



The Case for Galvanizing in Indian Automobiles



Agenda

- ☐ Present Status of Indian made Automobiles
- ☐ Value Proposition for Galvanizing
- ☐ Cost benefit
- ☐ Case Study : North American Light Weighting Challenge
- ☐ Hyundai Success Story
- ☐ Future Steel Vehicle & IZA GAP program
- ☐ Summary

Galvanizing in Indian Automobiles

A joint initiative by

Hindustan Zinc Ltd



International Zinc Association



Car buyers in Europe, North America, South Korea and Japan have benefitted from unique protection warranties for decades..... Isn't it time for Indian consumers to also benefit?

- 1 India is the 6th largest car manufacturer in the world
- 2 Global Carmakers Offer : Anti perforation warranty for up to 12 yrs
- 3 Galvanizing : The Right Starting Material for Perforation Warranties
- 4 Improved Safety performance of the Car
- 5 Leads to Weight Reduction & Reduced Emissions
- 6 Improved Fuel Efficiency
- 7 Reduction in TCO/ Life Cycle Cost

India's Automotive Landscape

2nd

2 Wheelers



China
India

2nd

Buses



China
India

3rd

Heavy Trucks



China
Japan
India

6th

Cars



China
Japan
Germany
S Korea
USA
India

7th

Commercial Vehicles



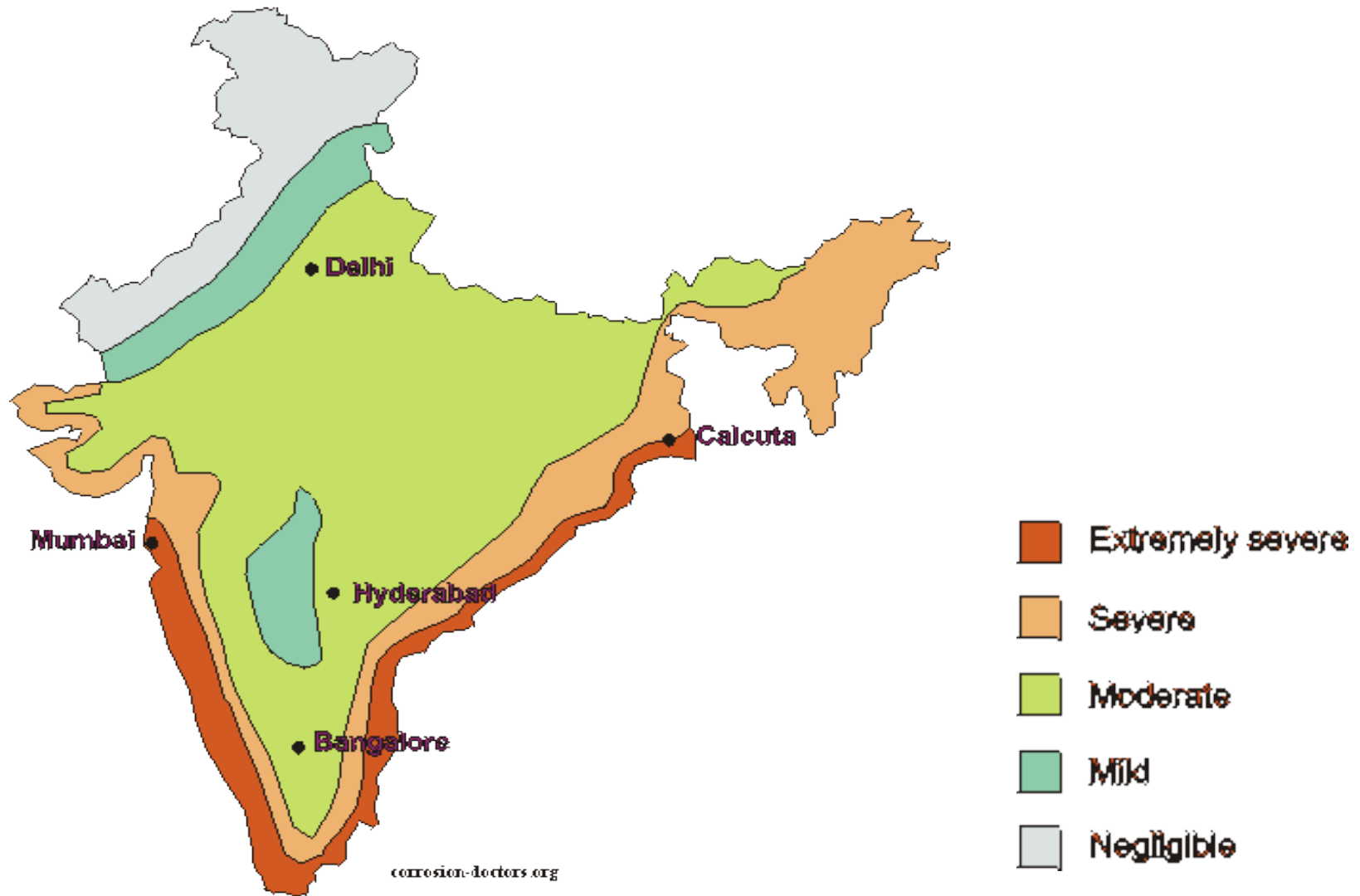
USA
China
Thailand
Canada
Japan
Mexico
India

Ranking is for Production Data

Indian Auto Production in 2015 and Growth History (million units)

Category	2010-11	2011-12	2012-13	2013-14	2014-15
Passenger Cars	3.124	3.146	3.230	3.088	3.220
Commercial Vehicles	0.912	0.929	0.833	0.699	0.698
3-Wheelers	0.878	0.879	0.840	0.830	0.949
2-Wheelers	15.454	15.428	15.744	16.883	18.500
Grand Total	20.368	20.382	20.648	21.500	23.366

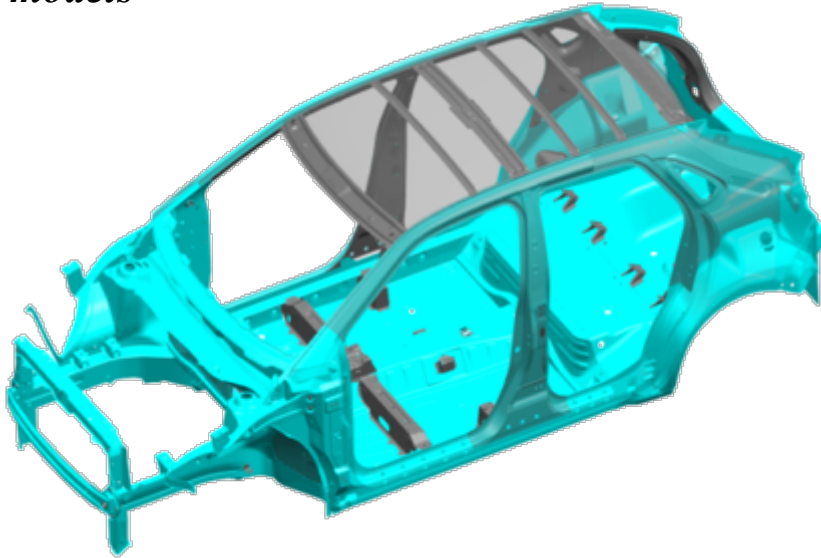
In India up to 5% of GDP is lost every year to corrosion



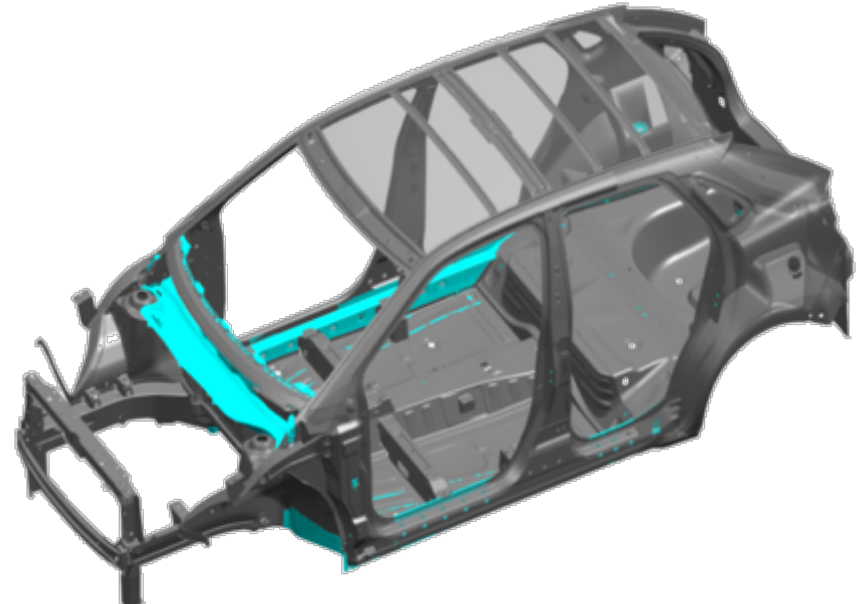
Cars are susceptible to corrosion!

Automobile Industry: Present Scenario in India

- *Galvanized steel has been used for decades in Europe, NA, Japan & South Korea for exterior and interior body panels. Anti perforation warranties are standard offerings*
- *When Indian cars are made from galvanized steel, they have the same look and feel as International cars. However, Indian car companies do not give anti perforation warranties*
- *India has started using galvanized and galvaneal steel for body panels, but only for export models*



For Export models, 70% of the body in white is galvanized (blue)



For Domestic models, 3% is galvanized; in some new models, up to 20% is galvanized

India has 3 domestic Automotive Exposed Quality galvanized steel suppliers

Company	Location	# CGL's	Capacity MT	GI	GI / GA	AZ	T X W mm	Zinc Usad KT	AE Capability
Bhushan	Ghaziabad, Uttar Pradesh	4	400,000	3		1			No
Bhushan	Khopoli, Maharashtra	2	200,000	1		1			No
Essar	Hazira, Gujarat	2	500,000	2					No
Essar	Pune, Maharashtra	1	450,000	1					No
JSW	Tarapur, Maharashtra	5	750,000	3	2				Yes - GA
JSW	Vasind, Maharashtra	2	400,000	2					No
JSW	Kamleswar, Maharashtra	2	330,000	1		1			No
POSCO	Mangaon, Maharashtra	1	400,000		1				Yes - GA
SAIL	Bokaro, Jharkhand	1	170,000	1					No
SAIL	Rourkela, Odisha	1	290,000	1					No
Tata	Jamshedpur, Jharkhand	2	450,000	1	1		1560 mm	15.5	Yes - GA
Tata Bluescope	Jamshedpur, Jharkhand	1	200,000			1			No
Uttam Galva	Khopoli, Maharashtra	2	200,000	2			1250mm		No
Indian Steel		2	370,000	2					NoNo
Lloyds	Wardha, Maharashtra	1	125,000	1					No
Metalman	Pithampur, Madhya Pradesh	1	70,000	1				2.8	No
National	Sejwaya, Madhya Pradesh	1	280,000	1					No
RSAL (Ruchi)	Indore, Madhya Pradesh	1	55,000	1					No
Steelco	Palej, Gujarat	1	80,000	1					No
Shree Precoat	Sanaswadi, Maharashtra	2	500,000	2					No
Vardhman	Patiala, Punjab	1	50,000	1			.14 - .80; 1100mm		No
TOTALS		36		28	4	4			

How Galvanizing leads to anti Perforation Warranties

- Galvanizing is a controlled coating of Zinc on Steel in order to protect it from corrosion
- Zinc sacrifices itself to protect the strength and safety of steel in the automobile body-in-white

Honda



12 year anti-corrosion & perforation warranty

12 year unlimited mileage cover* that protects against rust perforation affecting sheet metal body panels as a result of a manufacturing fault. This warranty can also be transferred to any future owner throughout the 12 year period.

*Light commercial vehicles (Hilux and Proace) subject to 6 year anti-corrosion and perforation warranty.

*Galvanized Steel :
The right
STARTING
MATERIAL for
car bodies*

Structural Corrosion Warranty (12 Years)

Honda warrants that the Honda car specified on your Warranty Certificate is free from corrosion from the inside to the outside of body panels for the period of 12 years unlimited mileage from the "Warranty Start Date" as specified on your Warranty Certificate.

During this period Honda will rectify, free of charge, any such defects found on the car, subject to the Warranty conditions in your Service Book.



All this at what cost ?

Benefits of Galvanizing

☐ Corrosion resistance / Anti perforation warranties



Cost

☐ *Galvanizing adds only 0.02% to the cost of the car*

☐ One time cost with no maintenance costs for first 5 years

Costs in INR / car		Non Galvanized		Galvanized	
	Est. Price	Towards		Est. Price	Towards
Year 1	7000	Initial coatings (Teflon/UV protection/Underbody)		9000	Galvanized
Year 2	1000	Maintenance			Anti perforation/ surface rust warranty for 5 years minimum
Year 3	3500	Repeat teflon			
Year 4	1500	Maintenance			
Year 5	3500	Repeat teflon			
Year 6	2500	Maintenance		1000	Only touch up
Total Cost : 6 yrs		19,000		10,000	

The Road Ahead

Learning from International Auto makers

The Road Ahead

Cooperative Initiatives:

- ❑ World Steel Future Steel Vehicle
- ❑ IZA Galvanized Auto body Partnership (GAP)

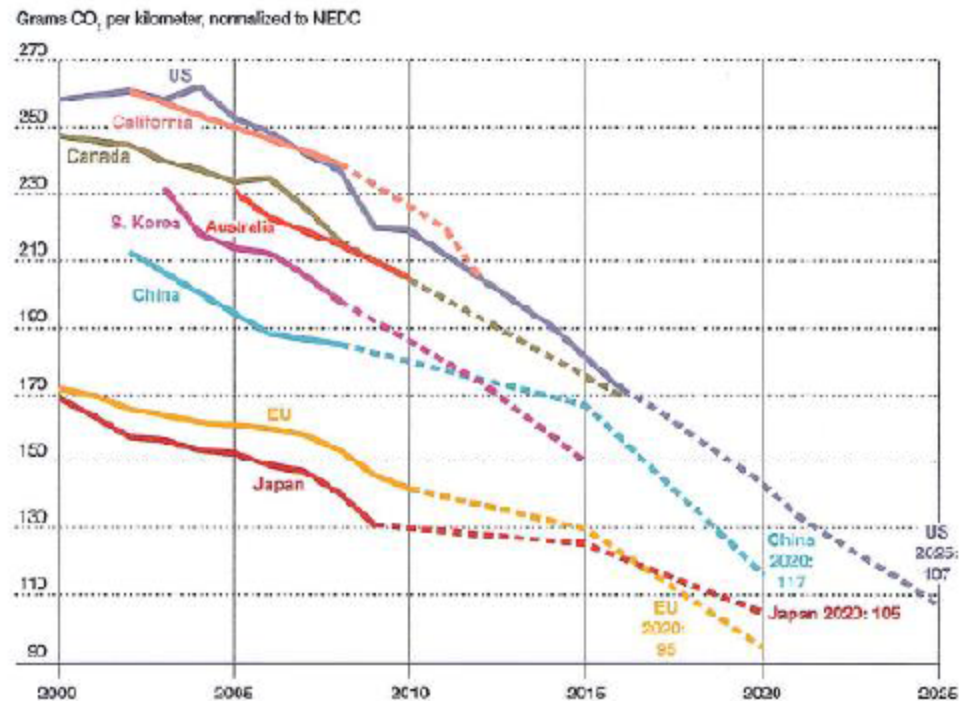
FutureSteelVehicle

1. State-of-the-future development process
2. 177 kg body structure mass - *39% mass reduction*
3. 97% use of HSS and AHSS
4. Nearly 50% GigaPascal steels
5. Enables 5-star safety ratings
6. Nearly 70% Total Lifetime Emissions Reduction
7. Mass savings at no cost penalty
8. Near-term production-applicable solutions



100 kg weight reduction = 0.4 L/100km improvement & less emissions

Tailpipe Emissions Standards More Stringent Globally



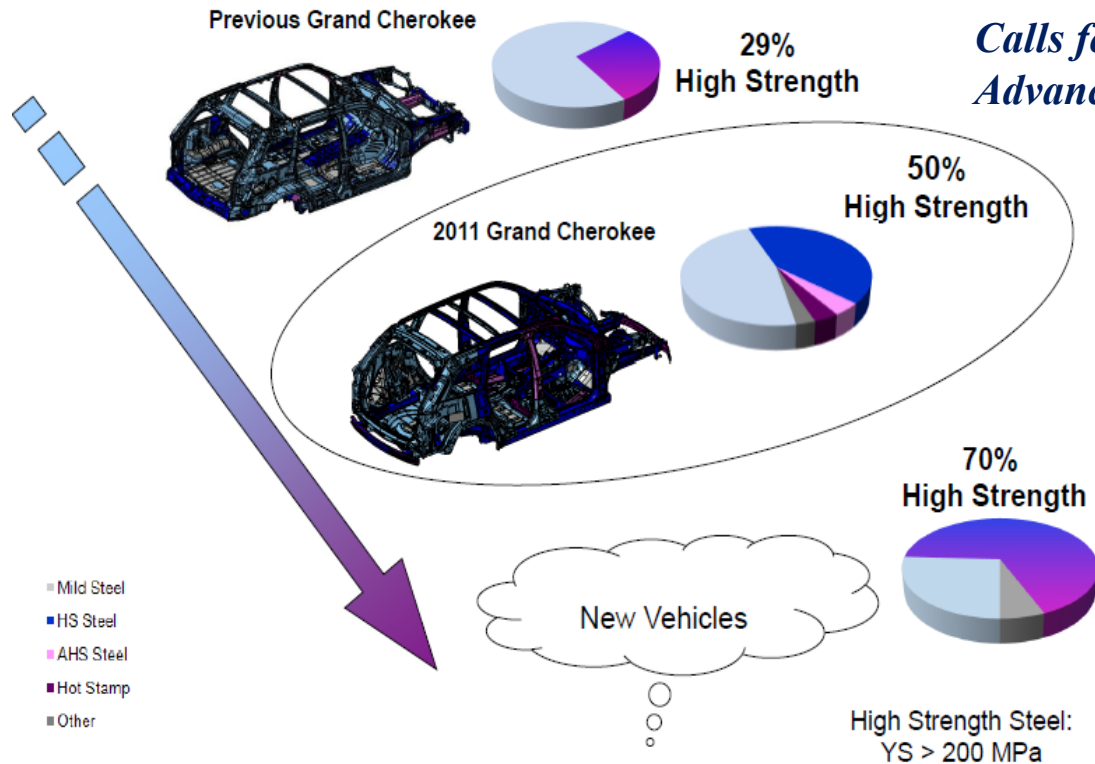
Source: International Council on Clean Transportation August 2011



www.worldautosteel.org

Reduction in Emissions & Light weighting Go Hand in Hand

USA CAFE regulations (54.5 mpg by 2025)
Similar for Europe: 95g/km of emissions by 2021



*Calls for more use of
Advanced High Strength Steel*

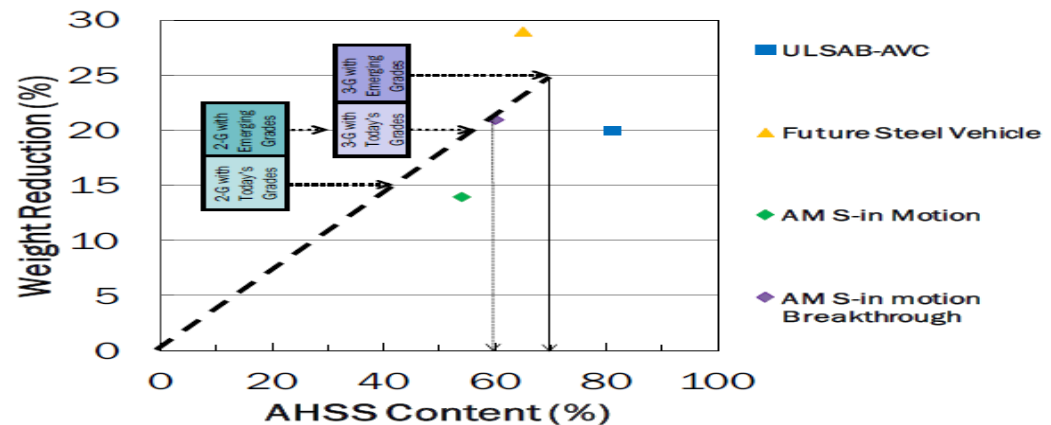
Reduction in Emissions & Light Weighting Go Hand in Hand

Material Production GHG comparison for a functionally equivalent component - **example**

	Mid-Range CO ₂ e	Estimated Part Weight (kg)	(kg CO ₂ e)
Mild Steel	2.3	100	230
Advanced High-Strength Steel	2.3	75	173
Aluminium	11.3	67	757
Magnesium	46.0	50	2300
Carbon FRP	22.0	45	990

Use of Advanced High Strength Steel (AHSS) leads to significantly lower emissions

How much weight reduction can steel provide?



Hyundai Sonata Success Story



HYUNDAI

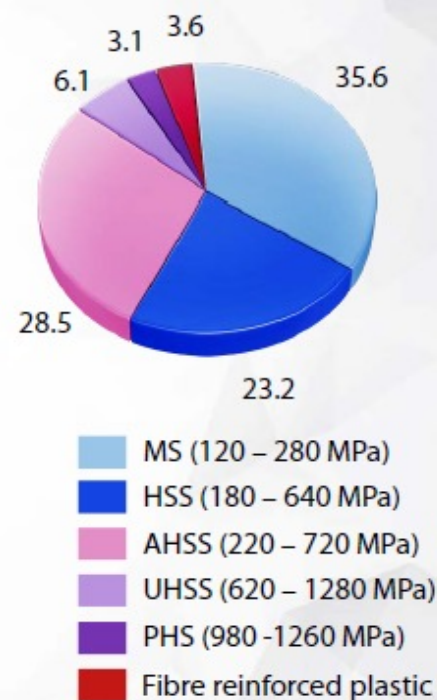
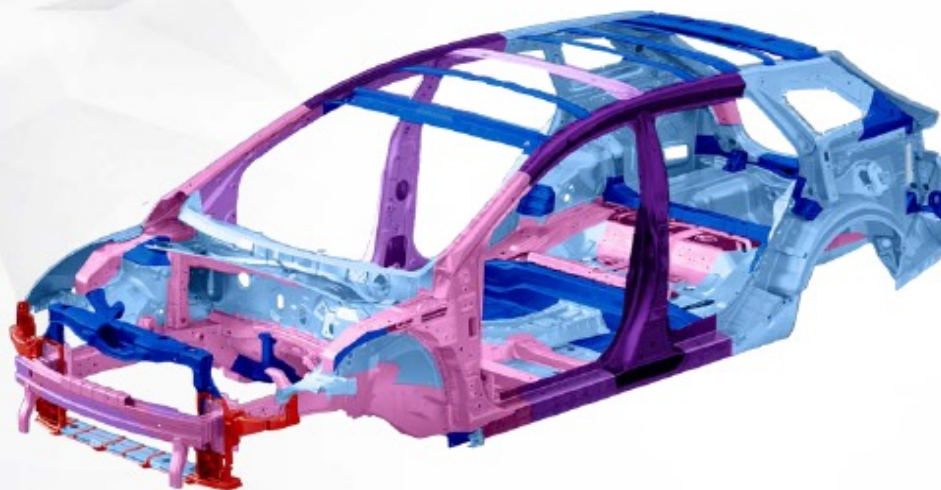
NEW THINKING.
NEW POSSIBILITIES.

i40

Product Concept / BIW Concept

Weight optimization

- Achieved a 7.6% reduction in BIW weight compared to predecessor.



Lower TCO and Improved Fuel Efficiency

Hyundai Sonata



HYUNDAI

NEW THINKING.
NEW POSSIBILITIES.

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Product Concept / BIW Concept

Efficiency

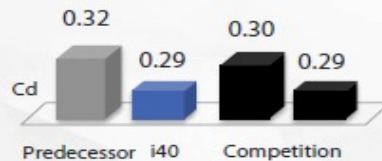


Strong TCO performance through:

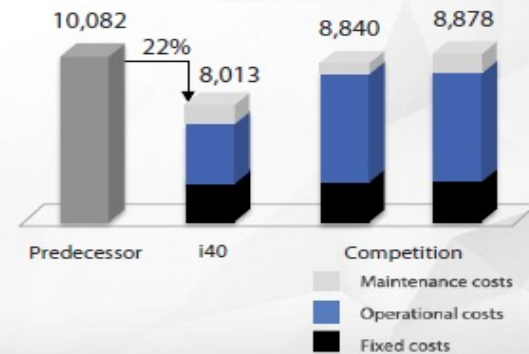
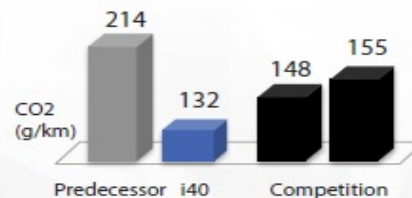
- High residual value
- 5-year triple care program
- Competitive RCAR performance

Total cost of ownership:

Aerodynamics



Fuel efficiency



Hyundai Sonata at GDHS Conference 2013

Product Concept

IZA GAP program & GAP Members

19 Global Steel Companies

7 Equipment Suppliers, 1 Automaker, and IZA Members

Funding of USD 1Mn +



In Summary: India's Automobile Industry will Prosper

- **India is set to become the fourth largest automotive producer in the world by 2020**
- **Automotive sector is the second largest market for steel, consuming about 10 million tons of steel and will grow significantly in the coming years**
- **With the increasing demand for Indian made automobiles, there will be growing demand for high strength galvanized steel, which will account for nearly 70% of the total car body weight.**
- **The performance and durability of Indian made cars will benefit from the use of galvanized steel**
- **Consumers will benefit from better fuel efficiency, lower emissions and safer vehicles with anti perforation warranties**

Reference: 1) Steel perspectives for the automotive industry, P. Blain

2) Metals and Mining Sector Report, 2015, India Brand and Equity foundation

Thank You