



MEMORANDUM

To: CMAP Economic Development Working Committee

From: CMAP Staff

Date: September 25, 2017

Re: Draft ON TO 2050 Economy Indicator Refinement

Following an approach established in GO TO 2040, ON TO 2050 will include various topic-specific indicators, which are a set of performance measures to benchmark the region's progress on plan implementation. The final set of indicators should highlight and complement all of the major recommendations made in ON TO 2050. All indicators will have targets for both 2025 and 2050 to evaluate near- and long-term progress.

In identifying the set of indicators for ON TO 2050, staff first began by reviewing the existing GO TO 2040 indicators, as revised via the Plan Update process in 2014. Informed by several ON TO 2050 Strategy Papers and Snapshot Reports, staff considered whether the current set adequately addresses the core ON TO 2050 topics from both a technical (e.g. available data sources, methodologies) and policy (e.g. regulations, plan priority, accessibility, and level of effort) standpoint. This memo outlines recommendations for revisions or entirely new indicators to successfully benchmark the region's progress on implementing ON TO 2050. Staff are seeking input on the following core and kindred economic indicators.

Current GO TO 2040 Economy Indicators

The GO TO 2040 Plan Update in October 2014 included an extensive review of the original GO TO 2040 indicators, and made several modifications and updates to indicators related to the regional economy. CMAP currently uses five core indicators to track progress on the plan's Human Capital and Innovation recommendations (Table 1). The table also includes the two "kindred" indicators (listed in italics) that do not have identified targets but provide additional insights into important segments of the regional economy. Additional details can be found in the Indicator Methodology [Appendix](#) from the GO TO 2040 Plan Update.¹

¹ CMAP. GO TO 2040 Plan Update, Indicator Methodology Appendix, 2014, <http://www.cmap.illinois.gov/documents/10180/332742/Update+Indicator+Methodology+FINAL.pdf/720e4b90-0058-4d27-bdff-e898cdf3fb2b>

Table 1. GO TO 2040 Economy Indicators and ON TO 2050 Recommendations

Indicator	Description	Targets (2020/2040)	ON TO 2050 Recommendation
Population Age 25 and Over with an Associate’s Degree or Higher	Percentage of the regional population age 25 and over that have obtained an Associate’s degree or higher	47 percent / 58 percent	Keep
Workforce Participation	Percentage of the regional population age 20-64 that is either working or actively looking for work	82.8 Percent / 82.8 percent	Keep
Scientific Research and Development Employment	The number of people employed in science, research and development as measured by NAICS 5417	20,000 jobs / 48,000 jobs	Revise
Venture Capital Funding	Share of total U.S. venture capital deals that occur in the State of Illinois	5.5 percent / 5.5 percent	Keep
Number of Patents Issued Annually	The number of utility patents -- or “patents for inventions” -- issued annually in the region	Target values assess the region’s share of total U.S. patents issued: 3.1 percent / 3.9 percent	Keep
<i>Kindred Indicators</i>			
<i>Technology Transfer</i>	<i>Total licensing revenue, the number of university startups, and the number of university patents resulting from the commercialization of academic research</i>	<i>N/A</i>	<i>Eliminate</i>
<i>Manufacturing Exports</i>	<i>Total annual value of exports for manufactured goods in the Chicago Customs District</i>	<i>N/A</i>	<i>Keep</i>

Rationale for ON TO 2050 Economy Indicators

As part of the ON TO 2050 plan development process, CMAP explored key policy areas through the development of strategy memos on Regional Economic Development, Human Capital, and Innovative Capacity. Key findings and policy recommendations from this effort have reaffirmed the relevance, importance, and continued use of the existing plan indicators for GO TO 2040 as updated in October 2014.

Countless measurements of economic opportunity and growth exist, with data readily available from all levels of government and numerous proprietary sources. The five indicators chosen in the GO TO 2040 update provide accessible measures of some underlying trends that contribute to the region’s economic performance and help to focus public attention on plan priorities. Largely maintaining them for the new ON TO 2050 plan reflects both the care given in their initial selection and the need for continued work in these areas. This consistency allows CMAP to focus on providing context and analysis around trends that are unique to the Chicago region and continue across plans. CMAP regularly provides additional, related data in other reports,

annual indicators, and Policy Updates. Accordingly, CMAP has substantial related work that can be used to complement the indicators and frame economic trends for the public.

ON TO 2050 will carry forward the priority placed on improvements to the adult education and workforce systems, as well as growth-enabling innovation. Human capital remains one of the most important determinants -- if not the most important -- of regional economic vitality. In the face of mounting global competition, education and training providers must become more responsive to changing needs and technology, while ensuring all residents have access to training with regional economic value. Analysis for ON TO 2050 has demonstrated that sub-baccalaureate training and “middle-skill jobs” – requiring more than a high school diploma but less than a Bachelor’s degree – will remain central to building regional economic opportunity. The indicators for educational attainment and workforce participation provide widely used measures for regional economic prosperity, and are thus a strong basis for benchmark comparisons.

Sustainable and resilient growth also depends on the Chicago region’s capacity to transform new ideas into higher productivity and greater competitiveness. Since GO TO 2040, CMAP’s policy work has highlighted opportunities and challenges for the public sector to support innovation. While still evolving, sound measurement of innovation is crucial for evaluating the efficiency of public policies and programs in achieving regional objectives. The GO TO 2040 indicators focus primarily on inputs to idea generation, including patent activity, venture capital, and STEM jobs. Due to data access and quality problems, researchers and governments alike continue to seek strong metrics of outcomes -- the economic value of new-to-market or new-to-firm innovations. Enhancements to information and data systems will figure prominently in ON TO 2050 recommendations, including measures of regional innovative performance. CMAP will explore additional metrics and data sources through its Regional Economic Indicators microsite and related Policy Updates. For the ON TO 2050 plan, these existing indicators provide general signals for the vibrancy and competitiveness of the regional economy, as well as avenues for continued policy analysis.

To improve their data quality and accuracy, CMAP staff recommend modifying two indicators: employment in innovative industries and manufacturing exports. For the former, the GO TO 2040 plan update defined private sector employment in research and development (R&D) as the number of workers employed in the Scientific R&D Services industry (NAICS classification number 5417). Subsequent analysis found that Scientific R&D employment failed to capture numerous innovative segments of the economy. Accordingly, staff expanded the view to employment in science, technology, engineering, and mathematics (STEM) fields. While white-collar advanced science and technology jobs represent a core component in the region’s innovative capacity, the need for STEM skills permeates many other fields as well, including many blue-collar jobs. This expanded scope will be reflected in ON TO 2050, and the plan indicators should more accurately track employment in STEM-based occupations that can appear in a wide array of industries. CMAP can track STEM employment in the seven-county Chicago region using the Bureau of Labor Statistics’ Quarterly Census of Employment and Wages data, as sourced from Economic Modeling Specialists International (Emsi). This modification to the indicator would mirror CMAP’s existing changes to the Regional Economic Indicators microsite and related Policy Updates.

Finally, GO TO 2040 sourced data on manufacturing exports – a kindred indicator – from USA Trade Online, tracking the dollar value of exports for goods-producing industries (NAICS classification numbers 31-33). At the time, this source provided the best available regional exports data. However, this data includes all exports that pass through the unique Chicago Customs District, which includes large portions of northern and central Illinois, northwestern Indiana, and Iowa. ON TO 2050 will continue the previous plan’s focus on boosting economic growth originating in the region’s traded clusters. Modifying this kindred indicator to focus on just the Chicago-Naperville-Elgin metropolitan statistical area and point-of-origin export values will more accurately reflect gains made in the region’s manufacturing cluster. CMAP can better measure the annual value of manufacturing exports by sourcing data from the U.S. Census Bureau’s Origin of Movement series, in which export sales are attributed to metropolitan areas based on the ZIP code in which payment for a good is received. Again, this modification would reflect CMAP’s existing changes to the Regional Economic Indicators microsite and related Policy Updates.

Eliminating the ‘Technology Transfer’ Kindred Indicator for ON TO 2050

The kindred indicator for technology transfer attempts to track the commercialization activity that occurs at the Chicago region’s institutions of higher education and research. In addition to creating and attracting talent, universities and national laboratories have extensive resources for supporting innovation and economic growth. In particular, some innovations developed through academic research reach the commercial market via invention licenses for private companies or new business startups. The region’s world-class institutions offer numerous opportunities for leveraging existing assets and strengths for economic development.

However, data quality and reliability are a recurring problem in using the technology transfer kindred indicator. This measure tracks the licensing revenue, number of university startups, and university patents at regional universities, as drawn from the Association of University Technology Managers (AUTM) annual survey. CMAP has tracked technology transfer for several years, both as a benchmark for GO TO 2040 implementation and as part of the Regional Economic Indicators microsite. Several concerns have arisen out of this effort. Staff found that the AUTM data, which is collected on a voluntary basis, to be incomplete, provided inconsistently, and inadequate for capturing technology transfer activity.

Given these considerations, CMAP staff recommend that technology transfer be eliminated as a kindred indicator for the ON TO 2050 plan. While engaging universities and the national laboratories in economic development remains a priority, this measure does not meet our criteria for consistency, data quality and reliability, or level of staff effort. Other CMAP policy work – including upcoming Policy Updates and refinements to the Regional Economic Indicators microsite – will help to better assess and track our regional innovative performance.

Draft Recommended ON TO 2050 Indicators and Targets

The following tables describes the proposed ON TO 2050 Economy Indicators in more detail, including updated targets for 2025 and 2050. Together, these indicators offer performance measures to benchmark our progress on implementation of the ON TO 2050 plan.

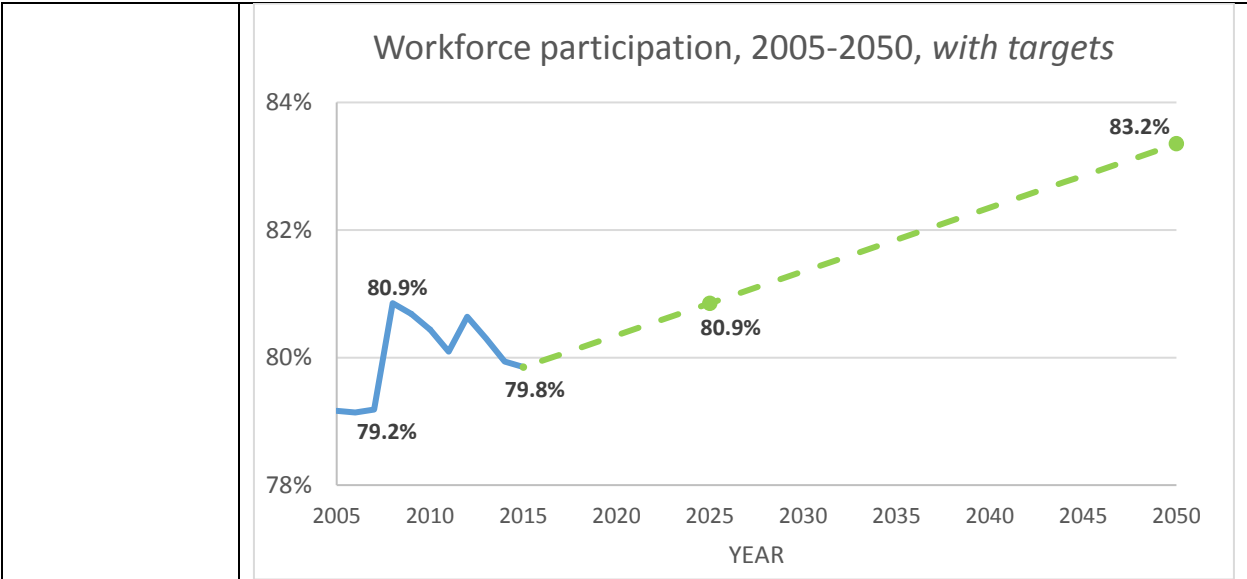
Population Age 25 and Over with an Associate’s Degree or Higher

<p>Indicator:</p>	<p>This measure reports the percentage of the regional population age 25 and over that have obtained an Associate’s degree or higher. Data come from the American Community Survey (ACS) and represent the seven-county CMAP region. Educational attainment data are released annually. The inclusion of Associate’s degrees in this measure helps to highlight the important role community colleges play in improving education and workforce development, and reflects the significance of “middle-skill” jobs in our regional economy. These are jobs that require more than a high school diploma but less than a Bachelor’s degree.</p> <p>The overall level of resident education within metropolitan areas is a useful proximate measure for regional economic prosperity. Higher levels of education are generally associated with lower unemployment rates, a more innovative workforce, and a more economically vibrant region. Many jobs that previously only required a high school education are becoming more complex. Employers now seek workers with advanced skills that can raise productivity and help firms compete in the global marketplace.</p>										
<p>Targets:</p>	<p>2025: 50.2 percent of the population in the region age 25 and over with at least an Associate’s degree</p> <p>2050: 64.9 percent of the population in the region age 25 and over with at least an Associate’s degree</p> <div data-bbox="443 1329 1398 1902" data-label="Figure"> <p style="text-align: center;">Percent of population (age 25 and over) with an Associate's Degree or higher, 2010-2050, with targets</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>2010</td> <td>41.7%</td> </tr> <tr> <td>2015</td> <td>44.3%</td> </tr> <tr> <td>2025</td> <td>50.2%</td> </tr> <tr> <td>2050</td> <td>64.9%</td> </tr> </tbody> </table> </div> <p>Source: U.S. Census Bureau American Community Survey data.</p>	Year	Percentage	2010	41.7%	2015	44.3%	2025	50.2%	2050	64.9%
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Methodology:	<p>In 2015, approximately 44 percent of the regional population age 25 and over held an Associate’s degree or higher; this exceeds the national average of 39 percent. Data from the ACS show that higher education levels are generally on the rise, in the region and nationwide. Between 2009-14, the proportion of the region’s residents holding an Associate Degree or higher has increased by an average .59 percentage points per year, ahead of the national average of .51 percentage points per year. The goal is to maintain the current growth rate in educational attainment as it relates to higher education, providing the basis for the 2025 and 2050 targets.</p>
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Workforce Participation

Indicator:	<p>This value represents the percentage of the regional population age 20- 64 that is either working or actively looking for work. Data are from the American Community Survey (ACS) and represent the seven-county CMAP region. There are many caveats to note when analyzing workforce participation statistics.</p> <p>An increase in workforce participation is generally viewed as a positive indicator of regional economic opportunity. Increased participation suggests a decrease in the number of discouraged workers -- individuals who are able to work but currently unemployed, and have not searched for employment in the last four weeks due to a lack of suitable options or a lack of success through previous job applications. However, workforce participation is a complex measure because it tracks both the number of employed persons and unemployed persons currently looking for work. Thus an increase in unemployment can register as an increase in workforce participation. Similarly, decreases in workforce participation may be due to an increase in the number of discouraged job seekers, or to an increase in the number of people choosing to retire early or leave the workforce for other reasons. Even with these caveats, an increase in workforce participation is generally indicative of a healthy economy.</p>
Targets:	<p>2025: Regional workforce participation rate of 80.9 percent</p> <p>2050: Regional workforce participation rate of 83.2 percent</p>



Source: U.S. Census Bureau American Community Survey data.

Methodology: The Chicago region experienced a 0.6 percentage point decrease in its workforce participation rate between 2010-15, despite the region’s ongoing recovery from the most recent recession. Among peer metropolitan areas, fluctuations in workforce participation rates tend to mirror each other, suggesting that macroeconomic factors contribute heavily to such trends. The goal for the Chicago region is to return to its previous 10-year high of an 80.9 percent workforce participation rate by 2025 and then maintain this steady annual growth rate of 0.1 percentage points through 2050.

Employment in STEM Occupations

<p>Indicator:</p>	<p>Data from the Bureau of Labor Statistic’s Quarterly Census of Employment and Wages are used to estimate employment in science, technology, engineering, and mathematics fields in the seven-county CMAP region. The occupations specified for this indicator reflect the STEM occupations as defined by the federal Standard Occupational Classification (SOC) Policy Committee in 2010.</p> <p>This indicator helps to measure a region's capacity for innovation; a creative workforce plays an essential role in spurring economic growth. Previously, CMAP used private sector R&D employment to measure innovation, but this measure was too narrowly focused and missed crucial industries engaged in innovation. This updated indicator includes 166 detailed occupations, resulting in a much more accurate estimate of the region’s innovative landscape.</p>
<p>Targets:</p>	<p>2025: 12.8 percent of all jobs in the region in STEM occupations</p> <p>2050: 13.4 percent of all jobs in the region in STEM occupations</p>

	<div data-bbox="444 155 1398 726" data-label="Figure"> <table border="1"> <caption>Share of STEM Occupations in the Chicago region, 2010-2050, with targets</caption> <thead> <tr> <th>Year</th> <th>Share of STEM Occupations (%)</th> </tr> </thead> <tbody> <tr> <td>2010</td> <td>12.4%</td> </tr> <tr> <td>2015</td> <td>12.5%</td> </tr> <tr> <td>2025</td> <td>12.8%</td> </tr> <tr> <td>2050</td> <td>13.4%</td> </tr> </tbody> </table> </div> <p data-bbox="444 730 1192 768">Source: Economic Modeling Specialists International data.</p>	Year	Share of STEM Occupations (%)	2010	12.4%	2015	12.5%	2025	12.8%	2050	13.4%
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Methodology:	<p>The Chicago region experienced a 0.12 percentage point increase in the share of STEM occupations between 2010 and 2017. Despite the Chicago region’s diverse industry mix and exceptional education and research institution, regional STEM employment closely mirrors that of the U.S. overall. In 2017, 12.5 percent of workers in the Chicago region filled positions in STEM occupations, compared with 12.7 percent nationwide. However, regional STEM employment lags behind other peer metropolitan areas, such as Boston, New York, and Washington, D.C. Over the past seven years, the share of STEM employment in the Chicago region grew by an average of 0.017 percentage points annually. Targets are based on the goal to double the region’s annual growth rate to 0.034 percentage points per year through 2025, and then to maintain robust STEM activity by matching the U.S. annual growth rate of 0.024 percentage points per year.</p>										

Venture Capital Funding

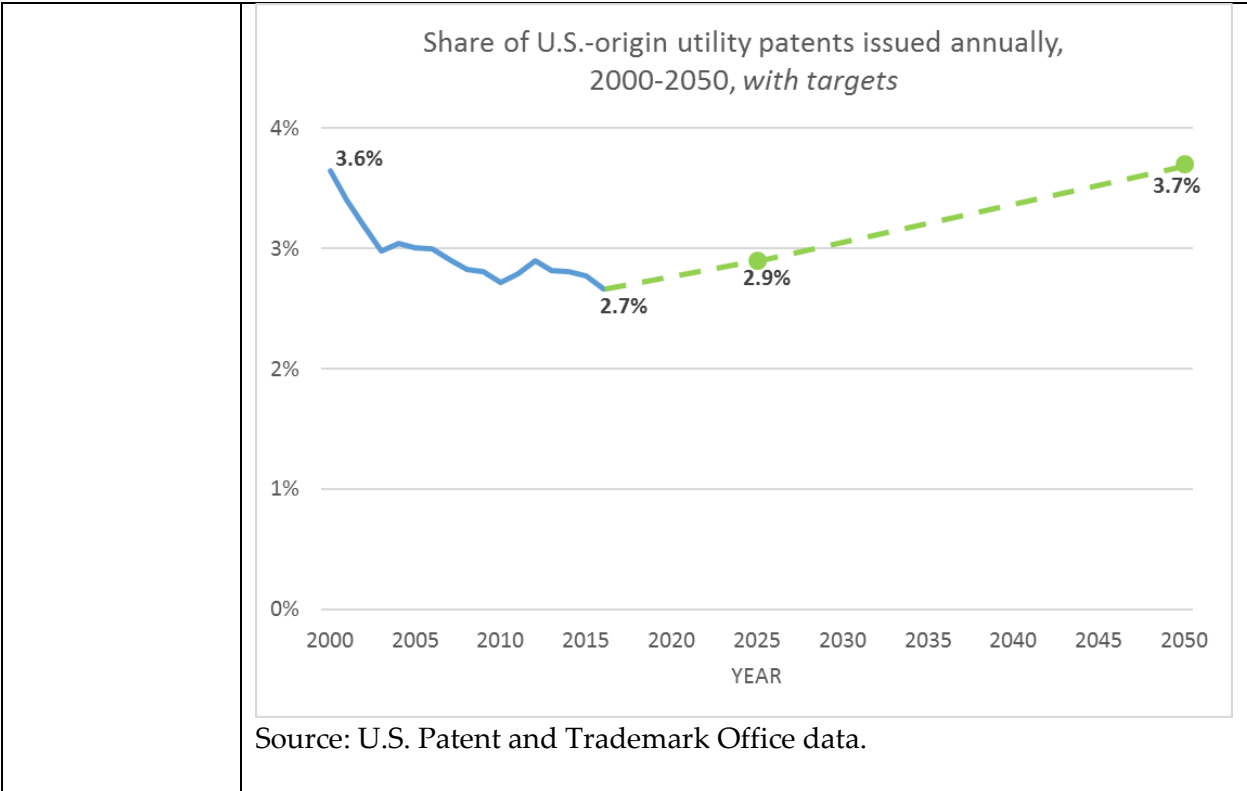
Indicator:	<p>This indicator measures the State of Illinois’ share of total U.S. venture capital deals. Innovation in new goods, services, and technologies drives economic growth, but related research, creation, and marketing costs can be substantial. Investors support high-risk, high-growth startup companies through venture capital deals.</p> <p>As a private financial transaction undertaken between two parties, government agencies do not track venture capital funding. Several private organizations track this activity by estimating both the number of deals made and dollar value of deals within various geographies. The data used in this indicator are produced by Thomson Reuters and published by PricewaterhouseCoopers (PwC), representing a “best guess” of venture</p>
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	<p>capital activity by region and state. PwC does not track data specifically for the Chicago region, but most of the venture capital funding in the state flows to northeastern Illinois. The targets below focus on the number of VC deals rather than their value because one or two high-value deals can significantly skew state and regional data.</p>																																						
<p>Targets:</p>	<p>2025: The State of Illinois should account for 5.5 percent of all U.S. venture capital deals.</p> <p>2050: The State of Illinois should account for 5.5 percent of all U.S. venture capital deals.</p> <div data-bbox="443 590 1414 1251" data-label="Figure"> <table border="1"> <caption>Illinois share of U.S. venture capital deals, 2002-2050, with targets</caption> <thead> <tr> <th>Year</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr><td>2002</td><td>1.1%</td></tr> <tr><td>2003</td><td>1.8%</td></tr> <tr><td>2004</td><td>1.5%</td></tr> <tr><td>2005</td><td>1.5%</td></tr> <tr><td>2006</td><td>1.9%</td></tr> <tr><td>2007</td><td>1.5%</td></tr> <tr><td>2008</td><td>1.8%</td></tr> <tr><td>2009</td><td>1.0%</td></tr> <tr><td>2010</td><td>2.5%</td></tr> <tr><td>2011</td><td>3.1%</td></tr> <tr><td>2012</td><td>2.5%</td></tr> <tr><td>2013</td><td>2.4%</td></tr> <tr><td>2014</td><td>2.5%</td></tr> <tr><td>2015</td><td>2.1%</td></tr> <tr><td>2016</td><td>2.5%</td></tr> <tr><td>2017</td><td>2.8%</td></tr> <tr><td>2025</td><td>5.5%</td></tr> <tr><td>2050</td><td>5.5%</td></tr> </tbody> </table> </div> <p>Source: PricewaterhouseCoopers MoneyTree report.</p>	Year	Share (%)	2002	1.1%	2003	1.8%	2004	1.5%	2005	1.5%	2006	1.9%	2007	1.5%	2008	1.8%	2009	1.0%	2010	2.5%	2011	3.1%	2012	2.5%	2013	2.4%	2014	2.5%	2015	2.1%	2016	2.5%	2017	2.8%	2025	5.5%	2050	5.5%
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<p>Methodology:</p>	<p>Since the mid-1990s, the state of Illinois has account for 1-3 percent of all VC deals in the U.S. Trends show that the Midwest (defined as Illinois, Indiana, Michigan, Missouri, Ohio, Wisconsin, and western Pennsylvania) is accounting for an increasing proportion of total VC deals; however, Illinois' proportion of deals has not kept pace. In 2002, the Midwest accounted for 3.9 percent of all VC deals; by 2016, this proportion increased to 7.5 percent -- an average 0.3 percentage point increase per year. The goal for 2025 is to increase the number of VC deals in the state such that Illinois' share of total U.S. VC deals accounts for 0.3 percentage points more per year than the previous year. This growth is equivalent to the overall growth rate experienced by the Midwest, and mirrors the increases seen by peer regions such as Northern California and New York. Because venture capital deal making is partially driven by industry mix, the goal for the Chicago region will be to reach 5.5 percent of all VC deals nationwide by</p>																																						

	2025, and then maintain this level of robust investment activity and availability into 2050.
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Number of Patents Issued Annually

<p>Indicator:</p>	<p>This indicator measures utility patent output; these are commonly referred to as “patents for invention.” According to the U.S. Patent and Trademark Office (USPTO), utility patents may be granted “to anyone who invents or discovers any new or useful process, machine, article of manufacture, or composition of matter, or any new or useful improvement thereof.” High levels of patent production generally indicate an innovative region supported by an educated workforce with a strong capacity to conduct research and development. Patent output data are available annually from the USPTO.</p> <p>While this indicator reports the number of patents issued annually in the region, the target values are measured as the share of total U.S. patents issued in northeastern Illinois. This allows benchmark comparisons to peer regions and national trends.</p>
<p>Targets:</p>	<p>2025: 2.9 percent of U.S. origin patents should be issued in northeastern Illinois. This is equivalent to our region’s current “fair share” of patents (i.e., a patent output share/population share ratio equal to 1.00)</p> <p>2050: 3.7 percent of U.S. origin patents should be issued in northeastern Illinois. This represents the goal of achieving 26 percent more than our region’s current “fair share” of patent output (i.e., a ratio patent of output share/population share equal to 1.26).</p>



Methodology: The majority of new patents are issued to residents and businesses in metropolitan areas, with the total number of patents correlated with their regional population. In 2016 the Chicago MSA accounted for 2.9 percent of the U.S. population, but only 2.7 percent of total patent output originating in the U.S. Thus, the region’s patent output share divided by its population share ratio equaled 0.92. The region’s “fair share” of patents for 2016 was 2.9 percent (equivalent to its population share). The goal for 2025 is for the region to increase its patent output to meet its 2016 “fair share” of patent output – 2.9 percent.

The top 25 most populous metro areas account for 42.4 percent of the U.S. population and 53.6 percent of the nation’s patents. In other words, they produce 26 percent more than their “fair share” of patents. The goal for 2050 is for our region to match the patent output rate of the top 25 metropolitan areas and to have a patent output share that is 26 percent more than the region’s share of national population. The 2050 target is for the region to produce 3.7 percent of the nation’s patents, a 26 percent increase over the 2025 target.

Manufacturing Exports (*kindred*)

Indicator: This measure is based on CMAP’s drill-down [analysis](#) of manufacturing data. It links directly to ON TO 2050’s call for organizing regional economic and workforce development efforts around [specialized industry clusters](#). Historically, manufacturing has been a key driver of economic growth in the Chicago region.

The data from the U.S. Census Bureau’s Origin of Movement series attributes export sales to metropolitan areas based on the ZIP code in which payment for a good is received. Data specifically for manufactured goods can be obtained by summing the total of all manufacturing NAICS codes (31-33). The geography for this data is the Chicago-Naperville-Elgin metropolitan statistical area.

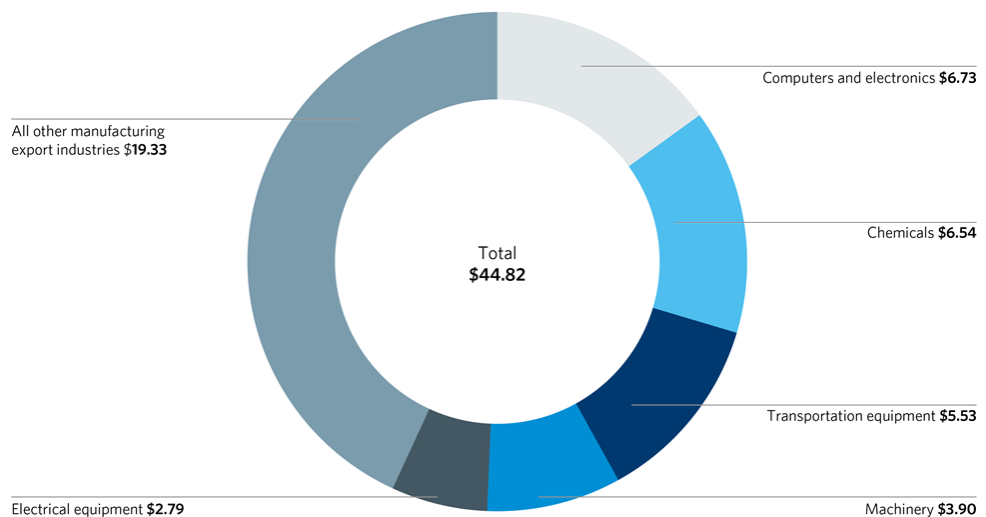
Targets:

Not applicable. As a kindred indicator, CMAP will not specify targets for manufacturing exports in the ON TO 2050 plan.

<i>Chicago Manufacturing Exports Value (\$ Billions)</i>	
2005	\$ 31.86
2006	\$ 34.46
2007	\$ 35.13
2008	\$ 39.26
2009	\$ 31.25
2010	\$ 36.72
2011	\$ 41.78
2012	\$ 42.01
2013	\$ 45.84
2014	\$ 47.55
2015	\$ 44.82

Chicago metropolitan statistical area (MSA) major manufacturing export industries, 2015,
in billions of dollars

Source: Chicago Metropolitan Agency for Planning analysis of U.S. Census Bureau data.



Next Steps

Following committee review and discussion of the above list of proposed indicators and targets, staff will adjust the list as needed to incorporate feedback – by modifying or eliminating indicators, or by adding new ones if necessary. Once finalized, the indicators will be compiled into a final list of indicators and targets covering the full range of topics in ON TO 2050.