



Insurance Institute for Highway Safety
Highway Loss Data Institute

Vehicle technology and insurance losses

CAS Annual Meeting
November 12, 2018

Matt Moore, Senior Vice President HLDI

iihs.org

IHS is an independent, nonprofit scientific and educational organization dedicated to reducing the losses — deaths, injuries and property damage — from crashes on the nation's roads.

HLDI shares this mission by analyzing insurance data representing human and economic losses from crashes and other events related to vehicle ownership.

Both organizations are wholly supported by auto insurers.

IIHS – HLDI supporting groups

AAA Carolinas
Acceptance Insurance
Alfa Alliance Insurance Corporation
Alfa Insurance
Allstate Insurance Group
American Agricultural Insurance Company
American Family Mutual Insurance Company
American National
Ameriprise Auto & Home
Amica Mutual Insurance Company
Auto Club Enterprises
Auto Club Group
Auto-Owners Insurance
Bitco Insurance Companies
California Casualty Group
Celina Insurance Group
Censtat Casualty Company
CHUBB
Colorado Farm Bureau Mutual Insurance Company
Concord Group Insurance Companies
COUNTRY Financial
CSAA Insurance Group
Desjardins Insurance
ECM Insurance Company
Elephant Insurance Company
EMC Insurance Companies
Erie Insurance Group
Esurance
Farm Bureau Financial Services
Farm Bureau Insurance of Michigan
Farm Bureau Mutual Insurance Company of Idaho
Farmers Insurance Group
Farmers Mutual of Nebraska
Florida Farm Bureau Insurance Companies
Frankenmuth Insurance
Gainsco Insurance
GEICO Corporation
The General Insurance
Georgia Farm Bureau Mutual Insurance Company

Goodville Mutual Casualty Company
Grange Insurance
Grinnell Mutual
Hallmark Financial Services
Hanover Insurance Group
The Hartford
Haulers Insurance Company, Inc.
Horace Mann Insurance Companies
Imperial Fire & Casualty Insurance Company
Indiana Farm Bureau Insurance
Indiana Farmers Insurance
Infinity Property & Casualty
Kemper Corporation
Kentucky Farm Bureau Mutual Insurance Companies
Liberty Mutual Insurance Company
Louisiana Farm Bureau Mutual Insurance Company
The Main Street America Group
Mercury Insurance Group
MetLife Auto & Home
Mississippi Farm Bureau Casualty Insurance Company
MMG Insurance
Munich Reinsurance America, Inc.
Mutual Benefit Group
Mutual of Enumclaw Insurance Company
Nationwide
New Jersey Manufacturers Insurance Group
Nodak Mutual Insurance Company
Norfolk & Dedham Group
North Carolina Farm Bureau Mutual Insurance Company
Northern Neck Insurance Company
Ohio Mutual Insurance Group
Old American Indemnity Company
Oregon Mutual Insurance Company
Paramount Insurance Company
Pekin Insurance
PEMCO Insurance
Plymouth Rock Assurance
Progressive Insurance
PURE Insurance

Qualitas Insurance Company
Redpoint County Mutual Insurance Company
The Responsive Auto Insurance Company
Rider Insurance
Rockingham Group
RSA Canada
Safe Auto Insurance Company
Safeco Insurance
Samsung Fire & Marine Insurance Company
SECURA Insurance
Selective Insurance Company of America
Sentry Insurance
Shelter Insurance Companies
Sompo America
South Carolina Farm Bureau Mutual Insurance Company
Southern Farm Bureau Casualty Insurance Company
State Farm Insurance Companies
Stillwater Insurance Group
Tennessee Farmers Mutual Insurance Company
Texas Farm Bureau Insurance Companies
The Travelers Companies
United Educators
USAA
Utica National Insurance Group
Virginia Farm Bureau Mutual Insurance
West Bend Mutual Insurance Company
Western National Insurance Group
Westfield Insurance

Funding associations

American Insurance Association
National Association of Mutual Insurance Companies
Property Casualty Insurers Association of America

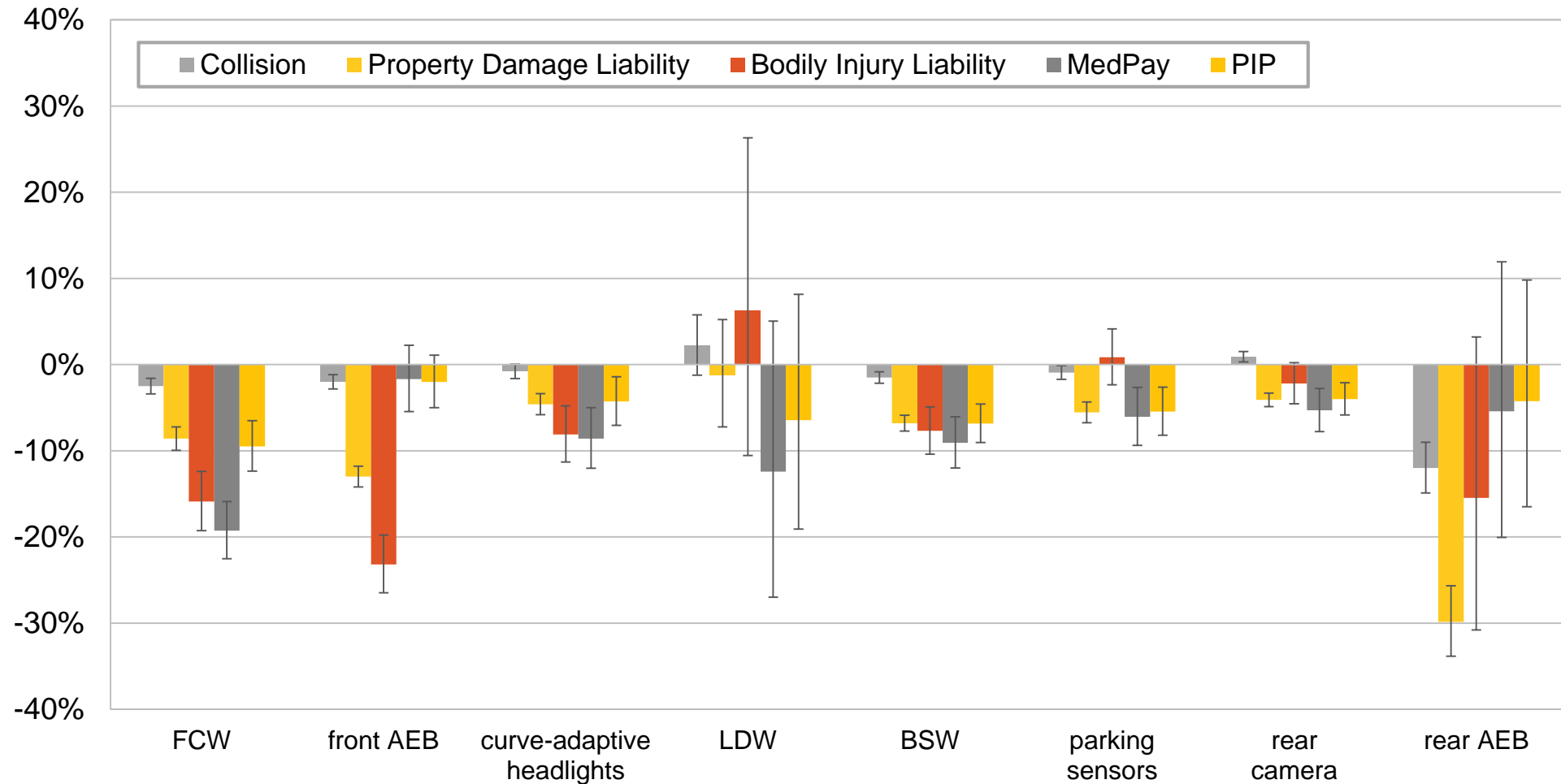
Evaluations of Advanced Driver Assistance Systems (ADAS)

HLDI collision avoidance analysis

- ▶ The HLDI database includes data from companies that represent 85% of private passenger auto insurance in the U.S.
- ▶ On a monthly basis, HLDI processes 320 million insurance data transactions
- ▶ The insurance data includes the garaging zip code and rated driver demographics
- ▶ Manufacturers shared with us 17 digit VINs and information about collision avoidance systems fitted to those vehicles
- ▶ Our collision avoidance analysis used the manufacturer supplied feature data along with our geographic and demographic data
- ▶ Large amount of timely data
- ▶ Limited information on crash circumstances

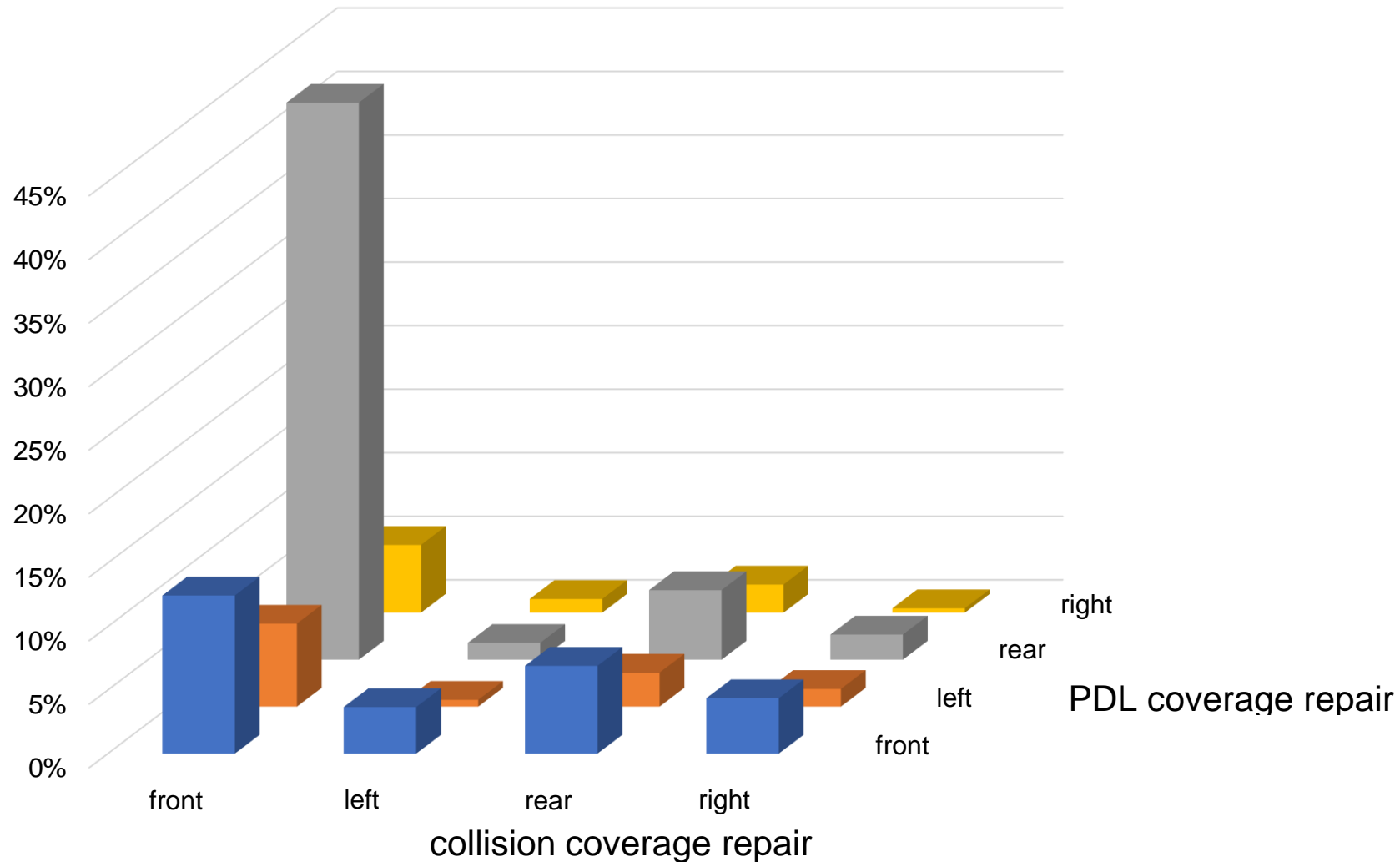
Summary of technology effects on insurance claim frequency

Results pooled across automakers



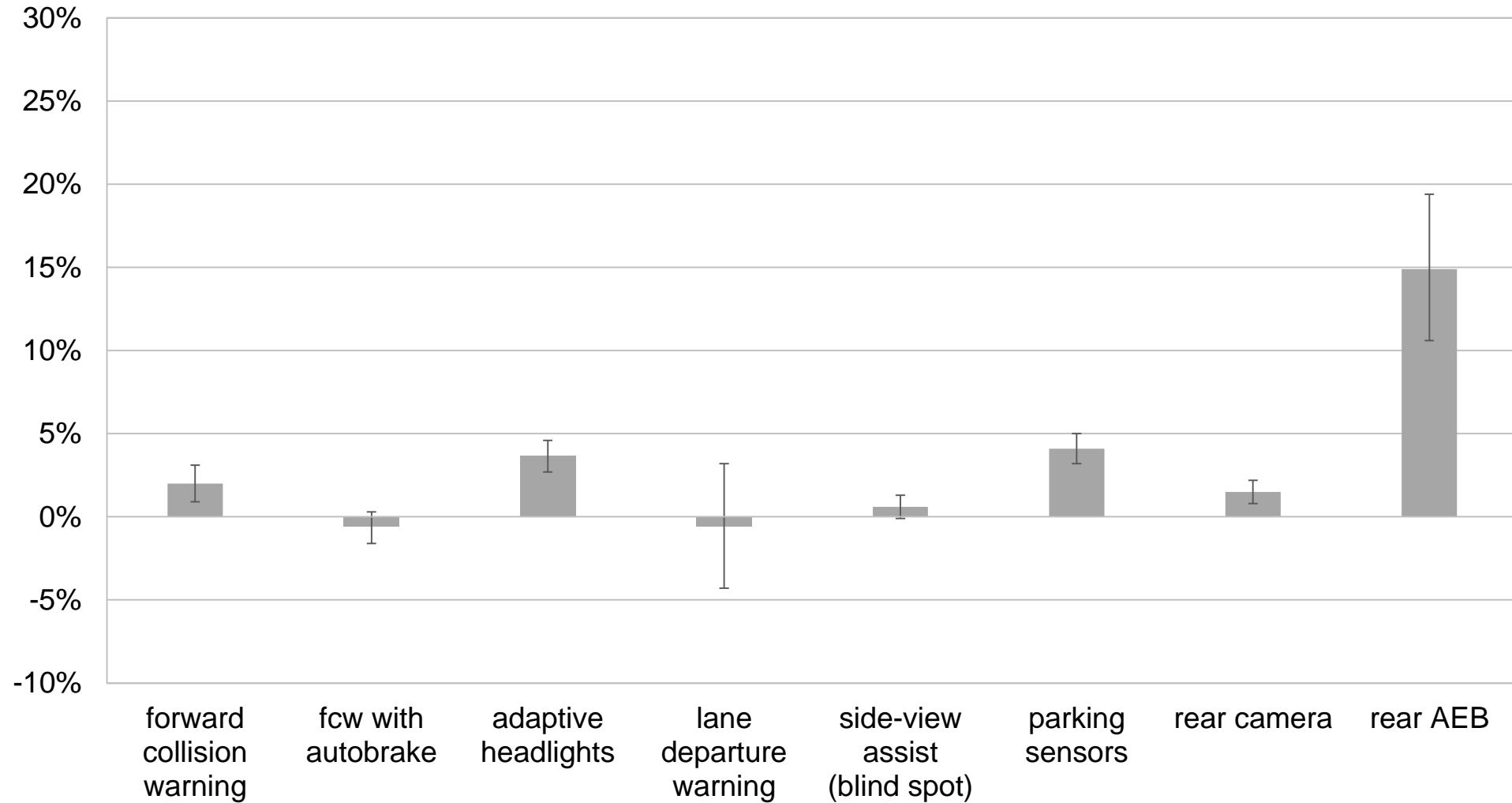
Percent distribution of matched pairs of collision & PDL estimates by point of impact

1981-2017 models, 2016 calendar year



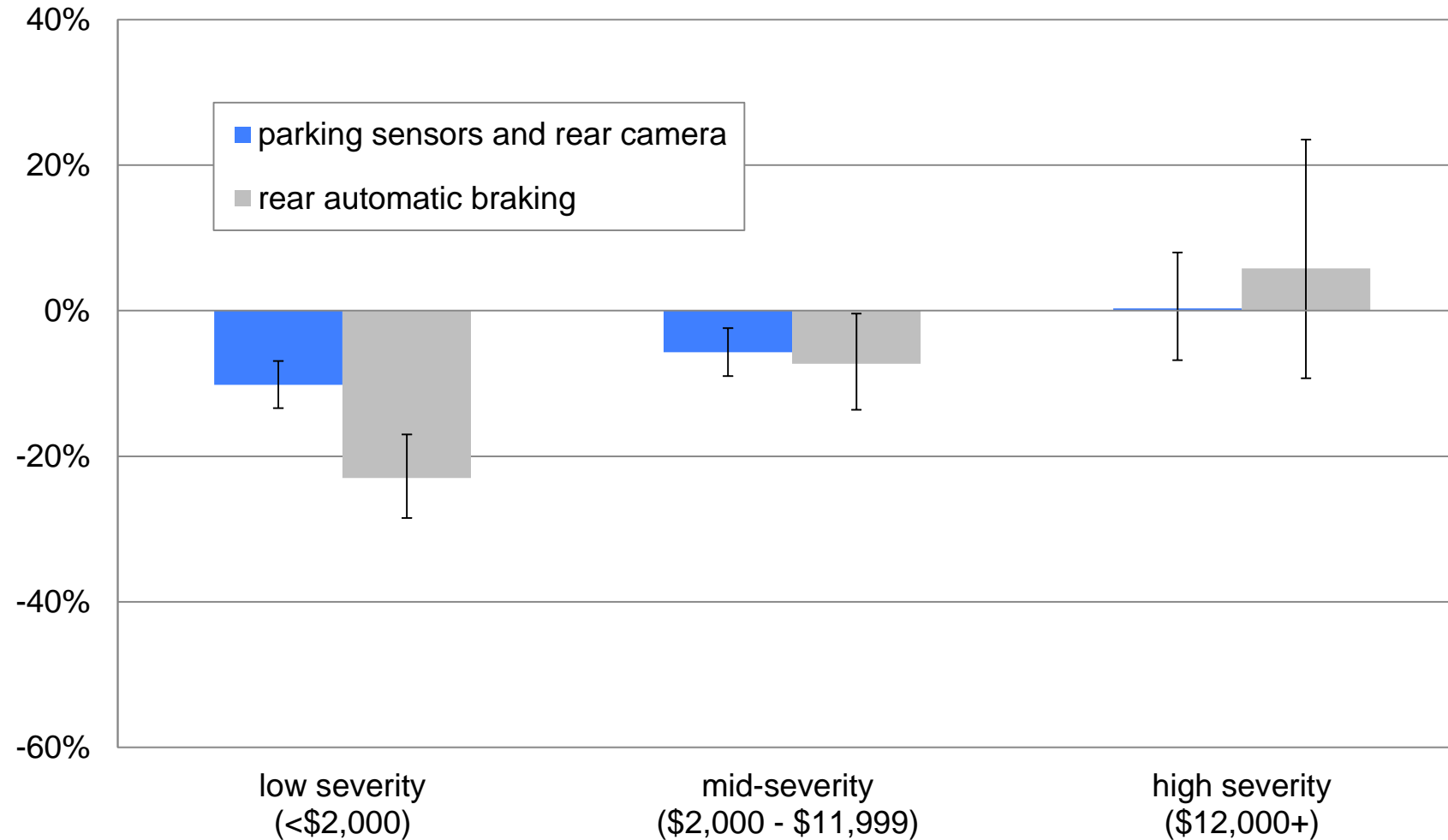
Summary of technology effects on collision claim severity

Results pooled across automakers



Change in collision claim frequency

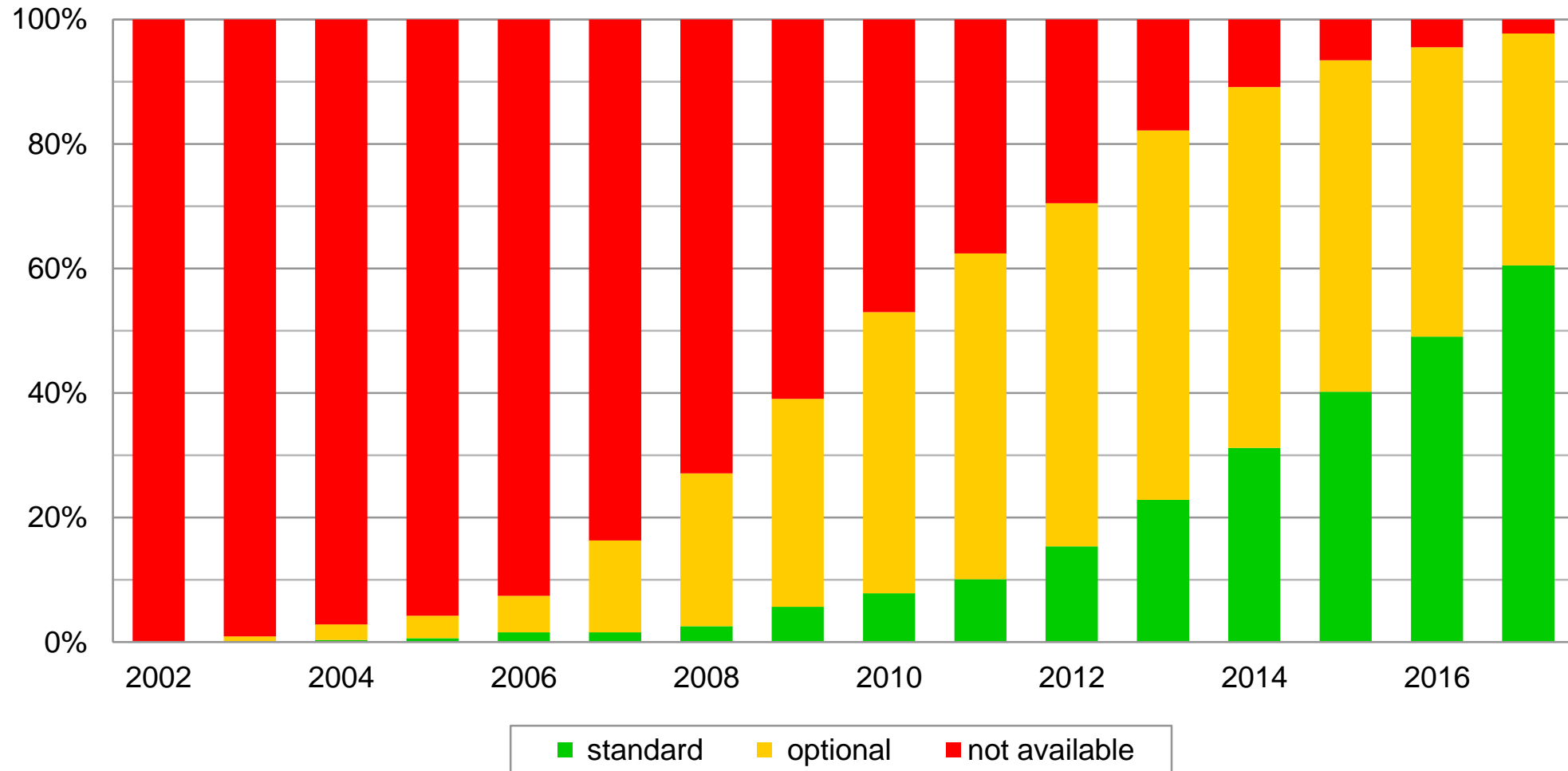
By severity range



Phase in of collision avoidance systems

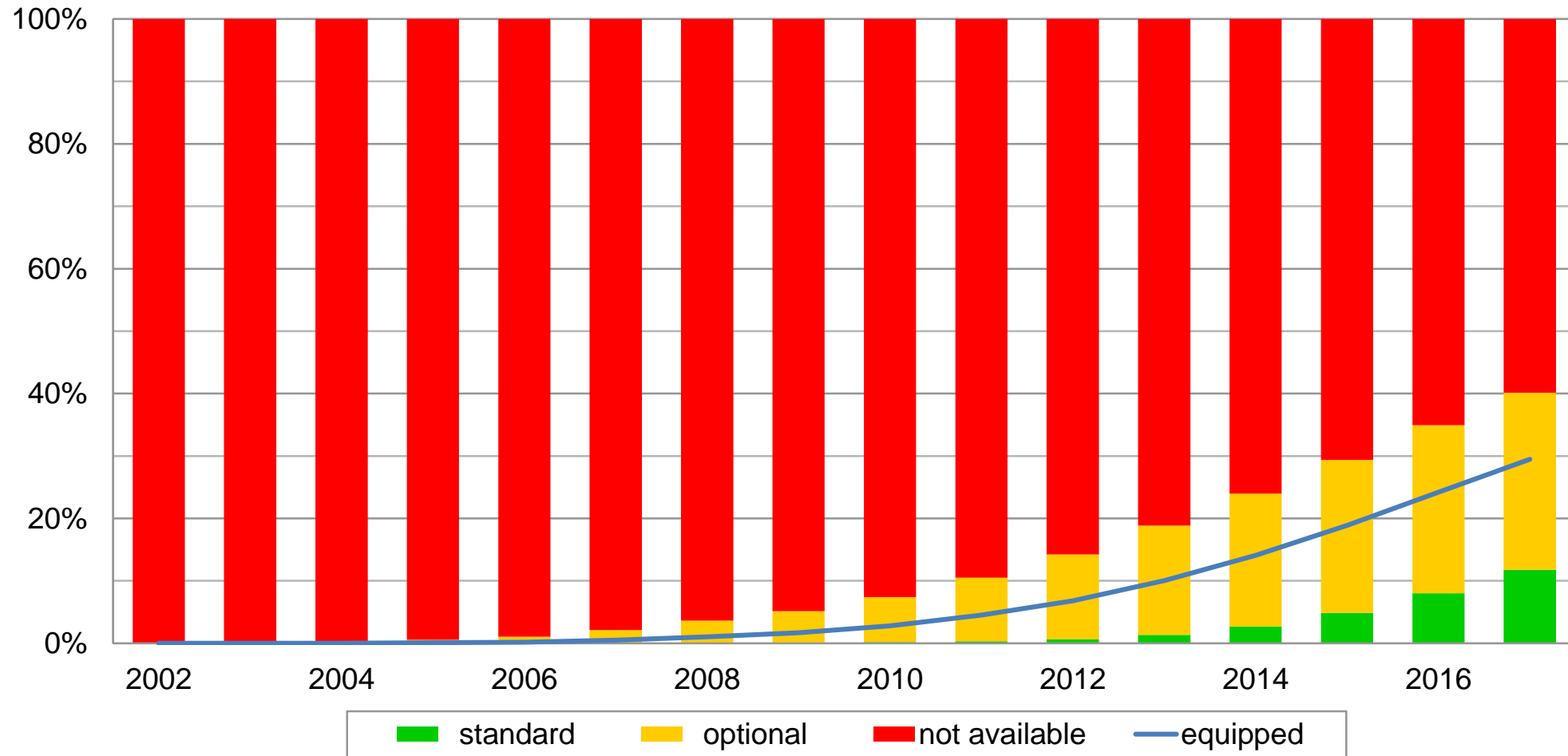
New vehicle series with rear camera

By model year



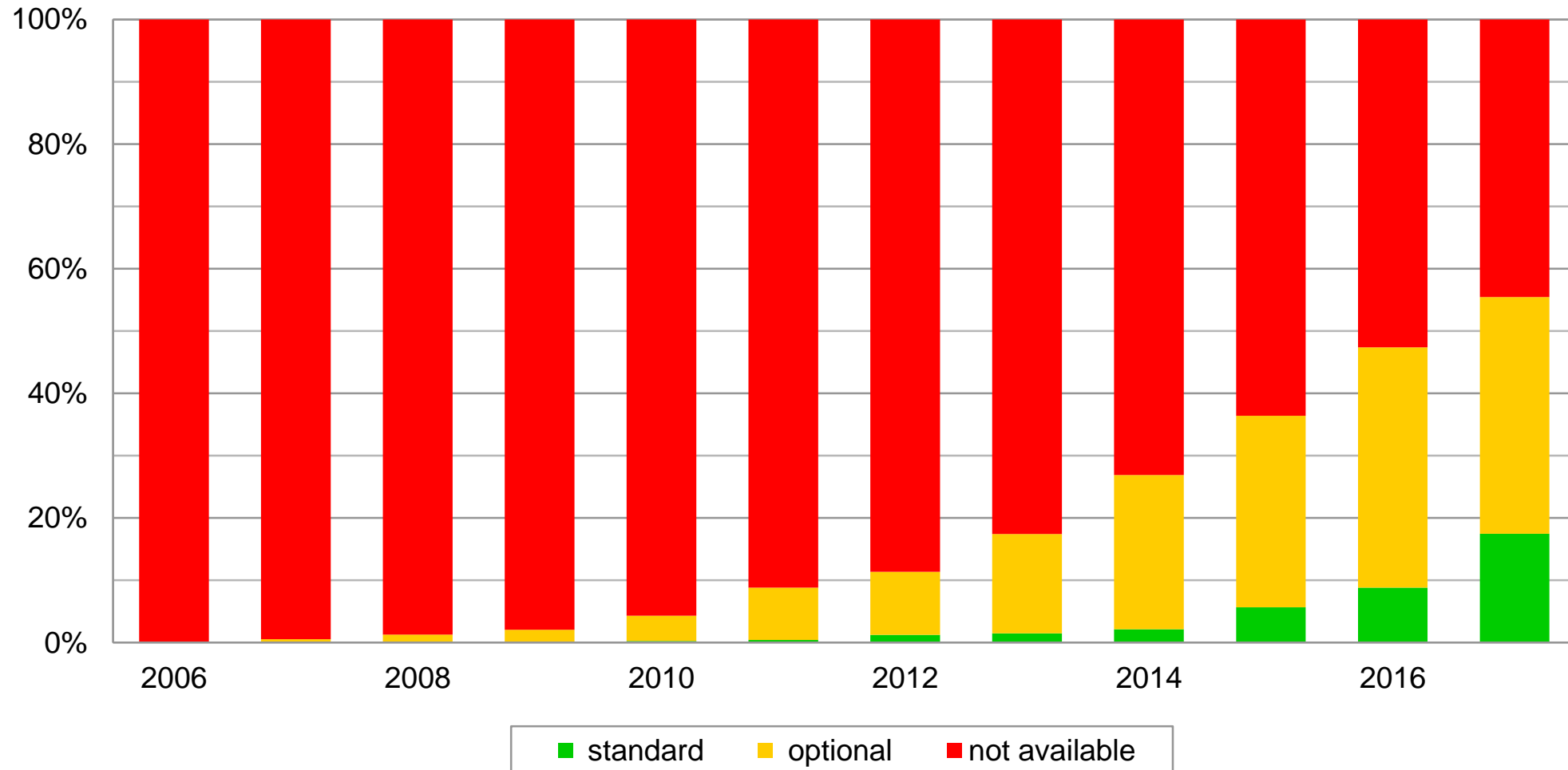
Registered vehicles with rear camera

By calendar year



New vehicle series with autonomous emergency braking

By model year



Registered vehicles with autonomous emergency braking

By calendar year



Estimated registered vehicles by feature

Calendar years 2017 and 2022



Turbo and supercharged engines

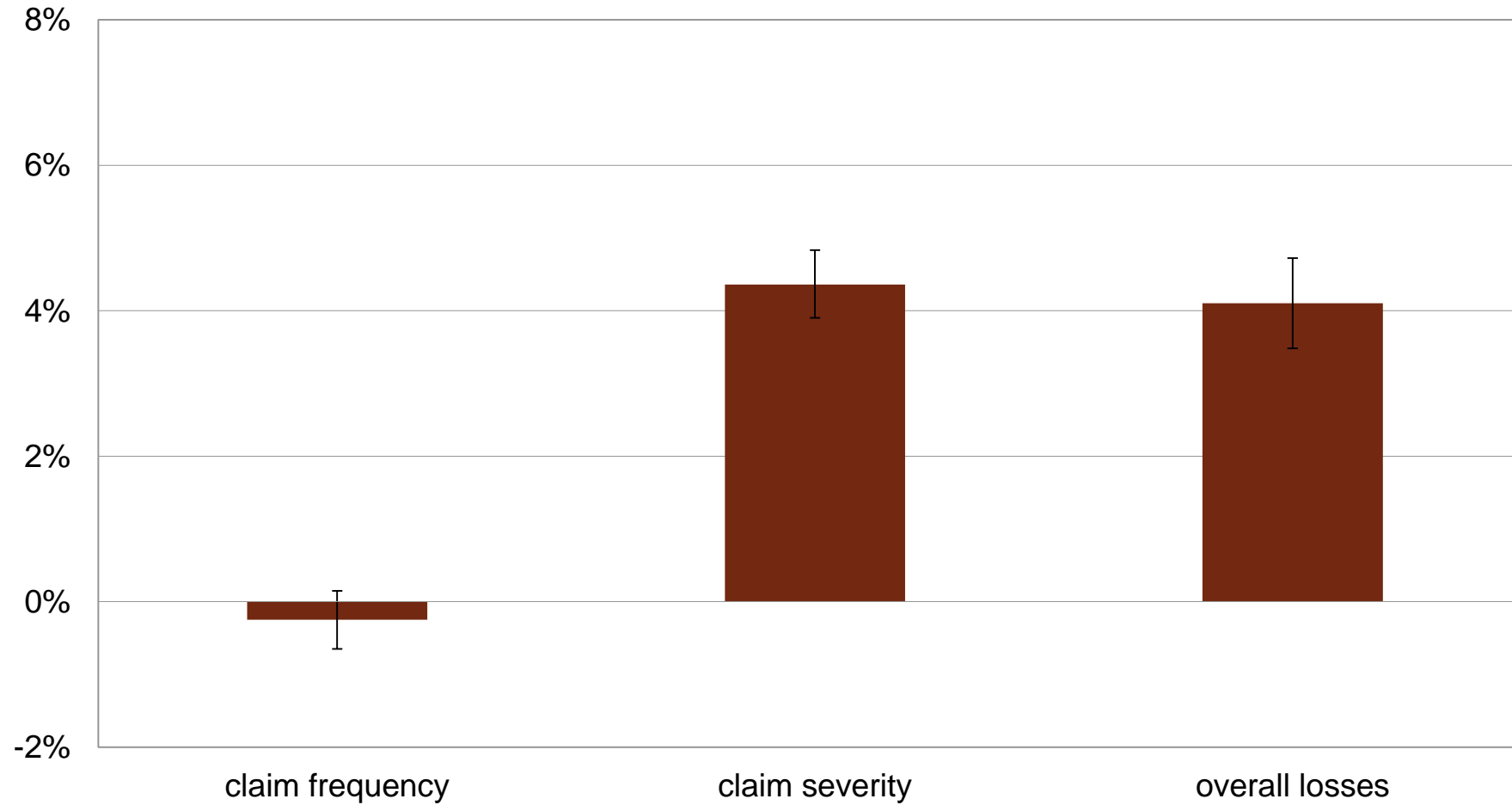
Turbo and supercharged engines

Pooled

turbo/supercharged exposure (years)	12,925,939
non-turbo/supercharged engines exposure (years)	21,967,095
calendar years	2005-16
unique make, series, model, engine price points	December 2016: 1,556 April 2017: 5,032
covariates	calendar year, model year, make, series, state, vehicle density, rated driver age group, gender, marital status, deductible, risk, base price, horsepower-to-curbweight ratio
method	vehicle series that have models with and without turbo/supercharged engines

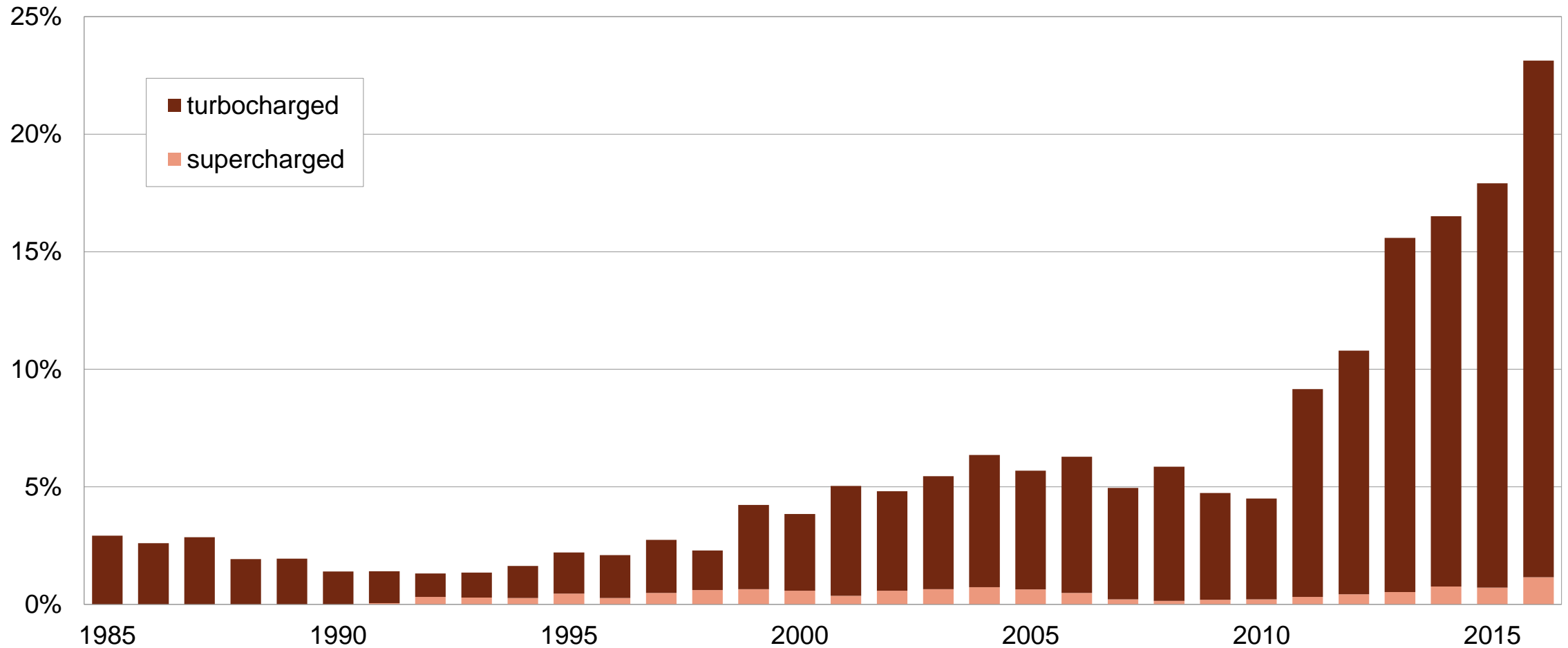
Turbo and supercharged engines

Collision losses



Percent of vehicles with turbo and supercharged engines

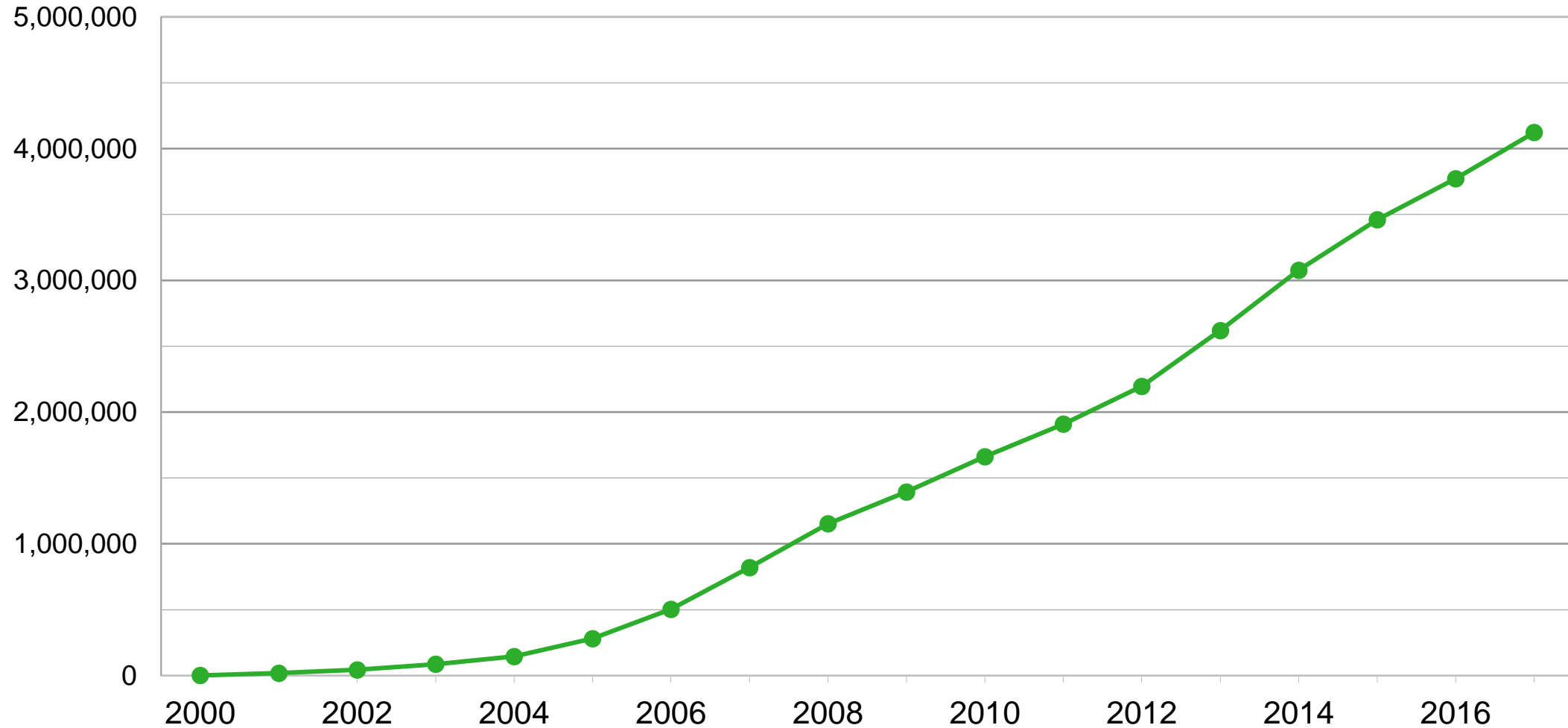
By model year



Hybrid and electric vehicles vs. conventional counterparts

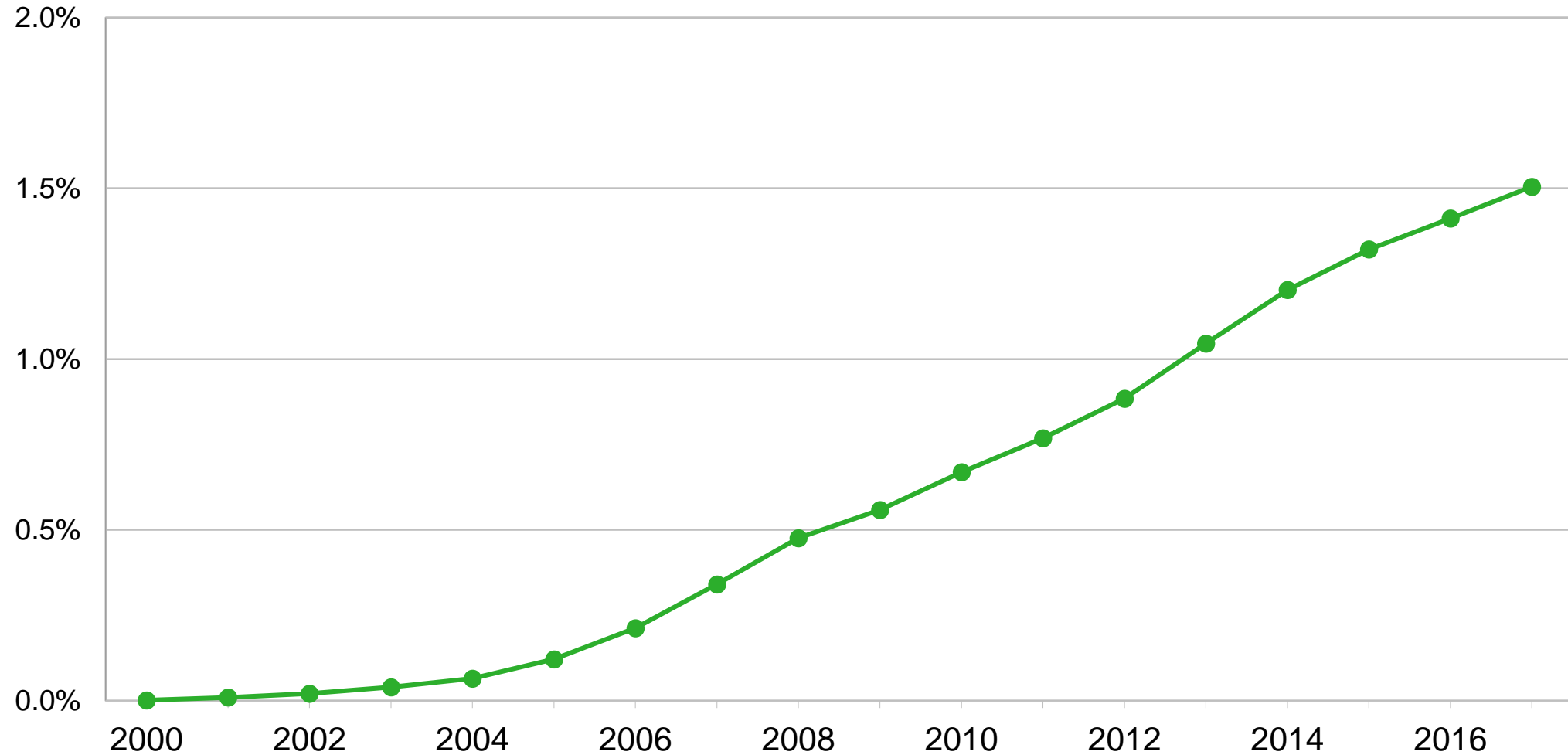
Registered hybrid vehicles

Calendar years 2000–17



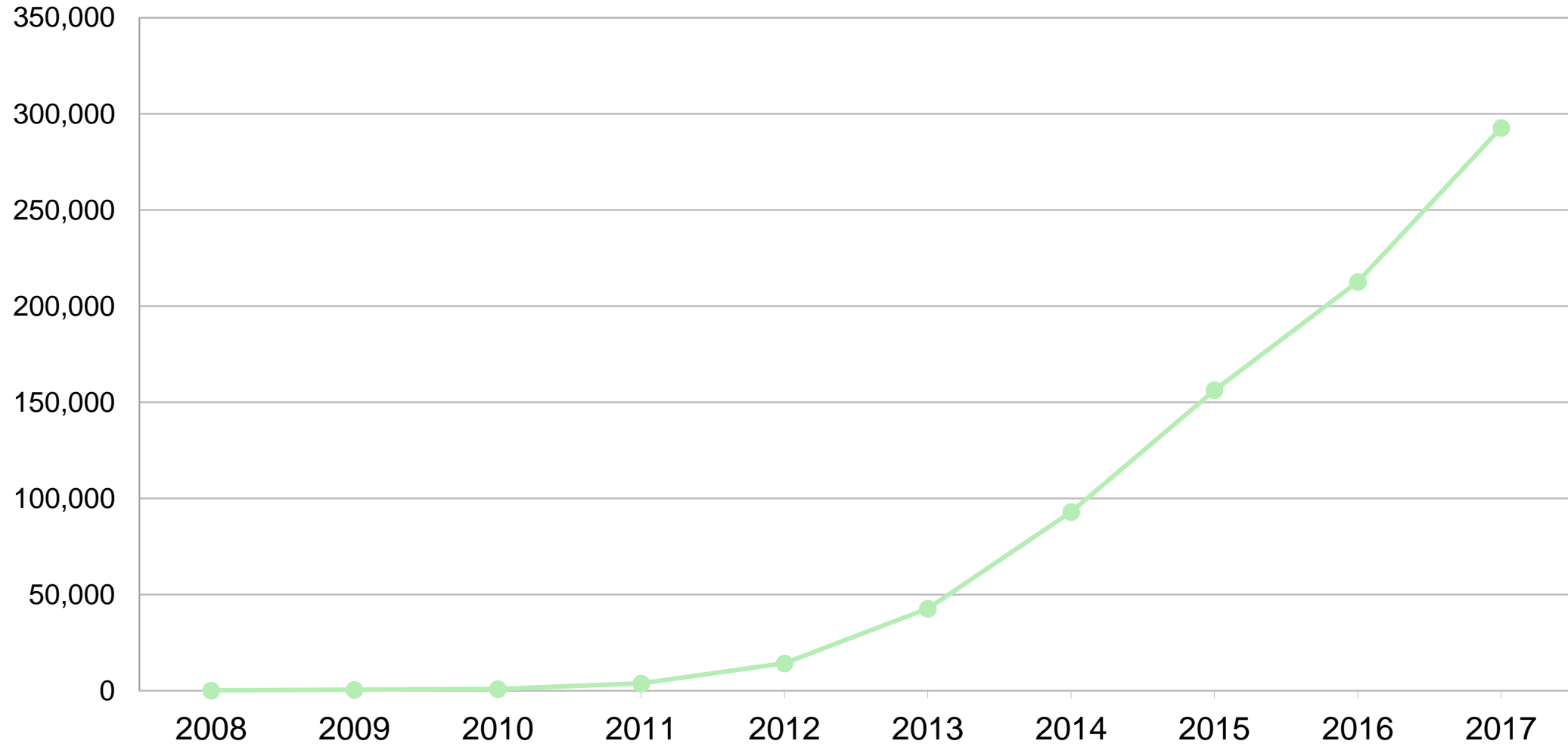
Percent of hybrid vehicles in registered vehicle fleet

Calendar years 2000–17



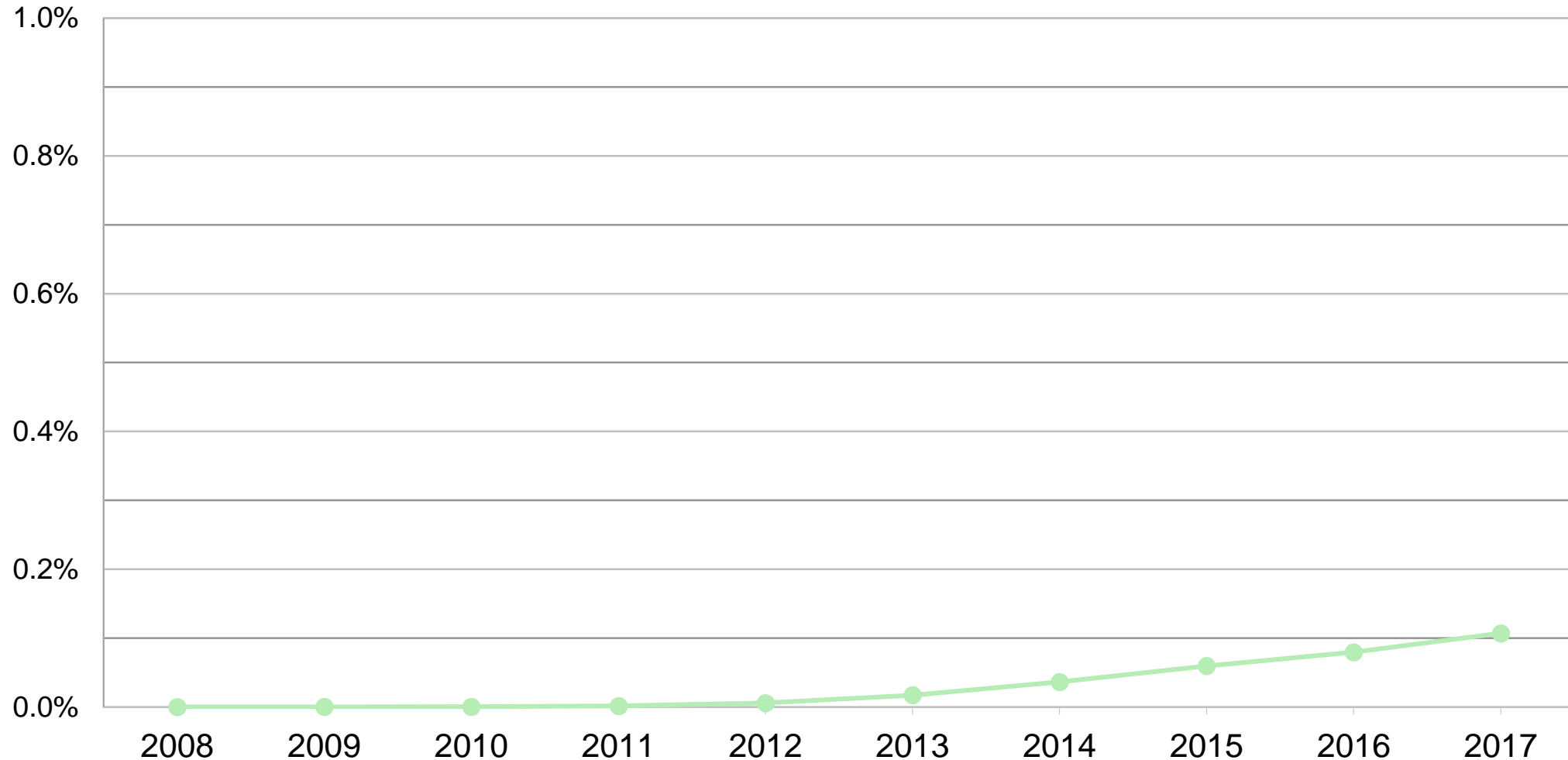
Registered electric vehicles

Includes all electric vehicles, calendar years 2008-17

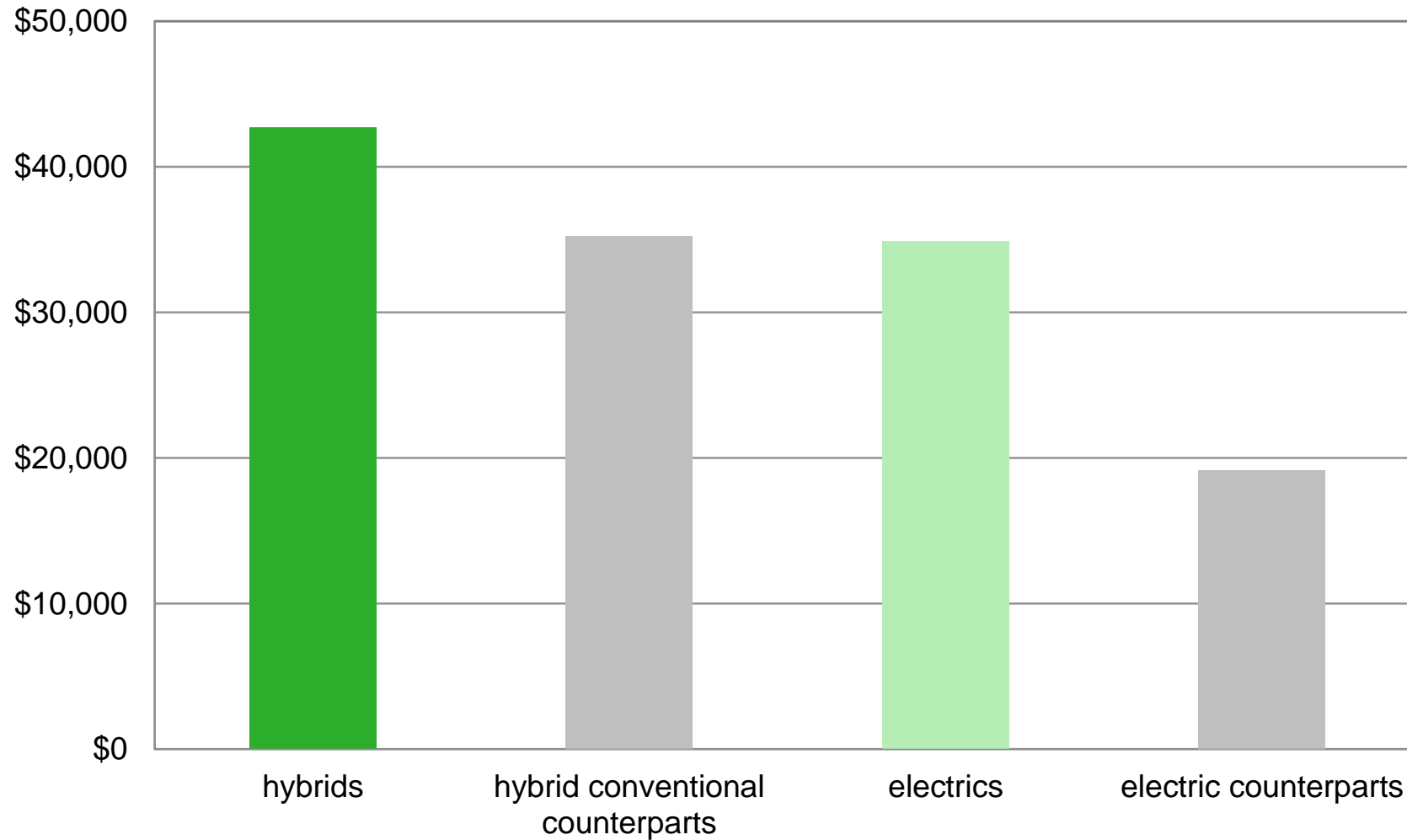


Percent of electric vehicles in registered vehicle fleet

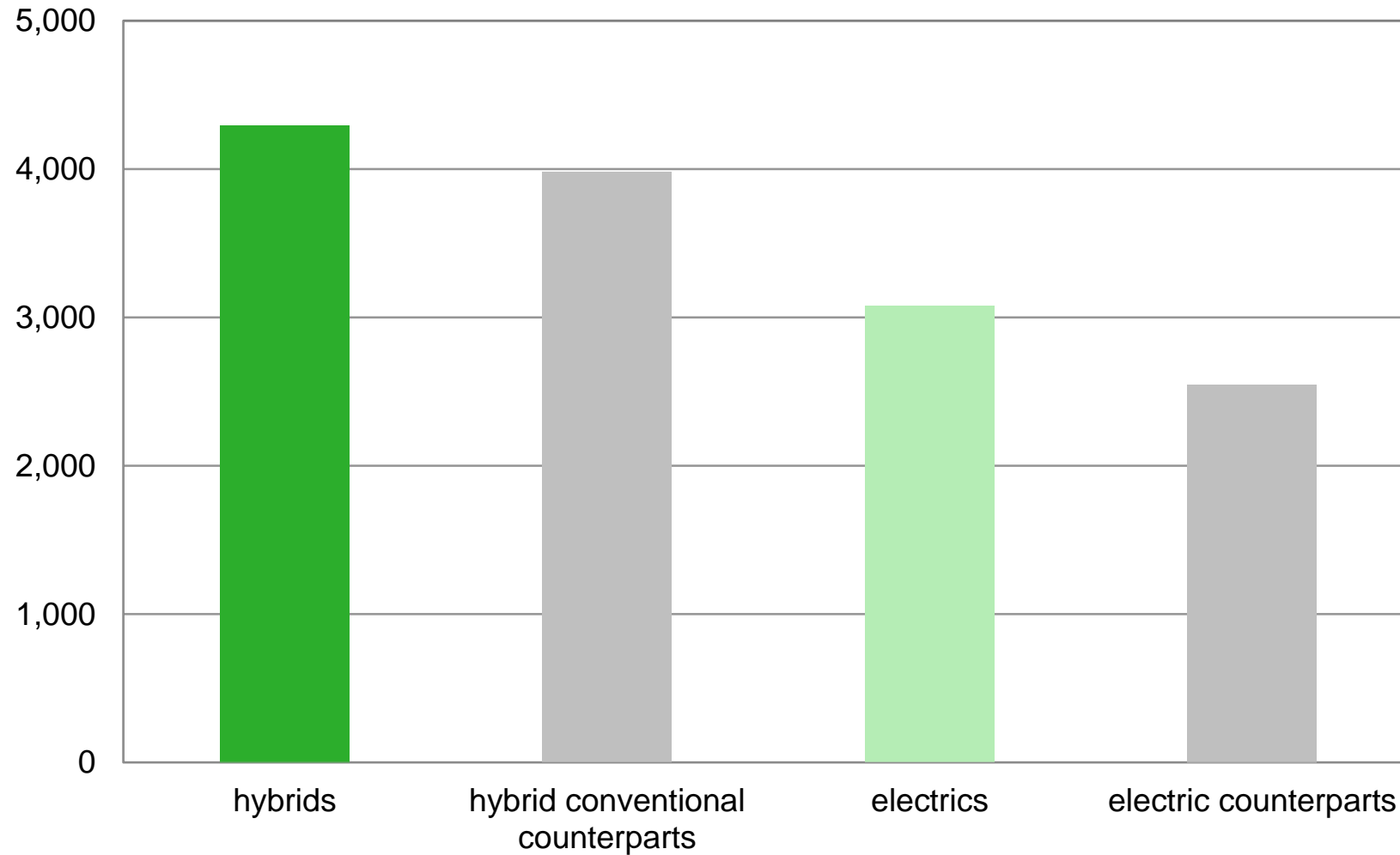
Includes all electric vehicles, calendar years 2008-17



Average base price



Average curb weight (lbs.)



2017 Porsche Cayenne 4WD



2017 Porsche Cayenne 4WD

Base price: \$60,650

Curb weight: 4,488 lbs.

2017 Porsche Cayenne hybrid 4WD

Base price: \$79,750

Curb weight: 5,181 lbs.

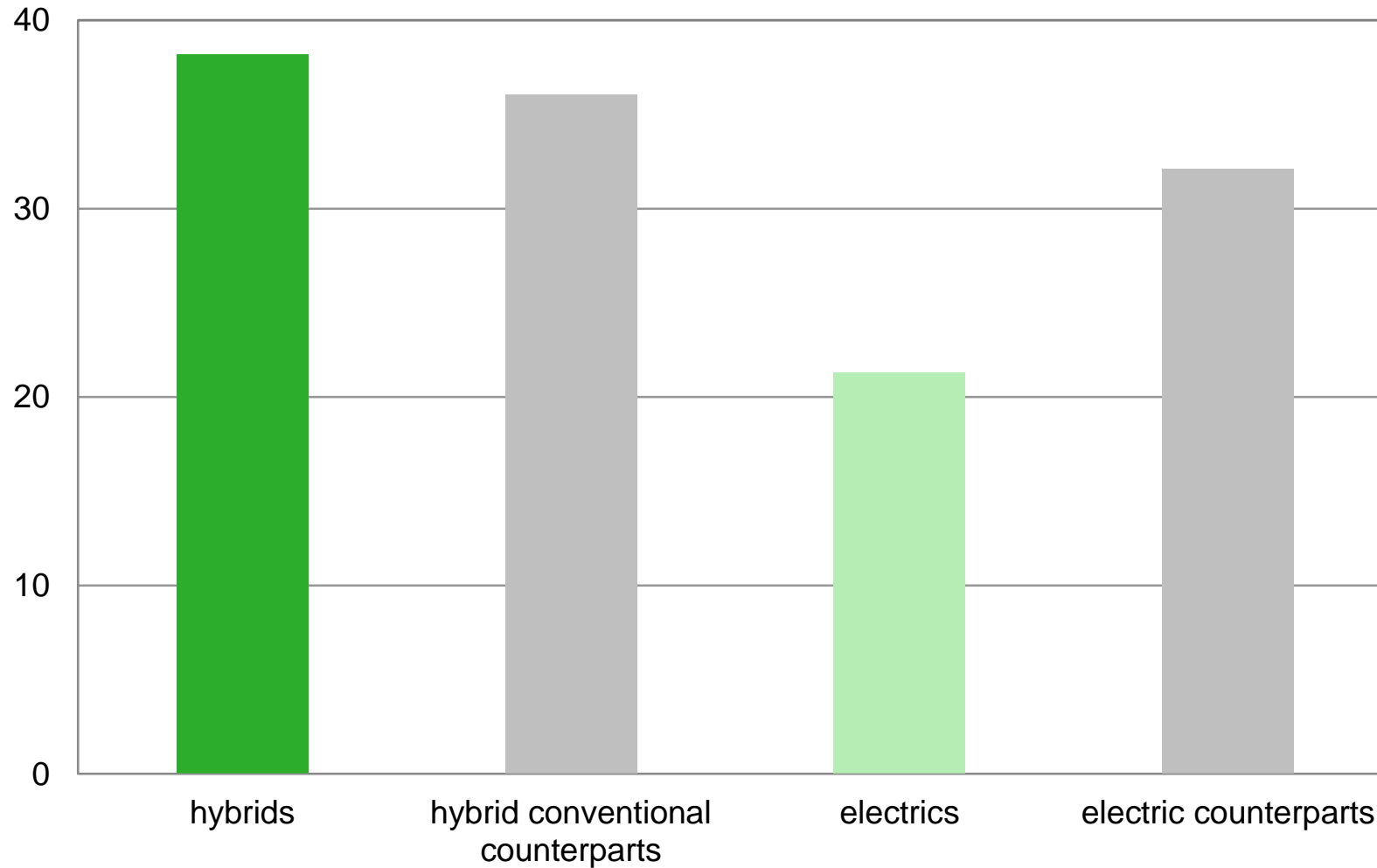
2017 Kia Soul station wagon



2017 Kia Soul station wagon
Base price: \$18,400
Curb weight: 2,884 lbs.

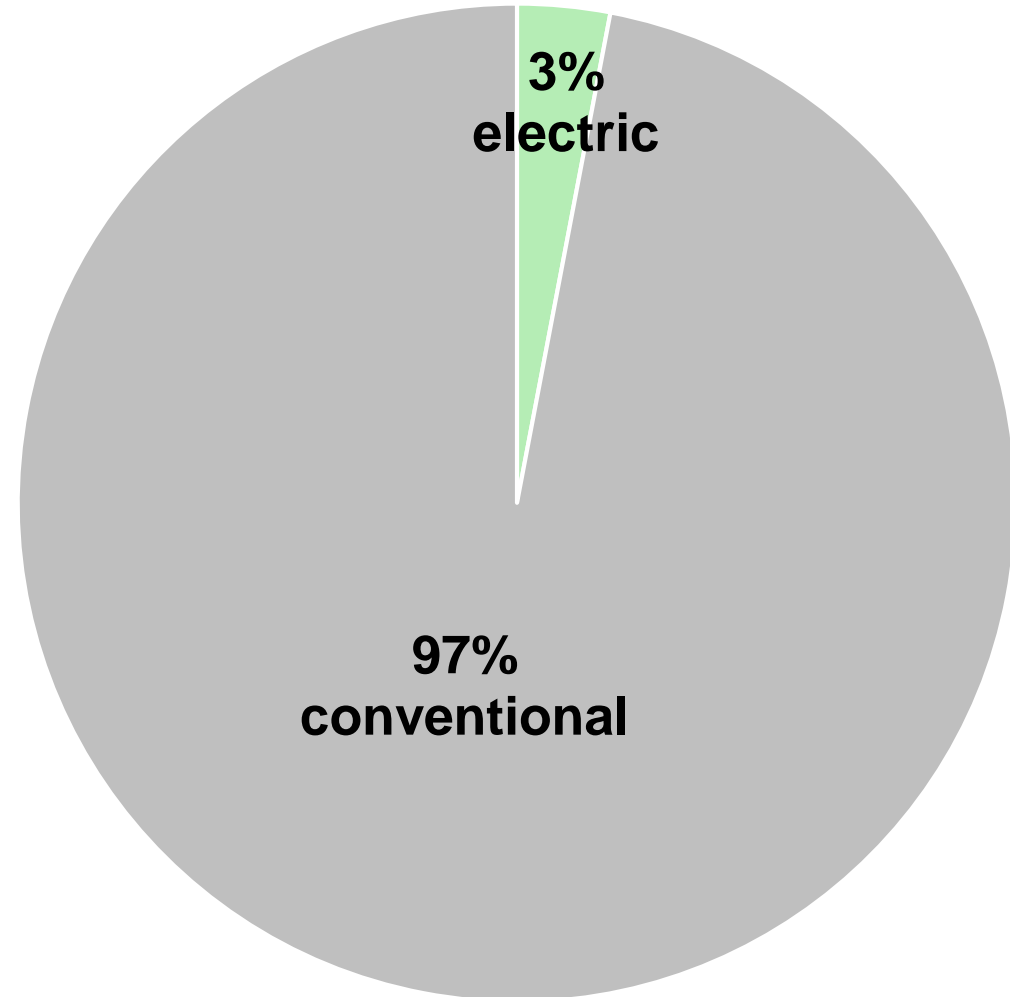
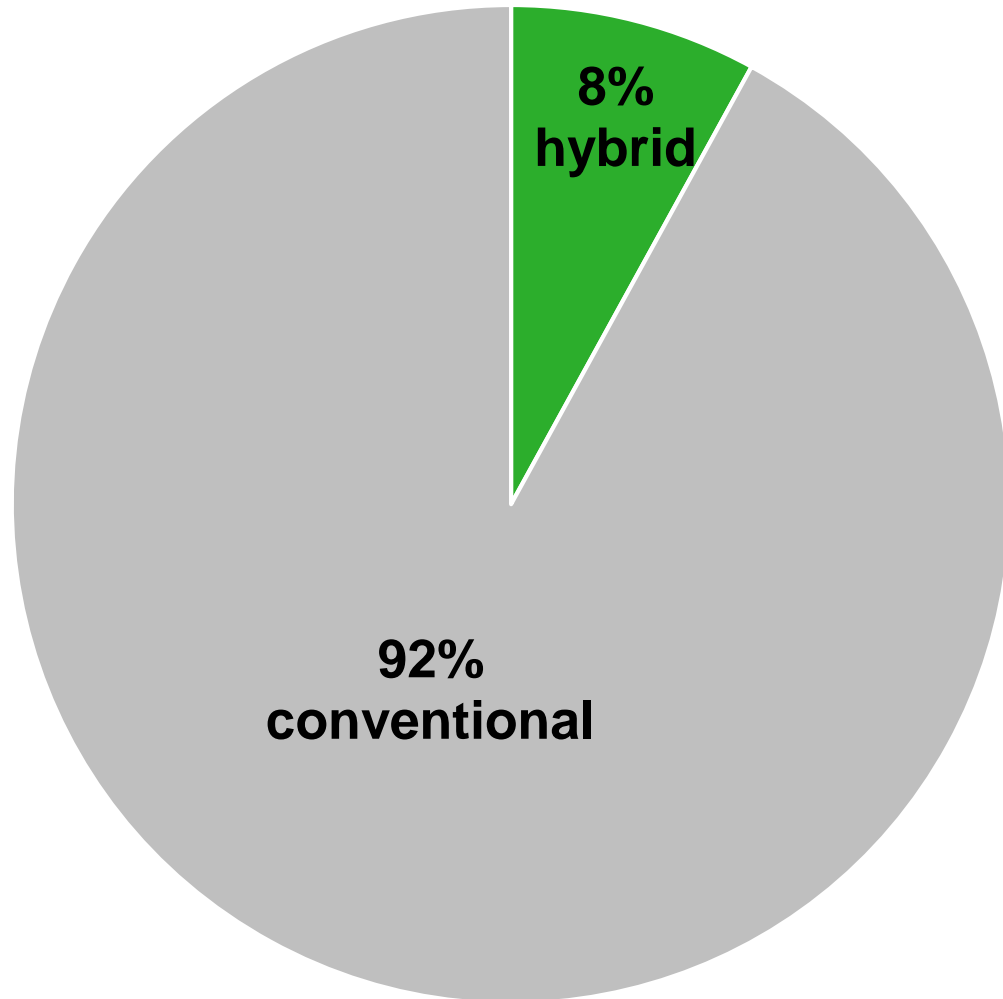
2017 Kia Soul electric station wagon
Base price: \$33,145
Curb weight: 3,289 lbs.

Average miles per day



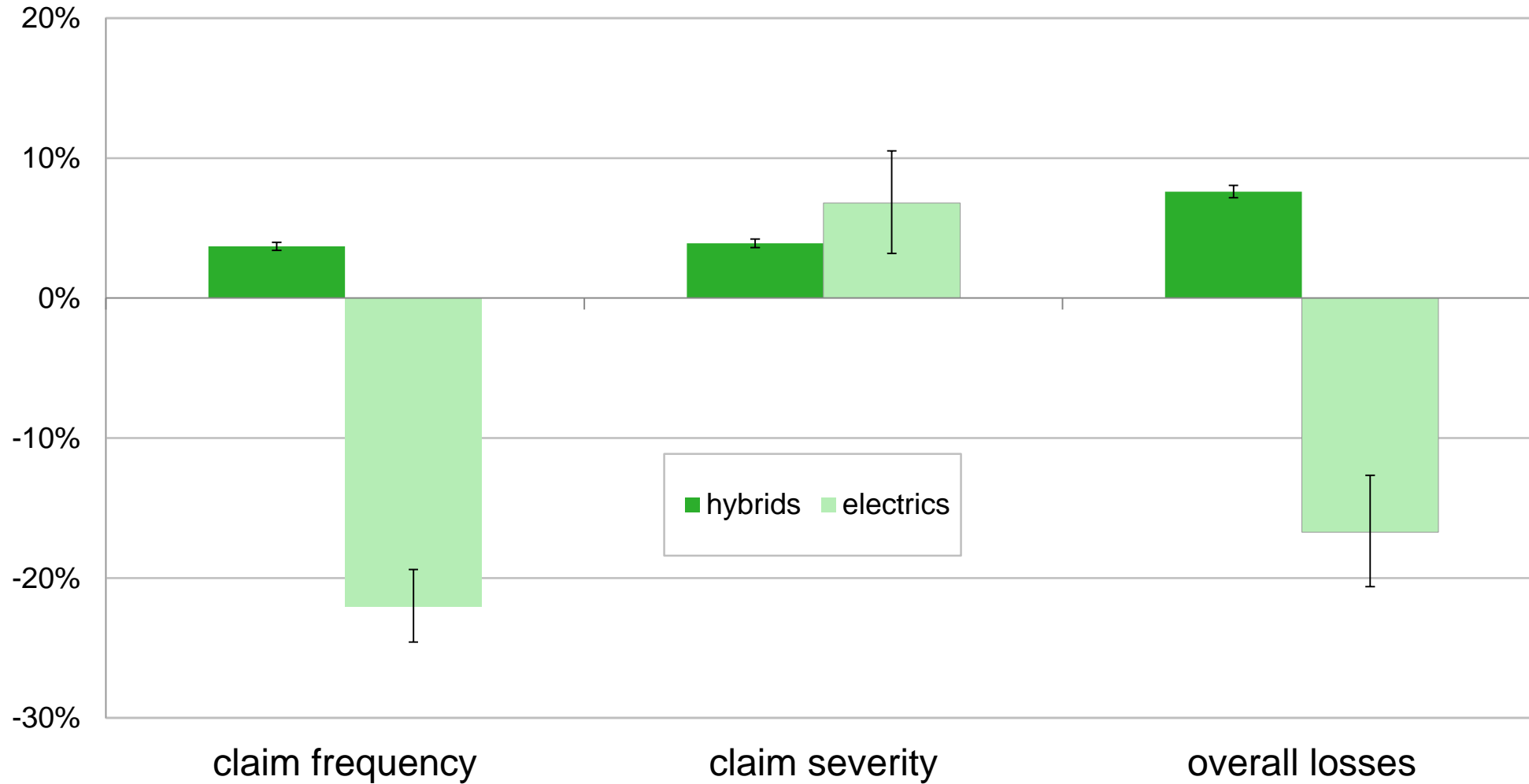
Hybrid and electric vehicles and their conventional counterparts

Percent of study exposure



Estimated collision losses

Hybrid and electric vs. conventional



Estimated PDL losses

Hybrid and electric vs. conventional

