SELVOL™

Selvol Life Cycle Analysis

An analysis of the environmental impacts of our business

SEKISUI

Selvol High Performance Polyvinyl Alcohol

Polyvinyl alcohol is water soluble, non hazardous, non-toxic, and biodegradable polymer. Because it is water soluble, polyvinyl alcohol also reduces the need for organic solvents and it is a key ingredient in many biodegradable and green technologies.

Selvol polyvinyl alcohol is a key ingredient in laminated glass for interlayer films. These films are designed to add sound and heat insulation to automotive glass. Soundproofing helps keep automobiles lightweight, while heat insulation reduces air conditioning use in the summer. Both of these features help reduce automobile CO_2 emissions.

If installed on 10 million vehicles, this interlayer film could reduce CO_2 emissions by as much as 600,000 tons, and it is already used in many vehicles worldwide.

What is an LCA?

The US Environmental Protection Agency defines LCA as a technique to assess the environmental aspects and potential impacts associated with a product. The assessment compiles "an inventory of relevant energy and material inputs and environmental releases" and evaluates "the potential environmental impacts associated with identified inputs and releases". An LCA goes beyond simply evaluating greenhouse gas emissions (i.e. a carbon footprint) to look at the complete impact of our products' manufacturing process on the environment.

The results of the assessment are presented in "cradle to gate" format. They include the impacts of extraction and transportation of raw materials, production and transport of fuels, production and transport of packaging to our facilities, and production of products ready for shipment to customers.

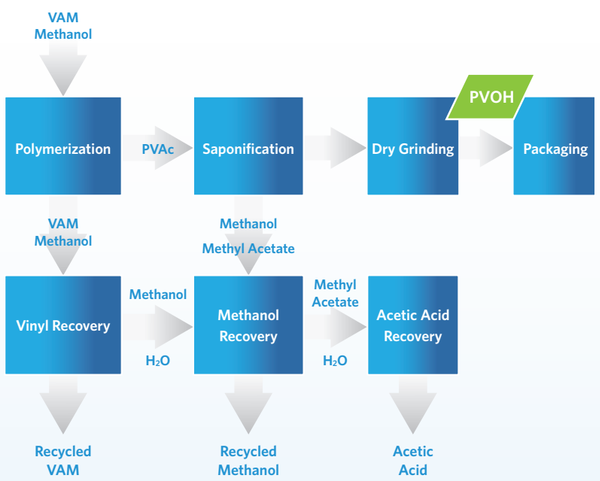
Selvol Life Cycle Analysis

Sekisui Specialty Chemicals is strongly committed to preserving a global environment in which future generations can prosper.

Sekisui Specialty Chemicals has three ISO 9002 certified manufacturing facilities located in the US and Spain, and a robust supply chain network that delivers our polymers to customers around the world. Because our operations span the planet, we take environmental responsibility very seriously. Our goal is to contribute to the survival of the planet by minimizing our impact on natural capital (i.e. soil, air, water, mineral, flora, fauna, etc), and implementing measures to combat rising greenhouse-gas emissions and overconsumption of resources.

To better understand our impact on the global environment, we commissioned a Life Cycle Analysis (LCA) study on all three of our production facilities.

FIGURE 1: Our Manufacturing Process



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Cradle to Gate Life Cycle Analysis

1) Inputs

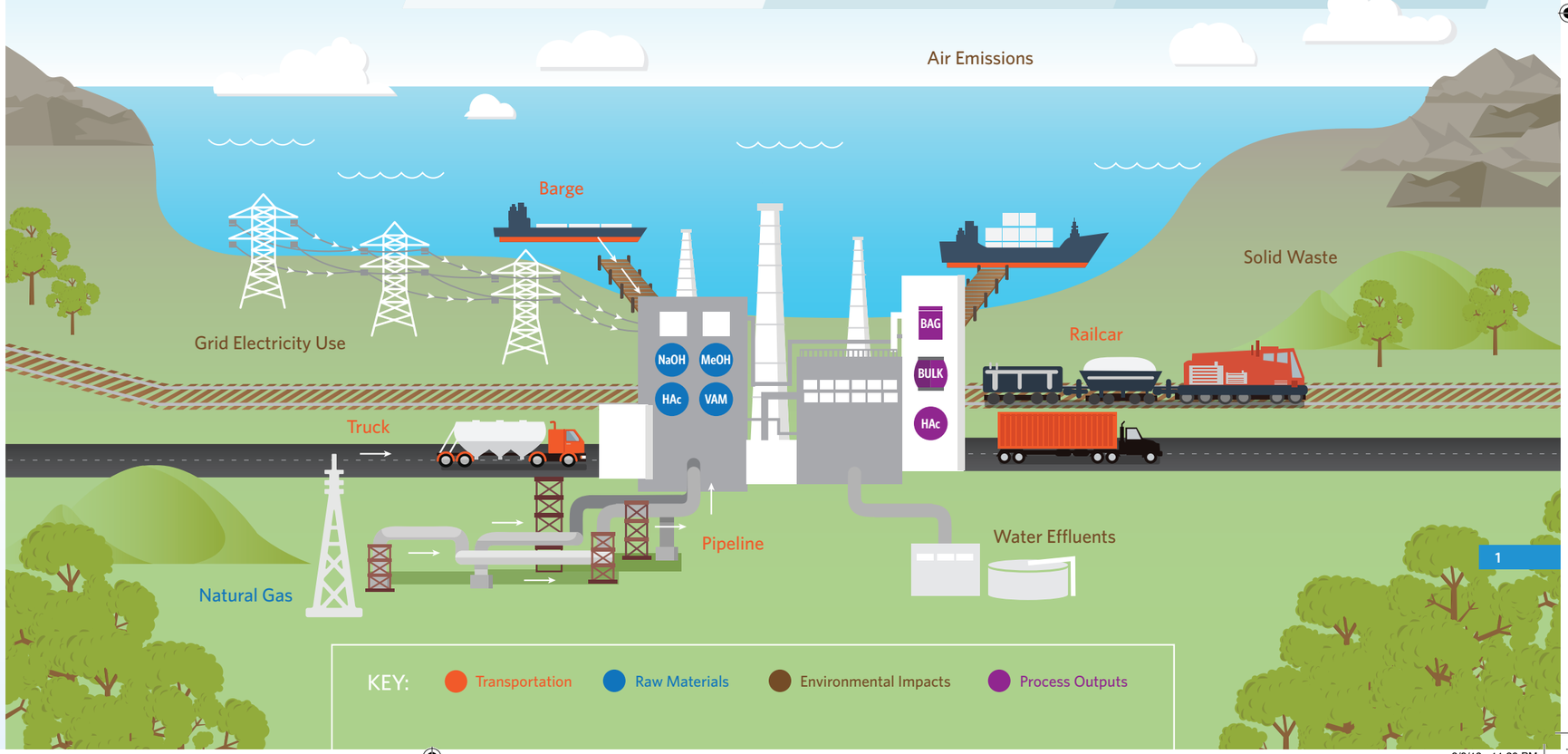
The cradle to gate format begins with an assessment of raw materials and energy inputs, along with the transportation impacts associated with getting them to our manufacturing plants. These include electricity, fuel, vinyl acetate monomer(VAM), and methanol.

2) Process

The Process of producing Selvol polyvinyl alcohol actually varies from plant to plant depending on plant capabilities. The results presented here are the average of all three plants. Our manufacturing process includes VAM, methanol, and acetic acid (HAc) recovery and recycling.

3) Results

The cradle to gate LCA analysis ends with finished bags and bulk containers of Selvol sitting at our front door waiting for shipment to customers. The impacts of our processes on environmental acidification, ozone depletion, and carbon emissions are detailed in "The Results" section.



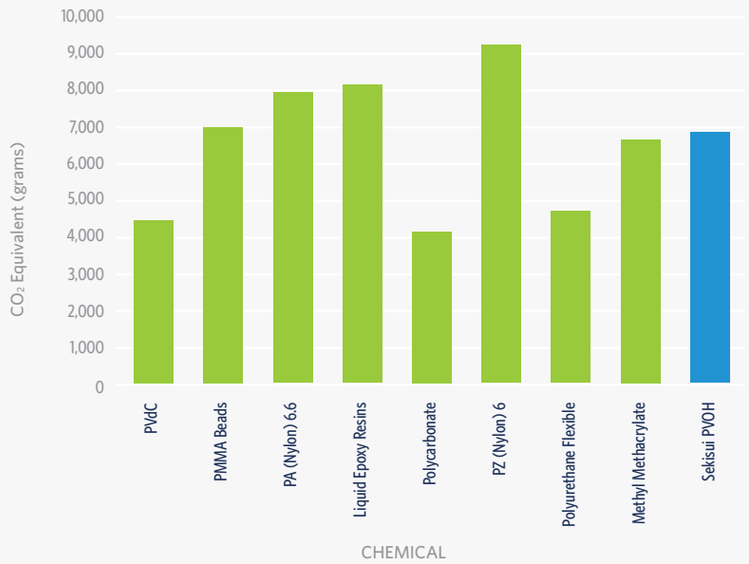
Data Discovery and Verification

The assessment was conducted in accordance with scientific practices described in ISO 14040, 14041, 14042, and 14044. The first step in the LCA process was to calculate the energy and raw material inputs and air emissions, water effluents, and solid waste outputs based on polymer production. The Boustead Model was used to calculate the consumption of energy, fuels and raw materials and generation of solid, liquid, and gaseous wastes starting from the extraction of primary raw materials. The namesake of this model, Dr. Ian Boustead, was one of the leading experts participating in the formation of ISO standards, and the model regularly updated with life cycle information on a variety of chemicals, materials, processes, transportation, packaging, and more. The database also contains fuel producing industry data for all of the OECD (Organization for Economic Co-operation and Development) countries and some non-OECD countries. The results of the analysis included the following topics:

- Global warming potential (CO_2 equivalents)
- Conservation of fossil fuels (MJ)
- Acidification (H+ equivalents)
- Grid Electricity use (MJ)
- Stratospheric Ozone depletion (CFC-11 equivalents)
- Municipal Solid Waste (mg)

We have highlighted three of these topics to the right. If you would like more specific information, please contact your Selvol representative or email PS@sekisui-sc.com.

FIGURE 2: 100 Year Carbon Emission Equivalents



The Results

805

ACIDIFICATION POTENTIAL

Expressed as hydrogen-ion equivalents resulting from production of one Kilogram of PVOH.

0

This life cycle analysis showed that there are no identified ozone depleting chemicals associated with the Sekisui Specialty Chemicals process of manufactering Selvol polymers.

6,813

Carbon dioxide equivalent of 100 year air emissions is 6,813 grams

About Sekisui Chemical Company

A new frontier, a new lifestyle.

Sekisui Chemical Group is a multibillion dollar, global company that delivers a wide range of products and services to enrich people's lives. Sekisui has been striving to 'produce a better world with creative technologies' since its formation in 1947.

The company is comprised of core businesses and technologies in housing, social infrastructure, and chemical solutions. Minimizing environmental impact and maximizing the environmental benefit of products and solutions are core values of Sekisui's Corporate Social Responsibility philosophy.

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