How Green is Stainless Steel?

How does it contribute to Sustainable Development?

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- How Green a material is, and to what extent it contributes to sustainable development, are very important considerations for materials decisions by environment-conscious purchasers.

- By the same token, stainless steel industry personnel should know fully well about the “green credentials” of our material.

- What is “Green”?

  Leaving minimal carbon footprint, or minimal CO_2 emission during production and processing.
- Sustainable: minimum usage for the present generation, leaving a lot of earth’s resources for future generations.

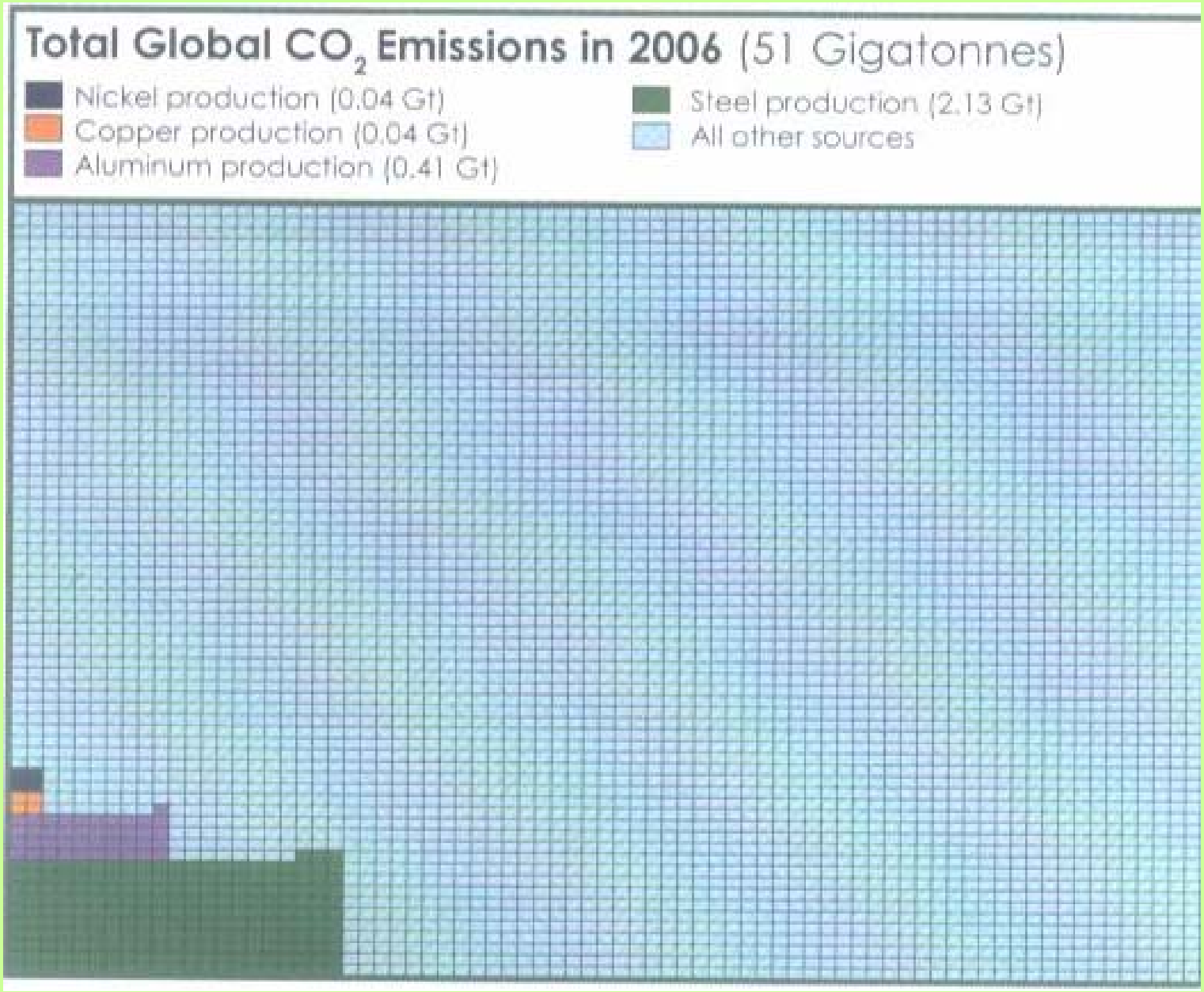
- The important question is whether

Stainless steel is part of the problem

OR

Part of the solution to Climate Change?

- The fact is: Every process does lead a carbon footprint, whether it is industrial processing or agriculture.
- First, we will see how infinitesimal is the contribution of stainless steel to global warming.


Total Global CO_2 Emissions in 2006 (51 Gigatonnes)
Nickel production (0.04 Gt)
Copper production (0.04 Gt)
Aluminum production (0.41 Gt)
Steel production (2.13 Gt)
All other sources

- The steel industry as a whole emits 2.13Gt of CO2 out of a total global emission of 51Gt, i.e. about 4.2%.

- Stainless steel tonnage worldwide is only 2-3% of carbon steel tonnage. Stainless industry's share of CO2 could be only about 0.12% of global emission.

Meat Production accounts for nearly 20% of GH Gases! (FAO)

World feels the heat from meat

TIMES NEWS NETWORK

New Delhi: R K Pachauri, chief of the Nobel prize winning UN climate change panel, has spiced up the debate on kebabs and steaks by suggesting that the best and easiest way of stemming climate change is to not eat meat at least one day each week. What has eating meat got to do with climate change, you may ask. A lot, actually.

The FAO calculates that meat production accounts for nearly a fifth of global greenhouse gas emissions. The emissions arise not because you eat and belch or fart but in the way land is cleared, and feed for animals is grown. And also how the livestock emit methane, when it belches or farts, which is 23 times stronger as a climate-changing agent than carbon dioxide.

So, Pachauri's suggestion that the world should be biting into meat a little less seems a good idea. But the world is not a monolith. As in emissions, for which the rich countries are much more responsible than the poor ones, so with meat. Some eat it; others gobble it.

A citizen of UAE eats nearly 100 kg of poultry products per person annually. India might be famous for its tandoori chicken, but an average Indian eats just 2.1 kg of poultry products per person per year according to the US Department of Agriculture. An average American chews upon 46 kg of chicken in a year, a Chinese 8.7 kg.

The story is the same for beef. An average Indian consumes 1.6 kg of beef and buffalo products while an average American eats 41.7 kg every year and a Brazilian 37.6 kg.

▶ Go veg, help save the world? P 17

BIGGEST HEATERS

	India	Global
Energy	61	26
Industry	8	19
Agriculture	28	14
Forestry	1	17
Waste	2	-
Transport	-	13

Greenhouse gas emissions in % from different sectors

Annual consumption
Per capita in kg

Poultry

Beef


POLLUTION
UNDER
CONTROL

- Having established how small is the CO_2 footprint of stainless steel production, let us address the question of how stainless steel contributes to sustainable development.

- In the first place, more than 60% of the charge that goes into the furnace for making stainless steel is scrap. This means less ore is depleted from the earth’s crust for Fe, Cr, Ni etc. Scrap ratio keeps increasing, sometimes, even 100% scrap is charged.
- Second, stainless steel products last for a very long time, usually many decades. No need to go looking for fresh supplies for a long time; less need to mine.

During service, stainless steels hardly ever degrade. No loss of material during service and hence

A) 100% material available for recycling.

B) No pollution of the environment by corrosion products.

C) Paints, usually needed for protection of substrates, not needed for austenitic stainless steels.

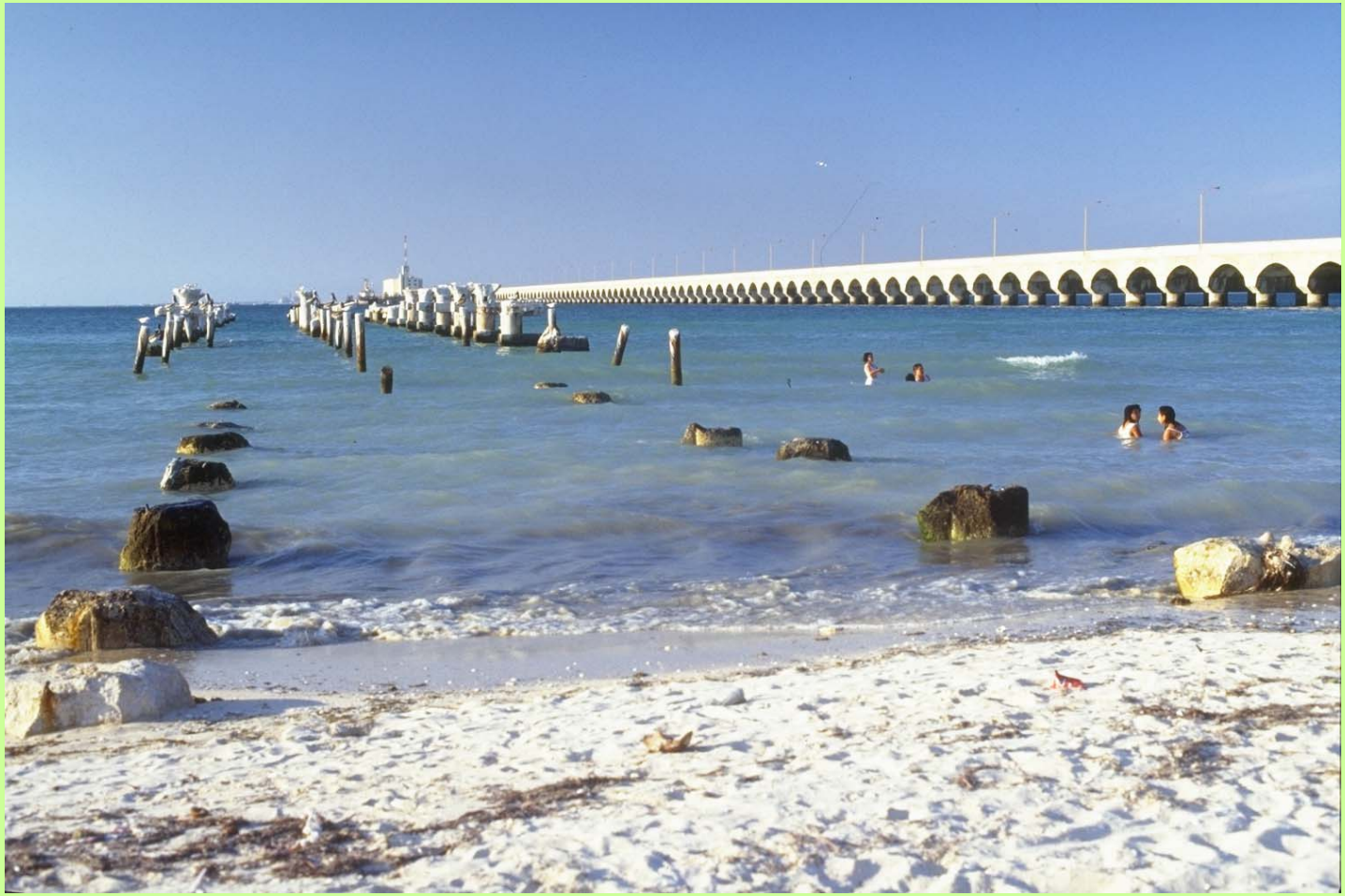
- Recycling does not deteriorate the quality of stainless steel. Even hygienic surgical equipment are made from recycled stainless steel. Very Safe!

Stainless Steel:
One Of The World's Most Recycled Materials

- In short,

Stainless Steel is one of the world's most recycled materials.

Helps other materials last longer



Extending the Life of Japanese Apartments to 200 years

An ‘all-stainless steel’ piping system aims to extend the life of residential high-rises

Steeled Against the Elements
Withstand Direct Hurricane Hit at 250 kmph

Saving Energy

PHOENIX CITY HALL
Perforated, polished stainless steel window shades; US$285,000 one time capital savings in installing A/c equipment; US$200,000 annual air conditioning savings in electricity

Largest Gold LEED Certified Building:
Pittsburgh Convention Center.

Notice the large bare stainless steel roof

Helps clean energy production

- Intergovernmental Panel on Climate Change recommends doubling nuclear power production to minimize global warming. This will reduce fossil fuel combustion.
- Huge quantities of stainless steel required for each nuclear plant.

Helps LNG supplies

- LNG is a clean fuel and its liquefaction, storage, transport and regasifiation need cryogenic materials like 304/316. Not many materials can withstand -196 C and be ductile at those temperatures.
- Mild steel, for instance, would become brittle at -20C.

Helps reduce GH emissions—through biogas route for generation of electricity. The biogas would otherwise be burned and add to CO2 emissions. Fossil fuel use reduced.

- Austenitic stainless steels are the most cost-effective material for the systems that clean and compress corrosive biogas prior to combustion.

Helps in cleaning the environment

- Automotive exhausts using catalytic converters use stainless steel for containment because of their elevated temperature properties.
- Electrostatic precipitators and other environmentally friendly waste containment processes in the industry use stainless steel.

Conclusions

- Production footprint minimal—about 0.6% of the meat industry
- Very durable and highly recycled—Sustainable material, minimizes mining
- Helps other materials last much longer
- Saves energy in buildings
- Helps in production of clean nuclear energy
- Helps in production and transport of clean fuel LNG

Conclusions…cont.

- Helps cleaning up the environment (auto exhausts etc.)
- Reduces Green House Gas emission through biogas and other waste-to-energy processes

Stainless steel is definitely a part of the solution!

Stainless steel helps in saving Planet Earth!

Thank you!