CALIFORNIA STEEL INDUSTRIES, INC.

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March 6, 2020

Mr. Richard Corey
Executive Officer
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Comments by California Steel Industries, Inc., on ARB Concepts for GHG Reduction in Industrial Sectors

Dear Mr. Corey:

We appreciate the opportunity to provide comments regarding the information provided in the February 20, 2020 ARB webinar on potential Industrial Sector Greenhouse Gas (GHG) reduction strategies.

BACKGROUND

California Steel Industries, Inc. (CSI) is the largest steel producer in the Western U.S. and one of the last survivors of the domestic steel industry in California. CSI produces about 1.5 million tons per year of steel sheet in various forms, using purchased steel slabs as our raw material. Steel slabs weighing about 25 tons each are reheated in natural gas-fired furnaces and hot rolled in our rolling mill. Some of the resulting coils are sold as Hot Rolled Steel Sheet, an ARB benchmarked product under Cap and Trade. Most of the Hot Rolled coil is further processed downstream as ARB benchmarked steel sheet products or as line pipe.

CSI is an Energy Intensive, Trade Exposed (EITE) facility under the GHG cap and trade program. In particular, just like similar steel mills around the world, CSI burns natural gas in large quantities as part of its production processes. Our gas consumption at current steel production levels is a critical element to produce various forms of steel products. Nearly 75% of CSI's natural gas utilization is for heating the 25-ton, nine-inch-thick slabs to approximately 2,300 degrees Fahrenheit, so they may be converted into Hot Rolled Steel Sheet as thin as $1/16^{th}$ of an inch. Additional ARB-benchmarked production of Pickled Sheet, Cold Rolled Annealed Sheet, and Galvanized Sheet make up the remainder of CSI's natural gas demand.

Following are the concepts ARB communicated on February 20th for GHG reduction by industrial companies who rely on combustion in their processes:

1. Process Changes
2. Energy Efficiency
3. Hydrogen as Fuel or Feedstock
4. Electrification of Heat
5. CCUS (Carbon Capture, Utilization and Storage)
6. Biomass as Fuel or Feedstock

Regarding items 1 and 2, CSI has adopted many process improvements over the years, often driven by energy efficiency and/or environmental improvement.

In September 2012, EPA published "Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Iron and Steel Industry". Section VII, subpart G identifies technologies available in Hot Rolling Mills similar to operations at CSI. Below is CSI's status related to all the items listed in the text:

Hot Rolling Mills

□ ***Proper Reheating Temperature***

CSI Hot Strip Mill has a furnace model that maximizes fuel efficiency.

□ ***Avoiding Overload of Reheat Furnaces***

CSI Hot Strip Mill is not furnace limited, meaning it has adequate capacity in furnace even at maximum production rate.

□ ***Hot Charging***

This is not feasible as CSI does not have a melt shop which is required for this process. CSI relies on purchased steel slab being brought to CSI.

□ ***Process Control in Hot Strip Mill***

CSI has process controls implemented into the rolling mill.

□ ***Recuperative Burners***

CSI has installed recuperative burners

□ ***Flameless Burners***

CSI has flameless burners in areas of furnace that are hot enough to maintain auto ignition.

□ ***Insulation of Furnaces***

CSI has low-thermal-mass insulation in its reheat furnaces.

□ ***Walking Beam Furnace***

CSI's reheat furnaces are walking beam furnaces.

□ ***Controlling Oxygen Levels & Variable-Speed Drives on Combustion Air Fans***

CSI has oxygen controls at the burner and continuously improves through combustion tune-ups

□ ***Heat Recovery to the Product***

This was evaluated and determined to be not practical or cost effective as it would require an extensive redesign of the furnace exhaust system. Also, redesigning the exhaust system could significantly impact the management of other emissions that we are required to control (NOx).

□ ***Waste Heat Recovery from Cooling Water***

This is not done at CSI. After an evaluation of the proposal it was determined that there is limited direct emissions savings.

CSI has advised ARB in the past that we already employ the federal EPA best practice recommendations for reheat furnace carbon emission reduction that can be employed without building an entirely new hot rolling plant.

Regarding the other concepts offered by ARB for GHG reductions in the Industrial Sector:

3. Hydrogen as Fuel or Feedstock. We understand that there has been limited implementation of this concept in the world. Small scale experiments in industrial use are reportedly active in England. In order to achieve meaningful hydrogen usage as a replacement for natural gas, renewable energy must be heavily relied on for production of the hydrogen. Otherwise there is little chance for net carbon emission reduction. Additionally, use of hydrogen would appear to face significant logistical and transportation barriers, likely requiring pipeline conversions or replacement.

4. Electrification of Heat. CSI has not been able to determine that any similar steel operation in the world is employing this idea for processes similar to those at CSI. The cost and inefficiency of this concept are difficult to imagine.

5. CCUS. CSI is open to further information sharing. If CCUS is widely adopted it would require a challenging societal effort to establish safe and adequate capture, transport and storage of industrial carbon emissions.

6. Biomass as Fuel or Feedstock. CSI has been open to exploring this concept for many years and has discussed it on more than one occasion with our natural gas utility, Southern California Gas Co. (SoCal Gas). In recent discussions, SoCal Gas has advised us that Renewable Natural Gas (RNG) continues to cost from $7 to $17 per MMBtu more than natural gas. This differential in costs between current natural gas and RNG would increase CSI's annual fuel costs approximately $25 to $65 million dollars. As for future cost forecasts, the American Gas Foundation commissioned a December, 2019 study by ICF. The study indicates that by 2040, ICF optimistically expects the majority of RNG to cost from $7-$20 per MMBtu, well above the historical average cost of natural gas. Purely as an emission reduction strategy, ICF claims that the cost of RNG is still competitive with other technologies, even with RNG carbon abatement costs ranging from $55-$300 per metric ton of CO2.

The difficulty appears to be the continuing high cost of utilizing RNG vs. natural gas at scaled volumes. This is a particularly challenging issue for serving a large industrial natural gas consumer such as CSI. Without cost-competitive, reliable & substantial volumes of RNG and an effective transportation system, the incentive for companies, such as CSI, to expand the utilization of RNG is minimized and therefore will not result in significant GHG emissions reductions.

Finally, CSI continues to evaluate and implement new process improvements all the time. We have invested more than $1 billion in improvements since the mid-1990s. We work hard to overcome the high cost of energy and other California-only costs, to produce the best products possible for the customer companies we serve, 200 of which are in California. California Steel Industries is a proud economic partner in the region with a workforce of approximately 1000 people. Additionally, our supply chain supports an estimated 6,500 external jobs.

We are firmly committed to environmental and safety excellence. We look forward to continuing our work with ARB to find ways to achieve California's GHG goals, while remaining globally competitive and preventing industrial leakage due to cap and trade program costs.

Best regards,

Fernando Barros
California Steel Industries, Inc.
Executive VP, Finance & Administration