

WACKER ON INTEGRATED PRODUCTION

What Does Integrated Production Mean?

Integrated production means taking the by-products of chemical processes, such as waste gas, waste water, solid waste and "waste heat", and using these as starting materials for other products.

Integrated Production at WACKER

Putting sustainability into practice through closed material loops is one of WACKER's major strengths. Through the highly integrated production systems at its major sites in Burghausen, Nünchritz, Charleston and Zhangjiagang, WACKER has created a unique product and production strategy for conserving energy and resources. Incorporating environmental protection into the production process involves the following:

- Integrated energy solutions
- Integrated material systems

Integrated Energy Solutions

Integrated energy solutions are based on the principle of reusing the waste heat generated in downstream chemical processes.

Example: generating steam from waste heat

Heat released during chemical reactions is used for producing steam, which, in turn, serves as heating or process steam in other plants – resources that then do not need to be generated from primary fuels at the power plant.

Example: preheating feed water for de-ionized (DI) water production.

Because feed water is too cold for producing DI water effectively, it is warmed using waste heat from turbines and refrigeration units. This saves energy and cooling water, while also helping cool the cooling turbines and refrigeration units.

Integrated Material Systems

The principle underlying WACKER's integrated production system is to conserve raw materials by introducing byproducts into material loops. Byproducts generated in a given process are either treated and fed back into that process or used as raw materials for other processes. Many different production chains fit together like cogs in a machine, thus driving the overall material loop of the integrated production system.

Example: the relationship between the hydrochloric acid and silicon production networks

Hydrochloric acid production requires a great deal of energy, and the lion's share of this can be obtained instead by recovering hydrogen chloride from downstream production processes. Within the integrated silicon production network, for instance, silicon is converted to chlorine-containing intermediates from which chlorine-free end products such as silicones, hyper-pure silicon and pyrogenic silica are produced – this, in turn, yields hydrogen chloride, which is then recovered. Hydrochloric acid and steam are also generated from chlorine-containing waste gases.

Example: integrated acetic acid production

Acetic acid is a recurring building block in our integrated production system, because it is recovered from various recycling loops along with methanol, methyl acetate and ethylene. This system eliminates the need for procuring up to 1,150 rail cars of raw materials each year – the equivalent of a train 19 km long. Acetic acid and ethylene are used as starting materials for vinyl acetate monomer (VAM) – the raw material for nearly all of the products sold by WACKER POLYMERS.

Our Goal

In the future, WACKER will put even more effort into the integrated production approach in order to make more progress in the reduction of solid, liquid and gas wastes. Eliminating the need for producing energy and raw materials from scratch also serves as an indirect way of reducing greenhouse gas emissions. Additional plans call for incorporating partners outside of WACKER into the integrated production system as well.

Support Tools and Links

- [WACKER ECOWHEEL®](#)
- [Sustainability Report](#)