



DUCKER WORLDWIDE

*Advancing Growth*

# **2015 North American Light Vehicle Aluminum Content Study**

**Executive Summary  
June 2014**



[drivealuminum.org](http://drivealuminum.org)

## 2015 Key Findings

### In 2015:

- Pickup trucks will contain the most aluminum at 548.9 lbs. per vehicle, followed closely by E Segment sedans at 546.9 lbs., SUVs at 410.3 lbs. and minivans at 396.5 lbs. All other segments will be below the average content of 394 pounds per vehicle.
- Tesla, Mercedes, BMW and Ford will all exceed the average aluminum content and the average aluminum share of curb weight.
- The F-150 will contain 1,080 pounds of aluminum. Aluminum sheet and extruded products for the body and closures are over one half of this content.
- The total aluminum content for the 17.46 million vehicles of expected production will equal nearly 7 billion pounds. Body and closure parts will be 11% of the total.
- Total North American light vehicle aluminum consumption will increase by 28% in 2015 over 2012.
- Consumption will surpass all records set in previous decades by one billion pounds.
- Aluminum hood penetration will increase from 34% in 2012 to 48% in 2015.
- More than 500,000 pickup trucks and EV's (a combined total) will have complete aluminum bodies, and have a content of over 500 million pounds of aluminum.

## 2025 Key Future Projections

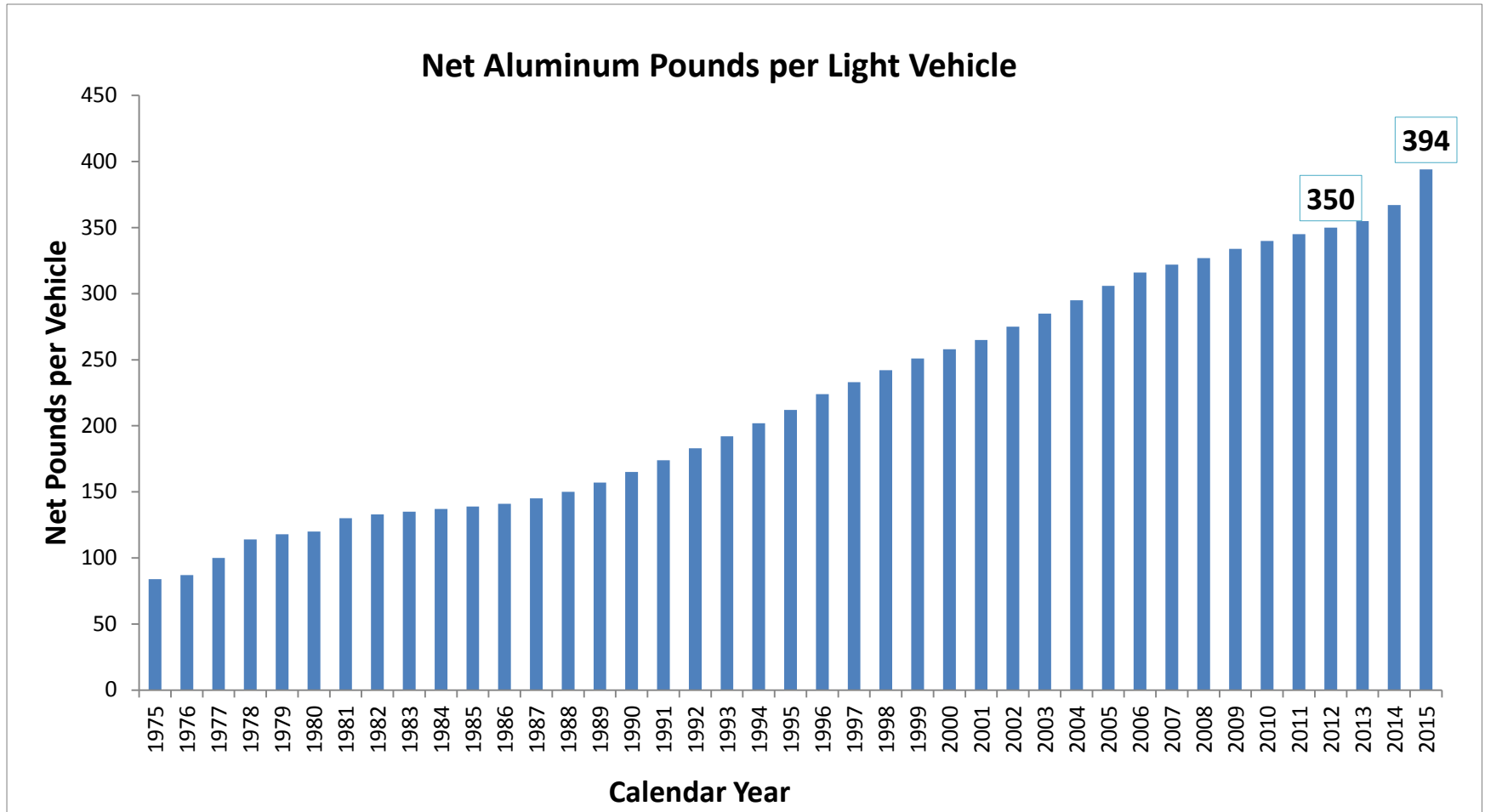
### **Within the Decade:**

- Seven out of 10 new pickup trucks produced in North American will be aluminum-bodied.
- Every leading automaker will have an aluminum body program in place.
- Ford, General Motors and Fiat Chrysler will be the biggest users of aluminum sheet.
- Aluminum hood penetration will reach 85% and doors will reach 46%; complete bodies will reach 18%, from less than one percent today. This will drive total aluminum content to 547 pounds per vehicle.
- The total North American aluminum content will be 10 billion pounds.
- Aluminum will comprise more than 75% of pickup truck body and closure parts, 24% of E Segment body and closure parts, 22% of SUV body and closure parts and 18% of minivan body and closure parts.
- Aluminum sheet for light vehicle body and closure parts will grow from less than 200 million pounds in 2012 to nearly 4 billion pounds.
- On a volume basis, 26.6% of all the body and closure parts will be made of aluminum.
- The gross weight savings from aluminum body and closure use will be 175 pounds per vehicle.
- Globally, light vehicle aluminum content will approach 35 billion pounds, making light vehicles the most important global market for aluminum.



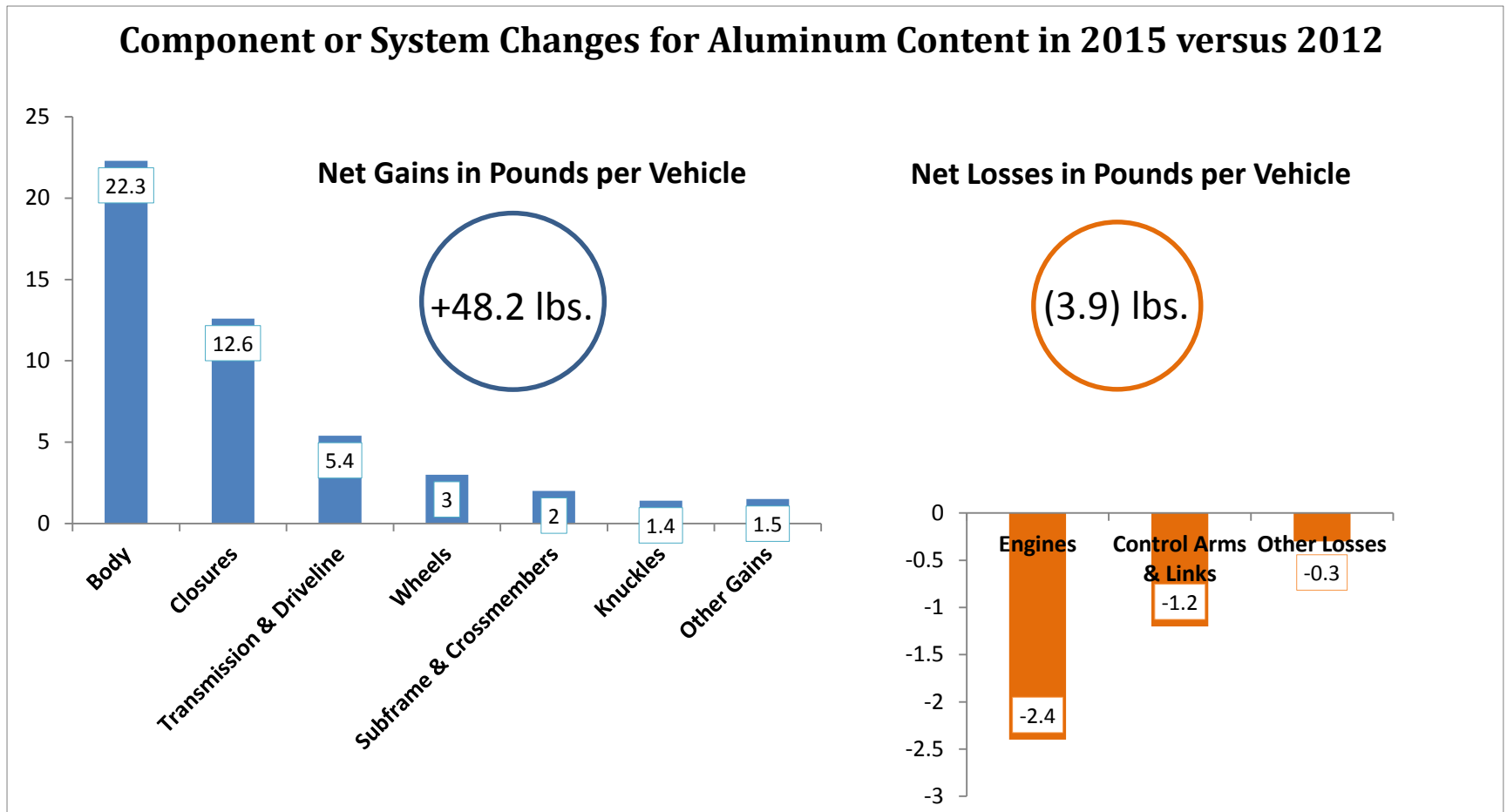
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- Aluminum content will break with the long term 40 year trend line in 2015 as aluminum penetration for body parts, doors and closures (other than hoods) finally reaches the critical mass for an explosive period of growth from 2015 to 2025.



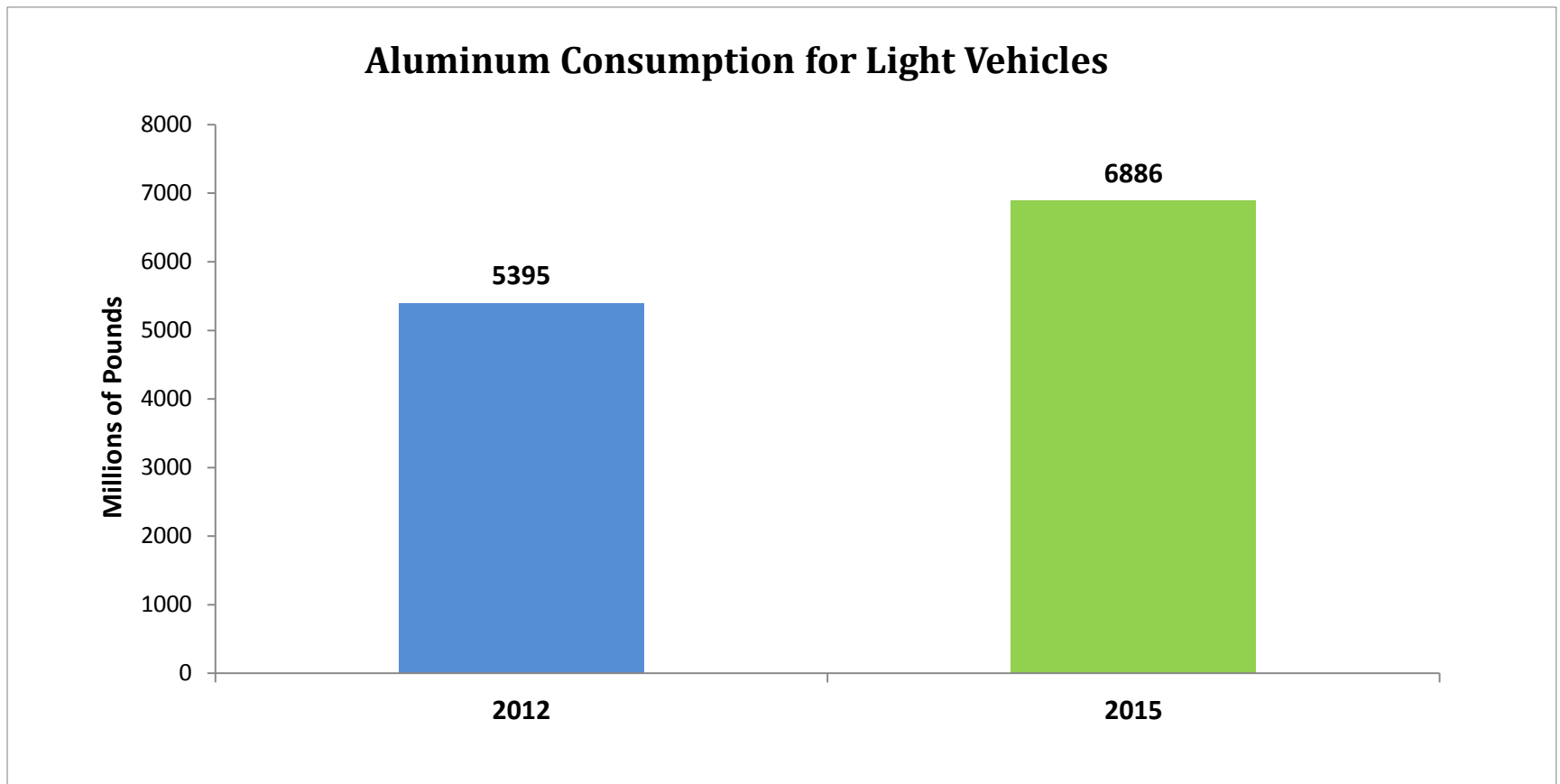
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- Large content increases for body parts, closures and larger transmission cases will more than offset small content losses for smaller engines and stiff competition from new steels for suspension control arms over the period 2012 to 2015.
- The net increase is expected to be a plus 44.3 pounds per vehicle from 2012 to 2015 compared to an increase of only 10 pounds per vehicle from 2010 to 2012.



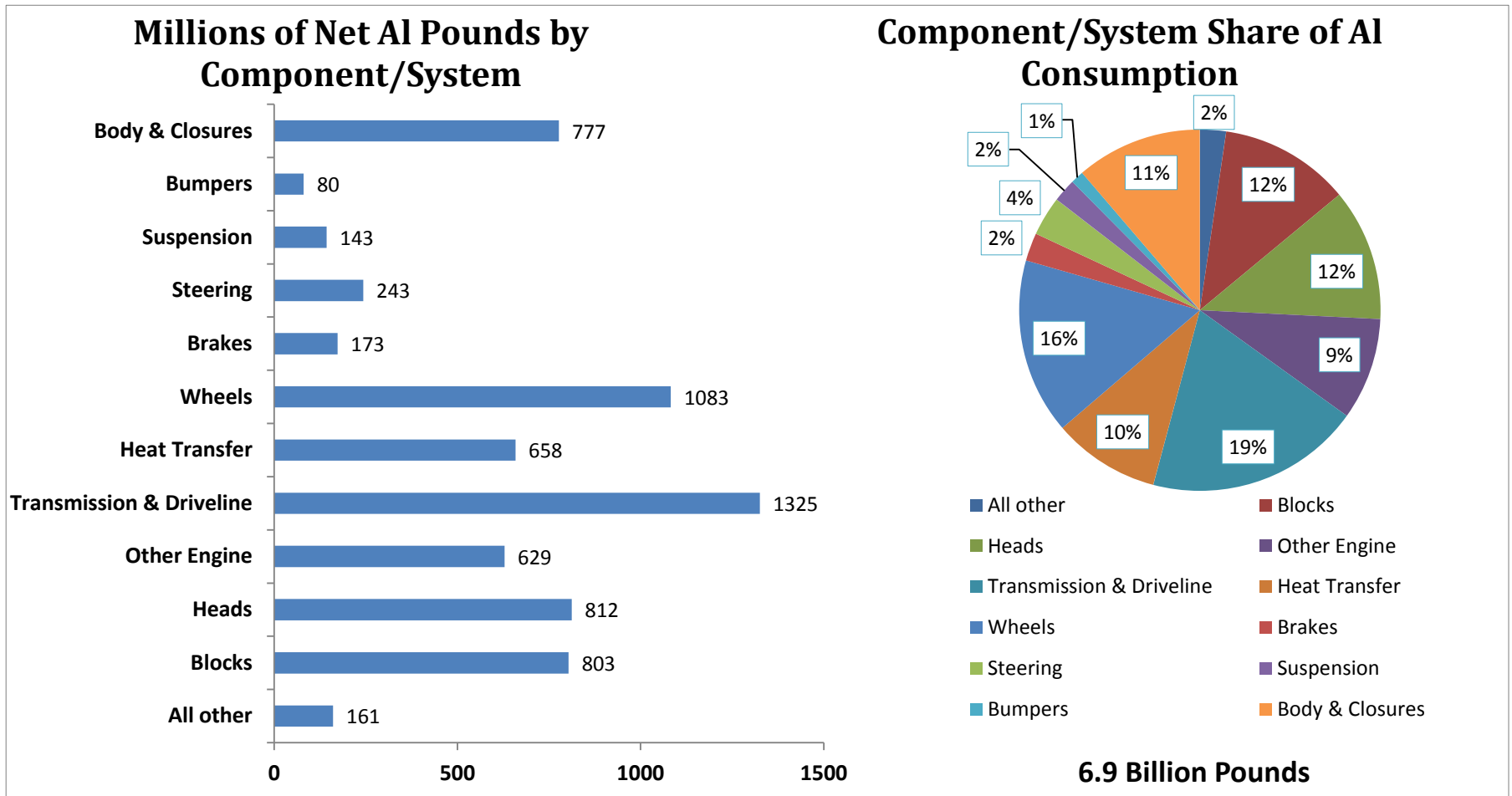
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- Total North American light vehicle aluminum consumption will increase by 28% in 2015 over 2012.
  - The increase is an equal combination of more vehicles and more aluminum content per vehicle.
- Consumption in 2015 will surpass any records set in previous decades by one billion pounds.



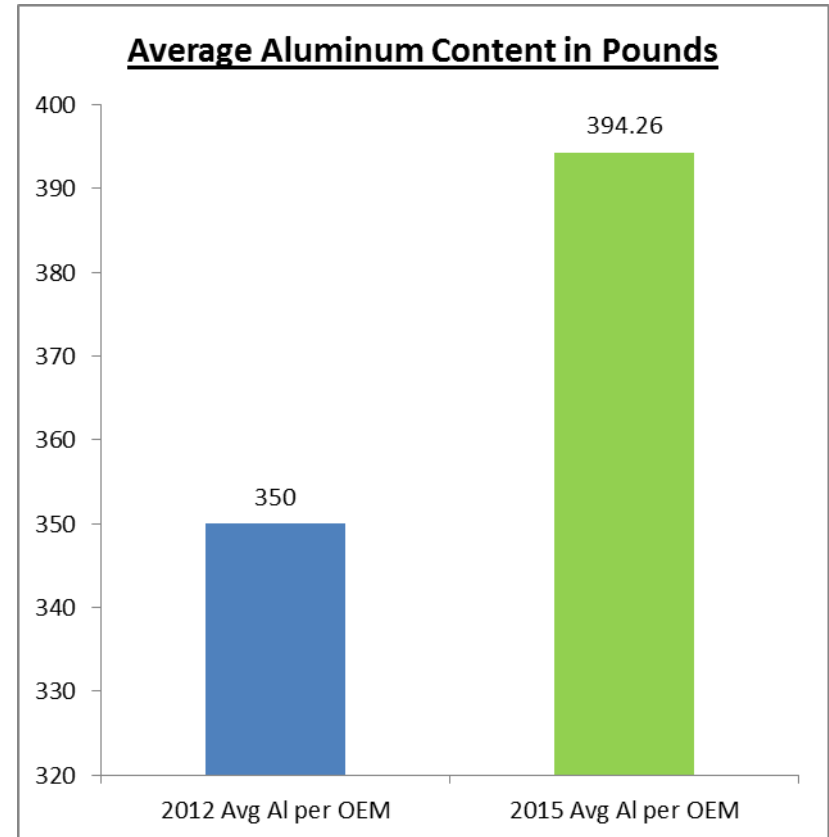
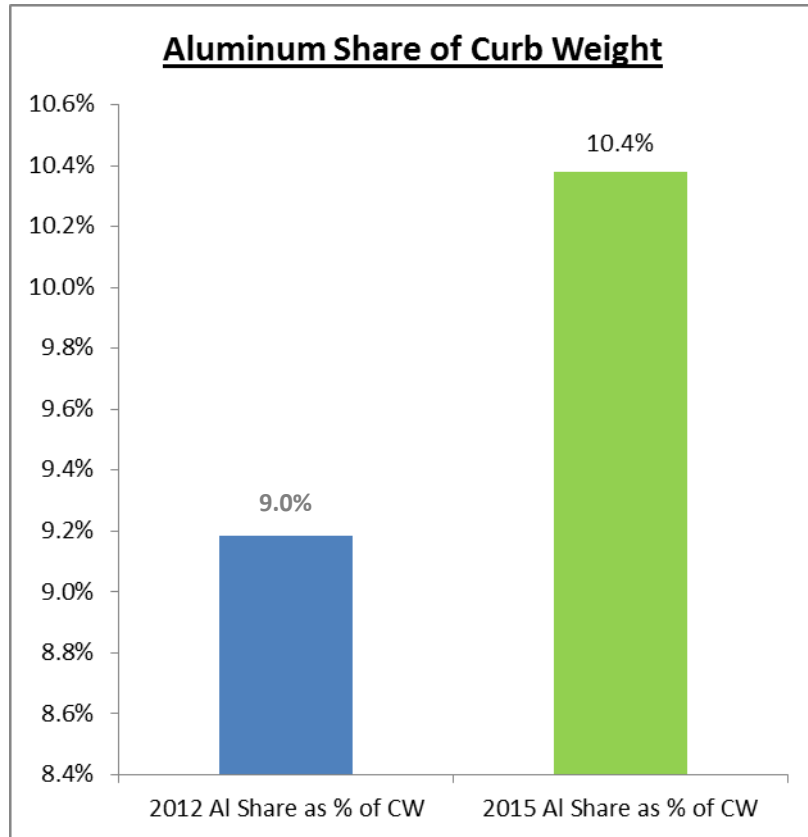
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- In 2015, the total aluminum content for the 17.46 million vehicles of expected production will equal nearly 7 billion pounds.
  - Body and closure parts will be 11% of the total.
  - 33% of the content will be for engine parts.



# Executive Summary

- Aluminum's share of the 3,798-pound curb weight in 2015 is expected to be 10.4%.
  - This is compared to the 9% share of the 3,828-pound curb weight in 2012.
- Tesla, Mercedes, BMW and Ford will exceed the average aluminum content and the average aluminum share of curb weight for 2015.





# Executive Summary

- As aluminum content spreads across vehicle segments, the E Segment, SUV Segment and PUP Segment emerge as content leaders.

## 2015 Vehicle Segment Average Aluminum Pounds and Share of 2015 Production

A/B Segment  
Fiat 500  
Ford Fiesta



**251.6 lb.'s**

**3% of Production**

MPV Segment  
Honda Odyssey  
Chrysler Town & Country



**396.5 lb.'s**

**4% of Production**

C Segment  
Ford Focus  
Honda Civic



**273.9 lb.'s**

**17% of Production**

SUV Segment  
Chevy Suburban  
Jeep Grand Cherokee



**410.3 lb.'s**

**33% of Production**

D Segment  
Chevy Malibu  
Dodge Charger  
MUSTANG



**363.3 lb.'s**

**21% of Production**

VAN Segment  
Dodge Sprinter  
Ford Transit



**273.2 lb.'s**

**2% of Production**

E Segment  
Cadillac XTS  
STING RAY



**546.9 lb.'s**

**2% of Production**

PUP Segment  
Ford F150  
Ram 1500



**548.9 lb.'s**

**17% of Production**

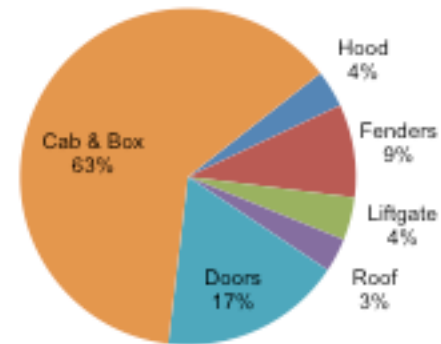
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- The 2015 Ford F-150 is a test case for a high-volume aluminum vehicle, achieving ~ 700 lbs. of weight savings over the current model.

## Redesigned 2015 F-150



## 2015 F-150 Crew Cab Net Aluminum Sheet

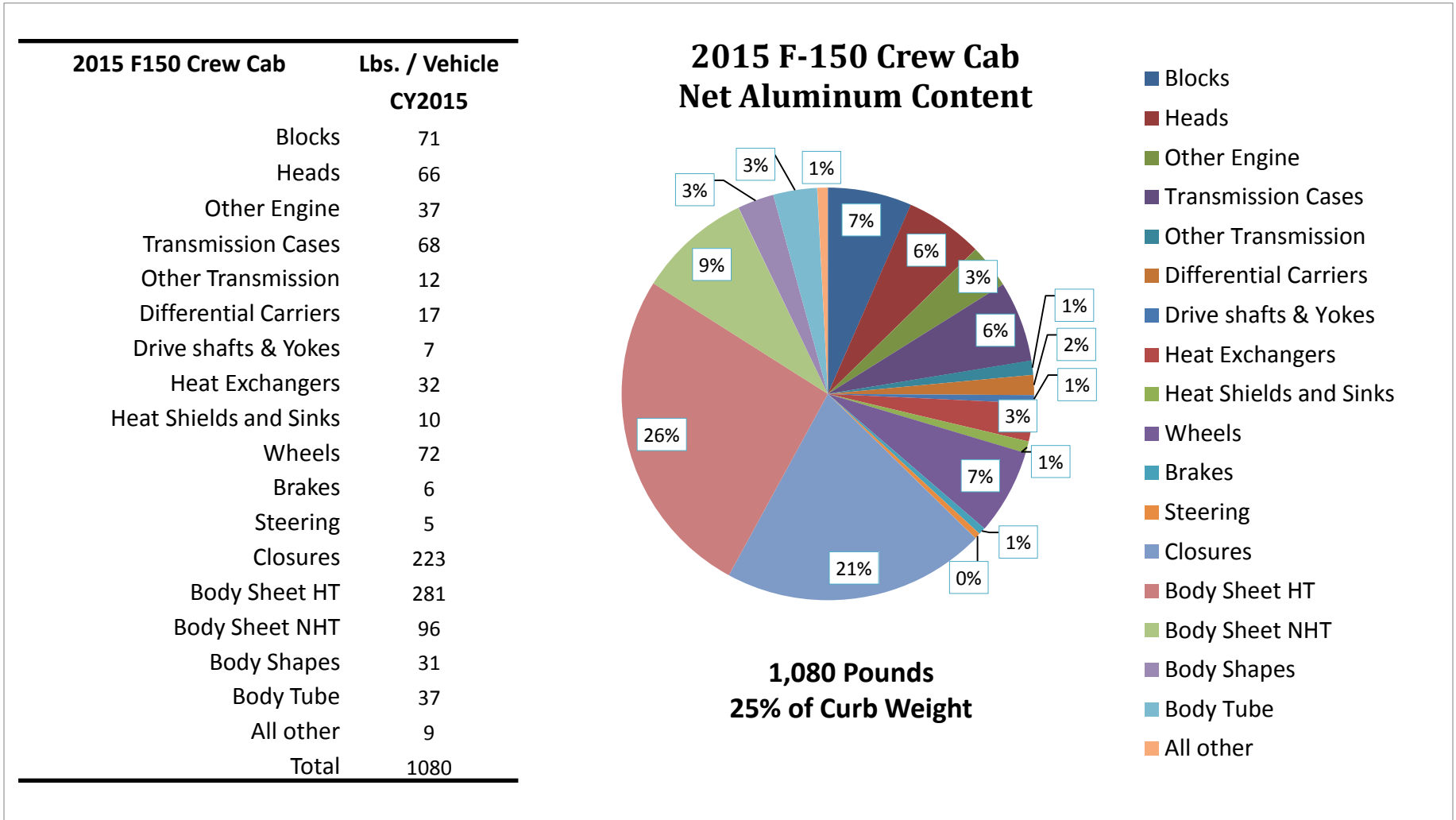


**600 Pounds** (Excludes 70 pounds of extruded aluminum products)

- The aluminum-bodied F-150 goes into production later this year.
- This is the first high-volume aluminum-bodied vehicle to go into production in the world.
- When the program reaches full production in 2016, Ford will be making 850,000 trucks per year and require 350,000 tons of aluminum sheet per annum.

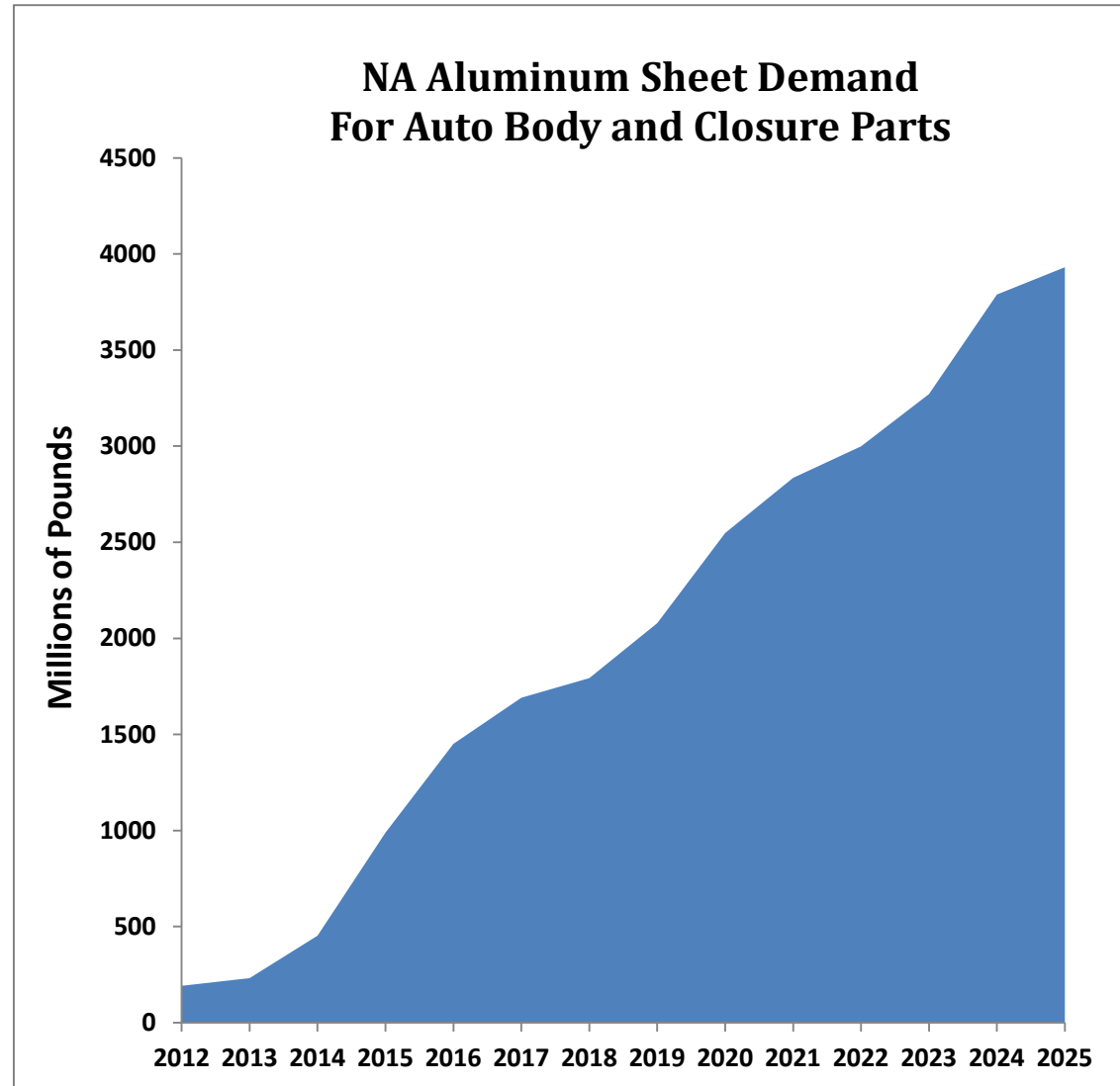
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- The 2015 Ford F-150 will have over 1,000 pounds of net aluminum content, or approximately 25% of its curb weight.



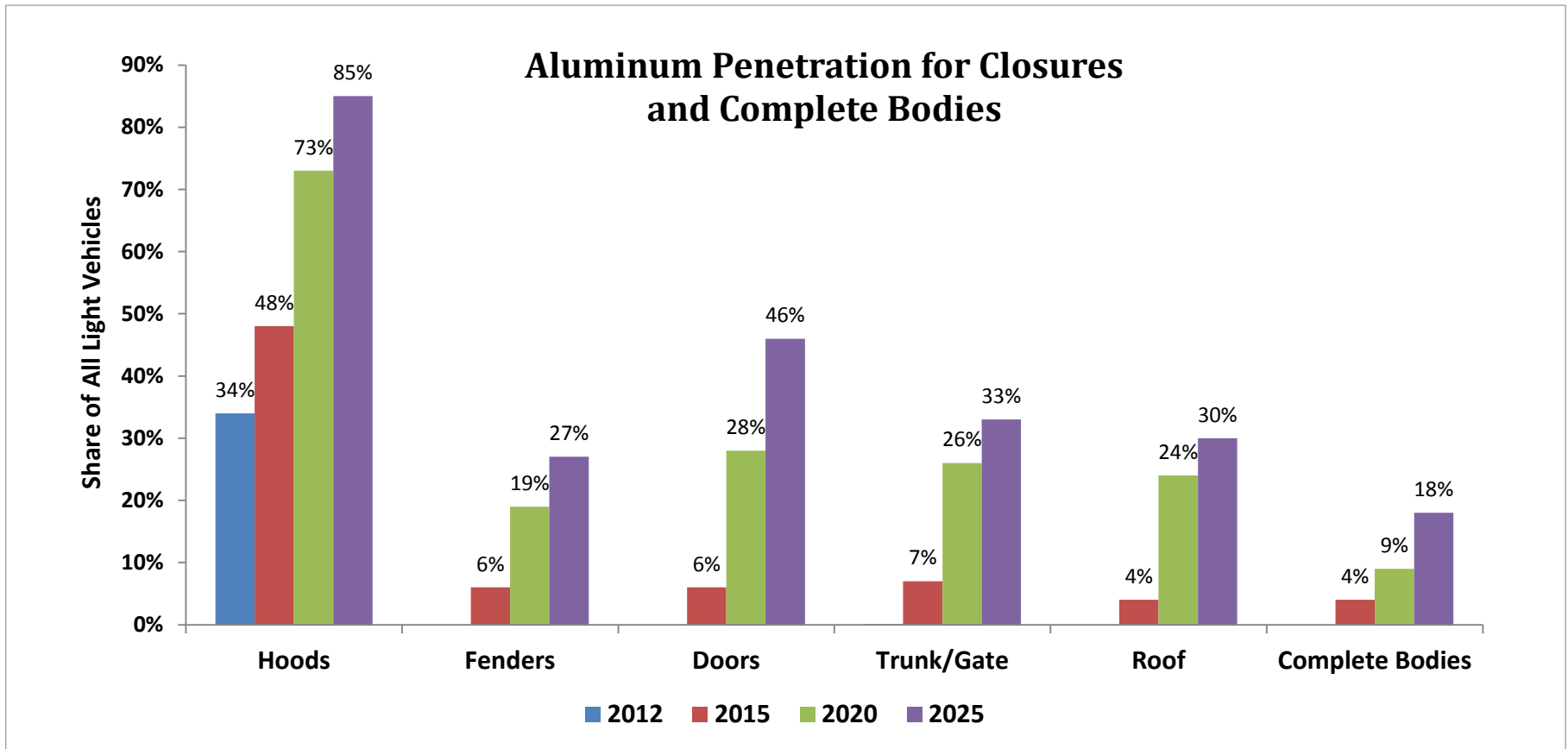
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- Aluminum sheet for light vehicle body and closure parts will grow from less than 200 million pounds in 2012 to nearly 4 billion pounds by 2025.
- This growth of aluminum rolled products for automotive applications will require a tremendous increase in heat treating capacity.
- Ford, General Motors and Fiat Chrysler will be the biggest users of aluminum sheet
- Every leading automaker will have several aluminum body and closure panel programs by 2025.
- 26.6% of all the body and closure parts on a volume basis will be made of aluminum in 2025.
- 70% of the aluminum sheet will need to be 6xxx heat treatable sheet.



# Executive Summary

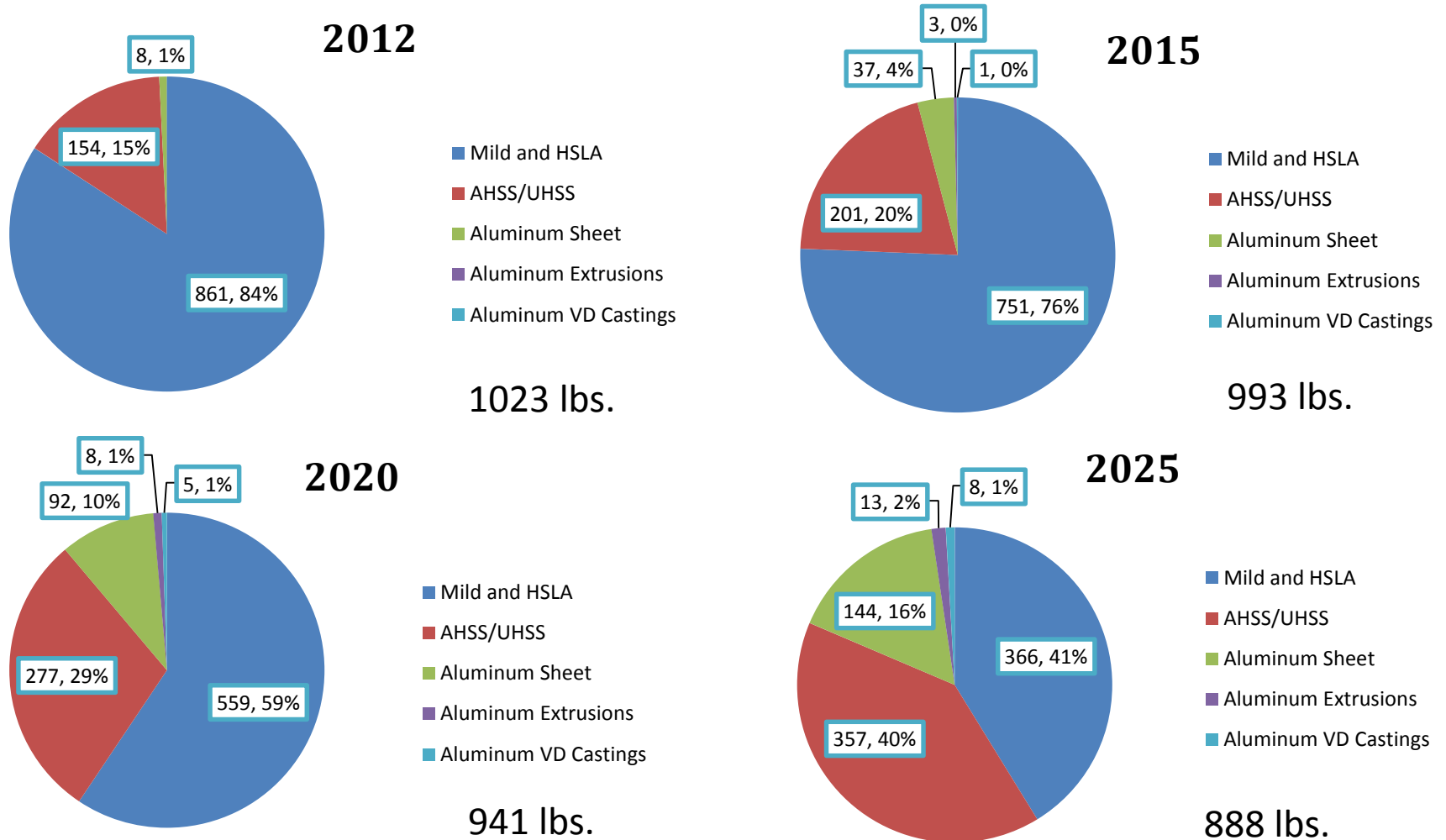
- The number of vehicles with aluminum closures and complete body structures will increase by significant proportions over the next ten years.



*The chart does not include the numerous vehicles that will also have partial body structures, vacuum die cast shock towers and other VD cast body parts.*

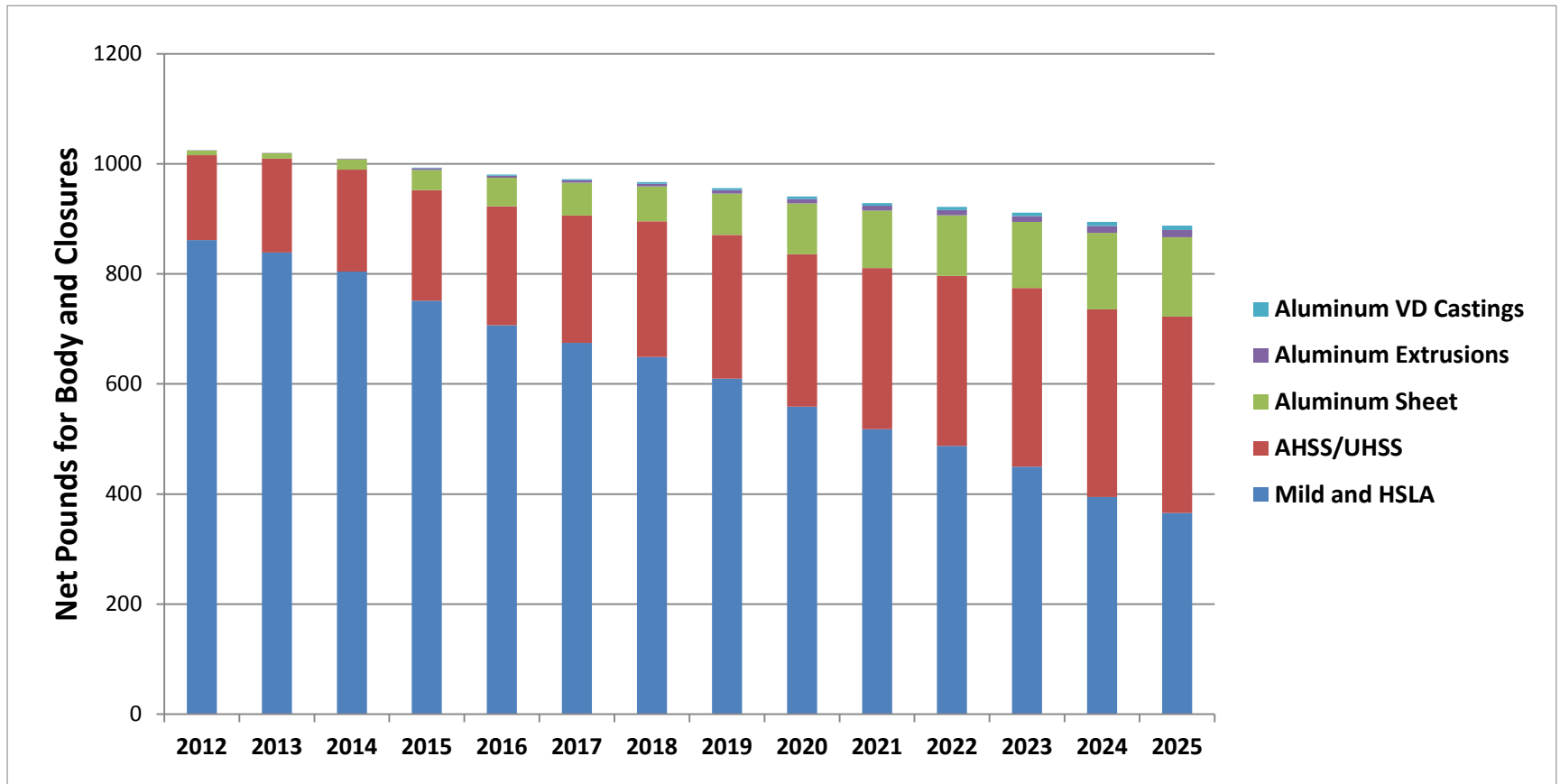
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- The material mix for body and closure parts will change dramatically over the next ten years.
- On a weight basis, aluminum will grow to 19% of the weight for body and closure parts by 2025.



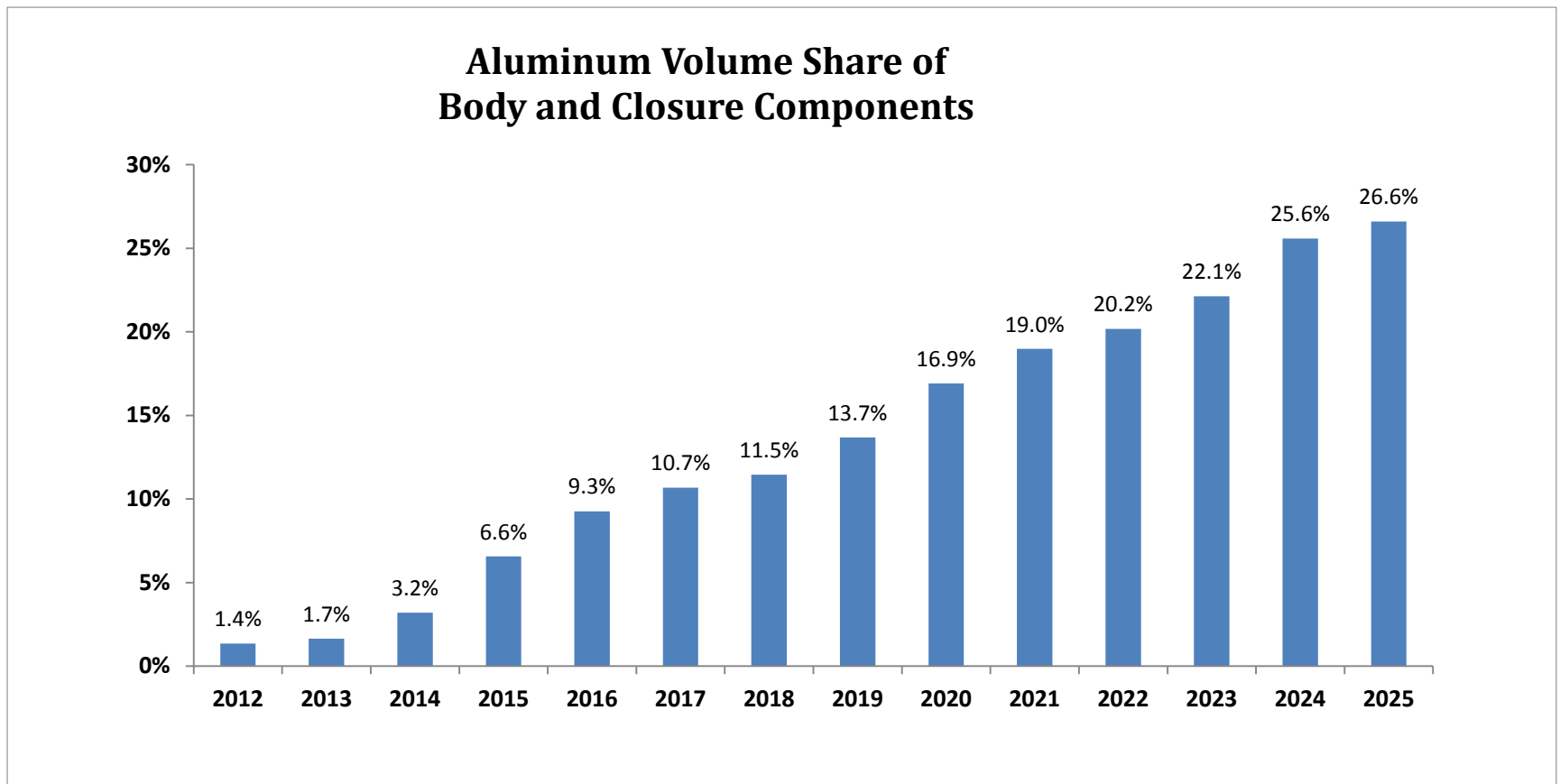
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- A mild, HSLA and bake hard steel body structure with closures weighs on average 1,060 pounds.
- This excludes bumpers and the 500-pound ladder frame for pickup trucks.
- By 2025, the weight for the average body with closures will be 888 pounds.
  - This is based on a constant vehicle footprint of 49 square feet.
- New materials, including aluminum, will continue to save weight without sacrificing safety, size or efficiency.



# Executive Summary

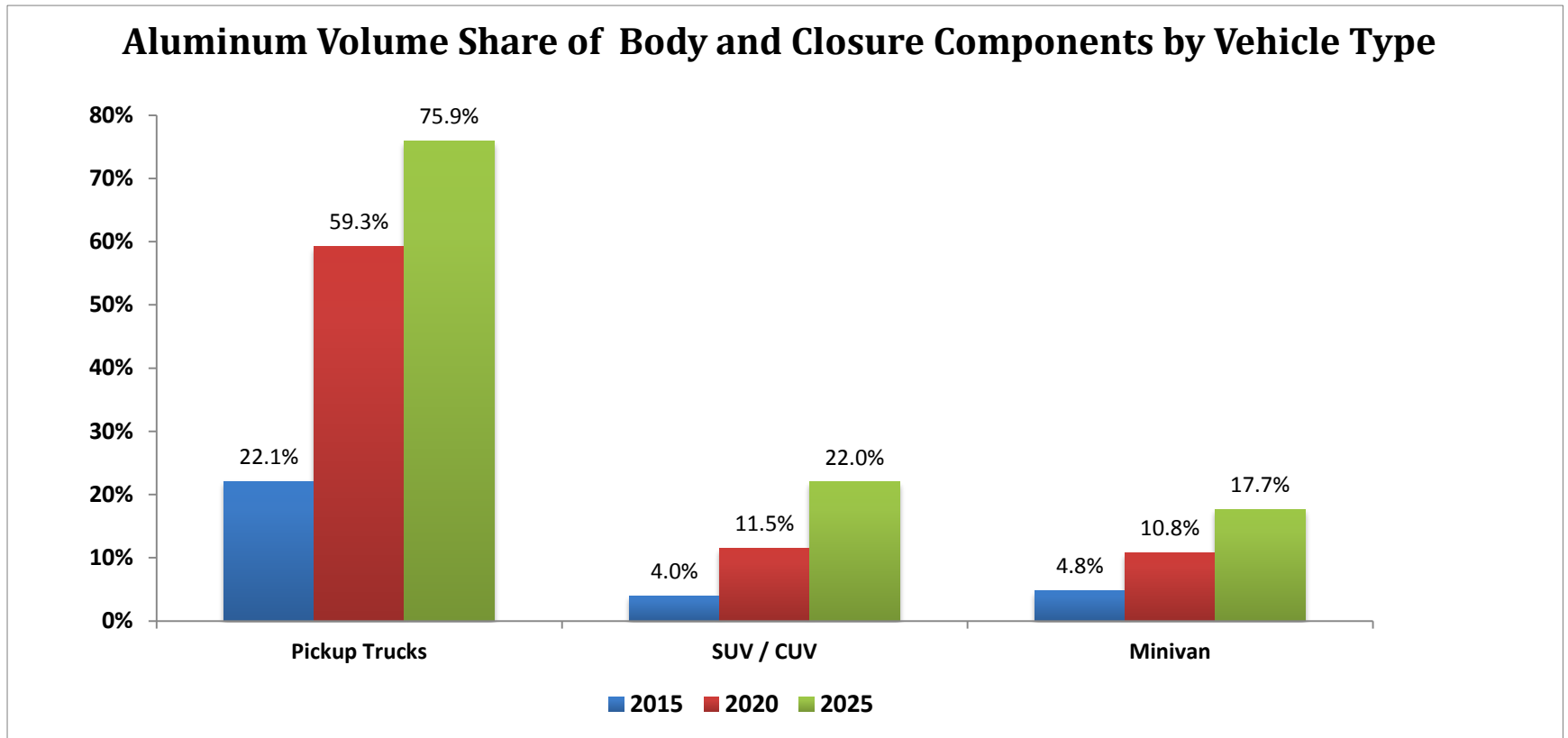
- By 2025, 26.6% of all the body and closure parts for light vehicles in North America will be made of aluminum (measured by volume rather than weight).
- A burst of aluminum activity is expected in the few years leading up to the 2025 EPA mandate of 161 grams of CO<sub>2</sub> per mile taking full effect.





# Executive Summary

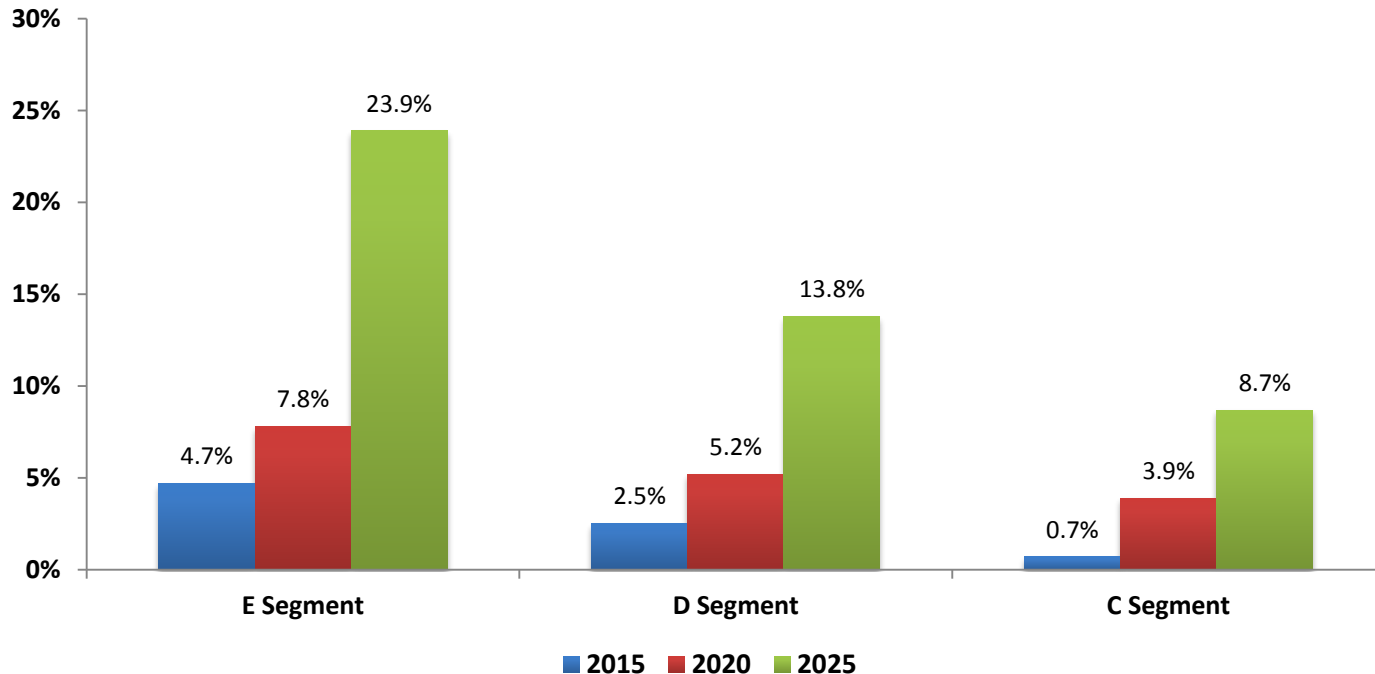
- Pickup trucks will demonstrate the highest penetration of aluminum parts for bodies and closures at more than 75% by 2025.
- If the fuel economy achieved with powertrain changes does not achieve projected levels, additional fuel economy improvements can be achieved through additional aluminum based weight savings on C, D and SUV segment vehicles. Other segments such as minivans and E segment cars are also candidates for additional weight savings, but their volumes are too small to have a significant impact on CO2 emissions.



# Executive Summary

- In the car segments, E Segment vehicles will show the highest aluminum penetration for body and closure parts at nearly 24% by 2025.
- Weight savings estimates remain conservative for C segment and D segment cars given they are the prime candidates for hybrid and electric powertrains. Alternative powertrain assumptions will be severely challenged by the high cost of hybrid, plug-in and all-electric technologies. A low-cost, low weight battery solution is not yet on the horizon.

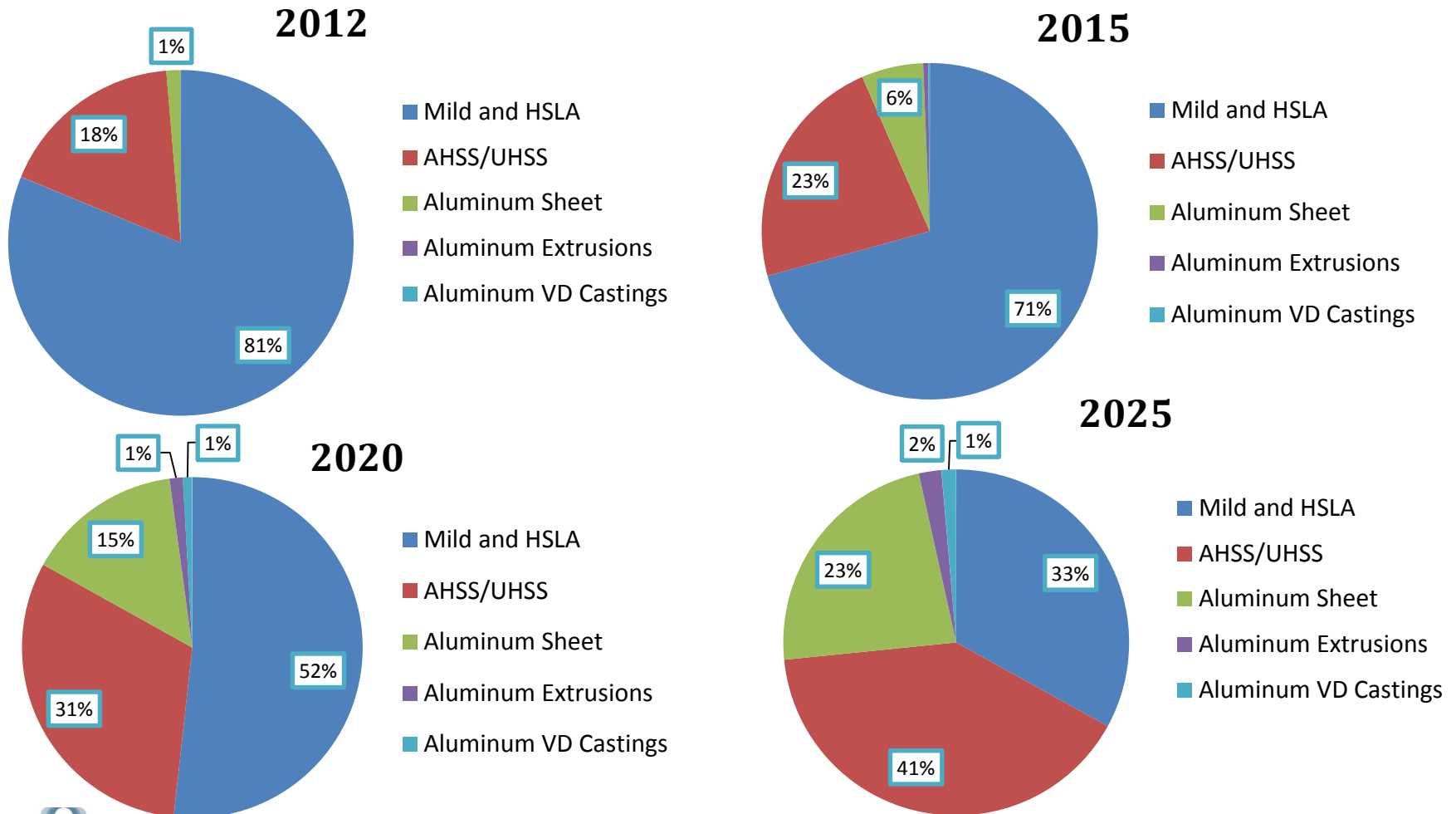
**Aluminum Volume Share of Body and Closure Components by C, D & E Segment Cars**



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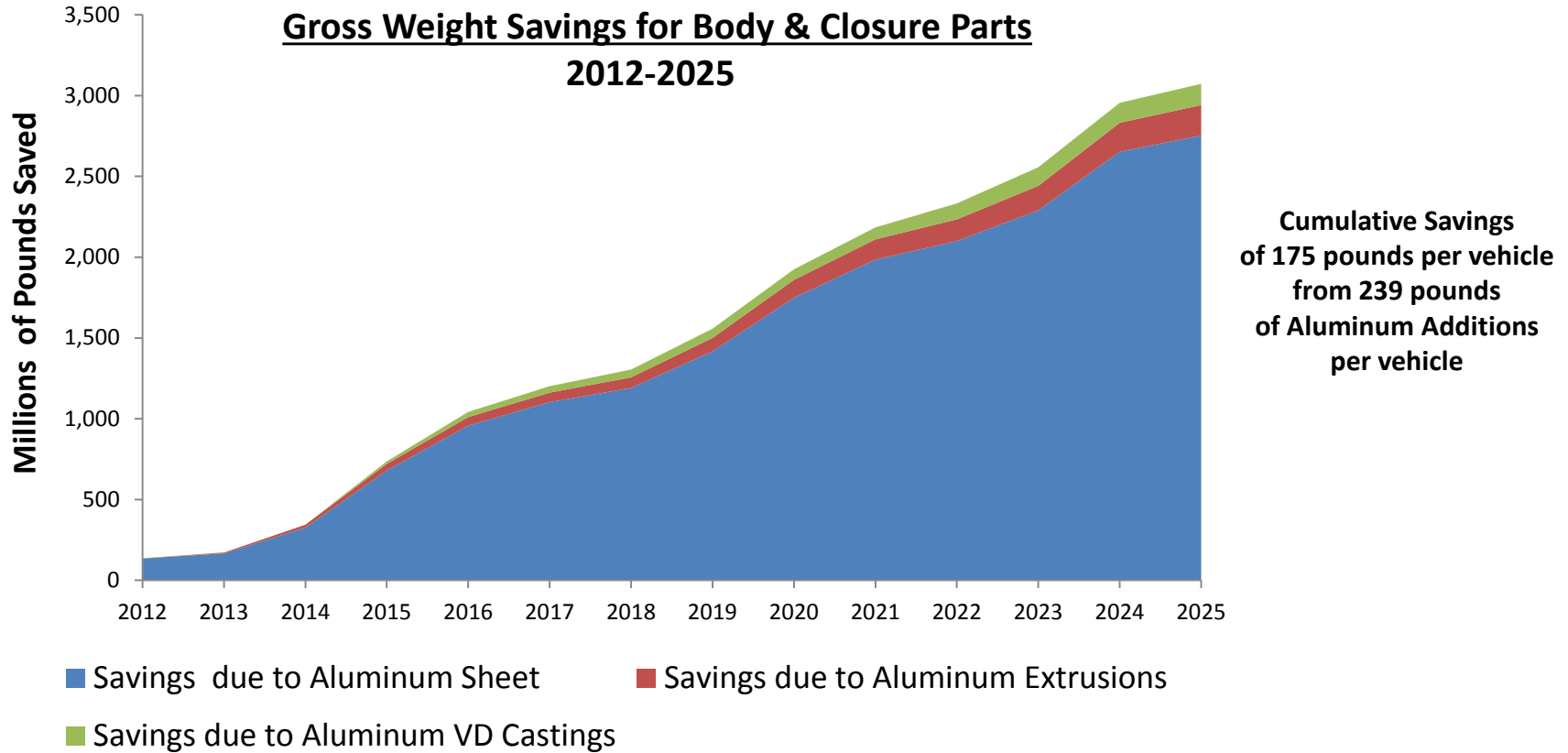
- Extensive use of aluminum, dual phase, complex phase and press hardened steels will be required to remove 150-200 pounds out of the average auto body with closures by 2025. To remove more than 200 pounds it will require aluminum to be used for over 30% of the parts.

## Light Vehicle Body and Closure Part Volume Share by Material



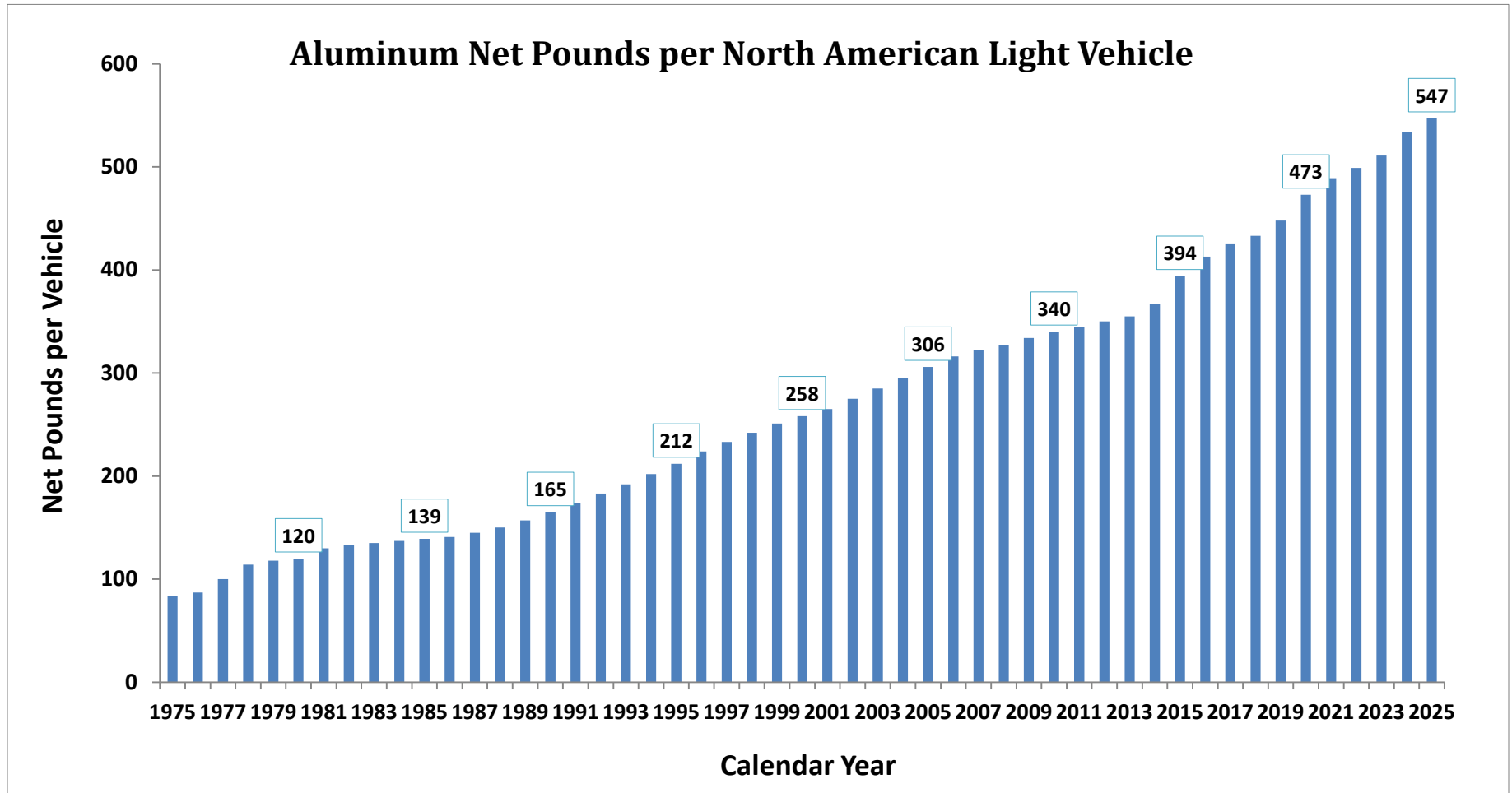
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- As aluminum grows to 26% of the part volume for light vehicle bodies and closures, the total amount of material needed in 2025 will decline by over 3 billion pounds per year over the need in 2012.



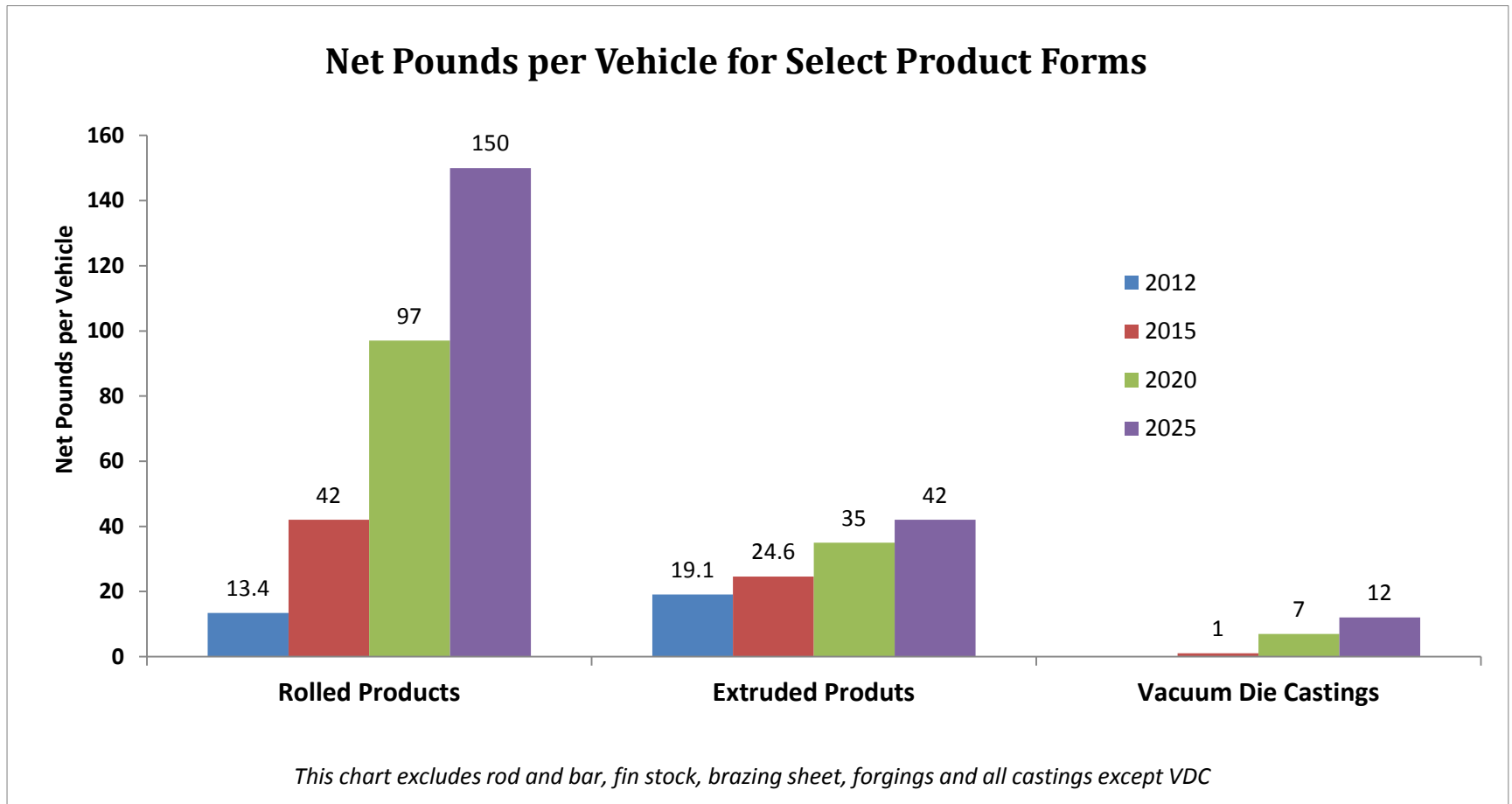
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- Fifty years of uninterrupted aluminum growth for North American manufactured light vehicles is guaranteed. There is nothing on the horizon that would indicate that this burst in aluminum growth can be significantly slowed over the next ten years.



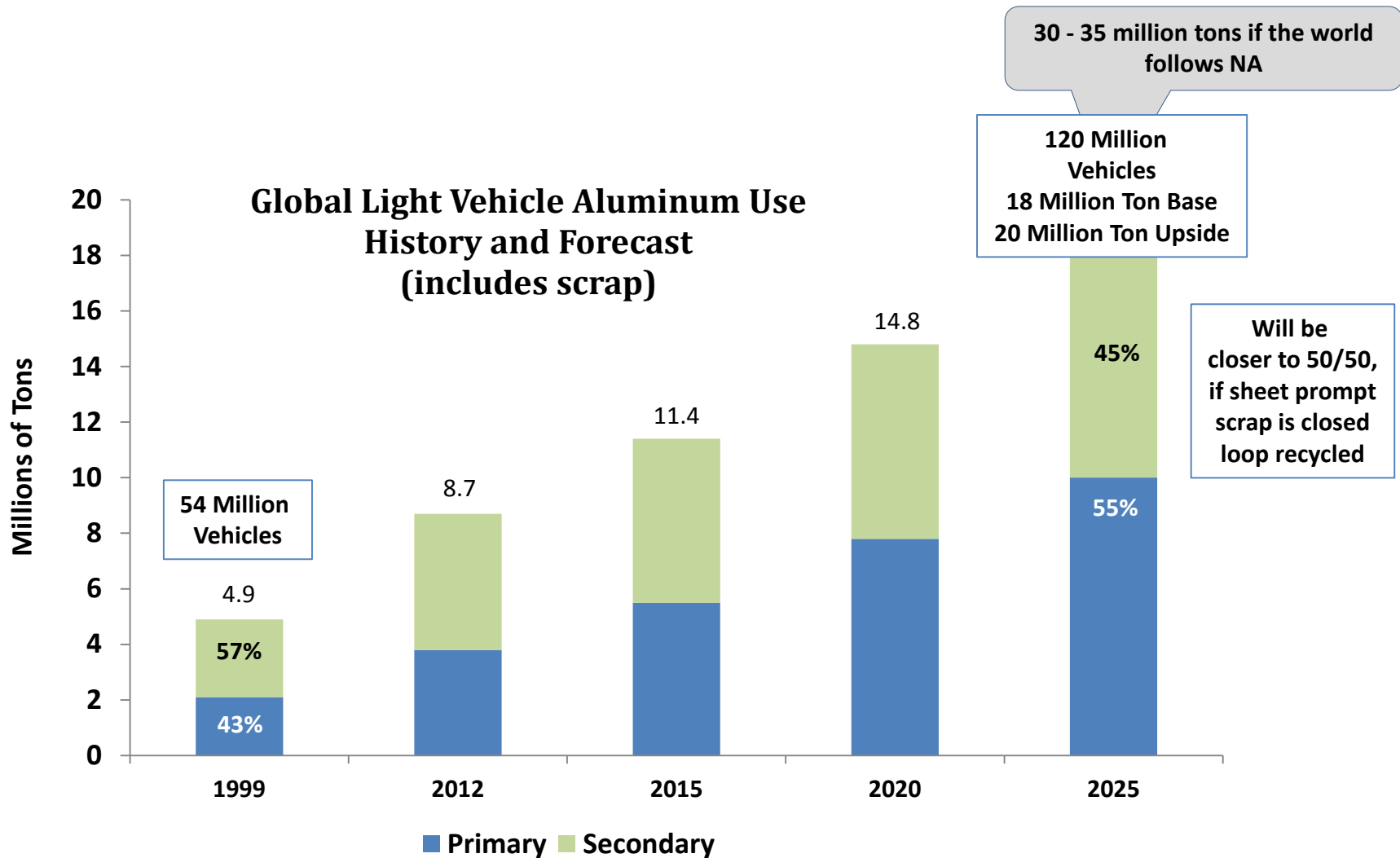
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- Aluminum heat treated and non-heat treated sheet, extruded shapes and tube as well as vacuum assisted high pressure die castings are the products that will benefit the most from the need to use more aluminum to save weight and improve fuel economy by 90% by 2025.
- All other product forms including conventional HPDC, permanent mold castings, brazing sheet, fin stock, rod and bar and forgings will only increase by 27 pounds in total over the period 2012 to 2025.



# Executive Summary

- Light vehicles will be the most important global market for aluminum in the coming decade.



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## This concludes our report. Thank you.

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