THE U.S. AND MICHIGAN ECONOMIC OUTLOOK
FOR 2018–2020

PREPARED FOR PRESENTATION AT THE
CONSENSUS REVENUE ESTIMATING CONFERENCE

LANSING, MICHIGAN
MAY 16, 2018

BY

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“The Michigan Model”
Employment Cost Growth

Core Inflation Trending Up
Monetary Policy: Steady Tightening

➢ Federal funds rate path consistent with our outlook:
  • Latest rate hike in March, 2018
  • Three more 25 basis point hikes in 2018, three in 2019
    ▪ The latest Fed “dot plot” has only two more hikes

➢ New leadership at the Fed
  • Jerome Powell leadership style not yet clear. Continuity expected.
  • Four open seats at the Board of Governors
Market Interest Rates

Fiscal Policy—A Major Boost to the Outlook

➢ Tax Cuts and Jobs Act
  • $1.5 trillion in new deficits over 2018–27
  • Boosted our GDP forecast by ~0.2pp in 2018–19

➢ Bipartisan Budget Act of 2018 & The Omnibus
  • Authorized almost $300 billion in new spending during fiscal 2018–19
  • More than 12 percent increase in discretionary caps compared to 2017
  • It will take time to ramp up government spending
  • Lifted our GDP forecast by 0.2pp in 2018, 0.3pp in 2019, and 0.1pp in 2020
Federal Budget, NIPA Basis
(Billions of Dollars)

<table>
<thead>
<tr>
<th></th>
<th>FY'17</th>
<th>FY'18</th>
<th>FY'19</th>
<th>FY'20</th>
<th>FY'21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current receipts</td>
<td>3560.8</td>
<td>3612.7</td>
<td>3749.5</td>
<td>3951.1</td>
<td>4183.1</td>
</tr>
<tr>
<td>% change</td>
<td>3.0</td>
<td>1.5</td>
<td>3.8</td>
<td>5.4</td>
<td>6.1</td>
</tr>
<tr>
<td>Current expenditures</td>
<td>4217.3</td>
<td>4462.3</td>
<td>4740.3</td>
<td>4994.9</td>
<td>5208.4</td>
</tr>
<tr>
<td>% change</td>
<td>2.4</td>
<td>5.8</td>
<td>6.2</td>
<td>5.4</td>
<td>4.7</td>
</tr>
<tr>
<td>Consumption</td>
<td>971.4</td>
<td>1012.5</td>
<td>1098.4</td>
<td>1156.7</td>
<td>1152.3</td>
</tr>
<tr>
<td>% change</td>
<td>0.8</td>
<td>4.2</td>
<td>8.5</td>
<td>5.3</td>
<td>1.7</td>
</tr>
<tr>
<td>Transfer payments</td>
<td>2693.5</td>
<td>2811.2</td>
<td>2932.2</td>
<td>3054.4</td>
<td>3190.8</td>
</tr>
<tr>
<td>% change</td>
<td>2.4</td>
<td>4.4</td>
<td>4.3</td>
<td>4.2</td>
<td>4.4</td>
</tr>
<tr>
<td>Surplus (+) or deficit (-)</td>
<td>-656.4</td>
<td>-849.5</td>
<td>-990.8</td>
<td>-1043.8</td>
<td>-1025.2</td>
</tr>
<tr>
<td>Percent of GDP</td>
<td>-3.4</td>
<td>-4.2</td>
<td>-4.7</td>
<td>-4.7</td>
<td>-4.5</td>
</tr>
</tbody>
</table>

RSQE: May 2018

Price of Oil
(West Texas Intermediate Crude)

<table>
<thead>
<tr>
<th>Year</th>
<th>Dollars/Barrel</th>
<th>Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>43.3</td>
<td>49.3</td>
</tr>
<tr>
<td>2017</td>
<td>49.3</td>
<td>55.4</td>
</tr>
<tr>
<td>2018</td>
<td>55.4</td>
<td>62.9</td>
</tr>
<tr>
<td>2019</td>
<td>62.9</td>
<td>67.0</td>
</tr>
<tr>
<td>2020</td>
<td>67.0</td>
<td>64.0</td>
</tr>
</tbody>
</table>

4th Quarter to 4th Quarter % Change

<table>
<thead>
<tr>
<th></th>
<th>WTI</th>
<th>Import*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>16.9</td>
<td>5.1</td>
</tr>
<tr>
<td>2017</td>
<td>12.4</td>
<td>21.8</td>
</tr>
<tr>
<td>2018</td>
<td>17.3</td>
<td>23.6</td>
</tr>
<tr>
<td>2019</td>
<td>-0.2</td>
<td>-0.9</td>
</tr>
<tr>
<td>2020</td>
<td>1.9</td>
<td>1.6</td>
</tr>
</tbody>
</table>

*Implicit deflator for petroleum & products

RSQE: May 2018
Growth of Nonresidential Fixed Investment

Level in 2017 (billions of chained 2009 dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Equipment</th>
<th>Structures</th>
<th>Intellectual Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>2314.2</td>
<td>1098.1</td>
<td>471.5</td>
<td>748.8</td>
</tr>
</tbody>
</table>

Housing Market

A. Housing Starts

<table>
<thead>
<tr>
<th>Year</th>
<th>Singles</th>
<th>Multis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>0.78</td>
<td>0.39</td>
<td>1.11</td>
</tr>
<tr>
<td>2017</td>
<td>0.65</td>
<td>0.36</td>
<td>1.21</td>
</tr>
<tr>
<td>2018</td>
<td>0.90</td>
<td>0.41</td>
<td>1.31</td>
</tr>
<tr>
<td>2019</td>
<td>0.95</td>
<td>0.39</td>
<td>1.34</td>
</tr>
<tr>
<td>2020</td>
<td>0.96</td>
<td>0.38</td>
<td>1.34</td>
</tr>
</tbody>
</table>

B. Existing Home Sales*

<table>
<thead>
<tr>
<th>Year</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>4.83</td>
<td>4.91</td>
<td>4.91</td>
<td>4.93</td>
<td>4.91</td>
</tr>
</tbody>
</table>

*Single-family homes

RSQE: May 2018
Brief Thoughts on China Trade Tensions

➢ China’s current role in global supply chains: point of assembly

➢ China runs significant goods trade deficit with Australia, Brazil, Germany, Japan, South Korea, Switzerland

➢ And significant goods trade surplus with the United States

➢ Significant tariffs targeting China will lower trade with China, but might not narrow the trade deficit much
  ▪ Supply chains will adjust eventually
  ▪ Transshipping is hard to police when tariffs only target one country

➢ Raising trade barriers is unlikely to make up even a fraction of jobs lost due to globalization.
Limited China Escalation Scenario

- $50 billion of Chinese and US goods subject to 25% bilateral tariffs
- Short-term, U.S. trade deficit shrinks by ~$25 billion
  - Returns to baseline path in the longer-run
- Overall consumer price level goes up by 0.1 percentage points
- Investment prices for equipment jump by 1 percentage point
- Slower consumption and investment undo GDP boost from net exports
- Medium-term growth is weaker due to net exports rising back to trend
- About 200,000 jobs and 0.3 percent of GDP lost through 2021
Risks to Our Outlook

➢ Oil Prices and Geopolitical Risks
➢ Fiscal Policy
➢ Monetary Policy
➢ Trade Policy
➢ Abnormal weather

RSQE: May 2018

The Michigan Economic Outlook
For 2018–2020

Consensus Revenue Estimating Conference
Lansing, MI
May 16, 2018

Research Seminar in Quantitative Economics
U.S. Light Vehicle Sales, 1990–2020

U.S. Light Vehicle Sales
Total vs. Detroit Three, 2016–2020

RSQE: May 2018
Annual Job Growth in Michigan, 1991–2020
Government Sector

Michigan Total Jobs and Detroit Three Sales of Light Vehicles, 1991–2020
Michigan Wage and Salary Employment
First Quarter of 2000 to Fourth Quarter of 2020

Thousands of Payroll Jobs

Peak '00q2

Gain:
'09q3−'20q4 = 701,600
(82% of jobs lost)

Forecast
'20q4.

Loss: '00q2−'09q3
= 859,300

Trough '09q3

Alternative Measures of Labor Underutilization
Michigan, 2016 and 2017

Percent

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>U-3</td>
<td>5.0</td>
<td>4.6</td>
</tr>
<tr>
<td>U-4</td>
<td>5.3</td>
<td>4.9</td>
</tr>
<tr>
<td>U-5</td>
<td>6.0</td>
<td>5.6</td>
</tr>
<tr>
<td>U-6</td>
<td>10.3</td>
<td>9.1</td>
</tr>
</tbody>
</table>

U-3: Official unemployment rate
U-4: Unemployed (U-3) + discouraged workers
U-5: U-4 + all other marginally attached workers
U-6: U-5 + employed part-time for economic reasons

RSQE: May 2018
Michigan Inflation and Income Growth, 2016–2020

- Detroit CPI
  - 2016: 1.6
  - 2017: 2.1
  - 2018: 2.1
  - 2019: 1.7
  - 2020: 1.8

- Personal Income
  - 2016: 2.8
  - 2017: 2.6
  - 2018: 4.4
  - 2019: 4.6
  - 2020: 4.5

- Real Disposable Income
  - 2016: 1.3
  - 2017: 0.4
  - 2018: 2.7
  - 2019: 2.7
  - 2020: 2.4

RSQE: May 2018
<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>'17–'18</th>
<th>'18–'19</th>
<th>'19–'20</th>
<th>'17–'20</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL JOBS (Number of persons)</td>
<td>4,372.5</td>
<td>54.5</td>
<td>43.5</td>
<td>47.8</td>
<td>146.0</td>
</tr>
<tr>
<td>(Annual percentage change)</td>
<td>(1.2)</td>
<td>(1.2)</td>
<td>(1.0)</td>
<td>(1.1)</td>
<td>(3.3)</td>
</tr>
<tr>
<td>TOTAL GOVERNMENT</td>
<td>604.2</td>
<td>4.3</td>
<td>3.7</td>
<td>5.7</td>
<td>13.7</td>
</tr>
<tr>
<td>TOTAL PRIVATE</td>
<td>3768.3</td>
<td>50.2</td>
<td>39.9</td>
<td>42.1</td>
<td>132.1</td>
</tr>
<tr>
<td>Natural resources and mining</td>
<td>7.2</td>
<td>0.2</td>
<td>0.0</td>
<td>-0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Construction</td>
<td>162.8</td>
<td>10.2</td>
<td>5.8</td>
<td>6.3</td>
<td>22.2</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>614.7</td>
<td>1.1</td>
<td>3.0</td>
<td>4.1</td>
<td>8.1</td>
</tr>
<tr>
<td>Trade, transportation and utilities</td>
<td>788.8</td>
<td>5.9</td>
<td>7.7</td>
<td>8.3</td>
<td>21.9</td>
</tr>
<tr>
<td>Information</td>
<td>56.4</td>
<td>-1.2</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-2.2</td>
</tr>
<tr>
<td>Financial activities</td>
<td>218.0</td>
<td>2.2</td>
<td>2.7</td>
<td>2.4</td>
<td>7.3</td>
</tr>
<tr>
<td>Professional and business services</td>
<td>648.0</td>
<td>13.7</td>
<td>10.3</td>
<td>10.2</td>
<td>34.1</td>
</tr>
<tr>
<td>Private education and health services</td>
<td>671.1</td>
<td>5.4</td>
<td>4.8</td>
<td>3.8</td>
<td>14.0</td>
</tr>
<tr>
<td>Leisure and hospitality</td>
<td>433.3</td>
<td>9.5</td>
<td>5.2</td>
<td>6.7</td>
<td>21.4</td>
</tr>
<tr>
<td>Other services</td>
<td>168.0</td>
<td>3.3</td>
<td>0.9</td>
<td>1.0</td>
<td>5.2</td>
</tr>
</tbody>
</table>
Michigan Automotive Industry Update

Kristin Dziczek | Vice President
Center for Automotive Research
CREC
16 May 2018

AGENDA

• Sales, Production & Employment
• Automaker Investments
• Trade
• Meridian
Sales, Production & Employment

CAR's U.S. Light Vehicle Sales Forecast 2018-2025

Source: CAR Research, April 2018
U.S. Light Vehicle Sales
Percent Change (YTD) Through April: 2018 vs. 2017

U.S. Market Share: YTD April 2018
2018 YTD Light Vehicle Production:
Michigan Ranks 1st in the U.S.; 3rd in NAFTA Region

Michigan produces proportionately more pickups & SUVs than the U.S. market buys.
Michigan engine production was down; transmission production up between 2016-2017.

Michigan Powertrain Production Forecasts: 2017 to 2024

Michigan motor vehicle & parts employment is up 49% from January 2009, but flat over the past 12 months.
Michigan automaker investments greater than Mexico since 2009.
North American Announced Automaker Investment by Region 2009 to Q1 2013

<table>
<thead>
<tr>
<th>Region</th>
<th>Investment Amount ($USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>$7.1B</td>
</tr>
<tr>
<td>United States</td>
<td>$89.3B</td>
</tr>
<tr>
<td>U.S. Great Lakes</td>
<td>$56.3B</td>
</tr>
<tr>
<td>Michigan</td>
<td>$28.1B</td>
</tr>
<tr>
<td>South</td>
<td>$20.4B</td>
</tr>
<tr>
<td>Mexico</td>
<td>$24.8B</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$119.5B</strong></td>
</tr>
</tbody>
</table>

Note: U.S. Great lakes includes: IL, IN, KY, MI, MO, and OH
South includes: AL, FL, GA, MS, SC, TN, and TX
Automaker Announced Investment: Michigan vs. Other States Q1 2018

Michigan Announced Investment, 2009 to Q1 2018

- Billion
- Share of U.S.


Share of N.A. Announced Automaker Investment by Region, Q1 2018

- Kentucky: 1%
- Kansas: 15%
- Tennessee: 20%
- Michigan: 64%

Michigan New & Major Change Launches

- 2018: Lansing Grand River
- 2019: Flat Rock
- 2020: Warren Truck
- 2021: Flat Rock
- 2022: Lansing Grand River
- 2023: Detroit-Hamtramck

Launches:
- Lansing Grand River: Cadillac CT4 & CT5
- Flat Rock: Flat Rock
- Warren Truck: Jeep Grand Wagoneer, Jeep Wagoneer
- Flat Rock: Ford C-Max EV
- Lansing Grand River: GAC Sierra HD
- Detroit-Hamtramck: Cadillac CT6
Trade Update

Top Ten U.S. States by Automotive Exports in Dollar Terms:
Michigan Motor Vehicle Exports Grew 9.2% in 2017

- 2363 Motor Vehicles
- 3362 Vehicle Body and Trailer
- 3363 Auto Parts

The actual destination for Michigan exports are Mexico and Canada.
Standard U.S. Tariffs On Imported Steel, Aluminum, Automotive Parts & Passenger Cars/Trucks Under WTO

**Most-Favored-Nation Tariff Rates**
- Steel—0%
- Aluminum—0-6%
- Automotive Parts—2.5%
- Passenger Cars—2.5%
- Pickup Trucks/Cargo Vehicles—25%

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**Global Tariffs and Light Vehicle Imports**

**Tariff on imported cars**
- Japan: 0%
- South Korea: 6%
- European Union: 10%
- China: 25%
- United States: 25%

**Share of car sales that are imported**
- United States: 26.2%
- China: 4.2%
- Mexico: 24.8%
- Other Sources: 0%

*Sources: U.S. Automotive*
NAFTA Background

- Enacted in 1994, NAFTA eliminated tariffs and created a unified trading region
- Canada & Mexico responsible for half of U.S. light vehicle imports
- NAFTA makes North America a globally competitive and complete auto region
- Every global automotive region relies on low-cost content

The United States cannot self-supply.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Production</td>
<td>11 million</td>
</tr>
<tr>
<td>less U.S. Exports</td>
<td>- 2.4 million</td>
</tr>
<tr>
<td>plus U.S. Imports</td>
<td>+ 8.7 million</td>
</tr>
<tr>
<td><strong>U.S. Sales</strong></td>
<td><strong>17.3 million</strong></td>
</tr>
</tbody>
</table>
Sourcing of U.S. Light Vehicle Sales in 2017

A competitive automotive industry is good for consumers.

U.S. Consumer Price Indices for All Items Except Food & Energy and New Vehicles, 1990-2017
Overview of U.S. Proposal

- Increases Regional Value Content (RVC) from 62.5%—already the highest of any U.S. trade agreement
- Institutes an RVC for steel and aluminum content
- Institutes a Labor Value Content (LVC) requirement for a share of work to be done at or above a specified wage

Not everything traded in NAFTA Region uses NAFTA preferential rates

<table>
<thead>
<tr>
<th>YEAR: 2017 in USD Billions</th>
<th>NAFTA</th>
<th>Civil Aircraft</th>
<th>No Program Claimed</th>
<th>Total</th>
<th>NAFTA Share of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada Motor Vehicles</td>
<td>43.6</td>
<td>-</td>
<td>0.7</td>
<td>44.3</td>
<td>98.60%</td>
</tr>
<tr>
<td>Motor vehicle Bodies &amp; Trailers</td>
<td>0.5</td>
<td>-</td>
<td>0.4</td>
<td>0.9</td>
<td>16.00%</td>
</tr>
<tr>
<td>Motor Vehicle Parts</td>
<td>11.1</td>
<td>0.04</td>
<td>2.0</td>
<td>13.2</td>
<td>34.37%</td>
</tr>
<tr>
<td>Canada Total</td>
<td>55.2</td>
<td>0.04</td>
<td>3.1</td>
<td>58.4</td>
<td>96.50%</td>
</tr>
<tr>
<td>Mexico Motor Vehicles</td>
<td>57.5</td>
<td>-</td>
<td>0.1</td>
<td>57.7</td>
<td>99.62%</td>
</tr>
<tr>
<td>Motor vehicle Bodies &amp; Trailers</td>
<td>0.01</td>
<td>-</td>
<td>1.4</td>
<td>1.5</td>
<td>2.52%</td>
</tr>
<tr>
<td>Motor Vehicle Parts</td>
<td>34.6</td>
<td>0.01</td>
<td>10.3</td>
<td>45.0</td>
<td>75.90%</td>
</tr>
<tr>
<td>Mexico Total</td>
<td>92.2</td>
<td>0.01</td>
<td>11.8</td>
<td>104.2</td>
<td>85.50%</td>
</tr>
<tr>
<td>CANADA/MEXICO TOTAL</td>
<td>147.5</td>
<td>0.1</td>
<td>15.0</td>
<td>162.6</td>
<td>90.70%</td>
</tr>
</tbody>
</table>

Source: U.S. International Trade Commission
China, Japan & South Korea Could Replace Canada & Mexico to be U.S.'s Largest Automotive Parts Importers

<table>
<thead>
<tr>
<th>2017 Total U.S. auto parts imports: $108.8B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico: $45.7B</td>
</tr>
<tr>
<td>Canada: $14.0B</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mexico</th>
<th>Canada</th>
<th>Next Largest Importers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engines &amp; Parts</td>
<td>38%</td>
<td>21%</td>
<td>Japan 11% Germany 4% China 5%</td>
</tr>
<tr>
<td>Transmission &amp; Powertrain Parts</td>
<td>35%</td>
<td>13%</td>
<td>Japan 18% China 8% South Korea 7%</td>
</tr>
<tr>
<td>Electrical &amp; Electronic (excl. Lighting)</td>
<td>52%</td>
<td>2%</td>
<td>China 11% Japan 8% Taiwan 8%</td>
</tr>
<tr>
<td>Steering &amp; Suspension Parts</td>
<td>40%</td>
<td>10%</td>
<td>Japan 21% China 7% South Korea 7%</td>
</tr>
<tr>
<td>Seating &amp; Interior Trim</td>
<td>64%</td>
<td>10%</td>
<td>UK 6% China 6% Germany 3%</td>
</tr>
<tr>
<td>Brake Systems</td>
<td>31%</td>
<td>8%</td>
<td>China 31% Japan 6% Germany 5%</td>
</tr>
<tr>
<td>Metal Stampings</td>
<td>18%</td>
<td>18%</td>
<td>Taiwan 20% China 18% South Korea 9%</td>
</tr>
<tr>
<td>Other Motor Vehicle Parts</td>
<td>38%</td>
<td>18%</td>
<td>China 18% South Korea 7% Japan 6%</td>
</tr>
</tbody>
</table>

Source: U.S. International Trade Commission

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Results:
At least 22 and as many as 40 vehicle nameplates that currently qualify under NAFTA would not qualify under the U.S. proposal CAR evaluated.

CAR estimates that the U.S. proposal as of 26 April 2018 would:

- Add USD 2.1-3.8 billion to the cost of light vehicles in the United States
- Averages USD 470-2,200 to the cost of these particular vehicles
- Assuming manufacturers pass through increased costs, result in an estimated 60,000-150,000 lost U.S. light vehicle sales
Timeline and Phase-In

- 2-year, 3-year, or 4-year transition periods are inadequate
- Minimum time to launch new assembly capacity is 3 years once the decision has been made
- Adjusting and re-sourcing the supply chain also takes time
- And all of this might cost more than the 2.5% MFN tariff

U.S., Canadian, and Mexican Free Trade Reach
Share of the New Motor Vehicle Market That Can Be Reached Tariff-Free 2016 Market; Free Trade Agreements in Place as of March 2018

United States: 28%
Canada: 53%
Mexico: 51%

- U.S.
- Canada
- Mexico
- Other FTAs
- CPTPP
- Rest of World

Source: Data is based on information included in the United States' CPTPP agreement with Mexico and other NAFTA parties.
NAFTA & Steel/Aluminum Tariffs

- Removing the exclusion for Canada and Mexico would endanger NAFTA.
- Canada is among the top 5 countries that import rolled steel products and bar and ingot steel to the U.S. and the number one import source for unwrought, bar, and sheet aluminum.
- Mexico is a top 5 rolled steel exporter to the U.S.
U.S. Steel was already highly protected from imports

- As of April 19, 2017, the U.S. has 152 antidumping (AD) and countervailing duty (CVD) orders in place on steel from 32 countries.
- Twenty-eight of the 152 orders (18%) are on steel products from China – 16 AD and 12 CVD.
- The steel orders represent almost 40 percent of all AD/CVD orders in place.
- There are also 25 investigations underway for steel products, 16 in which Commerce has yet to issue final determinations and 9 investigations (on cut-to-length plate) for which Commerce has issued final determinations and are waiting for final determinations from the International Trade Commission.

Special restrictions already cover 94 percent of steel imports from China, which now make up only 3 percent of all US steel imports.
Conclusions

- The steel & aluminum tariffs may impact the automotive supply chain more than automakers themselves.
- Suppliers could move work to:
  - A FTZ (tariff inversion in effect) or
  - Outside the United States since imported articles, parts & components made of steel or aluminum are not subject to the tariff.
- There are more workers in steel- and aluminum-consuming industries than there are in metals production in the United States.
- The last broad steel tariffs under President Bush lasted 18 months.
Impact of Meridian Fire

Material Percentage Use by Year, 2010 to 2040

- Mild Steel
- HSLA: High Strength Low Alloy
- HSS: High Strength Steel
- AHSS: Advanced High Strength Steel
- UHSS: Ultra High Strength Steel
- Boron/Martensite
- AL 5000/6000: Alclad 5000/6000
- Aluminum/High Strength
- Mg: Magnesium
- CFRP/Comp: Composite

Note: Between 2010 and 2020 the mix of materials represents the mix throughout the industry as some vehicles in the fleet still use predominantly mild or lower grade steels, while few higher-end vehicles use extra-high strength steels with aluminum. Automotive engineers want the right material at the right place but are currently constrained with issues such as mixed-material joining, supply chain risk, footrest design, etc. In the future, no single material wins the race to lightweighting in fleet vehicles and have highly optimized mixed-material body structures; therefore, from 2020 to 2040 the material percentages represent material mix in a single vehicle.

Source: CAFI Research
Thank you

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