



## PVC (Polyvinyl Chloride) Impact on the Environment

In the past, there has been controversy regarding the impact of PVC production on the environment. In fact, this controversy in Europe led to a dramatic fall-off in PVC usage in the 1970's. Since that time, much research has been done to clarify the actual impact of PVC on the environment.

### Energy Consumption in Production:

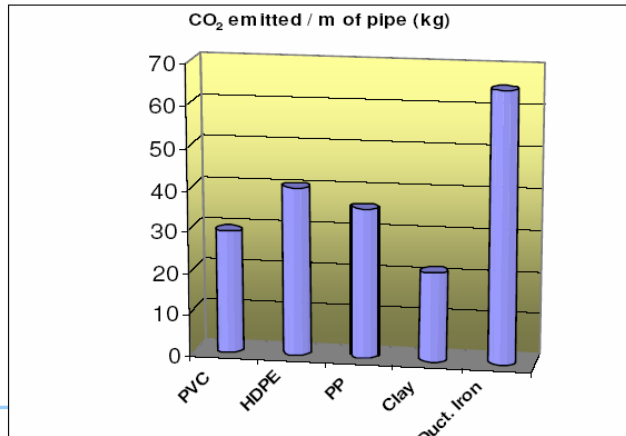
Energy consumption in production is important as it generally relates directly to carbon dioxide emissions (greenhouse gas). A published study (Chem Systems) compared carbon dioxide emissions per km of PVC and Steel water pipe and found that the manufacturing of Steel pipe created almost four times the carbon dioxide emissions as PVC pipe. When compared to HDPE (High Density Polyethylene) material, PVC manufacturing results in 27% less carbon emissions than HDPE.



DN 250 pipe (according to EN standards)

	PVC	HDPE	PP	Clay	Duct. Iron
Material Energy (MJ/kg)	56	76	73	10	25
weight of pipe (kg/m)	8.1	8.2	7.6	33	40
Energy (MJ/m)	454	623	555	330	1000
Oil consumption (kg)	9.9	13.5	12.1	7.2	21.7
CO2 emitted (kg)	29.6	40.6	36.2	21.5	65.2

Assumptions : all energy from petrol. Petrol energy : 46 MJ/kg Not counting installation energy



Sources :  
ECVM & SOLVIN

### **Raw Material:**

PVC is produced by combining ethylene (derived from either natural gas or petroleum) and vinyl polymer – based on chlorine from sodium chloride or table salt. As a result only 43% of PVC comes from a non-renewable resource in the form of fossil fuels – whereas 100% of HDPE comes from non-renewable fossil fuels. Hence, PVC is a better choice from the standpoint of resource conservation than the other thermoplastic pipe of choice.

### **Dioxin and Chlorine:**

The Vinyl Institute reports that the EPA has estimated that the Vinyl Chloride Monomer (VCM) industry has reduced overall emissions by 99% since the 1970's. The risk of the 5 million people presumed to be living within 5 miles of a VCM plant is calculated to be less than 0.1 case of cancer in the next 70 years. This compares with the risk over a lifetime of smoking 1.4 cigarettes, drinking ½ liter of wine or by having one chest x-ray.

The Vinyl Institute also reports that of the EPA's estimated 3000 grams of dioxin emitted each year in the US – the VCM industry accounts for about 12.6 grams or less than one half of 1%. In fact, with PVC production tripling in the past 30 years, dioxin levels found in the environment have steadily reduced. Furthermore, the New York State Energy Research & Development Authority (NYSERDA) found that the presence or absence of vinyl has no effect on the amount of dioxin produced during the incineration process.

With respect to chlorine, once chlorine is locked into the PVC chemical structure – it is more difficult to liberate than in the chemical structure of salt. Chlorine is not released into the atmosphere by modern incinerators, land-filling or recycling.

### **Recycling:**

A vast network of PVC recyclers exists throughout the United States (see Vinyl Institute website [www.vinylinfo.org/recycling/index.html](http://www.vinylinfo.org/recycling/index.html) - ). For example, more than 1 billion pounds of vinyl was recycled in the US in 1997 alone. Combined with the natural longevity of PVC (50-100 years), PVC has become a plastic of choice when considering environmental impact.