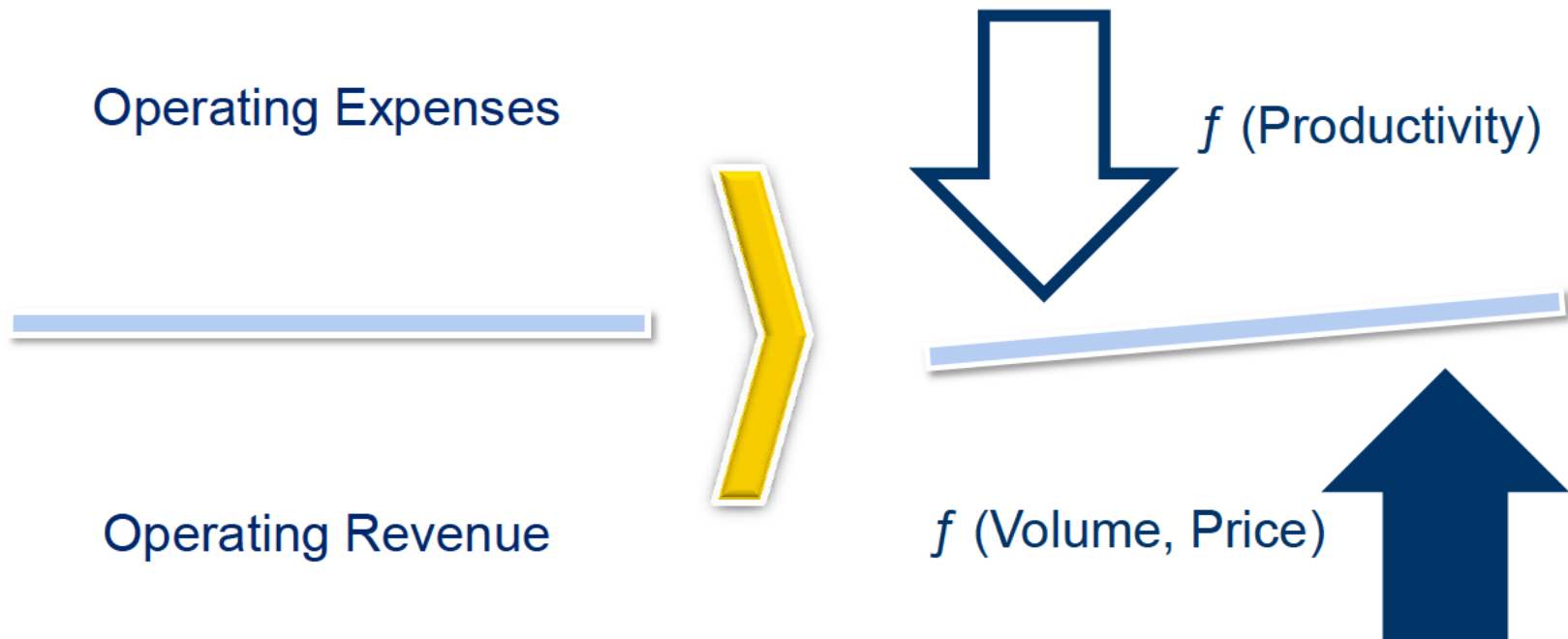
# FUTURE CHALLENGES REMAIN



- Near-term remains favorable for rail
  - *Positive macro-economic environment*
  - *Maintains a strong value proposition with better infrastructure than alternative modes*
  - *ELD's likely to hinder productivity and even exacerbate the driver shortage*
  
- However uncertain, other initiatives will likely promote trucking efficiencies
  - *Increased size and weight*
  - *More stringent fuel consumption standards*
  - *Platooning and autonomous vehicles*
  
- Railroads must focus on innovation
  - *Technological advances still important*
  - *Must not neglect process innovation to control asset and labor costs*



# SUPERIOR SERVICE KEY TO SUSTAINABLE GROWTH





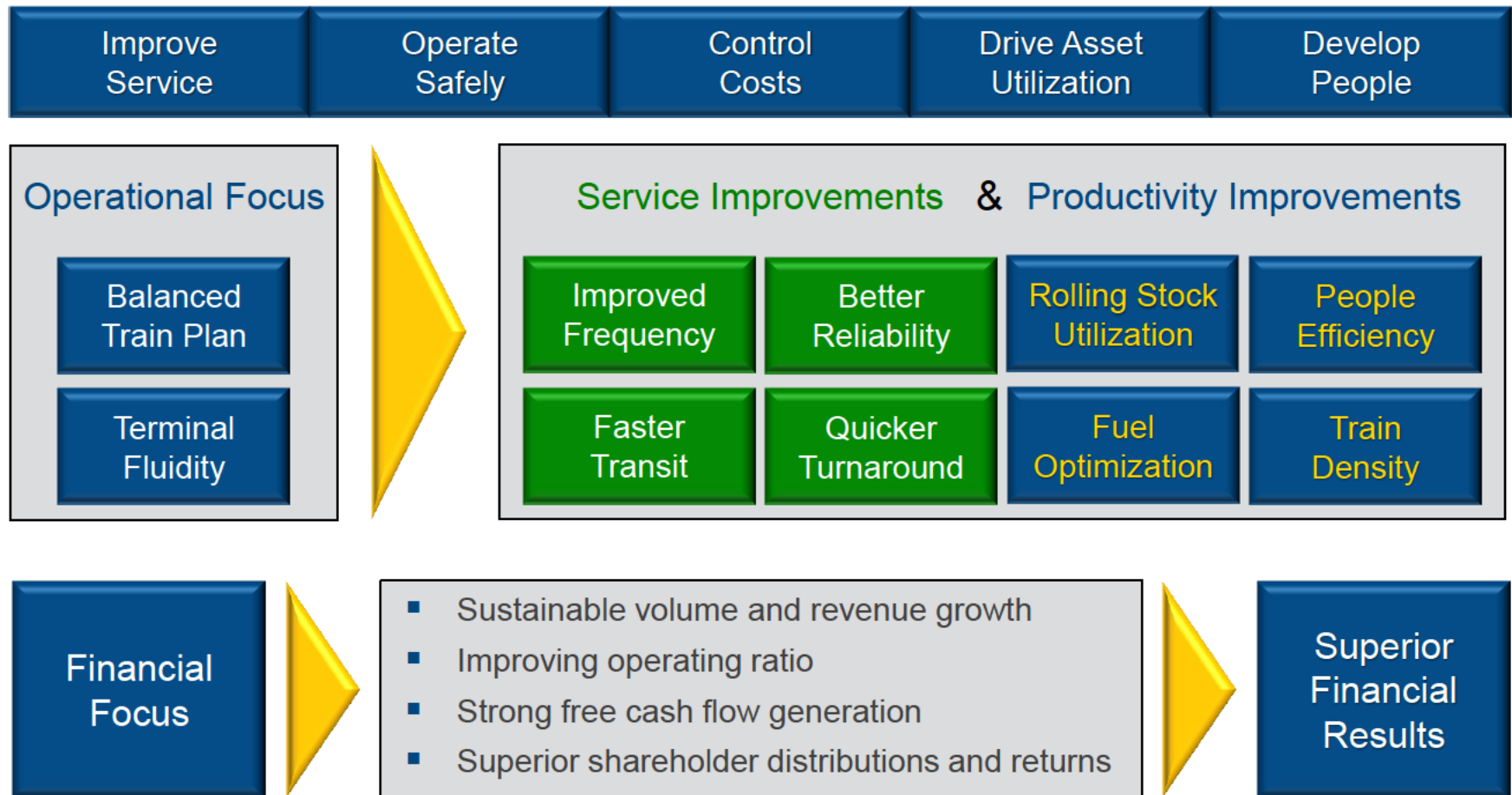
*IF I HAD ASKED PEOPLE WHAT THEY WANTED,  
THEY WOULD HAVE SAID FASTER HORSES.*

- HENRY FORD

HOW TOMORROW MOVES



# PSR: 'RAILROADING IS JUST A BUNCH OF PROCESSES'



# PSR STARTS WITH THE CUSTOMER

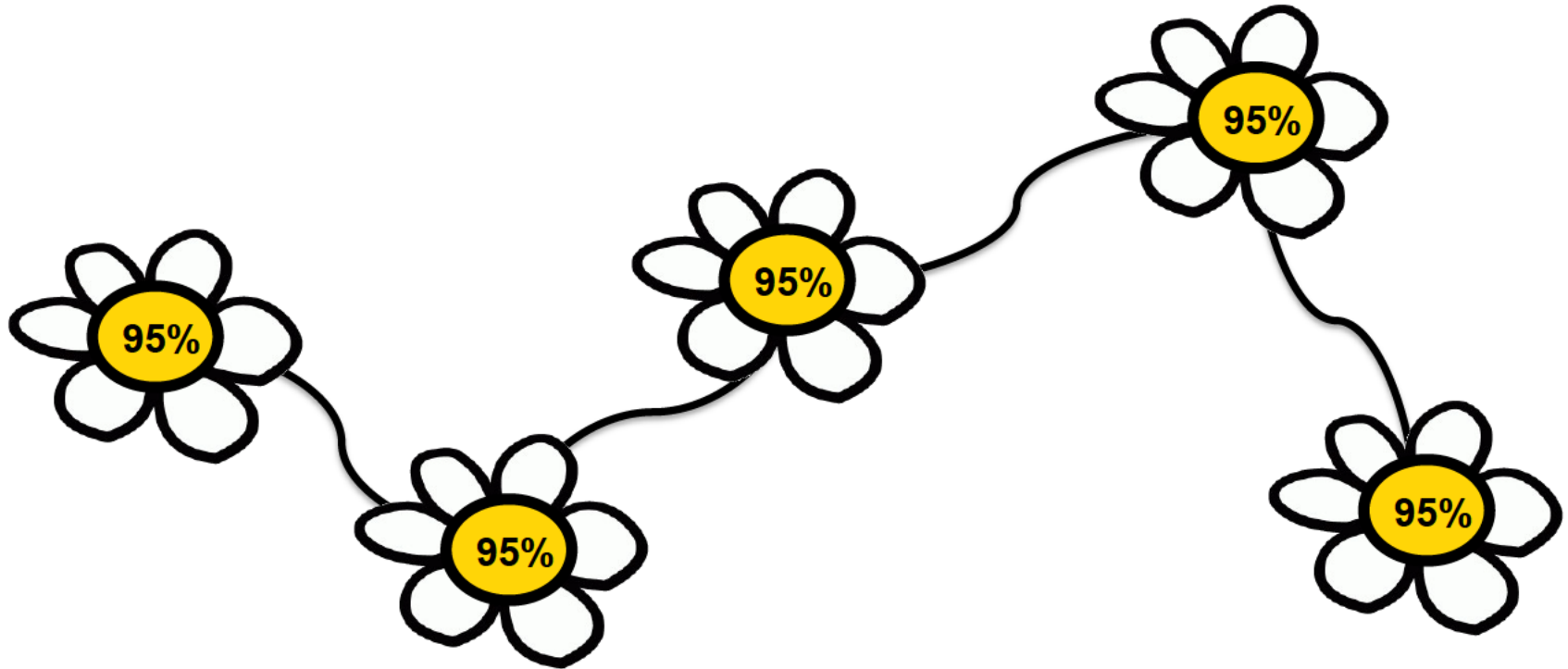
Do not confuse the ends with the means



- **‘Just run the plan’ *and mean it***
  - *Integrate MOW with the plan, versus running a competing plan characterized by curfews*
  - *All trains need to operate to a schedule*
- **Unit trains are not always better**
  - *Unit train transits compensated for issues with the scheduled Merchandise network*
  - *Excessive dwell to build and unload unit trains elongates cycle times, requiring more assets*
- **Focus on end-to-end transit times**
  - *FMLM as part of overall service performance, not as a separate goal unto itself*
  - *There is no intrinsic value in hump yards*



# 'DAISY CHAINS' ARE FRAGILE BY DESIGN



Reliability degrades across handlings: < 80%





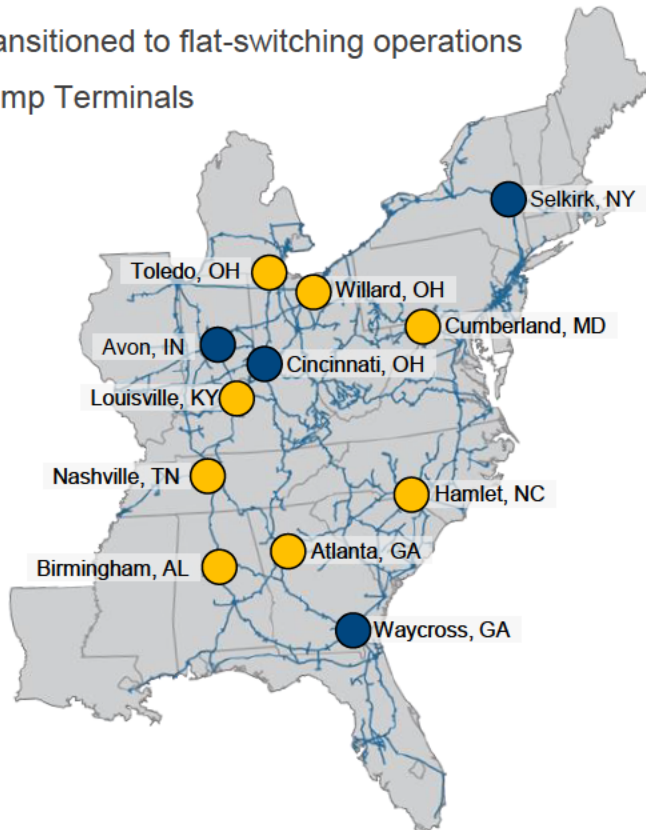
# OVER-RELIANCE ON HUMPS HINDERS PROGRESS

## CSX Hump Terminals

### Transitioning operations to flat-switching

● Transitioned to flat-switching operations

● Hump Terminals



## ■ Transitioning hump yards

- Started with twelve; eight have been converted to flat switching operations
- Two to four hump yards likely long term

## ■ Yard efficiency improving

- Nearly two-thirds of all yard activity is now done through flat switching
- Eliminating a handling can accelerate transit by at least a day

## ■ Current footprint supports radically different train plan

- Strategic blocking allows for farther, faster transit while reducing handlings
- Eliminates out-of-route miles associated with “boomerang” service routings
- Reduced operating units from 9 to 5



# HOW CAN YOU PARTNER WITH CSX GOING FORWARD?

Change is a Team effort  
– Customers included



- **Help cycle equipment quickly to avoid idle dwell**
  - *Do not allow cars to sit in the serving yard*
  - *Quickly load and unload to turn the cars*
  - *Release cars promptly in usable condition*
  
- **Reduce time at customer to make local service more predictable**
  - *Drop and hook is the ideal set up*
  - *Eliminate excessive switching or placement*
  - *Do not require mainline time to switch*
  
- **Plan with the end in mind**
  - *Pre-block cars to facilitate switching in transit*
  - *Update transit times to manage pipeline*



*GROWTH IS NEVER BY MERE CHANCE; IT IS THE  
RESULT OF FORCES WORKING TOGETHER.*

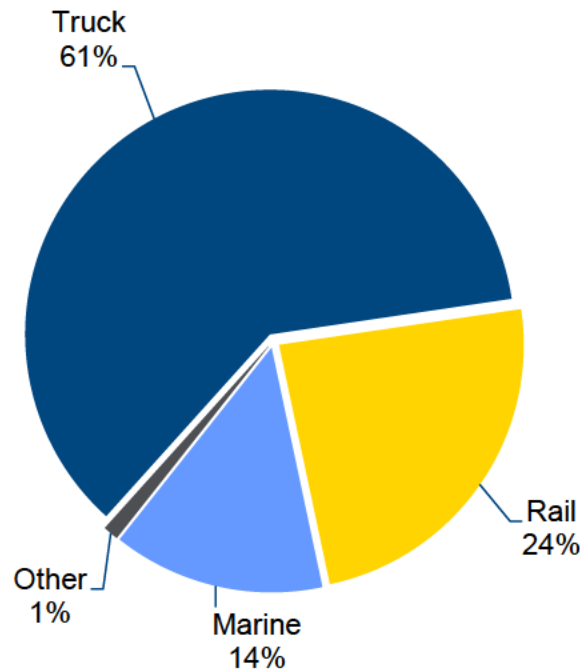
*- J.C. PENNY*

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# “NO OTHER SECTOR ON SUCH A PACE OF EXPANSION”

## Shipments by Mode



- Abundant, low-cost shale gas driving a chemical manufacturing renaissance
  - Chemical shipments could increase by 36MT, requiring an additional 1.8M shipments by 2020
  - Majority of planned expansions expected to come on-line over the next 2-years
  - This follows decades without significant new capacity being built for commodity chemicals
- ACC members concerned with transportation across all modes
  - Concerned with regulation, congestion issues and increasing costs across all modes
  - PwC estimates excess inventories, operating costs, new equipment and infrastructure to cost \$74B





# TRUCK AND MARINE MODES ALREADY CONSTRAINED

ASCE  
D

## Trucking Industry

**Figure 3: Chemical companies expect trucking service issues to become more acute by 2020**

% of respondents with concern about trucking issues  
Current vs. Future



Source: ICIS, PwC Analysis

Notes: 1) Percentage of concerned respondents is calculated by number of respondents having 'Significant' or 'Moderate' concerns for any region over the total number of respondents. 2) 'Future' is defined as 2020 for this analysis

- Driver shortage likely to worsen as many retire
- TWIC and hazmat requirements further limit the driver pool for chemicals shippers
- Regulations like ELDs expected to negatively impact driver productivity
- ASCE scored our nation's roads as "at risk"

ASCE  
C+

## Marine Industry

**Figure 4: Concerns over port congestion appears to be shifting from the West Coast to the Gulf and East Coasts**

Percent of respondents with concerns about port congestion issues  
Current vs. Future – by port



Source: PwC Analysis

Notes:

1) Percentage of concerned respondents is calculated by number of respondents having 'Significant' or 'Moderate' concerns for any region over the total number of respondents  
2) 'Future' is defined as 2020 for this analysis

- Current service is better at long-distance ports
- Labor disputes remain a persistent concern, especially at West Coast Ports
- Less certainty about ability of Gulf Coast ports to accommodate future growth prospects
- Ports scored as "needs attention"



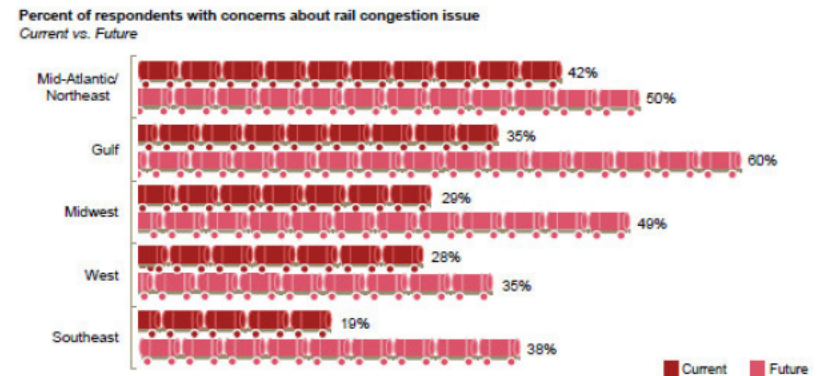
# ASCE: RAILROADS ARE BEST-IN-CLASS

- Biggest concern with rail appears to be variation in transit times
  - Congestion at choke points, especially in the Gulf Coast and Midwest
  - Higher carrying costs in the form of in-transit inventory and safety stock
  - PwC estimates rail delays will double by 2025, if capacity remains static
  - PwC also estimates 23K additional railcars are required to capture growth at just 4-5 turns/year, though **no mention of impact from using cars as storage due to lack of demurrage**
- ACC: rail capacity constrained by a “lack of strategic investment”
  - Railroads invest 19% of revenue on capital expenditures compared to 3% on average
  - ASCE gave its highest score of B to railroads, indicating “good, adequate for now”



## Railroad Industry

Figure 5: Rail concerns are growing across the network; however, future concerns are most significant in the Gulf



Source: ICIS, PwC Analysis  
Notes:

1) "Percentage of concerned respondents" is calculated by number of respondents having "Significant" or "Moderate" concerns over the total number of respondents

“Efforts should focus on ways to increase capacity or improve efficient use of the current network” – PwC



*THE WORLD HATES CHANGE, YET IT IS THE ONLY  
THING THAT HAS BROUGHT PROGRESS.*

- CHARLES KETTERING

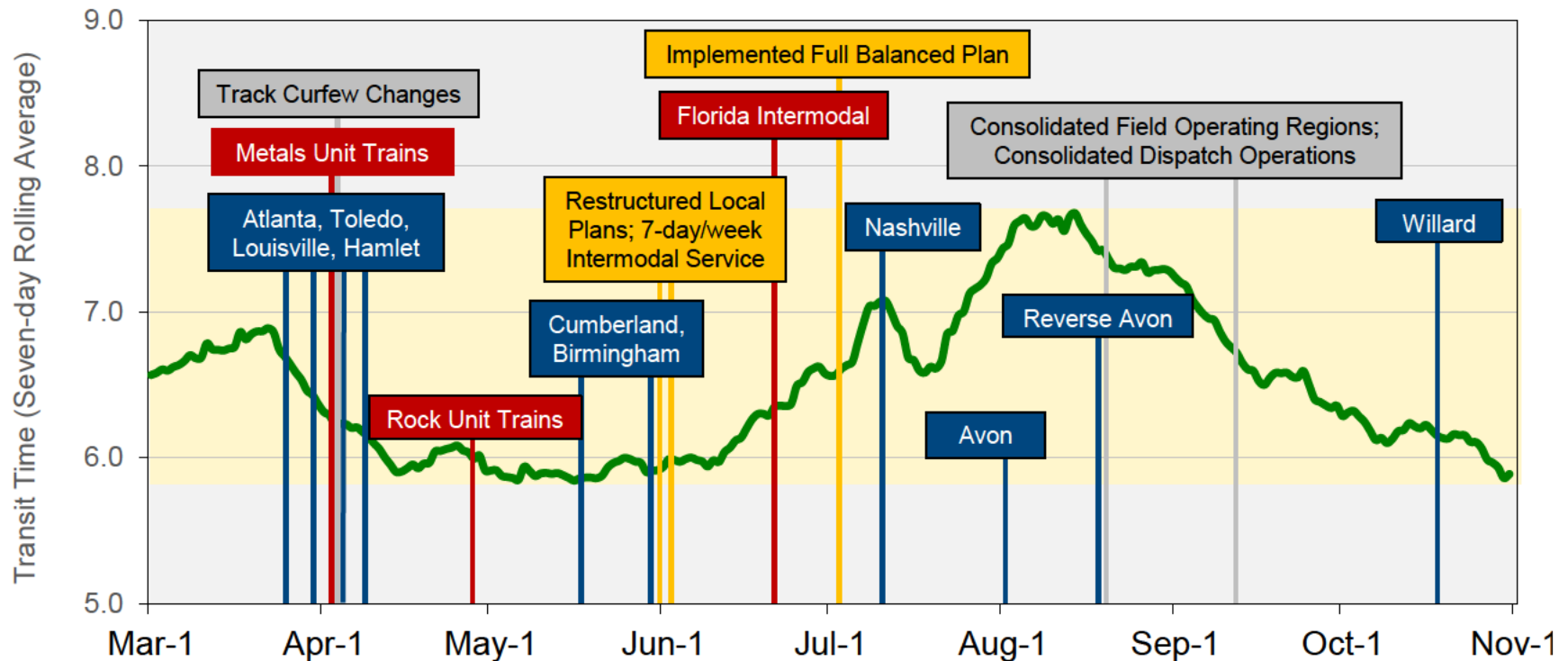
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# CHANGES PROFOUND, SWIFT AND PURPOSEFUL

## Transit Time and Transformation Timeline

— Transit Time — Train Plan Changes — Hump Yard Conversions — Train Consolidations — Other Changes





# ALREADY DELIVERING RESULTS FOR CUSTOMERS

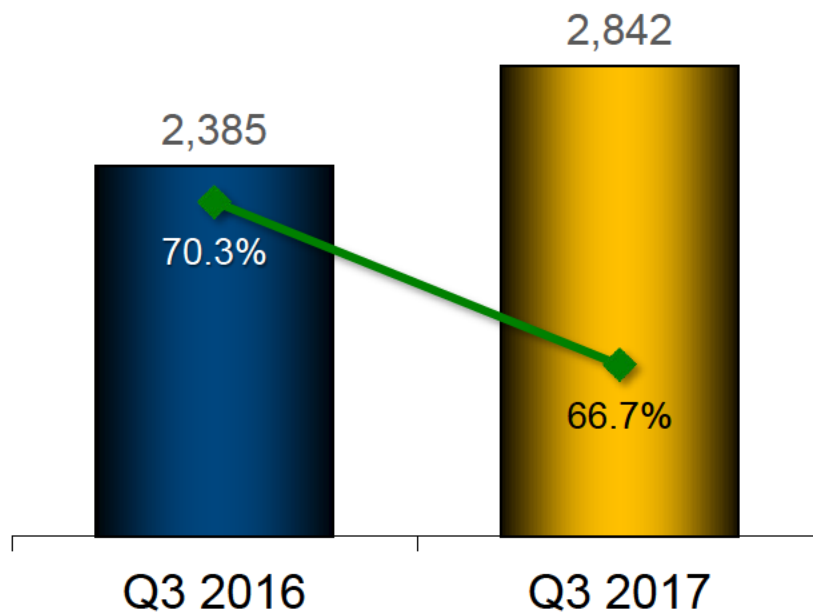
(Y/Y % Change)		Week 44 11/3/17	Week 43 10/27/17	Week 42 10/20/17	QTD 4Q:17
TRAIN SPEEDS	CNI	(10.1%)	(10.4%)	(7.5%)	(8.7%)
	CP	(3.8%)	(2.2%)	(5.9%)	(4.0%)
	CSX	6.2%	5.2%	8.9%	7.1%
	NSC	(11.3%)	(9.6%)	(10.9%)	(11.1%)
	BNSF	(1.6%)	(4.6%)	(2.3%)	(2.2%)
	UNP	(6.1%)	(5.3%)	(5.3%)	(4.8%)
	KSU	(1.8%)	(2.5%)	(1.8%)	(2.0%)
	<b>Total</b>	<b>(4.1%)</b>	<b>(4.2%)</b>	<b>(3.5%)</b>	<b>(3.7%)</b>
DWELL TIMES	CNI	30.7%	25.0%	22.1%	23.4%
	CP	8.3%	(1.6%)	0.0%	5.3%
	CSX	(8.1%)	(6.6%)	(13.2%)	(5.7%)
	NSC	13.9%	15.8%	16.8%	13.5%
	BNSF	3.5%	8.7%	8.1%	6.8%
	UNP	14.3%	14.0%	14.3%	13.3%
	KSU	0.4%	1.7%	5.9%	2.3%
	<b>Total</b>	<b>9.0%</b>	<b>8.1%</b>	<b>7.7%</b>	<b>8.4%</b>



# ALREADY DELIVERING RESULTS FOR CSX

## YTD Operating Results as of Third Quarter

■ Operating Income    ◆ Operating Ratio



- Early gains from Precision Railroading drive:
  - Operating ratio improvement of 360 bps year-over-year
  - Operating income growth of nearly 20% year-over-year
- Financials resilient through recent service changes
- Significant opportunity ahead



# CSX IS UNDERGOING TRANSFORMATIONAL CHANGE

- Precision Scheduled Railroading rollout has been rapid
  - *Implementing core tenets on an accelerated basis*
- Now focused on executing and refining operating plan
  - *Aligning field leaders with Precision Railroading and new regional structure*
- Resources support current train plan
  - *As execution improves, service, volume and utilization are expected to improve*
- Long-term vision intact despite recent transition issues
  - *Transition issues in Q3 temporarily slowed progress for this year*





A photograph of a CSX freight train traveling through a lush green forest. The train consists of two blue and yellow CSX locomotives, numbered 3244 and 3245, pulling several white CSX intermodal containers. The locomotives have the CSX logo in yellow on their blue sides. The train is on a gravel bed track, and the background is filled with dense green trees under a blue sky with light clouds.

# CSX CORPORATION

## 2017 RAIL TRENDS CONFERENCE

Progressing Forward





# FORWARD LOOKING DISCLOSURE

This information and other statements by the company may contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act with respect to, among other items: projections and estimates of earnings, revenues, margins, volumes, rates, cost-savings, expenses, taxes, liquidity, capital expenditures, dividends, share repurchases or other financial items, statements of management's plans, strategies and objectives for future operations, and management's expectations as to future performance and operations and the time by which objectives will be achieved, statements concerning proposed new services, and statements regarding future economic, industry or market conditions or performance. Forward-looking statements are typically identified by words or phrases such as "will," "should," "believe," "expect," "anticipate," "project," "estimate," "preliminary" and similar expressions. Forward-looking statements speak only as of the date they are made, and the company undertakes no obligation to update or revise any forward-looking statement. If the company updates any forward-looking statement, no inference should be drawn that the company will make additional updates with respect to that statement or any other forward-looking statements.

Forward-looking statements are subject to a number of risks and uncertainties, and actual performance or results could differ materially from that anticipated by any forward-looking statements. Factors that may cause actual results to differ materially from those contemplated by any forward-looking statements include, among others; (i) the company's success in implementing its financial and operational initiatives; (ii) changes in domestic or international economic, political or business conditions, including those affecting the transportation industry (such as the impact of industry competition, conditions, performance and consolidation); (iii) legislative or regulatory changes; (iv) the inherent business risks associated with safety and security; (v) the outcome of claims and litigation involving or affecting the company; (vi) natural events such as severe weather conditions or pandemic health crises; and (vii) the inherent uncertainty associated with projecting economic and business conditions.

Other important assumptions and factors that could cause actual results to differ materially from those in the forward-looking statements are specified in the company's SEC reports, accessible on the SEC's website at [www.sec.gov](http://www.sec.gov) and the company's website at [www.csx.com](http://www.csx.com).

# NON-GAAP MEASURES DISCLOSURE

CSX reports its financial results in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP). CSX also uses certain non-GAAP measures that fall within the meaning of Securities and Exchange Commission Regulation G and Regulation S-K Item 10(e), which may provide users of the financial information with additional meaningful comparison to prior reported results.

Non-GAAP measures do not have standardized definitions and are not defined by U.S. GAAP. Therefore, CSX's non-GAAP measures are unlikely to be comparable to similar measures presented by other companies. The presentation of these non-GAAP measures should not be considered in isolation from, as a substitute for, or as superior to the financial information presented in accordance with GAAP. Reconciliations of non-GAAP measures to corresponding GAAP measures are attached hereto in the Appendix of this presentation.

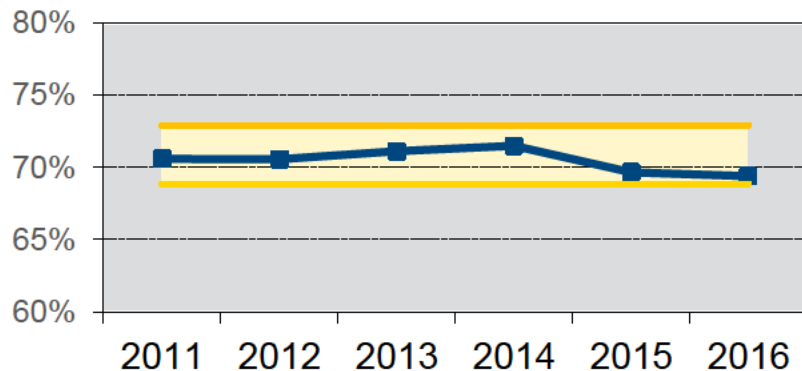
## **Forward Looking Non-GAAP Measures**

CSX presents non-GAAP or adjusted operating ratio and adjusted net earnings per share, assuming dilution on a forward-looking basis. The most directly comparable forward-looking GAAP measure is operating ratio and net earnings per share, assuming dilution. CSX is unable to provide a quantitative reconciliation of these forward-looking non-GAAP measures to the most directly comparable forward-looking GAAP measure, because CSX cannot reliably forecast the timing and amount of future restructuring charges and other charges related to the change of leadership and strategy which are difficult to predict and estimate. Please note that the unavailable reconciling items could significantly impact CSX's future financial GAAP results.

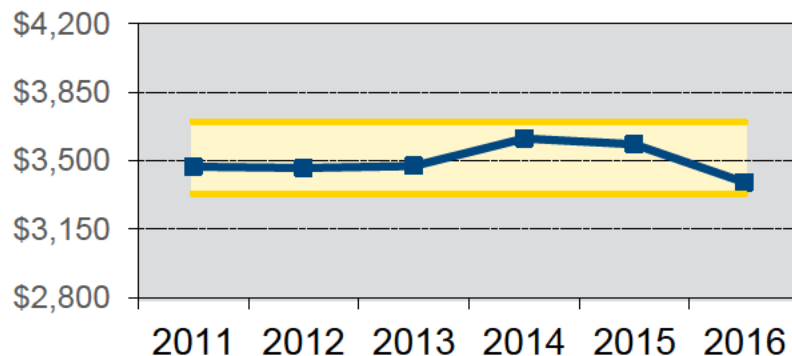
# CONVENTIONAL RAILROAD WISDOM TRANSFORMED

## CSX Historically Range Bound

CSX Operating Ratio



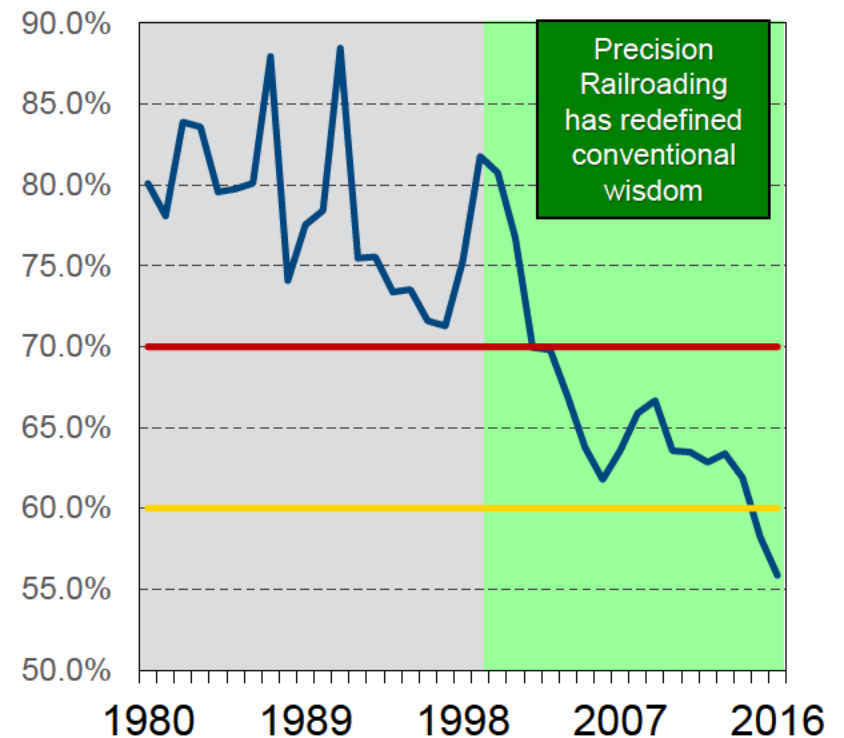
CSX Operating Income  
Dollars in Millions



## Redefining What is Possible

Operating Ratio

Best-in-Class Old Paradigm New Paradigm



# PRECISION RAILROADING DRIVING TRANSFORMATION

Improve  
Service

Operate  
Safely

Control  
Costs

Drive Asset  
Utilization

Develop  
People

## Operational Focus

Balanced  
Train Plan

Terminal  
Fluidity

## Service Improvements & Productivity Improvements

Improved  
Frequency

Better  
Reliability

Rolling Stock  
Utilization

People  
Efficiency

Faster  
Transit

Quicker  
Turnaround

Fuel  
Optimization

Train  
Density

## Financial Focus

- Sustainable volume and revenue growth
- Improving operating ratio
- Strong FCF generation & less capital intensity
- Superior shareholder distributions and returns

Superior  
Financial  
Results



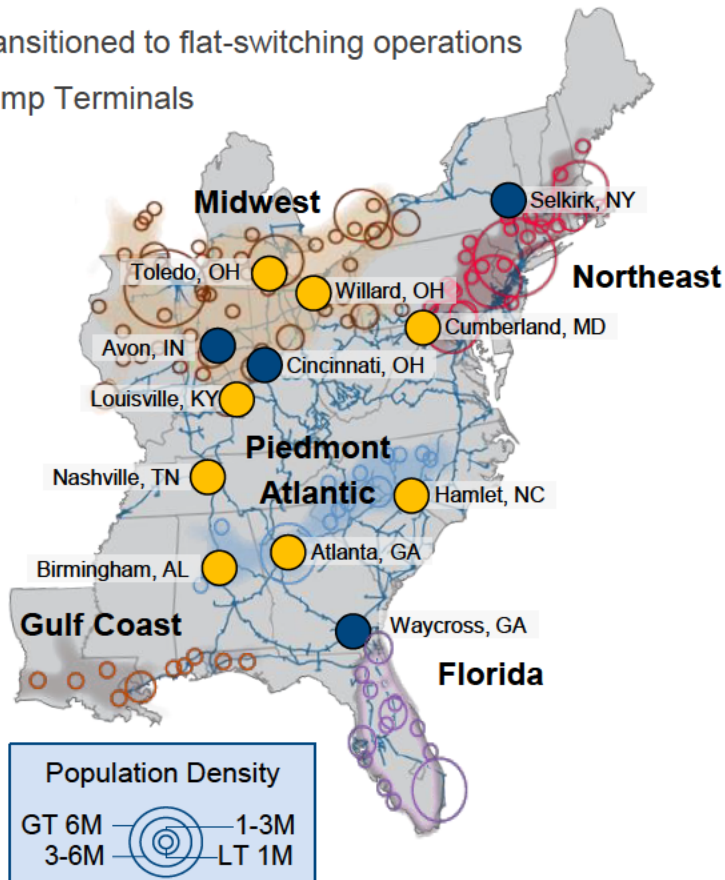
# PRECISION RAILROADING CHALLENGES STATUS QUO

## CSX Hump Terminals

Transitioning operations to flat-switching

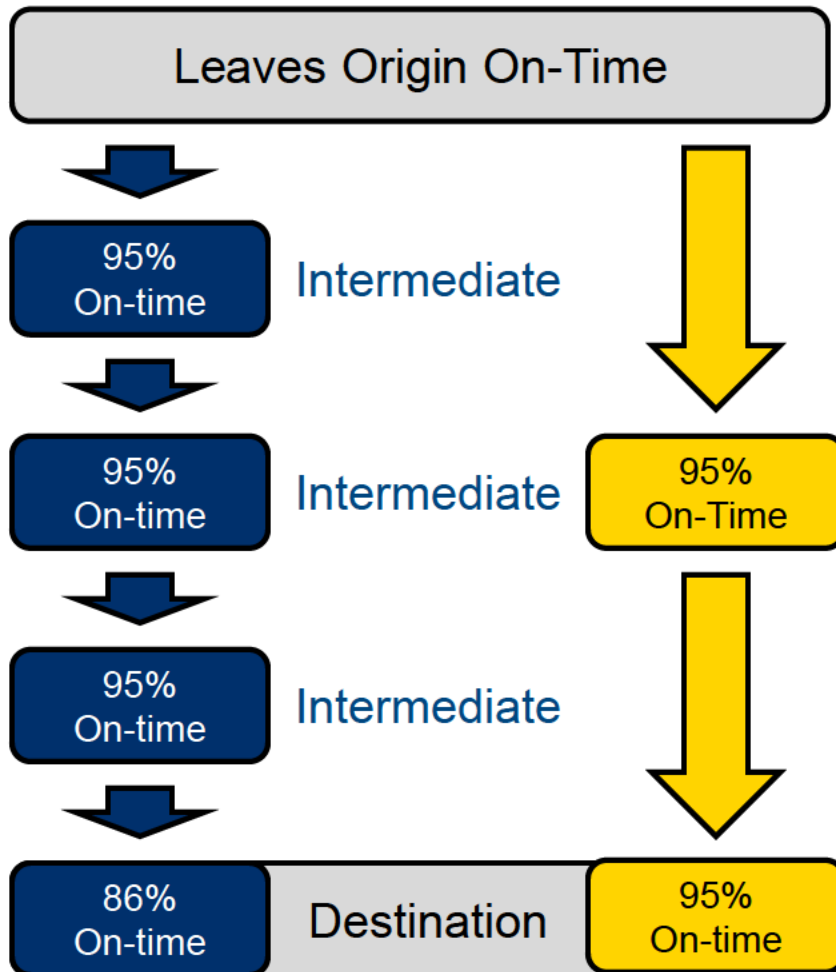
● Transitioned to flat-switching operations

● Hump Terminals



- 'Just run the plan' *and mean it*
- Transitioning from hump yards supports radically different plan
- Faster, more reliable transit with fewer intermediate handlings
  - Strategic blocking moves cars farther, faster
- Streamlined operations allow for a streamlined organization
  - Reduced operating units from 9 to 5

# PRECISION RAILROADING DRIVES SUPERIOR SERVICE

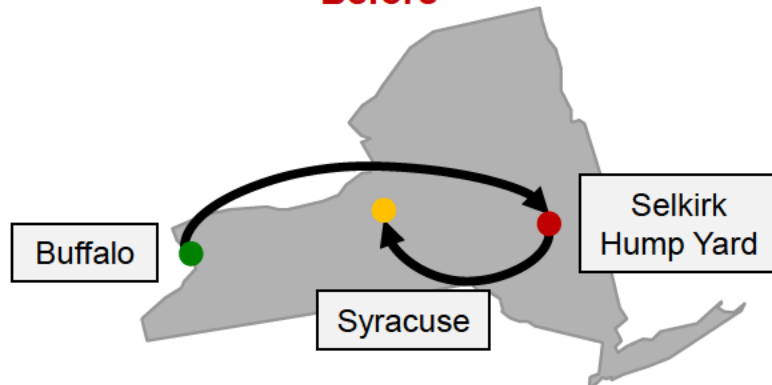


- Reducing intermediate handlings improves service
  - Speed of transit reduces inventory carrying costs
  - Streamlined service solution supports overall reliability
- Result – Faster, more reliable service over longer distances

# BETTER PROSPECTS POST-IMPLEMENTATION

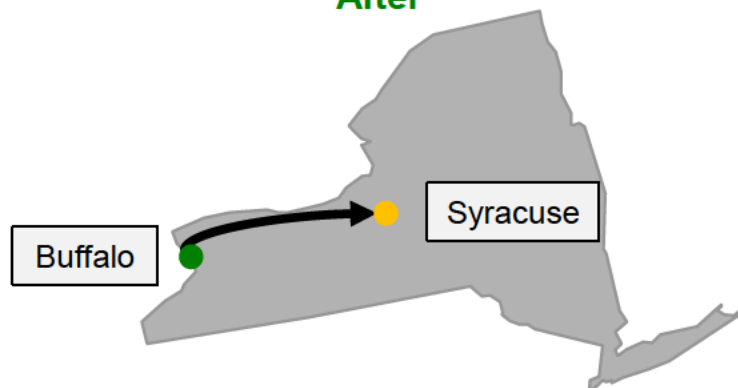
## Buffalo – Syracuse Customer

**Before**



## Buffalo – Syracuse Customer

**After**

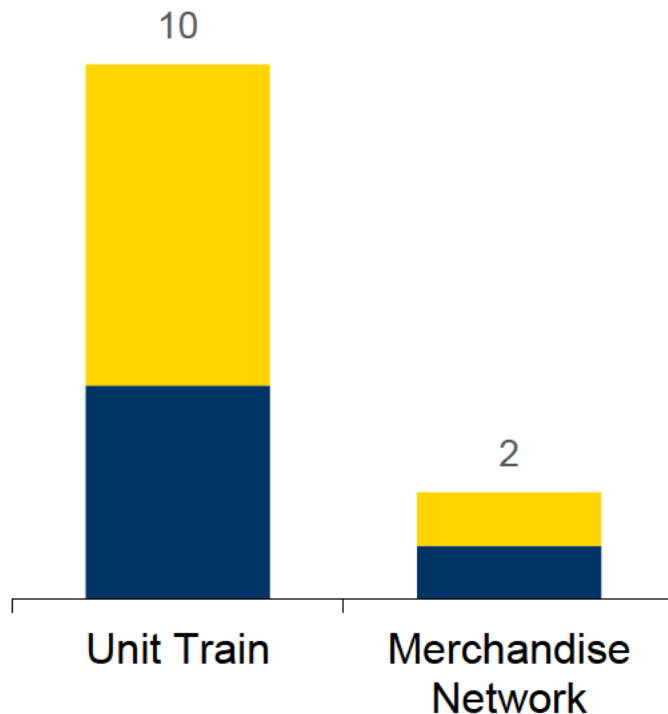


- Excessive out-of-route miles in some shorter lengths of haul
- Reliance on hump yard drove increased dwell and transit time
- Result – converted highly competitive business at more profitable rates
- More direct route improves transit and cost structure
- Faster, more reliable service for customer

# RETHINKING THE VALUE OF UNIT TRAINS

## Total Time at Actual Metals Customer

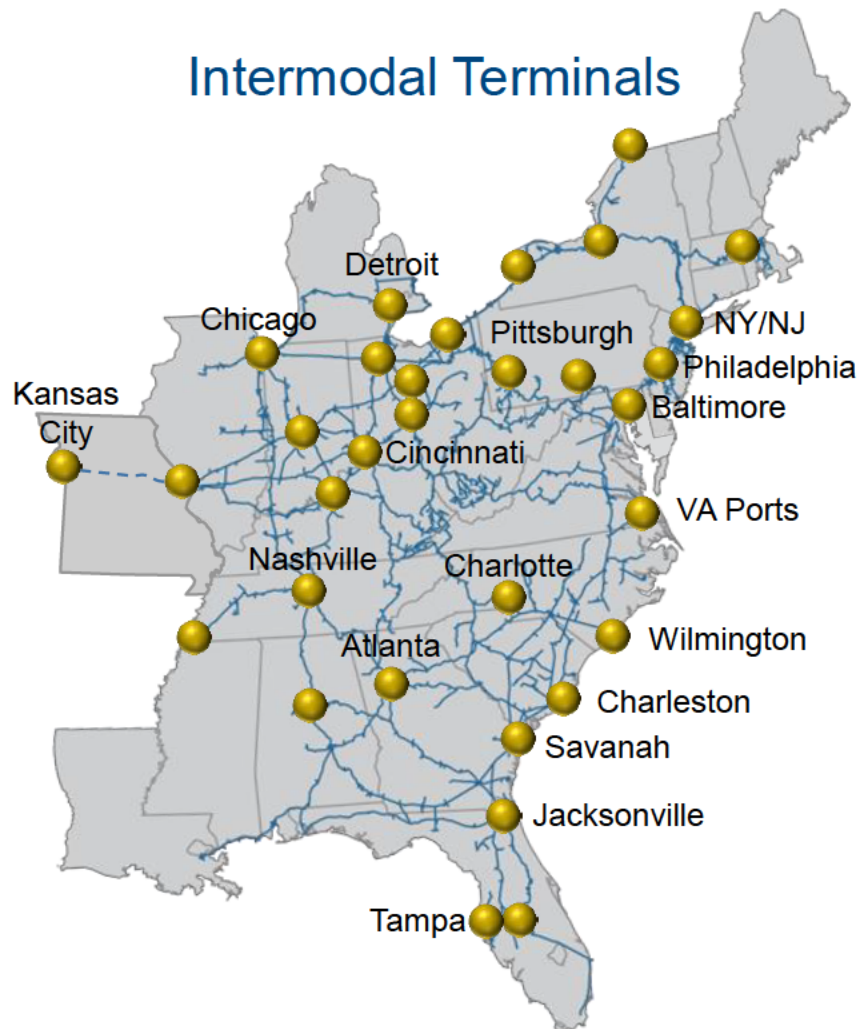
■ Loading Time ■ Unloading Time



- Unit trains historically used due to unreliable scheduled network
- Efforts to justify unit trains often created inefficiencies
- Result – reduced fleet in this lane by 10% - 15%
- Redeployed assets to capture new business in a new lane
- More ratable flows now lead to a more resilient supply chain



# ALIGNING INTERMODAL WITH PRECISION RAILROADING

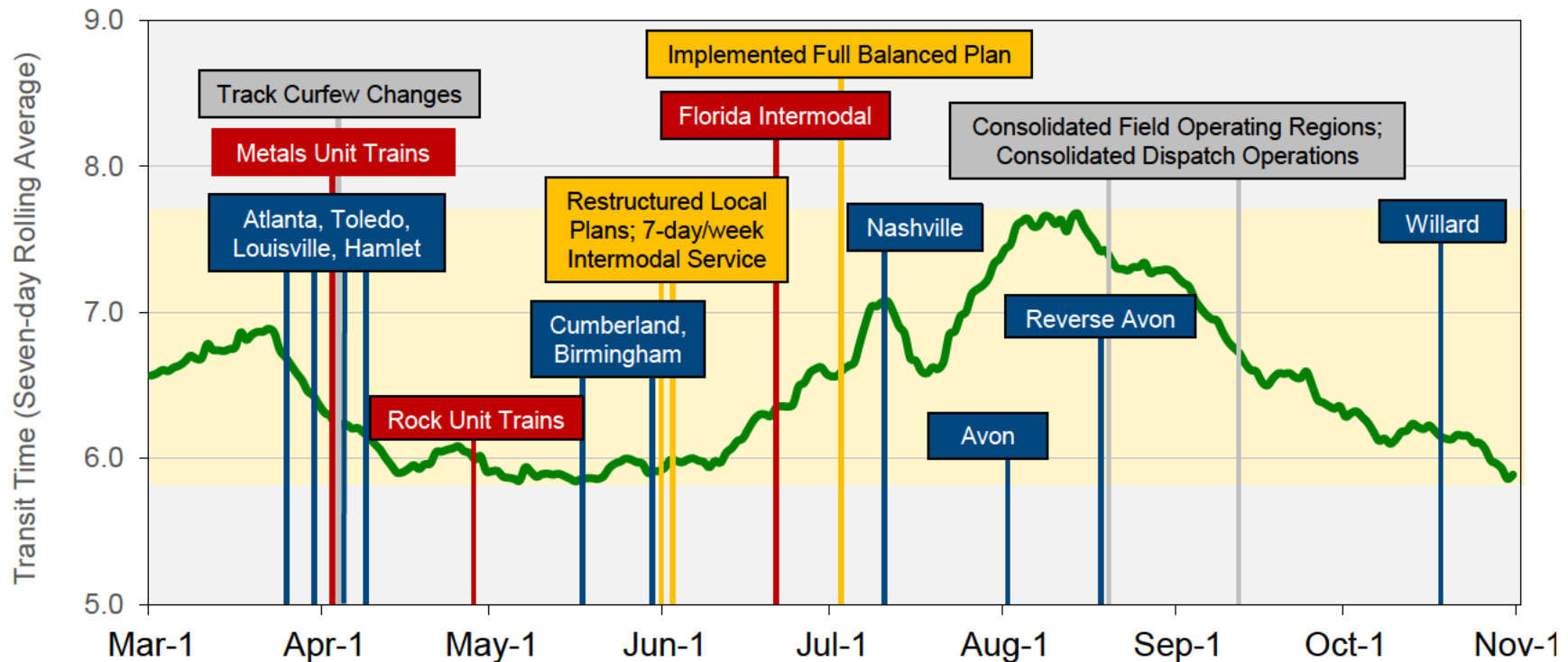


- Underutilized terminals and lanes under strategic review
- Leveraging merchandise trains to improve network efficiency
- Utilizing Intermodal trains to serve high density lanes
- Focus is to improve profitability of intermodal business

# CHANGES PROFOUND, SWIFT AND PURPOSEFUL

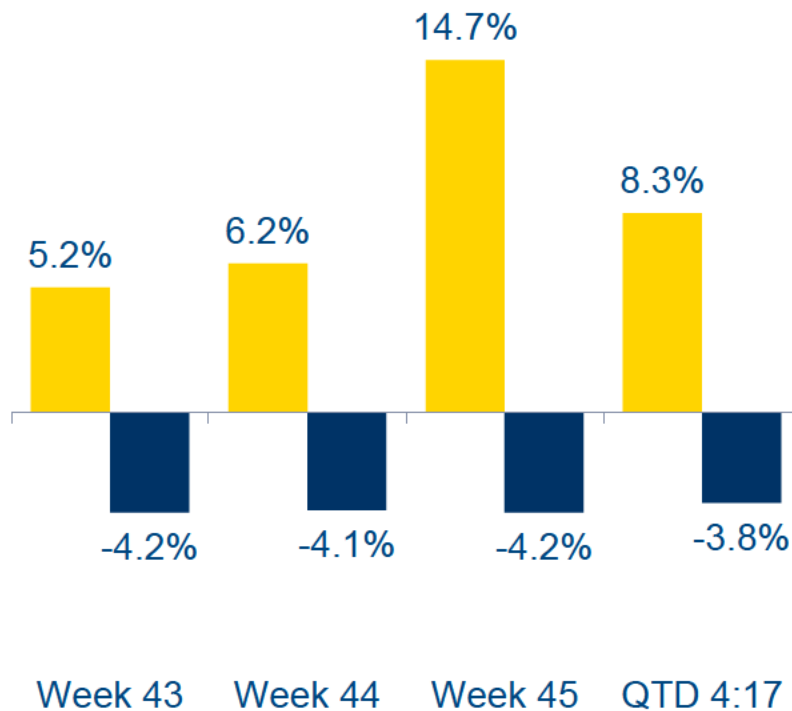
## Transit Time and Transformation Timeline

— Transit Time — Train Plan Changes — Hump Yard Conversions — Train Consolidations — Other Changes

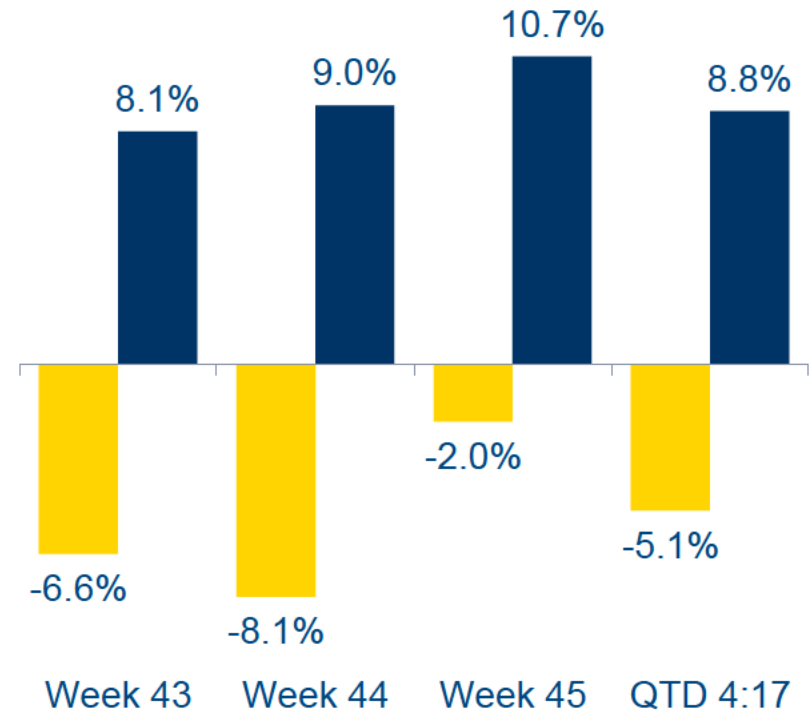


# DELIVERING SUPERIOR SERVICE FOR CUSTOMERS

## Train Velocity (y/y)



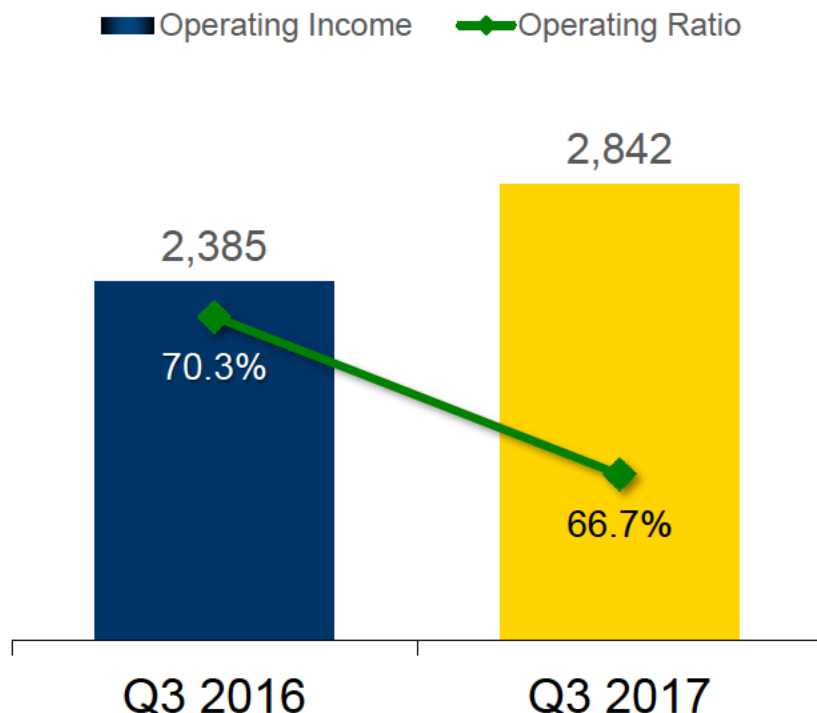
## Terminal Dwell (y/y)



■ CSX ■ Class I Railroads

# DELIVERING BETTER RESULTS FOR SHAREHOLDERS

## YTD Operating Results as of Third Quarter



- Early gains from Precision Railroading drive:
  - Operating ratio improvement of 360 bps year-over-year
  - Operating income growth of nearly 20% year-over-year
- Financials resilient through recent service changes
- Significant opportunity ahead
  - Anticipate a first quarter 2018 Investor Conference

Note: Results for 2017 excluding restructuring charges; see Non-GAAP reconciliation on slide 15



# CSX TRANSFORMATION YIELDING RESULTS

- Precision Scheduled Railroading rollout has been rapid
  - *Implementing core tenets on an accelerated basis*
- Now focused on executing and refining operating plan
  - *Aligning field leaders with Precision Railroading and new regional structure*
- Long-term vision intact despite recent transition issues
  - *Transition issues in Q3 temporarily slowed progress for this year*
- Significant opportunities lie ahead
  - *Operating model is already creating value for shippers*