ENERGY CONSERVATION

Industrial Applications Study
Volume V

Bibliography of Relevant Literature

December, 1976

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Division of Conservation Research and Technology

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INDUSTRIAL APPLICATIONS STUDY

Volume V

BIBLIOGRAPHY OF RELEVANT LITERATURE

FINAL REPORT

December, 1976

Prepared by

DREXEL UNIVERSITY
Philadelphia, Pennsylvania

UNITED TECHNOLOGIES
RESEARCH CENTER
East Hartford, Connecticut

MATHEMATICA, INC.
Princeton, New Jersey

under

ERDA Contract No. E (11-1)2862

Division of Conservation

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Philadelphia, Pennsylvania

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INDUSTRIAL APPLICATION STUDY

The results of this study have been organized into the following five volumes:

I. EXECUTIVE SUMMARY: INDUSTRIAL WASTE ENERGY DATA BASE TECHNOLOGY EVALUATION

II. INDUSTRIAL DATA BASE

III. TECHNOLOGY DATA BASE

IV. INDUSTRIAL PLANT SURVEYS

V. BIBLIOGRAPHY OF RELEVANT LITERATURE

PROJECT TEAM

Drexel University

Harry L. Brown*
Bernard B. Hamel*
Som Karamchetty
William H. Steigelmann
Birur C. Gajanana
Anil P. Agarwal
Lawrence W. Klock
James M. Henderson
Gary Calobrisi
Bruce A. Hedman
Michael Koluch

United Technologies Research Center

Frank Biancardi
Robert Bass
Abraham Landerman
George Peters

Mathematica, Inc.

Dilip Limaye
Jeffrey Price
Janet Farr

*Principal Investigators

Foreword

This five volume report represents an initial Phase 0 evaluation of waste heat recovery and utilization potential in the manufacturing portion of the industrial sector. The scope of this initial phase was limited to the two-digit SIC level and addressed the feasibility of obtaining in-depth energy information in the industrial sector. Within this phase, we have successfully established the methodology and approaches for data gathering and assessment. Using these approaches, energy use and waste heat profiles were developed at the 2-digit level; with this data, waste heat utilization technologies were evaluated.

We believe this study represents an important first step in the evaluation of waste heat recovery potential. To proceed further, the data base must be extended to the 4-digit level and a realistic assessment of the application problems must be done.

This "Industrial Applications Study" was conducted for the Energy Research and Development Administration, Division of Conservation Research and Technology, under Contract No. E(11-1)2862. The program was conducted by Drexel University, Philadelphia, Pa. under the direction of Professors Harry L. Brown and Bernard B. Hamel. United Technologies Research Center, under the direction of Mr. Frank Biancardi, and Mathematica, Inc., under the direction of Mr. Dilip Limaye, were subcontractors to Drexel University. Mr. Marvin Gunn of the Division of Conservation Research and Technology was the ERDA program monitor.

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B-I. GENERAL OR INDUSTRIAL ENERGY CONSERVATION

ID NO.- EI751173653 573653
EFFICIENT USE OF FUELS IN PROCESS AND MANUFACTURING INDUSTRIES, SYMPOSIUM PAPERS, 1974.
Symp
DESCRIPTORS- *FUEL ECONOMY, (INDUSTRIAL PLANTS, Waste Heat Utilization),
CARD ALERT- 402, 521
SOURCE- Eff Use of Fuels in Process and Manuf Ind, Symp Pap, Ill Inst of Technol, Chicago, Apr 16-19 1974 Publ by Inst of Gas Technol, Chicago, Ill, 1974, 347 p
This symposium includes papers on the role of gas in $left double quote$ Project Independence $right double quote$; future availability and prices of the industrial fuels; consequences of a shortage of energy in the United States; economics of energy management; fuel use monitoring and control; process control for increased fuel efficiency; cost factors related to energy-saving applications of refractories; fuel savings through ceramic fiber linings; designs and operations of industrial steam boilers for maximized fuel economy; waste heat recovery in process plants; heat pipes; heat storage wells; improved space heating in industrial buildings; and improved combustion techniques. Selected papers are indexed separately. Refs.

Energy Consumption in Manufacturing and the Minnesota Economy

Minnesota Energy Agency, St. Paul. Research Div.
AUTHOR: Venegas, Ernesto C., Carter, James E.
C5865J3 FLD: 10A, 97B USGRDR7605
Jun 75 37p
REPT NO: MEA-MFG-7506
MONITOR: 18

ABSTRACT: This report reviews the relative importance of manufacturing to the Minnesota economy. It compares energy requirements with dollar value-added and employment in manufacturing. Fuel cost and fuel intensities of various manufacturers are also derived in order to obtain an indication of the effect of fuel scarcities on manufacturing output and employment. Projections of fuel requirements are made based on alternative growth rates of employment, labor productivity, and value-added. Recommendations are made on energy conservation to insure that adequate supplies of energy are available for full employment through 1980.

DESCRIPTORS: *Manufacturing, *Fuel consumption, *Energy consumption, Food industry, Paper industry, Glass industry, Metal industry, Machine and tool industry, Chemical industry, Electrical industry, Rubber industry, Plastics industry, Textile industry, Industries, Natural gas , Fuel oil, Distillates, Coal, Residual oils, Electricity, Energy conservation, Forecasting, Employment, Minnesota

IDENTIFIERS: *Electric power consumption, SIC 20, SIC 26, SIC 32, SIC 33, SIC 34, SIC 35, SIC 39, SIC 28, SIC 27, SIC 24, SIC 36, SIC 30. SIC 37, SIC 38, SIC 22, SIC 23, Printing industry, Lumber industi Transportation equipment industry, Heat consumption, Ener forecasting, NTISMENA

PB-248 056/4ST NTIS Prices: PC$4.00/MF$2.25

Project Independence Blueprint. Task Force Report. Energy Conservation in the Manufacturing Sector 1954-1990. Volume 3

Federal Energy Administration, Washington, D.C. Project Independence.

Final rept.
C60 12D4 FLD: 10A, 97G USGRDR7607
Nov 74 475p*
REPT NO: FEA/N-74/536
MONITOR: 18
See also PB-248 493.

ABSTRACT: This report attempts to forecast the extent to which the manufacturing sector will economize in its use of scarce energy resources. Six industries are the primary focus of the report and include: paper and allied products; chemicals and allied products; stone, clay, glass, hydraulic cement, and glass containers; primary metals; and food and kindred products. Portions of this document are not fully legible.

DESCRIPTORS: *Energy conservation, Industries, Paper industry, Chemical industry, Petroleum industry, Petroleum refining, Glass industry, Metal industry, Food industry, Fuel consumption, Electricity, Supply(Economics), Demand(Economics), Econometrics, Energy consumption, Technology assessment, Forecasting

IDENTIFIERS: *Project Independence, Heat consumption, Electric power consumption, NTISEXFEA, NTISEXCEQ

PB-248 495/4ST NTIS Prices: PC$12.00/MF$2.25

(ORNL-TM--4610) ENERGY DEMAND PATTERNS OF ELEVEN MAJOR INDUSTRIES. Kaplan, S.I. (Oak Ridge National Lab., Tenn. (USA)). Sep 1974. Contract W-7405-eng-26. 47p. Dep. NTIS $5.50.

The first phase of a study of energy usage by manufacturing industries is summarized. Purchased energy demand for eleven large industries is tabulated according to energy source for the period 1958-1971. Average energy prices, annual growth rates, and relative energy use per unit of production are shown, and an overall trend in specific energy utilization for the 13-year period is calculated. Further work in this study will focus on end uses for energy in specific manufacturing industries. (auth)

File6, COPR. by N.T.I.S. User 244 Page 15 (Item 18 of 105)

Report on a Workshop for Energy Conservation in Southeast Industrial Plants

University of South Florida, Tampa. Coll. of Engineering.*National Science Foundation, Washington, D.C. Div. of Engineer.

Final rept.
AUTHOR: Kopp, E. W.
C5793K2 FLD: 10A, 97G USGRDR7604
30 Jun 75 55p
GRANT: NSF-ENG-03005
MONITOR: NSF/ENG-75-03005

ABSTRACT: The objective of this workshop was to identify research areas which should lead to a more efficient use of energy in industrial and commercial plant operations. The program was designed to define the state-of-the-art of energy use in such industrial facilities by means of case study presentations and descriptions of ongoing research activities having potential for energy conservation in industrial plants. The report briefly reviews results of the workshop regarding solutions to existing problems and identification of needed research.

DESCRIPTORS: *Industrial plants, *Energy conservation, *Meetings, Energy management, Reviewing, United States

IDENTIFIERS: Southeast Region(United States), NTISNSFBR

PB-246 651/4ST NTIS Prices: PC$4.50/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 25 (Item 30 of 105)

Energy Management Case Histories

Resource Planning Associates, Cambridge, Mass.*Federal Energy Administration, Washington, D.C. Office of Industrial Programs.

Conservation paper.
C5385C4 FLD: 10A, 05C, 97G, 96B, 94 USGRDR7524
Apr 75 18p
CONTRACT: DI-14-01-0001-1895
MONITOR: FEA/D-CP-1A

ABSTRACT: The President has established national energy independence as a long-range goal for the United States. An important element for the achievement of this goal is the reduction of domestic energy consumption through industrial energy conservation. This report illustrates case experiences by four U. S. firms: Raytheon Company, Chemetron Corporation, Chesebrough-Ponds, Inc., and Behrenberg Glass Company. It discusses how they organized to achieve results, how they implemented their energy saving projects and what the results of their efforts were.

DESCRIPTORS: *Energy conservation, *Industries, *Manufacturers, Energy policy, Cost effectiveness

IDENTIFIERS: Raytheon Company, Chematron Corporation, Chesebrough-Pond's Incorporated, Behrenberg Glass Company, NTISEXFEA

PB-244 908/0ST NTIS Prices: PC$3.25/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 10 (Item 11 of 105)

The Role of Chemical Kinetics in Energy Conservation

National Bureau of Standards, Washington, D.C. Inst. for Materials Research. (401 937)

Final rept.
AUTHOR: Roserstock, H. M., Garvin, D., Herron, J. T., Tsang, W.
C5945D4 FLD: 07D, 10A, 99P, 68, 97G, 86V USGRDR7606
Oct 75 123p
REPT NO: NBSIR-75-910
PROJECT: NBS-3160900
MONITOR: 18

ABSTRACT: Many of the technological areas of pertinence to energy independence involve chemical transformation of gas phase materials at high temperatures. The design, control and optimization of such devices and processes have come to depend increasingly on mathematical modeling. Among the most important input data required for there models are information on the detailed chemical mechanisms and the rates of the individual processes. It is concluded that although many resources are available there does not exist at present an adequate, publicly available data base for the modeling of high temperature systems. A detailed program involving a combination of experimentation and compilation, evaluation and dissemination of gas kinetic data is proposed.

DESCRIPTORS: *Reaction kinetics, *Combustion, Experimental data, Sulfur oxides, Nitrogen oxide(NO), Atoms, Conservation, Energy, Mathematical models, Industrial plants, Hydrogen, Oxygen, Methane, Pyrolysis, Oxidation, Pollution, Data processing, High temperature, Thermochemistry, Activation energies, Chemical reactions, Vapor phases Gases

IDENTIFIERS: *Energy conservation, Industrial energy, Chemical reaction mechanisms, NTISCOMNBS

PB-248 646/2ST NTIS Prices: PC$5.50/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 35 (Item 41 of 105)

Report of Conference Held at Northwestern University Under the Aegis of the National Science Foundation, on Innovative Design Techniques for Energy Efficient Processes March 13-14, 1975

Northwestern Univ., Evanston, Ill. Dept. of Chemical Engineering.*National Science Foundation, Washington, D.C. Energy-Related General Research Office. (404 372)

Final rept.
AUTHOR: Mah, Richard S. H.
C5244E3 FLD: 10A, 97G* USGRDR7522
30 May 75 95p*
REPT NO: NU-CHE-75-001
GRANT: NSF-ENG75-08617
MONITOR: 18

ABSTRACT: This report summarizes the discussions and recommendations of a two-day industry-university-government conference on the subject of the title, held on March 13-14, 1975. It identifies a number of pressing needs of the process industries in meeting energy challenges and recommends increased NSF support in process-design related researches and graduate training in process design. Four major areas of research are identified and specific recommendations are embodied in the report.

DESCRIPTORS: *Energy technology, *Meetings, *Systems engineering, Petroleum refining, Chemical engineering, Industrial plants, Design, Optimization, Energy conservation, Energy management, Heat exchangers, Computerized simulation, Planning, Forecasting, Coal, Synthesis

IDENTIFIERS: Petrochemical industry, NTISNSFBR

PB-243 651/7ST NTIS Prices: PC$4.25/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 48 (Item 54 of 105)

Energy Conservation

Texas Governor's Energy Advisory Council, Austin.*National Science Foundation, Washington, D.C. Div. of Advanced Energy Research and Technology.

Final rept.
AUTHOR: Van, Steve, Carpenter, Joyce, Wiegand, Marc
C5102H2 FLD: 10A, 97B, 97G USGRDR7520
25 Nov 74 119p
GRANT: NSF-GI-44085, NSF-SIA73-05812
Proj., L/R-3
PROJECT: L/R-3
MONITOR: NSF/RA/N-74-239

ABSTRACT: Various ways to conserve energy in the residential, commercial, transportation, industrial, and electric utilities sectors are discussed. Legal issues involved are noted.

DESCRIPTORS: *Energy conservation, *Government policies, *Texas, Coal, Natural gas, Petroleum products, Electricity, Metal industry, Chemical industry, Petroleum industry, Food industry, Glass industry, Electric utilities, Transportation, Fuel consumption, Residential buildings, Commercial buildings, Industries, Constraints, State government, Taxes, Decisional law

IDENTIFIERS: NTISNSFRA

PB-243 335/7ST NTIS Prices: PC$5.25/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 47 (Item 53 of 105)

Energy Conservation Study. Report to Congress

Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
C5102K2 FLD: 10A, 05D, 97G USGRDR7520
Dec 74 181p
REPT NO: FEA/D-74/231
MONITOR: 18

ABSTRACT: This report discusses (1) the energy conservation potential of restricting exports of fuels or energy-intensive products or goods, including an analysis of balance-of-payments and foreign relations implications of any such restrictions; (2) alternative requirements, incentives, or disincentives for increasing industrial recycling and resource recovery in order to reduce energy demand, including the economic costs and fuel consumption tradeoff which may be associated with such recycling and resource recovery in lieu of transportation and use of virgin materials; and (3) means of incentives or disincentives to increase efficiency of industrial use of energy.

DESCRIPTORS: *Energy conservation, *International trade, Fuel consumption, Crude oil, Jet engine fuels, Liquefied petroleum gases, Kerosene, Distillates, Residual oils, Natural gas, Coal, Industries, Food industry, Paper industry, Chemical industry, Metal industry, Glass industry, Petroleum industry, Balance of payments, Foreign policy, Materials recovery, Utilization, Steels, Aluminum, Ingots, Glass, Papers, Plastics, Incentives, Constraints

IDENTIFIERS: Waste recycling, Secondary materials industry, NTISEXFEA

PB-243 369/6ST NTIS Prices: PC$7.00/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 45 (Item 51 of 10

The Potential for Energy Conservation in Nine Selected Industries. The Data Base

Gordian Associates, Inc., New York.*Federal Energy Administration, Washington, D.C.
C5244B2 FLD: 10A, 97B*, 97G, 99B* USGRDR7522
Jun 74 529p*
CONTRACT: DI-14-01-0001-1842
MONITOR: FEA/D-74/143
Paper copy also available in set of 10 reports as PB-243 610-SET, PC$58.00.

ABSTRACT: This report provides basic data on energy consumption in industry and notes opportunities for energy conservation. The industries discussed are: Petroleum refining, copper, aluminum, steel, paper, plastics, cement, synthetic rubber, and glass.

DESCRIPTORS: *Energy consumption, *Industries, Glass industry, Paper industry, Rubber industry, Petroleum industry, Petroleum refining, Iron and steel industry, Metal industry, Aluminum industry, Copper, Plastics industry, Portland cements, Styrene butadiene resins, Fuel consumption, Electric power demand, Process charting, Manufacturing, Energy conservation

IDENTIFIERS: NTISEXFEA

PB-243 611/1ST NTIS Prices: PC$12.50/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 65 (Item 73 of 105)

Five Year Program Planning Document for End Use Energy Conservation, Research, Development, and Demonstration

Federal Energy Administration, Washington, D.C.
AUTHOR: Bauer, Douglas C.
C4463L4 FLD: 05A, 97G* USGRDR7510
Jun 74 259p*
REPT NO: FEA/PD-226-D
MONITOR: 18

ABSTRACT: Prepared by the Federal Energy Administration (FEA) with assistance from sixteen participating federal agencies, this Research, Development and Demonstration (RD and D) Program Planning Document represents the initial effort to organize the nation's resources into task forces under national government leadership. Report covers projects and funding needed for energy conservation studies in areas of transportation, industry, and building research.

DESCRIPTORS: *Energy policy, *Energy conservation, *National government, Residential buildings, Commercial buildings, Industries, Transportation, Metal industry, Chemical industry, Petroleum industry, Glass industry, Food industry, Paper industry, Projects, Finan costs, Government policies

IDENTIFIERS: NTISEXFEA

PB-240 406/9ST NTIS Prices: PC$8.50/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 66 (Item 74 of 105)

Energy Conservation: A Case Study for a Large Manufacturing Plant

Massachusetts Inst. of Tech., Cambridge. Energy Lab.

Final rept.
AUTHOR: Pelton, Lewis A., Glicksman, Leon R.
C4452D3 FLD: 10A, 97B* USGRDR7510
May 74 111p*
REPT NO: MIT-EL-74-010
MONITOR: 18

ABSTRACT: The methods of formulating, implementing, and evaluating a conservation program in a commercial building or light industrial plant are examined and the results of one case study are presented. In commercial and light industrial applications, most energy is consumed to maintain proper environmental conditions; light levels, heat levels, and fresh air levels. This report presents a method that can be used by many commercial and light industrial concerns to establish a conservation program. Guidelines are presented that can be used to examine environmental conditions and determine ways they must be changed. A system of program analysis is also presented.

DESCRIPTORS: *Energy conservation, Commercial buildings, Industrial buildings, Electricity, Fuel oil, Heat loss, Illuminating, Gas heating, Air conditioning, Ventilation, Industries, Manufacturing, Project planning, Instructions, Study estimates, Methodology

IDENTIFIERS: NTISMITEL

PB-239 302/3ST NTIS Prices: PC$5.25/MF$2.25

Proceedings of the NSF/RANN Conference on Energy Conservation Research, Held at Airlie House, in Warrenton, Va., on Feb 18-20, 1974

National Science Foundation, Washington, D.C. Research Applied to National Needs.*Urban Inst., Washington, D.C.
AUTHOR: Lyday, Noreen
C4391P3 FLD: 10A, 97B* USGRDR7509
1974 199p*
REPT NO: NSF/RA/N-74-187
MONITOR: 18

ABSTRACT: This report contains the proceedings of the Conference on Energy Conservation Research, held at Airlie House, Warrenton, Virginia, February 18-20, 1974. The Conference brought together NSF/RANN energy conservation research grantees and representatives of user federal agencies for an exploration of current energy conservation research. The major purposes of the Conference were to identify those research results that could have immediate application in achieving energy conservation, to assess research priorities in light of changing events and to identify potential areas for new research initiatives. Four major categories of research were discussed in workshops on (1) conservation in residential and commercial buildings; (2) conservation in the industrial sector; (3) conservation in the transportation field; and (4) cross-sector conservation studies.

DESCRIPTORS: *Energy conservation, *Meetings, Fuel consumption, Electric power demand, Space heating, Air conditioning, Hot water heating, Residential buildings, Commercial buildings, Industrial plants, Transportation, Food processing, Refineries, Proceedings

IDENTIFIERS: Electric power consumption, NTISNSFRA

PB-239 271/0ST NTIS Prices: PC$7.00/MF$2.25

Energy Conservation Program Guide for Industry and Commerce (EPIC)

National Bureau of Standards, Washington, D.C. Inst. for Applied Technology.*Federal Energy Administration, Washington, D.C. Conservation and Environment Div. (400 614)

Final handbook
AUTHOR: Gatts, Robert R., Massey, Robert G., Robertson, John C.
C3692G2 FLD: 10A, 97B, 94, 86V USGRDR7425
Sep 74 204p
REPT NO: NBS-HB-115
PROJECT: NBS-4314560
MONITOR: 18
Sponsored in part by Federal Energy Administration, Washington, D.C. Conservation and Environment Div. Library of Congress Catalog Card no. 74-600153.
Paper copy available from GPO.

ABSTRACT: A guide to assist business and industry to establish an ongoing conservation program is presented. The guide outlines steps in an energy conservation program and suggests specific ways to reduce energy use in manufacturing and commercial businesses. Key steps in an implementation plan and energy conservation opportunities identified by industry are emphasized.

DESCRIPTORS: *Manuals, *Energy conservation, *Industrial management, Instructions, Handbooks, Projects, Project planning, Industrial plant efficiencies

IDENTIFIERS: *Energy management, NTISCOMNBS

COM-74-50933/2ST NTIS Prices: PC-GPO/MF$2.25-NTIS

Conservation via Effective Use of Energy at the Point of Consumption

National Bureau of Standards, Washington, D.C. Inst. for Applied Technology. (400 614)

Final rept.
AUTHOR: Berg, Charles A.
C2692C4 FLD: 10A, 97B, 97G, 86V USGRDR7411
Apr 73 38p
REPT NO: NBSIR-73-202
PROJECT: NBS-4000910
MONITOR: 18

ABSTRACT: The practices and equipment employed at the point of energy consumption in buildings and in industrial processes permit excessive consumption of energy. It is estimated that if full application of the economically justifiable technical improvements presently available were made to equipment and practices in buildings and industry, as much 25 as percent of the total primary fuel consumption in the U.S.A. could be conserved. The reasons why economically justifiable application of effective technology at the point of energy consumption has not been widely adopted in the past are considered. The needs to facilitate adoption of effective equipment and practices in the future are discussed. (Author)

DESCRIPTORS: *Energy, Conservation, Fuel consumption, Buildings, Utilization, Industries

IDENTIFIERS: Energy conservation, NBS

COM-74-10479/5 NTIS Prices: PC$5.00/MF$1.45

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Efficient Use of Energy: A Physics Perspective, A Report of the Research Opportunities Group of a Summer Study Held in Princeton, New Jersey on July, 1974

American Physical Society, Washington, D.C.*National Science Foundation, Washington, D.C.*Electric Power Research Inst., Palo Alto, Calif.*Federal Energy Administration, Washington, D.C.
AUTHOR: Carnahan, Walter, Ford, Kenneth W., Prosperetti, Andrea, Rochlin, Gene I., Rosenfeld, Arthur H.
C4981L4 FLD: 13A, 10A, 97G, 46 USGRDR7518
Jan 75 264p
MONITOR: 18
Prepared in cooperation with National Science Foundation, Washington, D.C., Federal Energy Administration, Washington, D.C., and Electric Power Research Inst., Palo Alto, Calif.

ABSTRACT: Research opportunities in physics related to efficient energy utilization are identified. Stress is given to the conceptual framework of thermodynamics, especially as a tool for assessing the efficiency of the management of low quality heat. Elementary quantitative models of energy flows in the house and the car are developed. The report emphasizes the importance of new systems concepts and new materials for the management of heat and of new diagnostic instrumentation. Further technologies reviewed include the automobile tire and suspension, hot water heaters, HVAC systems, the fuel cell as a combined system for electricity and heat, electrochemical processes, and processes involving separative work.

DESCRIPTORS: *Energy conservation, *Meetings, Thermal efficiency, Thermodynamic properties, Houses, Automobiles, Industrial plant efficiencies, Industries, Residential buildings, Insulation, Air conditioning, Space heating, Hot water heating, Illuminating, Temperature control, Motor vehicle drive systems, Automobile tires, Electric power generation

IDENTIFIERS: NTISNSFG, NTISEXFEA, NTISEPRI

PB-242 773/0ST NTIS Prices: PC$8.50/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 26 (Item 31 of 105)

Evaluation of the Theoretical Potential for Energy Conservation in Seven Basic Industries

Battelle Columbus Labs., Ohio.*Federal Energy Administration, Washington, D.C. Office of Industrial Programs. (407 080)

Final rept.
AUTHOR: Hall, E. H., Hanna, W. T., Reed, L. D., Varga, J. Jr, Williams, D. N.
C5332G1 FLD: 10A, 97B*, 94* USGRDR7523
11 Jul 75 444p*
CONTRACT: DI-14-01-0001-1880
MONITOR: FEA/D-75/CE1

ABSTRACT: This report discusses the minimum theoretical energy requirements in seven basic industries through a thermodynamic analysis of the processes employed in each industry. The study includes the steel, copper, aluminum, glass, synthetic rubber, selected plastics, and paper industries. Results of the calculations for these seven industries include the minimum theoretical energy, the efficiency of selected unit processes, and the effect of certain process changes on the energy use. A computer model was developed to perform the necessary calculations. The model performs the customary energy balances based on the first law of thermodynamics. The results identify where large energy or availability losses occur.

DESCRIPTORS: *Aluminum industry, *Iron and steel industry, *Glass industry, *Rubber industry, *Plastics industry, *Paper industry, *Energy consumption, Metal industry, Industries, Fuel consumption, Manufacturing, Production engineering, Thermodynamics, Energy requirements, Energy conservation, Thermal efficiency, Computerized simulation

IDENTIFIERS: *Copper industry, Heat consumption, Electric power consumption, Energy use, NTISEXPEA

PB-244 772/0ST NTIS Prices: PC$11.25/MF$2.25

Energy Industrial Center Study

Dow Chemical Co., Midland, Mich.*National Science Foundation, Washington, D.C. Office of Energy Research and Development Policy.*Environmental Research Inst. of Michigan, Ann Arbor.*Townsend-Greenspan and Co., Inc., New York.*Cravath, Swain and Moore, New York. (116 750)

Final rept. Jun 74-Jun 75.
C5244K2 FLD: 10A, 97C* USGRDR7522
Jun 75 472p*
GRANT: NSF-OEP74-20242
MONITOR: 18
See also PB-243 824. Prepared in cooperation with Environmental Research Inst. of Michigan, Ann Arbor, Townsend-Greenspan and Co., Inc., New York, and Cravath, Swain and Moore, New York.

ABSTRACT: This report summarizes the findings of a study of the technical, environmental, economic, legal and regulatory aspects of two well-known approaches to conserving fuel burned to produce steam: (1) the generation of by-product electric power from the steam generated by industry for use in manufacturing, and (2) the supplying of steam to industry from utility central power stations. Estimates are developed of the nationwide extent to which each approach is economically viable, and of the corresponding reductions in capital investment and fuel consumption. An assessment is made of the potential impacts on the electric utility industry and on electric rates over the next decade. Environmental issues to be faced in specific instances of implementation are identified for the pulp and paper, petroleum refining, and chemical industries. Attention is given to possible interactions with the Federal Power Act, the Public Utility Holding Company Act, State regulatory patterns, antitrust laws, environmental protection considerations, fuel allocation priorities, private law considerations, and federal income tax consequences.

DESCRIPTORS: *Industrial plants, *Steam electric power generation, *Waste heat utilization, *Steam heating, Heat recovery, Environmental impacts, Economics, Law(Jurisprudence), Regulations, Legislation, Electric power production, Electric utilities, Energy conservation

IDENTIFIERS: NTISNSFRDA

PB-243 823/2ST NTIS Prices: PC$11.50/MF$2.25

Energy Industrial Center Study: Executive Committee Summary Report and Policy Proposals.

Dow Chemical Co., Midland, Mich.*National Science Foundation, Washington, D.C. Office of Energy Research and Development Policy.*Environmental Research Inst. of Michigan, Ann Arbor.*Townsend-Greenspan and Co., Inc., New York.*Cravath, Swain and Moore, New York. (116 750)

Final rept. Jun 74-Jun 75
AUTHOR: McCracken, Paul W., Rosenberg, William G., Decker, Gerald L.
C5244K3 FLD: 10A, 97C* USGRDR7522
Jun 75 23p*
GRANT: NSF-OEP74-20242
MONITOR: 18
See also PB-243 823. Prepared in cooperation with Environmental Research Inst. of Michigan, Ann Arbor, Townsend-Greenspan and Co., Inc., New York, and Cravath, Swain and Moore, New York.

ABSTRACT: This report summarizes the findings of a study of the technical, environmental, economic, legal and regulatory aspects of two well-known approaches to conserving fuel burned to produce steam: (1) the generation of by-product electric power from the steam generated by industry for use in manufacturing, and (2) the supplying of steam to industry from utility central power stations.

DESCRIPTORS: *Industrial plants, *Steam electric power generation, *Steam heating, *Waste heat utilization, Electric power production, Electric utilities, Heat recovery, Reviewing, Appraisals, Economics, Environmental impacts, Law(Jurisprudence), Energy conservation, Regulations, Legislation

IDENTIFIERS: Industrial parks, NTISNSFRDA

PB-243 824/0ST NTIS Prices: PC$3.25/MF$2.25

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Potential for Energy Conservation in Industrial Operations in Texas

Texas Governor's Energy Advisory Council, Austin.*National Science Foundation, Washington, D.C. Div. of Advanced Energy Research and Technology.*Cullen Coll. of Engineering, Houston, Tex.

Final rept.
AUTHOR: Prengle, H. William Jr
C5102F1 FLD: 10A, 97B USGRDR7520
Nov 74 240p
GRANT: NSF-GI-44085, NSF-SIA73-05812
Proj., S/D-10
PROJECT: S/D-10
MONITOR: NSF/RA/N-74-231
Prepared in cooperation with Cullen Coll. of Engineering, Houston, Tex.

ABSTRACT: This project was undertaken to determine energy consumption and potential savings in the industrial sector in Texas, as measured by petroleum refining, chemical manufacture, pulp and paper, and metals production. energy use was determined by actual survey of the 211 companies in the four subject industries.

DESCRIPTORS: *Energy conservation, *Texas, *Petroleum industry, *Chemical industry, *Paper industry, *Metal industry, Petroleum refining, Industries, Fuel consumption, Electric power demand, Boilers, Heat recovery, Economic analysis, Computerized simulation, Computer programs, Forecasting

IDENTIFIERS: Energy use, NTISNSFRA

PB-243 326/6ST NTIS Prices: PC$7.50/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 89 (Item 105 of 105)

End-Use Conservation

USAEC, Washington, D.C. (6549500)
A7241H4 FLD: 10A, 97B, 97G NSA7504
11 Nov 74 56p
MONITOR: 18

ABSTRACT: For abstract, see ERA 75 04, number 00622.

DESCRIPTORS: (*Energy conservation, *Budgets), Air conditioning, Buildings, Demand factors, Economics, Government policies, Heating, Hybrid systems, Industry, Lighting systems, Planning, Recommendations, Refrigeration, Research programs, Space heating, Systems analysis, Total energy systems, Transportation systems, Urban populations, Water heaters

IDENTIFIERS: ERDA/320000, ERDA/291000, ERDA/291500, ERDA/292500, NTISERDA

TID-26743 NTIS Prices: PC$4.50/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 52 (Item 58 of 105)

Technical Aspects of Efficient Energy Utilization: 1974 Summer Study of the American Physical Society

American Physical Society, Washington, D.C.*Federal Energy Administration, Washington, D.C.*National Science Foundation, Washington, D.C.*Electric Power Research Inst., Palo Alto, Calif.

Summary rept.
AUTHOR: Berman, S., Hartley, D., Ross, M., Socolow, R.
C5095J1 FLD: 10A, 97G USGRDR7520
Jan 75 59p
MONITOR: 18
Supported in part by Federal Energy Administration, Washington, D.C., National Science Foundation, Washington, D.C., and Electric Power Research Inst., Palo Alto, Calif.

ABSTRACT: Research opportunities in physics related to efficient energy utilization are identified. The first section stresses the usefulness of the conceptual framework of thermodynamics, especially as a tool for assessing the efficiency of the management of low quality heat. It also develops elementary quantitative models of energy flows in the house and the car. It calls attention to the importance of new systems concepts and new materials to improve the management of heat, and of new diagnostic instrumentation. The second section deals with the role of physics in combustion, stressing numerical modeling, laser diagnostics, and the exploration of new concepts such as the combustion of emulsions. The third section, a detailed examination of the architectural window, evaluates the cost-effectiveness of existing and modified window systems.

DESCRIPTORS: *Energy conservation, Houses, Automobiles, Industries, Thermal efficiency, Combustion, Lasers, Windows, Architecture, Structural design, Solar space heating, Cost effectiveness, Meetings

IDENTIFIERS: *Energy use, NTISNSFG, NTISEXPEA, NTISEPRI

PB-243 116/1ST NTIS Prices: PC$4.25/MF$2.25

File6, COPP. by N.T.I.S. User 244 Page 18 (Item 18 of 39)

Utilization Analysis of Energy Systems

Drexel Univ., Philadelphia, Pa.*National Science Foundation, Washington, D.C. Research Applied to National Needs. (405 723)

Summary rept.
AUTHOR: Brown, H. L.
C4391R4 FLD: 13A, 97G USGRDR7509
11 Jan 74 83p
GRANT: NSF-GI-36598
MONITOR: NSF/RA/N-74-163

ABSTRACT: An index of relative efficiency for energy systems in the commercial, industrial, and residential sector is developed. An effectiveness is developed based upon the concept of thermodynamic availability. Characterization of energy consumption in Philadelphia by census tracts using census data integrated with local utility data and a regional input-output study is covered.

DESCRIPTORS: *Energy management, Solar heating, Geothermal prospecting, Heat recovery, Heat pumps, Heat exchangers, Thermal efficiency, Residential buildings, Commercial buildings, Industries, Fuel consumption, Pennsylvania, Abstracts, Reviews

IDENTIFIERS: Philadelphia(Pennsylvania), NTISNSFRA

PB-239 291/8ST NTIS Prices: PC$4.75/MF$2.25

Report of Conference Held at Northwestern University Under the Aegis of the National Science Foundation, on Innovative Design Techniques for Energy Efficient Processes March 13-14, 1975

Northwestern Univ., Evanston, Ill. Dept. of Chemical Engineering.*National Science Foundation, Washington, D.C. Energy-Related General Research Office. (404 372)

Final rept.
AUTHOR: Mah, Richard S. H.
C5244E3 FLD: 10A, 97G* USGRDR7522
30 May 75 95p*
REPT NO: NU-CHE-75-001
GRANT: NSF-ENG75-08617
MONITOR: 18

ABSTRACT: This report summarizes the discussions and recommendations of a two-day industry-university-government conference on the subject of the title, held on March 13-14, 1975. It identifies a number of pressing needs of the process industries in meeting energy challenges and recommends increased NSF support in process-design related researches and graduate training in process design. Four major areas of research are identified and specific recommendations are embodied in the report.

DESCRIPTORS: *Energy technology, *Meetings, *Systems engineering, Petroleum refining, Chemical engineering, Industrial plants, Design, Optimization, Energy conservation, Energy management, Heat exchangers, Computerized simulation, Planning, Forecasting, Coal, Synthesis

IDENTIFIERS: Petrochemical industry, NTISNSFBR

PB-243 651/7ST NTIS Prices: PC$4.25/MF$2.25

Energy Consumption: Fuel Utilization and Conservation in Industry

Dow Chemical Co., Freeport, Tex. Texas Div.*Industrial Environmental Research Lab., Research Triangle Park, N.C. (116 700)

Final rept. Apr-Jun 75
AUTHOR: Reding, John T., Shepherd, Burchard P.
C5744D2 FLD: 10A, 97B* USGRDK7603
Sep 75 44p*
CONTRACT: EPA-68-02-1329
PROJECT: EPA-ROAP-21ADE-010
MONITOR: EPA/650/2-75-032-a

ABSTRACT: The report gives results of a study of fuel utilization and energy conservation for the six biggest energy consuming industrial groups: chemicals, primary metals, petroleum, paper, stone/clay/glass/concrete, and food. Level of heat rejection and short term effects of various conservation measures are covered.

DESCRIPTORS: *Chemical industry, *Metal industry, *Petroleum industry, *Paper industry, *Glass industry, *Fuel consumption, *Food industry, Coal, Crude oil, Natural gas, Electricity, Petroleum products, Heat loss, Industries

IDENTIFIERS: *Energy consumption, Energy conservation, Petroleum, Heat consumption, NTISEPAORD

PB-246 688/2ST NTIS Prices: PC$4.00/MF$2.25

The Potential for Energy Conservation. A Staff Study

Office of Emergency Preparedness, Washington, D.C. (407 474)

Final rept.
C0281A1 FLD: 21D, 5C, 96A, 81D, 67B USGRDR7304
Oct 72 247p*
MONITOR: 18
Paper copy also available from GPO $3.00 as stock no. 4102-00009.

ABSTRACT: The objective of the study was to suggest programs which would either improve on the efficiency with which energy is consumed or minimize the consumption of energy (as measured in BTU's) while providing the same or similar services to the consumer. The report (1) assembles relevant energy consumption information in a single document, (2) identifies areas of consumption which offer possibilities for significant reduction in the rate of growth of overall energy consumption, (3) recommends specific plans to execute energy conservation programs under the sponsorship of government and/or private institutions, and (4) identifies the costs and some economic implications of conservation measures which warrant further consideration as a function of the time frames indicated. Accordingly, energy consumption has been divided into four broad areas--transportation, industry, electric utilities, and residential/commercial.

DESCRIPTORS: (*Fuel consumption, *Conservation), (*Energy, Conservation), (*United States, Fuel consumption), Government policies, Trends, Forecasting, Transportation, Industries, Electric utilities, Heating equipment, Heating load, Electric power generation, Heating fuels, Heat, Pollution, Demand(Economics), Insulation, Cost estimates, Economic analysis, Supply(Economics), Taxes, Regulations, Financing

IDENTIFIERS: Thermal pollution, Tax incentives

PB-213 722/6 NTIS Prices: PC$5.50/MF$0.95

B-II. GENERAL WASTE HEAT UTILIZATION

THERMODYNAMICS AND ENERGY ACCOUNTANCY IN INDUSTRIAL PROCESSES. Cozzi, C. (Montedison, Milan). Energy Sources; 2: No. 2, 165-178(1975).

A prerequisite for any energy saving action in an industrial plant is an account of the process energy consumption. The aim is to point out steps in which the energy dissipation is great and there is a good possibility of saving energy. However, some problems still exist. For instance, how to compare thermal and electric energy units and how to measure the energy released or absorbed during a chemical process are areas in which agreement is lacking. In this paper it is shown how these problems can be overcome. The way proposed of performing energy accountancy consists of considering only the active part of each energy input or output in the process, i.e., only that part of the different types of energy able to do work. During the process active energy is converted into inert energy, i.e., energy that cannot do work and, hence, can no longer be considered an economic resource. (auth)

Thermal Energy Recovery by Basic Oxygen Furnace Offgas Preheating of Scrap.
J. J. Drost, C. B. Daellenbach, W. M. Mahan, and W. C. Hill. Bureau of Mines, Twin Cities, Minn. Twin Cities Metallurgy Research Center. Jul 74, 13p BuMines-RI-7929
PB-234 712/5WE PC$3.00/MF$2.25

The feasibility of basic oxygen furnace (BOF) offgas heat recuperation by preheating scrap was investigated. Scrap charges, representing from 22 to 40 percent of the 450-pound BOF metallic charge, were preheated by passing the off-gases through a static bed of shredded auto scrap. As compared to the maximum cold scrap charge, usable preheating allowed scrap utilization to be increased by up to 43 percent. Thermal energy recovered accounts for up to 44 percent of the energy needed to melt the scrap.

WASTE-HEAT CONSIDERATIONS FOR NEW ENERGY SOURCES. A comparison is made of the heat rejection burden resulting from the use of fossil fuel, nuclear, geothermal and solar energy sources for power production. Heat rejection, an inevitable consequence of the second law of thermodynamics, can be viewed on a comparative basis in terms of a ratio of heat rejected (Q_R) to useful work (W) or Q_R: W. For a fossil fuel plant with no stack losses, this ratio is on the order of 1.7 and increases to about 2.2 for the nuclear plant. Depending upon the power cycle configuration, the Q_R/W ratio for the solar and geothermal sources can be on a par or 2.5 times that of the conventional plant respectively. Reject heat, if properly utilized, provides a source of energy. Consideration is given to the potential role of useful aspect systems in reject dispersal. In particular, the feasibility of year-round operation of an evaporative pad agricultural greenhouse complex is demonstrated in concert with optimum power plant performance. 7 refs

Trezek, G.J. Univ of Calif, Berkeley. Schrock, V. *Energy Sources* v 1 n 3 1974 p 271-281.

ID NO.- EI760104565 604565
ENERGY SAVED THROUGH HEAT-TRANSFER METHODS.
Wong, S. L.
M. W. Kellogg Co, Hackensack, NJ
DESCRIPTORS- (*PETROLEUM REFINERIES, *Waste Heat Utilization), (HEAT TRANSFER, Fuel Economy), (WATER COOLING SYSTEMS, Fuel Economy),
CARD ALERT- 513, 616, 641, 521
CODEN- OIGJAV SOURCE- Oil Gas J v 73 n 44 Nov 3 1975 p 49-52
A heat-transfer engineer has countless opportunities to save energy in process plants and refineries. A few typical cases are discussed here: waste-heat recovery, optimizing process heat exchangers, cooling-water balance, and minimizing excess air in fired heaters. The latter measure achieves a saving of 2% fuel by lowering excess air by 5%. 7 refs.

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ID NO.- EI751068448 568448
INVESTING CAPITAL FOR ENERGY SAVINGS.
Grace, J. A.; Khurana, K. C.
Kinet Technol Int, The Hague, Neth
DESCRIPTORS- (*PETROLEUM REFINERIES, *Waste Heat Utilization), (FURNACES, INDUSTRIAL, Fuel Economy),
CARD ALERT- 513, 521, 642
CODEN- OIGJAV SOURCE- Oil Gas J v 73 n 35 Sep 1 1975 p 105-106, 109-110
The authors show how a number of process plant areas can now offer potential energy savings due to higher fuel costs. Three general categories of measures for conservation of heat energy in process plants are cited, and the following major capital-expenditure areas for energy savings/recovery are discussed in detail: proper instrumentation, forced-draft combustion, improved waste-heat recovery system, using air preheaters and/or waste-heat boilers, and, finally, improved furnace-refractory lining and insulation.

Future Developments in Waste Heat Utilization

Oregon State Univ., Corvallis. Engineering Experiment Station.*National Science Foundation, Washington, D.C. Energy-Related General Research Office.

Summary rept.
AUTHOR: Knudsen, James G., Boersma, Larry L.
C6103D1 FLD: 10A, 13B, 02C, 97G, 68D, 98 USGRDR7608
Aug 75 117p
REPT NO: OSU-EES-75-49C
GRANT: NSF-ENG75-03338
MONITOR: 18

ABSTRACT: This report summarizes the discussions and recommendations of a two-day industry-university-government conference on waste heat utilization. A partial listing of topic areas includes: Future developments in waste heat utilization; Constraints on efficient waste heat utilization; General problems in reject heat utilization; The agro-power-waste water complex; Energy utilization in agriculture; Current geothermal energy activities at the Idaho national engineering lab; Using power plant discharge water in greenhouse vegetable production; Use of waste heat for soil warming and frost protection of field crops in northern climates; Beneficial uses of waste heat from power plants for aquaculture; Biological recycling of nutrients from livestock wastes; Utilization of warm water for afforestation of the Snake River desert plain.

DESCRIPTORS: *Meetings, *Heat recovery, *Energy conservation, Electric power plants, Greenhouses, Aquaculture, Agricultural wastes, Geothermal energy, Afforestation, Soil moisture, Frost protection, Nuclear power plants, Systems engineering, Thermal pollution, Agriculture

IDENTIFIERS: *Waste heat utilization, Agro industrial complexes, Nuclear agro industrial complexes, NTISNSFBR

PB-249 346/8ST NTIS Prices: PC$5.50/MF$2.25

TITLE: The Inverted Brayton Cycle for Waste-Heat Utilization
AUTHOR: Wilson, D.G.; Dunteman, N.E.
CORPORATE AUTHOR: Massachusetts Institute of Technology
ADDRESS: Room 3-447, Cambridge, MA 02139
PUBLICATION DESCRIPTION: Paper 73-GT-90, contributed by the Gas Turbine Division of The American Society of Mechanical Engineers for presentation at the Gas Turbine Conference and Products Show, Washington, D.C., April 8-12, 1973.
PUBLICATION DATE: 1973, April
ABSTRACT: When a waste-heat boiler is added to a gas turbine, the additional pressure loss reduces the power delivered. However, when a compressor is added downstream of the boiler, the lost power can not only be restored but, in many cases, the net power level can be substantially increased above the bare-turbine case. This approach employs the "inverted" Brayton cycle, which is analyzed in this paper for thermodynamic and economic performance. (Auth)
AVAILABILITY: ASME, 345 East 47th Street, New York, NY 10017, ($3.00; $1.60 to ASME members)

Thermal wheels for waste heat recovery

Anon., Steam Heat Engr, 43, 32-33, (Mar. 1974). Heat from industrial processes and ventilation systems can be simply recovered by installing a regenerator with a rotor of wiremesh or other material driven by a motor, the rotor taking up heat in passing through the exhaust air and giving it up to the incoming fresh air. Thermal efficiency is < 80%. C

Print 14/5/1-191
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ID NO.- EI760321166 621166
WASTE HEAT RECOVERY.
Iriarte, W. Richard
Hughes Aircr Co, Torrance, Calif
DESCRIPTORS- *WASTE HEAT UTILIZATION, HEAT TRANSFER, HEAT PIPES, HEAT EXCHANGERS,
CARD ALERT- 616, 643, 641
SOURCE- Am Inst of Plant Eng (AIPE), Int Plant Eng Conf, Proc, Anaheim, Calif, Jun 10-12 1975 Pap 10-B, 5 p. Publ by AIPE, Cincinnati, Ohio, 1975
Various methods and especially heat pipes are discussed and evaluated.

ID NO.- EI750958516 558516
ENERGY SYSTEMS FOR DEVELOPMENT.
Orlando, J. A.; Limaye, D. R.
Mathematica, Inc, Univ City Sci Cent, Philadelphia, Pa
DESCRIPTORS- *ELECTRIC POWER SYSTEMS, WASTE HEAT UTILIZATION, ELECTRIC POWER GENERATION,
CARD ALERT- 615, 706
SOURCE- Pittsburgh Conf on Modeling and Simul, 5th Annu, Proc, Univ of Pittsburgh, Pa, Apr 24-26 1974 pt 2, p 673-682. Publ by ISA, Pittsburgh, Pa, 1974
Description of the nature of the MIUS (Modular-Sized Integrated Utility System), reports on analytic investigations of its economics, and describes some of the institutional problems which will impede its widespread use. 4 refs.

ID NO.- EI750105010 505010
POWER AND ENERGY FROM GAS PRIME MOVERS.
Taylor, J. C. B.
DESCRIPTORS- *POWER GENERATION, GAS TURBINES, WASTE HEAT UTILIZATION
CARD ALERT- 615, 612
CODEN- PLEGAA SOURCE- Plant Eng (Lond) v 18 n 9 Sep 1974 p 17-25
The extraction of energy from the basic source may be only a small part of the overall efficiency. For example, a large modern boiler may extract nearly 90 per cent of the energy from the fuel and convert it to steam, but if only 40 per cent of the energy in the steam can be utilized the overall efficiency would be less than 30 per c
However, efficiency can be greatly increased by heat recovery ... process heating. Electricity and process gas production, using gas turbines, are compared with alternate methods.

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ID NO.- EI730210751 310751
RECOVER WASTE HEAT SYSTEMATICALLY.
Mills, L.
Hunt & Moscrop Ltd, Manchester, Engl
DESCRIPTORS- *WASTE HEAT UTILIZATION,
CARD ALERT- 643
CODEN- POWEAD SOURCE- Power v 116 n 12 Dec 1972 p 36-37
Examples show how secondary losses can be reduced by utilizing heat discarded in boiler blowdown, engine exhaust and other sources.

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ID NO.- EI730629477 329477
ENERGY CONSERVATION IN AN INDUSTRIAL PLANT.
Waterland, A. F.
DuPont, Wilmington, Del
DESCRIPTORS- (*INDUSTRIAL PLANTS, *Waste Heat Utilization), STEAM CONDENSERS,
IDENTIFIERS- ENERGY CONSERVATION
CARD ALERT- 402, 616
CODEN- ASMSA4 SOURCE- ASME Paper n 73-IPWR-9 for Meet May 14-20 1973 5 p
The incentive for energy conservation is emphasized and the skills or resources required for a successful energy conservation effort in an industrial plant are explained. Two examples, based on industrial condensing turbines, are presented illustrating successful techniques for combining economics and engineering in the solution of energy conservation problems.

ID NO.- EI750316647 516647
HOW TO ELIMINATE HEAT LEAKS IN YOUR PLANT.
Wilson, David N.
Du Pont, Wilmington, Del
DESCRIPTORS- *FUEL ECONOMY, (SHEET AND STRIP METAL, Precoating), INDUSTRIAL HEATING,
CARD ALERT- 521, 535, 642
CODEN- IFIIAJ SOURCE- Ind Finish v 50 n 12 Dec 1974 p 12-14, 16
A survey of eight industrial plants shows that savings of up to 43% can be achieved in energy costs in areas such as excess air control, steam leaks, condensate return, steam balance, energy recovery, use of waste fuel, and process control. Typical case histories are described for each area. For example a steam leak in one plant was rated at 3500 lbs/hr, wasted 4. 4 million Btu/hr in fuel at a cost of $38,000 a year.

File8, COPR. by Engineering Index User 244 Page 52 (Item 128 of 411)

ID NO.- EI750317033 517033
ELECTROHEAT $EM DASH$ CONSERVING ENERGY IN THE PRODUCTION ENGINEERING INDUSTRY.
Harrison, Wm. Leonard
DESCRIPTORS- (*INDUSTRIAL PLANTS, *Process Heating), ELECTRIC HEATING, INDUSTRIAL HEATING, FUEL ECONOMY,
IDENTIFIERS- ENERGY CONSERVATION
CARD ALERT- 402, 521, 532, 642
CODEN- ELWIBK SOURCE- Elektrowaerme Int v 32 n B6 Dec 1974 p B353-B360
The author presents a survey on the different types of using electroheat in the production engineering industry. 9 refs.

ID NO.- EI740955781 455781
HEATING FUEL CONSERVATION.
Meister, Raymond A.
Robert S. Curl & Assoc, Columbus, Ohio
DESCRIPTORS- (*INDUSTRIAL HEATING, *Fuel Economy), COMBUSTION,
CARD ALERT- 521, 642
CODEN- PLENAV SOURCE- Plant Eng (Barrington, Ill) v 28 n 14 Jul 11 1974 p 92-93
Major sources of wasted fuel are excessive flue gas temperatures in furnaces, boiler plants and ovens; excessive combustion air, combustion and chamber leakage excessive heat removal by exhaust ventilation and malfunctioning temperature and pressure controls. Correction factors are described for each problem.

ID NO.- EI71X177004 177004
Beneficial uses of thermal discharge
STEWART R; BJORNSSON S
State Univ of New York, Albany
DESCRIPTORS- *WASTE HEAT UTILIZATION, METEOROLOGY,
IDENTIFIERS- THERMAL DISCHARGE
CARD ALERT- 443, 616
SOURCE- Proc 27th annu meeting Eastern Snow Conf, Albany, NY, Feb 12-13 1970 p 63-6
2 refs.

File8, COPR. by Engineering Index User 244 Page 42 (Item 101 of 191)

ID NO.- EI740741583 441583
UEBERBLICK UEBER SYSTEME UND AUFBAU BEI ANLAGEN ZUR WAERMERUECKGEWINNUNG IN PRODUKTIONSBETRIEBEN. $left bracket$ Principle and Design of Heat Recovery Equipment in Production Plant $right bracket$.
Dickopp, Adolf
DESCRIPTORS- *INDUSTRIAL HEATING, (FURNACES, INDUSTRIAL, Waste Heat Utilization), HEAT EXCHANGERS, HEAT PUMP SYSTEMS,
IDENTIFIERS- HEAT RECOVERY
CARD ALERT- 616, 642, 643
CODEN- ELWIBK SOURCE- Elektrowaerme Int v 32 n B2 Apr 1974 p B69-B74
It is shown that an adequate number of processes and equipment is available for the purpose of utilizing residual and waste heat from industrial processes. Reference is made to the economic use of heat-recovery equipment and heat exchangers for liquids and gases are described. The author concludes with a description of the design of heat pumps and with the limitations to their use. In German with English abstract.

File8, COPR. by Engineering Index User 244 Page 44 (Item 107 of 191)

ID NO.- EI740633806 433806
DIE WAERMETECHNISCHEN ERGEBNISSE DER ABGASWAERMENUTZUNG BEI INDUSTRIEOEFEN $EM DASH$ 1. $left bracket$ Thermal Engineering Aspects of Waste Gas Heat Utilization in Industrial Furnaces $EM DASH$ 1 $right bracket$.
Cernoch, Svatopluk
Tech Hochsch, Kosice, Czech
DESCRIPTORS- (*FURNACES, INDUSTRIAL, *Waste Heat Utilization),
CARD ALERT- 642, 522
CODEN- ETNKA2 SOURCE- Energietechnik v 23 n 12 Dec 1973 p 554-561
A recently developed diagram is used as an aid in the analysis. The most important balance components with the basic concepts of combustion, such as the adiabatic, calorimetric, theoretical and combustion gas temperature, are illustrated and described. The heat balance of the furnace, with and without recuperation, is determined with the aid of such characteristic values as firing and thermal efficiency. 26 refs. In German.

ID NO.- EI730840130 340130
SOME CONSIDERATIONS IN INDUSTRIAL HEAT RECOVERY.
Polimeros, George
DESCRIPTORS- (*INDUSTRIAL PLANTS, *Waste Heat Utilization), HEAT EXCHANGERS,
IDENTIFIERS- INDUSTRIAL HEAT RECOVERY
CARD ALERT- 402, 616
CODEN- BSUDBP SOURCE- Build Syst Des v 70 n 4 Apr-May 1973 p 36-38
It is stressed that many existing plants could install systems to recover heat from ongoing processes and make a profit on them or, defray expenses for air pollution control equipment. Various heat recovery methods, guidelines for technical feasibility and for economic appraisal, and special problems in connection with the use of heat recovery systems in plants are discussed.

B-III. HEAT RECOVERY IN FURNACES AND OVENS

File8, COPR. by Engineering Index User 244 Page 20 (Item 50 of 191)

ID NO.- EI751171761 571761
CERAMIC FIBER FITS EASILY AS LINING FOR FURNACE.
Fidler, F. E.
Babcock & Wilcox Co, Augusta, Ga
DESCRIPTORS- (*CERAMIC MATERIALS, *Fibers), (FURNACES, INDUSTRIAL, Waste Heat Utilization), (PETROLEUM REFINERIES, Fuel Economy), PETROCHEMICAL PLANTS,
CARD ALERT- 812, 616, 642, 513
CODEN- OIGJAV SOURCE- Oil Gas J v 73 n 37 Sep 15 1975 p 184-190
Ceramic-fiber-blanket furnace lining is gaining in popularity with refiners, petrochemical processors, and other processing plants as a method to cut fuel consumption and lost BTU's. The flexibility of the soft-fiber blanket makes it suitable for use in furnaces or furnace sections which are shop fabricated and shipped to other locations. Proper installation of ceramic-fiber furnace linings, which involves the use of anchoring systems, is discussed, and several installation methods are recommended.

File6, COPR. by N.T.I.S. User 244 Page 12 (Item 12 of 39)

Heat Recovery Systems for Industrial Furnaces, Particularly Coke Ovens

Kanner (Leo) Associates, Redwood City, Calif.
AUTHOR: Cassan, J. H. F.
C499114 PLD: 13A STAR1315
Jan 75 14p
REPT NO: NASA-TT-F-16400
CONTRACT: NASW-2481
MONITOR: 18
Tran-Transl. Into English from German Patent No. 900930, Class 10A, Group 401 (Appl. No. C3869v1b/10A, 4 Jan. 1954) 7 p.

ABSTRACT: A heat recovery system for furnaces is described. A regenerator system is characterized by the use of single recovery units (one pair for each burner), independent of one another and of the masonry or wall, which form the foundation for the furnace wall system. The individual recovery units are not exposed to any forces or deformation deriving from the surrounding masonry, which might impair their integrity. All the ducts or passages which would normally be located in the intermediate section of the furnace are situated in the lower part of the massive masonry of the recovery system, which is exposed to no expansion and no dislocations.

DESCRIPTORS: *Combustion chambers, *Furnaces, *Heat radiators, *Ovens. Ducts, Exhaust systems, Performance prediction

IDENTIFIERS: NTISNASA

N75-23869/9ST NTIS Prices: PC$3.25/MF$2.25

ID NO.- EI750638069 538069
RECUPERATING ENERGY & MONEY.
Anon
DESCRIPTORS- (*FURNACES, HEAT TREATING, *Waste Heat Utilization), (HEAT EXCHANGERS, Regenerators),
IDENTIFIERS- RECUPERATORS
CARD ALERT- 532, 537, 616
CODEN- INGNAC SOURCE- Ind Gas (N Y) v 55 n 3 Mar 1975 p 11-13
A new gas-fired heat treat furnace at the New Process Gear Division (NPG) of Chrysler Corp, is achieving a 27% fuel reduction, while providing 33% more productive capacity and decreased thermal pollution. Energy conservation is being realized through the incorporation of heat recuperators on the radiant tube combustion system of a new furnace, which carburizes and hardens transmission gears and shafts. These recuperators recover heat from the exhaust gases to warm the incoming combustion air. This reduces the fuel required to bring the gas/air mixture to furnace temperature.

ID NO.- EI750316674 516674
OPTIMUM EFFICIENCIES OF FURNACES: SETTING THE TARGETS.
Essenhigh, Robert H.
Pa State Univ, University Park
DESCRIPTORS- (*FURNACES, *Waste Heat Utilization), FUEL ECONOMY,
CARD ALERT- 642, 616, 521
CODEN- INHTAZ SOURCE- Ind Heat v 41 n 11 Nov 1974 p 21-24
As processing temperatures rise, the unavoidable wall and increased stack gas losses become increasingly important, and the ratio of operational to intrinsic efficiency drops to 0. 5 and lower. Heat recovery is the most effective method for improving efficiency. Below 1000 $degree$ F metallic recuperators can be used or, for higher temperatures refractory regenerators or waste heat boilers. Preheating, such as a billet heating furnace, is another alternative.

ID NO.- EI760102634 602634
ENERGY CONSERVATION AND ENVIRONMENTAL ADVANTAGES OF MODERN VACUUM FURNACES.
Hunt, Thomas; Lamere, Robert; Colligan, George; Stewart, Arthur
Richard D. Brew & Co, Concord, NH
DESCRIPTORS- (*FURNACES, ELECTRIC, *Vacuum), (FURNACES, INDUSTRIAL, Vacuum),
CARD ALERT- 532, 642, 633
CODEN- INHTAZ SOURCE- Ind Heat v 42 n 11 Nov 1975 p 10-15, 17
When procuring industrial furnaces today, energy conservation and environmental features warrant serious consideration. This article provides a technical assessment of these features in regard to design and characteristics of modern, high temperature, electrically-heated vacuum furnaces.

ID NO.- EI70X036275 036275
Thermodynamics of recuperation of waste heat from the combustion products of industrial furnaces
CERNOCH S
Iron & Steel Works, Kosice, Czechoslovakia
DESCRIPTORS- *WASTE HEAT UTILIZATION, FURNACES, INDUSTRIAL,
CARD ALERT- 616, 642
SOURCE- J Iron Steel Inst (London) v 207 pt 12 Dec 1969 p 1578-90
A survey is presented of the main aims and assumptions of the thermodynamic analysis of the recuperation of waste heat. A new diagram is applied showing the thermal work of the furnace from the viewpoint of the first and second theorem of thermodynam,h thermal balanace of the working space of. without and with recuperation is discussed, together with higher output and fuel consumption saving. The best ways of utilizing waste heat by recuperation are determined.

ID NO.- EI740312945 412945
IMPROVEMENT OF FUEL EFFICIENCY IN INDUSTRIAL HEATING EQUIPMENT.
Thekdi, A. C.; Hemsath, K. H.
Midland-Ross Corp, Toledo, Ohio
DESCRIPTORS- (*FURNACES, INDUSTRIAL, *Combustion),
IDENTIFIERS- AIR PREHEATING, OXYGEN ENRICHMENT, FUEL EFFICIENCY
CARD ALERT- 642
CODEN- ASMSA4 SOURCE- ASME Pap n 73-WA/Fu-3 for Meet Nov 11-15 1973 8 p
Summarizes various methods of increasing fuel efficiency in industrial operations. It is shown that combustion air preheating and oxygen enrichment of air are two most practical and economical methods for small to medium size installations. The effectiveness, economics and typical problems associated with the application of these two methods are discussed. It is pointed out that new approach and efforts are required in the development of reliable and economical combustion system components required with the use of preheated and oxygen enriched air. The paper includes description of a new burner which can operate on 21 to 45 percent enriched air.

File8, COPR. by Engineering Index User 244 Page 111 (Item 283 of 411)

ID NO.- EI740419779 419779
ADDITION OF HEAT RECOVERY EQUIPMENT TO EXISTING FURNACES.
Olson, B. L.
Salem Corp
DESCRIPTORS- (*FURNACES, INDUSTRIAL, *Fuel Economy),
CARD ALERT- 521, 642
CODEN- INHTAZ SOURCE- Ind Heat v 41 n 1 Jan 1974 p 11-18
Techniques for adding recuperative devices to reduce energy consumption for gas-fired furnaces, are described. Furnaces cover include slab heating, annealing, paint drying and radiant-tube types

ID NO.- EI740419794 419794
OPTIMIZING CONTROL OF CONTINUOUS METALLURGICAL REHEATING FURNACES.
Grosse, G.; Gauvrit, M.
DESCRIPTORS- (*FURNACES, METALLURGICAL, *Control),
CARD ALERT- 532, 642, 921
CODEN- WWINAZ SOURCE- Wire World Int v 15 Double N 5 Sep-Oct 1973 p 203-209

A mathematical model is presented for optimizing the electric controls of continuous reheating furnaces for metal slabs, billets, or blooms. The paper is divided into three parts dealing, respectively, with the model of the reheating process, identification of coefficients dependent upon temperature, and the optimization problems. It is stated that the model has been used to improve the results of an existing furnace, to define a new installation in an optimum manner, and to demonstrate the value of the radiant roof.

File8, COPR. by Engineering Index User 244 Page 103 (Item 262 of 411)

ID NO.- EI740526698 426698
POTENTIAL FOR IMPROVING FURNACE PERFORMANCE.
Essenhigh, Robert H.
Pa State Univ, University Park
DESCRIPTORS- *FURNACES, INDUSTRIAL, FUEL ECONOMY,
CARD ALERT- 521, 642
SOURCE- Fuels Util Conf, Proc, Cleveland State Univ, Ohio, Oct 26 1972 p 106-136. Available from Cleveland State Univ, Div of Contin Educ, Ohio, 1972

The three factors that most affect thermal efficiency are matching the furnace to the load, control of excess air by good fuel/air ratio control and dampering and heat recovery. The effects of heat recovery on furnace efficiency, maintenance procedures and efficient pollution control are also covered. Refs.

ID NO.- EI740741147 441147
ISPOL'ZOVANIE TEPLA OTKHODYASHCHIKH GAZOV NAGREVATEL'NYKH PECHEI V ISPARITEL'NO-EKONOMAIZERNYKH POVERKHNOSTYAKH PODKLYUCHENNYKH K SISTEME ISPARITEL'NOGO OKHLAZHDENIYA PECHI. $left bracket$ Utilization of the Heat of Waste Gases of Heating Furnaces on Evaporation-Economizer Surfaces Connected to the Evaporation-Cooling Systems of Furnaces $right bracket$.
Kolobkov, P. S.
Khar'kov Eng Constr Inst, Ukr SSR
DESCRIPTORS- (*FURNACES, HEATING, *Waste Heat Utilization), (ECONOMIZERS, Waste Heat Utilization), (FURNACES, Cooling),
CODEN- IVZEAY SOURCE- Izv Vyssh Uchebn Zaved, Energ n 2 Feb 1974 p 75-78
Waste heat utilizing boilers after recuperators of heating furnaces have proved highly inefficient. Another type of waste heat utilizing installation is needed, one that is much cheaper and simpler, being placed directly by the furnace and efficient even at low furnace loads. These conditions are met by tubular evaporation-economizer surfaces in the furnace flue. They are connected to the separator of the furnace system of cooling by evaporation. Problems of optimum design of such installations are considered. In Russian.

ID NO.- EI750104347 504347
CONSERVE OVEN HEAT $EM DASH$ 2.
Schrantz, Joe
DESCRIPTORS- *OVENS, INDUSTRIAL, FUEL ECONOMY,
CARD ALERT- 642, 521
CODEN- IFIIAJ SOURCE- Ind Finish v 50 n 11 Nov 11 1974 p 22-26, 28
The ability of gas analyzers to continuously monitor solvent vapor concentrations to conserve energy in finishing ovens is evaluated. Three types $EM DASH$ catalytic oxidation, sensing flame, and infrared spectroscopy $EM DASH$ appear to be the most common. The principles of operation of each type, installation and costs are described.

ID NO.- EI750104346 504346
CONSERVE OVEN HEAT $EM DASH$ 1.
Schrantz, Joe
DESCRIPTORS- *OVENS, INDUSTRIAL, FUEL ECONOMY, (PAINT, Drying),
CARD ALERT- 642, 521, 813
CODEN- IFIIAJ SOURCE- Ind Finish v 50 n 10 Oct 1974 p 14-18, 20
Used on paint curing ovens, true continuous vapor concentration indicators and controls can reduce oven ventilation required by at least 50%. Reduced ventilation can reflect Btu savings of from 20 to 75%, depending upon loading, solids in the coating, temperature, etc. Typically, the higher temperature ovens and those with high production throughput would get the fastest payback since vast Btu savings can be made with these ovens.

B-IV. HEAT RECOVERY - GAS TURBINES

ID NO.- EI751177223 577223
ANORDNUNG DER ND-VORWAERMER IM TURBINENABDAMPFSTUTZEN $EM DASH$ SCHALTUNGEN, BAUARTEN UND MONTAGEMOEGLICHKEITEN. $left bracket$ Application of Low Pressure Feed Heaters in Turbine Exhaust Steam Branches $EM DASH$ Operation, Construction and Installation Methods $right bracket$.
Welch, R.
Kraftwerk Union Aktienges, Erlangen, Ger
DESCRIPTORS- (*STEAM TURBINES, *Exhausts), (TURBOMACHINERY, Waste Heat Utilization),
CARD ALERT- 917, 632
CODEN- VGBKB5 SOURCE- VGB Kraftswerkstech v 55 n 6 Jun 1975 p 360-363
Changes from U-shaped piping to straight heating surface pipework are discussed. Computerized calculations showing acceptable thermal stresses are described. Data are presented in tabular and graphical form. In German with English abstract.

ID NO.- EI750745153 545153
RECUPERATOR DEVELOPMENT TRENDS FOR FUTURE HIGH TEMPERATURE GAS TURBINES.
McDonald, C. F.
DESCRIPTORS- (*GAS TURBINES, *Waste Heat Utilization), HEAT EXCHANGERS,
CARD ALERT- 612, 641, 616
CODEN- ASMSA4 SOURCE- ASME Pap n 75-GT-50 for Meet Mar 2-6 1975, 24 p
For future low cost, high temperature, small gas turbines, with improved cycle efficiencies, it is postulated that the complete hot section of the engine (combustor, ducts, turbine nozzle and rotor) will be all ceramic and may include a ceramic heat exchanger. Few of the answers are available today in the areas of ceramic recuperator performance, cost and structural integrity and concentrated development efforts are required to demonstrate the viability of a fixed boundary ceramic gas turbine heat exchanger. This paper briefly outlines possible design and development trends in the areas of exchanger configuration, surface geometry and materials, and it includes specific sizes and economic aspects of ceramic recuperators for future advanced low SFC gas turbines. 21 refs.

File8, COPR. by Engineering Index User 244 Page 55 (Item 136 of 191)

ID NO.- EI72X043313 243313
Computer techniques for evaluating gas turbine heat recovery applications
STEWART JC
Henry Vogt Machine Co, Louisville, Ky
DESCRIPTORS- (*GAS TURBINES, *Waste Heat Utilization),
CARD ALERT- 612
SOURCE- ASME Pap 72-GT-103 for meeting Mar 26-30 1972, 8 p
Describes programs which provide an installed cost estimate that can be used to evaluate the effect of variations in boiler pinch point, back pressure, stack temperature, superheated steam temperature, feed water approach temperature, and supplementary firing for any gas turbine heat recovery application. Another program provides operating performance of the selected boiler design through a range of exhaust conditions due to ambient or load changes, and also for changes in the steam capacity or pressure requirements. 5 refs.

ID NO.- EI71X002553 102553
Steam injection can improve gas turbines
EDISS BG
Iver Heath, Buckshire, England
DESCRIPTORS- (*GAS TURBINES, *Efficiency), (GAS TURBINES, Waste Heat Utilization),
CARD ALERT- 612
CODEN- PCWEA SOURCE- Power v 114 n 6 June 1970 p 82-4
Injecting steam from waste heat into cycle improves output and reliability.

ID NO.- EI70X012543 012543
Gas turbines and total energy concept
BRAY KA; TYLER JR
DESCRIPTORS- (*GAS TURBINES, *Waste Heat Utilization),
CARD ALERT- 296
SOURCE- Diesel Engrs & Users Assn-Publ 325 May 1969 p 1-9
Majority of industrial applications of gas turbines fall into three categories broadly defined by economic factors; base load applicwtions where fuel cost is negligible part of overall cost of operation and thermal efficiency is therefore unimportant; applications where hours run are small and hence thermal efficiency is again relatively unimportant; this includes standby and emergency installations as well as peak lopping; applications where it is possible to use exhaust heat of low efficiency engine to increase overall thermal efficiency so that it competes directly on fuel costs.

File8, COPR. by Engineering Index User 244 Page 73 (Item 180 of 191)

ID NO.- EI70X037608 037608
Power recovery from gas turbines- a review of the limitations, and an evaluation of the use of '%'organic'%' working fluids
LUCHTER S
Mechanical Technology, Inc, Latham, NY
DESCRIPTORS- (*GAS TURBINES, *Waste Heat Utilization),
CARD ALERT- 612
SOURCE- ASME Pap 70-GT-113 for meeting May 24-28 1970 7 p
Gas- turbine waste heat appears to be a valuable source of energy, yet the number of installations in which this energy is utilized is minimal. The reasons for this are reviewed and a typical nonafterburning cycle is examined for both steam and an '%'organic'%' working fluid. The power level range over which each is attractive is obtained, and the costs of each are compared on a relative basis. 10 refs.

ID NO.- EI730734570 334570
PERSPECTIVES FOR WASTE HEAT RECOVERY BY MEANS OF ORGANIC FLUID CYCLES.
Angelino, G.; Moroni, V.
Politecnico of Milan, Italy
DESCRIPTORS- (*GAS TURBINES, *Closed Cycle), WASTE HEAT UTILIZATION, (HEAT TRANSFER, Gases),
IDENTIFIERS- ORGANIC FLUIDS
CARD ALERT- 612, 641
CODEN- JEPOA8 SOURCE- J Eng Power, Trans ASME v 95 Ser A n 2 Apr 1973 p 75-83
Paper No. 72-WA/Pwr-2.

B-IV-A. HEAT RECOVERY - BOILERS

Performance Evaluation of a Power Recovery Waste Heat Boiler

Oak Ridge Gaseous Diffusion Plant, Tenn.
AUTHOR: Szady, A. J.
A5642B2 FLD: 13A, 69A NSA2623
14 Sep 72 29p
CONTRACT: W-7405-ENG-26
MONITOR: 18

ABSTRACT: For abstract, see NSA 26 23, number 55950.

DESCRIPTORS: *Boilers, *Heated effluents,

K-1837 NTIS Prices: PC$3.00/MF$0.95

ID NO.- EI70X010259 010259
Use and design features of waste heat boilers, (Der Einsatz von Abhitzekesseln und einige Konstruktionsmerkmale)
CAPITAINE D; STOFFELS PH; JENTZSCH W
DESCRIPTORS- (*BOILERS, *Design), WASTE HEAT UTILIZATION, REFUSE INCINERATORS,
CARD ALERT- 019, 076, 199
SOURCE- Vereinigung der Grosskesselbesitzer-Mitteilungen v 49 n 3 June 1969 p 165-73
Attempt to classify waste heat boilers; several design features which are characteristic of waste heat recovery systems are explained and in particular gas coolers, waste heat recovery and directly fired superheaters for ethylene and ammonia plants, and waste heat boilers connected with steel converters and with sulfur combustion or refuse incineration plants. In German.

B-IV-B. HEAT RECOVERY - FURNACES, BOILERS AND TURBINES MIXED

File8, COPR. by Engineering Index User 244 Page 52 (Item 128 of 191)

ID NO.- EI730207545 307545
GAS TURBINE HEAT RECOVERY IMPROVES REHEAT STEAM CYCLE.
Woodburn, J. D.; Andrew, W. H.
Public Service Dept, City of Burbank, Calif
DESCRIPTORS- (*GAS TURBINES, *Waste Heat Utilization), WASTE HEAT UTILIZATION,
IDENTIFIERS- HEAT-RECOVERY STEAM GENERATORS
CARD ALERT- 612, 913
CODEN- ASMSA4 SOURCE- ASME Paper n 72-WA/Pwr-10 for Meet Nov 26-30 1972, 7 p
A new 23,000-kw gas turbine furnishes exhaust gas to an unfired heat recovery steam generator which produces 70,000 lb/hr steam at 535 psig and 800 F. This steam is utilized by an older 55,000-kw reheat steam turbine and boiler by injecting the recovery steam into the cold reheat line between the steam turbine and the reheater section of the boiler. This combined cycle increases the capacity of the existing steam turbine and the total combined net heat rate with the gas turbine can be as low as 9700 Btu/kwh at a cost of $100/kw for the additional capacity. 7 refs.

ID NO.- EI760209747 609747
FLOW VISUALIZATION STUDIES OF A FLUIDIZED BED FURNACE FOR A COAL-FIRED CLOSED CYCLE GAS TURBINE.
Holcomb, R. S.
Oak Ridge Natl Lab, Tenn
DESCRIPTORS- (*GAS TURBINES, *Closed Cycle), (BOILERS, Waste Heat Utilization), (HEAT TRANSFER, Fluidized Beds),
CARD ALERT- 612
CODEN- ASMSA4 SOURCE- ASME Pap n 75-WA/Ener-4 for Meet Nov 30-Dec 4 1975, 7 p
Flow visualization studies were performed on a small-scale Plexiglas model of a coal-burning fluidized bed furnace that has been designed as a heat source for a closed cycle gas turbine total energy system for the HUD-MIUS Program. The test model was 10 in. square with a tube bundle of $one quarter$ in. O. D. tubes 6 rows deep. The bed material was limestone with a mean particle size of 370 mu m and a static bed height of 1 ft. The following results were obtained: a static region of bed material can be used as thermal insulation of the bed plate and around the turbine air manifolds; the minimum velocity for solids mixing at the wall was 1. 75 ft/sec, allowing a 3:1 turndown of the furnace; the bed pulsation frequency was 2 to 3 cycles/sec over the operating range of air velocity. 5 refs.

ID NO.- EI70X012789 012789

Gas turbine heat recovery boiler thermodynamics, economics and evaluation

FOSTER-PFGG RW

Struthers Energy Systems, Inc, Warren, Pa

DESCRIPTORS- (*GAS TURBINES, *Waste Heat Utilization), (BOILERS, Waste Heat), (INDUSTRIAL PLANTS, Power Supply),

CARD ALERT- 019, 159, 296

SOURCE- ASME-Paper 69-GT-116 for meeting Mar 10-13 1969, 12 p

Horizontally oriented, natural circulation type boilers are described, most of comments and evaluations given are applicable to other designs as well; operating conditions and design solutions of conventional boilers are significantly different from heat recovery boilers; main differences are tabulated and discussed.

ID NO.- EI760210249 610249
PRACTICAL RANKINE CYCLES FOR PROCESS PLANTS.
Klooster, H. J.
Fluor Eng & Constr Inc, Los Angeles, Calif
DESCRIPTORS- (*INDUSTRIAL PLANTS, *Waste Heat Utilization),
CARD ALERT- 402, 616, 643
SOURCE- Intersoc Energy Convers Eng Conf, 10th, Rec, Univ of Del, Newark, Aug 18-22 1975 Pap 759210 p 1439-1442. Publ by IEEE (Cat n 75CHO 983-7 TAB), New York, NY, 1975
Recent parametric studies were made for single and dual Rankine cycle $left double quote$ systems $right double quote$ to determine the economic optimum for recovery of low temperature level energy from process streams in the 300 $degree$ F to 500 $degree$ F range. A total of nine alternate Rankine cycle applications were investigated utilizing steam, isobutane, freon, benzene, and thiophene either singly or in combined application. Each system was studied to evaluate not just the best operating efficiency of the Rankine cycle alone, but also to obtain the optimum economic condition for the Rankine cycle and other equipment associated with the total $left double quote$ system $right double quote$. 6 refs.

ID NO.- EI750320930 520930
RANKINE-CYCLE SYSTEMS FOR WASTE HEAT RECOVERY.
Barber, Robert E.
Barber-Nichols Eng Co, Arvada, Colo
DESCRIPTORS- *WASTE HEAT UTILIZATION, (INDUSTRIAL PLANTS, Waste Heat Utilization),
CARD ALERT- 402, 643
CODEN- CHEEA3 SOURCE- Chem Eng (NY) v 81 n 25 Nov 25 1974 p 101-104, 106
Waste heat can be utilized by an organic Rankine-cycle system to produce useful electrical or shaft power without any fuel expense. Such a system starts with a heat recovery boiler, which provides saturated or superheated vapor to an expander by transferring heat from the waste-heat fluid to the Rankine-cycle working fluid. Power is extracted in the expander, and the fluid passes on to a condenser, which provides liquid to a feed pump. The feed pump raises the pressure and resupplies fluid to a boiler, thereby completing the cycle. The working-fluid condenser heat is rejected to a cooling fluid in the condenser. Depending on the particular application and working fluid selected, it may be economical to add a regenerator to improve cycle efficiency. 16 refs.

ID NO.- EI750530948 530948
LOW-LEVEL HEAT RECOVERY TAKES ON ADDED MEANING AS FUEL COSTS JUSTIFY INVESTMENT.
Sternlicht, Beno
Mech Technol Inc
DESCRIPTORS- (*HEAT ENGINES, *Waste Heat Utilization),
CARD ALERT- 641
CODEN- POWEAD SOURCE- Power v 119 n 4 Apr 1975 p 84-87
Low-level heat recovery can be made through the classical Rankine cycle, using man-made organic fluids. In the wide range below 800F, organic fluids are more efficient than superheated steam. Cost and reliability remain prime challenges to acceptance. 11 refs.

ID NO.- EI741172588 472588

POTENTIAL OF RANKINE ENGINES TO PRODUCE POWER FROM WASTE HEAT STREAMS.

Barber, Robert E.
Barber-Nicholas Eng Co, Denver, Colo

DESCRIPTORS- (*POWER PLANTS, *Waste Heat Utilization),

CARD ALERT- 617, 641

SOURCE- Intersoc Energy Convers Eng Conf, 9th, Proc, San Francisco, Calif, Aug 26-30 1974 Pap 749018, p 508-514. Available from ASME, New York, 1974

This paper describes heat recovery Rankine Cycle systems and how to estimate the potential power output of a heat source. An economic study shows that the Rankine Cycle system can produce power at a real cost below that of a coal-fired steam unit and pay off the capital costs in less than three years based on the current minimum value of electricity (2. 2 $cent$ /kw-hr). This payoff period will be reduced as the value of electricity increases in the future. 17 refs.

B-VI. 24 LUMBER AND WOOD PRODUCTS

File6, COPR. by N.T.I.S. User 244 Page 81 (Item 93 of 105)

Economic Impact of Energy Shortages on the Logging and Sawmills, Paper and Allied Products Industries. Volume 1

Delex Systems, Inc., Springfield, Va.*Federal Energy Administration, Washington, D.C. (406 069)

Final rept.
C3705I4 FLD: 10A, 97B*, 96A* USGRDR7425
May 74 226p*
REPT NO: TR-D-171-Vol-1
CONTRACT: DI-14-01-0001-1653
MONITOR: FEA/EI-1653-Vol-1
See also Volume 2, PB-236 263.

ABSTRACT: This study is one of a series conducted in an effort to provide meaningful information on the structure and characteristics of a selected lumber industries. Particular emphasis is placed on fuel use by major type and production process. In addition, the possibilities for fuel substitution and conservation of energy are explored. Report covers logging, sawmills, millwork, and plywood industries.

DESCRIPTORS: *Sawmills, *Logging, *Plywood, *Millwork, Fuel consumption, Substitutes, Constraints, Variations, Statistical data, Tables(Data), Industries

IDENTIFIERS: *Energy shortages, Energy conservation, Energy use, Energy supplies, NTISEXFEA

PB-236 262/2ST NTIS Prices: PC$7.50/MF$2.25

Economic Impact of Energy Shortages on the Logging and Sawmills, Paper and Allied Products Industries. Volume 2

Delex Systems, Inc., Springfield, Va.*Federal Energy Administration, Washington, D.C. (406 069)

Final rept.
C3705J1 FLD: 10A, 97B, 96A USGRDR7425
May 74 246p*
REPT NO: TR-D-171-Vol-2
CONTRACT: DI-14-01-0001-1653
MONITOR: FEA/EI-1653-Vol-2
See also Volume 1, PB-236 262.

ABSTRACT: Structure and characteristics of the pulp, paper, paperboard, corrugated and solid fiber box, and building paper and building board industries are discussed, with emphasis on fuel use by major type and production process.

DESCRIPTORS: *Pulp mills, *Paper mills, *Paper industry, *Paper boards , Fuel consumption, Substitutes, Constraints, Variations, Statistical data, Tables(Data)

IDENTIFIERS: *Energy shortages, Energy conservation, Energy use, Energy supplies, NTISEXFEA

PB-236 263/0ST NTIS Prices: PC$7.50/MF$2.25

ID NO.- FI741171064 471064
HOW TO REDUCE ENERGY CONSUMPTION IN KILN-DRYING LUMBER.
Wengert, E. M.
DESCRIPTORS- (*LUMBER, *Drying), KILNS,
IDENTIFIERS- ENERGY CONSUMPTION
CARD ALERT- 642, 811
CODEN- XALNA9 SOURCE- US For Prod Lab Res Note FPL-0228 1974, 4 p

Twenty-five suggestions are given for increasing efficiency to reduce energy consumption in both air drying and kiln drying of lumber.

B-VII. SIC 262 and 261

PAPER AND PULP MILLS

F 5, COPR. by N.T.I.S. User 244 Page 37 (Item 43 of 105)

The Potential for Energy Conservation in Nine Selected Industries. The Data Base. Volume 8. Selected Paper Products

Gordian Associates, Inc., New York.*Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
C5244D2 FLD: 10A, 11L, 97B, 97G, 71R USGRDR7522
Jun 74 161p*
CONTRACT: DI-14-01-0001-1842
MONITOR: FEA/D-CP-16
Paper copy also available from GPO. Paper copy also available in set of 10 reports as PB-243 610-SET, PC$58.00.

ABSTRACT: This report deals with energy consumption for four major paper and paperboard products: Newsprint, writing paper (chemical), corrugated containers, and folding boxboard. Descriptions include harvesting of roundwood and chip acquisition, wood preparation, pulping, pulp bleaching, paper and paperboard production, converting, ancillary materials, and energy consumption for overall production sequences.

DESCRIPTORS: *Energy consumption, *Paper industry, Paper products, Paperboards, Newsprint, Writing papers, Containers, Boxboard, Process charting, Fuel consumption, Electric power demand, Coal, Fuel oils, Netural gas, Nuclear energy, Hydroelectric power, Manufacturing, Industries, Energy conservation

IDENTIFIERS: NTISEXPEA

PB-243 619/4ST NTIS Prices: PC$6.25/MF$2.25

File8, COPR. by Engineering Index User 244 Page 28 (Item 67 of 191)

ID NO.- EI750640614 540614
PYROLYSIS-GASIFICATION-COMBUSTION: DESIGN OF AN EXPERIMENTAL UNIT USED FOR STUDY OF HEAT AND CHEMICAL RECOVERIES FROM PULPING LIQUORS.
Brink, David L.; Thomas, Jerome F.
Univ of Calif, Berkeley
DESCRIPTORS- (*PULP MANUFACTURE, *Waste Liquor Utilization), (CHEMICAL REACTIONS, Pyrolysis), COMBUSTION, CHEMICAL EQUIPMENT, WASTE HEAT UTILIZATION, CHEMICALS,
IDENTIFIERS- KRAFT BLACK LIQUOR
CARD ALERT- 521, 616, 802, 804, 811
CODEN- TAPPAP SOURCE- TAPPI v 58 n 4 Apr 1975 p 142-145
An experimental unit was designed to pyrolyze and completely gasify the organic content of concentrated pulping liquors (kraft and neutral sulfite semichemical) and has been operated at rates of up to 1 ton/day of kraft black liquor solids. Products are heat, a pyrolysis (fuel) gas, and smelt. The pyrolysis gas is comprised of hydrogen, carbon monoxide, carbon dioxide, methane, hydrogen sulfide, nitrogen, water vapor, and traces of ethane and ethylene. All compounds typical of the total reduced sulfur content of recovery furnace emissions, except hydrogen sulfide, are absent. Smelt, comprising sodium carbonate, and sodium sulfide, issues as a molten stream from the unit. Background work carried out which led to the construction of the experimental unit is summarized. Descriptions of the experimental unit and aspects of its operation are presented. 8 refs.

ID NO.- EI741279585 479585
ENERGY CONSERVATION IN THE DRYER BY VAPOR COMPRESSION.
Choudhury, Wasi U.; Chance, J. Larry
Beloit Corp, Wis
DESCRIPTORS- (*PAPERMAKING MACHINERY, *Dryers), (PAPER AND PULP MILLS, Waste Heat Utilization),
CARD ALERT- 643, 802, 811
SOURCE- TAPPI Eng Conf, Pap, Seattle, Wash, Oct 21-24 1974 Pap 5-3, p 109-113. Publ by TAPPI, Atlanta, Ga, 1974
The water vapor generated in the dryer hood, while a web is being dried, is usually mixed with air to a total pressure of 14. 7 psia. The energy contained by this vapor is wasted. In this paper a vapor compression scheme is analyzed which reclaims this energy. A cost comparison of this scheme with the cost of drying in a conventional dryer is made. The results presented show a savings in the operating costs of the new system over the conventional system. At higher energy costs, which may be the case in the future, both the total drying costs and the operating costs of the new system are lower than the conventional system at normal operating conditions. Design problems associated with the new system are discussed in some detail. The hood, being airtight, will have an inside temperature of 212 F. It will have to be well insulated with a false ceiling inside to allow any condensate to drain to the sides. There may be problems associated with shaft seals and bearings exposed to the steam. 4 refs.

ID NO.- EI740741191 441191
TOTAL ENERGY SUPPLY SYSTEMS FOR PAPER MILLS.
Frei, D.; Holik, H.
Winterthur Eng Works Div
DESCRIPTORS- (*GAS TURBINES, *Waste Heat Utilization), (PAPER AND PULP MILLS, Gas Turbines),
CARD ALERT- 612, 811
CODEN- COMBAF SOURCE- Combustion v 45 n 10 Apr 1974 p 39-43
The production of paper, cardboard and millboard requires energy in three forms as a rule: electricity, steam and hot gas for drying. The present article describes a total energy system capable of generating these three energy components simultaneously in a compact unit. The economics are shown taking the consumption figures for a tissue machine as an example. In addition, the economical application area is delimited as a function of the ratio between power and heat consumption.

ID NO.- EI721316499 294498
APPLICATION OF BY-PRODUCT POWER RATE.
Elmenius, L.
Stal-Laval Turbin, Finspong, Swed
DESCRIPTORS- (*PAPER AND PULP MILLS, *Operations Research), (STEAM TURBINES, Waste Heat Utilization),
CARD ALERT- 616, 617, 811, 912
CODEN- TAPPAP SOURCE- TAPPI v 55 n 5 May 1972 p 713-718
Considerations are presented which are related to the improvement of steam efficiency in a pulp and paper mill. By-product power (BPP) is defined as noncondensing power generated when process steam is expanding through a turbine generator on its way from the boiler to the process. The BPP rate is defined as the kilowatt output generated per million British thermal units per hour heat flow to the process. The BPP rate concept can be applied to existing installations indicating how effectively the power house is operated with regard to load distribution between several units. Diagrams and examples illustrate the BPP rate analysis for comparison of the economics of varied systems or operating efficiencies.

le8, COPR. by Engineering Index User 244 Page 93 (Item 237 of 411)

ID NO.- EI740742988 442988
ENERGY RECOVERY THROUGH INCINERATION IN PAINT DRYING PROCESS.
Hemsath, Klaus H.; Thekdi, Arvind C.; Vereecke, Frank J.
Midland-Ross Corp, Toledo, Ohio
DESCRIPTORS- (*OVENS, INDUSTRIAL, *Exhaust Gases), (PAINT, Drying), SOLVENTS,
IDENTIFIERS- HEAT RECOVERY, INCINERATOR DESIGN
CARD ALERT- 642, 803, 804, 813
SOURCE- ASME Natl Incinerator Conf, Proc, Pap, Miami, Fla, May 12-15 1974 p 271-279. Publ by ASME, New York, 1974
The conventional oven-incinerator system in paint drying process required considerable amount of auxiliary fuel. The fuel consumption can be reduced drastically by using a new drying process. In this process, drying is achieved by using inert gases. A special incinerator design, which utilizes chemical energy of the solvents to bring the fumes to the incineration temperature, is used to incinerate oxygen-free fumes from the oven and produce high temperature inert gases. Part of these inert gases can be recycled to the oven, while additional gases can be used as a source of heat for other processes. This paper describes the process, development work, and the incinerator design and performance. 4 refs.

File6, COPR. by N.T.I.S. User 244 Page 36 (Item 42 of 105)

The Potential for Energy Conservation in Nine Selected Industries. The Data Base. Volume 9. Styrene Butadiene Rubber

Gordian Associates, Inc., New York.*Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
C5244D3 FLD: 10A, 07A, 11J, 97B, 97G, 71H, 99B USGRDR7522
Jun 74 137p*
CONTRACT: DI-14-01-0001-1842
MONITOR: FEA/D-CP-17
Paper copy also available in set of 10 reports as PB-243 610-SET, PC$58.00.

ABSTRACT: This report deals with energy consumption data for the production sequence that results in the output of virgin styrene butadiene rubber (SBR). SBR is defined as any copolymer of butadiene and styrene containing over 50 percent butadiene by weight. Virgin SBR used as a basis for the study is the product existing before addition of fillers, oils, carbon black or other materials needed to impact particular characteristics to the rubber for specific end uses. Production description included in the report include the following: Styrene, butadiene, SBR, ethylbenzene by superfractionation, benzene by catalytic reforming, and benzene from coke oven light oil and dripolene.

DESCRIPTORS: *Energy consumption, *Rubber industry, *Styrene butadiene resins, Elastomers, Styrene, Butadiene, Benzene, Ethylene, Fuel consumption, Electric power demand, Coal, Fuel oils, Natural gas, Nuclear energy, Hydroelectric power, Process charting, Manufacturing, Industries, Energy conservation

IDENTIFIERS: NTISFEA

PB-243 620/2ST NTIS Prices: PC$5.75/MF$2.25

ID NO.- EI751283231 583231
RECYCLING COOLING AND CHILLING EQUIPMENT ENERGY.
Prasad, Anil; Fitzgerald, John
Appl Eng Corp, Elk Grove Village, Ill
DESCRIPTORS- (*PLASTICS PLANTS, *Waste Heat Utilization), (PLASTICS MACHINERY, Cooling), (PLASTICS, Molding), (HEAT EXCHANGERS, Cooling), WATER COOLING TOWERS, COSTS,
CARD ALERT- 616, 816, 817, 911
SOURCE- SPE Tech Conf, 33rd Annu, Proc, Atlanta, Ga, May 5-8 1975 p 8-10. Publ by SPE, Greenwich, Conn, 1975
Every plastics molding operation generates a high level of heat from the operation of its processing equipment. Molding machines themselves, their hydraulics and heat extracted from the molds are a source of valuable and useable energy. The author discusses three different temperature considerations which should be taken into account when selecting cooling and chilling equipment. Water temperature levels of 80 $degree$ F to 95 $degree$ F are used in the cooling of hydraulic oil and air compressors. These higher water temperatures are usually supplied by an evaporative cooler normally known as a cooling tower. The second range of temperatures is from 40 $degree$ F to 55 $degree$ F. this coolant temperature is generally used for cooling molds, jacketed vessels, calenders and mills. This level of water temperature is usually supplied by refrigeration equipment. The usual coolant medium is water. The third area of temperature consideration is the low temperature range of coolants. This temperature range is from 40 $degree$ F to 0 $degree$ F and below. These molding temperatures are supplied by low temperature refrigeration equipment. For larger cooling system requirements, it may be more advantageous to consider a central system. One of the more practical central system designs is the energy conserving air cooled type. From an energy and economical standpoint, this type of chilling provides two benefits; it conserves water (100% recovery) and it recycles process energy to conserve heating fuel.

ID NO.- EI751070644 570644
SPOSOBY SNIZHENIYA ZATRAT TEPLA PRI REGENERATSII SHCHELOCHNYKH ABSORBENTOV. $left bracket$ Ways of Reducing Heat Losses in the Regeneration of Alkali Absorbents $right bracket$.
Gridin, I. D.; Volodin, N. I.; Afanas'ev, N. A.; Uvarova, V. I.
DESCRIPTORS- *WASTE HEAT UTILIZATION, (AMMONIA, Purification), HEAT TRANSFER, CARBON DIOXIDE,
CARD ALERT- 616, 803, 804, 522, 641
CODEN- KPRMAW SOURCE- Khim Prom n 6 1975 p 43-45
A number of schemes are described for removing carbon dioxide from ammonia synthesis gas by an aqueous solution of monoethanolamine. One scheme, in particular, is recommended which ensures total elimination of the heat losses caused by throttling. In the proposed scheme the process of recovery of the heat of the regenerated absorbent coincides with the process of desorption of the acid gas (the heat-transfer surface is located inside the regenerator). In Russian.

File6, COPR. by N.T.I.S. User 244 Page 44 (Item 50 of 105)

The Potential for Energy Conservation in Nine Selected Industries. The Data Base. Volume 1. Selected Plastics

Gordian Associates, Inc., New York.*Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
C524493 FLD: 10A, 11I, 97B, 97G, 710 USGRDR7522
Jun 74 149p*
CONTRACT: DI-14-01-0001-1842
MONITOR: FEA/D-CP-9
Paper copy also available from GPO. Paper copy also available in set of 10 reports as PB-243 610-SET, PC$58.00.

ABSTRACT: This report deals with the energy consumption data for the production sequences that result in the output of the following thermoplastic resins: low density polyethylene, high density polyethylene, polystyrene, and polyvinyl chloride. Other production information included in this report are: natural gas liquids, availability of hydrocarbon raw materials, shifts in sources of raw materials, and potential for material substitution.

DESCRIPTORS: *Energy consumption, *Plastics industry, Fuel consumption, Electric power demand, Coal, Fuel oils, Crude oil, Residual oils, Natural gas, Nuclear energy, Hydroelectric power, Natural gas liquids, Petroleum products, Distillates, Ethylene, Polyvinyl chloride, Vinyl chloride, Chlorine, Styrene, Polystyrene, Industries, Energy conservation, Substitutes, Process charting

IDENTIFIERS: Fuel substitution, NTISEXPEA

PB-243 612/9ST NTIS Prices: PC$5.75/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 69 (Item 77 of 105)

Industrial Energy Study of the Drug Manufacturing Industries for the Federal Energy Administration/U.S. Department of Commerce

Versar, Inc., Springfield, Va.*Federal Energy Administration, Washington, D.C. (389 335)

Final rept.
C4313A4 FLD: 10A, 97B* USGRDR7508
30 Sep 74 209p*
CONTRACT: DI-14-01-0001-1669
MONITOR: FEA/EI-1669

ABSTRACT: Information is provided on the basic structure and characteristics of the drug manufacturing industries. Particular emphasis is placed on fuel use by major type and production process as well as exploring the possibilities for fuel substitutability and conservation alternatives.

DESCRIPTORS: *Drug industry, *Energy consumption, Fuel consumption, Propane, Butanes, Residual oils, Petroleum products, Coal, Natural gas, Distillates, Electricity, Hexanes, Heptanes, Napthas, Benzene, Toluene, Xylenes, Geographic divisions, Statistical data, Energy conservation

IDENTIFIERS: Electric power consumption, SIC 2831, SIC 2833, SIC 2834, NTISEXFEA

PB-238 994/8ST NTIS Prices: PC$7.25/MF$2.25

Industrial Energy Study of the Industrial Chemicals Group

International Research and Technology Corp., Washington, D.C.*Department of Commerce, Washington, D.C. Industrial Energy Analysis Group.*Federal Energy Administration, Washington, D.C. (388 995)

Final rept.
AUTHOR: Saxton, James C., Kramer, Marc P., Robertson, David L., Fortune, Michael A., Leggett, Nickolaus E.
C3794B2 FLD: 10A, 7A, 97B*, 99B* USGRDR7426
30 Aug 74 160p*
REPT NO: IRT-342-R
CONTRACT: DI-14-01-0001-1654
MONITOR: 18

ABSTRACT: Results for energy use in each of the six SIC industries within the industrial chemicals group are given. Report covers the alkalies and chlorine industry; industrial gases industry; inorganic pigments industry; industrial inorganic chemicals industry; cyclic crudes, and cyclic intermediates, dyes, and organic pigments industry; and industrial organic chemicals industry.

DESCRIPTORS: *Energy consumption, *Chemical industry, Chemical plants, Feeding(Supplying), Alkalies, Chlorine, Oxygen, Nitrogen, Pigments, Acetylene, Hydrogen, Ammonia, Styrene, Titanium dioxide, Zinc oxides, Phosphoric acids, Phenols, Cyclohexane, Ethylene, Methyl alcohol, Natural gas, Fuel oil, Coal, Napthas, Ethane, Propane, Benzene

IDENTIFIERS: Energy conservation, *Energy requirements, Energy use, NTISEXPEA

PB-236 322/4SL NTIS Prices: PC$6.25/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 14 (Item 14 of 1

Energy Consumption: The Chemical Industry

Dow Chemical Co., Freeport, Tex. Texas Div.*National Environmental Research Center, Research Triangle Park, N.C. Control Systems Lab.

Final rept. Aug 74-Mar 75
AUTHOR: Reding, John T., Shepherd, Burchard P.
C4852J2 FLD: 10A, 07A, 97B*, 99B* USGRDR7516
Apr 75 71p*
CONTRACT: EPA-68-02-1329
PROJECT: EPA-ROAP-21ADB-010
MONITOR: EPA/650/2-75-032-a
See also PB-241 926.

ABSTRACT: The report gives results of a study of energy consumption in the chemical industry. It analyzes energy-intensive steps or operations for manufacturing processes which produce 12 of the top 50 volume chemicals in the U.S. Results of the analyses are in the form of energy consumption block diagrams, energy-intensive equipment schematic diagrams, and tables that indicate the causes of energy losses, as well as possible conservation approaches.

DESCRIPTORS: *Energy consumption, *Chemical industry, Energy conservation, Electrolysis, Evaporation, Pyrolysis, Alkylation, Dehydrogenation, Oxidation, Distillation, Furnaces, Chlorine, Sodium hydroxide, Ethylene, Ethyl benzene, Styrene, Phenol, Acetone, Cumene, Carbon black, Sodium carbonates, Oxygen, Nitrogen, Equipment, Design, Industrial engineering, Manufacturing, Production engineering, Heat recovery, Fuel consumption

IDENTIFIERS: SIC 28, Electric power consumption, NTISEPAORD

PB-241 927/3ST NTIS Prices: PC$4.25/MF$2.25

File8, COPR. by Engineering Index User 244 Page 57 (Item 143 of 191)

ID NO.- EI72X011846 211846
Energy systems in large process plants
SLACK JB
M.W.Kellogg Co, Houston, Tex
DESCRIPTORS- (*INDUSTRIAL PLANTS, *Waste Heat Utilization), GAS TURBINES,
IDENTIFIERS- PROCESS ENERGY RECOVERY, STEAM BALANCES
CARD ALERT- 402, 612, 616, 641
SOURCE- ASME Pap 71-Pet-13 for meeting Sept 19-23 1971 7 p
In the sophisticated modern process plant, major advances are made by close integration of utility and process systems. As has been dramatically shown by recent ammonia plant developments, total manufacturing costs can be optimized when process engineers and utility designers work together from the start and jointly decisions concerning steam, cooling water, type of heating medi etc. This paper covers some of the more obvious areas that must be considered and it describes a typical energy system for a modern large process plant. 5 refs.

ID NO.- EI740633998 433998
ABHITZEANLAGEN ALS ENERGIEERZEUGER IN UMWELTSCHUTZANLAGEN. $left bracket$ Waste Heat Recovery as a Measure for Energy Conservation in Environmental Control $right bracket$.
Vollhardt, Frohmut
Siegener, Huettental-Geisweid, Ger
DESCRIPTORS- (*HEAT EXCHANGERS, *Waste Heat Utilization),
CARD ALERT- 616, 643
CODEN- ENTEA6 SOURCE- Energ Technik v 26 n 3 Mar 1974 p 69-73
Description of heat exchangers and recuperators for waste heat in chemical and petrochemical plants is given with operational data and experiences gained within the last several years. In German.

ID NO.- EI740524015 424015
ZENTRALE ODER INTEGRIERTE RAUCHGAS-ABWAERMEVERWERTUNG IN ATHYLENANLAGEN. $left bracket$ Central or Decentralized Recovery of Waste Heat Contained in the Flue Gases Emitted by Cracking Reactors in an Acetylene Plant $right bracket$.
Mol, Alfred
Sales of Am, Hague, Neth
DESCRIPTORS- (*ACETYLENE, *Manufacture), (CHEMICAL PLANTS, Waste Heat Utilization), (AIR POLLUTION, Control),
CARD ALERT- 451, 802, 804
CODEN- EKEPAB SOURCE- Erdoel Kohle - Erdgas - Petrohchem v 27 n 1 Jan 1974 p 12-17
Paper describes the heat recovery techniques applying either to a central chimney or individual stacks, deserving a battery of cracking reactors. Paper also discusses the pros and cons of either technique by analyzing the thermal efficiency, fuel, feedstock, reliability, air pollution control, capital investment and the impact on manufacturing costs. 3 refs. In German.

ID NO.- EI730945129 345129
COMBINED GAS TURBINE INSTALLATION AT THE BP CHEMICALS PLANT IN HULL, GREAT BRITAIN.
Aicher, W.
DESCRIPTORS- (*GAS TURBINES, *Waste Heat Utilization),
CARD ALERT- 612
SOURCE- Turboform n 3 Apr 1973 p 123-128
Four BST gas turbine sets supplying process air and steam for the production of acetic acid are installed in the chemical plant of BP Distillers, near Hull, Great Britain. The process air is taken from the HP branch of the combustion air compressor and raised to about 53 atm abs in radial compressors driven by the gas turbine. The steam required for acetic acid production is generated in an unfired waste heat boiler, giving a high exploitation of fuel heat. The relation between gas turbine load and steam output is explained, taking the influence of the ambient temperature into account. Using simplifying assumptions, it is shown that a combined gas turbine installation of this kind is very economical, even where the cost of electricity is low. 1 ref.

ID NO.- EI71X182077 182077
Single process plant application of a gas turbine generator with recovery boiler
KLEIN RW
Union Carbide Corp, Whiting, Ind
DESCRIPTORS- (*GAS TURBINE POWER PLANTS, *Efficiency), (GAS TURBINES Waste Heat Utilization), (CHEMICAL PLANTS, Boilers),
CARD ALERT- 612, 616, 802
SOURCE- ASME Pap 71-GT-30 for meeting Mar 28-Apr 1 1971, 7 p
This paper consists of the application considerations give for the selection of on- site power generation using a gas turbine with a recovery boiler in the process chemical industry. The additional use of 400 psig steam from recovery heat of the gas turbine exhaust used for process steam is evaluated. The techniques used for engineering, construction, training, and start- up are discussed. The performance of the unit after 30,000 operating hours, including reliability and a discussion of equipment problems, is included.

ID NO.- EI72X005712 205712
Energy recovery in sulphuric acid production by the contact process from Portuguese pyrites, (Recuperation de l'energie dans la production de l'acide sulphurique au Portugal en partant des pyrites)
FARA SANTOS JM; LEAL DA SILVA JM; HENRIQUES V
DESCRIPTORS- *SULFURIC ACID, (PYRITES, Portugal), WASTE HEAT UTILIZATION,
CARD ALERT- 505, 803
SOURCE- 7th World Energy Conf Aug 20-24 1968, Moscow, Trans v 19 Sect F 1969 p 267 p 249-65
The experience obtained with waste- heat boilers and steam superheaters in new sulfuric acid contact plants roasting Portuguese phrites with reference to design conditions, technical operation and gas- side boiler- tube cleaning, is described. The article is based on the well known techniques using heat released in roasting sulfidic ores and reaction heat from catalytic oxidation of sulfurous anhydride to sulfuric anhydride, for the production ofh- p steam. This corresponds to an interesting energy source for countries with a well developed sulfuric acid industry using sulfidic raw materials, such as pyrites. 20 refs. In French with English summary.

ID NO.- EI71X182191 182191
Fuel for total energy
TINTORI J; SCHIEFER RB; TAYLOR JR
Campagnie Industrielle Pontde-Claix, Grenoble, France
DESCRIPTORS- (*GAS TURBINES, *Waste Heat Utilization), (CHEMICAL PLANTS, Power Supply),
CARD ALERT- 612, 802
SOURCE- ASME Pap 71-GT-55 for meeting Mar 28-Apr 1 1971, 7 p
This paper reviews the uses of gas turbines in total energy systems, describes the actual fuel adopted, and gives a comprehensive description of the particular plant installed. Some notes on the plant performance up to the time of the submission of the paper are also included.

OPERATION OF GAS TURBINES AND WASTE HEAT BOILERS IN A TOTAL ENERGY CYCLE FOR A MAJOR MANUFACTURING COMPLEX.

(Dow Chemical of Canada Ltd., Sarnia, On..).
Combustion; 45: No. 10, 17-22(Apr 1974).

A brief history is given on the application, start-up, and operation of two gas turbines with waste heat recovery boilers in a combined energy cycle, integrated with an existing power plant to provide the total energy needs for a major chemical manufacturing complex. An installation is described with some unique design features to provide for maximum cycle efficiency and reliability and the major problems and difficulties experienced in putting this complex energy plant into operation are outlined. (auth)

File6, COPR. by N.T.I.S. User 244 Page 73 (Item 81 of 105)

Industrial Energy Study of the Petroleum Refining Industry

Sobotka and Co., Inc., New York.*Federal Energy Administration, Washington, D.C.

Final rept.
C4235A2 FLD: 10A, 97B*, 96A USGRDR7507
May 74 98p*
CONTRACT: DI-14-01-0001-1656
MONITOR: FEA/EI-1656

ABSTRACT: The study provides information on the structure of the petroleum refining industry as well as energy consumption patterns and the potential for energy substitution and conservation.

DESCRIPTORS: *Energy consumption, *Petroleum industry, *Refineries, Fuel consumption, Propane, Butanes, Residual oils, Petroleum products, Coal, Natural gas, Petroleum coke, Steam, Electricity, Distillates, Geographic divisions, Energy conservation, Substitutes, Statistical data

IDENTIFIERS: Electric power consumption, SIC 2911, Fuel substitution, NTISEXFEA

PB-238 671/2ST NTIS Prices: PC$4.75/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 43 (Item 49 of 105)

The Potential for Energy Conservation in Nine Selected Industries. The Data Base. Volume 2. Petroleum Refining

Gordian Associates, Inc., New York.*Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
C5244B4 FLD: 10A, 21D, 07A, 97B, 97G, 99B USGRDR7522
Jun 74 390p*
CONTRACT: DI-14-01-0001-1842
MONITOR: FEA/D-CP-10
Paper copy also available from GPO. Paper copy also available in set of 10 reports as PB-243 610-SET, PC$58.00.

ABSTRACT: The report includes methods of separation of crude oil into its constituent parts and conversion of intermediate materials into more valuable products to meet market demands; energy consumption and yield data; description of a typical refinery system in terms of material and energy balances; historical trends in processing technology; and various potentials for energy conservation in the refining process.

DESCRIPTORS: *Energy consumption, *Petroleum industry, *Petroleum refining, Process charting, Thermodynamics, Capitalized costs, Petroleum products, Crude oil, Process charting, Energy conservation, Industries

IDENTIFIERS: NTISEXFEA

PB-243 613/7ST NTIS Prices: PC$10.25/MF$2.25

Energy Consumption: The Primary Metals and Petroleum Industries

Dow Chemical Co., Freeport, Tex. Texas Div.*National Environmental Research Center, Research Triangle Park, N.C. Control Systems Lab.

Final rept. Aug 74-Mar 75
AUTHOR: Reding, John T., Shepherd, Burchard P.
C4905B4 FLD: 10A, 07A, 11F, 97B*, 99B, 94G USGRDR7517
Apr 75 59p*
CONTRACT: EPA-68-02-1329
PROJECT: EPA-ROAP-21ADB-010
MONITOR: EPA/650/2-75-032-b

ABSTRACT: The report gives results of a study of energy consumption in the primary metals and petroleum industries. It analyzes energy-intensive steps or operations for commonly used manufacturing processes. Results of the analyses are in the form of energy consumption block diagrams, energy-intensive equipment schematic diagrams, and tables that indicate the causes of energy losses, as well as possible conservation approaches.

DESCRIPTORS: *Energy consumption, *Petroleum industry, *Aluminum industry, *Steel plants, Metal industry, Electrolysis, Distillation, Insulation, Furnaces, Design, Fuel consumption, Electric power demand, Energy conservation, Heat recovery, Industries

IDENTIFIERS: SIC 33, SIC 29, Electric power consumption, NTISEPAORD

PB-241 990/1ST NTIS Prices: PC$4.25/MF$2.25

ID NO.- EI72X050354 250354
Big users of energy look for savings
EWING RC
DESCRIPTORS- (*PETROLEUM REFINERIES, *Waste Heat Utilization),
CARD ALERT- 513, 616
CODEN- OIGJA SOURCE- Oil Gas J v 70 n 9 Feb 28 1972 p 74-7, 80
Byproducts of heat, steam and electricity, offer multiple choices both in how they are manufactured and consequently used. Choice depends upon feasibility and economics. 3 refs.

ID NO.- EI751068447 568447
REFINERY ENERGY SAVING $EM DASH$ PROCESS ENERGY SAVINGS: COMPLEX BUT REWARDING.
Hopkins, P. S.; Greve, F. L.
King-Wilkinson Inc, Houston, Tex
DESCRIPTORS- (*PETROLEUM REFINERIES, *Waste Heat Utilization), FUEL ECONOMY,
CARD ALERT- 513, 521
CODEN- OIGJAV SOURCE- Oil Gas J v 73 n 35 Sep 1 1975 p 77-80
Though fired heaters should command first scrutiny in an overall refinery-energy-conservation study, thermal savings at process units can in total exceed those made in the heater area. King-Wilkinson Inc. found this the case in its 2 $one-half$ -month energy conservation study of a 100,000-b/sd refinery on the Mediterranean. The investigation of process units and equipment was more complicated and called for more projects and a greater capital investment. But possible fuel-cost savings are some 40% higher than those found in heaters.

ID NO.- EI730208942 308942
POWER-RECOVERY GAS EXPANDER GAINS IN FCC CYCLE.
Stettenbenz, L. W.
Ingersoll-Rand Co, Phillipsburg, NJ
DESCRIPTORS- (*PETROLEUM REFINERIES, *Waste Heat Utilization), WASTE HEAT UTILIZATION, GAS TURBINES, (AIR POLLUTION, Control),
IDENTIFIERS- POWER RECOVERY GAS EXPANDER
CARD ALERT- 451, 513, 612
CODEN- OIGJAV SOURCE- Oil Gas J v 70 n 51 Dec 18 1972 p 60-67
In cat cracking and other process cycles, power-recovery systems can return a good profit and at the same time offset much of pollution-control cost. 6 refs.

ID NO.- EI731152252 352252
WHICH HEAT RECOVERY SYSTEM?
Mol, A.
Selas of America, Hague, Neth
DESCRIPTORS- (*CHEMICAL PLANTS, *Waste Heat Utilization), HEAT EXCHANGERS, ETHYLENE, PETROLEUM REFINERIES,
CARD ALERT- 513, 616, 802, 804
CODEN- HYPRAX SOURCE- Hydrocarbon Process v 52 n 7 Jul 1973 p 109-112

The author discusses waste heat utilization in a petrochemical plant producing ethylene. Two systems employed are compared with each other. Pyrolysis heaters with IWHR (integrated waste heat recovery) systems are the obvious choice when fuel is relatively cheap, when cracking a low fuel consuming feedstock (ethane/propane) and when maximum reliability is required. IWHR is lowest investment for naphtha/gas oil crackers for ethylene capacities up to 400,000 metric tons per year. CWHR (central waste heat recovery) systems for plants using liquid feedstocks show interesting improvements in manufacturing costs. If oil firing is done, furnace efficiency decreases and enhances the economic incentives for CWHR. Recommendations for practice are included. 3 refs.

ID NO.- EI730736041 336041
HEAT EXCHANGE SCHEME AT HIGH-EFFICIENCY ATMOSPHERIC INSTALLATIONS.
Isaev, B. N.; Pikalov, G. P.
Novo-Polotskii Petroleum Refinery, USSR
DESCRIPTORS- (*PETROLEUM REFINERIES, *Waste Heat Utilization), (HEAT EXCHANGERS, Regenerators), (CHEMICAL PLANTS, Layout),
CARD ALERT- 513, 616, 802
CODEN- CTFOAK SOURCE- Chem Technol Fuels Oils v 8 n 1-2 Jan-Feb 1972 p 51-52

This is a brief description, accompanied by a scheme, of a heat exchange system that has been installed in one of the Soviet petroleum atmospheric refineries to increase the plant's productivity and improve its technical and economic characteristics. The present paper considers the question of heat regeneration at this installation. Heat exchanger's technical and performance data are tabulated.

B-X. COKE PLANTS

ID NO.- EI70X012254 012254
Unique application of gas turbines in coke and coal chemical plant
AMATANGELO CJ; BUSA JV
DESCRIPTORS- (*CHEMICAL PLANTS, *Power Supply), COAL BYPRODUCTS, COKE, POER GENERATION, WASTE HEAT UTILIZATION, GAS TURBINES,
CARD ALERT- 029, 034, 058, 116, 296
SOURCE- W.B.WILSON
ASME- Paper 69- GT113 for meeting Mar 10- 13 1969, 6 p ; Basis for selection and application of seven combined energy cycle systems, (natural gas and steam) is presented; gas turbines are used as prime energy source for production of electric power and operation of gas compressors in coke and coal chemical plant; ungiue features discussed are production of variable frequency electric power and utilization of steam produced in waste heat boilers for direct process requirements.

ID NO.- EI72X051939 251939
Utilization of heat from the tar liquor in the collecting main
VOLKOV EL; DEEV VYA; ROZLYAKOV TM
DESCRIPTORS- (*COKE PLANTS, *Waste Heat Utilization), COAL TAR, HYDROGEN SULFIDE, (AIR POLLUTION, Control), (GAS PURIFICATION, Desulfurizing),
CARD ALERT- 451, 803
CODEN- COKCA SOURCE- Coke Chem (USSR) n 4 1971 p 47-8
Large amounts or energy are consumed in the removal of hydrogen sulfide from coke- oven gas with alkaline solutions. The economics of sulfur removal can be improved by utilizing waste heat from otheR PARTS OF THE PLANT. The liquor temperature required in the actifier is no higher than 65 to 70 C, and accordingly a scheme has been devised at the Enakievo Coke and Chemical Works whereby sensible heat from the tar liquor in the collecting mains cycle is used to heat the foul liquor from the absorbers. The introduction of this waste heat recovery unit has resulted in a saving of about 10 tonnes/ hr about 180 thousand roubles per annum.

B-XI. 322 - GLASS INDUSTRY

File8, COPR. by Engineering Index User 244 Page 17 (Item 42 of 191)

ID NO.- EI751281271 581271
WAERMEWIRTSCHAFT DES GLASSCHMELZOFENS IM BEREICH DES GLASBADES UND DES WANNENBECKENS $EM DASH$ VERBESSERUNGSMOEGLICHKEITEN. $left bracket$ Fuel Economy in the Melting End of Glass Tank Furnaces $EM DASH$ Possibilities of Improvement $right bracket$.
Trier, Wolfgang
Dtsch Glasind, Frankfurt AM, Ger
DESCRIPTORS- (*GLASS FURNACES, *Waste Heat Utilization),
CARD ALERT- 642, 812
CODEN- GLBEAQ SOURCE- Glastech Ber v 48 n 9 Sep 1975 p 181-189
Various methods for potential savings in fuels are discussed. Heat transfer in the melting zones can be improved convectively by combustion in the gas flow boundary layer and by pelletizing the batch so far as radiation is concerned. Froth or foam is a serious barrier to effective heat transfer and the development of batches and pellets which melt without frothing very much could improve heat transfer. Electric boosting is scarcely advantageous energetically but can sometimes be economically desirable. It can permit a reduction in crown temperature. Thermal insulation of the tank, especially the bottom, is now possible and has definite advantages in fuel economy. 10 refs. In German with English abstract.

ID NO.- EI751281270 581270
ABHITZEKESSEL HINTER REGENERATOREN VON GLASSCHMELZWANNEN. $left bracket$ Waste Heat Boilers Fitted Behind the Regenerators of Glass Tank Furnaces $right bracket$.
Ehrich, Werner
Delog-Detag, Gelsenkirchen, Ger
DESCRIPTORS- (*GLASS FURNACES, *Waste Heat Utilization),
CARD ALERT- 642, 812
CODEN- GLBEAQ SOURCE- Glastech Ber v 48 n 9 Sep 1975 p 173-180
Data on the heat content and useful heat of the waste gases relative to the energy content of the gases leaving the regenerators are shown. Tabulated values of representative costs of primary and secondary entry allow determination of the economic limits for replacing primary energy by converted waste heat. The use of these criteria and data is illustrated by making an economic calculation for an existing installation. The operating characteristics of existing waste heat installations are presented and the factors influencing life and yield considered. In German with English abstract.

The Potential for Energy Conservation in Nine Selected Industries. The Data Base. Volume 7. Glass

Gordian Associates, Inc., New York.*Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
C5244D1 FLD: 10A, 11B, 13D, 97B, 97G, 71D USGRDR7522
Jun 74 131p*
CONTRACT: DI-14-01-0001-1842
MONITOR: FEA/D-CP-15
Paper copy also available from GPO. Paper copy also available in set of 10 reports as PB-243 610-SET, PC$58.00.

ABSTRACT: This report deals with energy consumption data for the production sequence leading to the output of glass containers. Process descriptions include mining of sand, limestone, rock salt and feldspar; and production of soda ash and glass containers. Other items discussed include electric energy, furnance efficiency, and material substitution.

DESCRIPTORS: *Energy consumption, *Glass industry, Sands, Limestone, Sodium carbonates, Rock salt, Feldspars, Containers, Fuel consumption, Electric power demand, Coal, Fuel oils, Natural gas, Hydroelectric power, Nuclear energy, Electricity, Process charting, Industries, Energy conservation

IDENTIFIERS: NTISEXFEA

PB-243 618/6ST NTIS Prices: PC$5.75/MF$2.25

Industrial Energy Study of the Glass Industry

Battelle Columbus Labs., Ohio.*Federal Energy Administration, Washington, D.C. (407 080)

Final rept.
AUTHOR: Schoor, J. R., Anderson, G. A.
C5042J3 FLD: 10A, 97B*, 96A USGRDR7519
1 Dec 75 251p*
CONTRACT: DI-14-01-0001-1667
MONITOR: FEA/B-75/385

ABSTRACT: This report examines types and amounts of energy used within various industry segments. It also covers the structure of each industry, how the energy is used, plant variations within an industry segment, energy supply situations, possible energy substitution and conservation technology, and constraints placed upon each industry segment as a result of energy and other shortages.

DESCRIPTORS: *Glass industry, *Energy consumption, Propane, Butanes, Residual oils, Petroleum products, Coal, Natural gas, Distillates, Energy conservation, Fuel consumption, Electric power demand, Electricity, Geographic divisions, Statistical data

IDENTIFIERS: Sic 3211, Sic 3221, Sic 3229, Sic 3231, Electric power consumption, Fuel substitution, NTISEXFEA

PB-242 832/4ST NTIS Prices: PC$8.50/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 15 (Item 15 of 19)

Energy Consumption: Paper, Stone/Clay/Glass/Concrete, and Food Industries

Dow Chemical Co., Freeport, Tex. Texas Div.*National Environmental Research Center, Research Triangle Park, N.C. Control Systems Lab.

Final rept. Aug 74-Mar 75
AUTHOR: Keding, John T., Shepherd, Burchard P.
C4852J1 FLD: 10A, 97B*, 99B* USGRDR7516
Apr 75 60p*
CONTRACT: EPA-68-02-1329
PROJECT: EPA-ROAP-21ADE-010
MONITOR: EPA/650/2-75-032-c
See also PB-241 927.

ABSTRACT: The report gives results of a study of energy consumption in the paper, stone/clay/glass/concrete, and food industries. It analyzes energy-intensive steps or operations for commonly used manufacturing processes. Results of the analyses are in the form of energy consumption block diagrams, energy-intensive equipment schematic diagrams, and tables that indicate the causes of energy losses, as well as possible conservation approaches.

DESCRIPTORS: *Energy consumption, *Glass industry, *Concrete plants, *Food industry, *Paper industry, Portland cements, Fuel consumption, Electric power demand, Natural gas, Fuel oil, Electricity, Coal, Rocks, Clays, Heat loss, Energy conservation, Industries

IDENTIFIERS: Standard industrial classification code, SIC 26, SIC 32, SIC 20, SIC 2611, SIC 2621, Electric power consumption, NTISEPAORD

PB-241 926/5ST NTIS Prices: PC$4.25/MF$2.25

File8, COPR. by Engineering Index User 244 Page 8 (Item 19 of 191)

ID NO.- EI760209834 609834
GLASS PLANT SAVES GAS.
Hune, Larry
East Ohio Gas Co, Youngstown
DESCRIPTORS- (*GLASS FURNACES, *Waste Heat Utilization),
CARD ALERT- 642, 812
CODEN- INGNAC SOURCE- Ind Gas (Stamford) v 55 n 10 Oct 1975 p 12-13
A brief description of an attempt made to capture the radiant heat that is being given off by the glass melting surface and be used in nearby buildings, is given. The heat recovery showed an annual savings of $24,000 in gas costs against a $40,000 investment for hood and ducts.

ID NO.- EI72X005819 205819

Complex heat exchange in a '%'retarded- gas- suspension'%' air heater

MOROZOV YUI; ERINOV AE; KUCHIN GP

DESCRIPTORS- (*HEAT EXCHANGERS, *Glass), GLASS FURNACES, WASTE HEAT UTILIZATION,

IDENTIFIERS- AIR HEATER

CARD ALERT- 616, 812

CODEN- GLCEA SOURCE- Glass Ceram v 27 n 1-2 Jan-Feb 1970 p 68-71

Air heaters of the retardedgas- suspension type have a number of advantages enabling them to be used as basic equipment employing waste- heat gases from direct- heat furnaces. This paper studies the heat exchange in the retarded gas suspension, determining the total coefficients of heat transfer for the upper chamber and the convective for the lower, explaining the effect on them of material concentrations, the velocity of the combustion products and air, and also determining the temperature of the gas currents. 3 refs.

File6, COPR. by N.T.I.S. User 244 Page 22 (Item 26 of 105)

Energy Conservation Potential in the Cement Industry

Portland Cement Association, Skokie, Ill.*Federal Energy Administration, Washington, D.C. Office of Industrial Programs.

Conservation paper.
C5464G2 FLD: 10A, 97B*, 96B USGRDR7525
Jun 75 344p*
CONTRACT: DI-14-01-0001-1858
MONITOR: FEA/D-75/400

ABSTRACT: This study gives detailed background data needed to establish energy conservation objectives which are reasonable for the industry, to assess the potential for energy conservation within the industry, and to establish the probable impacts of certain levels and types of federal research, development, and demonstration support. It discusses basic materials, processes used in manufacturing, new technology available, and the controlling economics.

DESCRIPTORS: *Energy consumption, *Fuel consumption, *Energy conservation, Portland cements, Kilns, Heat loss, Thermal efficiency, Energy requirements, History, Manufacturing, Economics, Industries, Japan, Europe, United States, Refractories

IDENTIFIERS: *Cement industry, *Technology assessment, *Heat consumption, *Electric power consumption, NTISEXFEA

PB-245 159/9ST NTIS Prices: PC$9.50/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 42 (Item 48 of 105)

The Potential for Energy Conservation in Nine Selected Industries. The Data Base. Volume 3. Cement

Gordian Associates, Inc., New York.*Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
C5244C1 FLD: 10A, 13C, 97B, 97G, 50C USGRDR7522
Jun 74 127p*
CONTRACT: DI-14-01-0001-1842
MONITOR: FEA/D-CP-11
Paper copy also available from GPO. Paper copy also available in set of 10 reports as PB-243 610-SET, PC$58.00.

ABSTRACT: This report deals with the processing sequences used to manufacture portland cement and presents the energy consumption per short ton of cement produced. Production is divided into the following activities: raw materials acquisition, preparation of raw materials, clinker production, and grinding and mixing of product cement. Other items discussed include energy for size reduction and kiln energy use.

DESCRIPTORS: *Portland cements, *Energy consumption, Fuel consumption, Electric power demand, Coal, Fuel oils, Natural gas, Gasoline, Diesel fuels, Nuclear energy, Hydroelectric power, Electricity, Process charting, Industries, Energy conservation

IDENTIFIERS: NTISEXFEA

PB-243 614/5ST NTIS Prices: PC$5.75/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 58 (Item 65 of 105)

Energy Consumption: Paper, Stone/Clay/Glass/Concrete, and Food Industries

Dow Chemical Co., Freeport, Tex. Texas Div.*National Environmental Research Center, Research Triangle Park, N.C. Control Systems Lab.

Final rept. Aug 74-Mar 75
AUTHOR: Reding, John T., Shepherd, Burchard P.
C4852J1 FLD: 10A, 97B*, 99B* USGRDR7516
Apr 75 60p*
CONTRACT: EPA-68-02-1329
PROJECT: EPA-ROAP-21ADE-010
MONITOR: EPA/650/2-75-032-c
See also PB-241 927.

ABSTRACT: The report gives results of a study of energy consumption in the paper, stone/clay/glass/concrete, and food industries. It analyzes energy-intensive steps or operations for commonly used manufacturing processes. Results of the analyses are in the form of energy consumption block diagrams, energy-intensive equipment schematic diagrams, and tables that indicate the causes of energy losses, as well as possible conservation approaches.

DESCRIPTORS: *Energy consumption, *Glass industry, *Concrete plants, *Food industry, *Paper industry, Portland cements, Fuel consumption, Electric power demand, Natural gas, Fuel oil, Electricity, Coal, Rocks Clays, Heat loss, Energy conservation, Industries

IDENTIFIERS: Standard industrial classification code, SIC 26, SIC 32, SIC 20, SIC 2611, SIC 2621, Electric power consumption, NTISEPAORD

PB-241 926/5ST NTIS Prices: PC$4.25/MF$2.25

Industrial Energy Study of the Concrete, Gypsum, and Plaster Products Industries

Stanford Research Inst., Menlo Park, Calif.*Federal Energy Administration, Washington, D.C.*Bureau of Mines, Washington, D.C. (332 500)

Final rept.
AUTHOR: Jensen, Gordon F.
C3994G3 FLD: 10A, 97B*, 96A USGRDR7503
Aug 74 360p*
CONTRACT: DI-14-01-0001-1666
PROJECT: SRI-3325
MONITOR: FEA/EI-1666
Prepared in cooperation with Bureau of Mines, Washington, D.C.

ABSTRACT: Information on structure and characteristics of the Concrete, Gypsum, and Plaster Products Industries is given. Particular emphasis is placed on fuel use by major type and production process. In addition, the possibilities for fuel substitution and conservation of energy are explored.

DESCRIPTORS: *Energy consumption, *Concrete plants, *Gypsum, *Lime, *Concrete products, Industries, Fuel consumption, Concrete blocks, Bricks, Concrete pipes, Precast concrete, Prestressed concrete, Substitutes, Constraints, Variations, Propane, Butanes, Residual oils, Petroleum products, Coal, Natural gas, Geographic divisions, Statistical data, Tables(Data)

IDENTIFIERS: Electric power consumption, Energy shortages, Energy requirements, Energy conservation, Fuel substitution, Energy use, SIC 3271, SIC 3272, SIC 3273, SIC 3274, SIC 3275, NTISEXFEA

PB-237 833/9ST NTIS Prices: PC$10.00/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 77 (Item 88 of 105)

Industrial Energy Study of the Hydraulic Cement Industry

Queen (Douglas M.), Inc., New Canaan, Conn.*Federal Energy Administration, Washington, D.C.

Final rept.
C38872K4 PLD: 10A, 97B*, 96A* NSGRDR7501
27 Aug 74 117p*
CONTRACT: DI-14-01-0001-1665
MONITOR: FEA/EI-1665
Prepared in cooperation with Federal Energy Administration, Washington, D.C.

ABSTRACT: This study is one of a series conducted in an effort to provide information on the basic structure or characteristics of the hydraulic cement industry. Particular emphasis is placed on fuel use by major type and production process and exploring possibilities for fuel substitutability and conservation alternatives.

DESCRIPTORS: *Energy consumption, *Hydraulic cements, Portland cement, Fuel consumption, Coal, Natural gas, Distillates, Residual oils, Petroleum products, Geographic divisions, Manufacturing, Operating costs, Production capacity

IDENTIFIERS: *Energy requirements, Energy use, Electric power consumption, Fuel substitution, Energy conservation, *Cement industry, NTISEXFEA

PB-237 142/5ST NTIS Prices: PC$5.25/MF$2.25

ID NO.- EI750959806 559806
CUT FUEL COSTS IN THE LIGHTWEIGHT AGGREGATE INDUSTRY.
Biege, N. W.; Cohen, S. M.
Fuller Co, Catasauqua, Pa
DESCRIPTORS- *KILNS,
CARD ALERT- 642
CODEN- ACSBA7 SOURCE- Am Ceram Soc Bull v 54 n 6 Jun 1975 p 569-570

Some lightweight aggregate kiln operators produce a ton of lightweight aggregate (LWA) for as much as 5 million Btu's/ton, while others require only 2 million Btu's/ton. Part of the discrepancy can be attributed to different moisture levels in the feed and different burning temperatures required, but inadequate equipment is mainly responsible. This paper shows ways to decrease fuel consumption for a particular raw material by $approximately equals$ 50% through the use of proper equipment.

ID NO.- EI741060730 460730
UTILIZATION OF WASTE HEAT FROM DRY-PROCESS ROTARY KILNS.
Weber, P.
Polysius Corp
DESCRIPTORS- (*CEMENT PLANTS, *Waste Heat Utilization),
CARD ALERT- 412, 643
CODEN- PIQUAN SOURCE- Pit Quarry v 67 n 1 Jul 1974 p 115-122
Paper discusses the utilization of waste heat from dry-process cement kilns under following aspects: Waste heat quantities from various dry-process kiln systems; possibilities for waste heat utilization in dryers and in combined drying and grinding plants; and effect of waste heat utilization on the overall heat consumption of the cement works.

ID NO.- EI740846764 446764
USTANOVKA DLYA ISPOL'ZOVANIYA VTORICHNOGO TEPLA VRASHCHAYUSHCHIKHSYA PECHEI. $left bracket$ Installation for Utilizing the Waste Heat of Rotary Kilns $right bracket$.
Satarin, V. I.; Vorobeichikov, L. T.; Matis, M. I.; Ostrovskaya, N. D.; Sukhodol'skii, G. N.; Shefelyuk, M. A.
Cem Plant, Yamnitsk, USSR
DESCRIPTORS- (*CEMENT PLANTS, *Kilns), (KILNS, Rotary), WASTE HEAT UTILIZATION,
CARD ALERT- 412, 616, 642
CODEN- TSMTAC SOURCE- Tsement n 4 Apr 1974 p 15
In Russian.

B-XIII. SIC 3312 - BLAST FURNACES AND STEEL IN GENERAL

ID NO.- EI740744871 444871
REDUCING FUEL COSTS.
Laws, W. R.
Br Steel Corp, London, Engl
DESCRIPTORS- (*STEELMAKING, *Fuel Economy), WASTE HEAT UTILIZATION, HEAT TRANSFER,
CARD ALERT- 521, 545, 616, 641
CODEN- ISTLA4 SOURCE- Iron Steel Int v 47 n 2 Apr 1974 p 105-113
Three areas of reducing fuel consumption in steelmaking are discussed. These include the selection of processes and plant to maintain a flexible choice between competing fuels so as to make the best of the long-term changes in the energy markets and enable changes in raw materials to alter energy balances. Energy-consuming equipment should also be selected to maximize thermal efficiency. The third approach is to utilize waste heat recovery equipment efficiently. 21 refs.

File8, COPR. by Engineering Index User 244 Page 46 (Item 111 of 191)

ID NO.- EI740311310 411310
ZUKUENFTIGE-VERWENDUNGSMOEGLICHKEITEN DES HOCHOFENGASES. $left bracket$ Future Possibilities for the Use of Blast Furnace Gas $right bracket$.
Hoffmann, Gerd W.
DESCRIPTORS- (*BLAST FURNACES, *Fuel Economy), WASTE HEAT UTILIZATION,
CARD ALERT- 521, 545, 913
CODEN- STEIA3 SOURCE- Stahl Eisen v 93 n 22 Oct 25 1973 p 1005-1011
Statistics for blast furnace gas production in West Germany from 1960-80 and for the effect of blast furnace fuel practice on the caloric value of the gas lead to the conclusion that most if not all of the blast furnace gas produced will be consumed in the plant itself for heating the stoves and for the coking and sintering plants. Little, if any, will be available for sale to electric power plants. In German.

ID NO.- EI751067098 567098
RECOVERY OF HEAT FROM METAL PROCESSING FURNACES.
McChesney, H. R.
Br Steel Corp
DESCRIPTORS- (*IRON AND STEEL PLANTS, *Waste Heat Utilization), (FURNACES, METALLURGICAL, Waste Heat Utilization), FUEL ECONOMY,
CARD ALERT- 545, 532, 521
CODEN- PLEGAA SOURCE- Plant Eng (Lond) v 19 n 6-7 Jun-Jul 1975 p 8, 10-12
This paper reviews some of the more general aspects of waste heat recovery in metal processing furnaces and briefly reviews both current methods of heat recovery and novel plant now being developed at the Corporate Engineering Laboratory of British Steel Corporation. The main limitation to improvements in primary waste heat recovery plant is the restraint placed on operating temperatures in metallic recuperators, while leakage problems have limited the success of previous ceramic recuperator designs. Because of the leakage problem a design concept has been proposed in which long ceramic tubes would span the waste gas duct and be sealed into refractory walls using flexible ceramic seals. By using long ceramic tubes and large refractory blocks the number of possible leakage paths between the air and waste gas could be greatly reduced. A research and development program is also being conducted to investigate the design of rotary ceramic regenerators to achieve preheat temperatures of up to 1000 $degree$ C. One of the advantages of the rotary regenerator is the high thermal effectiveness which can be obtained with compact matrices. In addition, research is under way in which the various sources of low-grade heat within a steelworks are being quantified so that economic assessments can be made of the costs of energy collection and transport to areas or processes in which it can be utilized.

ID NO.- EI760209710 609710
CONTINUOUS CHARGING AND PREHEATING OF PREREDUCED IRON ORE.
Hunter, W. L.
Bur of Mines, US Dep of the Inter, Albany, Oreg
DESCRIPTORS- (*FURNACES, ELECTRIC, *Waste Heat Utilization), (IRON ORE TREATMENT, Fuel Economy), (STEELMAKING, Fuel Economy),
CARD ALERT- 532, 642, 545, 616, 533, 521
SOURCE- Effic Use of Fuels in the Metall Ind, Symp, Pap, Ill Inst Technol Res Inst, Chicago, Dec 9-13 1974 p 425-432. Publ by Inst of Gas Technol, Chicago, Ill, 1975
The Bureau of Mines has developed a process to utilize waste heat from electric arc steelmaking furnace gases to preheat the ferrous material charged to the furnace. Four heat exchangers were designed, tested, and operated successfully on 1-ton electric arc furnaces. Briquets and pellets were charged continuously, both countercurrent to the hot furnace offgases and at ambient temperatures. A comparison of the electrical energy consumed in each situation showed that preheating can lower energy requirements as much as 15 percent. 4 refs.

ID NO.- EI760209727 609727
THERMAL ENERGY RECOVERY BY BASIC OXYGEN FURNACE OFFGAS PREHEATING OF SCRAP.
Mahan, Warren M.; Daellenbach, Charles B.
US Bur of Mines, Twin Cities, Minn
DESCRIPTORS- (*FURNACES, METALLURGICAL, *Waste Heat Utilization), (STEELMAKING, Basic Oxygen Process), (IRON AND STEEL SCRAP, Reprocessing),
CARD ALERT- 532, 616, 545, 913
SOURCE- Effic Use of Fuels in the Metall Ind, Symp, Pap, Ill Inst Technol Res Inst, Chicago, Dec 9-13 1974 p 457-465. Publ by Inst of Gas Technol, Chicago, Ill, 1975
The feasibility of basic oxygen furnace (BOF) offgas heat recuperation by preheating scrap was investigated on a pilot plant scale by the Bureau of Mines. Offgases generated during the oxygen blowing of a molten pig iron and scrap charge were passed through a static bed of shredded auto scrap. As compared to cold scrap used in the normal BOF practice, it was found that by preheating scrap, usage could be increased by 43 percent. The thermal energy recovered by this preheating method can account for up to 44 percent of the energy necessary to melt the scrap. 7 refs.

ID NO.- EI760106176 606176
BEDEUTUNG DER ENERGIERUECKGEWINNUNG IN SAUERSTOFF-BLASSTAHLWERKEN FUER DIE ENERGIEWIRTSCHAFT GEMISCHTER HUETTENWERKE. $left bracket$ Significance of Energy Recovery in Oxygen Converter Steel Plants for Fuel Economy of Mixed Steel Plants $right bracket$.
Simon, Richard
Hoesch Huettenwerke, Dortmund, Ger
DESCRIPTORS- (*STEELMAKING, *Bessemer Process), (FOUNDRIES, Waste Heat Utilization), FUEL ECONOMY,
CARD ALERT- 545, 534, 521
CODEN- BHMMAM SOURCE- Berg Huettenmaenn Monatsh v 120 n 9 Sep 1975 p 444-451
Gas and energy recycling and use in blast furnaces is discussed. Application of full and semi-boilers with complete and suppressed combustion is analyzed, and quantity calculations are made. Data are presented graphically. 20 refs. In German with English contents.

File6, COPR. by N.T.I.S. User 244 Page 32 (Item 38 of 105)

Potential for Energy Conservation in the Steel Industry

Battelle Columbus Labs., Ohio.*Federal Energy Administration, Washington, D.C. Office of Industrial Programs.

Final rept.
C5251L3 FLD: 11F, 10A, 97B*, 71J* USGRDR7522
30 May 75 362p*
CONTRACT: FEA-C-04-51874-00
MONITOR: FEA/D-75/402

ABSTRACT: The report examines in detail both existing and new technologies in steelmaking that offer significant opportunities for energy conservation in the next five years, including the increased use of continuous casting, better utilization of by-product fuel gases, and improved process design and control in order to minimize the need for reheating of steel.

DESCRIPTORS: *Iron and steel industry, *Energy conservation, *Steel making, Energy consumption, Fuel consumption, Electric power demand, Electricity, Coal, Natural gas, Oxygen, Fuel oils, Forecasting, Cost analysis, Technology assessment, Great Britain, Germany, Energy requirements, Heat recovery, United States, Japan, International trade

IDENTIFIERS: NTISEXFEA

PB-244 097/2ST NTIS Prices: PC$10.00/MF$2.25

The Potential for Energy Conservation in Nine Selected Industries. The Data Base. Volume 6. Steel

Gordian Associates, Inc., New York.*Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
C5244C4 FLD: 10A, 11F, 97B, 97G, 71N USGRDR7522
Jun 74 144p*
CONTRACT: DI-14-01-0001-1842
MONITOR: FEA/D-CP-14
Paper copy also available from GPO. Paper copy also available in set of 10 reports as PB-243 610-SET, PC$58.00.

ABSTRACT: This volume deals with energy consumption data for the production sequence that results in the output of raw steel, including ingots, steel castings and strand or pressure cast blooms, billits, slabs and other product forms. Material descriptions include mining of ore, smelting iron ore into pig iron, coke production, semifinishing of steel, oxygen production, and production of fluxes. Other items included are depletion of high grade U.S. ores, decreasing ration of coke to pig iron, shifts in steel furnace technology, and new technology trends.

DESCRIPTORS: *Energy consumption, Iron and steel industry, Steels, Iron ore, Pig iron, Steel making, Smelting, Mining, Coke, Oxygen, Fluxes, Process charting, Fuel consumption, Electric power demand, Coal, Fuel oils, Natural gas, Nuclear energy, Hydroelectric power, Industries, Energy conservation

IDENTIFIERS: NTISEXFEA

PB-243 617/8ST NTIS Prices: PC$5.75/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 68 (Item 76 of 105)

The Impact of Energy Shortages on the Iron and Steel Industries

Booz-Allen and Hamilton, Inc., Bethesda, Md.*Federal Energy Administration, Washington, D.C. (408 597)

Final rept.
C4384E3 FLD: 10A, 05C, 97B*, 97G, 96A USGRDR7509
Aug 74 300p*
CONTRACT: DI-14-01-0001-1657
MONITOR: FEA/EI-1657

ABSTRACT: The study is one of a series conducted in an effort to obtain information on the basic structure or characteristics of the Iron and Steel Industry. Particular emphasis is placed on fuel use by major type and production process as well as exploring the possibilities for fuel substitutability and conservation alternatives in the Iron and Steel Industry.

DESCRIPTORS: *Fuel consumption, *Iron and steel industry, Shortages, Consumption, Steel plants, Foundries, Fuels, Supplies, Impact

IDENTIFIERS: *Energy shortages, Energy conservation, Energy use, Energy supplies, SIC 3462, Fuel substitution, SIC 3312, SIC 3313, SIC 3315, SIC 3316, SIC 3317, SIC 3321, SIC 3322, SIC 3324, SIC 3325, NTISEXFEA

PB-238 749/6ST NTIS Prices: PC$8.75/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 13 (Item 13 of

Energy Consumption: The Primary Metals and Petroleum Industries

Dow Chemical Co., Freeport, Tex. Texas Div.*National Environmental Research Center, Research Triangle Park, N.C. Control Systems Lab.

Final rept. Aug 74-Mar 75
AUTHOR: Reding, John T., Shepherd, Burchard P.
C4905B4 FLD: 10A, 07A, 11F, 97B*, 99B, 94G USGRDR7517
Apr 75 59p*
CONTRACT: EPA-68-02-1329
PROJECT: EPA-ROAP-21ADE-010
MONITOR: EPA/650/2-75-032-b

ABSTRACT: The report gives results of a study of energy consumption in the primary metals and petroleum industries. It analyzes energy-intensive steps or operations for commonly used manufacturing processes. Results of the analyses are in the form of energy consumption block diagrams, energy-intensive equipment schematic diagrams, and tables that indicate the causes of energy losses, as well as possible conservation approaches.

DESCRIPTORS: *Energy consumption, *Petroleum industry, *Aluminum industry, *Steel plants, Metal industry, Electrolysis, Distillation, Insulation, Furnaces, Design, Fuel consumption, Electric power demand, Energy conservation, Heat recovery, Industries

IDENTIFIERS: SIC 33, SIC 29, Electric power consumption, NTISEPAORD

PB-241 990/1ST NTIS Prices: PC$4.25/MF$2.25

File8, COPR. by Engineering Index User 244 Page 5 (Item 12 of 191)

ID NO.- EI760210446 610446
IMPACT OF THE L-D PROCESS UPON STEEL PLANT ENERGY USAGE.
Stone, Joseph K.
Kaiser Eng Inc, Chicago, Ill
DESCRIPTORS- (*IRON AND STEEL PLANTS, *Fuel Economy), (FURNACES, METALLURGICAL, Waste Heat Utilization), (STEELMAKING, Bessemer Process),
CARD ALERT- 545, 521, 532, 616
SOURCE- Effic Use of Fuels in the Metall Ind, Symp, Pap, Ill Inst Technol Res Inst, Chicago, Dec 9-13 1974 p 405-423. Publ by Inst of Gas Technol, Chicago, Ill, 1975
A study of the shift from open hearth steelmaking to basic oxygen, electric furnace, and direct reduction shows how this shift affects the amount and sources of energy used in the steel industry. In spite of the steel industry's good record in energy conservation, top gases from basic oxygen furnaces have to date, been wasted or used only to a very small extent. The theoretical basis, progress, and suggestions for using waste heat from L-D furnace gases are discussed. Preheati-- scrap, pre-calcining and preheating lime, and pre-reducing iron c for the charge are considered the best outlets for the use of was-- energy. 12 refs.

File8, COPR. by Engineering Index User 244 Page 31 (Item 75 of 191)

ID NO.- EI750427329 527329
CONTINUOUS CHARGING AND PREHEATING OF PREREDUCED IRON ORE.
Tress, J. F.; Hunter, W. L.; Stickney, W. A.
Albany Metall Res Cent, Oreg
DESCRIPTORS- (*STEELMAKING, *Electric Furnace Process), WASTE HEAT UTILIZATION, (HEAT TRANSFER, Gases),
IDENTIFIERS- PREHEATING OF IRON AND STEEL SCRAP
CARD ALERT- 545, 641
CODEN- XBMIA6 SOURCE- US Bur Mines Rep Invest n 8004, 1975, 10 p
The Bureau of Mines has developed a process to utilize waste heat from electric arc steelmaking furnace gases to preheat the ferrous material charged to the furnace. Four heat exchangers were designed, tested, and operated successfully on 1-ton electric arc furnaces. Briquets and pellets were charged continuously, both countercurrent to the hot furnace offgasses and at ambient temperatures. A comparison of the electrical energy consumed in each situation showed that preheating can lower energy requirements as much as 15. 6 percent. 4 refs.

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ID NO.- EI750101977 501977
L'UNION SIDERURGIQUE DE L'ENERGIE. $left bracket$ Iron and Steel Plant Energy Producing Association $right bracket$.
Bonneterre, J.
Union Sider de l'Energie, Briey, Fr
DESCRIPTORS- (*ELECTRIC POWER GENERATION, *Energy Resources), (BLAST FURNACES, Waste Heat Utilization), (COKE OVENS, Waste Heat Utilization),
CARD ALERT- 522, 532, 615, 642
CODEN- REMEAH SOURCE- Rev Metall (Paris) v 71 n 9 Sep 1974 p 635-644
The history of an association of independent steel producers, for the purpose of utilizing their coke oven and blast furnace gases for the production of electric power for their iron mines, is traced from its beginnings in 1918 to date. In French.

Filed, COPR. by N.T.I.S. User 244 Page 7 (Item 7 of 39)

Potential for Energy Conservation in the Steel Industry

Battelle Columbus Labs., Ohio.*Federal Energy Administration, Washington, D.C. Office of Industrial Programs.

Final rept.
C5251L3 PLD: 11F, 10A, 97B*, 71J* USGRDR7522
30 May 75 362p*
CONTRACT: FEA-C-04-51874-00
MONITOR: FEA/D-75/402

ABSTRACT: The report examines in detail both existing and new technologies in steelmaking that offer significant opportunities for energy conservation in the next five years, including the increased use of continuous casting, better utilization of by-product fuel gases, and improved process design and control in order to minimize the need for reheating of steel.

DESCRIPTORS: *Iron and steel industry, *Energy conservation, *Steel making, Energy consumption, Fuel consumption, Electric power demand, Electricity, Coal, Natural gas, Oxygen, Fuel oils, Forecasting, Cost analysis, Technology assessment, Great Britain, Germany, Energy requirements, Heat recovery, United States, Japan, International trade

IDENTIFIERS: NTISFXFEA

PE-244 097/2ST NTIS Prices: PC$10.00/MF$2.25

ID NO.- EI71X173504 173504
Utilization of in- plant fines
CAVAGHAN NJ; TRAICE PB
Swinden Lab, Rotherham, England
DESCRIPTORS- (*IRON AND STEEL PLANTS, *Waste Utilization), (IRON AND STEEL PLANTS, Waste Heat Utilization),
CARD ALERT- 545
CODEN- JISIA SOURCE- J Iron Steel Inst (London) v 208 pt 6 June 1970 p 538-42
This paper highlights the growing problem of iron- and steelworks' in- plant ferruginous waste disposal, and discusses the technically feasible routes by which such materials can be brought back, conveniently and economically, into the steelmaking cycle. The paper is primarily concerned with the utilization of oxide fume arising from the major steelmaking processes, whether equipped with wet- or dry- precipitator systems, in both integrated and non- integrated works. 8 refs.

ID NO.- EI70X002112 002112
Waste heat utilization in iron and steel works (Abwaermeverwertung auf Huettenwerken)
THEEGARTEN H; ZUR M
DESCRIPTORS- (*IRON AND STEEL PLANTS, *Waste Heat Utilization),
CARD ALERT- 076, 103
SOURCE- Stahl u Eisen v 89 n 5 Mar 6 1969 p 231-8
Report of design and operation from 1953 to 1967 of equipment converting waste heat into steam at Westfalen plant of Hoesch AG; installations serve three high power gas engines, eight open hearths, three pusher- type furnaces, and five soaking pits; during period considered, 8,752,000 tons of steam were produced; economics are discussed. In German.

ID NO.- EI70X001437 001437
Top gas turbines in ironworks. Applications and experience in operation, (Gichtgasturbinen in Huettenwerken. Einsatz und Betribbserfahrungen)
HEILIG H
DESCRIPTORS- (*IRON AND STEEL PLANTS, *Waste Heat Utilization), (BLAST FURNACES, Blowers), GAS TURBINES,
CARD ALERT- 076, 103, 296
SOURCE- Stahl u Eisen v 89 n 7 Apr 3 1969 p 355-64
Review of applications of top gas turbines for production of blast and electric current; European plants now using gas turbine installations are tabulated; investigations of turbine blade corrosion and deposits are described; effect of corrosion on economics of operation was found to be more damaging than expected; remedies are discussed. In German.

ID NO.- EI70X040430 040430
Waste heat utilization in an oxygen steel plant, (Abhitzeverwertung in einem Sauerstoffaufblas- Stahlwerk)
KRUEGER W
DESCRIPTORS- (*IRON AND STEEL PLANTS, *Waste Heat Utilization), (IRON AND STEEL PLANTS, Dust Problems), (STEELMAKING, Basic Oxygen Process),
CARD ALERT- 545
SOURCE- Stahl u Eisen v 89 n 21 Oct 16 1969 p 1150-6
The conditions under which the costs of dust removal from the waste gases of basic oxygen converters can be lowered by utilization of the waste heat generated by cooling the gases are described, as well as the limitations of the method. Investment costs for equipment must be kept low. Examples are given. In German.

File6, COPR. by N.T.I.S. User 244 Page 19 (Item 23 of 105)

Impact of Energy Developments on the Sheet Metal Industry

Mitre Corp., McLean, Va.*Sheet Metal Workers' International Association, Washington, D.C. (402 364)
AUTHOR: Cohen, Arnold, Harlow, Mary, Johnson, Augustus, Spewak, Peter
C5473K4 PLD: 13A, 10A, 97G*, 89B* USGRDR7525
Jun 75 116p*
MONITOR: 18
Sponsored by Sheet Metal Workers' International Association, Washington, D.C.

ABSTRACT: This report surveys the present energy situation, the federal government's energy policies and programs, and the state-of-the-art in solar heating and cooling of buildings and in energy conservation. It recommends a program of specific action for the Sheet Metal Workers International Association which will, at the same time, serve the nation's energy needs and provide employment opportunities for the Union's members.

DESCRIPTORS: *Metal industry, *Solar space heating, *Solar air conditioning, Solar collectors, Energy policy, Cost effectiveness, Marketing, Solar water heaters, Solar air heaters, Energy conservation, Heat recovery, Buildings, Reviewing, Reviews, National government, Energy demand, Planning, United States, Industries

IDENTIFIERS: Waste heat utilization, NTISSOLO

PB-245 669/7ST NTIS Prices: PC$5.25/MF$2.25

B-XIV. 34 - FABRICATED METAL PRODUCTS

ID NO.- EI751173657 573657
ENERGY CONSERVATION IN THE METALWORKING INDUSTRY.
Byrer, Thomas G.
Battelle Columbus Lab, Ohio
DESCRIPTORS- *FUEL ECONOMY, METAL FORMING, FURNACES, HEATING,
IDENTIFIERS- METALWORKING INDUSTRY
CARD ALERT- 521, 532, 535, 642
CODEN- SMEPBA SOURCE- SME Tech Pap MM75-129 for Meet, Detroit, Mich, Apr 7-10 1975, 14
Several examples are given which point up how significant energy savings can be realized without large expenditures in capital investment. A major area for improvement is increasing efficiency of metalworking furnaces. Longer range improvements include the use of warm working which means implementing new concepts and processes in place of traditional hot working techniques now widely used.

ID NO.- EI751067791 567791
HOW TO SAVE GAS IN METAL DECORATING OVENS.
Johnson, Fred I.
Bangor Punta Corp
DESCRIPTORS- (*METALS AND ALLOYS, *Protective Coatings), (OVENS, INDUSTRIAL, Fuel Economy),
CARD ALERT- 539, 531, 642, 521
CODEN- MOMLAJ SOURCE- Mod Met v 31 n 7 Aug 1975 p 65-66, 68
With natural gas supply dwindling and prices on the rise, it makes economic sense to invest in fuel conserving measures for all types of ovens used to cure coatings on metals. This discussion is primarily concerned with metal sheet coating wicket type ovens, but is also pertinent to $left double quote$ pin $right double quote$ ovens for curing outside coatings on 2-piece cans and inside coating ovens for 2-piece and 3-piece cans. Economics achieved in this field with various Btu-saving approaches are documented.

B-XV. NON-FERROUS METALS

File6, COPR. by N.T.I.S. User 244 Page 27 (Item 32 of 10

Impact of Energy Developments on the Sheet Metal Industry

Mitre Corp., McLean, Va.
AUTHOR: Cohen, Arnold, Harlow, Mary, Johnson, Augustus, Spewak, Peter
C5321P3 FLD: 13A, 10A, 97C* USGRDR7523
Jun 75 115p*
MONITOR: 18

ABSTRACT: This report surveys the present energy situation, the federal government's energy policies and programs, and the state-of-the-art in solar heating and cooling of buildings and in energy conservation. It recommends a program of specific action for the Sheet Metal Workers International Association which will, at the same time, serve the nation's energy needs and provide employment opportunities for the Union's members.

DESCRIPTORS: *Solar space heating, *Solar air conditioning, *Metal industry, Planning, Government policies, National government, Technology assessment, Reviewing, Solar collectors, Feasibility, State government, Geographic areas, Energy conservation, Energy policy, Buildings, Industries, Solar air heaters, Program goals

IDENTIFIERS: Geographic locations, NTISSOLO

PB-244 274/7ST NTIS Prices: PC$5.25/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 55 (Item 62 of 105)

Energy Consumption: The Primary Metals and Petroleum Industries

Dow Chemical Co., Freeport, Tex. Texas Div.*National Environmental Research Center, Research Triangle Park, N.C. Control Systems Lab.

Final rept. Aug 74-Mar 75
AUTHOR: Reding, John T., Shepherd, Burchard P.
C4905B4 PLD: 10A, 07A, 11F, 97B*, 99B, 94G USGRDR7517
Apr 75 59p*
CONTRACT: EPA-68-02-1329
PROJECT: EPA-ROAP-21ADE-010
MONITOR: EPA/650/2-75-032-b

ABSTRACT: The report gives results of a study of energy consumption in the primary metals and petroleum industries. It analyzes energy-intensive steps or operations for commonly used manufacturing processes. Results of the analyses are in the form of energy consumption block diagrams, energy-intensive equipment schematic diagrams, and tables that indicate the causes of energy losses, as well as possible conservation approaches.

DESCRIPTORS: *Energy consumption, *Petroleum industry, *Aluminum industry, *Steel plants, Metal industry, Electrolysis, Distillat Insulation, Furnaces, Design, Fuel consumption, Electric power dem Energy conservation, Heat recovery, Industries

IDENTIFIERS: SIC 33, SIC 29, Electric power consumption, NTISEPAORD

PB-241 990/1ST NTIS Prices: PC$4.25/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 40 (Item 46 of 105)

The Potential for Energy Conservation in Nine Selected Industries. The Data Base. Volume 5. Aluminum

Gordian Associates, Inc., New York.*Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
C5244C3 FLD: 10A, 11F, 97B, 97G, 71N USGRDR7522
Jun 74 128p*
CONTRACT: DI-14-01-0001-1842
MONITOR: FEA/D-CP-13
Paper copy also available in set of 10 reports as PB-243 610-SET, PC$58.00.

ABSTRACT: This report deals with the materials balances and energy consumption data for the production sequence resulting in the output of primary aluminum ingots. The ingot are formed by casting the molten aluminum obtained from smelting are suitable for subsequent fabrication of products. This study describes production of primary aluminum ingots, including mining of bauxite, refining bauxite into alumina, and smelting alumina into aluminum. Other data cover production of soda ash, lime, petroleum coke, cryolite and fluorspar, and caustic; energy requirements and consumption and the effect of raw materials imports.

DESCRIPTORS: *Energy consumption, *Aluminum industry, Ingots, Bauxite, Bayer process, Smelting, Refining, Fuel consumption, Electric power demand, Coal, Fuel oils, Natural gas, Nuclear energy, Hydroelectric power, Industries, Metal industry, Process charting, Energy conservation, Sodium carbonates, Calcium oxides, Petroleum coke, Fluorite, Cryolite, Alkalies

IDENTIFIERS: NTISEXFEA

PB-243 616/OST NTIS Prices: PC$5.75/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 41 (Item 47 of 105)

The Potential for Energy Conservation in Nine Selected Industries. The Data Base. Volume 4. Copper

Gordian Associates, Inc., New York.*Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
C5244C2 FLD: 10A, 11F, 97B, 97G, 71N USGRDR7522
Jun 74 124p*
CONTRACT: DI-14-01-0001-1842
MONITOR: FEA/D-CP-12
Paper copy also available from GPO. Paper copy also available in set of 10 reports as PB-243 610-SET, PC$58.00.

ABSTRACT: This report deals with the processes used and the energy consumed in the production of refined primary copper. The traditional methods of copper production, mining and ore preparation, smelting, and refining, are described. Data related to material and energy consumption and ancillary process (such as limestone mining) are also covered, as is discussion of a number of new developments in the copper production process. Included are developments in the following areas: smelting techniques, copper refining, hydrometallurgical processes, and secondary copper.

DESCRIPTORS: *Energy consumption, *Metal industry, Metalliferous minerals, Beneficiation, Smelting, Refining, Hydrometallurgy, Fuel consumption, Electric power demand, Coal, Fuel oils, Natural gas, Gasoline, Diesel fuels, Copper, Energy requirements, Nuclear energy, Hydroelectric power, Electricity, Industries, Process charting, Energy conservation

IDENTIFIERS: *Copper industry, NTISEXFEA

PB-243 615/2ST NTIS Prices: PC$5.25/MF$2.25

Study of the Energy and Fuel-Use Patterns in the Nonferrous Metals Industries

Battelle Columbus Labs., Ohio.*Federal Energy Administration, Washington, D.C. Office of Economic Impact.*Department of Commerce, Washington, D.C.

Final rept.
AUTHOR: Hall, E. H., Bartlett, E. S., Buttner, F. H., Conkle, E. N., Drennen, D. C.
C5464K2 FLD: 11F, 10A, 97B*, 71N* USGRDR7525
31 Dec 74 356p*
CONTRACT: DI-14-01-0001-1658
MONITOR: FEA/EI-1658

ABSTRACT: This report covers the patterns of energy use in 10 SIC's within the nonferrous metals industries. Total energy use, broken down by fuel type, is estimated for each of the 10 industries and for major processes within each industry. A review of each industry is presented with respect to: the potential for fuel switching, opportunities for short-term conservation, sources of fuels and energy supply, levels of fuel stocks, key constraints on industry operations, and industry products which may be critical to the needs of Project Independence. The 10 industries included in the study are: primary copper; primary lead; primary zinc; primary aluminum; primary nonferrous metals; secondary nonferrous metals; copper rolling and drawing; aluminum rolling and drawing; nonferrous rolling and drawing; nonferrous wire, drawing and insulation. Also included are industry projection details. Portions of this document are not fully legible.

DESCRIPTORS: *Metal industry, *Fuel consumption, *Aluminum industry, *Zinc industry, *Energy consumption, Propane, Butanes, Residual oils, Gasoline, Petroleum products, Coal, Lubricants, Natural gas, Petroleum coke, Electricity, Distillates, Smelting, Briquetting, Sintering, Refining, Substitutes, Energy conservation, Geographic locations, Processing, Industries, Energy supplies, Energy sources, Mineral deposits

IDENTIFIERS: *Nonferrous metals, *Copper industry, *Lead industry, SIC 3331, SIC 3332, SIC 3333, SIC 3334, SIC 3339, SIC 3341, SIC 3351, SIC 3352, SIC 3356, SIC 3357, *Heat consumption, *Electric power consumption, Fuel substitution, NTISEXFEA, NTISCOMSEC

PB-245 194/6ST NTIS Prices: PC$10.00/MF$2.25

ID NO.- EI751285487 585487
OBZHIG TSINKOVYKH KONTSENTRATOV V KIPYASHCHEM SLOW. $left bracket$ Roasting Zinc Concentrates in a Fluidized Bed $right bracket$.
Shteingart, G. M.
DESCRIPTORS- (*ZINC ORE TREATMENT, *Roasting), (FURNACES, METALLURGICAL, Fluidized Bed), (ZINC METALLURGY, Waste Heat Utilization), (FURNACES, Recuperators),
CARD ALERT- 533, 532, 531, 546, 616
CODEN- TVMTAX SOURCE- Tsvet Met n 7 Jul 1975 p 21-27
The present state and the main trends of further development of fluidized-bed roasting of zinc concentrates are reviewed. In addition to increasing the size of the furnaces, which corresponds to the main trend in the development of fluidized-bed roasting outside the Soviet Union, it is necessary to design highly efficient automated equipment in which the roasting process is intensified by the use of oxygen and by increasing the roasting temperature. All fluidized-bed furnaces should be equipped with recuperator boilers or evaporative-cooling plants. It is suggested that at one particular zinc-refining plant tests be made of the feasibility of roasting granulated concentrates with the roasted granules being melted in electrothermal furnaces. In Russian.

ID NO.- EI760207809 607809
ENERGY USAGE IN THE ZINC-LEAD BLAST FURNACE.
Hopkin, William; Richards, Alan W.
Imp Smelting Processes Ltd, Avonmouth, Bristol, Engl
DESCRIPTORS- (*BLAST FURNACES, *Waste Heat Utilization), (ZINC ORE TREATMENT, Roasting), (LEAD ORE TREATMENT, Roasting), (ZINC SMELTING, Fuel Economy), (LEAD SMELTING, Fuel Economy),
CARD ALERT- 532, 616, 546, 533, 521, 531
SOURCE- Effic Use of Fuels in the Metall Ind, Symp, Pap, Ill Inst Technol Res Inst, Chicago, Dec 9-13 1974 p 607-633. Publ by Inst of Gas Technol, Chicago, Ill, 1975
The energy usage and thermodynamic requirements of the zinc-lead blast furnace together with practical constraints are discussed, first on an absolute basis, and second relative to the alternative processes. Hot briquetting will allow the process to be based only on zinc concentrates with fluid bed roasting and waste heat recovery. Overall, the zinc-lead blast furnace makes a valuable contribution to the world's metals production and resource conservation, with firm prospects of still further energy economy. 6 refs.

File8, COPR. by Engineering Index User 244 Page 11 (Item 26 of 191)

ID NO.- EI760208553 608553
OUTOKUMPU FLASH SMELTING AND ITS ENERGY REQUIREMENT.
Juusela, Jyrki; Harkki, Seppo; Andersson, Bengt
Outokumpu Oy Harjavalta, Finl
DESCRIPTORS- (*COPPER SMELTING, *Fuel Economy), (NICKEL SMELTING, Waste Heat Utilization),
IDENTIFIERS- FLASH SMELTING
CARD ALERT- 531, 544, 521, 548, 616
SOURCE- Effic Use of Fuels in the Metall Ind, Symp, Pap, Ill Inst Technol Res Inst, Chicago, Dec 9-13 1974 p 555-575. Publ by Inst of Gas Technol, Chicago, Ill, 1975

Flash smelting, a continuously-operated smelting method developed originally by Outokumpu Oy to treat sulfide copper concentrates, is described with special stress on energy savings. Besides the utilization of the latent reaction heat of the concentrates, the process also offers a highly developed waste heat recovery and energy savings. The oxygen enrichment of the process air $EM DASH$ introduced a few years ago $EM DASH$ has considerably increased the specific capacity of the smelting unit and made the process almost independent of additional fuel. 13 refs.

B-XVI. MISCELLANEOUS INDUSTRIES

An Economic Evaluation of Technical Systems for Scrap Tire Recycling

Municipal Environmental Research Lab., Cincinnati, Ohio. Solid and Hazardous Waste Research Div.

Final rept.
AUTHOR: Goddard, Haynes C.
C6095J2 FLD: 13B, 68C*, 91A* USGRDR7608
Dec 75 48p*
MONITOR: EPA/600/5-75/019

ABSTRACT: A technological and economic assessment is made of alternative technologies to recover the waste rubber in scrap vehicle tires. The principal technical alternatives evaluated are ground scrap rubber as an asphalt additive, retreading, energy recovery, and carbon black recovery. The greatest potential benefits are seen to occur with retreading and asphalt additives, followed by carbon black and energy recovery.

DESCRIPTORS: *Materials recovery, *Tires, *Solid waste disposal, *Scrap, Elastomers, Asphalts, Construction materials, Flexible pavements, Economic analysis, Management planning, Reclamation, Carbon black, Incinerators, Heat recovery, Roads

IDENTIFIERS: *Waste recycling, Secondary materials industry, Scrap disposal, NTISEPAORD

PB-249 197/5ST NTIS Prices: PC$4.00/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 12 (Item 14 of 105)

Energy Requirements in Minnesota Iron Ore and Taconite Mining 1953-2000

Minnesota Energy Agency, St. Paul. Research Div.
AUTHOR: Hirsch, Howard
C5865J2 FLD: 08I, 10A, 97B, 48A USGRDR7605
Aug 75 38p
REPT NO: MEA-MINE-7508
MONITOR: 18

ABSTRACT: This report is concerned primarily with forecasting energy requirements for taconite and iron mining in Minnesota until 2000, and additionally with the role of the industry in the economy of both the State and the three-county Iron Range region of northeastern Minnesota. Direct energy inputs in iron mining in 1973 are related to three end-use categories: production, transportation, and overhead activities. Over 85 per cent of direct energy consumed was for production activities. Transportation and overhead accounted for 6.74 and 7.91 per cent of direct energy use respectively.

DESCRIPTORS: *Fuel consumption, *Iron ores, *Taconite, *Mining, *Energy consumption, Iron ore deposits, Metalliferous minerals, Industries, Electricity, Natural gas, Propane, Fuel oil, Gasoline, Diesel fuels, Petroleum products, Forecasting, Minnesota, Economic impacts, Energy conservation

IDENTIFIERS: *Electric power consumption, Energy use, NTISMENA

PB-248 055/6ST NTIS Prices: PC$4.00/MF$2.25

Fuel and Energy Consumption in the Coal Industries

Hittman Associates, Inc., Columbia, Md.*Federal Energy Administration, Washington, D.C.*Bureau of Mines, Washington, D.C. (387 333)

Final rept.
CJ925K2 FLD: 10A, 97B USGRDR7502
May 74 266p
REPT NO: HIT-575
CONTRACT: DI-14-01-0001-1659
MONITOR: FEA/EI-1659

ABSTRACT: Information on the basic structure and characteristics of the coal mining industry is presented. Particular emphasis is placed on fuel use by major type and production process and exploring possibilities for fuel substitutability and conservation alternatives.

DESCRIPTORS: *Energy consumption, *Coal industry, Industries, Coal mining, Coal preparation, Fuel consumption, Electric power demand, Stockpiles, Underground mining, Surface mining, Strip mining, Natural gas, Gasoline, Distillates, Residual oils, Petroleum products, Propane , Butanes, Statistical data, Anthracite, Geographical divisions, Bituminous coal, Lignite, Diesel fuels

IDENTIFIERS: Electric power consumption, Energy conservation, Fuel substitution, NTISEXPEA

PB-237 151/6SL NTIS Prices: PC$8.50/MF$2.25

File6, COPR. by N.T.I.S. User 244 Page 78 (Item 89 of 105)

Industrial Energy Study of the Motor Vehicles Industry

Kearney (A.T.), Inc., Chicago, Ill.*Federal Energy Administration, Washington, D.C.

Final rept.
C3871E2 FLD: 10A, 13F, 97B*, 85B* USGRDR7501
Jul 74 478p
CONTRACT: DI-14-01-0001-1671
MONITOR: FEA/EI-1671

ABSTRACT: This document presents findings relating to energy use by establishments in Standard Industrial Classification (SIC) 371 and its 4-digit subindustries: motor vehicles and passenger car bodies (SIC 3711); and truck and bus bodies (SIC 3713); motor vehicle parts and accessories (SIC 3714); truck trailers (SIC 3715). The material contained herein serves to: characterize industry energy consumption by process and subprocess, by type of energy, and by geographic pattern of use; document the dynamics of energy supply in the industry; identify and describe potential for energy substitutions and conservation of petroleum fuels; determine factors affecting energy consumption efficiency within the industry; and, identify key constraints limiting the productive capacity of the industry. (Modified author abstract)

DESCRIPTORS: *Energy consumption, *Automotive industry, Fuel consumption, Electric power demand, Econometrics, Industrial plants, Manufacturing, Fabrication, Petroleum products, Natural gas, Coal, Fuel oil, Gasoline, Diesel fuels, Propane, Butanes, Distillates, Residual oils, Metal working, Heating, Air conditioning, Transportation, Illuminating

IDENTIFIERS: SIC 371, SIC 3711, SIC 3713, SIC 3714, SIC 3715, Energy shortages, Electric power consumption, Geographic locations, Energy conservation, NTISEXFEA

PB-236 694/6ST NTIS Prices: PC$12.00/MF$2.25

Energy Use in the Contract Construction Industry

Tetra Tech, Inc., Arlington, Va.*Federal Energy Administration, Washington, D.C. Office of Economic Impact. (388 403)

Final rept.
C5471C4 FLD: 13M, 13B, 10A, 97B*, 50* OSGRDR7525
18 Feb 75 185p*
REPT NO: TETRAT-A-412-75-011-F
CONTRACT: DI-14-01-0001-1664
MONITOR: FEA/EI-1664
See also Appendix A, PB-245 423 and Appendix B, PB-245 424.

ABSTRACT: This report is an analysis of energy use in the contract construction industry compiled to determine the amount of energy used and the potential impact that national energy shortages would have on the industry. Analysis includes building construction, heavy construction, and special trades. The overview is composed of a discussion of the industry structure, energy use, intraindustry variations, energy supply, and substitutability and conservation of fuels. Contractors in the following industries are analyzed: Single-family housing; residential building; industrial building; nonresidential construction; highway and street; bridge, tunnel, and elevated-highway; waterworks, sewer, pipeline, communication line, and power line; heavy construction, swimming pool and fence; and special trades.

DESCRIPTORS: *Construction industry, *Energy consumption, *Fuel consumption, Diesel fuels, Gasoline, Lubricants, Petroleum products, Electricity, Asphalts, Residential buildings, Houses, Industrial buildings, Highways, Streets, Bridges(Structures), Waterworks, Sewer, Pipelines, Communication cables, Power distribution lines, Swimming pools, Fences, Air conditioning, Space heating, Plumbing, Painting, Carpentry, Roofing, Water wells, Demolition, Industries, Contractors

IDENTIFIERS: *Electric power consumption, *Heat consumption, SIC 15, SIC 16, SIC 17, Fuel substitution, Energy conservation, Geographic divisions, Public utilities, NTISEXPEA

PB-245 422/1ST NTIS Prices: PC$7.00/MF$2.25

Guide to Energy Conservation for Food Service

Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
C6194E3 FLD: 06H, 10A, 97G*, 98H* USGRDR7609
Oct 75 83p*
REPT NO: FEA/D-75/411
MONITOR: 18

ABSTRACT: The guide, developed by FEA and food industry representatives, offers energy-saving suggestions for all types of food service operations: schools and hospitals, fast food operators, coffee shops, restaurants, cafeterias, hotels, and motels. Energy conservation steps are identified for food preparation and storage, lighting, heating, ventilating, and air conditioning, and sanitation. The potential for savings are listed, with emphasis placed on increasing the efficiency of presently used equipment. Detailed steps to enable a food service manager to chart his fuel usage and monthly energy consumption, and to analyze the results of his conservation efforts are given.

DESCRIPTORS: *Energy conservation, *Food services management, *Manuals, Food services, Food preparation, Food storage, Illuminating, Space heating, Air conditioning, Ventilation, Food sanitation, Dishwashers, Water heaters, Stoves, Ovens, Refrigerators, Freezers, Maintenance, Planning, Industries

IDENTIFIERS: NTISEXFEA

PB-249 462/3ST NTIS Prices: PC$5.00/MF$2.25

ID NO.- EI740959295 459295
HEAT ENERGY CONSERVATION: A LOOK AT THE POSSIBILITIES.
Fleming, Myron T.
Thermal Exch Syst Inc
DESCRIPTORS- (*TEXTILE MILLS, *Drying), WASTE HEAT UTILIZATION, DRYERS,
CARD ALERT- 819, 802, 642
CODEN- TINDAZ SOURCE- Text Ind v 138 n 4 Apr 1974 p 61, 99, 101, 103
In industrial drying processes, the cost of drying one pound of water from a fabric averaged 0. 2 $cent$; in relation to material and other processing costs, this is small, and rarely received attention. Because industry must now take a new approach to energy utilization, it is appropriate that we look at ways to conserve heat in dryer installations. While there are few $left double quote$ off the shelf $right double quote$ solutions, heat energy savings in this area can average 15-22%, or higher.

ID NO.- EI750957715 557715
COIL COATING LINE FEATURES FLOATER OVENS AND HEAT RECOVERY.
Schrantz, Joe
DESCRIPTORS- (*COATING TECHNIQUES, *Waste Heat Utilization), (REFUSE INCINERATORS, Waste Heat Utilization),
IDENTIFIERS- COIL COATING
CARD ALERT- 539, 813, 616, 642
CODEN- IFIIAJ SOURCE- Ind Finish v 51 n 3 Mar 1975 p 24-32
A new coil coating line at Southern Coated Products saves energy with lower oven temperatures and by recovering the heat from the fume incinerator. Recovered heat from a fume incinerator supplies heat: (1) for the entire pretreatment wet section; (2) to preheat oven supply air; (3) to preheat oven fumes prior to incinerator entry. The heat recovery utilizes 80-85% of incinerator heat. The advantages of high-velocity air flotation (floater) ovens are also described.

ID NO.- EI750101727 501727
IMPROVING THE EFFICIENCY OF FURNACES IN THE DRYING OF PULP-INSULATED WIRE.
Durr, Helmut E.
DESCRIPTORS- (*ELECTRIC CONDUCTORS, INSULATED WIRE, *Drying), FURNACES, ELECTRIC, Waste Heat Utilization),
CARD ALERT- 704, 642
CODEN- WELEAX SOURCE- West Electr Eng v 18 n 2 Apr 1974 p 26-29
The amount of moisture remaining in newly produced pulp insulation of cable conductor wire is critical to the insulation's physical properties. The drying of the wet pulp as it passes through an open-ended electric furnace must be closely controlled. This control can be made difficult by the presence of too much moisture in the furnace's naturally vented interior atmosphere, necessitating higher heat to lower the atmosphere's relative humidity. Forced removal of furnace atmosphere, by itself, would necessitate consumption of considerably more heating power. Also, variations in the humidity of incoming ambient air affect insulation-drying. A modification of furnaces has resulted in removing the moisture-laden atmosphere, transferring part of its heat energy to incoming new air, and raising the temperature of the new air still further before introducing it into the furnace, whose heating elements are operated at reduced power. Variations in shop air humidity do not affect the system's operation, which can be closely controlled. The modification has produced a general increase in wire-insulation quality for the furnaces to which it has been applied.

B-XVII. 335 - ROLLING MILLS

339 - FORGES AND MISCELLANEOUS PRODUCTS

ID NO.- EI751176648 576648
WILL ENERGY SHORTAGE SPARK DIRECT ROLLING?
McManus, George J.
DESCRIPTORS- (*ROLLING MILL PRACTICE, *Waste Heat Utilizaation), (STEELMAKING, Waste Heat Utilization), STEL FOUNDRY PRACTICE,
CARD ALERT- 535, 545, 534
CODEN- IRAGAN SOURCE- Iron Age v 216 n 11 Sep 15 1975 p MP9-MP12
The article discusses the possibilities and advantages of direct rolling $EM DASH$ a continuous system that would start with molten steel and go directly through casting and rolling. Such a coupling of the casting of liquid steel with the rolling of finished products could lead to substantial savings in energy and labor, and it could also be a key to improving the overall efficiency of steelmaking.

ID NO.- EI760317097 617097
ENERGY SAVING AS APPLIED TO LARGE MULTIZONE PUSHER AND UNDERFIRED WALKING-BEAM FURNACES.
Hopkins, N.; Gandhi, K. C.
Stein Atkinson Stordy Ltd, Dorking, Engl
DESCRIPTORS- (*FURNACES, HEATING, *Waste Heat Utilization), FUEL ECONOMY,
CARD ALERT- 532, 642, 521
CODEN- IMKSB7 SOURCE- Ironmaking Steelmaking v 2 n 4 1975 p 295-298
An attempt is made to highlight the areas in large reheating furnaces where energy can be saved. These are: (i) heat-to-stock, (ii) water-cooling losses, and (iii) waste-gas losses. Each of these areas is discussed in some detail together with ways in which savings are currently being made and also possibilities for conserving energy. These fall into three basic categories: (i) better control of the equipment in relation to furnace temperature, fuel flows, and furnace pressure to achieve optimum results from varying outputs and loading patterns; (ii) the provision of good and easy to install insulation of beams and skids combined with steam-raising systems such as evaporative cooling; and (iii) waste-heat recovery by means of recuperation of the air for combustion and waste-heat boilers to provide steam to the works system. 15 refs.

Print 53/5/1-411
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ID NO.- EI760319688 619688
ENERGY USE IN MILL AREAS.
Smithson, D. J.; Sheridan, A. T.
Br Steel Corp, Swinden Lab, Rotherham, Engl
DESCRIPTORS- (*ROLLING MILL PRACTICE, *Soaking Pits), FUEL ECONOMY, (FURNACES, Heating),
CARD ALERT- 535, 521, 532, 642
CODEN- IMKSB7 SOURCE- Ironmaking Steelmaking v 2 n 4 1975 p 286-294
Soaking pits and reheating furnaces are the predominant consumers of energy in the mill area. Attention is focused on the improved thermal efficiency of soaking pits obtained by correct charging temperatures and good scheduling, and current developments are reviewed. Improved output rates from reheating furnaces have been achieved at the expense of thermal efficiency, and development work on reducing heat losses and the better control of large furnaces leading to improved thermal efficiency are discussed. Electrical heating methods have been applied to reheating for rolling and examples are given to highlight the advantages gained. 24 refs.

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ID NO.- EI760212572 612572
COMPUTER CONTROLLED REHEATING FURNACES OPTIMIZE HOT STRIP MILL PERFORMANCE.
Hollander, F.; Huisman, R. L.
K Ned Hoogovens en Staalfabr, IJmuiden, Neth
DESCRIPTORS- (*ROLLING MILLS, *Fuel Economy), (FURNACES, HEATING, Computer Applications), IRON AND STEEL PLANTS,
CARD ALERT- 535, 521, 532, 642, 723, 545
SOURCE- Effic Use of Fuels in the Metall Ind, Symp, Pap, Ill Inst Technol Res Inst, Chicago, Dec 9-13 1974 p 335-381. Publ by Inst of Gas Technol, Chicago, Ill, 1975
The hot strip mill computer control system at Holland's Hoogovens optimizes furnace capacity as well as fuel consumption, while providing optimum rolling performance. Computer control of the reheat furnace contributes more to total hot strip mill efficiency than can be achieved through the installation of additional heating capacity. 6 refs.

ID NO.- EI760317094 617094
FURTHER THOUGHTS ON ENERGY SAVING IN REHEATING FURNACES.
Harrison, G.
Salem Eng Co, Milford, Derby Engl
DESCRIPTORS- *FURNACES, HEATING, FUEL ECONOMY,
CARD ALERT- 532, 642, 521
CODEN- IMKSB7 SOURCE- Ironmaking Steelmaking v 2 n 4 1975 p 299-301
To obtain substantial fuel savings in the walking-beam furnace $EM DASH$ which is the reheating furnace of the present and near future because of features which are not possible in pusher furnace $EM DASH$ something will have to be done to substitute much of the water-cooled elements by either metal or ceramics. If rolling can be carried out at 1150 $degree$ C because of absolute uniformity in the reheating process, it may be better to think in terms of using metal construction in certain parts of the furnace. Walking-beam furnaces are used in the tube-making industry and working successfully heating the stock to 1125 $degree$ C on metallic beams.

ID NO.- EI760209714 609714
DESIGN AND OPERATION OF REHEAT FURNACES $EM DASH$ ENERGY ORIENTED.
Hovis, James E.
Bloom Eng Co, Pittsburgh, Pa
DESCRIPTORS- (*FURNACES, HEATING, *Fuel Economy), (ROLLING MILL PRACTICE, Hot Rolling), (STEEL INGOTS, Heating),
CARD ALERT- 532, 642, 521, 545, 534
SOURCE- Effic Use of Fuels in the Metall Ind, Symp, Pap, Ill Inst Technol Res Inst, Chicago, Dec 9-13 1974 p 479-498. Publ by Inst of Gas Technol, Chicago, Ill, 1975
Reheat furnaces consume a large portion of the industrial load distribution to heavy steel and of the self-generated by-product sources of energy. The reheats on a modern vintage hot strip mill may use in the range of 8 to 10 billion cubic foot/year of natural gas or equivalent, dependent upon production levels. This paper considers first what can be done to reduce energy consumption in the present day reheat furnaces, and then offers an energy oriented approach to future designs.

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ID NO.- EI750959030 559030
EFFECTIVE HEATING PRACTICE FOR FORGING $EM DASH$ 2.
Hovis, James e.
Bloom Eng Co, Pittsburgh, Pa
DESCRIPTORS- *FURNACES, HEATING, FORGING,
CARD ALERT- 535, 532, 642
CODEN- INHTAZ SOURCE- Ind Heat v 42 n 4 May 1975 p 17-22
In this concluding part, batch and continuous type slot furnaces along with the type and arrangement of their burners are described in relation to effective heating of steel to forging temperatures.

ID NO.- EI750959031 559031
EFFECTIVE HEATING PRACTICE FOR FORGING $EM DASH$ 1.
Hovis, James E.
Bloom Eng Co, Pittsburgh, Pa
DESCRIPTORS- *FURNACES, HEATING, FORGING,
CARD ALERT- 535, 532, 642
CODEN- INHTAZ SOURCE- Ind Heat v 42 n 3 Mar 1975 p 14-16, 18
Principles of radiation heating for upset forging are presented and then batch-type and continuous-slot-type furnace design, including types of burners and their arrangements, are described in relation to efficient heating and product quality.

ID NO.- EI750959033 559033
EXPERIENCES WITH SKID INSULATION IN REHEAT FURNACES.
Nabors, T. L.
Repub Steel Corp, Cleveland, Ohio
DESCRIPTORS- (*FURNACES, HEATING, *Fuel Economy), (ROLLING MILL PRACTICE, Hot Rolling),
CARD ALERT- 535, 532, 642
CODEN- INHTAZ SOURCE- Ind Heat v 42 n 3 Mar 1975 p 68-81
Because most of the natural gas and fuel oil purchased by Republic Steel is used to reheat steel and generate steam, first priority was given to conservation efforts through increased efficiencies in reheat furnaces and boilers. The improved program of skid pipe insulation in pusher-type, over- and under-fired slab and billet reheat furnaces has initiated Republic's goal of maintaining a 75% to 80% insulation coverage program. Fuel conservation accomplishments are noted in this article which is from a paper presented at a conference on fuel efficiency in industry, held at The Pennsylvania State University, University Park, Pa. , in April, 1974.

ID NO.- EI740419790 419790
METHODS OF HEATING IN ROLLING MILLS AND FORGES.
Ullrich, Walter
DESCRIPTORS- *FURNACES, METALLURGICAL,
CARD ALERT- 532, 545, 642
CODEN- WWINAZ SOURCE- Wire World Int v 15 Double n 2 Mar-Apr 1973 p 45-49
A general discussion of the characteristics of furnaces for rapid heating of semiproducts of steel to forging or rolling temperatures is followed by a comparison of the relative advantages and disadvantages of fuel-heated vs induction furnaces.

B-XVIII. 332 and 336 - FOUNDRIES - FERROUS AND NON-FERROUS

ID NO.- EI760103053 603053
FERNWAERMEVERSORGUNG AUS KRAFT-WAERME-KUPPLUNG UND ABWAERME EINES HUETTENWERKES. $left bracket$ Remote Heating from Energy-Heat Combination and Waste Heat of a Foundry $right bracket$.
Buehl, Ernst; Ussar, Max B.
Krupp, Bochum, Ger
DESCRIPTORS- (*INDUSTRIAL HEATING, *Waste Heat Utilization), FOUNDRIES, Waste Heat Utilization), FUEL ECONOMY,
CARD ALERT- 642, 534, 521
CODEN- BHMMAM SOURCE- Berg Huettenmaenn Monatsh v 120 n 9 Sep 1975 p 436-443
Energy conservation and environmental protection through use of relatively inexpensive sources is discussed. Supply and demand coordination is analyzed, and economic workability is emphasized. Diagrams, curves, and tables show data. 8 refs. In German with English contents.

ID NO.- EI740848728 448728
EFFECTIVE USE OF ENERGY IN THE FOUNDRY.
Davies, I.
DESCRIPTORS- *FURNACES, ELECTRIC, FOUNDRY PRACTICE, (FURNACES, Heat Treatment),
CARD ALERT- 532, 642, 534, 537
CODEN- FUTJAD SOURCE- Foundry Trade J v 136 n 2995 May 2 1974 p 483-486
Care should be taken to minimize heat loss from the surface of molten metal held in the furnace and means taken to cut down emission of heat from the shell. Improved materials handling equipment and adding cranes can speed up charging time and reduce pouring time. Recommendations for energy saving are included for heat-treating furnaces.

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ID NO.- EI750101407 501407
RECUPERATOR REDUCES CUPOLA COSTS.
Anon
DESCRIPTORS- *CUPOLA PRACTICE, WASTE HEAT UTILIZATION,
CARD ALERT- 534, 616
CODEN- FNMTBS SOURCE- Foundry Manage Technol v 102 n 10 Oct 1974 p 88, 91
A heat recuperator system saved 20% on energy costs, increased cupola melt rate 20%, recovered 50% of waste heat from the cupola, and saved an estimated $8500 as compared to cost of a fuel-generated hot blast. Hot gases are first cooled from 1600 $degree$ F to 1200 $degree$ F by a water spray, pass through a cyclone where 65% of dust particles are removed and then through the recuperator where 50% of usable heat is extracted from the gas.

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ID NO.- EI740741152 441152
ABWAERMENUTZUNG BEI INDUKTIVEN SCHMELZANLAGEN. $left bracket$ Waste Heat Utilization in Induction Melting $right bracket$.
Schwindt, Heinz Juergen
DESCRIPTORS- (*FURNACES, MELTING, *Waste Heat Utilization), INDUSTRIAL HEATING, ELECTRIC HEATING, INDUCTION, FOUNDRIES,
CARD ALERT- 532, 534, 642
CODEN- ELWIBK SOURCE- Elektrowaerme Int v 32 n B2 Apr 1974 p B78-B82
The author deals with the fundamentals of waste heat utilization in induction melting plant employed in foundries and presents a number of solutions. The examples cited show that apart from power savings, waste heat utilization offers further advantages such as savings in the requirements of make-up water and reductions in the discharge of waste water. In German with English abstract.

B-XIX. WASTE HEAT KILNS

ID NO.- EI751171770 571770
WASTE HEAT UTILIZATION FOR SPRAY DRYERS.
Lee, David A.
Nichols Eng & Res Corp, Belle Mead, NJ
DESCRIPTORS- (*CERAMIC PLANTS, *Waste Heat Utilization), DRYERS, (FURNACES, INDUSTRIAL, Waste Heat Utilization),
CARD ALERT- 642, 812
CODEN- ACSBA7 SOURCE- Am Ceram Soc Bull v 54 n 9 Sep 1975 p 790-791
Possible methods of waste heat utilization from ceramic kilns for spray dryers are discussed. Spray dryers have to be modified to use available waste heat. The predominant method has been the direct use of off-gases from some waste heat source. Examples of how this can be done are presented. 5 refs.

ID NO.- EI760317847 617847
RECUPERO DEL CALORE DI SCARICO DAI FORNI A TUNNEL PER CERAMICA. $left bracket$ Waste Heat Recovery from Ceramic Tunnel Kilns $right bracket$.
Ferrari, Pietro; Gaia, Mario
Politec di Milano, Italy
DESCRIPTORS- (*KILNS, *Waste Heat Utilization),
CARD ALERT- 642, 643
CODEN- TERMAK SOURCE- Termotecnica (Milan) v 29 n 2 Feb 1975 p 90-93
Up to 10-12% of waste heat from ceramic tunnel kilns can be recovered as electric power by means of an organic vapor cycle. Heat rejected from condenser is in turn utilized in low temperature air driers. Heat recovery confined to the discharge end of ware is also considered. In Italian.

ID NO.- EI730522319 322319
WIRTSCHAFTLICHE BETRACHTUNGEN ZUR AUSNUTZUNG DER KUEHLWAERME BEI KERAMISCHEN BRENNOEFEN. $left bracket$ Economic Investigations of the Utilization of Cooling Heat Available in Operation of Ceramic Kilns $right bracket$.
Gatzke, H.
DESCRIPTORS- (*CERAMIC PLANTS, *Kilns), (KILNS, Waste Heat Utilization),
CARD ALERT- 616, 642, 812
CODEN- KERZAS SOURCE- Keram Z v 25 n 2 Feb 1973 p 76-78
Heat balance of an intermittently operating kiln is compared with that of a continuous tunnel kiln, with and without the drawing off the heat from the cooling zone. Nowadays some of this heat is recycled into the firing zone and the remainder is used for drying. A suitable heat recirculation system can achieve fuel savings of up to 30%. Paper presents graphically heat recirculation systems for various kiln configurations. In German.

ID NO.- EI750638777 538777
FACTORS AND FIELD EXPERIENCES IN IMPROVING FUEL EFFICIENCY IN TUNNEL KILNS.
Pfister, Georg
Keller Corp, Hatfield, Pa
DESCRIPTORS- *KILNS,
CARD ALERT- 642
CODEN- ACSBA7 SOURCE- Am Ceram Soc Bull v 54 n 3 Mar 1975 p 311
The fuel consumption of a brick plant is measured in Btu/lb of fired ware or in ft**3 gas/1000 brick. The correct measurement would be Btu consumption/lb of ware which is actually sold. If a plant consumes 1300 Btu/lb of fired ware and 5% or more of its brick must be discarded, the actual consumption of fuel for salable brick is 1368 Btu/lb. Thus, improving the quantity of salable brick improves the Btu consumption. Today, the situation is somewhat unusual in that total fuel availability may require a sacrifice in quality when daily fuel consumption must be kept to a required minimum. Field experience at numerous brick plants has indicated areas where improvements can usually be made.

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ID NO.- EI741277605 477605
METHOD OF DETERMINING ECONOMICAL INSULATIONS FOR KILNS.
Anon
DESCRIPTORS- *HEAT INSULATING MATERIALS, KILNS, FUEL ECONOMY,
CARD ALERT- 413, 642, 521
CODEN- INHTAZ SOURCE- Ind Heat v 41 n 8 Aug 1974 p 53-58
Procedures for determining installation and the cost of insulating materials, and the value of the energy saved, are evaluated. Charts are utilized to show the economic amount of insulation for a steam pipe; a typical case history which cites insulation thickness, cost and heat saved and the resistance and cost effectiveness of insulating refractories.

B-XX. HEAT RECOVERY POWER GENERATION

ID NO.- EI741279548 479548
COORDINATED APPROACH TO INDUSTRIAL ENERGY SYSTEMS DESIGN.
Elmenius, Lars; McConnell, John E.
Stal-Laval Turbin, Finspong, Swed
DESCRIPTORS- (*PAPER AND PULP MILLS, *Accounting), POWER GENERATION, INDUSTRIAL HEATING, MATHEMATICAL TECHNIQUES, INDUSTRIAL ECONOMICS,
IDENTIFIERS- INDUSTRIAL ENERGY SYSTEMS
CARD ALERT- 615, 642, 811, 911, 921
SOURCE- TAPPI Eng Conf, Pap, Seattle, Wash, Oct 21-24 1974 Pap 12-2, p 201-210. Publ by TAPPI, Atlanta, Ga, 1974
The paper describes easily applied means developed by the authors of more effectively evaluating dual energy systems (electrical and thermal). By introducing factors which measure the kW-hours generated for each million BTU required for thermal energy demand, the authors are able to show the effects of such considerations as: changing inlet conditions, selecting pressures for process equipment, selecting feedwater heaters, changing turbine generator design and flow characteristics, examining the alternatives of motor drives or mechanical drives for various equipment, and examining combined gas and steam turbine cycles. The paper shows the convenience of calculating using the new factors as calculation tools and demonstrates how the factors called $left double quote$ Byproduct Power Rate $right double quote$ and $left double quote$ Power Rate $right double quote$ can help industrial power system designers and process engineers to better coordinate their selection of power and process apparatus. 5 refs.

ID NO.- EI730418612 318612
IMPORTANCE OF, AND PROSPECTS FOR, COMBINING POWER GENERATION WITH INDUSTRY ON THE BASIS OF INDUSTRIAL USE OF HEAT.
Semenenko, N. A.; Sidel'kovskii, L. N.
Moscow Power Inst, USSR
DESCRIPTORS- *INDUSTRIAL HEATING, (ELECTRIC POWER PLANTS, Efficiency HEAT TREATMENT, (IRON AND STEEL PLANTS, Refractory Materials),
CARD ALERT- 532, 537, 545, 642
CODEN- THENAD SOURCE- Thermal Eng v 18 n 12 Dec 1971 p 79-83
The authors discuss possible ways of increasing the effectiveness of the use of energy resources by improving the combination of power generation with the industrial use of heat. presently 30% of fuel fired in boilers and ovens and 2-25% of electrical power produced in the USSR are used for industrial heat treatment, with very low efficiency. Ways to improve the recovery of heat in smelting furnaces, and especially on the basis of heat treatment of fine granular changes in cyclones are discussed. The development of a power generating and processing unit, an important element of which is a self-restoring furnace lining of the converter, is proposed. The future combined use of heat for power generation and treatment of materials on a large scale is envisaged.

B-XXI. RECUPERATORS AND REGENERATORS

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ID NO.- EI760102616 602616
EVALUATION OF BALANCED PRESSURE AIR/FUEL RATIO CONTROL FOR A RECUPERATIVE BURNER SYSTEM.
Shefsiek, Paul
Holcroft & Co, Livonia, Mich
DESCRIPTORS- (*FUEL BURNERS, *Control), WASTE HEAT UTILIZATION, AIR PREHEATERS,
CARD ALERT- 521, 616, 643
CODEN- INHTAZ SOURCE- Ind Heat v 42 n 10 Oct 1975 p 22-24, 26, 28
Analytical and quantitative evaluation is made of a recuperator-burner system controlled by a balanced pressure system. It is argued that the first requirement for such a system is to adjust to minimum excess air at the highest furnace temperature and at the highest fuel flow rate which will ever be required. It is concluded that, if properly used, a balanced pressure system can serve as a safe, inexpensive system for controlling air/fuel ratio in a recuperator-burner system with little deviation in fuel savings from the ideal mass balance control systems.

ID NO.- EI760210445 610445
STATE OF THE ART $EM DASH$ REGENERATIVE AND RECUPERATIVE HEAT RECOVERY.
McChesney, Herbert R.
Br Steel Corp, London, Engl
DESCRIPTORS- (*IRON AND STEEL PLANTS, *Fuel Economy), (FURNACES, METALLURGICAL, Waste Heat Utilization),
CARD ALERT- 545, 521, 616
SOURCE- Effic Use of Fuels in the Metall Ind, Symp, Pap, Ill Inst Technol Res Inst, Chicago, Dec 9-13 1974 p 71-109. Publ by Inst of Gas Technol, Chicago, Ill, 1975
The role that energy plays in a modern integrated steelworks is reviewed and improved processes for reducing the overall specific energy consumption in the production of steel are briefly discussed. In particular, it is shown that more efficient waste heat recovery using improved regenerators and recuperators can play a significant part in this effort. Modern methods of heat recovery are discussed in relation to the limitations of their energy recovery capabilities and their general operational characteristics. Research and development by the British Steel Corporation's Corporate Engineering Laboratory on improved waste heat recovery plant is described and both the details and potential benefits of a new ceramic recuperator operating with waste gas temperatures up to 1300 $degree$ C are given. 12 refs.

ID NO.- EI750535057 535057
ATERLUFTFORING. $left bracket$ Exhaust Air Recuperation $right bracket$.
Olander, Lars
Arbetsmedicinska Avd, Swed
DESCRIPTORS- *WASTE HEAT UTILIZATION,
CARD ALERT- 643
CODEN- VVSTAH SOURCE- VVS Tidskr Vaerme Vent Sanit Kyltetek v 45 n 8 Aug 1974 p 53-56
The possibility of recuperation of industrial exhaust air as a potential alternative to energy conservation is examined. The principal inherent problem $EM DASH$ i. e. , efficient control of gaseous and solid pollutants present in waste air $EM DASH$ is discussed in detail. 1 ref. In Swedish.

ID NO.- EI751173679 573679
RECUPERATORS HELP INDUSTRY CONSERVE ENERGY.
Heyn, Fred M.
Kleinewefers Corp, Krefeld, Ger
DESCRIPTORS- (*FURNACES, INDUSTRIAL, *Recuperators), FUEL ECONOMY,
CARD ALERT- 642, 616, 521
CODEN- PCMEBG SOURCE- Precis Met v 33 n 9 Sep 1975 p 50-53
Industrial furnaces discharge a large portion of the total fuel input into the atmosphere. Recuperators are now being successfully used to reduce fuel usage by recovering part of this waste heat. The principle of the recuperator fuel saving capabilities is explained, and the evaluation, operating parameters and type of equipment that are necessary for recuperation in new and existing furnaces are discussed.

ID NO.- EI750852138 552138
PRISPEVEK K OTAZCE KONSTRUKCE KONVEKCNICH TRUBKOVYCH REKUPERATORU. $left bracket$ Design of Convection Tube Recuperators $right bracket$.
Bulina, Vladimir
Zelezarny a Strojirny, Ostrava-Vitkovice, Czech
DESCRIPTORS- *FURNACES, HEATING,
CARD ALERT- 532, 642
CODEN- HUTLA7 SOURCE- Hutn Listy v 30 n 2 1975 p 108-113
Reference is made to the author's 1972 paper dealing with the design and construction of convection tube recuperators in continuous reheating furnaces. Results of new theoretical and laboratory investigations are reported. Using these results, a prototype recuperator has been built with the aim of raising the thermal efficiency of the continuous heating furnace. In Czech.

ID NO.- EI760209915 609915
WASTE HEAT UTILIZATION THROUGH THE USE OF HEAT PIPES.
Basiulis, A.; Plost, M.
Hughes Aircr Co, Torrance, Calif
DESCRIPTORS- (*HEAT PIPES, *Waste Heat Utilization), HEAT TRANSFER,
CARD ALERT- 641
CODEN- ASMSA4 SOURCE- ASME Pap n 75-WA/HT-48 for Meet Nov 30-Dec 4 1975, 5 p
Heat pipes can be effectively used to recover heat in a variety of applications. Some of the potential applications are: temperature control in a methanation reaction, plume control in sulfur scrubbers, and conservation of fuel in gas turbines. In each case, waste energy is recovered and used to control a process, to provide free heat, or simply improve the efficiency of a system. Heat pipes provide the waste heat recovery system designer with viable alternatives to existing heat transfer techniques and heat exchangers. 7 refs.

ID NO.- EI760209916 609916
HEAT PIPE THERMAL RECOVERY UNITS.
Ruch, Michael A.
Q-dot Corp, Dallas, Tex
DESCRIPTORS- (*HEAT PIPES, *Waste Heat Utilization),
CARD ALERT- 641, 643
SOURCE- Intersoc Energy Convers Eng Conf, 10th, Rec, Univ of Del, Newark, Aug 18-22 1975 Pap 759220 p 1507-1510. Publ by IEEE (Cat n 75CHO 983-7 TAB), New York, NY, 1975
The heat pipe is an evaporation/condensation device which can transfer large quantities of heat with very small temperature differences. Three general classes of applications can be identified: (1) using energy recovered from process exhaust to regenerate the process; (2) using energy from process exhaust to heat comfort make-up air during the winter months; and (3) using comfort exhaust to preheat comfort make-up air during the winter months and/or precool comfort make-up air during the summer months. Installations of each class are described.

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ID NO.- EI760209917 609917
HIGH TEMPERATURE HEAT PIPES FOR ENERGY CONSERVATION.
Basiulis, A.; Johnson, J. H.
Hughes Aircr Co, Torrance, Calif
DESCRIPTORS- (*HEAT PIPES, *Waste Heat Utilization),
CARD ALERT- 641, 643
SOURCE- Intersoc Energy Convers Eng Conf, 10th, Rec, Univ of Del, Newark, Aug 18-22 1975 Pap 759221 p 1511-1515. Publ by IEEE (Cat n 75CHO 983-7 TAB), New York, NY, 1975
This paper examines five basic heat exchanger approaches to high temperature heat recovery. The operating principles of each approach are shown along with their relative advantages and disadvantages. The conclusions drawn are that the heat pipe and plate-fin type heat exchangers offer superior performance for high temperature operation. Of these two, the heat pipe exchanger has lower pressure drops and all welded construction so that it is shown to have greater potential for future applications. 5 refs.

B-XXIII. MISCELLANEOUS TECHNOLOGY

ID NO.- EI760100269 600269
AIR/FUEL RATIO CONTROL WITH PREHEATED AIR.
Thekdi, Arvind C.
Midland-Ross Corp, Toledo, Ohio
DESCRIPTORS- *AIR PREHEATERS, (FURNACES, Waste Heat Utilization), (FUEL BURNERS, Control), FUEL ECONOMY,
IDENTIFIERS- HEAT RECUPERATORS, HEAT REGENERATORS
CARD ALERT- 616, 532, 534, 535, 537, 642
CODEN- INHTAZ SOURCE- Ind Heat v 42 n 10 Oct 1975 p 13-15, 17-20
Recovery of waste heat in flue gases by preheating combustion air is considered. The use of pre-heated air can save 10 to 35% fuel in most furnaces. The article discusses the necessity of a properly designed air/fuel ratio control system and several methods available for the ratio control. It explains how a newly developed ratio regulator can satisfy the need of current requirements of the preheated air combustion systems. This is necessary because the use of conventional air/fuel ratio control system with preheated air applications may result in reduced efficiency and one may not realize all the fuel savings offered by the use of preheated air.

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ID NO.- EI751175530 575530
NEW HEAVY RIG AIMS FOR FAST MOVES IN NORTH SLOPE'S PRUDHOE BAY FIELD.
West, Jim
DESCRIPTORS- (*OIL WELL DRILLING, *Rigs), (OIL FIELDS, Alaska), WASTE HEAT UTILIZATION,
CARD ALERT- 511, 512, 616
CODEN- OIGJAV SOURCE- Oil Gas J v 73 n 37 Sep 15 1975, 5 p between p 140 and 153
This article describes Nabors Alaska Drilling Inc's Rig 18-E, a $6-million unit rated to 26,000 ft, which travels in wheel-mounted complexes to allow pad-to-pad mves in 48 hr. The rig is designed to speed moves between development locations and to conserve energy by using all waste heat generated by its prime movers. Design, major components, substructure, as well as pump and power complexes of the rig are discussed.

ID NO.- EI751070603 570603
LIQUID COUPLED SYSTEM FOR HEAT RECOVERY FROM EXHAUST GASES.
Strindehag, O.
DESCRIPTORS- (*VENTILATION, *Exhausts), HEAT EXCHANGERS, COMPUTER PROGRAMMING, WASTE HEAT UTILIZATION,
IDENTIFIERS- HEAT RECOVERY, ENERGY SAVING
CARD ALERT- 616, 643, 723
CODEN- BSVEAI SOURCE- Build Serv Eng v 43 Jun 1975 p 52-56
The basic equations for the technical optimization are given, and a computer program is described which gives the optimum liquid flow, the temperature efficiency and the pressure drops for three sizes of supply and exhaust air heat exchangers. Also described is a sub-program, which can be used for calculation of the energy saving per year for different system efficiencies. The procedure for figuring out the profitability of the various alternatives is discussed. 5 refs.

ID NO.- EI740741391 441391
ENERGIEEINSPARUNG DURCH WAERMEPUMPEN. $left bracket$ Energy Savings by Using Heat Pumps $right bracket$.
Trenkowitz, G.
BBC-York, Mannheim, Ger
DESCRIPTORS- *HEAT PUMP SYSTEMS, (REFRIGERATION, Waste Heat Utilization), (AIR CONDITIONING, Waste Heat Utilization),
CARD ALERT- 644, 643
CODEN- KLKIAP SOURCE- Klim Kaelte Ing v 2 n 4 Apr 1974 p 155-162
The basics of designing and planning heat pumps are explained. Some examples are given showing the remarkable reduction in energy consumption if the heat pump principle is applied in an optimum manner and if the heat yield on the condenser side of the refrigeration side is properly used. It is suggested that before the construction of any refrigeration plant possible utilization of any heat produced should be considered to save energy. In German.

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ID NO.- EI751064679 564679
PUT COMPRESSOR WASTE HEAT TO WORK.
Lohse, Don; Taft, Gordon
Joy Manuf Co
DESCRIPTORS- (*COMPRESSORS, *Waste Heat Utilization),
CARD ALERT- 618, 643
CODEN- POWEAD SOURCE- Power v 119 n 8 Aug 1975 p 34-35
The heat going to a compressor in the form of brake horsepower of the prime mover is largely recoverable. To get an idea of the amount, multiply the horsepower by 42 to get Btu/min. This rule holds for all types of compressors $EM DASH$ recip, centrifugal, rotary sliding vane, and rotary-screw, whether air- or water-cooled, single or multistage. Water has been the most common cooling medium for compressors over the years. Water-cooled machines, are often considered heavy-duty units, and air-cooled units are thought to be light-duty. In the cases of air-cooled, oil-flooded, rotary-screw compressors, or water-cooled recips modified for air cooling, however, air-cooled packaged compressors are now feasible for heavy-duty industrial use. Air-cooled compressors have fans that blow ambient air over radiator-type heat exchangers, and this warmed air is readily available to heat any large space. Water-cooled compressors can also serve for space heating. The recommended discharge temperature for cooling water from a reciprocating compressor is 110-120F, and the equation for water flow in gpm at 120F is: compressor bhp $multiplied by$ 42 Btu/min/bhp divided by water-temperature rise $multiplied by$ 8. 33. For a 100-hp compressor and 60F water leaving at 120F, the flow is 8. 4 gpm. The hot water can be piped to the use point, circulated through a commercial water-to-air fan-cooled heat exchanger, and returned as cool water. Some saving on water and sewage bills is possible with this arrangement.

ID NO.- EI750963449 563449
UTILIZATION OF WASTE HEAT FROM QUENCHING OPERATIONS.
Anon
DESCRIPTORS- *WASTE HEAT UTILIZATION, (HEAT TREATMENT, Quenching),
CARD ALERT- 537, 643, 616
CODEN- INHTAZ SOURCE- Ind Heat v 42 n 4 May 1975 p 34-35, 38

Commonwealth Industries in Detroit, one of the nation's largest heat treating operations, saves $6000 annually in heating bills by using rejected Btu's from two oil coolers to warm the warehouse and loading docks. The two closed-cycle coolers themselves eliminate over $5000 in water costs. Heat generated from treating about one million lb of metal products per day in eight furnaces keeps most of this plant's 4200-sq-ft warm. Using the same oil coolers that serve quench oil tanks on two furnaces, loading dock and warehouse areas are heated. The only additional cost is for the duct work. Fans convect heated air from cooling section through duct work to both areas. Temperature can be controlled by varying fan speed or employing twice-through heating.

Evaluation of the Fluidized Bed Combustion Process. Volume III. Appendices

Westinghouse Research Labs., Pittsburgh, Pa. (376 670)
AUTHOR: Archer, D. H., Keairns, D. L., Hamm, J. R.
C0122I3 FLD: 7A, 13B, 13A, 68A, 59B, 69A, 67B USGRDR7302
15 Nov 71 1013p*
CONTRACT: CPA-70-9
MONITOR: APTD-1167
See also Volume 2, PB-212 960.

ABSTRACT: The results of the evaluation of fluidized bed combustion for steam/power generation are presented in the three-volume report. The research concerns two fluidized bed fuel processing systems which should meet both market requirements and air pollution abatement requirements and are likely to be cheaper than alternative, conventional systems. Volume III contains the following detailed backup reports: Electric utility and Industrial boiler market survey; Development of fluidized bed combustion boilers; Industrial boiler design report; Turndown techniques for atmospheric fluidized bed boilers; Dynamics of atmospheric fluidized bed boilers; Optimization of heat trap system cost; Pressurized boiler design report; Regeneration/sulfur recovery system cost; Pressurized boiler combined cycle plant report; Atmospheric-pressure boiler design report; Boiler burner for low Btu gas; Gas turbine corrosion, erosion, and fouling; and Stack gas cooler design.

DESCRIPTORS: (*Electric power plants, Air pollution control equipment), (*Boilers, Fluidized bed processors), (*Fluidized bed processors, *Desulfurization), (*Air pollution control equipment, Fluidized bed processors), (*Coal, Fluidized bed processors), (*Fuel oil, Desulfurization), (*Air pollution, *Combustion products), Electric utilities, Market research, Design, Heat recovery, Cost estimates, Dolomite(Rock), Industrial engineering, Chemical engineering, Flue gases, Regeneration(Engineering), Furnaces, Gasification, Engineering drawings, Gas burners, Cooling systems

IDENTIFIERS: *Air pollution control, *Waste gas recovery, *Lime stone injection, Sulfur containing fuels, Gas turbine combustors

PB-213 152/2 NTIS Prices: PC$13.00/MF$0.95

File6, COPR. by N.T.I.S. User 244 Page 26 (Item 27 of 39)

Trends and New Developments in High Temperature Air Preheat Equipment

BISRA-The Corporate Labs. of the British Steel Corp., London (England). Plant Engineering Dept.
AUTHOR: Winkworth, D. A., Blundy, R. F.
C0412K1 FLD: 13A, 69A USGRDR7306
Oct 72 25p
REPT NO: BISRA-PE/A/23/72
MONITOR: 18

ABSTRACT: The report covers two heat recovery projects which are currently under development at the Corporate Laboratories. Previous world-wide developments in ceramic recuperators are surveyed and a brief summary is given on the progress made to date on the Corporate Laboratories design for a soaking pit application. The thermal design for a compact ceramic regenerator for a soaking pit is given and the potential advantages indicated. Both projects are intended to be a basis for a wide range of heat recovery applications within the steel industry. (Author)

DESCRIPTORS: (*Regenerators, Ceramics), (*Soaking pits, Regenerators), (*Heat recovery, Iron and steel industry), Heat exchangers, Design, Great Britain

PB-214 217/2 NTIS Prices: PC$3.00/MF$0.95

File6, COPR. by N.T.I.S. User 244 Page 21 (Item 22 of 39)

Disposal of Waste Heat

Department of the Interior, Washington, D.C. (109 950)

Patent
AUTHOR: Cywin, Allen
C1805H2 FLD: 13B, 68D, 91A, 90H USGRDR7323
Filed 28 Jan 71, patented 25 Sep 73 4p
REPT NO: PAT-APPL-110 430, PATENT-3 760 868
MONITOR: DOCKET/FWQ-1691
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

ABSTRACT: The patent concerns an invention to utilize a domestic water distribution system and its associated ground mass as a heat sink for waste heat produced by industrial processes to keep it from reaching the environment. Domestic water is used as a cooling medium to absorb waste heat produced by industrial processes. Heated domestic water is then passed to a municipal water distribution system to thereby utilize the distribution system and the surrounding ground mass as a heat sink.

DESCRIPTORS: (*Industrial water, *Heat recovery), (*Cooling water, Heat recovery), (*Patents, Heat recovery), Water pollution, Abatement, Heating equipment, Communities, Urban areas

IDENTIFIERS: PAT-CL-1651-1, *Thermal pollution, Water pollution abatement, GPINT

PB-223 794/9 NTIS Prices: Not available NTIS

File8, COPR. by Engineering Index User 244 Page 2 (Item 4 of 191)

ID NO.- EI760214053 614053
MULTI-VANE EXPANDER AS PRIME MOVER IN LOW TEMPERATURE SOLAR OR WASTE HEAT APPLICATIONS.
Eckard, Spurgeon E.
GE, Evendale, Ohio
DESCRIPTORS- *WASTE HEAT UTILIZATION, SOLAR ENERGY,
IDENTIFIERS- VAPOR EXPANDERS
CARD ALERT- 643
SOURCE- Intersoc Energy Convers Eng Conf, 10th, Rec, Univ of Del, Newark, Aug 18-22 1975 Pap 759204 p 1399-1405. Publ by IEEE (Cat n 75CHO 983-7 TAB), New York, NY, 1975
The development of a small rotary multivane expander which has the potential for a brake efficiency approaching 85% is discussed. Tests results are presented for two ranges of expander inlet temperature: 1) 180 to 250 $degree$ F which is consistent with the available temperature from flat plate solar collectors and from some waste heat sources; and 2) 400 to 600 $degree$ F which is consistent with the exhaust temperature of an internal combustion engine. 14 refs.

ID NO.- EI741280470 480470
HIGH TEMPERATURE CORROSION IN INCINERATOR HEAT RECOVERY UNITS.
Colby, G. R.
Air Preheater Co, Wellsville, NY
DESCRIPTORS- (*REFUSE INCINERATORS, *Corrosion),
CARD ALERT- 642, 539
SOURCE- NACE, Int Corros Forum, Chicago, Ill, Mar 4-8 1974 Prepr Pap 132, 6 p. Publ by NACE, Houston, Tex, 1974
Corrosion of superheater tubes in incinerators is accelerated by the presence of lead and zinc; alkalis are useful for reducing corrosion. The maximum metal temperature should be limited to about 650 F unless the units are designed in such a manner as to exclude the occurrance of locally reducing conditions in the flue gas. 8 refs.

File8, COPR. by Engineering Index User 244 Page 29 (Item 69 of 191)

ID NO.- EI750638287 538287
FORWARD BRANCHING SCHEME FOR THE SYNTHESIS OF ENERGY RECOVERY SYSTEMS.
Rathore, Ram N. S.; Powers, Gary J.
Carnegie-Mellon Univ, Pittsburgh, Pa
DESCRIPTORS- (*HEAT EXCHANGERS, *Waste Heat Utilization), WASTE HEAT UTILIZATION,
CARD ALERT- 616
CODEN- IEPDAW SOURCE- Ind Eng Chem Process Des Dev v 14 n 2 Apr 1975 p 175-181
A forward branching scheme is developed for the synthesis of heat exchanger networks. Nearly optimal networks can be discovered in relatively few enumerations using this scheme. A larger number of enumerations, which is still much smaller than that required for exhaustive search, is necessary to establish optimality. An upper bound on energy recovery is established and is used to measure the performance of each candidate network. An example is presented for a four-stream problem in which two streams are to be heated and two to be cooled. 13 refs.

File8, COPR. by Engineering Index User 244 Page 27 (Item 65 of 191)

ID NO.- EI750745154 545154
HOT GAS DUCTING, EXPANSION JOINTS AND DAMPERS: A CASE HISTORY.
Wadsworth, W. J.
Fern Eng Co, Buzzards Bay, Mass
DESCRIPTORS- (*GAS TURBINES, *Waste Heat Utilization), DRYING,
CARD ALERT- 612, 642, 802
CODEN- ASMSA4 SOURCE- ASME Pap n 75-GT-75 for Meet Mar 2-6 1975, 7p

A hot gas duct system is described where the exhaust gases from three gas turbines are directed through suitable ducts and dampers to allow the use of any combination of gas turbines with any combination of drying equipment in a process application. Specific problems with the original design and installation are discussed, as well as the design modifications made to overcome them. A list of features to look for to help assure a well designed hot gas ducting system is offered.

ID NO.- EI730630289 330289
OPTIMIZATASIYA PARAMETROV TEPLOUTILIZATSIONNOI USTANOVKI GTU KOMPRESSORNYKH STANTSII MAGISTRAL'NYKH GAZOPROVODOV. $left bracket$ Optimization of the Parameters of Heat Utilization Installations of Gas TTurbine Plants of Compressor Stations on Major Gas Pipelines $right bracket$.
Yurashchik, I. L.; Sazanov, B. V.
Moscow Power Engineering Inst, USSR
DESCRIPTORS- (*NATURAL GAS PIPELINES, *Compressor Stations), (TURBOMACHINERY, Waste Heat Utilization), THERMODYNAMICS, STEAM TURBINES, (HEATING, District),
CARD ALERT- 512, 522, 612, 617, 618, 641
CODEN- IVUZB5 SOURCE- Izv Vyssh Uchebn Zaved, Energ n 1 Jan 1973 p 96-103

Formulas are deducted for the determination of thermodynamic parameters of such proposed heat utilization installations equipped with district heating and condensing steam turbines. Results are presented of the optimization of such installations with the aid of a computer, depending on the temperature of the heating gases, condensation pressure, and the quantity of steam bleeding. In Russian.

B-XXIV. INDUSTRIAL BUILDINGS

Proceedings of the Conference on Energy Conservation in Commercial, Residential and Industrial Buildings Held at the Fawcett Center for Tomorrow, Ohio State University, Columbus, Ohio, May 5-7, 1974

National Science Foundation, Washington, D.C. Div. of Advanced Energy Research and Technology.*Ohio State Univ., Columbus. Dept. of Mechanical Engineering.*American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Cleveland, Ohio. Research Lab.*Association of Physical Plant Administrators of Universities and Colleges, Washington, D.C.
C4592R4 FLD: 10A, 13A, 21D, 97G*, 89* USGRDR7512
7 May 74 340p*
REPT NO: NSF/RA/N-74-123
MONITOR: 18
Prepared in cooperation with Ohio State Univ., Columbus. Dept. of Mechanical Engineering, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Cleveland, Ohio. Research Lab., and the Association of Physical Plant Administrators of Universities and Colleges, Washington, D.C.

ABSTRACT: Topics discussed are as follows: (1) Current Energy Conservation Test Projects, (2) Energy Conservation Methods and Associated Problems in Industry, (3) Problems of Energy Conservation in Existing Buildings, (4) Energy Conservation Methods in Buildings, (5) Computer Programs and System Simulations, (6) Future Changes in Codes and Buildings, and (7) Possible Research Projects in Energy Conservation in the Future.

DESCRIPTORS: *Energy conservation, *Meetings, *Buildings, Residential buildings, Commercial buildings, Industrial buildings, School buildings, Schools, Heat recovery, Electric utilities, Temperature control, Automatic control, Heat exchangers, Boilers, Computerized simulation, Solar heating, Building codes, Design standards, Fuel consumption, Electric power demand, Energy consumption, Proceedings

IDENTIFIERS: Retrofit devices, NTISNSFRA

PB-240 306/1ST NTIS Prices: PC$9.50/MF$2.25

Lighting and Thermal Operations. Energy Management Action Program for Commercial-Public-Industrial Buildings

Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
C5463L1 FLD: 13A, 10A, 97G, 89B USGRDR7525
Nov 74 59p
REPT NO: FEA/D-74/136
MONITOR: 18

ABSTRACT: Desirable targets for lighting and thermal operations are discussed, including guidelines for illumination levels, efficiency in lighting, and operating cooling and heating systems. Energy savings in selected buildings in areas of illumination, thermostat setting, building occupancy, and fan operation are given.

DESCRIPTORS: *Energy conservation, *Commercial lighting, *Industrial lighting, *Space heating, Illuminating, Commercial buildings, Industrial buildings, Office buildings, Hospitals, Air conditioning, Data

IDENTIFIERS: NTISEXPEA

PB-245 047/6ST NTIS Prices: PC$4.25/MF$2.25

ID NO.- EI71X183494 183494
Performance evaluation of a gas turbine drive industrial building cooling system
SUNDEEN EE
International Harvester Co, Chicago,%% Ill
DESCRIPTORS- (*GAS TURBINES, *Waste Heat Utilization), (AIR CONDITIONING, Power Supply), (REFRIGERATION, Industrial Applications),
CARD ALERT- 612, 643, 644
SOURCE- ASME Pap 71-GT-49 for meeting Mar 28-Apr 1 1971, 4 p
The test deals with an evaluation of a gas turbine drive refrigeration system after 4 yr of operation. Comparison is made of actual performance, operating, and maintenance costs with original system design concept, goals, and objectives.

File8, COPR. by Engineering Index User 244 Page 69 (Item 171 of 191)

ID NO.- EI71X007221 107221
Air conditioning by waste heat recovery
DESCRIPTORS- (*AIR CONDITIONING, *Waste Heat Utilization),
CARD ALERT- 643
CODEN- HVECA SOURCE- Heat Vent Eng, J Air Cond v 43 n 512 Mar 1970 p 441-3
The heat recovery scheme designed by the York division of Borg-Warner Ltd, collects the excess heat generated by the electronics in the Information Services Center by means of a heat exchange system incorporating a York split condenser chilling plant, to heat administrative offices in the two- story block. The York refrigeration equipment comprises three package liquid water cooling systems designed to cool 160 gal/min from 55 to 45 F in summer and to operate as a heat pump in winter. Ten free- standing fan- coil coolers provide local heat gains, while a central air conditioning plant handles overall fabric heat gains and losses and checks humidity and dry bulb temperatures.

File8, COPR. by Engineering Index User 244 Page 117 (Item 301 of 411)

ID NO.- EI740207421 407421
HEATING OF INDUSTRIAL BUILDINGS.
Davis, Willard J.
Rust Eng Co, Birmingham, Ala
DESCRIPTORS- (*INDUSTRIAL PLANTS, *Space Heating), (BUILDINGS, Space Heating), INDUSTRIAL HEATING,
CARD ALERT- 402, 642, 643
CODEN- ASHRAA SOURCE- ASHRAE J v 15 n 11 Nov 1973 p 40-44
A guide to underlying design principles for various industrial heating systems and equipment alternatives deals with exhaust requirements; makeup air; system and equipment selection; panel heating; unit, ducted and infrared heaters; and heat recovery. 13 refs.

B-XXV. WASTE HEAT GREENHOUSES SOLAR AND DESALINIZATION

ID NO.- EI760212677 612677
SEA WATER DESALINATION BY LOW TEMPERATURE WASTE ENERGY.
Saari, Risto; Huhta-Koivisto, Esko; Soderman, Jarmo; Perander, Robert
Nord-Aqua Oy, Helsinki, Finl
DESCRIPTORS- (*SEAWATER, *Salt Removal), (DESALINATION, Waste Heat Utilization), ENVIRONMENTAL PROTECTION,
CARD ALERT- 471, 445, 802, 901
SOURCE- World Energy Conf, 9th, Trans, Pap and Discuss, Detroit, Mich, Sep 23-27 1974 v 7 p 173-190. Publ by US Natl Comm of the World Energy Conf, New York, NY, 1975
Using waste heat at low temperature in the range of 20-40 $degree$ C which constitutes e. g. 2/3 of the energy released in condensing power plants has been developed in Finland and tested with a pilot plant producing 120 m**3/d and using cooling water from an oil refinery as feed water. Diagrams, plates, and tables show data. 6 refs.

ID NO.- EI750427985 527985
TRINKWASSER AUS FLUSSWASSER. $left bracket$ Drinking Water from River Water $right bracket$.
Hirschfeld, D.; Kupka, K. H.
DESCRIPTORS- (*WATER TREATMENT, *Waste Heat Utilization),
CARD ALERT- 445
CODEN- TMKWA3 SOURCE- Tech Mitt Krupp Werksber v 32 n 3 Oct 1974 p 131-136
A seawater desalination plant of the flash evaporation type was used for the production of drinking water from river water. The raw water was treated with a solution of sodium hypochlorite, a solution of sodium sulfite, and sulfuric acid. The distillate was bacteriologically acceptable and, after addition of a water hardening agent, suitable as drinking water. Waste heat from large industrial plants may be used for the process. In German.

ID NO.- EI750213953 513953
PRIMENENII KONTAKTNYKH TEPLOOBMENNIKOV V SKHEMAKH GAZOTURBINNYKH USTANOVOK DLYA VYRABOTKI PRESNOI VODY. $left bracket$ Use of Contact Heat Exchangers in Gas Turbine Plant Arrangements for the Production of Fresh Water $right bracket$.
Bukharkin, E. N.
All-Union Corresp Polytech Inst, USSR
DESCRIPTORS- (*WATER TREATMENT, *Salt Removal), (GAS TURBINE POWER PLANTS, Waste Heat Utilization), HEAT EXCHANGERS,
CARD ALERT- 445, 802, 612, 616
CODEN- TPLOA5 SOURCE- Teploenergetika n 10 Oct 1974 p 59-62
An analysis is given of the proposals published in literature on raising the efficiency of gas turbine plants by making use of contact heat exchangers yielding heat for water distillation. It is shown that the proposed methods are inefficient. A scheme is worked out for connecting the distilling contact heat exchanger immediately before the gas turbine. This arrangement ensures a substantial increase in the thermal efficiency of the plant. In Russian.

ID NO.- EI72X040663 240663
Multistage flash desalination utilizing diesel generator waste heat
WILLIAMS JS; HODGSON AS
Naval Civil Engineering Lab, Port Hueneme, Calif
DESCRIPTORS- (*SEAWATER, *Salt Removal), (WATER TREATMENT, Salt Removal), WASTE HEAT UTILIZATION,
IDENTIFIERS- MULTISTAGE FLASH DESALINATION
CARD ALERT- 445, 471
CODEN- IEPDA SOURCE- Ind Eng Chem, Process Des Develop v 10 n 4 Oct 1971 p 460-66
A multistage flash evaporator utilizing diesel generator waste heat has been developed for seawater desalination. After preliminary studies, a unit was constructed to operate continuously from a variable heat supply and produce between 2500 and 6000 gpd of freshwater. Interstage brine transfer is automatically regulated by level controllers in each stage, eliminating the need for manual control of the unit as the generator load and, hence, heat output varies. All- aluminum construction has reduced corrosion in relation to steel, and the unit has performed satisfactorily during tests. Experimental and design data are included.

File6, COPR. by N.T.I.S. User 244 Page 3 (Item 3 of 8)

Solar Energy for Process Steam Generation

Thermo Electron Corp., Waltham, Mass.*National Science Foundation, Washington, D.C. (348 650)
AUTHOR: Davis, Jerry P.
C4384B1 FLD: 13A, 97C USGRDR7509
25 Nov 74 40p
REPT NO: TE-5392-34-75
MONITOR: 18

ABSTRACT: The purpose of this one-month study was to assess, in a preliminary way, the performance and economic possibilities of process steam generation by the coupling of low temperature solar collectors (120-240F) producing low pre-sure saturated or wet steam to a fuel-driven diesel/compressor which compresses the steam to be desired final conditions (320F, 60 psig). The system concept is analogous to a heat pump, which extracts low temperature ambient heat, and raises its temperature to a useful level via mechanical work. The fuel required to power the diesel compressor is approximately 31% of the fuel which would have been required to produce the process steam in a direct-fired boiler. An economic evaluation of annual fuel savings, at $1.50/10 to the 6th power Btu fuel cost, to incremental investment required for $2/sq ft solar collectors or $4/sq ft solar collectors yielded 14% and 8% respectively.

DESCRIPTORS: *Steam electric power generation, *Boilers, Waste heat boilers, Steam, Compressing, Solar energy, Systems analysis, Economic analysis

IDENTIFIERS: Solar collectors, Solar thermal power plants, NTISNSP

PB-238 109/3ST NTIS Prices: PC$3.75/MF$2.25

File8, COPR. by Engineering Index User 244 Page 49 (Item 120 of 191)

ID NO.- EI730632343 332343
USE OF WASTE HEAT IN A SOLAR STILL.
Proctor, D.
CSIRO, Highett, Victoria, Aust
DESCRIPTORS- (*WATER TREATMENT, *Distillation), DISTILLATION, (SOLAR RADIATION, Collectors), (INTERNAL COMBUSTION ENGINES, Waste Heat Utilization),
IDENTIFIERS- SOLAR DISTILLATION, SOLAR STILLS
CARD ALERT- 445, 657, 802
CODEN- SRENA4 SOURCE- Solar Energy v 14 n 4 Mar 1973 p 433-449
System is described that makes it possible to use some of the waste heat of internal combustion engines to produce distilled water in solar stills. The solar still replaces the cooling tower, ponds, or radiators normally used to control the engine temperature. The diesel cooling water in such a system remains separate from the saline water in the solar still. The advantages of using such a system are compared with a conventional solar still. The influence of hot water production on the output of the waste heat solar still is discussed. 10 refs.

File8, COPR. by Engineering Index User 244 Page 54 (Item 133 of 191)

ID NO.- EI72X057790 257790
Waste heat use in greenhouses
VAN DER HORST JMA
DESCRIPTORS- *GREENHOUSES, (WATER POLLUTION, Waste Heat Effects), (POWER PLANTS, Waste Heat Utilization),
CARD ALERT- 453, 821
SOURCE- J Water Pollut Control Fed v 44 n 3 pt 1 Mar 1972 p 494-6
In Roumania, 325 acres of hothouses for vegetable production have been heated with waste heat from a nearby power plant. The hot houses are heated with pressurized water in a closed circuit, with the heat coming from a heat exchanger between the last turbine and the condenser of the power plant.

File8, COPR. by Engineering Index User 244 Page 38 (Item 91 of 191)

ID NO.- EI741170211 470211

FEASIBILITY OF USING AN EVAPORATIVE PAD GREENHOUSE AGRICULTURAL COMPLEX FOR REJECT HEAT DISPERSAL.

Trezek, G. J.; Olszewski, M.
Univ of Calif, Berkeley

DESCRIPTORS- (*GREENHOUSES, *Waste Heat Utilization),

CARD ALERT- 402, 616

SOURCE- Intersoc Energy Convers Eng Conf, 9th, Proc, San Francisco, Calif, Aug 26-30 1974 Pap 749085, p 588-594. Available from ASME, New York, 1974

Six geographic locations, having a broad range of climatic conditions were examined diurnally for a typical summer and winter day. The results indicate that with an evaporative pad greenhouse the condenser cooling water will approach a temperature closer to the prevailing wet bulb temperature than it will with a cooling tower, resulting in a lower turbine back pressure and higher power plant output. Further, with this heat rejection system the house temperature can be modulated to yield a daily temperature cycle, required by plants, within the plant's optimal temperature zone, thus providing optimal plant growth conditions year round. The most suitable locations for such a complex are shown to be those with relatively cold winters and warm, dry summers. 9 refs.

Part C

U. S. EPA Publications

On Specific Industries

U. S. Environmental Protection Agency

The Economic Impact of Pollution Control on the Animal Feed, Breakfast Cereal, and Wheat Starch Segments of the Grain Mills Industry
PB245-082

The Economic Impact of Pollution Controls on the Textile Industry
PB243-906

The Control of Atmospheric Emission from the Wood and Paper Industries.
Vol I PB190-351
Vol II PB190-352

Polluting Control for Web Offset and Metal Decorating Processes
PB226-552

The Economic Impact of Pollution Control Costs on the Fertilizer Industry
PB241-315

The Economic Impact of Polluting Control on the Insulation and Fiberglass Industry
PB240-649

The Economic Impact of Pollution Control on the Grain and Feed Industry
PB241-234

Batelle Columbus Labs
Evaluation of the National Boiler Inventory Report No. U.S.EPA
October 1975

U.S. EPA
Economic Analysis of Effluent Guidelines on the Ferroalloy Industry

Air Pollution Control in the Petrochemical Industry
PB245-277

Inspection Manuals for New Source Performance Standrds in
Portland Cement Plant PB245-849
Fossil Fired Steam Generators PB246-087
Glass Plants PB245-065

Economic Analysis for Efficient Guidelines for
- Rubber PB235-691
- Electroplating PB236-595
- Ferroalloys PB234-045
- Glass PB234-845
- Dioganic Chemicals PB234-457
- Cement PB234-442
- Selected Segments of the Seafood Processing Industry PB234-457

Standards for
- Asphalt, Asphalt, Concrete Plants, and Petroleum Refineries Storage Vessels PB229-660
- Pharmaceuticals PB233-116
- Daries PB234-613
- Bronze and Lead PB231-601

PB-207 166/BE PCS3.75/MFS2.25
Charles River Associates, Inc., Cambridge, Mass.
The Effects of Pollution Control on the Nonferrous Metals Industries. Aluminum. Part III. The Economic Impact of Pollution Abatement on the Industry
Dec 71, 37p
See also Part 2, PB-207 165.

Descriptors: *Economic factors, *Aluminum industry, *Pollution, Aluminum industry, *Industrial waste treatment, Aluminum industry, Air pollution, Water pollution, Abatement, Cost estimates, International trade, Prices, Employment, Marketing.
Identifiers: *Air pollution economics, *Water pollution economics, Economic impact.

A detailed analysis of the economic effects of imposing pollution controls on the aluminum industry is given. Some of the effects studied include price increases, foreign trade, employment, and marketing.

PB-207 165/BE PCS5.25/MFS2.25
Charles River Associates, Inc., Cambridge, Mass.
The Effects of Pollution Control on the Nonferrous Metals Industries. Aluminum. Part II. Structure of the Industry
Dec 71, 108p
See also Part 1, PB-207 164, and Part 3, PB-207 166.

Descriptors: *Economic factors, *Aluminum industry, *Pollution, Aluminum industry, *Industrial waste treatment, Aluminum industry, Air pollution, Water pollution, Abatement, Trends, Supply(Economics), Demand(Economics), Prices, Government policies, Bauxite, Aluminum oxides, Cost estimates.
Identifiers: *Air pollution economics, *Water pollution economics, Economic impact.

The report concerning the economic effects of pollution controls on the aluminum presents a broad profile of the aluminum industry. The topics include the following: Trends in supply and the technology of production; Consumption; Structure of the industry; Prices; Government policies; The aluminum industry in the United States. (Author)

PB-207 161/BE PCS3.75/MFS2.25
Charles River Associates, Inc., Cambridge, Mass.
The Effects of Pollution Control on the Nonferrous Metals Industries. Copper. Part I. Introduction and Executive Summary
Dec 71, 33p*
See also Part 2, PB-207 162.

Descriptors: *Economic factors, *Metal industry, *Pollution, Metal industry, *Industrial waste treatment, Metal industry, Copper, Air pollution, Water pollution, Abatement, Trends, Supply(Economics), Demand(Economics), Prices, Government policies, Cost estimates.
Identifiers: *Copper industry, *Air pollution economics, *Water pollution economics, Economic impact.

The report on the economic effects of pollution controls on the copper industry summarizes a study providing a broad profile of the copper industry and outlining the economic effects of pollution controls on the industry. (Author)

PB-207 167/BE PCS5.25/MFS2.25
National Economic Research Associates, Inc., New York.
Possible Impact of Costs of Selected Pollution Control Equipment on the Electric Utility Industry and Certain Power Intensive Consumer Industries
5 Jan 72, 105p*
See also PB-207 168.

Descriptors: *Economic factors, *Electric utilities, *Pollution, Electric utilities, *Industrial waste treatment, Electric utilities, Air pollution, Water pollution, Abatement, Electric power

PB-207 164/BE PCS3.75/MFS2.25
Charles River Associates, Inc., Cambridge, Mass.
The Effects of Pollution Control on the Nonferrous Metals Industries. Aluminum. Part I. Introduction and Executive Summary
11 Dec 71, 31p*

See also Part 2, PB-207 165.

Descriptors: *Economic factors, *Aluminum industry, *Pollution, Aluminum industry, *Industrial waste treatment, Aluminum industry, Air pollution, Water pollution, Abatement, Reviews, Demand(Economics), Prices, Government policies, Marketing, Cost estimates, Trends.
Identifiers: *Air pollution economics, *Air pollution economics, Economic impact.

The report on the economic effects of pollution controls on the aluminum industry summarizes a study on the broad profile of the aluminum industry and the economic effects of pollution controls on the industry. (Author)

PB-207 157/BE PCS3.75/MFS2.25
Charles River Associates, Inc., Cambridge, Mass.
The Effects of Pollution Control on the Nonferrous Metals Industries. Lead. Part III. The Economic Impact of Pollution Abatement on the Industry
Dec 71, 30p
See also Park 2, PB-207 156.

Descriptors: *Economic factors, *Metal industry, *Pollution, Metal industry, *Industrial waste treatment, Metal industry, Lead, Water pollution, Air pollution, Abatement, Cost estimates, Trends, Prices, Profits.

Identifiers: *Lead industry, *Air pollution economics, *Water pollution economics, Economic impact.

Presented is a detailed analysis of the economic effects of imposing pollution controls on the lead industry. This includes cost estimates, probable trends without control measures, and the effects of costs.

PB-207 163/BE PCS3.75/MFS2.25
Charles River Associates, Inc., Cambridge, Mass.
The Effects of Pollution Control on3he Nonferrous Metals Industries. Copper. Part III. The Economic Impact of Pollution Abatement on the Industry
Dec 71, 39
See also Part 2, PB-207 162.

Descriptors: *Economic factors, *Metal industry, *Pollution, Metal industry, *Industrial waste treatment, Metal, Copper, Air pollution, Water pollution, Abatement, Taxes, Cost estimates, Prices, Production capacity, Trends, Employment, Smelting.
Identifiers: *Copper industry, *Air pollution economics, *Water pollution economics, Economic impact.

Presented is a detailed analysis of the economic effects of imposing pollution controls on the copper industry. This includes areas such as cost increases, taxes, marketing, prices, smelting, and employment.

PB-207 162/BE PCS5.25/MFS2.25
Charles River Associates, Inc., Cambridge, Mass.
The Effects of Pollution Control on the Nonferrous Metals Industries. Copper. Part II. Structure of the Industry
Dec 71, 118p
See also Part 1, PB-207 161, and Part 3, PB-207 163.

Descriptors: *Economic factors, *Metal industry, *Pollution, Metal industry, *Industrial waste treatment, Metal industry, Copper, Air pollution, Water pollution, Abatement, Cost estimates, Demography, Trends, Prices, Smelting, Supply(Economics), Demand(Economics), Government policies, Employment.
Identifiers: *Copper industry, *Air pollution economics, *Water pollution economics, Economic impact.

The report concerning the economic effects of pollution controls on the copper industry presents a broad profile of the copper industry. The topics include the following: Trends in supply and the technology of production; Consumption; Structure of the industry; Prices; Government policies; The copper industry in the United States. (Author)

PB-207 160/BE PCS3.75/MFS2.25
Charles River Associates, Inc., Cambridge, Mass.
The Effects of Pollution Control on the Nonferrous Metals Industries. Zinc. Part III. The Economic Impact of Pollution Abatement on the Industry
Dec 71, 30p
See also Part 2, PB-207 159.

Descriptors: *Economy factors, *Metal industry, *Pollution, Metal industry, *Industrial waste treatment, Metal industry, Zinc, Air pollution, Water pollution, Abatement, Cost estimates, Trends, Profits, Prices, International trade.
Identifiers: *Zinc industry, *Air pollution economics, *Water pollution economics, Economic impact.

Presented is a detailed analysis of the economic effects of imposing pollution controls on the zinc industry. This includes such areas as trends in supply, consumption, prices and government policies.

PB-207 159/BE PC$4.75/MF$2.25
Charles River Associates, Inc., Cambridge, Mass.
The Effects of Pollution Control on the Nonferrous Metals Industries. Zinc. Part II. Structure of the Industry
Dec 71, 85p
See also Part 1, PB-207 158, and Part 3, PB-207 160.

Descriptors: *Economic factors, *Metal industry, *Pollution, Metal industry, *Industrial waste treatment, Metal industry, Zinc, Air pollution, Water pollution, Abatement, Smelting, Mining, Trends, Prices, Demand(Economics), Government policies, Profits, Cost estimates.
Identifiers: *Zinc industry, *Air pollution economics, *Water pollution economics, Economic impact.

The report on the economic effects of pollution controls on the zinc industry provides a broad profile of the zinc industry. Discussed are the following areas: Trends in supply and the technology of production; Consumption; Structure of the industry; Prices; Government policies; The zinc industry in the United States.

PB-207 158/BE PC$3.75/MF$2.25
Charles River Associates, Inc., Cambridge, Mass.
The Effects of Pollution Control on the Nonferrous Metals Industries. Zinc. Part I. Introduction and Executive Summary
Dec 71, 30p*
See also Part 2, PB-207 159.

Descriptors: *Economic factors, *Metal industry, *Pollution, Metal industry, *Industrial waste treatment, Metal industry, Zinc, Air pollution, Water pollution, Abatement, Supply(Economics), Demand(Economics), Prices, Government policies, Cost estimates.
Identifiers: *Zinc industry, *Air pollution economics, *Water pollution economics, Economic impact.

The report on the economic effects of pollution controls on the zinc industry summarizes a larger study providing a broad profile of the zinc industry and outlining the economic effects of pollution controls on the industry. (Author)

PB-207 155/BE PC$3.75/MF$2.25
Charles River Associates, Inc., Cambridge, Mass.
The Effects of Pollution Control on the Nonferrous Metals Industries. Lead. Part I. Introduction and Executive Summary
Dec 71, 32p*
See also Part 2, PB-207 158.

Descriptors: *Economic factors, *Metal industry, *Pollution, Metal industry, *Industrial waste treatment, Metal industry, Lead, Air pollution, Water pollution, Demand(Economics), Prices, Government policies, Cost estimates, Abatement.
Identifiers: *Lead industry, *Air pollution economics, *Water pollution economics, Economic impact.

The report on the economic effects of pollution controls on the lead industry summarizes a broader study, provides a broad profile of the lead industry and outlines the economic effects of pollution controls on the industry. The important points and conclusions are presented.

PB-207 156/BE PC$4.75/MF$2.25
Charles River Associates, Inc., Cambridge, Mass.
The Effects of Pollution Control on the Nonferrous Metals Industries. Lead. Part II. Structure of the Industry
Dec 71, 77p
See also Part 1, PB-207 155, and Part 3, PB-207 157.

Descriptors: *Economic factors, *Metal industry, *Pollution, Metal industry, *Industrial waste treatment, Metal industry, Lead, Air pollution, Water pollution, Abatement, Trends, Supply(Economics), Prices, Government policies, Demand(Economics).
Identifiers: *Lead industry, *Air pollution economics, *Water pollution economics, Economic impact.

The report on the economic effects of pollution controls on the lead industry presents a review of the lead industry. It is divided into the following sections: Trends in supply and the technology of production; Consumption; Structure of the industry; Prices; Government policies; and The lead industry in the United States.

PB-207 154/BE PC$3.75/MF$2.25
Urban Systems Research and Engineering, Inc., Cambridge, Mass.
The Leather Industry: A Study of the Impact of Pollution Control Costs. Volume III. The Impact of Pollution Control Costs on the Tanning Industry
Dec 71, 26p
Contract EQC-211
See also Volume 2, PB-207 153.

Descriptors: *Economic factors, *Industries, *Pollution, Industries, *Industrial waste treatment, *Leather, Air pollution, Water pollution, Abatement, Cost estimates, Prices, Employment, Production rate, Profits.
Identifiers: *Leather industry, *Air pollution economics, *Water pollution economics, Economic impact.

The economic impact of pollution control measures on the leather industry is discussed in relationship to the following topics: Disaggregation of the tanning industry; Aggregate impact of pollution control cost on the tanning industry; Impact of pollution control costs on individual firms.

PB-207 169/BE PC$3.25/MF$2.25
Ernst and Ernst, Washington, D.C.
Analysis of Economic Impacts of Environmental Standards on the Bakery Industry. Part I
Dec 71, 6p*
See also Part 2, PB-207 170.

Descriptors: *Economic factors, *Food industry, *Pollution, Food industry, *Industrial waste treatment, Food industry, Water pollution, Air pollution, Abatement, Bakery products, Cost estimates, Financing.
Identifiers: *Air pollution economics, *Bakery industry, *Water pollution economics, Economic impact.

The report summarizes pertinent industry structure and trends in the bakery industry and the quantitative and qualitative findings concerning the economic impacts on the industry of abatement control expenditures. (Author)

PB-207 170/BE PC$3.00/MF$2.25
Ernst and Ernst, Washington, D.C.
A Descriptive Analysis of the Bakery Products Industry Detailing Industry Trends and Characteristics Relevant to Economic Impact Analysis of Environmental Standards. Part II
10 Dec 71, 23
See also Part 1, PB-207 169 and Part 3, PB-207 171.

Descriptors: *Economic factors, *Food industry, *Pollution, Food industry, *Industrial waste treatment, Food industry, Air pollution, Water pollution, Abatement, Bakery products, Demand(Economics), Supply(Economics), Employment, Trends, Profits, Cost estimates.
Identifiers: *Air pollution economics, *Water pollution economics, *Bakery industry, Economic impact.

Presented is a description of the structure of the bakery industry, an analysis of the industry detailing industry characteristics and trends that are relevant to the economic analysis of the effects of pollution abatement costs on the industry. Such topics include demand, supply, plants, employees, trends, and financial structure. (Author)

PB-207 171/BE PC$3.75/MF$2.25
Ernst and Ernst, Washington, D.C.
A Study of the Impact of Pollution Standards and Changes on the Bakery Industry. Part III
10 Dec 71, 40p
See also Part 2, PB-207 170.

Descriptors: *Economic factors, *Food industry, *Pollution, Food industry, *Industrial waste treatment, Food industry, Air pollution, Water pollution, Abatement, Bakery products, Prices, Trends, Shutdowns, Cost estimates.
Identifiers: *Air pollution economics, *Water pollution economics, *Bakery industry, Economic impact, Industrial shutdowns.

A detailed analysis of the economic impact of pollution abatement upon the bakery industry is given particularly the costs of pollution control. The analysis includes the impact on prices, dislocations, related industries, and trends. (Author)

PB-207 197/BE PC$3.25/MF$2.25
Sobotka (Stephen) and Co., New York.
The Impact of Costs Associated with New Environmental Standards upon the Petroleum Refining Industry. Part 1. Executive Summary
23 Nov 71, 16p*
See also Part 2, PB-207 198.

Descriptors: *Economic factors, *Petroleum refining, *Pollution, Petroleum refining, *Industrial waste treatment, Petroleum refining, Air pollution, Water pollution, Abatement, Cost estimates, Profits, Demand(Economics), Crude oil, Desulfurization, Employment, Prices, Natural gas.
Identifiers: *Air pollution economics, *Water pollution economics, Low sulfur fuels, Economic impact.

The study summarizes the economic impact of pollution abatement costs which result from regulation of petroleum refinery operations. It is aimed at determining the impact of the costs of controlling refinery airborne and waterborne emissions. (Author)

PB-207 199/BE PCS4.25/MFS2.25
Sobotka (Stephen) and Co., New York.
The Impact of Costs Associated with New Environmental Standards upon the Petroleum Refining Industry. Part 3. The Impact of Environmental Control Costs
23 Nov 71, 60p
See also Part 2, PB-207 198.

Descriptors: *Economic factors, *Petroleum refining, *Pollution, Petroleum refining, *Industrial waste treatment, Petroleum refining, Air pollution, Water pollution, Abatement, Cost estimates, Prices, Capital costs, Operating costs, Employment, Air pollution control equipment.
Identifiers: *Air pollution economics, *Water pollution economics, Economic impact, Air pollution control, Water pollution control.

The report discusses the impact of pollution control on the petroleum refining industry. The topics delt with include the following: Industry cost and price effects; Control cost differences among refineries; Employment and other related effects.

PB-207 198/BE PCS4.25/MFS2.25
Sobotka (Stephan) and Co., New York.
The Impact of Costs Associated with New Environmental Standards upon the Petroleum Refining Industry. Part 2. Structure of the Industry
23 Nov 71, 57p
See also Part 1, PB-207 197 and Part 3, PB-207 199.

Descriptors: *Economic factors, *Petroleum refining, *Pollution, Petroleum refining, *Industrial waste treatment, Petroleum refining, Air pollution, Water pollution, Abatement, Demand(Economics), Marketing, Government policies, Supply(Economics), Trends, Financing, Cost estimates, Profits, Prices, Shutdowns, Consumption, Economic analysis.
Identifiers: *Air pollution economics, *Water pollution economics, Economic impact, Industrial shutdowns.

Data and background information is presented which is relevant to a consideration of the economic impact of pollution abatement costs on the petroleum refining industry. The topics include: Demand (Market and distribution, government influence on market); Supply (Industry operations, financial structure and trends, refinery technology and technological trends, industry utilization rates, competition); and The viability of small refineries. (Author)

PB-207 140/BE PCS3.75/MFS2.25
Dunlap and Associates, Inc., Manhattan, Kans. Agri Div.
Economic Impact of Environmental Controls on the Fruit and Vegetable Canning and Freezing Industries. Part I. Executive Summary
Nov 71, 28p* Rept no. P-585-Pt-1
Contract PA-71-53
See also Part 2, PB-207 141.

Descriptors: *Economic factors, *Food processing, *Pollution, Food processing, *Industrial waste treatment, Food processing, Water pollution, Air pollution, Abatement, Trends, Demand(Economics), Profits, Employment, Supply(Economics), Freezing, Canneries, Fruits, Vegetables.
Identifiers: *Air pollution economics, *Water pollution economics, Economic impact.

The implementation of environmental controls normally results in added costs and may result in economic and locational adjustments within these industries. The study summarizes these adjustments as they relate to the fruit and vegetable processing industries in terms of costs, capital requirements, profits, industry structure and location, employment, product prices and regional and national economic impacts. The general approach used was to initially analyze and describe the characteristics of supply, demand, price and operating requirements of these industries and given this base, evaluate the microeconomic relationships among representative firms within the fruit and vegetable processing industries as a first step; and, second to then project macroeconomic impacts at the industry level based on the resulting microeconomic impact relationships which were developed. (Author)

PB-207 141/BE PCS5.75/MFS2.25
Dunlap and Associates, Inc., Manhattan, Kans. Agri Div.
Economic Impact of Environmental Controls on the Fruit and Vegetable Canning and Freezing Industries. Part II. Industry Structure
Nov 72, 135p Rept no. P-585-Pt-2
Contract PA-71-53
See also Part 1, PB-207 140 and Part 3, PB-207 142.

Descriptors: *Economic factors, *Food processing, *Pollution, Food processing, *Industrial waste treatment, Food processing, Water pollution, Air pollution, Abatement, Demand(Economics), Trends, Supply(Economics), Fruits, Vegetables, Freezing, Canneries, Cost estimates, Prices, Profits, Employment, Shutdowns.
Identifiers: *Air pollution economics, *Water pollution economics, Economic impact, Industrial shutdowns.

The report concerns the economic impact of pollution control measures on the fruit and vegetable canning and freezing industries. Included is information on the following: Demand characteristics of the fruit and vegetable industry; Supply characteristics of the fruit and vegetable industry.

PB-207 142/BE PCS6.25/MFS2.25
Dunlap and Associates, Inc., Manhattan, Kans. Agri Div.
Economic Impact of Environmental Controls on the Fruit and Vegetable Canning and Freezing Industries. Part III. Impact Analysis
Nov 71, 157p Rept no. P-585-Pt-3
Contract PA-71-53
See also Part 2, PB-207 141 and Part 4, PB-207 143.

Descriptors: *Economic factors, *Food processing, *Pollution, Food processing, *Industrial waste treatment, Food processing, Air pollution, Water pollution, Abatement, Cost estimates, Profits, Prices, Shutdowns, Employment, International trade.
Identifiers: *Air pollution economics, *Water pollution economics, Economic impact, Industrial shutdowns.

The report concerns the economic impact of pollution control measures on the fruit and vegetable canning and freezing industries. The report includes the following: Methodology; Industry analysis; Overall impact on the industry; Specific region/area and economic dislocation impacts.

PB-207 143/BE PCS5.75/MFS2.25
Dunlap and Associates, Inc., Manhattan, Kans. Agri Div.
Economic Impact of Environmental Controls on the Fruit and Vegetable Canning and Freezing Industries. Part IV. Statistical Supplement
Nov 71, 126p Rept no. P-585-Pt-4
Contract PA-71-53
See also Part 3, PB-207 142.

Descriptors: *Economic factors, *Food processing, *Pollution, Food processing, *Industrial waste treatment, Food processing, Water pollution, Air pollution, Abatement, Statistical data, Tables(Data), Canneries, Freezing, Fruits, Vegetables.
Identifiers: *Air pollution economics, *Water pollution economics, Economic impact.

The report presents tabulations of the locations of canners and freezers in the United States. This was done for a study concerned with the economic impact pollution control measures on the fruit and vegetable canning and freezing industry.

PB-207 144/BE PCS3.25/MFS2.25
Little (Arthur D.), Inc., Cambridge, Mass.
Economic Impact of Anticipated Paper Industry Pollution. Abatement Costs. Part I. Executive Summary
Nov 71, 19p* Rept no. ADL-C-73977-Pt-1
See also Part 2, PB-207 145.

Descriptors: *Economic factors, *Paper industry, *Pollution, Paper industry, *Industrial waste treatment, Paper industry, Air pollution, Water pollution, Prices, Trends, Shutdowns, Employment, Paper mills, Pulp mills, Abatement.
Identifiers: *Air pollution economics, *Water pollution economics, Industrial shutdowns, Economic impact.

The analysis provides out assessment of the economic impact on the paper and related industries that will result from the air and water pollution control requirements anticipated through 1976. The analysis is meant to provide information that can be used in formulating federal policy for pollution abatement programs in the paper industry over the next five years. Discussed are the following: Industry structure; Profitability trend; Price impact; Mill shutdown probabilities; Employment impact; Indirect impacts.

PB-207 145/BE PCS4.25/MFS2.25
Little (Arthur D), Inc., Cambridge, Mass.

Economic Impact of Anticipated Paper Industry Pollution. Abatement Costs. Part II. Industry Structure and Business Outlook
Dec 71, 73p Rept no. ADL-C-73977-Pt-2
See also Part 1, PB-207 144, and Part 3, PB-207 146.

Descriptors: *Economic factors, *Paper industry, *Pollution, Paper industry, *Industrial waste treatment, Paper industry, Air pollution, Water pollution, Cost estimates, Trends, Paper mills, Pulp mills, Employment, Prices, Shutdowns, Supply(Economics), Demand(Economics), Profits, Abatement.
Identifiers: *Air pollution economics, *Water pollution economics, Industrial shutdowns, Economic impact.

Presented is a report developed to assess how costs associated with new environmental protection standards will affect the pulp and paper industry. The report itself describes industry characteristics and trends that are relevant to this economic analysis. Thus the report serves to focus the analysis on those sectors of the industry that will be most adversely affected. (Author)

PB-207 146/BE PCS4.25/MFS2.25
Little (Arthur D.), Inc., Cambridge, Mass.
Economic Impact of Anticipated Paper Industry Pollution. Abatement Costs. Part III. Economic Analysis
Nov 71, 70p Rept no. ADL-C-73977-Pt-3
See also Part 2, PB-207 145.

Descriptors: *Economic factors, *Paper industry, *Pollution, Paper industry, *Industrial waste treatment, Paper industry, Air pollution, Water pollution, Sulfite pulping, Cost estimates, Prices, Shutdowns, Employment, Supply(Economics), Demand(Economics), Trends, Paper mills, Pulp mills, Abatement.
Identifiers: *Air pollution economics, *Water pollution economics, Industrial shutdowns, Economic impact.

The purpose of the report is to analyze the specific dislocations and changes that are anticipated as a result of the increased capital and operating costs the paper industry will face in complying with the water and air pollution limits anticipated over the next five years. This analysis draws on the description of the industry structure and trends in supply/demand and profitability. (Author)

PB-207 147/BE PCS3.25/MFS2.25
Kearney (A. T.) and Co., Chicago, Ill.
Study of Economic Impacts of Pollution Control on the Iron Foundry Industry. Part I. Executive Summary
30 Nov 71, 20p*
See also Part 2, PB-207 148.

Descriptors: *Economic factors, *Iron and steel industry, *Pollution, Iron and steel industry, *Industrial waste treatment, Iron and steel industry, Foundries, Employment, Cast iron, Demand(Economics), Supply(Economics), Air pollution, Water pollution, Trends, Shutdowns, Abatement.
Identifiers: *Air pollution economics, *Water pollution economics, Industrial shutdowns, Economic impact.

The report discusses aspects of the iron foundry industry as related to a study on the economic impact of pollution control. The contents include: Structure of the industry (Description of the iron foundry industry, demand for iron castings, supply of iron castings); Overall impact on industry (Price increases, factor dislocations within industry, effects on related industries, industry dislocations, locations of dislocations, compensatory factors, net employment impact, impact on local economy).

PB-207 148/BE PCS5.25/MFS2.25
Kearney (A. T.) and Co., Chicago, Ill.
Study of Economic Impacts of Pollution Control on the Iron Foundry Industry. Part II. Structure of the Iron Foundry Industry
30 Nov 71, 113p
See also Part 1, PB-207 147 and Part 3, PB-207 149.

Descriptors: *Economic factors, *Iron and steel industry, *Industrial waste treatment, Iron and steel industry, *Pollution, Iron and steel industry, Cost estimates, Foundries, Demand(Economics), Supply(Economics), Air pollution, Water pollution, Economic analysis, Trends, Employment, Shutdowns, Abatement.
Identifiers: *Air pollution economics, *Water pollution economics, Industrial shutdowns, Economic impact.

The report discusses aspects of the iron foundry industry as related to a study on the economic impact of pollution control. The contents include: Demand for iron castings; Supply of iron castings (Industry structure, financial structure trends, current technology and technolcgical trends, current capacity, current competition, government influence on casting supply).

PB-207 150/BE PCS3.25/MFS2.25
Boston Consulting Group, Inc., Mass.
The Cement Industry: Economic Impact of Pollution Control Costs. Volume I. Executive Summary
Nov 71, 15p*
Contract EQC-204
See also Volume 2, PB-207 151.

Descriptors: *Economic factors, Industries, *Pollution, Industries, *Industrial waste treatment, *Cements, Water pollution, Air pollution, Prices, Profits, Trends, Employment, Cost estimates, Abatement.
Identifiers: *Cement industry, *Air pollution economics, *Water pollution economics, Economic impact.

The report summarizes the economic impact of pollution control on the cement industry.

PB-207 149/BE PCS4.25/MFS2.25
Kearney (A. T.) and Co., Chicago, Ill.
Study of Economic Impacts of Pollution Control on the Iron Foundry Industry. Part III. The Economic Impact of Pollution Abatement upon the Iron Foundry Industry
30 Nov 71, 51p
See also Part 2, PB-207 148.

Descriptors: *Economic factors, *Iron and steel industry, *Pollution, Iron and steel industry, *Industrial waste treatment, Iron and steel industry, Foundries, Air pollution, Water pollution, Prices, Economic analysis, Cost estimates, Employment, Communities, Shutdowns, Abatement.
Identifiers: *Air pollution economics, *Water pollution economics, Industrial shutdowns, Economic impact.

The report discusses aspects of the iron foundry industry as related to a study on the economic impact of pollution control. The contents include: Price increases; Factor dislocations within industry; Effects on related industries; Industry dislocations; Locations of dislocations; Compensatory factors; Net employment impact; Impact on local economy.

PB-207 153/BE PCS6.25/MFS2.25
Urban Systems Research and Engineering, Inc., Cambridge, Mass.
The Leather Industry: A Study of the Impact of Pollution Control Costs. Volume II. Description of the Industry
Dec 71, 153p
Contract EQC-211
See also Volume 1, PB-207 152, and Volume 3, PB-207 154.

Descriptors: *Economic factors, *Industries, *Pollution, Industries, *Industrial waste treatment, *Leather, Air pollution, Water pollution, Abatement, Tanning materials, Cost estimates, Shoes, Hides, Trends, Profits.
Identifiers: *Leather industry, *Air pollution economics, *Water pollution economics, Economic impact.

Reported is a review of the leather industry as related to the economic impact of pollution control measures. Included is a description of the leather industry, technology in the leather industry, cost of treating tannery wastes, and show and hide industry description.

PB-207 152/BE PCS3.75/MFS2.25
Urban Systems Research and Engineering, Inc., Cambridge, Mass.
The Leather Industry: A Study of the Impact of Pollution Control Costs. Volume I. Executive Summary
Dec 71, 27p*
Contract EQC-211
See also Volume 2, PB-207 153.

Descriptors: *Economic factors, Industries, *Pollution, Industries, *Industrial waste treatment, *Leather, Air pollution, Water pollution, Abatement, Cost estimates, Employment, Trends, Production control.
Identifiers: *Leather industry, *Air pollution economics, *Water pollution economics, Economic impact.

The report summarizes a review of the impact of pollution control costs on the leather tanning and finishing industry in the United States. Recent trends in production, employment, and product acceptability have been reviewed along with current and planned pollution control expenditures. The summary presents an overview of the total study highlighting the industry trends and the relative importance of pollution control costs to the future of the industry. (Author)

PB-207 151/BE PCS7.00/MFS2.25
Boston Consulting Group, Inc., Mass.
The Cement Industry: Economic Impact of Pollution Control Costs. Volume II
Nov 71, 187p
Contract EQC-204
See also Volume 1, PB-207 150.

Descriptors: *Economic factors, Industries, *Pollution, Industries, *Industrial waste treatment, *Cements, Water pollution, Air pollution, Prices, Profits, Marketing, Demand(Economics), Trends, Employment, Cost estimates, Supply(Demand), Abatement.
Identifiers: *Cement industry, *Air pollution economics, *Water pollution economics, Economic impact.

The report concerns a study on the economic impact of pollution control measures on the cement industry. The contents include: Industry description; Production process and pollution control problems; Market structure and distribution; Financial resources of the cement industry; Cement demand, foreign trade and employment impact.

Part D.

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