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Energy use in production of polymers and rubber goods

(Trillion BTU's)	Fuel oils	Coal	Natural gas	Purchased electricity	Total
Synthetic resins and other plastic materials	33.4	29.0	55.8	102.8	221
Synthetic rubber	0.9	5.5	61.5	21.1	89
Cellulosic man-made fibers	7.5	46.3	8.8	5.4	68
Synthetic organic fibers	50.6	59.5	52.8	57.1	220
Tires and inner tubes	13.8	13.8	35.0	43.4	106
Rubber footwear	1.1	0.1	0.7	2.1	4
Reclaimed rubber	0.1	0.4	0.6	0.9	2
Other fabricated rubber products	15.0	7.1	29.9	36.0	88
Miscellaneous plastic products	7.0	1.7	46.7	117.6	173
Totals:	129.4	163.4	291.8	386.4	971

Fuels and electric energy used in U.S. production of synthetic materials (SIC 282) and rubber and plastic products (SIC 30) during 1973. Source: Foster D. Snell, Inc., subsidiary of Booz, Allen & Hamilton.

uct separations and other techniques.

Up to now, the Saxton group observes, cost-benefit studies have tended to favor the slightly higher operating costs of inefficient energy management over the increased capital investment necessary for the additional heat exchangers, longer distillation columns and other equipment associated with energy conservation. But now, the authors say, the ground rules have changed in two fundamental ways:

(1) Petroleum and other fuel prices have risen rapidly; hence, cost-benefit studies will shift toward favoring energy conservation.

(2) Allocation of fuels during a period of shortages will mean that an energy-efficient plant will be able to maintain output at a higher level than a plant with low efficiency in energy utilization; "and the margin for economic operations at reduced output is usually rather thin." Saxton says this aspect of conservation "makes it essential that those companies that have aggressively pursued energy reductions in the past not be penalized by allocations based on future conservation steps."

Plug for Coal: In the plastics and rubber industries, there could be appreciable substitution of coal for fuel oils and natural gas by 1980, according to the Foster D. Snell study.

Conservation of fuels and electricity by near-term measures to improve plant efficiency could reduce the rubber and plastics industries' total energy require-

ments by only about 5%, the Snell team estimates. This would be in line with trends already observed in these industries. For example, in plants producing polyethylene and other synthetic resins, consumption of Btus. per unit of production is expected to drop by 50% from 1962 to 1980.

The Btus. in Benzene: Industry people do not take issue with the general findings in these reports, but they do contend that the methods used in quantifying the various industries' energy consumption patterns have led to distortions.

In the report on industrial chemicals, for instance, feedstocks as well as fuels are measured in terms of each material's heat of combustion. The Petrochemical Energy Group, representing 18 producers of organic intermediates and derivatives, maintain that this method is inaccurate for some products and should not be used for determining any future regulations on allocation or pricing of petrochemical feedstocks. PEG says the energy actually consumed in producing benzene and shipping it to a customer is about twice that product's heat of combustion.

As of now, FEA is merely stockpiling these reports, along with the written comments that have been sent in by PEG and other industry groups. If new regulations are needed, the reports will undoubtedly provide useful background, but the industry comments make it clear that detailed and up-to-date testimony from industry experts will be indispensable.

Building safer PVC unit

B.F. Goodrich demonstrated last week that it apparently doesn't expect the Labor Dept.'s Occupational Safety and Health Administration to promulgate its proposed "no detectable level" standard for worker exposure to vinyl chloride monomer (*CW*, June 26, p. 14).

While testifying at OSHA's VCM hearings in Washington last week, Goodrich Vice-President of Manufacturing John L. Nelson said the company has begun construction of a polyvinyl chloride plant in Louisville, Ky. The plant, to go into production in mid-1975, will significantly reduce VCM exposure, Nelson stated, but still will not be capable of reaching the proposed no-detectable-level standard (see also p. 30).

The new plant will incorporate Goodrich's latest PVC technology and will have several features that will result in a reduction in VCM exposure, according to Nelson.

Polymer reactors to be installed in the plant will be larger than those in the company's five other PVC installations. Goodrich contends that the larger reactors will have about 87% fewer VCM leak sources than those now in use. Other safety factors, according to Goodrich: greater use of computer controls and the fact that the plant will be an "outdoor" operation.

The Louisville plant will be located on the property where the company now operates a PVC plant, which was built in 1937, a Goodrich spokesman relates. He adds, however, that the new installation is meant to supplement, not replace, the old plant.

It was at the existing Louisville plant that the link between worker exposure to VCM and the rare liver cancer, angiosarcoma, was first reported in January. A search of employee medical records had revealed two deaths attributed to angiosarcoma. Investigations at PVC and VCM plants of other companies turned up several more cases of the disease. Angiosarcoma deaths of former employees of the Louisville PVC plant now number five, Goodrich says, and two other cases have been reported.

Temporary Standards: Concern about incidents of angiosarcoma at installations of Goodrich and other companies prompted OSHA to impose a temporary 50-parts-per-million emergency standard in April for VCM exposure. The agency's next step was to order the proposed no-detectable-level standard.

VCM and PVC producers have con-

Disputed data: How much can CPI cut energy use?

FEA gets a tally on industrial consumption of fuels but still may not know the score.

Petrochemical group urges the agency not to make rules based on contested figures

Executives in the chemical process industries are uneasy about the dossiers that the Federal Energy Administration has been compiling on their operations. Their worry: when the energy crisis heats up again, inaccurate or oversimplified data in those new FEA tally sheets may mislead the agency into drawing up unworkable regulations on the use and conservation of industrial fuels and feedstocks.

"In some cases," declares the energy resources manager for one large chemical company, "the figures are off not by just 20%, as stated in the report itself, but by as much as 300%."

At this moment, of course, petroleum products have become relatively plentiful, prices have eased in international markets if not in the U.S., and there is no Congressional clamor for FEA to propound tough new rules for curbing fuel consumption. Accordingly, FEA officials now regard these energy use reports as a data bank to be accumulated for reference.

Keeping Options Open: The reports, which include recommendations for reducing wasteful or inefficient use of fuel and feedstock materials, were commissioned last winter when the Arab petroleum embargo prompted the U.S. government to adopt an emergency allocation plan and to consider more drastic measures, such as gasoline rationing.

And while the Nixon Administration continues to back its proposal for virtual self-sufficiency in energy by 1980, it can be expected to keep all its options open. But Eric Zausner, FEA's assistant administrator in charge of Project Independence, says 16 industry studies are not now counted as a vital element in that project.

The studies were requested by Treasury Secretary William Simon when he was head man in the energy office, but they were sponsored by the U.S. Commerce Dept.

By last week, FEA had received the reports, in final or draft form, on 10 industries: industrial chemicals, polymer and rubber products, petroleum refining, paper and lumber, hydraulic cement, iron and steel, food processing, coal mining, motor vehicles, and ground freight transportation.

Still to come are reports on pharmaceuticals, nonferrous metals, glass, plaster and concrete products, and contract construction.

Commended on Perspective: By and large, according to industry people who have read them, the reports do give a reasonably sound over-all account of energy consumption in these industries.

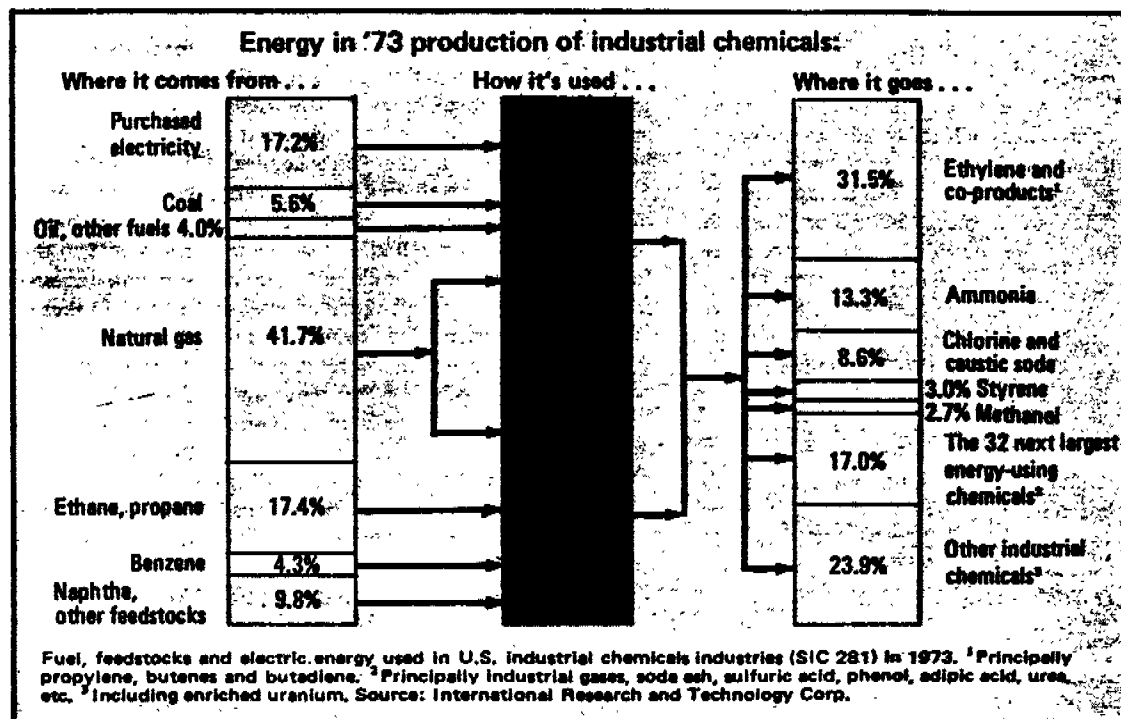
In the report on industrial chemicals, for instance, James C. Saxton and his associates at International Research and Technology Corp. (Arlington, Va.) point out that while this industry turns out more than 1,000 products of economic significance, it uses more than 75% of its total energy budget to produce just 37 of those products (*chart, below*).

And the report authored by Joseph Ne-

mec, Jr., Herbert Terry and Stephen F. Nagy of Foster D. Snell, Inc. (Florham Park, N.J.), shows that 22.7% of all energy consumed in the synthetic materials and rubber industries is in the form of electric power purchased for use in the plastics industry's polymerization and molding plants (*table, p. 20*).

Where Cuts Can Come: In plants that produce industrial chemicals, Saxton says, the greatest opportunity for energy conservation lies in the area of turbine and boiler fuel use. Observing that leading producers such as Dow, Du Pont and Union Carbide have already reported achieving increased efficiency in these operations, Saxton estimates that similar improvements throughout the industry could save 67-79 trillion Btus./year on turbine fuels and 382 trillion Btus./year on boiler fuels.

"Taken together, the improved turbine and boiler fuel uses represent a potential 25.7% reduction in 1974 fuel requirements," the authors continue. "If there were no reduction in the 1974 feedstock energy requirements (estimated at 1,950 trillion Btus.), the savings in fuel use would mean a 12% over-all reduction in total energy requirements." They add that feedstock use can be reduced by improvements in reaction efficiencies, prod-



tended throughout the OSHA hearings that the proposed level is unrealistic. Most have recommended a compromise standard, such as that suggested by the Society of the Plastics Industry—25 ppm. by October 1975, with a time-weighted average of 10 ppm. for PVC plants and 10 ppm. plus a time-weighted average of 5 ppm. for VCM plants.

Goodrich declares that its VCM exposure levels have dropped from 35-40 ppm. at the beginning of the year to 12-14 ppm. now. The company says it is trying to limit exposure to a ceiling level of 25 ppm. and a time-weighted average of 10 ppm.

Nelson told OSHA that while Goodrich expects vinyl chloride exposure levels at the new Louisville unit to be lower than those currently existing in the company's other PVC plants, the actual levels will not be known until the new plant is in operation.

The process to be employed at the facility will be suspension polymerization. Both suspension and emulsion polymerization are used in the old plant, Goodrich says.

VCM will be shipped to the company's new operation by tank car from Goodrich's Calvert City, Ky., VCM production unit.

The company stresses that the preliminary engineering work on the new plant began in 1972—before the angiosarcoma controversy emerged—and that actual field construction was started early this year.

Expected capacity at the new installation and cost of the project were not reported by the company.



GOODRICH'S NELSON: Even for new PVC plant, 'no detectable level' is unfeasible.

Less urge to merge

The number of mergers proposed and completed by chemical, paint and coatings firms dropped 21%, to 23, in second-quarter 1974 from 29 in the same period last year, W. T. Grimm & Co. (Chicago) management consultant firm reported last week. There were 41 mergers in the first half, down 24% from the 54 recorded in first-half 1973, Grimm added.

Eight of the chemical, paint and coatings mergers in the second quarter were cash transactions, compared with nine in the same period a year ago. Stock was exchanged in one case, compared with four a year ago, and a combination of payment methods was reported in three cases, the same number as in last year's quarter, according to Grimm.

The number of drug, cosmetic and medical equipment mergers also dropped in second-quarter and first-half 1974 from the year before—to 14 from 19, in the second quarter, and to 27 from 37 in the first half.

Solid second quarter

Several early-reporting chemical companies have chalked up record second-quarter profits. They attribute the gains mostly to higher prices.

PPG's sales and earnings in the period were the highest in company history, according to Board Chairman Robinson F. Barker. Earnings were \$25.4 million, 5% ahead of the previous high set in same-period 1973. Sales were \$448 million, 16% higher than the \$385 million recorded in second-quarter 1973. Barker attributes the gains to higher prices and growing demand for energy-saving glass.

Allied Chemical's second-quarter earnings amounted to \$50.5 million (up 80% from same-period 1973) on sales of \$567.7 million (up 31%). Board Chairman John T. Connor says the company's energy, chemicals, fibers and fabricated products and export sales and earnings all contributed to the company's best quarterly performance ever.

FMC predicts second-quarter results will match the trend of the first quarter, when sales were \$477.2 million, up 20% from same-period 1973, and earnings totaled \$23.1 million, up 21%. Chairman and President Robert H. Malott says that full-year sales will rise 18% over 1973 levels, topping the \$2 billion mark for the first time.

Reynolds Metals boosted sales 48%, to \$530.6 million, in the second quarter, thanks to a market recovery for alumi-

num. Earnings skyrocketed to \$33.3 million, almost six times higher than in same-period 1973.

Pluses in Paper: International Paper credits record production at its pulp and paper mills and price rises in many areas for its solid second-quarter results. Sales were up 25%, to \$763.4 million, while earnings jumped 61%, to a record \$75.1 million.

Crown Zellerbach reports a 10% increase in earnings and a 20% sales gain for the second quarter. President C. R. Dahl predicts 1974 will be a record year for the company, adding that sales "should break the \$1.6-billion barrier."

A "particularly outstanding" performance by Dart Industries' chemical group helped the company boost per-share earnings 30%, to a record of about 87¢, in the second quarter, according to President Justin Dart.

Akzona reports record sales of \$208 million, up 88% from same-period 1973, and record earnings of \$11 million, up 37%, in the second quarter. Claude Ramsey, chairman and president, says sales were limited only by plant capacity or raw-material shortages. He believes raw-material supplies will improve in the second half, but adds that "gains over the strong performance of the second half of 1973 will be increasingly difficult to achieve."

IP scraps merger

International Paper still wants to tap the potential 300 million bbls. of oil beneath about 2.9 million acres it owns, but General Crude Oil (Houston) won't be part of the deal.

IP made an offer early last month to buy General Crude for about \$437 million—a payment of \$45/share for General Crude common stock and \$180/share for preferred stock (*CW*, June 19, p. 23).

Initial response to the proposed merger seemed favorable. Pew Memorial Trust, which holds about 63% of General Crude's common, approved the deal. General Crude's directors would not commit themselves, however, promising only to take the matter under advisement.

Meanwhile, General Crude began discussions with other possible suitors. Then, IP reported it had withdrawn its purchase offer and "terminated the negotiations with respect to the transaction."

An IP spokesman declined to give details on why the proposed merger fell through but did say that development of potential oil lands "is still a priority intention here."



SENATOR McCLELLAN: 'Confused' law would lead to a weakened patent system.

Patent reform hits snag

The road to patent reform legislation continues rocky. As soon as the latest Senate bill on the subject cleared one hurdle, it ran smack up against several others.

Studies and proposals for patent reform have been in the works for eight years. Last fall, Senator Hugh Scott (R., Pa.) introduced S.2504, the Nixon Administration's bill (*CW*, Oct. 10, p. 20). That was turned over to the Senate Judiciary Committee's Subcommittee on Patents, Trademarks and Copyrights, which "marked up" (revised) the bill and turned it over to the full committee for a vote.

However, Senator John L. McClellan (D., Ark.), chairman of the subcommittee, made it amply clear that he did not like the Committee Print (mark-up) of S.2504. Instead of writing a minority report, he issued a scathing personal statement in which he said, among other things, "... our patent system will be weakened by enactment of legislation which is confused in purpose and deficient in execution." He was particularly pained that C. Marshall Dann, Commissioner of Patents, had been denied the opportunity of expressing his personal views on the matter.

Then, to confuse matters, Dann broke his silence with a 21-page letter to McClellan, acknowledging some of the procedures would complicate the process "to some unavoidable degree." In general, Dann supports the Administration's proposals, although he, too, objects to parts of the mark-up.

Detailed Objections: Most knowledgeable patent people lean toward McClellan's view. Their objections are many. But basically the consensus appears to be that the proposal is too detailed, attempting to legislate in areas that are better left to Patent Office regulations. Many feel that the bill would throw enormous roadblocks in the way of obtaining a patent, that it would raise the cost of obtaining and maintaining a patent significantly. The net effect, they fear, would be to encourage secrecy rather than patents.

Objections to the S.2504 mark-up can be expected to become vocal. What impact this will have on the deliberations by the Senate Judiciary Committee and full Senate is difficult to assess. But chances of a patent bill passing through Congress this session are slim. Reason: The House Judiciary Committee, which would have to approve a House version, is too involved with impeachment considerations to take on patent reform. Opponents fear, however, that the bill might sail through the Senate, generating momentum that would make for early passage next session.

No goodbye Columbus

Production resumed last week at Borden's Columbus Coated Fabrics plant (Columbus, O.) following settlement of a strike that had idled the wall-covering operations since February.

With the settlement, Borden rescinded a decision, announced last month, to move the entire operation to Andover, Mass. However, about half of the operation has been transferred to Andover, resulting in the loss of about 250 jobs at Columbus.

The strike began when negotiations between the company and Local 487 of the Textile Workers of America broke down over the issue of wages. Shortly after the strike began, Borden stated that it would have to close the Columbus unit completely unless a settlement could be reached quickly.

The impasse continued for several months, with the company refusing to yield to strikers' demands and union officials charging that the company was unfairly trying to pressure a settlement.

Then, on June 29, an agreement on wages was reached with most workers, and on July 1 there was agreement with the others. The settlement calls for a \$1.30/hour increase during the next three years.

"I'm not happy with the terms of the

new contract," says Corwin Smith, president of Local 487. "But, under the circumstances, I think we have something we can live with for three years and keep the company from moving jobs away from the plant here."

Closing Shop: As the Columbus Coated Fabrics plant swings back into operation, another chemical process plant is shutting down for good. Litton Industries reported last week that it will liquidate assets of its Hewitt-Robins subsidiary's unit in Buffalo, N.Y.

The plant, which produces industrial rubber products, has been closed since March by a strike involving about 475 members of the United Rubber Workers. Litton tried unsuccessfully to sell the plant to at least a dozen companies, according to a spokesman.

Alcoa set for expansion

Because of increasing demand, Aluminum Co. of America said last week, the smelting capacity of the company's Badin, N.C., plant will be expanded by 50%, to 180,000 tons/year of primary aluminum. Cost was not disclosed.

Alcoa says the project, expected on-stream by mid-1976, will include a third potline and supporting facilities. The work force at the plant, now 680, will rise to around 830.

A spokesman says the expanded plant will not use the company's new electrolytic process for converting aluminum chloride into aluminum, but will use the conventional Hall process. Its aluminum chloride method, he explains, is still being developed by the company at a Texas pilot plant.

Power for the enlarged facility will be provided by local utilities, and the bauxite will come from Alcoa's world resources, the spokesman says. No reason was given for choosing the Badin site for expansion, but relatively cheap power in the area might be a factor. Alcoa says its domestic smelters are now operating at 100% of their 1.57-million-tons/year capacity.

In another aluminum-related development, Continental Oil (Conoco) said last week that it would construct a \$10-million, 40-million-tons/year high-purity-alumina plant at its Lake Charles, La., complex. When completed in 1976, the unit will produce CATAPAL SB, a highly active form of high-purity alumina used as a catalyst support in all major refining and petrochemical catalytic applications. Conoco now makes the product in a 20-million-lbs./year plant in West Germany.