ENERGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

NOVEMBER 1974
ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges:

IAA (A-10000 Series)  A74-19206—A74-28535

STAR (N-10000 Series)  N74-15700—N74-21629

Previous publications announced in this series/subject category include:

Energy: A Special Bibliography NASA SP-7042
(Coverage: Jan. 1, 1968 through Dec. 31, 1973)

Energy: A Continuing Bibliography NASA SP-7043(01)
(Coverage: Jan. 1, 1974 through Mar. 31, 1974)

This bibliography was prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by Informatics Information Systems Company, Inc.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through July 1, 1974.
This bibliography lists 405 reports, articles, and other documents introduced into the NASA scientific and technical information system from April 1, 1974 through June 30, 1974.
Please substitute these abstracts on page 24 of NASA SP-7043 (01) as indicated.

N74-13759 Polytechnic Inst. of Brooklyn, N.Y.  
THE SYNCHRONOUS EFD DEVICE Ph.D. Thesis  
Frank Richard Honigsbaum 1973 110 p  
Avail: Univ. Microfilms Order No. 73-24769  
A survey of the literature reveals that the major objection to the use of electrofluidodynamic devices for direct energy conversion has been that of low output per stage. This objection does not apply to the synchronous EFD device, because it permits simple and effective multistaging. Since the synchronous EFD Device is a recent development, efforts directed toward: (1) describing the basic concept; (2) validating it experimentally; (3) assaying its potential; and (4) deriving a simple circuit model. All of these objectives were met. Dissert. Abstr. (This abstract replaces N74-12759 on page 24)

N74-13766 Energy Research Corp., Bethel, Conn.
HYDROGEN GENERATOR Final Technical Report  
(Contract DAAK02-71-C-0397; DA Proj. 106-63702-DG-10) (AD-767402; ERC-0397F) Avail. NTIS CSCL 10/2  
A compact hydrogen generator for small liquid hydrocarbon fueled fuel cells was designed, built and partially tested. The basic generator embodies the steam reforming of liquid fuels available to the military. Provisions have been made for sulfur removal and hydrogen purification can be achieved with a palladium-silver hydrogen separator. Extensive testing on the reforming unit was conducted and results reported. An electronic control system for startup and steady state operation was designed and built but was not fully integrated with the reformer. Emphasis throughout the study was placed on miniaturizing components. Author (GRA) (This abstract replaces N74-12766 on page 24)

The index entries refer to the substitute abstracts (N74-13759 and N74-13766) instead of the originally printed abstracts (N74-12759 and N74-12766). Thus, no change in the indexes will be necessary.
ENERGY

A Continuing Bibliography

With Indexes

Supplement 02

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced from April 1 through June 30, 1974 in:

- Scientific and Technical Aerospace Reports (STAR)
- International Aerospace Abstracts (IAA).
This Supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22151, for copies mailed to addresses outside the United States, add for handling and postage.
INTRODUCTION

This supplement to Energy: A Continuing Bibliography with Indexes (NASA SP-7043) lists 405 reports, journal articles, and other documents announced between April 1, 1974 and June 30, 1974 in Scientific and Technical Aerospace Reports (STAR), or in International Aerospace Abstracts (IAA). The first issue of this continuing bibliography was published in May 1974 and supplements are issued quarterly.

The coverage includes regional, national and international energy systems; research and development on fuels and other sources of energy; energy conversion, transport, transmission, distribution and storage, with special emphasis on use of hydrogen and of solar energy. Also included are methods of locating or using new energy resources. Of special interest is energy for heating, lighting, for powering aircraft, surface vehicles, or other machinery.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, IAA Entries and STAR Entries in that order. The citation, and abstracts when available, are reproduced exactly as they appeared originally in IAA or STAR including the original accession numbers from the respective announcement journals. This procedure, which saves time and money accounts for the slight variation in citation appearances.

Five indexes—subject, personal author, corporate source, contract number, and report number are included. The indexes are of the cumulating type throughout the year, with the fourth quarterly publication containing abstracts for the fourth quarter and index references for the four quarterly publications.
AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A74-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies are available at $5.00 per document up to a maximum of 20 pages. The charge for each additional page is 25 cents. Microfiche \(^{1}\) are available at the rate of $1.50 per microfiche for documents identified by the \# symbol following the accession number. A number of publications, because of their special characteristics, are available only for reference in the AIAA Technical Information Service Library. Minimum airmail postage to foreign countries is $1.00. Please refer to the accession number, e.g., A74-11072, when requesting publications.

STAR ENTRIES (N74-10000 Series)

A source from which a publication abstracted in this Section is available to the public is ordinarily given on the last line of the citation, e.g., Avail: NTIS. The following are the most commonly indicated sources (full addresses of these organizations are listed at the end of this introduction):

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Microfiche. Microfiche are available from NTIS at a standard price of $2.25 (regardless of an additional documents identified by the \# sign following the accession number, e.g., A74-0036\#) and having an NTIS availability shown in the citation. Star means a microfiche of (1) the full collection of NTIS-available documents announced in STAR with the \# symbol, (2) NASA reports only (identified by an asterisk), (3) NASA-accessioned non-NASA reports only (for those who wish to maintain an integrated microfiche file of aerospace documents by the \"N\" accession number), or (4) any of these classes within one or more STAR categories, also may be placed with NTIS at greatly reduced prices per title (e.g., 45 cents) over individual requests. Inquiries concerning NTIS Selective Research

\(^{1}\) A microfiche is a transparent sheet of film, 105 x 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).
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Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration. Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the Mississippi Test Facility, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: NASA Scientific and Technical Information Office. Documents with this availability are usually news releases or informational brochures available without charge in paper copy.

Avail: AEC Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of U.S. Atomic Energy Commission reports, usually in microfiche form, are listed in Nuclear Science Abstracts. Services available from the USAEC and its depositories are described in a booklet, Science Information Available from the Atomic Energy Commission (TID-4550), which may be obtained without charge from the USAEC Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from Dissertation Abstracts, and are sold by University Microfilms as xerographic copy (HC) at $10.00 each and microfilm at $4.00 each, regardless of the length of the manuscript. Handling and shipping charges are additional. All requests should cite the author and the Order Number as they appear in the citation.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc., (PHI), Redwood City, California. The U.S. price (including a service charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown (if none is given, inquiry should be addressed to BLL).

Avail: ZLDI Sold by the Zentralstelle fur Luftfahrdokumentation und -Information, Munich, Federal Republic of Germany, at the price shown in deutschmarks (DM).

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Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.
GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the STAR Entries and IAA Entries sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

SUBSCRIPTION AVAILABILITY

This publication is available on subscription from the National Technical Information Service (NTIS). The annual subscription rate for the monthly supplement is $15.00. All questions relating to subscriptions should be referred to the NTIS.
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TYPICAL CITATION AND ABSTRACT FROM STAR

NASA SPONSORED DOCUMENT - N74-16492
ACCESSION NUMBER - N74-16492
TITLE - HYDROGEN-METHANE FUEL CONTROL SYSTEMS FOR TURBOJET ENGINES
AUTHORS - J. S. Goldsmith and G. W. Bennett
CONTRACT OR GRANT - (Contract NAS3-14319)
AVAILABLE ON MICROFICHE - CORPORATE SOURCE

TYPICAL CITATION AND ABSTRACT FROM IAA

NASA SPONSORED DOCUMENT - A74-27772
ACCESSION NUMBER - A74-27772
AUTHORS - R. L. Thomas and J. M. Savino (NASA, Lewis Research Center, Cleveland, Ohio)

The utilization of wind energy is technically feasible as evidenced by the many past demonstrations of wind generators. The cost of energy from the wind has been high compared to fossil fuel systems. A sustained development effort is needed to obtain economical systems. The variability of the wind makes it an unreliable source on a short-term basis. However, the effects of this variability can be reduced by storage systems or connecting wind generators to fossil fuel systems, hydroelectric systems, or dispersing them throughout a large grid network. The NSF and NASA-Lewis Research Center have sponsored programs for the utilization of wind energy.

F.R.L.
A Listing of Energy Bibliographies Contained In This Publication:

1. A Bibliography of Non-Technical Literature on Energy
   N74-16641 p0051

2. A Bibliography of Congressional Publications on Energy from the
   89th Congress to 1 July 1971
   N74-16642 p0051

3. Bearings for Power Station Plant. A Selective Bibliography, 1960 -
   September 1973
   N74-19113 p0073

4. Air Pollution Aspects of Emission Sources: Petroleum Refineries;
   A Bibliography with Abstracts
   N74-19228 p0073

5. Energy Sources - Citations from the Early DDC Collections
   N74-20705 p0081
IAA ENTRIES


Arguments in favor of the use of liquid-hydrogen fuel for power supersonic transport aircraft are presented, with a view toward the 'better and faster' SST the U.S. will eventually build. It is seen that, in addition to the economic and operational advantages, the use of hydrogen will establish a sound basis for evolving out of the present self-limited petroleum era into tomorrow's hydrogen economy. V.P.


A theoretical and experimental study was made of relaxation processes in MHD generators. From the calculations of the relaxation process in a two-dimensional geometry the configuration of preionizers with respect to the maximum efficiency has been derived. The time-dependent behavior of discharges in preionizers and in a periodic generator segment have been studied using two-dimensional time-dependent calculations. A model for the calculation of the power output and efficiency of MHD generators has been developed. To study the relaxation processes in an MHD generator with an enthalpy input of 5 MW a shock tunnel was built which delivered a plasma with the desired parameters. The experimental results are explained by means of a theoretical analysis. The increase in the electron density due to preionization was in agreement with a quasi-one-dimensional theory. The experimental efficiencies for preionization ranged from 10 to 30%. Current distributions determined from measurements with electrostatic probes and high-speed photography showed a qualitative agreement with the theoretical results. F.R.L.


This doctoral thesis deals with loss mechanisms which reduce the efficiency and power output of nonequilibrium Faraday-type MHD generators. Particular attention is given to losses in the boundary region. The interaction of the losses is studied on the basis of an equivalent resistance model (whose development is described). Here, the losses are represented by resistances which are loads for the bulk of the MHD generator. Equations governing the processes responsible for the losses are derived and are used to calculate numerically the influence of the electrode configuration on generator performance. It is shown that rod electrodes placed in the flow perform better than flat electrodes at the wall. Experiments performed with cesium-seeded argon plasma are described, showing that voltage drops are by far the most dominant loss mechanism. The origin of the voltage drops is studied. V.P.


Discussion of the use of pressurized plastic balloons for the detection of energy resources. The balloon system to be employed is compared to aircraft, sounding rocket, and satellite systems. The remote sensors which could be used with a balloon system for earth resources surveys are described. The physics of pressurized balloons are analyzed to determine their performances. (Author)


Energy development and usage are worldwide problems. The prospects of energy supply and demand over the long term indicate a critical impact on air transportation. Unless energy is conserved through various alternative actions, air transportation will suffer. This paper analyzes options for reducing demand, for improving efficiency and for diversifying, both through alternative fuels and transportation modes, for the near term (one to 15 years) and the 15-year plus time frame. These options offer a 30 to 50% reduction in projected fuel requirements. (Author)


The years 1950s and 1960s which mark the beginning of the air transportation industry, were decisive for airport infrastructure through the realization of suitable flight and operational infrastructure capable of ensuring practicability and receptivity. The 1970s with jumbo jets have new problems of dimensions and qualification for large airports together with problems of accessibility and ecology. Thus it is necessary to consider if the way followed until now, which leads to the superairport, does not have to be reexamined for a different solution to the problem of qualified airport systems. In the 1980s and thereafter, in addition to the use of atomic energy in air transportation, a new and unforeseeable leap will be made with mercantile aircraft. (Author)


A review of the state of the art in the energy conversion field indicates that the photovoltaic converter is now the most common and efficient type of energy converter. It is anticipated that recent improvements in silicon solar cells will benefit the development of terrestrial solar power plant technology. Solar power plants in space are also considered as a possibility in the future. V.Z.

After referring to the enormous increase in air transport during the last two decades, encouraged by the considerable availability of low cost fuel, the authors discuss the problems and difficulties which may in the near future affect the aviation market's oil supplies. The more demanding quality requirements and the ever growing needs of light distillates by all the other markets are taken into consideration. Attention is given, moreover, to the possibilities open to the oil companies, aircraft manufacturers, and airline operators in order to moderate and alleviate this critical situation.

(Author)


Two solar furnaces are described that have been designed and built for the purposes of testing materials for resistance against thermal shocks characterized by steep and sudden rises in temperature, and for studying the phenomena associated with such thermal shocks. The tests are applied, particularly, to materials liable by the nature of their service (e.g., protective shielding against the thermal effects of nuclear explosions, certain spacecraft or aircraft components) to be subjected to thermal shocks. The design and performance characteristics of these solar furnaces are reviewed, and they are shown to make possible the application of thermal shocks over wide ranges of several parameter values.

M.V.E.


Current and future applications of the helicopter at sea are reviewed for both military and commercial service tasks. Discussed missions include rescue, anti-submarine warfare, mine sweeping, the deposition of pilots on merchant ships at sea or of personnel and supplies on oil-drilling ocean platforms. Some of the navigation and safety problems involved are examined.

M.V.E.


The heat pipe is a very efficient device for the transportation of heat at high temperatures on a thermionic basis. One of the applications of the heat pipe is connected with the development of a vacuum furnace which utilizes natural gas for heating. In the new device the heat pipe is used for the transfer of heat from a high-temperature burner to a vacuum chamber. The vacuum furnace provides temperatures up to 1037.5°C at a vacuum of 5 microtorr.

G.R.


The effectiveness of the use of optimum flight profiles as a means of reducing the fuel crisis is studied on the basis of selected performance data for the B-727-200 series aircraft. It is shown that the success of airline fuel conservation programs will depend on the controller and the facility planner. A discussion of a method of measuring fuel savings shows that a descent profile must be applied to existing procedures to determine where these savings can be realized.

V.P.

A74-20067 # Effect of dry friction on the response to a symmetric harmonic signal of an energy converter producing mechanical energy (Vliianie sukhogo treniia na otkliki reguliruemyh prigravozvastel'nyih energii v mekhanicheskuui strukturnui carakteristikui gornomicheskiui signal). V. N. Prokof'ev et al. (Moskovskoe Vysshee Tekhnicheskoie Uchilishche, Moscow, USSR), and E. A. Musatov. *Mashinostroenie, no. 12, 1973, p. 60-65. 10 refs. In Russian.


It is suggested that lighter-than-air craft, in the form of very large airships, can be developed using nuclear propulsion. Such an airship can be designed to move cargo pieces weighing a million pounds and more into difficult-to-reach places at energy expenditures matching available resources. Inherent environmental cleanliness and quiet would be important fringe benefits.

F.R.L.


It is the purpose of this paper to pinpoint some of the sources and types of fuel contamination and to outline precautions and procedures currently in use by the industry to preclude the possibility of contaminated fuel from reaching the turbine. In this connection, practices used in the aviation sector of the industry will be explored in detail since millions of gallons of jet fuel daily are being supplied to aviation turbines clean, bright, and dry with utmost reliability of product quality. Similar procedures applied to ground and marine units can assure dependable and economical operation.

(Author)


Discussion of the means and merits of centrifugal purification of fuel oils, i.e., for the removal of water, solids, and other contaminants heavier than fuel oil. The optimal centrifuge types are defined depending on the oil to be purified, and the purifying performance is discussed in terms of processing cost efficiency.

M.V.E.


Topics discussed include a lithium/sulfur battery, a reversible negative electrode for alkaline storage batteries based on hydrides of the Ti-Ni system, high-discharge-rate long-life nickel/zinc cells, a bipolar NiO(OH)-K2BO3-Zn accumulator with a zinc ion repelling separator, separators for silver/zinc alkali cells, the effect of KOH on sintered silver electrodes, a silver oxide/zinc battery, sintered-plate nickel hydroxide electrodes, a hot-pressing technique for fabricating cadmium and nickel electrodes, a laser interferometric method of measuring the current distribution at nickel and cadmium electrodes, the thermal behavior of sealed nickel/cadmium batteries, the nickel/cadmium cells used on the OAO spacecraft, a two-layer oxygen electrode with a hydrophilic porous nickel layer and a hydrophobic carbon layer, the electrochemical behavior of mixed
oxides in aqueous media, the use of charge-transfer complexes as electrodes in rechargeable batteries, and a rechargeable lithium nonaqueous battery which utilizes lamellar transition metal dichalcogenides as 'host' structures for cathodic nonmetals.

Individual items are announced in this issue.

A.B.K.

A74-20628


A primary version of the lithium-sulfur cell has been developed in which the two parallel electrodes operate in close proximity in a sealed system. The cell uses a foam metal matrix for lithium retention and compressed graphite felt for the cathode current collector, separated by a thin layer of fused salt electrolyte. This three-liquid system was shown to be stable even when operated in a vertical plane. Cells with 8.3 sq cm electrodes have been discharged for periods of 20 min at a current density of 0.5A/sq cm at an average voltage of 1.8 V. A short-term power density capability of over 1.5 W/sq cm has been demonstrated. (Author)

A74-20630


Progress report on the development of a new generation of sealed, rechargeable nickel-zinc cells consistent with long life operation and economic construction. The cells discussed have nonsintered type active nickel electrodes, and inorganic separator systems. Cyclic performance data obtained show that these cells are at present capable of 300 cycles and could be improved to a typical performance of at least 400 cycles. Truly long-life nickel-zinc batteries capable of 1000 cycles appear to be a distinct possibility in the near future.

M.V.E.

A74-20631


Nickel-zinc cells have been fabricated from positive electrodes prepared by a unique, low-cost molding technique. These cells are capable of being discharged at the 4C rate with little capacity loss. At reduced temperatures no capacity loss is observed down to -18 C, while at 30 C approximately one-half of the room temperature capacity is obtained. One hundred and sixty full depth cycles have been obtained, provided that a simple conditioning procedure is applied periodically. (Author)

A74-21028


The maximum theoretical conversion efficiency of Schottky-barrier solar cells is calculated in order to ascertain their possible utility. It is shown that Schottky-barrier solar cells are theoretically capable of a maximum solar-energy conversion efficiency very similar to that of conventional homojunction solar cells. Furthermore, the greater simplicity of fabrication of the former makes them an attractive consideration for use in both space and terrestrial environments.

F.R.L.

A74-21316


Discussion of the use of radiography for measuring seal clearances between rotating and static components and for determining the position and shape of various components in a full range of static and dynamic conditions in gas-turbine engines. A linear accelerator with its great output of high energy X rays has for the first time made possible such applications of radiography. The various parameters are reviewed which must be adhered to in order to obtain optimal results.

M.V.E.

A74-21874


The major pollutants produced by gas turbines and the manner and extent to which their exhaust concentration varies with combustor design and engine operating conditions are discussed. Various techniques for reducing emission levels are described, including rich and lean primary zones, water injection, compressor air bleed, variable geometry, and staged combustion. It is suggested that the 1979 U.S. EPA emission standards for aircraft can be met by relatively straightforward modifications to the combustor combined with the use of compressor air bleed at idling. Reference is made to the contribution made toward easing the emissions problem by a reduction in engine specific fuel consumption.

F.R.L.

A74-22271


Specifications for aviation turbine fuels prescribe a very low sulfur content because of highly unfavorable effects of sulfur admixtures on the nickel-containing structural materials employed in the aircraft propulsion systems. The available resources of mineral oil with the required low amounts of sulfur, however, are steadily decreasing. The aviation fuel needed must, therefore, be obtained by refining mineral oil which occurs naturally with higher sulfur contents. The refining process destroys unfortunately surface active substances which enhance the lubricating qualities of the oil. Approaches for overcoming these problems are considered. G.R.

A74-22272


The airship evaluation factor due to Jaray and reported by Pfeiffer (1935) is considered. The evaluation factor is the ratio...
between propulsion efficiency and air resistance coefficient. In the case of the Dolphin airship, the evaluation factor in its present form cannot be used due to the impossibility of a separate determination of the two parameters involved in the ratio. A new evaluation factor is, therefore, derived and used for the evaluation of a number of airships. G.R.

A74-22279 # The motion of a conducting piston in a channel with variable inductance (Dvizhenie provodilashhego poroshka v kanate s promennoi induktivnostju). V. V. Poludov, V. M. Titov, and G. A. Streltsov. PAMT - Zhurnal Prikladnuii Mekhaniki I Tekhnicheskoi Fiziki, Nov-Dej, 1973, p. 41-46. 7 refs. In Russian. Consideration of the motion of a conducting piston in a conduction-type MHD generator channel with solid electrodes. Formulas are obtained for calculating the power characteristics of a pulsed MHD generator under various operating conditions. It is shown that in an MHD generator at values of the magnetic Reynolds number much greater than 1 the power transferred to an ohmic load can substantially exceed the values obtained by Pain and Smy (1961) and Conger (1967). The conditions for obtaining a high coefficient of conversion of piston kinetic energy into electrical energy at a maximum value of the ratio of the electrical energy to the energy of the initial magnetic field in the generator channel are discussed. A.B.K.

A74-22355 Design of high-temperature solid-electrolyte fuel-cell batteries for maximum power output per unit volume. E. F. Sverdruop, C. J. Wardes, and R. L. Eback (Westinghouse Research Laboratories, Pittsburgh, Pa.). Energy Conversion, vol. 13, Dec. 1973, p. 129-141. 11 refs. Research supported by the U.S. Department of the Interior and Westinghouse Electric Corp. A high-temperature, solid-electrolyte battery design study is reported for an integrated fuel-cell power system that makes possible power densities exceeding 6 kW per cu ft of power-cell volume. The cost of the battery raw materials is expected to lie in the range of $10-20 per kilowatt of generating capacity. An approximate treatment, and also a distributed-parameter treatment, are presented. M.V.E.


Review of the development of gradient techniques and their application to aircraft optimal performance computations in the vertical plane of flight. Results obtained using the method of gradients are presented for attitude- and throttle-control programs which extremize the fuel, range, and time performance indices subject to various trajectory and control constraints, including boundedness of engine throttle control. A penalty function treatment of state inequality constraints which generally appear in aircraft performance problems is outlined. Numerical results for maximum-range, minimum-fuel, and minimum-time climb paths for a hypothetical supersonic turbojet interceptor are presented and discussed. In addition, minimum-fuel climb paths subject to various levels of ground overpressure intensity constraint are indicated for a representative supersonic transport. A variant of the Gel'fand-Tatlin 'method of raines' is reviewed, and two possibilities for further development of continuous gradient processes are cited - namely, a projection version of conjugate gradients and a curvilinear search. A.B.K.

A74-23221 # Effect of finite chemical reaction rates on heat transfer to the walls of combustion-driven supersonic MHD generator channels. J. W. Daily (Stanford University, Stanford, Calif.), J.


This book summarizes in a simple descriptive form the state of the art in aircraft applications of advanced hydraulic technology. The principles of hydraulic power generation, accident prevention and maintenance techniques, housekeeping practices, fluid supply in hydraulic units, direction and volume control, and hydraulic fluids are discussed. Hydraulic units, maintenance tools, plumbing operations, pressure-limiting, regulating and unloading devices, braking and landing gear systems, hydraulic system actuation, emergency pneumatic systems, hydraulic testing, and support systems are described. Attention is given to the troubleshooting of a complete hydraulic system. A glossary of the terms used is appended. V.Z.


Considerations of airline airplane selection for the 1980s are discussed in response to a recent British appraisal. It is pointed out that more system efficiency can be gained, and fuel saved, by solving the scheduled-vs-charter situation than by any other means, including airplane and engine design. The total commercial passenger-airplane market is expected to continue to require large, medium, and small aircraft in both short- and long-range applications. M.V.E.

A74-23839 # Lockheed S-3A Viking - With low fuel consumption over a wide power range the TF34-GE2 has high thrust to weight. Aircraft Engineering, vol. 46, Feb. 1974, p. 18-21.


This is an introductory article covering the field of solar photoelectric generators. A description is first given of the various semiconductor materials which can be used in the manufacture of solar batteries. It is then given some insight into the technology currently used in the making and the installing of solar batteries. And finally a summary is given of the principal fields of application of the photoelectric converters. It is to be borne in mind that space vehicles are almost exclusively powered by solar photoelectric generators. On the other hand, earth-side users are in an incipient stage of development. In the context of today's international energy crisis, it can be predicted that they will have a brilliant future. (Author)


It is shown that the WC-C fuel cell offers for many applications an excellent alternative to conventional power sources. For illustration, three demonstration examples are presented: (1) electric trucks for industrial warehouse and plant applications; (2) fork lift trucks; and (3) power supply for radio link stations. M.V.E.

Development work conducted with gallium arsenide was discontinued because the results made it appear that it would not be possible to meet the original design goal of a more economical and more reliable solar cell of lighter weight on a GaAs basis. It is pointed out, however, that GaAs cells might have possibilities for large power plants on earth. Work for the development of nuclear reactors was also terminated. The two reasons for this decision were the high development costs and new advances in enhancing the power of silicon cells. Since 1970 studies have been conducted to improve further solar cells by raising their efficiency, reducing cell thickness, and improving the radiation stability. Activities in the field of solar generators are also reported.


A flexible array with silicon cells has been built at SNIA. It is a fold-up array with an end-of-life power of 1 kW. The actuator is a pantograph. In parallel, MATRA has developed an advanced rigid array. The comparison of both arrays shows that for typical missions such as telecommunications it would be preferable to use rigid arrays instead of flexible arrays as long as the mission power is to be lower than 1 kW. The main results and objectives of the CoS activity are presented. Tests on ground and in space have shown that the stability problems have been resolved. An analysis of the economic problems shows that the CoS cell is a promising device for terrestrial applications.


Both theoretical considerations and recent experimental results have demonstrated possibilities of improving standard solar cell performance. The analysis of limiting factors has led us to define three directions of study: the N type layer, the basic material, and the rear electrode. The ion implanted N-layer has allowed a better spectral response at short wavelengths. Otherwise, a double diffusion process has solved the problem of contacts on a thin N layer. An increase of both open circuit voltage and fill factor has been obtained by lowering the basic material resistivity. A gridded rear electrode results in a lower operating temperature and an enhancement of the spectral response at long wavelengths.


A mathematical method is described for determining the


Recent advances in silicon and Cu2S solar cells are reported in papers dealing with improved device fabrication processes, factors participating in degradation mechanisms, design details of spacecraft solar cell arrays, and prospects of economically justified terrestrial applications. Some particular topics include details of integrated solar cell panels, design features of flexible and deployable large arrays, fabrication methods for thin-film solar cell structures, and the performance of protective coating materials.

T.M.


Review of the current status and future prospects of a program of applied research on photovoltaic solar energy conversion sponsored by the European Space Research and Technology Center. The research carried out deals with solar cells (mainly silicon solar cells and not only to a minor extent the Cu2S-CoS cell), silicon solar cell modules, including the use of welding for the interconnection of solar cells and the development of a process for the deposition of integral covers for solar cells by cathode sputtering of glass, and, finally, design studies of rigid and flexible deployable solar panels. A basic program of future applied research and technology in the field of photovoltaic energy conversion is outlined.

A.B.K.
dependence of the efficiency of a silicon photocell on the doping level of the rear layer. Consideration is given to a cell with uniform exposure and to a cell illuminated perpendicularly to the p-n junction. For photocells with uniform exposure, the optimum doping level is found to increase as the light intensity increases. Intensity increase is accompanied by photocell heating with consequent rise of opposite saturation current and decrease of photovoltage. Therefore, the creation of a cooling system is seen as a means of obtaining greater efficiency. For photocells illuminated perpendicularly to the p-n junction, it is found necessary to reduce the front layer series resistance to obtain greater efficiency. P.T.H.


This paper summarizes the possible technical approaches for the realization of integral diodes. Part of an experimental optimization program is presented which leads to the innovation of a Schottky-type integral diode. Path resistance of the lateral diode on the rear side of the solar cell body is minimized by the introduction of a multilayer. The use of photo- and transistor effect which occur at a diode-solar cell structure was analyzed. Electrical characteristics of various integral diodes are presented. (Author)


To realize a large-scale application of the photovoltaic generation of electricity as a terrestrial power source, a thin layer silicon solar cell structure is proposed. The silicon layer is grown on a stainless steel substrate with a titanium layer of about 1 micron in between to provide ohmic contact. The availability and the economy of the stainless steel is recognized. The methods to grow the semiconductor silicon layer by evaporation, by chemical vapor deposition, and by sputtering are reported. (Author)


Since the 7th Photovoltaic Specialists Conference, very important progress has been made. The final phenomena of electro-chemical instabilities have been ruled out, even for cells being operated in open circuit conditions. The technology has been qualified by a combined test program in space and on ground. Moreover, the technology has been simplified; the collecting grid is now laid down by an electroplating process. Owing to these advancements, it has been considered that the starting of mass fabrication was justified. At this moment a 70 W generator for balloons is being completed. (Author)


A brief assessment is given of the current position regarding the relative merits of CdS and silicon solar cells for both space and terrestrial applications. Having drawn attention to the present absence of any known major stability problem with CdS cells, two other important criteria are adopted for drawing a comparison between the two cells. The first of these is the expected cost in medium scale production of solar modules required for remote and portable terrestrial applications. Brief details are given of an integrated approach to the CdS module construction which uses current technology but results in significant cost savings. The other criterion is the power-to-weight ratio for space arrays. In both of these cases CdS cells are shown to possess significant potential advantages. (Author)


Thin film photocounters on the basis of cadmium sulphide and telluride are considered. The photovoltaic effect is realized in Cu2S-CdS, Cu2S-CdTe, and Cu2Te-Cd2Te heterojunctions where Cu2S or Cu2Te layers are produced by a chemical mode or by use spray in vacuum. The base thin film photoelectric characteristics are given. Thin film module constructions in glass sealed tubes and the results of their tests under terrestrial conditions are considered. (Author)


For several years the CNES has developed thin-film solar cells using CdS as the basic material. This material possesses good photoelectric qualities and has the advantage of having physical properties in the form of thin polycrystalline films almost identical to the material mass. Efficiencies of 7 percent are regularly obtained with solar cells covered with Acelor, and one has the right to ask if space or earth use might be possible. In this paper, we make a synthesis of the main results obtained during the last years in order to foresee the different uses of this new type of solar cells. (Author)


The performance of photovoltaic conversion of solar energy by means of CdS-Cu2S thin films photocells is examined, in the French east south, for the 1980-1990 period. It seems that this production mode of electric energy could be competitive, around 1985, if the

The local distribution of surface potential, photovoltaic efficiency, and temperature under forward and reverse current conditions of Cu(x)IS-CdS thin film solar cells have been studied. The methods employed were a scanning electron beam, a scanning light beam, and a cholesteric liquid crystal. All cells investigated by the above methods show inhomogeneities in both local domains and larger areas. Special forms of degradation were investigated by a flying-spot tube, and the buildup of local defects can be proved.

(Author)


This paper traces the development of the RAE lightweight flexible fold-up solar array, culminating in the recent successful tests on a 280 W prototype which have qualified the device for six years in geostationary orbit. The array embodies a number of unique features, including 126 micron silicon solar cells with wraparound contacts, 100 micron ceria-stabilized glass coverslips, cementless mounting of cells on the flexible substrate, and deployment by a pneumatically actuated telescopic mast. A small version of the array is to be flown on the British X4 satellite in 1974, and a 900 W derivative is planned for the Geostationary Technology Satellite.

(Author)


The results of investigations performed on the optical coating properties for solar energy semiconductor photovoltaic converters and concentrators are given. It is shown that with the aid of optical coatings the problems of reduction of solar radiation reflection from the semiconductor surface, improvement of the heat balance, protection of the conductor photovoltaic generator from space radiation, and protection of the solar energy concentrator from atmospheric effects can be solved.

(Author)


The current-voltage characteristics of the silicon solar cell array of D2A were measured under laboratory conditions of an air mass of 1, an illumination of 100 mW/sq cm, and a cell temperature of 28 C. It was calculated that the value of the current obtained (2.38 A) would have to be multiplied by a factor of 1.18 to obtain the value of the current that the solar array would have delivered under standard operating conditions of air mass zero, illumination equal to one solar constant, and cell temperature of 28 C. The current was then measured during the first orbit and was found to be 1.14 times the laboratory value. A different value for the solar constant would have obtained the correct correction factor. In the first ten months of orbit, the degradation of the array was found to be greater than predicted, but after the twelfth month the predicted and actual degradation were in close accord. Bombardment of the cells by low energy protons is discussed as a principal cause of degradation.

P.T.H.


Within the framework of the Franco-Soviet cooperation agreement, a technological satellite was launched in April 1972 with the aim of studying solar cells. Several experiments concerning new technological aspects of solar cells were undertaken to examine thin film CdTe solar cells, thin film Cu(x)IS solar cells, and silicon solar cells (perradiated and nonirradiated). The effects observed on silicon solar cells and on other thin-film solar cells made of Cu(x)IS and CdTe are described. The observed short-circuit degradations are compared with those previously obtained under laboratory conditions.

(Author)


During the project definition phase, three different solar generator concepts for the three-axis stabilized satellite Symphonie were investigated - one version with three rigid arrays, the other with two semiorientable arrays, and the third with two orientable arrays. The major problems and constraints are examined and discussed. This study led to the choice of the fixed version with three nonoriented and body-fixed arrays spaced at 120 deg. Its performance is described. In this configuration, the solar generator will supply the power for a lifetime of 5 years.

(Author)


Advances and improvements in the field of solar batteries are considered. The damage in solar batteries caused by corpuscular radiation can be significantly reduced by increasing the resistance of the silicon base. Other advances are connected with the thermal annealing of radiation damage and the implantation of lithium as a doping ingredient. Improvements in thermal cycle stability are discussed together with high-temperature solar batteries and high-voltage photovoltaic solar converters.

G.R.
A74-24937


Results for the first two years of work on direct conversion of solar into electrical energy, carried out by our research group, are presented. The study was undertaken with a view to examining the possibilities of solar energy conversion under earth conditions in general, and in Israel in particular. Automatic measurements and recordings in stations dispersed throughout the country are processed by a central system. The design of the stations, and original design techniques for single-cell measurement units and multiple arrays are described. The experimental part of the paper includes a description of the special processing of the meteorological observations, with a view to data on the design of power supplies based on solar cells. (Author)

A74-24939


Photovoltaic energy systems are described which compete economically with other power sources for terrestrial applications. A detailed description of a silicon solar cell module specifically designed to meet the cost and environmental requirements of various applications is described, including a description of the power conditioning, power storage, and powered equipment and the results of tests and installations in service during the last two years. (Author)

A74-24940


Silicon solar arrays provide an excellent means of supplying on-board energy for electronic devices in sounding balloons which must remain somehow in the atmosphere. The environmental stresses to which the generators are subjected, are examined. Three types of solar arrays are described together with the technologies developed for their applications and the results obtained. (Author)

A74-24941


The United States Solar Energy Panel was charged with assessing the potential of solar energy as a national energy resource. Three areas evolved where solar energy could supply significant amounts of the U.S. future energy needs: (1) energy for heating and cooling of buildings, (2) the production of fuels, and (3) the generation of electrical power. It was concluded that with adequate R&D support over the next 30 years, solar energy could provide at least 35 percent of the heating and cooling of future buildings, greater than 30 percent of the methane and hydrogen used in the U.S. for gaseous fuels, and greater than 20 percent of the electrical power needs of the U.S. All of this could be done with a minimal effect on the environment and a substantial savings of nonrenewable fuels. (Author)

A74-24942


The results of work carried out on a satellite solar power station (SSPS) since the concept was presented at the 1968 Solar Energy Conference are reviewed. The objective of this concept is to supply electrical power on the earth to provide an economically viable and environmentally and socially acceptable alternative to other energy production methods. The principle on which the SSPS is based relies on solar energy conversion in a satellite in synchronous orbit to produce electricity. This electricity is fed to microwave generators arranged to form an antenna which directs a beam to a receiving antenna on earth, where the microwave energy is efficiently and safely converted back to electricity. (Author)

A74-24943


Review of the current performances and limitations of two generations of solar cells which have been successfully developed. The technical and economic factors which have contributed to the success of both the silicon single-crystal solar cell and the CdS polycrystalline film solar cell are outlined. It is shown that CdS cells make it possible to envisage a large range of applications where an energy cost of the order of 0.01 to 0.1 dollar/watt-hour is admissible. It is concluded that cells with variable forbidden bands, the theory and initial prototypes of which have been developed by Marfaing and Cohen-Solal (1988), should make possible an improvement in the efficiency (up to 25 percent) and cost of photoelectric energy in the not too distant future. A.B.K.

A74-24996


The state of the art of power generation systems carried by spacecraft and rocket stages is reviewed, covering solar cells, fuel cells, chemical, biochemical, thermoelectric and thermionic cells, atomic power batteries, and MHD generators. Various electric power converter designs used in spacecraft technology are also considered. Further developments in the field are visualized to meet the growing challenge of spaceflight technology. V.Z.

A74-25217


The attainability of the very low limits which have been set for the 1975/76 automobiles and 1979 gas turbines is studied on the basis of a theoretical model developed to comprise a simple premixed two-stage combustor, with a stirred reactor as the first stage and a dilution zone as the second stage. The performance of the combustion section is calculated from an equation derived by Kretschmer and Ogders (1972), with the aid of which the air and fuel loadings
can be related to the equivalence ratio and combustion efficiency. It is shown that attainment of the low pollution levels will be extremely difficult. Changes in inefficiency due to ambient conditions are very significant at these levels, so that corrective techniques will be essential. Test rig repeatability is also in doubt. V.P.


The rate of CO burnout under conditions simulating operational engine idling downstream of the dilution plane was determined from a simple study of combustion. In general, the results indicate that for idling conditions, CO is unlikely to be eliminated effectively by oxidation in the fully diluted gas. V.P.


The future development of civil aviation is discussed from the viewpoint of new constraints dictated by considerations of the quality of life and the economic environment. Factors considered include reduction of noise levels, sonic boom hazards, engine exhaust and toxic emission regulations, the availability of aircraft fuels, transport time intervals, availability of airspace, and airport capacity and access problems. The nature of problems posed by each of these factors is discussed along with promising solutions. T.M.


Investigation of the optimal use conditions for a solar panel of photovoltaic cells designed to make available directly usable electric energy for the local needs of Sahara-near Sudanese regions lacking electric utility supplies. The tests and studies were conducted at the laboratory of physics of the Bamako Ecole Normale in the Sudan. M.V.E.


Since aviation technology has attained such a high degree of development, the question is raised concerning remaining possibilities for further growth. Clearly, much effort will be devoted to cost reduction and the refinement of present technology. However, many new fields of research are just beginning to be opened up. These include controlled configuration vehicles, the application of computers to engineering problems, the use of computers in navigation systems, noise reduction, atomic fuels, and composite materials. It is stressed that cooperation between European nations will be necessary for overcoming cost limitations in European research. P.T.H.


Subjects considered are in the areas of position sensitive detectors, semiconductor detector materials, semiconductor detector technology, biomedical instrumentation, reactor instrumentation, nuclear instrumentation, and data acquisition and processing. Topics related to photon detection are discussed together with methods for environmental radiation measurement, aspects of environmental gamma-ray analysis, and nuclear techniques for elemental analysis. Attention is also given to operation and design experience with systems at nuclear power plants.

Individual items are announced in this issue. G.R.


The operation of a solar cell power source as used on artificial satellites is outlined. Knowledge of the following parameters of the solar generator is considered necessary for the design of a simulator which will be able to reproduce its voltage-current behavior: the short-circuit current, the discharge voltage, the power output, and the impedance. Both digital and analog simulations are possible, though less problems are connected with analog simulation. The design and operation of an analog simulator are described which can employ either a single solar cell or a Zener diode as a reference element. P.T.H.


The design and performance characteristics of modern solar arrays whose basic element is a slice of single-crystal silicon, typically measuring 2 by 2 cm and 300 or 125 microns thick, are discussed. In the n-p-n configuration, a shallow junction is formed by diffusing phosphorus into the boron-doped crystal. Metal contacts are plated or evaporated on the front and back of the cell, and the active surface is coated with an SiO or TiOx antireflective layer. The cell responds to wavelengths between 0.4 and 1.1 micron, peaking at 0.8 to 0.85 micron. The behavior of efficiency as a function of the temperature is examined. Recent developments in large arrays constructed of folded rigid panels or of rolled or folded flexible panels are illustrated and discussed. V.P.


The design characteristics, principles of operation, and performance of a novel high-force turbine-driven actuator are discussed. Intended for thrust vector control, the actuator converts the power from hot or cold gas flows or from bleed air into mechanical output, and provides a rotary or linear output force in response to input commands. The actuator will operate directly on hot dirty solid-propellant gases, using the same hot-gas control valves which are being used for thrust vector control systems on Minuteman and Poseidon missiles. V.P.

A74-27321

Assessment of the prospects of nuclear electric power production in the context of other power sources and of the current energy demands and resources. The properties, economic costs and demands of nuclear plants, the U.S. uranium resources, nuclear hazards and waste disposal, breeder reactors, controlled fusion, and nuclear vs fossil power are discussed. It is pointed out that there are some reasons, both technological and social, to expect that the increase of nuclear power application for electric power generation will be even greater than had been hitherto anticipated. The impact of this increase on the economy, skilled labor, and capital investments is visualized.


An attempt is made to evaluate the economic, institutional and technological factors which will influence the production of geothermal electricity in the near future. Dry steam and hot water geothermal fields which may be available for electric power generation are assessed. Emphasis is on the U.S. prospects in the field.


Discussion of the chemical, energetic and economic aspects of solar-to-electric energy conversion by photosynthesis. Several model systems of photosynthetic solar energy conversion are described in detail, including photochemical hydrogen production, carbohydrate and polysaccharide production, and oxygen production by photosynthesis of binuclear manganese compound. The photoelectric membrane is considered as an agent in the primary quantum conversion event in the green plant. It is anticipated the conversion of carbohydrates from cane or beets through alcohol-to-hydrocarbon fermentation may become economic due to improved fermentation technology and increasing costs of hydrocarbon recovery from fossil sources.


Wind power, ocean thermal gradient power, solar heat, and solar-to-electric power conversion are considered as means of solar energy utilization by physical methods. An evaluation is made of total solar energy delivery on the projected U.S. energy economy. It is estimated that the potential sales in photovoltaic arrays alone can exceed $400 million by 1980 to meet the projected capacity buildup.


A mathematical modeling of well-known methods used to define turbojet main parameters, aiming at solution optimization, is described. The parameters considered include: compression ratio, maximum temperature for turbine, compressor efficiency, turbine efficiency, and others. A function representing a sum of the ratios describing specific thrust and SFC deviations against maximum specific thrust and minimum SFC, respectively, is derived. Main parameter selection criteria pending on engine operation conditions and aircraft category are introduced. Mathematical analysis for main parameter selection optimization leads to a convex programming model for which both the function and the constraints are convex functions defined by convex fields.


Energy losses during useful power production in reciprocating piston engines and turbojet engines are discussed. Mechanical friction, propeller blade drag and slipstream turbulence and rotation are considered as the causes of energy losses in the former. Mechanical friction, incomplete kinetic-to-pressure energy conversion, air compression in the compressor, incomplete fuel burning, gas flow turbulence, acceleration and drag, combustion product expansion, and incomplete gas-to-kinetic energy conversion in the nozzle are considered as the causes of energy losses in the latter. V.Z.


The properties of solar-electric energy converters are discussed with particular attention to photoelectric converters using CuS-CdS, CuTe-CdS, BiS-CdS; and CrS-CdS junctions. Techniques for obtaining such heterojunctions by electrochemical treatment of respective sulfide materials are described, with details concerning the formation of p-layers. The parameters and performance characteristics of junctions prepared by these techniques are included. Photoconverters produced by these techniques perform steadily in time and have an efficiency of 4 to 6%.


The utilization of wind energy is technically feasible as evidenced by the many past demonstrations of wind generators. The cost of energy from the wind has been high compared to fossil fuel systems. A sustained development effort is needed to obtain economical systems. The variability of the wind makes it an unreliable source on a short-term basis. However, the effects of this variability can be reduced by storage systems or connecting wind generators to fossil fuel systems, hydroelectric systems, or dispersing them throughout a large grid network. The NSF and NASA-Lewis Research Center have sponsored programs for the utilization of wind energy.


Estimates are made for both the performance and the power costs of H2-O2 combustion powered steam-MHD central power systems. Hydrogen gas is assumed to be transmitted by pipe from a remote coal gasifier into the city and converted to electricity in a steam MHD plant having an integral gaseous oxygen plant. These steam MHD systems appear to offer an attractive alternative to both in-city clean fueled conventional steam power plants and to remote coal fired power plants with underground electric transmission in the city.

(Author)
The anticipated development of advanced high-performance radioisotope power systems has motivated a new evaluation of their possible utility in earth-orbit missions. These have been compared, in detailed spacecraft design studies, with current and improved oriented-solar-array/battery systems in commercial synchronous-orbit application. It is concluded that the nuclear systems would be economically superior to current solar systems, including violet cells, and potentially competitive with systems employing nickel-hydrogen batteries. This results in part from significant reductions in housekeeping power, and in the weights of other subsystems, which can be achieved with nuclear power.  

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One of the problems associated with tracked air cushion vehicles (TACVs) is their high power requirement. It is shown that the power required for levitation for such vehicles can be significantly reduced by the use of multiple-stage air cushions. A mathematical model for these air cushions is developed, and the air cushion pressures obtained from the model are compared with experimental pressures. It is shown that one of the most significant features of multiple-stage air cushions is their inherent roll stability as opposed to an inherent instability for conventional air cushion designs. This inherent roll stability allows a significant reduction in the power required for levitation for tracked air cushion vehicles.

Advanced high-performance military fighter and bomber systems must use an advanced technique of energy management. Energy management in terms of optimum throttle and flight path will yield significant improvements in fuel, time, and distance over conventionally operated aircraft. Nominal flight path performance for certain mission segments is compared to fixed throttle optimum flight path performance and to variable throttle optimum flight path performance. Mission throttle control parameters are identified that can be measured in the engine and on the airframe during flight. These parameters are used to serve as indicators of the optimum throttle position. This avoids the necessity of carrying extensive throttle position data on board the aircraft. Sensors and transducers that may be used in the flight control/engine throttle control system are discussed.
STAR ENTRIES

N74-15734*# Kanner (Leo) Associates, Redwood City, Calif.
WIND ENERGY: ITS VALUE AND THE CHOICE OF SITE FOR EXPLOITATION
(Contract NASw-2481)
(NASA-TT-F-15311) Avail: NTIS HC $3.00 CSCL 10A
The problem of wind power utilization is discussed, including determination of wind power per square meter obtained yearly from surfaces subjected to wind action, and systematic prospecting working machines, calculators for strength, and construction and determination of wind power per square meter obtained yearly presented. Methods of optimal matching of wind engines with the wind engines used.
Author

N74-15739*# Scientific Translation Service, Santa Barbara, Calif.
HIGH POWERED ELECTRICAL POWER GENERATION BY WIND MOTORS
M. Kloss Washington NASA Feb. 1974 11 p ref Transl. into ENGLISH from Elektrotech. Z. (West Berlin), v. 72, no. 7, 1 Apr. 1951 p 201-202
(Contract NASw-2483)
(NASA-TT-F-15303) Avail: NTIS HC $3.00 CSCL 10A
The development of a wind wheel for electric power generation is discussed. The interaction between the wind wheel and the generator is accomplished with a power control device to prevent overloading the generator when the wind velocity increases. The self-controlled running wheel of the wind motor adjusts the blade angle of attack to compensate for the wind velocity. The generator must be dimensioned for the greatest wind intensity in order to accept the entire wind wheel power. The wind generation installation delivers all of the produced energy to the network so that other generating stations operating in parallel and the storage units must adjust the power level to the consumers.
Author

N74-15740*# Techtran Corp., Glen Burnie, Md.
NEUWERK WINDMILL POWER GENERATION PLANT
(Contract NASw-2485)
(NASA-TT-F-15303) Avail: NTIS HC $3.00 CSCL 10A
The installation and characteristics of a windmill power generation plant are discussed. The meteorological parameters of the German North Sea Coast which influenced the location of the windmill power generation system are analyzed. The regulating devices for compensating for changes in wind velocity are described. Results of the power generation operation for the year 1950 are tabulated.
Author

N74-15741*# Scientific Translation Service, Santa Barbara, Calif.
ECONOMY AND PRACTICAL APPLICATIONS OF LARGE WIND-DRIVEN POWER PLANTS, PART 1
1938 p 1373-1376
(Contract NASw-2483)
(NASA-TT-F-15308) Avail: NTIS HC $3.00 CSCL 10A
The question of the economy of large scale wind electrical generating stations is investigated based on present findings. By exploiting wind energy for producing electrical power, large amounts of coal could be made available for other uses, and would also ease our foreign currency situation. The practical aspects of large scale wind electrical power generating plants are discussed. The construction of a ring generator is described.
Author

N74-15742*# Kanner (Leo) Associates, Redwood City, Calif.
WIND-POWERED MACHINES
(Contract NASw-2481)
(NASA-TT-F-15319) Avail: NTIS HC $16.00 CSCL 10A
The basic problems connected with the selection of layouts and calculation of parameters of wind machines, their energy-producing characteristics and technical and economic indices is presented. Methods of optimal matching of wind engines with working machines, calculators for strength, and construction and automation of wind machines are analyzed in detail. A description is given of the setup of domestic and foreign wind installations for various purposes. Basic characteristics of wind as a source of energy, exact information from aerodynamics, the theory of the wind engine and calculation of its aerodynamic characteristics are presented. In conclusion, recommendations are presented for use of wind machines according to zone. The book is intended for engineers, designers and workers of scientific and research institutes connected with creation and utilization of wind machines and for engineers and mechanics in agriculture.
Author

N74-15743*# Kanner (Leo) Associates, Redwood City, Calif.
WIND POWER PLANTS IN RUSSIA
(Contract NASw-2481)
(NASA-TT-F-15331) Avail: NTIS HC $3.00 CSCL 10B
Several measures relative to wind power plants have been taken by the Soviet government, and are outlined. The large Balaklava wind power plant is described briefly. The wind power experimental facility in Moscow is illustrated in a diagram and its operation discussed in some detail.
Author

N74-15745*# Kanner (Leo) Associates, Redwood City, Calif.
OBSERVATIONS ON MODERN WIND-ELECTRIC POWER PLANTS
(Contract NASw-2481)
(NASA-TT-F-15357) Avail: NTIS HC $3.25 CSCL 10B
Development of the aeronautical type windmill design and the installation of wind-powered electricity plants is held feasible for Italy undergoing post-war reconstruction. It is shown to be possible to build from 200 to 300 small capacity power plants for a total output of 10,000 to 15,000 kW in areas of Italy which have the minimum necessary wind speed of 6.5 m/sec. Among the designs required for such wind electricity plants are windmill blades with variable pitch, automatic pitch control system which does not use the costly servomotor, and reversible wheels. These features enable a windmill of limited orientability to function with high efficiency. The effect of wind rose patterns, the surface area of the blade, and some possible local uses of the electricity produced by such plants are also discussed.
Author

N74-15746*# Scientific Translation Service, Santa Barbara, Calif.
IMPORTANCE AND PROGRESS OF WIND POWER UTILIZATION IN DENMARK

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N74-15747


N74-15747# Scientific Translation Service, Santa Barbara, Calif.

CHARACTERISTIC LINES (YEARLY PERMANENT LEVEL LINES) AND CHARACTERISTIC WIND VARIABLES FOR WIND ENERGY PRODUCTION


Optimum design methods for wind driven electrical generating plants are presented, based on yearly permanent wind level lines for selected erection sites. Wind conditions at any site are divided into five classes, of which only a few can be exploited by a given system. General purpose design curves are given. Author


METHOD OF CALCULATION OF ANNUAL OVERALL EFFICIENCY OF MODERN WIND POWER PLANTS


A method of calculating the annual overall efficiency of modern wind power plants equipped with asynchronous generators is reported that takes into account the annual velocity duration curve at Den Helder, Holland. A comparison is made between variable pitch windmills and fixed blade windmills equipped with movable flaps. A careful calculation is recommended in view of rather small differences in efficiency for both systems. Author

N74-15747# Kanner (Leo) Associates, Redwood City, Calif.

PROBLEMS IN THE ELECTRICAL EQUIPMENT OF WIND POWER PLANTS


Problems encountered in electric installations of wind power plants are discussed. Difficulties involved necessitate close cooperation of aerodynamic and electrical engineer in implementing wind power plants for d-c and a-c currents. Examples of actual installations in Germany are presented: a present task is erection of small wind power plants for farms. Author

N74-15750# Scientific Translation Service, Santa Barbara, Calif.

THE LARGE SCALE WIND DRIVEN ELECTRICAL GENERATING STATION


Large wind power plants and their use to alleviate coal shortage in Germany are discussed. It is stipulated that there is no economic necessity for development of large scale wind power plants before possible improvements in steam power plants such as combined heating and power plants, high pressure plants, etc. have been exhausted. A table gives comparison of costs and efficiency of wind and steam power plants. Author

N74-15751# Scientific Translation Service, Santa Barbara, Calif.

UTILIZATION OF WIND POWER WITH WARD-LEONARD TYPE CIRCUIT IN INVERTED OPERATION


An electric circuit is described comprising two direct current machines and one three-phase synchronous or an asynchronous induction machine suitable for transforming and feeding the energy from the wind into a three-phase conventional electric power network. Author

N74-15752# Kanner (Leo) Associates, Redwood City, Calif.

UTILIZATION OF WIND POWER IN AGRICULTURE IN THE USSR

D. Stein Washington NASA Feb. 1974 13 p refs Transl. into ENGLISH from Elektrizitaetskraftverwaltung (West Germany), v. 40, no. 4, 5 Feb. 1941 p 54-56 (Contract NASw-2481)

Wind motors are being used in Russian agriculture for milling and pumping water. Plans call for rapid expansion of the utilization of such power plants. The extent of present utilization, problems, and forecasts are outlined. Author

N74-15753# Kanner (Leo) Associates, Redwood City, Calif.

PROGRESS IN THE UTILIZATION OF WIND POWER


Wind power continues to be of interest as a source of energy for isolated locations. In order to distribute the capital costs over many service hours, the wind motors should be able to exploit low wind speeds. Low speed wind motors can be used only for driving slow machinery. High speed wind motors to drive small dynamos are now available which are self starting at low wind speeds. Large scale wind power stations have not yet passed the experimental stage. Author

N74-15764# Scientific Translation Service, Santa Barbara, Calif.

IMPORTANT AND PROGRESS OF WIND POWER UTILIZATION IN DENMARK

Dimitry Stein Washington NASA Feb. 1974 19 p refs Transl. into ENGLISH from Elektrizitaetskraft (Frankfurt am Main), v. 41, no. 16, 20 Aug. 1942 p 370-374 (Contract NASw-2483)

The designs of various wind power plants in Denmark are discussed. Price lists for the plants are given along with prices for direct current generators for wind power plants. Author

N74-15755# Kanner (Leo) Associates, Redwood City, Calif.

MEDIUM-CAPACITY AIR MOTOR PILOT PLANT WITH HYDRAULIC ENERGY ACCUMULATION BY PUMPING


An air motor power plant is to be erected on the island of Giglio. Italy. Slow speed orientable windmill designs are replaced by high speed air motors, protected and fixed in space. The entire air motor is placed in a tubular system similar to a Venturi tube. The operation of the enclosed air motor may be regarded as similar to that of a Kaplan turbine. Author

N74-15756# Technicon Corp., Glen Burnie, Md.

UTILIZATION OF WIND POWER

J. W. VanHeys Washington NASA Feb. 1974 11 p refs Transl. into ENGLISH from Elektrotech. Z. (Berlin), v. 64, no. 34
The possible power of wind in a wind turbine is determined from the airtable wind frequency line to provide the basis for the design of a wind turbine. Favorable results are obtained if work is continued on the previous principle of mill construction. There are two ways of achieving adequate power: enlarging the circumference of the windmill or using higher wind velocities. The latter are present at an altitude of about 200 meters above the ground. Satisfactory performance is attained with a vane length of 60 meters. Thus it is recommended that tests running at least one year be instituted with these dimensions.

Author:

N74-15757*# Scientific Translation Service, Santa Barbara, Calif.

**THE DIRECT DRIVING OF SYNCHRONOUS GENERATORS BY LARGE SCALE WIND ELECTRICAL POWER GENERATING PLANTS IN PARALLEL OPERATION WITH A SYNCHRONIZING NETWORK, PART 1**


(NASA-TT-F-15300) Avail. NTIS HC $3.00 CSCL 10B

The damped eigen oscillation of a synchronous generator connected with a fixed network is investigated. It is assumed that the generator is driven by a wind propeller wheel. The influence of the variation of the characteristic of the propeller wheel on the variation of the transient oscillatory behavior is investigated. First the wind velocity increase occurs suddenly and then in a continuous fashion. The power control measures including propeller pitch displacement are investigated for preventing overloads on the generator. The danger of resonance is pointed out. This depends on the number of propellers. The question is discussed of whether it is better to use an asynchronous generator instead of a synchronous generator. Author:

N74-15760*# Kanner (Leo) Associates, Redwood City, Calif.

**INVESTIGATION OF THE POSSIBILITIES OF USING WIND POWER**


(Contract NASw-2481)

(NASA-TT-F-15336) Avail. NTIS HC $3.00 CSCL 10B

Kromann's critique of several of Juul's articles in Elektroteknikeren and of Jul's riposte is reported. For example, Kromann argues that it should not be expected that wind tunnel experiments, necessary as these are for finding the best vane design, will yield the same results as real conditions. Juul counters that the same efficiency can be obtained in the open air as in a wind tunnel and that, in any case, this point will be investigated in greater detail in the near future. Kromann has misgivings about building windmills on the west coast of Jylland because he fears that the force of the wind there is too variable. Juul counters that wind force measurements show that this fear is unfounded (the corresponding curves are given).

Author:

N74-15762*# Scientific Translation Service, Santa Barbara, Calif.

**PARALLEL OPERATION OF A SYNCHRONOUS GENERATOR AND AN INFINITELY HIGH-POWERED NETWORK WHEN DRIVEN BY A HONNEF-GROSS WIND TURBINE**


(Contract NASAw-2481)

(NASA-TT-F-15333) Avail. NTIS HC $3.00 CSCL 10B

Denmark was one of the first countries to turn its attention to generating electric power from wind power, because it has to import all oil and coal it uses, and it has virtually no hydroelectric power. A large number of wind power stations were built in the early years of World War I when fuel was scarce. The total production of wind power was estimated at approximately 1.8 million kWh in 1941. The installation of wind power stations was generally considered to be a temporary measure.

Author:

N74-15763*# Scientific Translation Service, Santa Barbara, Calif.

**ANTENNA TOWERS AS WIND TOWER GENERATION PLANTS**


(Contract NASAw-2483)

(NASA-TT-F-15304) Avail. NTIS HC $3.00 CSCL 10B

A variety of wind power generating plants are considered to be installed on FM antenna masts. These include: Savonius rotor, horizontal axis wind wheels, multi-rotor configurations. Power levels vary between 10-20 kW for 100 meter mast heights.

Author:

N74-15764*# Kanner (Leo) Associates, Redwood City, Calif.

**WIND ENERGY**


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using large wind power plants to directly drive synchronous generators in parallel operation with a governing network.


Various aspects of wind powered synchronous generators are described. The influence of the fan wheel characteristic on damping of transients is slight. Altering vane position is the only feasible method for regulating power in order to avoid overloading the generator. In designing the fan wheel, and choosing the number of vanes, the operating behavior of the generator and the danger of resonance must be considered ahead of efficiency. Practical operating characteristics of the fan wheel must be known to the electrical engineer if he is to calculate the course of events during a transient.

Author

Kanner (Leo) Associates, Redwood City, Calif.

PROSPECTS FOR THE UTILIZATION OF WIND ENERGY IN CZECHOSLOVAKIA


Technical and economical conditions for the utilization of airstreams in Czechoslovakia are considered. The probable mean wind velocities in various districts of the country, their number and the probable daily and yearly charts at various altitudes, the most windy districts, the possibilities and extent of utilizing the airstreams by power stations equipped with prime movers with a 50 m propeller diameter and a 30-35 m high tower are investigated and presented on the basis of many years of observation. It is determined that the power stations in

Author

Kanner (Leo) Associates, Redwood City, Calif.

NEW WIND POWER STATION


A wind power plant is described which was used during the fuel shortage that occurred in World War II. Unlike ordinary wind power plants which produce usable power only at wind velocities above 4 or 5 m/s, this power plant was designed to operate over a wide range, changing its battery at low wind speeds, delivering usable power from generator and discharging battery at intermediate speeds, and delivering power and charging its batteries at high wind speeds. The result was exploitation of the wind for a larger number of hours per year and lower costs per kWh of output.

Author

Kanner (Leo) Associates, Redwood City, Calif.

WIND-POWER SUPPLY FOR THE DECENTRIMAL RANGE DIRECTIONAL RADIO SITE AT SCHONEBERG (EIFEL) AND THE EXPERIENCE GAINED


The Schoneberg directional radio station is located far from the wind power lines on a hilltop where the average wind velocity is 5.6 m/sec. The station, as first designed, required 25 kW/day of dc power. It uses two Allgaier wind power systems. Dr. Hutter type WE/G 6, with a nominal output of 6 kW at 9 m/sec and 1 kW at 4.2 m/sec wind velocity mounted on two 10-m high tubular poles. The dc generators are differentially compounded, shunt-wound. Lead storage batteries of 110 cells and 218 Ah are used to stabilize the output and store the energy. A diesel generator system is available as an emergency system. Tests show that more than 90% of the power required for the initial unmodified communications system could probably have been supplied by the wind power system. The results were completely positive. Wind power stations are economically advantageous where it is very expensive to connect to the public power system, where adequate wind is available and especially when only a moderate amount of power is required.

Author

Kanner (Leo) Associates, Redwood City, Calif.

THE UTILIZATION OF THE WIND ENERGY


Wind energy exploitation by very large wind power generating stations is discussed. This system is compared to other types of power generation.

Author

Kanner (Leo) Associates, Redwood City, Calif.

SMALL WIND-ELECTRICAL INSTALLATIONS FOR EXPORT


The design and operational problems are reported that are associated with wind power generating plants similar to the American wind chargers. The potential market for such export is discussed.

Author

Kanner (Leo) Associates, Redwood City, Calif.

SOVIET GEOTHERMAL ELECTRIC POWER ENGINEERING

REPORT 2

V. A. Stepanov Deck. 1972 85 p. refs

Information is provided on Soviet geothermal research and engineering associated with the design, construction, and maintenance of geothermal power plants and related facilities. Besides a general outline of geothermal characteristics, emphasis in this report is on Soviet geothermal research and development, including engineering data on existing power plants, as well as those under construction and in the planning stages. Other actual and potential applications of geothermal water such as for space heating, hotwater supply, mining and construction in permafrost regions, refrigeration, air conditioning, agriculture, medical and health applications, etc., are discussed.

Author (GRA)

Army Foreign Science and Technology Center, Charlottesville, Va.

SOME RESULTS OF TESTING OF A SOLAR WATER HEATING INSTALLATION DURING THE HEATING SEASONS


An experimental investigation of solar water heating plant with operating surface 2 sqm, mounted at the angle 50 degrees with the horizon are given. The possibility and expendability of solar energy application as a low potential heat source for the heating pump in heating regime are described.

Author (GRA)
with underground mine operators indicate good correlation of the suitability of solar absorber coatings for use as the in the underground mines. First hand observations fractures measured on bedrock outcrops, and fractures measured between the directions of fracture traces mapped from the imagery, (AD-769449; Contract from E74-10238; Original contains imagery. Original photography may be purchased from the EROS Data Center. 10th and Dakota Avenue, Sioux Falls. S. D. 57198 ERTS (Contract NAS9-13538) (E74-10258; NASA-CR-136586; QPR-3) Avail: NTIS HC $3.25 CCL-321) Refs (Contract NASA-CR-16071* Indiana Geological Survey, Bloomington. APPLICATION OF EREP IMAGERY TO FRACTURE-RELATED MINE SAFETY HAZARDS AND ENVIRONMENTAL PROBLEMS IN MINING Quarterly Progress Report, 20 Oct. 1973 - 20 Jan. 1974 Charles E. Wier, Frank J. Wobber, Roger V. Amato, and Orville R. Russell, Principal Investigators 22 Jan. 1974 14 p Ref Prepared in cooperation with Earth Satellite Corp., Washington, D.C. Original contains imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Avenue, Sioux Falls. S. D. 57198 ERTS (Contract NAS9-13538) (E74-10258; NASA-CR-136586; QPR-3) Avail: NTIS HC $3.25 CCL-321) The author has identified the following significant results. All Skylab 2 imagery received to date has been analyzed manually and data related to fracture analysis and mined land inventories has been summarized on map-overlays. A comparison of the relative utility of the three image products for fracture detection, soil tone/vegetation contrast mapping, and mined land mapping has been completed. Numerous fracture traces were detected on both color and black and white transparencies. Unique fracture trace data which will contribute to the investigator's mining hazards analysis were noted on the ERTS imagery; these data could not be detected on ERTS-1 imagery or high altitude aircraft color infrared photography. Stream segments controlled by fractures or joint systems could be identified in more detail than with ERTS-1 imagery of comparable scale. ERTS-1 mine hazards products will be modified to demonstrate the value of this additional data. Skylab images were used successfully to update a mined land map of Indiana made in 1972. Changes in mined area as small as two acres can be identified. As the Energy Crisis increases the demand for coal, such demonstrations of the application of Skylab data to coal resources will take on new importance.

N74-18049# Geological Survey, Washington, D.C. CLASSIFICATION OF PUBLIC LANDS VALUABLE FOR GEOTHERMAL STEAM AND ASSOCIATED GEOTHERMAL RESOURCES L. H. Godwin, L. B. Haigler, R. L. Rioux, D. E. White, L. J. P. Muffler, and R. G. Wayland 1971 21 p Refs (CIRC-647) Avail: NTIS HC $3.25 The classification standards for determining which Federal lands are classifiable as geothermal steam and associated geothermal resources lands under the Geothermal Steam Act of 1970 (84 Stat. 1566) are presented. The concept of a geothermal resources province is established for classification of lands for the purposes of retention in Federal ownership of rights to geothermal resources upon disposal of Federal lands. A geothermal resources province is defined as an area in which higher than normal temperatures are likely to occur with depth and in which there is a reasonable possibility of finding reservoir rocks that will yield steam or heated fluids to wells. The determination of a known geothermal resources area is made after careful evaluation of the available geologic, geochemical, and geophysical data and any evidence derived from nearby discoveries, competitive interests, and other indicia. Author

thermal power source to drive spaceborne Vuilleumier cycle cryogenic refrigerators was evaluated. The coating tested consisted of layers of A1203-Mo-A1203 (AMA) on various substrates. The coating was thermally cycled from 1500 to 1600°F about 10,000 times, simulating conditions for three years in orbit. Results are discussed.


(PB-224251/9GA; APTD-1588A-Pt-1) Avail: NTIS HC $6.75 CSCL 138

Aldehyde and reactive organic emissions as well as carbon monoxide and oxides of nitrogen emissions from automobiles equipped with various types of advanced prototype emission control systems including both catalytic and thermal reactor type systems were measured. The aim was to characterize aldehyde and reactive organic emissions from vehicles with prototype advanced emission control systems to provide data necessary to help determine if there is a need for aldehyde and/or reactive organic motor vehicle regulations, and to determine on a preliminary basis, the effect of ambient temperature on the emission characteristics of advanced emission control systems.

(Modified author abstract) GRA


(PB-224252/7GA; APTD-1588B-Pt-2) Avail: NTIS HC $4.50 CSCL 138

Aldehyde and reactive organic emissions as well as carbon monoxide and oxides of nitrogen emissions were measured from 1970 through 1973 model vehicles. The aim was to characterize such emissions and to provide data to compare exhaust hydrocarbon reactivity for exhaust from 1970 through 1973 vehicles with that of exhaust from prototype low-emission systems.

(Modified author abstract) GRA


ASSESSMENT OF SO2 CONTROL ALTERNATIVES AND IMPLEMENTATION PATTERNS FOR THE ELECTRIC UTILITY INDUSTRY. Mar. 1973 145 p refs (Contract OST-40)

(PB-224119/8GA; HIT-550) Avail: NTIS HC $4.50 CSCL 138

Four cases were investigated with the computer model developed by Hittman Associates to determine the nature of implementation plans for sulfur oxide control at the regional and national levels. In 1975 demand for low sulfur fuels will have exceeded the available supply. The four cases studied will achieve compliance with the state and Federal emission regulations by 1986 (see by 1983). All are based on the timely development of solvent refined coal and the availability and utilization of alternative stack gas cleaning and control processes. Control alternatives are summarized and discussed including nuclear power and other advanced energy conversion systems such as hydroelectric and geothermal.

GRA


EXPERIMENTAL RESEARCH ON MODEL MHD GENERATOR U-02 (STAGE 2). SCIENTIFIC AND TECHNICAL REPORT 17/73


(JPRS-60072) Avail: NTIS HC $17.25

The basic results are presented of stage 2 of research on a model combined MHD power plant (the U-02 installation). The research was conducted in order to investigate the basic physical processes that take place in parts of the open-cycle MHD generator. 

Author

Pratt and Whitney Aircraft, West Palm Beach, Fla.


(Contract F33615-71-C-1470; AF Proj 3048) (AD-769309; FWA-FR-5673; AFAPL-TR-73-52-Vol-2) Avail: NTIS CSCL 21/4

An analytical study was conducted to determine the requirements for future fuels and lubricants research based on design studies of a high Mach number afterburning turbojet and a higher Mach number advanced multicycle turboramjet. Fuel and lubrication systems were defined, and computer models were developed for their thermal analyses. Fuel and lubricant stream temperature profiles were computed, and the effects of design modifications on the temperatures were evaluated. Fuel and lubricant temperatures were calculated for baseline missions, for steady-state flight envelope points, for alternate aircraft/engine interface fuel temperatures, and for transient maneuvers. (Modified author abstract) GRA


HYDROGEN METHANE FUEL CONTROL SYSTEMS FOR TURBOJET ENGINES Final Report


Design, development, and test of a fuel conditioning and control system utilizing liquid methane (natural gas) and liquid hydrogen fuels for operation of a J85 jet engine were performed. The experimental program evaluated the stability and response of an engine fuel control employing liquid pumping of cryogenic fuels, gasification of the fuels at supercritical pressure, and gaseous metering and control. Acceptably stable and responsive control of the engine was demonstrated throughout the sea level power range for liquid gas fuel and up to 88 percent engine speed using liquid hydrogen fuel.

Author


ENERGY CONSERVATION WITH SOLAR CLIMATE CONTROL


Avail: NTIS HC $3.00

The use of solar energy for climate control is discussed, with emphasis on solar heating and cooling of buildings. Government/industry relations are discussed in terms of taking action and supplying the market for solar climate control systems. The components of these systems are listed.

K.M.M.


A NEW VIEW OF SOLAR ENERGY


Avail: NTIS HC $3.00

The use of solar energy as a comprehensive national energy policy is discussed in terms of its social, economic, and environmental effects. Also considered are the nature of solar energy, practical considerations, and research needs. K.M.M.
AN ECONOMIC EVALUATION OF MHD-STEAM POWER PLANTS EMPLOYING COAL GASIFICATION

P. D. Bergman, K. D. Plants, J. J. Demeter, and D. Biensnock 1973 37 p reprints (BM-Rl-7796) Avail. NTIS HC $4.00

To assess the efficacy and economics of producing power from coal, four open-cycle magnetohydrodynamic (MHD) processing schemes were selected for study. Each simulation modeled a different mode of coal combustion and level of gas cleanliness. The options considered were: (1) coal burned in a slagging combustor; (2) suspension gasification with slag removal prior to combustion; (3) parallel cyclone combustors, one operating fuel rich and the other operating with excess air; and (4) suspension gasification by the hot exhaust gases from the MHD duct with ash removed prior to combustion. Option 1 has the highest ash content in the combustion plasma and as a result would have the greatest operational difficulties associated with it. Options 2 and 4 have the cleanest MHD combustion plasma. For coal priced at $4/ton, the power generating cost of Option 4, 11.76 mills/kW-hr, is the highest, with Option 1, at 9.04 mills/kW-hr the lowest. These costs may be compared with a conventional power cost of 9.52 mills/kW-hr for the latter seventies. Capital costs of three of the four options were competitive with those of conventional thermal power plants employing stack gas SO2 cleanup systems. Option 2 has the most favorable combination of operating characteristics and power costs. It was concluded that a clean, high-temperature working fluid can probably be produced from coal without leading to depressed system efficiencies and exorbitant capital cost.

Author


PROCEEDINGS, COAL COMBUSTION SEMINAR


The proceedings document the 10 presentations made during the Seminar, which dealt with subjects related to EPA's research and development activities for control of air pollutant emissions from the combustion of pulverized coal. The Seminar was divided in two parts: participating in the portion on fundamental research were Rockwell International's Rocketdyne Division, KV8 Engineering, Inc. and Southern California Edison Co., EPA Holland's International Flame Research Foundation, and Jet Propulsion Laboratory, and taking part in the portion on pilot- and full-scale tests were Babcock and Wilcox (Alliance Research Center), U.S. Bureau of Mines, Esso Research and Engineering Co., Combustion Engineering, Inc. and Tennessee Valley Authority. Purpose of the Seminar was to provide contractors and industrial representatives with the latest information on coal combustion research.

Author

N74-16641 Committee on Interior and Insular Affairs (U. S. Senate)

A BIBLIOGRAPHY OF NON-TECHNICAL LITERATURE ON ENERGY


A bibliography of non-technical literature on energy sources and problems was prepared for the Committee on Interior and Insular Affairs of the United States Senate. The report covers the period of time from 1 July 1969 to 1 July 1971. The subjects covered include the following: (1) energy utility goals, (2) energy policy issues, (3) projections for future demands, (4) resource base for all energy sources, (5) management of federally owned resources, (6) production of fuels, (7) transportation of energy and fuels, (8) utilization (including conservation measures), and (9) environmental effects (relation of environmental policy to energy policy).

P.N.F.
The economic factors which influence the supply and demand of crude oil and natural gas in the U.S. are compared with those for the Persian Gulf nations. A theory of petroleum production costs is presented to show the relationship between production, development, and exploration of petroleum supplies. The effect of changing sources of reserves on the development costs of new petroleum resources is analyzed. The expected supply from the North Shore Alaska petroleum field is reported. Tables of data are included to show the following: (1) development investment in Persian Gulf petroleum, (2) cost projection of Persian Gulf resources from 1965 to 1969, (3) exploration activity and expenditures in North American petroleum development from 1965 to 1970, and (4) significant discoveries of oil and gas from 1945 to 1964.

Author

N74-16655 Massachusetts Inst. of Tech., Cambridge. Dept. of Economics.

LONG RUN COST TRENDS: PERSIAN GULF AND UNITED STATES


The production costs of crude oil and natural gas in the U.S. are compared with those for the Persian Gulf nations. A theory of petroleum production costs is presented to show the relationship between production, development, and exploration of petroleum supplies. The effect of changing sources of reserves on the development costs of new petroleum resources is analyzed. The expected supply from the North Shore Alaska petroleum field is reported. Tables of data are included to show the following: (1) development investment in Persian Gulf petroleum, (2) cost projection of Persian Gulf resources from 1965 to 1969, (3) exploration activity and expenditures in North American petroleum development from 1965 to 1970, and (4) significant discoveries of oil and gas from 1945 to 1964.

Author


BALANCING THE DEMAND AND SUPPLY OF OIL

James W. McKi / In Denver Univ. Balancing Supply and Demand for Energy in the US 1972 p 73-90 refs

The economic factors which influence the supply and demand of crude oil in the U.S. are discussed. Estimates are made of the projected availability of petroleum from domestic sources through the year 1980. The availability of petroleum supplies based on the predictions of exploration and development is analyzed. Tables of data are provided to show the following: (1) projections of the oil supply-demand balance from 1980 to 1985, and (2) estimates of domestic U.S. production in 1975, 1980, and 1985. The need for a Federal energy policy is stressed and approaches to such a policy are submitted.

Author

N74-16657 North Carolina State Univ., Raleigh.

BALANCING THE SUPPLY AND DEMAND FOR NATURAL GAS


An analysis of the supply and demand factors involving natural gas as an energy source was conducted. The need for a workable policy for natural gas production and use is stressed. Factors which have contributed to the lessering supply are reported. Measures for improving the situation are proposed. Tables of data are included to show: (1) predicted and actual discoveries of crude oil and natural gas from 1953 to 1967, (2) trends in well head price of natural gas compared with quantity of natural gas discoveries, (3) effects of oil and gas prices and other variables on oil and gas discoveries, and (4) projections of non-associated natural gas prices and required discoveries for the period of 1972 to 1985.

Author

N74-16658 Peabody Coal Co., St. Louis, Mo.

BALANCING THE DEMAND AND SUPPLY OF COAL


An analysis of coal supplies for energy applications was conducted to determine methods of obtaining a balance between supply and demand. The problems faced by the coal producer and those of the coal user are examined to show the environmental impacts. Methods for meeting the energy shortages through improved coal utilization are proposed. A table is included to show the total demand for U.S. coal (including exports).

Author


BALANCING THE DEMAND AND SUPPLY OF ELECTRICITY AND NUCLEAR FUELS

Dean A. McGee / In Denver Univ. Balancing Supply and Demand for Energy in the US 1972 p 115-130 refs

The problem of obtaining a balance between demand and supply of nuclear fuel for electric power generation in the United States to 1985 is discussed. It is stated that the balance will depend on economic rather than geologic considerations. Proven reserves of uranium and the quality of the resource base that offers potential for new discoveries assure that uranium ore deposits available for development and production will be sufficient to meet demand. Projections are made in the growth of the nuclear powered electric energy field. The operation of the nuclear reactors and the nuclear fuel cycle involved in electric power production are described. Charts are included to show the projected utilization of nuclear fuels and the mix of coal, hydro, gas, thermal, and nuclear fuels to the year 2000.

Author


BALANCING THE DEMAND AND SUPPLY OF OTHER ENERGY FORMS

James S. Cross / In Denver Univ. Balancing Supply and Demand for Energy in the US 1972 p 131-143 refs

Methods for balancing the demand and supply of various energy forms are discussed. A graphic presentation of the U.S. energy balance for the five year periods beginning in 1970 and extending to 1985 is developed. The economic and environmental factors involved in using hydroelectric, geothermal, synthetic gas, and tar sands for energy sources are examined. Other sources of energy from agricultural products and tidal energy are analyzed. The potential for using more of the energy available from the sun is proposed.

Author

N74-16661 Texas Univ., Austin.

ENVIRONMENTAL PROTECTION AND LONG RUN SUPPLY OF CRUDE OIL IN THE UNITED STATES

Stephen L. McDonald / In Denver Univ. Balancing Supply and Demand for Energy in the US 1972 p 145-158 refs

A study was conducted to determine the effects of energy conversion on the environment. The effects of various types of energy sources were examined and examples of legislation to reduce environmental pollution are presented. The subjects discussed are: (1) protection of the environment and national income, (2) allocation of environmental protection costs, (3) environmental protection problems in the petroleum industry, and (4) progress in developing new environmental protection techniques.

Author

N74-16662/ Committee on Interior and Insular Affairs (U. S. Senate).

ENERGY EMERGENCY LEGISLATION. PART 1


Avisi: SOD HC §2.35

A Congressional hearing concerning emergency energy legislation was conducted. The purpose of the legislation was as follows: (1) to declare by congressional action a nationwide energy emergency, (2) to authorize the president to immediately undertake specific actions to conserve scarce fuels and increase
supply, (3) to initiate the development of local, state, national, and international contingency plans, and (4) to assure the continuation of vital public services. P.N.F.

FUEL SHORTAGES, PART 1
Avail: Comm. on Interior and Insular Affairs
A Congressional hearing was conducted to investigate the factors contributing to current shortages of natural gas, residual oil, and other refined products. Testimony from the Senators of various states is submitted to show the extent of the energy crisis and their understanding of the basic causes. Communications from various segments of the economy are included to define the scope of the shortages and the impact on industry, public utilities, and home use. Tables of data are developed to show the resources available and the anticipated problem areas. The actions to be taken by Federal organizations to improve the energy situation are recommended. P.N.F.

FUEL SHORTAGES, PART 2
Avail: Comm. on Interior and Insular Affairs
A Congressional hearing was conducted to examine the short-term and long-term effects of the energy crisis on the nation's economy. The study reviews the history of national goal formation beginning with the Preamble to the Constitution of the United States. The process and specifics of national goal formation during several administrations are described. The background information provided by the study is considered useful in identifying the role of the energy policy in the implementation of national goals. The subjects contained in the study are: (1) historical evolution of the goals of the U.S., (2) maturation of early constitutional goals, (3) succession of national goals in the past half-century, (4) the interaction of science and technology with national goals, and (5) recent attempts to chart new goals for America. P.N.F.

A REVIEW OF ENERGY ISSUES AND THE 91ST CONGRESS
Avail: Comm. on Interior and Insular Affairs
A review of the energy crisis issues considered by the U.S. Congress was conducted. The purpose of the review is to examine the interrelationships between energy supply, the environment, resource conservation, economic growth, and the attainment of important national goals. The policy issues in the energy field involve the following: (1) oil imports, (2) trans-Alaska pipeline, (3) outer continental shelf, (4) natural gas supply, (5) shortages and movement toward an overall energy policy, (6) electric power generation and transmission, and (7) nuclear energy development and environmental effects. P.N.F.

A METHODOLOGY FOR PROJECTING THE ELECTRICAL ENERGY DEMAND OF THE MANUFACTURING SECTOR IN CALIFORNIA
W. E. Mowz and C. C. Mow Jan. 1973 75 p refs. (Grant NSF-GT-44) (R-991-NSF/CBRA) Avail: NTIS HC $5.75
The methodology reported is one part of a total electrical energy demand estimating methodology developed for use in California. Separate methodologies were developed for each sector of the economy, which comprises the following: residential, industrial (consisting of manufacturing and mining); commercial; government; and agricultural. In place of quantitative, determinant-based relationships, the methodology described relies on the projection of individual trends in electrical energy use for each of 20 manufacturing industries identified by the Standard Industrial Code. Data on these trends are presented, and reasonable projections are suggested. In addition, the roles of each of the determinants of electrical energy use are explored qualitatively.
for the benefit of analysts required to apply judgment in selecting inputs for the methodology.  

Author

N74-16674# RAND Corp., Santa Monica, Calif.

FUEL FROM ORGANIC MATTER: POSSIBILITIES FOR THE STATE OF CALIFORNIA


The amounts of organic material that might be made available for energy purposes in the State of California, its potential fuel value, and the estimated cost are investigated. Sources of organic material that are considered are: (1) crops grown specifically for energy, (2) natural forests, and (3) wastes from the urban, agricultural, and industrial sectors. Preliminary results indicate that about 19 percent of California's gas supply could be derived from organic sources.  

Author

N74-16676# RAND Corp., Santa Monica, Calif.

THE SOVIET UNION, THE MIDDLE EAST, AND THE EVOLVING WORLD ENERGY SITUATION


The U.S.S.R.'s position on the world oil crisis is discussed with special attention given to the limits of Soviet influence in global politics and a Soviet-preferred future world energy scenario.  

K.M.M.

N74-16676# RAND Corp., Santa Monica, Calif.

MEASURES FOR SLOWING GROWTH IN ELECTRICITY CONSUMPTION


Methods for reducing the growth rate of electricity demand are examined. The greatest opportunities for slowing growth were found in the residential and commercial sectors. Measures for conserving energy are presented, such as improved insulation, solar energy, gas substitution, increased air conditioning efficiency, decreased electricity for lighting, and low energy buildings.  

J.A.M.

N74-16677# RAND Corp., Santa Monica, Calif.

ENERGY CONSERVATION IN PUBLIC AND COMMERICAL BUILDINGS


A discussion is presented of the preliminary results of an ongoing study of the use of energy in public and commercial buildings. The effects of building location, design and operation alternatives are developed, together with initial estimates of the conservation potential in the sector.  

Author

N74-16678# RAND Corp., Santa Monica, Calif.

A METHODOLOGY FOR PROJECTING THE ELECTRICAL ENERGY DEMAND OF THE COMMERCIAL SECTOR IN CALIFORNIA


Methodology was developed for the electrical energy demand of commercial sectors, mining portion of the industrial sector, and other smaller sectors of California economy. Methodology was based upon the output of the sector, measured in terms of dollars of value added or dollars of contributed to gross state product; on the electrical energy intensiveness of the sector; and upon the price of electricity and natural gas. In small sectors, such as agriculture and railroads, the use of electricity was found to be either constant or the result of fairly simple forces.  

Author

N74-16680# RAND Corp., Santa Monica, Calif.

CALIFORNIA'S ELECTRICITY QUANDARY. 3: SLOWING THE GROWTH RATE


Results are presented of one part of a broad study effort on the underlying cause of the conflict between energy and the environment—namely the rapid increase in demand for electricity in all its forms and the implications of this conflict for governmental policymaking. The objectives are: (1) to examine the need for new state policies that would slow the growth of electricity demand; (2) to estimate the potential effectiveness of policies designed to slow the growth rate; and (3) to evaluate the potentially important side effects of slowed electricity growth.  

Author

N74-16684# Committee on Science and Astronautics (U.S. House).

GEOHERMAL ENERGY


The hearings are reported concerning the economic and technological feasibility of developing geothermal energy sources. Two bills are presented and discussed which would establish a Geothermal Energy Development Corporation to construct two or more geothermal demonstration installations and to develop and operate technology for generating steam and electric power from geothermal sources. Other topics include: the state of geothermal energy technology; environmental problems; the status of R and D activities; and international and foreign policy considerations.  

K.M.M.

N74-16690# Massachusetts Inst. of Tech., Cambridge. Energy Lab.

MODELING OF ELECTRIC POWER DEMAND GROWTH

Final Report


The paper describes a modeling approach, presently under development, directed at the growth in demand for electric power. The emphasis is to develop a mathematical model which can be used for the analysis of detailed questions, such as: How will changes in air conditioning power demand, electric rate structure, population, etc., affect the daily load shapes (MW vs. time) as well as the peak power and the overall electric energy consumption. Detailed answers to these questions are needed for generation-planning of capacity and plant mix (nuclear, fossil, and pumped-hydro) as well as for the evaluation of the resulting environmental and economic impacts. These issues require detailed models combining economic models with engineering considerations affecting the dynamics of load behavior. Modeling of this kind can be limited by the data available, and an important aspect of this effort is to identify the data required for a detailed understanding of the load. The approach to be employed is a combination of state dynamic models driven by stochastic processes with economic models.  

Author

N74-16691# Army War Coll., Carlisle Barracks, Pa.

UNITED STATES PETROLEUM SITUATION THROUGH 1980


The current and projected United States petroleum and natural gas requirements through 1980 are examined. These two resources account for three-fourths of all the energy consumed in the United States. The unprecedented rate at which they are being consumed has caused an imbalance between demand and
supplies and presents the Nation with an energy problem of serious
growing proportions. Domestic production is now unable to
supply the needs of some consumer sectors and shortages of
certain fuels exist. During the next three to five years, a further
deterioration of the domestic supply position is anticipated and
a sharp increase in imports is projected. The long lead times
required to provide new domestic supplies make this development
virtually certain. The United States also faces a serious balance
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America's current energy crisis consists of a growing
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diminution in known domestic petroleum reserves and aggravated
by a host of domestic anomalies that cry out for some sort of
unified energy policy. Yet any steps taken domestically will have
far reaching international effects, particularly in the Middle East.

Eight giant corporations (five of them American) discover and
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Hence, they have a powerful influence in the Middle East and are
a contributing factor in the stability of that politically volatile
part of the world.

Author (GRA)

N74-16767** Army War Coll., Carlisle Barracks, Pa.
The US Energy Crisis, The Multinational Oil
Corporations and Their Relationship to U.S.
Foreign Policy in the Middle East
John G. Pappageorge 28 Feb. 1973 59 p refs
(AD-780688) Avail: NTIS CSCL 05/3

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Modified author abstract (GRA)

Exploitation of Wind Energy
Transl. into English from Elektrizitaetswirtschaft (West Germany), v. 50, no. 11, Nov. 1951 p 320-322
(Contract NASw-2482) (NASA-TT-F-15309) Avail: NTIS HC $3.00 CSCL 10B

The utilization of wind power is discussed. A measurement
is made of the energy available from air currents. Wind turbulence
is calculated together with the average power. The structural
features of windmills are discussed in relation to possible industrial
applications.

Author

N74-16757### National Aeronautics and Space Administration.
Wind Energy Conversion Systems

Economic feasibilities and energy conversion efficiencies are
considered for various alternative energy sources that utilize wind
forces. For individual titles, see N74-16758 through N74-16793.

Author

Smith-Putnam Wind Turbine Experiment

CSCL 10B

A brief outline of the many problems encountered during
testing of a wind turbine generator prototype unit is given. Its
feasibility was demonstrated by the generation of electricity in
commercial quantities with delivery to a utility transmission
network. The experiment was terminated after blade failure
occurred.

G.G.

Motion Picture History of the Erection and Operation of the Smith-Putnam Wind Generator

CSCL 10B

A color movie presentation is discussed that presents the
various stages in assembling the major subsystems of a
synchronous wind generator, such as installing the rotor blades
and the rotating platform at the top of the tower. In addition
scenes are shown of the wind generator in operation.

Author

Percy Thomas Wind Generator Designs

CSCL 10B

The technical and economic feasibilities of constructing a
windpowered generator with a capacity of 2,000 to 4,000 kilowatt
are considered. Possible benefits of an integrated wind generating
electric energy source in an electric utility network are elaborated.
Applications of a windpowered waterpump, including its use as
a pumping source for hydroelectric pump storage operations,
are also mentioned. It is concluded that the greatest potential
of the wind generator is to generate heat directly and not
conversion to electricity and then to heat.

G.G.

N74-16761 Stuttgart Univ., West Germany.
Past Developments of Large Wind Generators in Europe

CSCL 10B

Physical size, maximum power output, and other characteris-
tics of various windpower systems are shown in picture form.

G.G.

N74-16762 Tompkin, Joseph, Salem, Ore.
Introduction to Voigt's Wind Power Plant

CSCL 10B

The design and operation of a 100 kilowatt wind driven
generator are reported. Its high speed three-bladed turbine
operates at a height of 50 meters. Blades are rigidly connected
to the hub and turbine revolutions change linearly with wind
velocity, maintaining a constant speed ratio of blade tip velocity
to wind velocity over the full predetermined wind range. Three
generators installed in the gondola generate either dc or ac
current. Based on local wind conditions, the device has a maximum
output of 720 kilowatts at a wind velocity of 16 meters per
second. Total electrical capacity is 750 kilowatts, and power
output per year is 2,135,000 kilowatt/hours.

G.G.

N74-16763** National Aeronautics and Space Administration.
Where There is a Wind, There is a Way
Charles A. Mosher In its Wind Energy Conversion Systems

CSCL 10B

A shift in USA energy policy from oil or natural gases to
thermonuclear fusion and solar energy is predicted. A massive
diversified energy research and development effort to productively
harness the energy in the winds is outlined to develop commercially
feasible wind energy conversion systems - considered a form of
solar energy - in the near future.

G.G.

N74-16764 West Texas State Univ., Canyon.
Need for a Regional Wind Survey
1973 p 33-40

CSCL 10B

Accurate measurements for the purpose of estimating wind
energies are proposed in those regions of the USA where the
greatest potentials exists. Preliminary wind characteristic
calculations from weather station data are provided for the
Southern Great Plains region; wind energies from 153 to 212 kW/ft² (ft squared-per year) for 1970 to 1972 are determined. It is concluded that a wind energy survey based on data compiled from weather service stations is feasible for determining the energy potential of a windpowered integrated energy network.

G.G.

N74-16788a Oklahoma Univ., Norman.

CSCL 10B  
Technical and economic feasibility studies on a small windmill to provide overnight charging for an electrically driven car are reported. The auxiliary generator provides power for heating and cooling the vehicle which runs for 25 miles on battery power alone, and for 50 miles with the onboard charger operating. The blades for this windmill have a diameter of 12 feet and are coupled through to a conventional automobile alternator so that they are able to completely recharge car batteries in 8 hours. Optimization of a windmill/storage system requires detailed wind velocity information which permits rational siting of wind power system stations.

G.G.

N74-16788a Alaska Univ., Fairbanks.

CSCL 04B  
The wind power potential of Alaska is assessed in order to determine promising wind power sites for construction of wind machines and for shipment of wind derived energy. Analyses of near surface wind data from promising Aleutian sites accessible by ocean transport indicate probable velocity regimes and also present deficiencies in available data. It is shown that winds for some degree of power generation are available 77 percent of the time in the Aleutians with peak velocities depending on location.

G.G.

N74-16787a Oregon State Univ., Corvallis.

CSCL 10B  
There have been two primary thrusts of the research effort to date, along with several supplementary ones. One primary area has been an investigation of the wind fields along coastal areas of the Pacific Northwest, not only at the shoreline but also for a number of miles inland and offshore as well. Estimates have been made of the influence of the wind turbulence as measured at coastal sites in modifying the predicted dependence of power generated on the cube of the wind speed. Wind flow patterns in the Columbia River valley have also been studied. The second primary thrust has been to substantially modify and improve an existing wind tunnel to permit the build up of a boundary layer in which various model studies will be conducted. One of the secondary studies involved estimating the cost of building an aerogenerator.

Author

N74-16786a Electrical Research Association, Surrey (England).

CSCL 04B  
Simple, averaged wind velocity data provide information on energy availability, facilitate generator site selection and enable appropriate operating ranges to be established for windpowered plants. They also provide a basis for the prediction of extreme wind speeds.

Author

N74-16789a Princeton Univ., N.J.

CSCL 10B  
Specifically discussed is the sailwing windmill. The aerodynamic characteristics of the sailwing, low the windmill is condensed form and its natural application to the wind machine is discussed. Past and present sailwing windmill configurations are shown and their relative merits are compared. A section on a future promising configuration is presented and its compatibility to advanced technology electrical machinery is briefly discussed. Also included is a short bibliography.

Author

N74-16770a Windworks, Inc., Mukwanago, Wis.

CSCL 11D  
Paper honeycomb is used for the construction of conventional, propeller-type, windmill blades. Using fairly simple techniques and conventional power tools, it is possible to shape both simple foils and more complex foils with or without tapered plan forms and with or without varying profiles. A block of honeycomb, in its compressed form, is mounted on a wedge and run through a bandsaw with the table at an appropriate tilt angle. It is the combination of the wedge angle and the table angle that gives the tapered planform and profile shape. Next the honeycomb is expanded on the shaft and jigged to give the desired angles of attack. With the honeycomb fixed in position, the blade is covered with a fine weave fiberglass cloth. Any surface quality can then be achieved with filing and sanding.

Author


CSCL 10B  
An 8 meter-diameter prototype sail wing windmill is reported that uses a one meter-diameter bulbous canted wheel to which three bamboo poles are latched in a triangular pattern with overlapping ends, to form the airframe for cloth sails. This device lifts 300 pounds to a height of 20 feet in one minute in a 10 mph wind.

G.G.

N74-16772a Army Air Mobility Research and Development Lab., Moffett Field, Calif.

CSCL 10B  
Successful large, reliable, low maintenance wind turbines must be designed with full consideration for minimizing dynamic response to aerodynamic, inertial, and gravitational forces. Much of existing helicopter rotor technology is applicable to this problem. Compared with helicopter rotors, large wind turbines are likely to be relatively less flexible with higher dimensionless natural frequencies. For very large wind turbines, low power output per unit weight and stresses due to gravitational forces are limiting factors. The need to reduce rotor complexity to a minimum favors the use of cantilevered (hingless) rotor configurations where stresses are relieved by elastic deformations.

Author

THE EFFECT OF AERODYNAMIC PARAMETERS ON POWER OUTPUT OF WINDMILLS

56
Aerodynamic results for a study on windpower generation are reported. Windmill power output is presented in terms that are commonly used in rotary wing analysis, namely, power output as a function of drag developed by the windmill. Effect of tip-speed ratio, solidity, twist, wind angle, blade setting and airflow characteristics are given.


VERTICAL AXIS WIND ROTORS: STATUS AND POTENTIAL


CSCL 10B

The design and application of a vertical axis wind rotor is reported that operates as a two stage turbine wherein the wind impinging on the concave side is circulated through the center of the rotor to the back of the convex side, thus decreasing what might otherwise be a high negative pressure region. Successful applications of this wind rotor to water pumps, ship propulsion, and building ventilators are reported. Also shown is the feasibility of using the energy in ocean waves to drive the rotor. An analysis of the impact of rotor aspect ratio on rotor acceleration shows that the amount of venting between rotor vanes has a very significant effect on rotor speed for a given wind speed.


ADVANTAGES OF THE DIFFUSER-AUGMENTED WIND TURBINE


CSCL 10B

Performance optimization for a wind turbine is realized by using a shrouded diffuser to produce up to twice the power of unshrouded turbines of the same diameter. The diffuser converts the kinetic energy of the flow downstream of the rotor into a pressure rise and thus makes it possible for the rotor to capture airflow from a free stream tube area that is greater than that from the rotor itself. The flow velocity through the shrouded rotor is 20 to 80 percent greater than the free wind velocity as opposed to 67 percent less for the unshrouded case. The diffuser also makes it possible to accommodate very high wind speeds without the need of variable pitch in the rotor blades.

N74-16778* California State Univ., San Diego.

BUCKET ROTOR WIND-DRIVEN GENERATOR


CSCL 10B

As compared with the ordinary propeller type rotor, the bucket rotor is limited in rotational speed since the tip rotor speed can never exceed the wind speed. However, it does not present the blade fatigue problem that the ordinary rotor has, and it perhaps causes less sight pollution. The deflector vanes also provide a venturi passage to capture greater wind flow. The bucket rotors can be strong together end-to-end up to thousands of feet long to produce large amounts of power.


WIND-POWERED ASYMMETRICAL AC/DC/AC CONVERTER SYSTEM


CSCL 10B

Two asynchronous ac/dc/ac systems are modelled that utilize wind power to drive a variable or constant hertz alternator. The first system employs a high power 60-hertz inverter to tie to the large backup supply of the power company to either supplement them from wind energy, storage, or from a combination of both at a preset desired current; rectifier and inverter are identical and operate in either mode depending on the silicon control rectifier firing angle. The second system employs the same rectification but from a 60-hertz alternator arrangement; it provides mainly dc output, some sinusoidal 60-hertz from the wind bus and some high harmonic content; 60-hertz from an 800-watt inverter.

N74-16777* Oklahoma State Univ., Stillwater.

AN ELECTRICAL GENERATOR WITH A VARIABLE SPEED INPUT: CONSTANT FREQUENCY OUTPUT


CSCL 10B

A new type of rotary energy conversion device for obtaining a desired constant frequency output independent of the speed of the prime mover has been developed and tested using the procedure of field modulation and solid state alternator output processing. A 10-kilowatt prototype field modulated frequency down converter system was designed, built, and successfully tested. Experimentally obtained performance characteristics are presented.

N74-16780* Oregon State Univ., Salem, Ore.

VOLTAGE VARIABLE SPEED DRIVE


CSCL 10B

The variable speed drive transmission is mounted within the gondola and connected with the wind turbine blades and the hub. This unit is designed for the production of ac power. The turbine turns by means of the variable speed drive and a set of synchronous three phase generators. This motion is controlled automatically by two wind rosettes in such a way that the wind turbine always opposes the wind direction. The Voltige variable speed drive is a mechanical variable positive drive gear transmission. It has an unlimited power and torque transmission, a constant ratio with high degree of accuracy, a speed variation over a wide range, and a nonislip drive.

N74-16781* General Electric Co., Santa Barbara, Calif.

USE OF HYDROGEN AND HYDROGEN-RICH COMPONENTS AS A MEANS OF STORING AND TRANSPORTING ENERGY


CSCL 10C

Theoretical and experimental studies on high pressure electrolysis producing hydrogen and oxygen for energy storage and reconversion are reported. Moderate temperature, high pressure hydrogen/oxygen fuel cells with nickel electrodes are investigated for effects of pressure, temperature, and membrane porosity. Test results from an aphodid burner turbine generator combination obtained 40 percent kilowatt hours out of the fuel cell divided by kilowatt hours into the electrolyzer. It is confirmed that high pressure hydroamination of organic materials can be used to synthesize hydroazones and methanes for making synthetic vehicular fuels.

N74-16782* Wisconsin Univ., Madison.

THE RELATIONSHIP BETWEEN HYTEC AND THE USE OF HYDROGEN AS A FUEL IN AUTOMOBILES


CSCL 10C

A one-megawatt wind energy source is assumed that uses half of its output to serve customers as electricity, and stores the other half by conversion to hydrogen, to liquid hydrogen, to stored LH2, and back to electricity. Energy costs and capital costs are evaluated. It is confirmed that moderate temperature, high pressure hydrogen/oxygen fuel cells with nickel electrodes can be investigated for effects of pressure, temperature, and membrane porosity. Test results from an aphodid burner turbine generator combination obtained 40 percent kilowatt hours out of the fuel cell divided by kilowatt hours into the electrolyzer. It is concluded that high pressure hydroamination of organic materials can be used to synthesize hydroazones and methanes for making synthetic vehicular fuels.
costs of the conversions escalate unit costs to 12.9 cents per kilowatt hour. High conversion costs can be reduced by using Mg2NiH4 and FeTiH2 storage, or by using a 100- or 1000 megawatt system.

STORAGE AND APPLICABILITY OF SOLID POLYMER ELECTROLYTE TECHNOLOGY TO ELECTROLYTIC HYDROGEN AND OXYGEN PRODUCTION

CSCL 10B
The solid polymer electrolyte (SPE) water electrolysis technology is presented as a potential energy conversion method for wind driven generator systems. Electrolysis life and performance data are presented from laboratory sized single cells (7.2 sq in active area) with high cell current density selected (1000 ASF) for normal operation.

N74-16783* Lewis Research Center, Cleveland, Ohio.
SUPERFLYWHEEL ENERGY STORAGE SYSTEM

CSCL 10B
A windpowered system using the superflywheel configuration for energy storage is considered. Basic elements of superflywheels are thin rods assembled in pregrooved hub lamina so that they fan out in radial orientation. Adjacent layers of hub lamina are assembled 90 degree in rotation to each other so as to form a circular brush configuration. Thus stress concentrations and rod failure are minimized and realistic failure containment for a high performance flywheel is obtained.

N74-16784* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
BATTERIES FOR STORAGE OF WIND-GENERATED ENERGY
Harvey J. Schwartz In its Wind Energy Conversion Systems Dec. 1973 p 146-151

CSCL 10C
Cost effectiveness characteristics of conventional-, metal gas- and high energy alkali metal batteries for wind generated energy storage are considered. A lead-acid battery with a power density of 20 to 30 watt/hours per pound is good for about 1500 charge-discharge cycles at a cost of about $90 per kilowatt hour. A zinc-chlorine battery that stores chlorine as solid chlorine hydrate at temperatures below 10° C eliminates the need to handle gaseous chlorine; its raw material cost is low and inexpensive carbon can be used for the chlorode electrode. This system has the best chance to replace lead-acid. Exotic alkali metal batteries are deemed too costly at the present stage of development.

N74-16785* InterTechnology Corp., Warrenton, Va.
ENERGY STORAGE BY COMPRESSED AIR

CSCL 10C
The feasibility of windpower energy storage by compressed air is considered. The system is comprised of a compressor, a motor, and a pump turbine to store air in caverns or aquifers. It is proposed that storage of several days worth of compressed air up to 650 pounds per square inch can be used to push the aquifier up closer to the container dome and thus initiate piston action by simply compressing air more and more. More energy can be put into it by pressure increase or pushing back the water in the aquifier. This storage system concept has high flexibility and low cost effectiveness.

EXPERIENCE WITH JACOBS WIND-DRIVEN ELECTRIC GENERATING PLANT, 1931 - 1957

CSCL 10B
Engineering, construction, performance, electric output, and different uses of the wind electric 2500- to 3000-watt plant are outlined. After several years of testing different types of windmills, the three blade aeroplane type of propeller was found to be far superior in power output. By means of a flyball governor operated, variable pitch speed control, the maximum speed of the propeller was accurately and easily controlled, to prevent excessive speeds in high winds and storms. The three blade propeller was found to be necessary to prevent excessive vibration whenever the shift of the wind direction required the plant to change its facing direction on the tower.

REVIEW OF THE WINDPOWER ACTIVITIES AT THE BRACE RESEARCH INSTITUTE

CSCL 10B
A chronology of windpower studies at the experimental station on Barbados is presented that includes the various development activities on wheeling windmills whose power output is utilized through electrical and electronic systems. A list of institute publications on windpower is included.

WIND POWER SYSTEMS FOR INDIVIDUAL APPLICATIONS

CSCL 10B
A small windpower system is described which is suitable for electrifying a house. The self-contained unit consists of a two kilowatt wind driven generator, a set of 19 storage batteries, a small dc to ac inverter, and a gasoline generator for use as an emergency backup system in case of prolonged calm periods. Cost effectiveness of the electricity generated by this windmill system comes out to about 15 cents per kilowatt hour - assuming a 10 year life for the batteries and a 20 year life for the other components. Some other small windpower systems are also described, and it is shown that a windpowered generator in the 15- to 25-kilowatt output range coupled to a direct heated water storage system is able to heat a typical New England home.

N74-16791* Pennwatt Corp., Houston, Tex.
ECONOMIC CONSIDERATIONS OF UTILIZING SMALL WIND GENERATORS

CSCL 10B
The economic feasibility of small wind generators is compared to that of solar cells, primary batteries, thermoelectric generators, and engine generators. It is shown that small wind generator plants offer an attractive alternative to primary battery systems and constantly running engines to generate power in remote areas. The limitation is an average average wind velocity of at least 9 to 10 mph. Presently available units are most useful in the average load range of 10 to 1000 watts.

N74-16792* Hydro-Quebec Inst. for Research, Varennes.
WIND UTILIZATION IN REMOTE REGIONS: AN ECONOMIC STUDY

CSCL 10C
A wind driven generator was considered as a supplement to a diesel group, for the purpose of economizing fuel when wind power is available. A specific location on Hudson's Bay, Povogntuk, was selected. Technical and economic data available for a wind machine of 10-kilowatt nominal capacity and available wind data for that region were used for the study. After subtracting the yearly wind machine costs from savings in fuel costs, a net savings of $1400 per year is realized. These values are approximate, but are thought to be highly conservative.

N74-16791* Montana State Univ., Bozeman.
TECHNICAL FEASIBILITY STUDY FOR THE DEVELOPMENT OF A LARGE CAPACITY WIND POWERED ELECTRICAL GENERATING SYSTEM

CSCL 10C

The engineering feasibility of developing a basic mechanical system necessary for extracting large amounts of power (on the order of 10 to 20 MW) from the wind is considered using the concept of vertical airfoils moving along a closed horizontal track system. Attention is focused on those components necessary for the conversion of wind energy to mechanical energy, although the general characteristics and critical aspects of other components are also considered. The four phases of this program are: (1) Establishment of component specifications and interface requirements for major system components; (2) formulation of alternative sets of conceptual designs for major system components: (3) engineering analysis of various components and systems; and (4) re-examination of basic concept and identification of any desirable follow-up work. Author

N74-16792* Oregon State Univ., Corvallis.
THE OREGON STATE UNIVERSITY WIND STUDIES

CSCL 10C

The economic feasibility of commercial use of wind generated power in selected areas of Oregon is assessed. A number of machines for generating power have been examined. These include the Savonius' rotor, transversal conventional wind turbines, the circulation controlled rotor and the vertical axis winged turbine. Of these machines, the conventional wind turbine and the vertical axis winged turbine show the greatest promise on the basis of the power developed per unit of rotor blade area. Attention has been focused on the structural and fatigue analysis of rotors since the economics of rotary winged, wind generated power depends upon low cost, long lifetime rotors. Analysis of energy storage systems and tower design has also been undertaken. An economic means of energy storage has not been found to date. Tower design studies have produced cost estimates that are in general agreement with the cost of the updated Putnam 110-foot tower. Author

N74-16793* Aerovoltat Corp., Paris (France).
FRENCH WIND GENERATOR SYSTEMS

CSCL 10B

The experimental design of a wind driven generator with a rated power of 800 kilovolt-ampere and capable of being connected to the main electrical network is reported. The rotor is a three bladed propeller; each blade is twisted but the fixed pitch is adjustable. The asynchronous 800-kilovolt-ampere generator is driven by the propeller through a gearbox. A dissipating resistor regulates the machine under no-load conditions. The first propeller on the machine lasted 18 months; replacement of the rigid propeller with a flexible structure resulted in breakdown due to flutter effects. Author

N74-16794* Massachusetts Univ., Amherst.
A PROPOSED NATIONAL WIND POWER R AND D PROGRAM

CSCL 10B

An offshore wind power system is described that consists of wind driven electrical dc generators mounted on floating towers in offshore waters. The output from the generators supplies underwater electrolyzer stations in which water is converted into hydrogen and oxygen. The hydrogen is piped to shore for conversion to electricity in fuel cell stations. It is estimated that this system can produce 150 x 10 to the ninth power kilowatt-hours per year. It is concluded that solar energy - that includes wind energy - is the only way out of the US energy dilemma in the not too distant future. Author

N74-16795* Budgen and Associates, Pointe Claire (Quebec).
A COMMENT ON TOWERS FOR WINDMILLS

CSCL 10B

Design considerations for windmill tower structures include the effects of normal wind forces on the rotor and on the tower. Circular tabular or masonry towers present a relatively simple aerodynamic solution. Economic factors establish the tubular tower as superior for small and medium sized windmills. Concrete and standard concrete block designs are cheaper than fabricated steel structures that have to be freighted. G.G.

N74-16796* Stuttgart Univ., West Germany.
SOME EXTEMPORANEOUS COMMENTS ON OUR EXPERIENCES WITH TOWERS FOR WIND GENERATORS

CSCL 10B

A wind generator tower must be designed to withstand fatigue forces and gust winds loads. Optimum tower height depends on the energy cost to the consumer because an increase in height results in an increase in the cost of the plant. It is suggested that costs are minimum for the shortest tower possible and that the rotor should be as large as possible. G.G.

N74-16797* AeroVironment, Inc., Pasadena, Calif.
WIND MACHINES

CSCL 04B

The basic elements of the air/water momentum exchange are described by the environment, the potential, the air and water subsystems, the total system, and the rule. Many of these topics have direct analogues in aerogenerator design. Aspects of optimal sail design and of waveless hulls are briefly outlined. A wind driven vehicle capable of moving directly downward faster than the wind, is reported. The lecture is illustrated with slides and movie clips showing surfing catamarans, land and water versions of the Bauer vehicle, hang gliding, land sailing, and wind surfing. Author

N74-16798* National Science Foundation, Washington, D.C.
NSF PRESENTATION

CSCL 10B

Wind energy conversion research is considered in the framework of the national energy problem. Research and development efforts for the practical application of solar energy -- including wind energy -- as alternative energy supplies are assessed in: (1) Heating and cooling of buildings; (2) photovoltaic energy conversion; (3) solar thermal energy conversion; (4) wind energy conversion; (5) ocean thermal energy conversion; (6) photosynthetic production of organic matter; and (7) conversion of organic matter into fuels. G.G.
The development of a wind energy system is outlined that supplies reliable energy at a cost competitive with other energy systems. A government directed industry program with strong university support is recommended that includes meteorological studies to estimate wind energy potentials and determines favorable regions and sites for wind power installations. Key phases of the overall program are wind energy conversion systems, meteorological wind studies, energy storage systems, and environmental impact studies. Performance testing with a prototype wind energy conversion and storage system is projected for Fiscal 1977.

Author

The AFAPL-MHD Facility (KIVA-I) was used to conduct an investigation into the feasibility of operating a large wind power plant, it may be said in conclusion that economic operation of such a wind power plant is feasible whenever, on the one hand, the cost of connecting the consumers to the public network is prohibitive, and on the other hand sufficient wind is available. The planning of long term duration and force reading is of particular value. It is advantageous to erect windpower stations in coastal and mountain regions.
conductivity, oxygen-to-fuel ratios, interelectrode connection angles, seed particle geometry, and optimum loading conditions. A peak power of 210 kW was achieved. A DC-to-DC Inverter was successfully operated on the MHD generator, providing an output of 50 kW at 50 kW dc. Numerous modifications were made to the KIVA-I facility, including a new high-speed data acquisition system, a close circuit television system, a pulse-control network for the main burner, a new set of pole faces for the magnet, a digital display panel, and an instrumented copper electrode assembly.

Author (GRA)

N74-16818g Army Foreign Science and Technology Center, Charlottesville, Va.

DIRECT ENERGY CONVERSION METHODS

(AD-770000, FSTC-HT-23-131-73) Avail: NTIS CSCL 10/2

Magnetohydrodynamic generators, thermoelctric and thermion generators are discussed. Data are presented for experimental installations of these generators in the Soviet Union.

Author (GRA)

N74-16819g Army Construction Engineering Research Lab., Champaign, Ill.

ADVANCED ELECTRICAL POWER GENERATION AND DISTRIBUTION CONCEPTS FOR MILITARY FACILITIES
Jun. 1973 134 p. refs

(8A Proj. AAO-82112-A-891)

(AD-765476, CERL-PR-E-13) Avail: NTIS CSCL 10/2

The report describes probable technical advancement of electrical power generation systems in the 1980-1990 time period for application in fixed or semi-fixed military facilities in the power range of 250 kw to 50,000 kw. Subjects covered include commercial power reliability, uninterruptable power system, conventional steam, diesel, gas turbine (open and closed cycle) generators and distribution systems for currently available equipment. Advanced power systems include, nuclear reactors, batteries and fuel cells, magnetohydrodynamic systems, fusion systems, solar power systems and direct conversion systems of the thermoelctric and thermionic type. (Modified author abstract)

Author (GRA)

N74-16996g Rocket Propulsion Establishment, Westcott (England)

THE PRODUCTION OF LIQUID HYDROGEN AT THE ROCKET PROPULSION ESTABLISHMENT

(RPE-TR-71/17: BR36685) Avail: NTIS HC $6.00

The design, development, and operation of a liquid hydrogen plant with an hourly output of 100 liters of normal liquid hydrogen or 70 liters of B5-90 per cent parahydrogen are described. In a period of six months over 40,000 liters of B5-90 per cent parahydrogen was produced, most of which was used in support of ELDO projects. The performance of a pre-cooled Linde cycle is examined and the major design concepts required to ensure a safe reliable production facility are discussed.

ESRO

N74-17190 Brigham Young Univ., Provo, Utah.

KINETICS OF COAL GASIFICATION IN A LOW PRESSURE, LOW RESIDENCE TIME, ENTRAINMENT-FLOW REACTOR
Ph.D. Thesis
Chiang-Liu Chen 1973 192 p

Avail: Univ. Microfilms Order No. 73-31405

Experimental studies were made with a small entrained reactor in which the finely-ground coal entrained in carrier gas was rapidly mixed with oxidizing combustion gases. A maximum of 86.5 percent coal was gasified in 0.012 seconds. The char formation was an overall zero order while the acetylene decomposition was a second order reaction with a frequency factor of 4 times 10 to the 7th power and an activation energy of about 12 Kcal/mole. The residence time less than 0.001 seconds is sufficient for hydrocarbon gas production. Higher residence time resulted in lower gasification because of partial decomposition of hydrocarbons to elementary carbon.

Disser. Abstr.

N74-17454g Paris Univ., Orsay (France), Lab. of Plasma Physics.

DESCRIPTION OF THE ENERGY SOURCE-PROJECT DELIVERING 1 MEGAJOULE IN 1 MICROSECOND [DESCRIPTION DU PROJET D'UNE SOURCE D'ENERGIE DELIVRANT 1 MEGAJOULE EN 1 MICROSECONDE]
F. Damidou and G. Roux Apr. 1972 17 p. refs in FRENCH

(UP-3) Avail: NTIS HC $4.00

The project for a high energy source delivering one MJ in one microsecond using a unipolar autoexcited ironless rotating generator is presented. Three subsystems are detailed: (1) the primary source mentioned above, delivering one MJ in 0.1 second with one MA current coupled to a magnetic storage coil, (2) a primary transfer coil with high efficiency (transfer time 100 microseconds and associated switching gear; and (3) a secondary transfer coil to reach one microsecond. Circuit breakers required for these connections are detailed with regard to mechanical devices and exploding wire techniques. Mutually coupled inductances used for high efficiency transfer are described and the sequence of switch operations detailed.

ESRO


PERFORMANCE OF ARMY ENGINES WITH LEADED AND UNLEADED GASOLINE. PHASE 1: LABORATORY TESTING Interim Report

(Contract DAA05-72-C-0427)

(AAD-765760; AFLRL-21) Avail: NTIS CSCL 21/7

Six different types of Army engines were endurance tested on dynamometers for 125 hr each, using three grades of military Federal specification gasoline having typical conventionally leaded, low-lead, and unleaded concentrations of lead antiknock additives, respectively. All six engine types performed satisfactorily on all gasoline blends from the standpoints of (1) catastrophic failure, (2) excessive valve or cylinder wear, (3) engine power output and fuel and oil consumption, and (4) emissions degradation. (Modified author abstract)

Author

N74-17527g Argonne National Lab., Ill.

SOLAR ENERGY EVALUATION GROUP REPORT
Aug. 1973 48 p. refs

(Contract W-31-109-eng-38)

(ANL-8045) Avail: NTIS HC $4.00

A partial review of the status of various phases of solar-energy utilization and of some of the areas of potentially profitable research is reported. The review covers the biological and in vitro aspects of the photochemical conversion of solar energy, the photovoltaic, photothermal, and thermoelectric studies of the physical-conversion process; the use of solar energy for heating and cooling buildings; and the central-station power approach.

Author (NASA)

N74-17642g National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

EMISSIONS OF NITROGEN OXIDES FROM AN EXPERIMENTAL HYDROGEN-FUELED GAS TURBINE COMBUSTOR

(NASA-TM-X-2997; E-7745) Avail: NTIS HC $3.00

The effect of operating variables of a hydrogen fueled combustor on exhaust concentrations of total oxides of nitrogen was determined at inlet-air temperature levels up to 810 K, pressure of 414,000N/sa m, and reference velocity of 21.3 m/sec. The combustor, which was originally designed for hydrocarbon fuel reduced a NO(x) concentration of 380 ppm with hydrogen at 810 K inlet-air temperature. A reduction in NO(x) of about 30% was obtained by modification to a lean or rich primary
zone. The lowest NO(x) levels obtained with hydrogen were equivalent to those of the reference combustor burning hydrocarbon fuels.

Author


A bibliography of abstracts on econometric models and their application to the economy and energy sectors is presented. The bibliography has 101 references. E.H.W.


TRANSLATIONS ON EASTERN EUROPE SCIENTIFIC AFFAIRS, NO. 383 30 Jan. 1974 29 p refs Transl. into ENGLISH from various East European periodicals (JPRS-81101) Available: NTIS HC $3.60

Romanian research is reported in the areas of: (1) digital processing and transmission of information, and (2) fuel savings with thermoenergetic equipment.


ROLE OF THERMOENERGETIC RESEARCH IN SAVING FUEL C33 Teofil Popovic and D. Marian In its Transl. on Eastern Europe Sci. Affairs. No. 383 (JPRS-81101) 30 Jan. 1974 p 24-26 Transl. into ENGLISH from Romanian Libera (Bucharest), 18 Nov. 1973 2 P

A question and answer interview with the director of the Romanian Research and Design Institute for Thermoenergetic Equipment is reported. The interview involves proposals of concrete methods by which researchers and designers of thermoenergetic equipment can help to better use the fuel in the national economy.

Author


DETERMINING THE EFFECTS OF GASOLINE PRICE ON USE OF METALS IN AUTOMOBILE MANUFACTURE Phillip N. Yasnowsky and Donald S. Colby 1974 18 p refs (BM-R1-7871) Available: NTIS HC $4.00

An attempt was made to relate the size of automobiles to the price of gasoline, and the use of minerals in automobile manufacture to the size of automobiles. Only one of the many plausible scenarios of public reaction to higher gasoline prices, a switch to economy size automobiles, is developed. No account is taken of other potential impacts such as improvements in public transportation or increased occupancy per vehicle. Furthermore, a gasoline price increase is the only incentive to the greater utilization of economy cars that is considered. A gasoline price increase to $0.60 per gallon would reduce the amount of minerals required to produce the automobiles sold in the United States by an estimated 15 percent. Gasoline prices of $0.80 and $1 per gallon would cause declines in mineral requirements for U.S. automobile sales estimated at 26 percent and 35 percent, respectively.

Author

N74-17669 Committee on Interior and Insular Affairs (U. S. Senate).


Available: Comm. on Interior and Insular Affairs.

The provision of an adequate supply of all needed forms of energy at reasonable and stable prices, with incentive for their continued adequate provision, without degradation of the environment or jeopardy to the national security, and with minimum waste is discussed. Three basic areas are discussed:

the legislation that was enacted; the legislation that was proposed but not enacted; and the hearings that were held by the various committees and subcommittees of the Congress. In addition, reports concerning energy that were issued are included. Author

N74-17660 Oak Ridge National Lab., Tenn.


One-hundred abstracts are presented of recently published articles on energy resources; energy conversion; energy production, consumption, economics, and policy; electric power production, consumption, and transmission; and environmental studies related to power production and use. Each abstract is accompanied by the following information: title; author; corporate author with address; publication description; publication date; research sponsor; and availability. N.S.A.

N74-17665 Technische Hogeschool, Delft (Netherlands).


The seventh Dr. Albert Plesman Memorial Lecture deals with the problems of aviation needs and public concerns. The problems of aircraft noise, and its reduction, are discussed. The growing demands on energy resources are coupled with the rising fuel prices. The growing scarcity of land suitable for airport sites is illustrated. Some background data is provided from related OECD studies.

ESRO

N74-17779 Battelle Columbus Labs., Ohio.


The report in four volumes presents the results of an analysis of the effects of cost changes on general aviation activity. The major objectives of the study were to investigate ownership and operating costs in each segment of general aviation, and to develop methodology for evaluating the cost impact of regulatory changes on general aviation activity. The study effort included a compilation of a cost and activity data base, definition of fixed and variable cost centers, determination of cost sensitivity relationships and determination of cost impact relationships. Volume 1 provides a summary of the overall study. (Modified author abstract) GRA

N74-17780 Battelle Columbus Labs., Ohio.


The report in four volumes presents the results of an analysis of the effects of cost changes on general aviation activity. Volume 2 presents the rationale and methodology used in the analysis. (Modified author abstract) GRA

N74-17781 Battelle Columbus Labs., Ohio.


The report in four volumes presents the results of an analysis.
of the effects of cost changes on general aviation activity. The major objectives of the study were to investigate ownership and operating costs in each segment of general aviation, and to develop methodology for evaluating the cost impact of regulatory changes on general aviation activity. The study effort included compilation of a cost and activity data base, definition of fixed and variable cost centers, determination of cost sensitivity relationships, and determination of cost impact relationships. The results are presented in graphical form in Volume 3 of this report to facilitate easy use. (Modified author abstract) GRA


A feasibility study of a satellite solar power station (SSPS) was conducted, (1) to explore how an SSPS could be "frozen" and controlled in orbit; (2) to determine the techniques needed to avoid radio frequency interference (RFI); and (3) to determine the key environmental, technological, and economic issues involved. Structural and dynamic analyses of the SSPS structure were performed, and deflections and internal member loads were determined. Desirable material characteristics were assessed and technology developments identified. Flight control performance of the SSPS baseline design was evaluated and parametric sizing studies were performed. The study of RFI avoidance techniques covered: (1) optimization of the microwave transmission system; (2) device design and expected RFI; and (3) SSPS RFI effects. The identification of key issues involved (1) microwave generation, transmission, and rectification and solar energy conversion; (2) environmental-ecological impact and biological effects; and (3) economic issues. The feasibility of the SSPS based on the parameters of the study was established. Author

N74-17786# Linguistic Systems, Inc., Cambridge, Mass. DC GENERATOR FOR KOLKHOZ WIND POWERED GENERATORS


The use of carbosilane-graphite resistors to control the voltage output from a wind-powered generator is described. Experiments were performed for devising methods of regulating dc generators to supply constant voltage, and a new type of nonlinear resistor was developed for use as a regulator. Author

N74-17787# Linguistic Systems, Inc., Cambridge, Mass. THE PRESENT STATUS OF HONNEF WIND POWER PLANTS


The most important energy sources on earth, next to the sun and water, are coal and oil. However, it seems that these deposits will be exhausted in the foreseeable future. Large wind power plants are destined to play an important role in the tapping of new energy sources. Their viability must be judged from the research and development work carried out in the U.S.S.R., the U.K., the U.S.A., and Germany. Author

N74-17788# Boeing Aerospace Co., Seattle, Wash. Kent Space Center. HIGH VOLTAGE SOLAR ARRAY EXPERIMENTS Final Report


(NASA-CR-121280) Avail: NTIS HC $10.00 CSCL 10A

The interaction between the components of a high voltage solar array and a simulated space plasma is studied to obtain data for the design of a high voltage solar array capable of 15kW at 2 to 16KV. Testing was conducted in a vacuum chamber 1.5-m long by 1.5-m diameter having a plasma source which simulated the plasma conditions existing in earth orbit between 400 nautical miles and synchronous altitude. Test samples included solar array segments pinholes in insulation covering high voltage electrodes, and plain dielectric samples. Qualitative data are presented in the areas of plasma power losses, plasma and high voltage induced damage, and dielectric properties. Limitations of the investigation are described. Author

N74-17789# Scientific Translation Service, Santa Barbara, Calif. THE dc GENERATORS FOR UTILIZING WIND POWER


Theoretical considerations are explained and experimental findings pertaining to the possibility of utilizing wind power with electromechanical units comprising various types of direct current machines. Author


Two obstacles to harnassing solar energy, storage and collection, are discussed in terms of solar heating and cooling systems for buildings. The cost ranges for heating with solar energy are compared with the use of conventional fuels. Photovoltaic conversion of solar energy is discussed along with solar energy conversion in space solar heat engine power plants, wind energy, and ocean thermal gradients for powering large heat engines. K.M.M.

N74-17791# Yardney Electric Corp., Pawcatuck, Conn. DEVELOPMENT AND FABRICATION OF SEALED SILVER-ZINC CELLS, PHASE 1 Final Report


A facility was designed, constructed and equipped for the production of prismatic alkaline rechargeable battery cells using inorganic (ceramic) separators. This unique facility is environmentally controlled and contains separate areas for electrode fabrication, separator processing, cell assembly, cell finishing and testing. An initial production run of 125 sealed silver zinc cells, using inorganic separators, was made in the facility in order to provide samples for baseline performance tests. Ten of these cells were given performance characterization and life cycle tests. Author


Both classical and theoretical methods for preventing wind engines from overspeeding are described. The greatest drawback in the use of these devices is said to be their inability to compete with other power sources on an economic basis. In this connection there is a detailed description of the failure of the Grandpa's Knob experiment conducted in Vermont in the early 1940's. The technical defects were minor in comparison to the lack of economic feasibility. Russian efforts and Danish projects are discussed briefly. Author
MARQUIS R. SEIDEL, STEVEN N74-17800)

1973 its could and retraction accelerations and velocities, and that the controls could achieve the desired hose extension, response. The report describes research and development leading to a high performance aerial refueling system. The test program demonstrated that the hydrostatic transmission feasibility of innovations to a high performance aerial refueling (AD-771389: R. Div.)

The development effort toward a scale up to government for use in submersible vehicles. The construction effort has included the gathering of both scientific and engineering data. The world-wide occurrence of both known and probable sites of hot-water (water-dominated) geothermal systems particularly in relation to United States Department of Energy installations are reviewed and discussed. Included are the geological settings and the types of detection techniques that are necessary to delineate geothermal systems.

The investigation has been directed toward a feasibility study for the development of hot-water (water-dominated) geothermal systems for potential Department of Defense use as an energy source. The research effort has included the gathering of both scientific and engineering data. The world-wide occurrence of both known and probable sites of hot-water (water-dominated) geothermal systems particularly in relation to United States Department of Energy installations are reviewed and discussed. Included are the geological settings and the types of detection techniques that are necessary to delineate geothermal systems.

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GRA SEMI-ANNUAL REPORT PERIOD 10/1 - 3/31, 1973

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common emission categories: fuel combustion, studies, engineering estimates, etc., have been compiled for use.

James AND THE EFFECTS OF EXHAUST EMISSIONS CONTROL

HC (PB-223996/OGA; Triangle Park, N.C.)

Triangle Park, N.C.

Pursuant to Section 202(c) of the Clean Air Act, the Environmental Protection Agency contracted with the National Academy of Sciences to study the technological feasibility of the 1975-76 Federal Motor Vehicle Emission Standards. This is a report on that study as carried out by the Committee on Motor Vehicle Emissions and covers various topics including test procedures and certification, conventional control technology, alternative engines, in-use emissions and manufacturing, cost and productivity.

GRA

CHARACTERIZATION OF PARTICulates AND OTHER NON-REGULATED EMISSIONS FROM MOBILE SOURCES AND THE EFFECTS OF EXHAUST EMISSIONS CONTROL DEVICES ON THESE EMISSIONS


The effect of emission control devices on the particulate emissions of an automotive power plant was investigated. Particulate mass emission rates were measured, as well as particle mass size distribution, carbon and hydrogen, trac metal, and benzene pyrene content of the particulate. Ammonia and aldehydes were measured in the exhaust gas condensate, and gaseous emissions were determined as a routine check on engine operating conditions.

GRA

Compilation of Air Pollutant Emission Factors (Second Edition)

Apr. 1973 268 p refs Revised

Emission data obtained from source tests, material balance studies, engineering estimates, etc., have been compiled for use by individuals and groups responsible for conducting air pollution emission inventories. Emission factors cover most of the common emission categories: fuel combustion by stationary and mobile sources; combustion of solid wastes; evaporation of fuels, solvents, and other volatile substances; various industrial processes; and miscellaneous sources. When no source test data are available, these factors can be used to estimate the quantities of primary pollutants (particulates, carbon monoxide, sulfur dioxide, nitrogen oxides, and hydrocarbons) being released from a source or source group.

GRA

Potential Pollutants in Fossil Fuels


This survey presents the composition of typical U.S. fossil fuels by source location, and the extent to which the selection of coals and crude oils by geographic source can be expected to affect their composition in trace elements. The first section deals with coals produced and consumed in the United States.
A section on petroleum and shale oil includes domestic crudes and crudes from nations which export to this country. The number of elements for which statistical data on composition and geographical location exist is entirely different for crude oil and for coal. Good data and useful correlations with source locations are available for petroleum, for sulfur, nitrogen and nickel/vanadium, but not for other potential pollutants. A large body of data is available for trace elements in coal, and is examined herein. For both coal and petroleum, however, the level of trace elements present is relatively low so that methods of sample selection and sample handling prior to analysis can and do present major complications in the interpretation of results.

**N74-18328**
Max-Planck-Institut fuer Plasmaphysik, Garching (West Germany).

**DESIGN STUDY OF SUPERCONDUCTING 5 TESLA DIPOLE MAGNETS FOR MGD GENERATORS**
W. Elsel and H. Muntenbruch Dec. 1972 99 p refs In Germany; ENGLISH summary

A general design concept for a 5 tesla dipole magnet to be used in a 10 MW MHD generator was developed. The solution allows the linear dimensions of the magnet to be increased or decreased by a factor of about 2 without need of major modifications. The required dimensions and properties of the magnet are: rated field strength = 5 Tesla, magnetic length = 2 m; uniformity-in a volume 50 cm in diameter and about 2 m in length deviations from the rated field strength should be less than 5%; room temperature bore-circular with a diameter of 70 cm or square with sides 60 cm long. The investigations provided the basic calculations and drawings for designing the magnet system, power supply system, cryogenic system and the control and safety facilities. Various conductors, coil geometries, winding concepts, and design principles were compared. The forces in the coils as well as in the structure were calculated and estimates concerning the quench behavior were made.

Author (NSA)

**N74-18403**
 Stevens Inst. of Tech., Hoboken, N.J.

**THE HYDROGEN IC ENGINE: ITS ORIGINS AND FUTURE IN THE EMERGING ENERGY-TRANSPORTATION ENVIRONMENT SYSTEM**
Kurt H. Weil [1973] 9 p refs

A historical review of the internal combustion engine is presented. The use of hydrogen based fuels instead of hydrocarbon based fuels are discussed as a fuel source for controlling air pollution both in automobiles and in electric utilities.

S.K.W.

**N74-18406**

**NAS REPORT ON TECHNOLOGICAL FEASIBILITY OF 1975-1976 MOTOR VEHICLE EMISSION STANDARDS: AN EVALUATION OF ALTERNATIVE POWER SOURCES FOR LOW-EMISSION AUTOMOBILES, NATIONAL ACADEMY OF SCIENCES**
Apr. 1973 161 p refs

The panel has evaluated several near and long term alternative power systems including diesel, gas turbine Rankine cycle and Stirling engines. In addition electric vehicles and alternative fuels were studied. Various aspects of each engine/system was considered including emissions, fuel economy, noise, cost size and weight, producibility, and reliability. The report also discusses the lead time necessary to begin limited and mass production of each system.

**N74-18407**

**NAS REPORT ON TECHNOLOGICAL FEASIBILITY OF 1976-1976 MOTOR VEHICLE EMISSION STANDARDS: EVALUATION OF CATALYST AS AUTOMOTIVE EXHAUST TREATMENT DEVICES, NATIONAL ACADEMY OF SCIENCES**
Mar. 1973 85 p refs

The report covers investigations into the availability of catalyst for oxidation and NOx reduction with sufficient activity and stability, the causes of aging, and the interaction of catalysts with hardware modifications. The report also examines the raw material availability, manufacturing and maintenance problems, and the toxicology of debris. The panel also discusses several remaining problem areas.

**N74-18414**

**LOW NOx EMISSION COMBUSTOR DEVELOPMENT FOR AUTOMOBILE GAS TURBINE ENGINES**
D. W. Dawson, K. A. Hanson, and R. C. Holder Feb. 1973 273 p refs

Thirty-five combustor configurations were tested to determine emission characteristics. Chemical kinetics of emissions formation are discussed. A design technique that achieved significant NOx reductions in a gas turbine combustor was demonstrated. This technique involved the application of recuperator (or regenerator) bypass air directly into the combustor primary zone. The vaporizer combustor resulted in the most significant improvement by the use of bypass flow. The optimum low emissions engine would use an engine cycle and variable bypass flow that have been matched to provide the best balance between fuel economy and related emissions. Variable recuperator bypass is a simple and convenient alternative to variable combustor geometry. The required control system is simpler and has the potential of: lower cost; higher reliability; and better maintainability.

**N74-18417**
Systems Research Labs., Inc., Dayton, Ohio.

**INVESTIGATION IN ENERGY TRANSFER AND ENERGY CONVERSION FOR ADVANCED POWER AND PROPULSION SYSTEMS**
C. Calvert and J. Watson Oct. 1973 120 p refs

The report covers the work done in three areas of energy conversion and transfer involving fluid dynamic processes: electrofluidodynamic energy conversion, multicomponent flow research, and aerodynamic energy transfer research. The effort under item one was an exploration of direct energy conversion of fluid dynamic energy into electrical power using electrofluidodynamic (EFD) processes. The objective here was to identify workable and practical systems and designs for superior, lightweight, reliable, electrical generators. Item two covers studies of methods by which heat energy from reactions of solid particles or droplets contained in a combustion or reaction chamber can be used to produce fluid dynamic energy. The principal objective of this work was to assess wall erosion, particle suspension, and related fluid dynamic processes and components germane to practical thrust augmentation ejectors. The objective was to identify appropriate design concepts applicable to vertical or short-field take-off-and-landing aircraft. (Modified author abstract)

**N74-18567**
National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

**LIGHT BULB HEAT EXCHANGER FOR MAGNETOHYDRODYNAMIC GENERATOR APPLICATIONS: PRELIMINARY EVALUATION**
The light-bulb heat-exchanger concept is investigated as a possible means of using a combustion heat source to supply energy to an inert gas MHD power generator system. In this concept, combustion gases flow through a central passage which consists of a duct with transparent walls through which heat is transferred by radiation to a radiation receiver which in turn heats the inert gas by convection. The effects of combustion-gas emissivity, transparent-wall transmissivity, radiation-receiver emissivity, and the use of fins in the inert gas-coolant passage are studied. The results indicate that inert gas outlet temperatures of 2500 K are possible for combustion temperatures of 3200 K and that sufficient energy can be transferred from the combustion gas to reduce its temperature to approximately 2000 K. At this temperature more conventional heat exchangers can be used.

Author


SYMPOSIUM ON ENERGY, RESOURCES AND THE ENVIRONMENT. VOLUME 1: SESSION ON INTERNATIONAL ISSUES


Technological and capital requirements to meet the growing international storage in energy by better and expanded exploitation of resources is discussed. Interwoven aspects of limited growth and the Environment are discussed. It is stipulated that the increasing real costs of energy have a decisive impact on all policies of decision makers and that alternatives need to be developed on research in resource exploration and extraction.

G.G.


INTRODUCTORY REMARKS


The interrelationships or linkages between economic growth, environmental impact, international problems, and definition of a consensual ethic in the worldwide energy sources development are discussed. It is stipulated that the increasing real costs of energy have a decisive impact on all policies of decision makers and that alternatives need to be developed on research in resource exploration and extraction.

G.G.

N74-18584 Hudson Inst., Inc., Croton-on-Hudson, N.Y.

CONTEXT OF THE SESSION THEME, INTERNATIONAL ISSUES


A study framework is projected that considers the context for international issues on energy demands, energy sources, and environmental values. Various possible prospective views are explored that project growth on resource dependence for various economic areas of the globe.

G.G.

N74-18585 Massachusetts Inst. of Tech., Cambridge.

COMPUTER SIMULATION OF WORLD DYNAMICS AND IMPLICATIONS FOR POLICY DECISIONS


It is stipulated that energy and resource policies are coupled to social issues. The effects of technology in social breakdown are stressed and it is suggested that energy demands should not be fully met for the long term good of society. Instead, the growth rate in the use of energy and resources should be gradually reduced so that demands no longer rise. The inevitable slowing of growth requires adjustment of our system policies on ethics, rights, and humanitarianism to new concepts of human equality.

G.G.

N74-18586 Hudson Inst., Inc., Croton-on-Hudson, N.Y.

ECONOMIC BASIS FOR ENERGY AND RESOURCE USE

Herman Kahn in Mitre Corp. Symp. on Energy, Resources and the Environment, Vol. 1 12 Apr. 1972 p 48-104

An economic basis for energy and resource use to solve international societal problems in the future is presented. G.G.

N74-18587 California Univ., Livermore. Lawrence Livermore Lab.

ENERGY IN GENERAL


Technical aspects of providing energy and utilizing resources for world-wide demand are considered. Projected energy flow patterns recognize growth demands fossil fuel reserves that require definite economic and technological adjustments. Better utilization of the coal and oil shale resources can be obtained by secondary and tertiary recovery methods such as water flood and fire flood, or nuclear explosions, a move to gaseifying coal underground also seems to be feasible. Nuclear breeder reactor development is technically proven but economic feasibility must be considered. Solar energy source developments require storage facilities in principle; hydrogen seems to be the best product to be used as a fuel and possible for transportation markets. Emphasis is placed on making all these fuel resources available at acceptable prices for the world's community.

G.G.


THE INTERNATIONAL ASPECTS OF IMPORTING NATURAL GAS


Importation of liquefied natural gas from Algeria to eliminate the expected natural gas shortage in the U.S.A. requires the adjustment of regulatory limitations to foreign currencies, the building of cryogenic tankers to transport liquid methane, and the building of terminal facilities in the east coast of the United States.

G.G.

N74-18589 Massachusetts Inst. of Tech., Cambridge.

REMARKS


The question whether or not the required capital will be available if technology did manage to meet energy and resource shortages, mounting pollution, and food shortages, is considered. Solving this real problem by a computer simulation model demands internal consistency between present assumptions and future expectations in technology, sociology, value structures, and long term versus short term conflicts.

G.G.

N74-18590 Hudson Inst., Inc., Croton-on-Hudson, N.Y.

REMARKS


World capital requirements to meet energy and resources shortages in 2100 relative to GNP will be about five to one. In order to maintain this projected growth to the year 2100 an accumulation of about two quadrillion dollars worth of capital is necessary. It is stipulated that capital accumulation of five percent a year does not seem to be a problem for the U.S.A.

G.G.


SYMPOSIUM ON ENERGY, RESOURCES AND THE ENVIRONMENT. SESSION ON ETHICS AND ENVIRONMENTAL ASPECTS OF THE DEMAND FOR AND USE OF ENERGY, VOLUME 2


Environmental ethics affect research and development of alternative energy sources as well as the more efficient exploitation of existing resources leading to a more equal distribution of...
wealth and the socioeconomic burden in a population.

It is stressed that socioeconomic considerations require the development of abundant and low-cost energy in a national policy. The energy should be environmental clean and reasonable self-sufficient to insure long term national security. Public policies and regulations and a lead agency are required to assume these responsibilities and to fund the various sources of energy exploration.

The development of a consensus energy ethic is projected that leads to public agreement as to what is fair in respect to the various aspects of source development. Key issues are: Source development - particularly of fossil fuel: energy use -- as affected by education, advertising, and legislation; (3) nationalism -- in the national security sense as seen by a citizen of a consuming nation; (4) pollution -- as a negative factor in the quality of life; (5) Federal funding -- as an element of public support; and (6) fusion reactors -- as an example of a possible technological key to abundant energy.

Issues involved in developing energy and environmental ethics rest on a basic collision of values between a society that is built on an abundant supply of energy and a society that has adopted an environmental concern. It is shown that the U.S. consumes thirty to thirty-five percent of the world's resources each year with six percent of the world's population and that the rest of the world is two-thirds in a perpetual blackout. A policy of conservation and saving, and a more even distribution of the world's resources necessitates inherent redistribution of wealth until research and development efforts produce more environmentally compatible sources of energy.

A comprehensive set of energy, resource and environmental issues is presented. Some changes to governmental institutions for dealing with the energy crisis are described that encompass pricing, depletion allowances, oil imports, and environmental regulations.

The following three policy mechanisms to achieve cleaner power are appraised: prices, regulation, and direct public provision. It is shown that the resource-environment-energy link up at the current level of pollution is due to multiplicative interaction of the amount of output per capita, the number of people, and the amount of pollution per unit output. The need for shifting some of the distribution impact of the projected financing burden from the poor population is emphasized.

The environmental issues discussed are: (1) Waste heat and its effect on temperature of the earth; (2) air pollution by smoke, sulfur and auto emissions; (3) radioactivity in catastrophic accident and local release, at background levels, and in the forever problem; (4) power plant and industrial facility siting; (5) strip and open pit mining; (6) offshore exploration and drilling; (7) wilderness and remote area exploitation; and (8) zero growth projection. It is concluded that in the long run the conservation of energy in order to conserve the environment cannot be overlooked and that research and development to find alternative resources will increase the energy cost factor markedly.

New technologies in energy conversion and new energy resources are considered that range from electric cars, solar energy conversion, magnetohydrodynamic power, geothermal energy, and nuclear fusion processes. The dominant role of the liquid metal cooled breeder reactor for providing future energy is emphasized.

The outlook on Japanese demand for energy and supplies for meeting this demand until 1985 is discussed. Indigenous sources of energy will meet only seven percent of the total energy demand, this necessitates the development of electric nuclear power plants in Japan and of uranium resources in overseas countries. Disposal of radioactive wastes poses a serious environmental problem.

The review of restrictive environmental protection laws and regulations is advocated in order to construct and operate new power facilities that insure increased electric energy demands for future economic growth in the U.S. Long term payoffs for society require power supply systems which produce and transmit abundant, reliable and cheap power without depletion of natural resources. Research on the use of solar energy, fusion power, large scale production of hydrogen, or an optimum blending of several of these concepts is projected for future energy supply systems.
N74-18603


MAN VERSUS HIS INSTITUTIONS


N74-18604

Office of Science and Technology, Washington, D.C.

ENERGY OPTIONS


N74-18605

Committee on Aeronautical and Space Sciences (U. S. Senate).

ENERGY-RELATED RESEARCH AND DEVELOPMENT


N74-18606

RAND Corp., Santa Monica, Calif.

THE POTENTIAL FOR ENERGY CONSERVATION IN COMMERCIAL AIR TRANSPORT

James J. Mutch Oct. 1973 90 p refs (Grant NSF GI-44) (R-1380-NSF) Avail: NTIS HC $7.50

N74-18607

RAND Corp., Santa Monica, Calif.

TRANSPORTATION ENERGY USE IN THE UNITED STATES: A STATISTICAL HISTORY, 1955 - 1971

James J. Mutch Dec. 1973 54 p refs

(Grant NSF GI-44) (R-1391-NSF) Avail: NTIS HC $5.75

Total transportation energy consumption is considered in view of increased travel per person and an increasing use of more energy intensive modes. Energy distribution for modes and markets is shown from $5 to $11 in graphical form. Freight and passenger transportation on highways, aircraft, railroads, and waterways are also reviewed.

N74-18608


NATURAL RESOURCES DEVELOPMENT AND POLICIES INCLUDING ENVIRONMENTAL CONSIDERATIONS. ADDENDUM: CHANGING PATTERNS IN THE WORLD ENERGY SITUATION

12 Jan. 1971 40 p refs (E/C.7/2/Add.1) Avail: NTIS HC $5.00

The consumption and production of energy worldwide are cited. Special attention was given to the close interrelationship between energy use and economic development. Energy demand as affected by industrialization, urbanization, and mechanization are discussed. Statistical tables covering consumption and energy supplies from 1950 to 1968 are included.

N74-18609

Cranfield Inst. of Technology (England).


The results are reported of a one-year study intended to assess the usefulness of a new transport technology; that of an urban air-supported and propelled system. The technology is described and its qualitative and quantitative assessment is reported in both absolute and comparative terms. It is concluded that the proposed system has several features which make its application unlikely; in particular there are safety problems, and there is no positive evidence that overall costs would be lower than existing competing modes in conventional circumstances. As a result it is not recommended that any further development of the technology should take place. The report is written as an account of the work undertaken. In this way it provides a guide to the process for future studies of this type.

N74-18610

Committee on Interior and Insular Affairs (U. S. Senate).

ENERGY CONSERVATION AND S. 2176, PART 2


Hearings are held describing the role of energy conservation in national energy policy. Conservation in transportation, housing, and in the industrial sector are emphasized. Ways to educate consumers to use energy more efficiently especially regarding motor vehicles and home appliances are outlined.

N74-18611

decision Sciences Corp., Jenkintown, Pa.

QUANTITATIVE ENERGY STUDIES AND MODELS: A STATE OF THE ART REVIEW

Dr. R. Limey, Fred Balch and John R. Shanko [1973] 50 p refs Sponsored by Council on Environmental Quality, in that demonstration can be applied to several areas of technology. Even if there is uncertainty about some of the underlying data, military goods and services should be expressed in terms that uniformly reflect Soviet rather than U.S. manufacturing methods and input quantities.

N74-18612

Transportation Systems Center, Cambridge, Mass.


70
The report is a compendium of selected time series data describing the transportation, promotion, processing, and consumption of energy. The report is divided into three main sections. The first contains such items as the revenues and expenses of oil pipeline companies, number and capacities of U.S. tank ships, and the total crude oil transported in the U.S. by methods of transportation. The second section reveals the growth over time of the U.S. oil and natural gas reserves, refining capacity, and yields. Trends in demand for fuel and power are displayed in the third section. Throughout this part, the transportation sector is emphasized. Included are the gasoline and oil costs of automobiles of different sizes, the consumption of petroleum by type of product, the energy intensiveness of the air carriers, the electrical energy consumed, the costs of automobiles of different sizes, and the demand for fuel and power in the U.S.


(IPS-224750/OGA; UKY-TF-70-73-CEED4) Avail: NTIS HC $5.00 CSCL 10A

Recent available information on the rapidly changing energy resource picture, fuel policies and consumer demands is presented. Papers by knowledgeable government officials and industrial representatives are included. Topics covered include new developments in the extraction of natural gas and crude oil, interfuel conversion (coal to gas and oil, coal to gas by the Lurgi process, SNG and oil), the role of the Federal Government to insure an adequate, reliable energy supply, and the transmission and transportation of energy.


Aug: 1973


The bibliography is a compilation of 287 references on Energy Conversion. Citations are sequenced numerically within each of the following categories: (1) Fuel Cells; (2) Mineral Fuels; (3) Nuclear Energy; (4) Solar Energy; (5) Steam Power; (6) Thermionic Generators; (7) Thermoelectric Generators; (8) Geopolitical Energy Studies, and (9) Miscellaneous Studies. Corporate Author-Monitoring Agency, Subject, Title, Personal Author, Contract Number, and Report Number Indexes are included.

Author (GRA)

**N74-18720** Tulane Univ., New Orleans, La. **INVESTIGATION OF ENERGY CONVERSION IN RAPIDLY CYCLING FUEL CELLS. 1. A SYSTEM FOR STUDYING THE SURFACE DIFFUSION OF HYDROGEN ON METALS, 2 Ph.D. Thesis**

Vasudev Dayanand Prebhu 1973 268 p

Avail: Univ. Microfilms Order No. 74-320

By rapidly cycling the fuel cell, energy conversion techniques can be applied to a mechanical device called an electrochemical pump. The cycle efficiency and performance of the electrochemical pump is studied by means of transient fuel cell and electrolysis operation of the ion exchange membranes fuel cell. Performance characteristics of the cell during rapid cycling operation are presented and critically analyzed. A system for experimentally measuring surface diffusion is designed and constructed. The surface diffusion of tritium can be obtained by monitoring the radioactivity of adsorbed tritium versus distance along a metal surface with an ion exchange membrane fuel cell. A critical analysis of results in terms of energies of tritium and noise level encountered during experiments is presented.

Dissert. Abstr.

**N74-18724#** Georgia Inst. of Tech., Atlanta. School of Mechanical Engineering. **COMPARATIVE EVALUATION OF SOLAR, FISSION, FUSION, AND FOSSIL ENERGY RESOURCES. PART 1**

**SOLAR ENERGY** Final Report

J. R. Williams 23 Jan. 1974 122 p refs (Grant NGR-11-002-186)

(NASA-CR-137242) Avail: NTIS HC $9.25 CSCL 10A

The utilization of solar energy to meet the energy needs of the U.S. is discussed. Topics discussed include: availability of solar energy, solar energy collectors, heating for houses and buildings, solar water heater, electric power generation, and ocean thermal power.

F.O.S.


(JPRS-61359) Avail: NTIS HC $4.00

A MHD generator circuit is described with an overload mode capacity making operation possible in a wide range of loads.

Author


(NBS-TN-789) Avail: SOD HC $2.35 Domestic Postpaid or $2.00 GPO Bookstore as C134.8:789

Actions pertinent to existing buildings and new buildings are described. Regarding existing buildings, principal topics include summer cooling, winter heating, and other energy conserving features -- i.e., insulation, fenestration, lighting, appliances, domestic hot water, and human comfort. Suggested actions include those which can be accomplished voluntarily or without expense, and also actions which require some modest effort or expense on the part of the building owner or occupant. Regarding new buildings, energy conservation actions are described that deal with building design and mechanical systems. The report concludes with a summary of mechanisms for implementation of such actions and criteria for use in evaluation of them.

Author

**N74-18725#** Union Electric Co., St. Louis, Mo. **RECYCLING SOLID WASTE FOR UTILITY FUEL AND RECOVERY OF OTHER RESOURCES**


Avail: NTIS HC $4.00

Full scale prototype testing to determine the feasibility of processing municipal solid waste to produce supplementary fuel for electric utility boilers and to recover recyclable, noncombustible materials has been conducted. Operation of the prototype was satisfactory during the first year with the exception of milled solid waste mechanical handling problems. Crushed glass in the solid waste resulted in excessive wear and maintenance of solid waste pneumatic transport piping bends and elbows. Metals and oversize pieces of wood caused frequent stoppages of solid waste transport system mechanical feeding equipment. The mechanical handling problems were identified soon after the initial operation and it appeared clear that the material presented no other operating problems at the processing plant or in furnace combustion. Consequently, engineering design and purchase of a mechanical air separator (air classifier) was initiated to provide for the removal of glass, metals, and other unburnable materials.

Author

**N74-18727#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. **COMPUTER PROGRAM FOR THERMODYNAMIC ANALYSIS**
OF OPEN CYCLE MULTISHAFT POWER SYSTEM WITH MULTIPLE REHEAT AND INTERCOOL


A computer program to analyze power systems having any number of shafts up to a maximum of five is presented. On each shaft there can be as many as five compressors and five turbines, along with any specified number of intercoolers and reheaters. A recuperator can be included. Turbine coolant flow can be accounted for. Any fuel consisting entirely of hydrogen and/or carbon can be used. The program is valid for maximum temperatures up to about 2000 K (3000 °R). The system description, the analysis method, a detailed explanation of program input and output including an illustrative example, a dictionary of program variables, and the program listing are explained.

Author

N74-18729# Los Alamos Scientific Lab., N.Mex.


The use of ocean water as a fuel source from which to derive hydrogen is proposed. The production of hydrogen by the reactions of the Mark-1 process and the process with iron-carbon catalysts is discussed. The pipelines and transport of hydrogen with its applications to fuel sources or everyday life are discussed. It is predicted that it will be possible to establish a powerful food chain depending neither on agriculture nor on oil reserves and based only on atomic energy. Scientists have been trying, with the aid of hydrogen yeast to obtain food from carbon dioxide, mineral salts, and hydrogen obtained with electrolysis of water by current from solar batteries. The same hydrogen and oxygen could serve as an energy source for fuel cells. Author (NSA)

N74-18730# Electricity Commission of New South Wales, Sydney (Australia).

ELECTRICITY: THE CONVERSION INDUSTRY N. B. Heal 1973 10 p refs (NP-19837) Avail: AEC Depository Libraries HC $3.00

Planning of future electric power supplies is considered with specific reference to Australia. Topics covered include fuel reserves, fuel costs, electricity supply today, planning future supplies, energy transport, and the effect of changes on the consumer. Coal, uranium, and possibly natural gas coal reserves are clearly adequate to provide a supply of fuel at reasonable costs for power generation for well into the next century. In comparison with uranium and coal, known reserves of crude oil and natural gas in Australia are relatively small. NSA

N74-18731# Atomic Energy Commission, Washington, D.C.


A process is described for the utilization of hydrodynamic energy produced by water falling through a pipe inserted deeply into the earth's crust at a point where the high temperature will produce steam and is returned to the earth surface through another pipe as steam. The waterfall created by this perforation is utilized by turbines suitable for the production of electric energy. While the steam produced spurs from the surface of the earth and can be used as a source of energy with multiple applications. NSA

N74-18732# Energy Research Corp., Bethel, Conn.


A sealed 7 Ah/6.5 volt nickel-zinc battery has been developed which is capable of 160-200 cycles of operation at approximately 60% depth of discharge at the C/4 rate. Initial energy density obtained was 28 Wh/lb at the C/4 discharge rate. The battery will deliver about 40% of its energy at -20°F at the C/4 rate. With silver-amalgam anode recombinant electrodes the battery is capable of continuous overcharge at 0.5 ampere at a safe steady state pressure below 50 psi. Improved inorganic separators (ERC-2002) have been developed which are chemically inert in KOH, have a uniform pore size distribution and stop the occurrence of zinc dendrites. The primary cause of failure of the battery was found to be from the zinc electrode failure. (Modified author abstract) GRA

N74-18733# Army Electronics Command, Fort Monmouth, N.J.


Shorting by zinc penetration through the separator layers was prevented in zinc-air and zinc-oxygen cells by inserting a 10 mil thick partially wetproofed porous nickel layer within the layers of separator material. Excellent capacity maintenance was attained for 50 cycles from a zinc-air cell by: (a) containing the zinc anode within a plastic frame onto which the separator layers were epoxy-sealed, (b) blocking the edges of the anode with a thin plastic shield, and (c) providing a 20 to 30 mil thick electrolyte channel between the charging electrodes and separator clad anodes. Preliminary results from sealed zinc-oxygen cell investigations indicate that good capacity maintenance can be attained by: (c) sealing the charging electrode within a plastic frame onto which a layer of potassium titanate paper is epoxy-sealed to the edge of the electrolyte face and a thin porous teflon layer is cemented to the gauze face, (b) using silver-amalgam catalyzed oxygen electrodes, and (c) adding 5% potassium titanate powder to the zinc oxide mix. Author (GRA)

N74-18815# Bureau of Mines, Washington, D.C.


The quantities and sources of moisture- and ash-free organic material contained in manure, urban refuse, industrial wastes, sewage solids, and agricultural wastes in the United States are itemized and evaluated. Furthermore, estimates are presented for amounts of organic wastes collected or concentrated. The potential for fuel, either oil or gas, from both the total organic wastes generated and those collected or concentrated is also estimated. Author

N74-18888 Duke Univ., Durham, N.C.


The limitations and deficiencies of the conventional models of ground transportation have prompted the proposal of a number of innovative high speed systems for future urban and interurban mass transit. Those which appear to offer the most desirable performance characteristics are systems which utilize an enclosed guideway. The power requirements for high speed ground transportation are, however, potentially high. Since the power required for propulsion of surface vehicles at higher speeds is largely that needed to overcome aerodynamic drag, enclosed guideway systems, operated at reduced internal pressures, are proposed to offer a more practical means for high speed ground transportation. A pneumatic tube transportation system would provide carrier vehicle tubes with a forced conveyance by the combined effects of continuous evacuation of the guideway length ahead of the vehicle and the admission of air at a higher pressure to the guideway behind the vehicle. Dissert. Abstr.

A conformal array on a surface of small curvature can be approximated by a number of planar arrays, several of which may be excited simultaneously so as to achieve a performance similar to that of a conformal array. Since the main beam of a planar array can be steered to any direction in visible space, several arrays, each oriented in a different direction, can be steered cooperatively to form a single beam in a desired direction. A general formulation of the radiated field of such a configuration of arrays is developed with the aid of formulas which relate the components into which a vector is resolved in one orthogonal coordinate system with those into which the same vector is resolved in a second orthogonal coordinate system. (Modified author abstract)

G.R.A.


A laboratory especially designed for the study of fuel-related problems in the operation of turbine engines has been installed at the U.S. Army Fuels and Lubricants Research Laboratory. The air supply system provides a clean, smooth flow of air to the combustion test cell at rates up to 2.5 lbs/sec; pressures to 16 atm and temperatures to 1500°F are possible at all flow rates. The fuel delivery system is capable of pumping fuels ranges in properties from gasoline to No. 5 diesel at flow rates of over 1 ppm and pressures over 1000 psi. Up to 50 channels of thermocouple and transducer signals are sampled; the data reduction is performed on-line with test results available immediately. The system has been designed for maximum flexibility and growth. Conceivably, any combustion chamber and associated rig can be plugged-in, instrumented, and operated within the air flow capabilities of the laboratory. Author (GRA)

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G.R.A.
mathematical framework, input requirements and data formats, program debugging and output options, and a complete list of flow schematics and computer listings. GRA


Data are presented which describe the rate of engine adjustment and exhaust emission deterioration with time and mileage. Three classes of vehicles are described which include pre 1966 cars without exhaust emission controls, 1966-1970 cars with HC and CO exhaust controls and post 1970 cars that are equipped to control HC, CO and NOx.The results of additional experiments to determine the repeatability of emissions measurements and the effect of cold soak temperature upon measured exhaust emission are also presented. Mass emission measurements were made using the 1972 Fed Test Procedure and concentration measurements were made in selected engine operation modes. GRA


The current status of the international research program directed towards developing a fusion reactor for electricity production is assessed. Information is obtained mainly from meetings of the International Fusion Research Council (July 29 and Aug. 1, 1973) and the Sixth European Conference on Controlled Fusion and Plasma Physics held in Heidelberg from July 30 to August 3, 1973. The major items of business discussed at the meeting of the International Fusion Research Council are presented and the various national research programs are outlined. Finally, the Australian program is considered. NSA


A program is presently underway at Los Alamos to determine how superconducting magnetic energy storage in conjunction with normal-going superconducting switches can be made to deliver the energies of the order of 200 MJ that will be needed for plasma compression in a pulsed theta-pinches. After a review of the circuit configurations, the properties of commercially available and of some developmental superconductors relevant to both the energy storage coil and to the switch are discussed. Critical current densities at low fields and stability requirements both with respect to rapidly changing external fields and to self fields are of particular importance in determining optimum operating fields and temperatures. The tradeoff between eddy current losses in the stabilizing material and the need for coil protection if a coil normality should occur is described. Problems in potting or other forms of mechanical stabilization for both superconducting elements are pointed out. Author (NSA)

**N74-19391**# Michigan Univ., Ann Arbor. Dept. of Physics. LIQUID HYDROGEN AS A FUEL FOR MOTOR VEHICLES: A COMPARISON WITH OTHER SYSTEMS

Lawrence W. Jones [1973] 4 p Avail: NTIS HC $4.00

The pros and cons are explored of liquid hydrogen fuel, especially for smaller systems (automobiles and trucks). The alternative methods of liquid hydrogen fueling, whether by replaceable tanks or pumping from a storage vessel, are also discussed. Author

**N74-19405**# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. A SIMPLIFIED LIFE-CYCLE COST COMPARISON OF VARIOUS ENGINES FOR SMALL HELICOPTER USE. Kestutis C. Civinskas and Laurence M. Fishbach Feb. 1974 29 p refs Prepared in cooperation with Army Air Mobility R and D Lab., Cleveland, Ohio (NASA-TM-X-71517; E-7908) Avail: NTIS HC $4.50 CSCL 21A

A ten-year, life-cycle cost comparison is made of the following engines for small helicopters: (1) simple turboshaft; (2) regenerative turboshaft; (3) compression-ignition reciprocator; (4) spark-ignited rotary; and (5) spark-ignited reciprocator. Based on a simplified analysis and somewhat approximate data, the simple turboshaft engine apparently has the lowest costs for mission times up to just under 2 hours. At 2 hours and above, the regenerative turboshaft appears promising. The reciprocating and rotary engines are less attractive, requiring from 10 percent to 80 percent more aircraft to have the same total payload capability as a given number of turbine powered craft. A nomogram was developed for estimating total costs of engines not covered in this study. Author


Soviet research and development in the field of creating multifuel motor vehicle diesel engines is described. Possible technical solutions directed at adapting the internal combustion engine to operation on various types of fuels are considered. GRA


The report describes the design and performance of Soviet designed jet aircraft bypass engines. GRA


A method for forming a tubular wick for heat pipes is presented. The method consists of steps involving forming the wick blank of a predetermined thickness from multiple layers of stainless steel screen mesh. The process makes it possible to reduce the pore size of the wicks by approximately fifty percent. NASA

The energy situation with respect to natural gas as an energy source was studied. Factors which contributed to the current shortage of natural gas supplied are analyzed. Federal actions to develop the policies necessary to increase the supply of natural gas and to encourage optimum use of this energy source are reported. Possible future sources of natural gas to supplement the shortage are identified. Tables, maps, and graphs are included to show the natural gas supply.

Avail: NTIS HC $4.00


Avail: NTIS HC $4.00

An analysis of the availability of natural gas and gas reserves in the United States is presented. The actual and projected demand for gas during the 1950 to 1990 time period is analyzed. Historical trends in natural gas production and reserve additions are illustrated. A graph of the annual demand for natural gas is plotted to show the levels of domestic productive capacity with annual reserve additions of 30, 25, and 20 trillion cubic feet.

F.P.F.


Avail: NTIS HC Subcomm. on Energy

The responses are reported of selected Federal agencies to requests, by the Committee, for information on current research in areas of solar energy. The nature of ongoing solar energy research, funding levels, and recommended areas for development are discussed. The legislative history of solar energy for heating and cooling, H.R. 11864 is included.

F.O.S.

N74-19805# Select Committee on Small Business (U.S. House).


(H-Rept-92-1313) Avail: U.S. Capitol, House Document Room

Hearings investigated the monopolistic impact of the growing economic concentration in the energy field and the reasons underlying the recent increases in electric rates in the Tennessee Valley Area. Electric rates have increased 28% and coal prices have risen 100% between 1971-72. Findings and recommendations concerning the causes and solutions to the escalating energy costs are included.

K.M.M.

N74-19608# Joint Committee on Atomic Energy (U.S. Congress).


Avail: SOD HC $5.20

Congressional reports on future energy research and development programs are presented. Policies to regain and maintain national energy self-sufficiency are outlined: (1) the conservation of energy by decreasing consumption and increasing the technical efficiency of conversion processes; (2) increase the domestic production of oil and natural gas; (3) increase the use of coal; (4) expand the production of nuclear energy; and (5) promote the use of alternate energy sources such as hydro, geothermal, and solar.

S.K.W.

N74-19614# Geological Survey, Washington, D.C.


Diagrams present the U.S. Geological Survey estimates of the United States resources of fuels. The technology of advanced energy systems is described including automobile engines, mass transit systems, pollution control devices, fuel cells, and magnetohydrodynamic production of electricity. The need for a vigorous, international research and development program is discussed to provide assurance for continued supplies of clean, abundant energy.

Author


The fuel resources available to the world are described, including solar, nuclear fusion, nuclear fission, geothermal, tidal, hydro, and fossil energy sources. These resources are compared with estimated fuel consumption rates in the future. Solar, fusion, and fission with breeding are shown to represent essentially infinite energy sources. Methods are described for improving the efficiency and economy in the ways we use fuels. Savings of 10-15% appear possible in the near term. An energy ethic is described which involves changes to government regulations and tax policies and other institutions to promote efficiency and conservation in the use of fuels. The technology of advanced energy systems is described including automobile engines, mass transit systems, pollution control devices, fuel cells, and magnetohydrodynamic production of electricity. The need for a vigorous, international research and development program is discussed to provide assurance for continued supplies of clean, abundant energy.

Author

N74-19617# Committee on Commerce (U.S. Senate).


Avail: Comm. on Com.

Hearings on the establishment of a national energy resources advisory board are presented. Measures to coordinate energy policies and improve management of energy resources are outlined.

S.K.W.

N74-19619# Committee on Interior and Insular Affairs (U.S. Senate).


Avail: Comm. on Interior and Insular Affairs

An overview is presented of factors contributing to the gasoline shortage, the extent of the shortage, and its impact on the country. Emphasis is placed upon problems of supply and demand and remedial actions taken to alleviate the problem.

Author


The role of transportation in air pollution and consumption of energy, especially petroleum, is reviewed, with emphasis on the U.S. situation. Both technological and control measures for each problem area are discussed. Technological measures focus on the automobile, high speed ground transportation modes, and non-petroleum fuels, while control measures, which encourage the use of the more efficient transportation modes, are seen to offer significant benefits. The near future is discussed with respect to the impact of the U.S. Amended Clean Air Act of 1970. Transportation evolution over the next few decades is projected.

A problem statement: Ocean based solar to hydrogen energy conversion facility. The potential of hydrogen as a transportable fuel with high spectral response and optical constant of gold film is essential for analyzing the ref. of the ultrathin metal film used in the cell. The economic framework and related demand for energy is reviewed, with emphasis on this purpose. Binary, ternary, sequential unconstrained minimization technique of nonlinear programming was implemented on the CDC 3300 computer for this purpose. Binary, ternary, and quaternary Rankine cycle configurations were optimized for maximum efficiency under a set of realistic constraints. Liquid metal working fluids were used for the higher temperature stages with water for the low temperature stage fluid. Maximum efficiencies are presented for the best cycle configurations with peak temperatures from 900 F to 3000 F. Sensitivity of the results to certain critical assumptions is also included.

A PROBLEM STATEMENT: OCEAN BASED SOLAR-TO-HYDROGEN ENERGY CONVERSION MACRO SYSTEM

MEETING CALIFORNIA'S ENERGY REQUIREMENTS, 1975-2000

STORAGE BATTERY COMPRISING NEGATIVE PLATES OF A WEDGE SHAPED CONFIGURATION

A PROBLEM STATEMENT: OCEAN BASED SOLAR-TO-HYDROGEN ENERGY CONVERSION MACRO SYSTEM

OPTIMIZATION OF STAGED RANKINE ENERGY CONVERSION CYCLES FOR HIGH EFFICIENCY

ENERGY RECOVERY FROM WASTE: SOLID WASTE AS SUPPLEMENTARY FUEL IN POWER PLANT BOILERS

The role of transportation in air pollution and consumption of energy, especially petroleum, is reviewed, with emphasis on the U.S. situation. Both technological and control measures for each problem area are discussed. Technological measures focus on the automobile, high speed ground transportation modes, and non-petroleum fuels, while control measures, which encourage the use of the more efficient transportation modes, are seen to offer significant benefits. The near future is discussed with respect to the impact of the U.S. Amended Clean Air Act of 1970. Transportation evolution over the next few decades is projected.

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processing system and its operation; boiler modification and operating experience; air pollution considerations; markets; and economics.

K.M.M.

N74-19700# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

A PANEL FOR DIRECTLY ABSORBING SOLAR THERMAL ENERGY AND THE METHOD FOR MANUFACTURING THE PANEL Patent Application
James R. Lowery, inventor (to NASA) Filed 5 Apr. 1974 21 p
(NASA-Case-MFS-22582-1; US-Patent-Appi-SN-458484) Avail:
NTIS HC $4.25 CSCL 10A
A panel for selectively absorbing solar thermal energy is reported that consists of a metallic substrate, a layer of bright metallic material carried on the substrate, and a solar thermal energy absorbing coating carried on the bright metallic material. A layer of zinc is interposed between the metal substrate and the layer of bright material, or the metallic substrate can be anodized for receiving the layer of bright metallic material. Also disclosed is the method for producing the coating which selectively absorbs solar thermal energy.

N74-19701# National Aeronautics and Space Administration. Pasadena Office, Calif.

HEAT OPERATED CRYOGENIC ELECTRICAL GENERATOR Patent Application
Taylor G. Wang (JPL), Melvin M. Saffre, and Daniel D. Eleman, inventors (to NASA) Filed 1 Apr. 1974 19 p
(Contract NAS7-100)
(NASA-Case-NPO-13303-1; US-Patent-Appi-SN-457295) Avail:
NTIS HC $4.00 CSCL 10A
An electrical generator useful for providing electrical power in deep space, is disclosed. The generator utilizes liquid helium conversion to and from a superfluid state to cause opposite directions of rotary motion for a rotor cell to move a magnetic field provided by a changed superconductive coil mounted on the exterior of the cell. An electrical conductor interacts with the moving magnetic field provided by the superconductive coil and thereby generates electrical energy. A heat control arrangement causes the liquid helium to be partially converted to and from a superfluid state.

N74-19702# National Aeronautics and Space Administration. Pasadena Office, Calif.

ELECTRIC POWER GENERATION SYSTEM DIRECTLY FROM LASER POWER Patent Application
Katsuhiro Shimada, inventor (to NASA) (JPL) Filed 27 Mar. 1974 17 p
(Contract NAS7-100)
(NASA-Case-NPO-13308-1; US-Patent-Appi-SN-455164) Avail:
NTIS HC $4.00 CSCL 10A
A system is reported in which laser power is directly converted into electric power. Liquid cesium is ionized by a laser beam with a collector spaced apart from the cesium to collect either the cesium ions or free electrons; thus, a potential difference between the collector and the cesium liquid is produced.

N74-19705# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

(NASA-TM-X-71523; E-7912) Avail: NTIS HC $4.00 CSCL 10A
The utilization of wind energy is technically feasible as evidenced by the many past demonstrations of wind generators. The cost of energy from the wind has been high compared to fossil fuel systems; a sustained development effort is needed to obtain economical systems. The variability of the wind makes it an unreliable source on a short term basis. However, the effects of this variability can be reduced by storage systems or connecting wind generators to: (1) fossil fuel systems; (2) hydroelectric systems; or (3) dispersing them throughout a large grid network. Wind energy appears to have the potential to meet a significant amount of our energy needs.

Author

N74-19706# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

The feasibility of converting biomass to portable fuels is studied. Since plants synthesize biomass from H20 and CO2 with the help of solar energy, the conversion methods of pyrolysis, anaerobic fermentation, and hydrogenation are considered. Cost reduction methods and cost effectiveness are emphasized. G.G.

N74-19707# Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-2481)
(NASA-TT-F-15440) Avail: NTIS HC $4.00 CSCL 10A
A synchronous flow generator is described. The results obtained from an investigation into direct frequency reversal with the aid of semiconductors have been used as a basis for designing a synchronous-flow generator. Its uses are forecast as reserve power plants for hospitals, power supplies on large ships, etc.

Author

N74-19708# Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-2481)
(NASA-TT-F-15441) Avail: NTIS HC $5.75 CSCL 10A
Aspects are discussed that must be considered in respect to the possible use of wind power in Sweden, such as availability and nature of wind resources, cost of this type of energy, etc. The basic theory of calculating the power of wind-power machine are presented with tables and diagrams. Data for several large wind-power machines constructed in the U.S.A., Great Britain, etc. are given. The conclusion is reached that the use of wind power in Sweden is not feasible, primarily because of its high cost per kWh.

Author

N74-19709# Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-2483)
(NASA-TT-F-15444) Avail: NTIS HC $4.00 CSCL 10A
In comparison to the usual power plants in which the machines are installed in special buildings, the high wind power plant is described as a power source in which the structure as a whole makes up the machine. New large structures are supports for generators with large diameters but with the other dimensions small. The use of the advantageous high wind flow leads to unusually high structures, but these are completely storm safe and stable, as well as economical. Details of the counter-rotating turbine and some experimental results are presented.

Author

N74-19710# Kanner (Lee) Associates, Redwood City, Calif.

(NASA TT F-15442) Avail: NTIS HC $4.75 CSCL 108

The Danish Wind Power Committee's experiments with propeller windmills are described, specifically the 25-m-high windmill at Gedser. Wind measuring stations were established, and the wind energy available and optimum locations determined. A cost comparison was made of electricity from wind and steam power, and the committee concluded that wind power plants were economically unfeasible to develop at that time. 

Author N74-19711# Chicago Univ., Ill.

SOLAR CONCENTRATORS OF A NOVEL DESIGN

A new principle for collecting and concentrating solar energy, the ideal cylindrical light collector, has been invented. The collector is a trough-like reflecting wall channel of a specific shape which concentrates radiant energy by the maximum amount allowed by phase space conservation. The ideal cylindrical light collector is capable of collecting solar radiation over an average 8-hour day and concentrating it by a factor of approximately 10 without diurnal tracking of the sun. This collector has a large acceptance for diffuse light. In fact, the efficiency for collecting and concentrating isotropic radiation, in comparison with a flat plate collector, is just the reciprocal of the concentration factor. 

Author N74-19717# Naval Ship Research and Development Center, Annapolis, Md.

PROCEEDINGS OF WORKSHOP ON NAVY ALTERNATE ENERGY SOURCES RESEARCH AND DEVELOPMENT

A workshop was held to examine the Navy's energy requirements and the directions that Navy Research and Development should take to minimize the impact on the Navy of projected national petroleum fuel supply shortages. The current state of research and development and the potential for alternate fuel and energy sources, as well as the ability to extract from them fuels that are reasonably similar to currently used petroleum products, make it appropriate for the Navy to concentrate first on these. Demonstrations of compatibality of Navy power plants with fuels derived from coal or oil shale, and definition of minimum fuel quality requirements, are needed. For the longer term, efforts to harness environmental energy sources, such as winds, currents, and thermal gradients in the earth and in the oceans, appear to have considerable potential payoff, particularly for nonmobile applications. (Modified author abstract) 

GRA N74-19975# Interior Dept., Washington, D.C.

FINAL ENVIRONMENTAL STATEMENT FOR THE GEOTHERMAL LEASING PROGRAM. VOLUME 2: LEASING OF GEOTHERMAL RESOURCES IN THREE CALIFORNIA AREAS
Avail: SOD HC $5.85

Individual environmental statements are presented for the leasing of federally owned geothermal resources for development in three specific areas: (1) Clear Lake geysers; (2) Mono Lake-Long Valley; and (3) Imperial Valley. Also included is a summary of comments and responses relative to the draft environmental impact statement issued in 1971. 

Author N74-19976# Interior Dept., Washington, D.C.

FINAL ENVIRONMENTAL STATEMENT FOR THE GEOTHERMAL LEASING PROGRAM. VOLUME 3: PROPOSED GEOTHERMAL LEASING AND OPERATING REGULATIONS
Avail: SOD HC $5.60

Proposed leasing and operating regulations to implement the Geothermal Steam Act are presented. Included are a study comparing vapor dominated hydrothermal systems with hot water systems, and a classification of public lands valuable for geothermal steam and associated geothermal resources. 

G.G. N74-19977# Interior Dept., Washington, D.C.

FINAL ENVIRONMENTAL STATEMENT FOR THE GEOTHERMAL LEASING PROGRAM. VOLUME 4: COMMENTS ON DRAFT IMPACT STATEMENT AND PROPOSED REGULATIONS
1973 726 p refs 4 Vol. 
Avail: SOD HC $5.65

Comments received from Federal, State, local, and individual interests on the leasing and operating regulations, the draft environmental impact statement for the Geothermal Leasing Program, and the supplement to the draft statement are presented. 


WASTE LUBRICATION OIL RESEARCH: AN INVESTIGATION OF SEVERAL RE-REFINING METHODS

Several commercial processes for reclaiming used lubricating oil were duplicated on a laboratory bench scale. Laboratory tests were selected and in some instances modified to determine the physical properties of each oil produced. In addition, the hydrocarbon composition of some samples was determined using a liquid chromatographic technique, and compared with the composition of new oil in order to determine the severity of the re-refining additive package for further estimates of quality as determined by wear, corrosion, foaming, and oxidation stability tests. Additionally, several samples of commercially re-refined oil and new oil were obtained and physical properties were determined for comparative studies. 

Author N74-20228# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

DEVELOPMENT CONCEPT FOR A SMALL, SPLIT-CORE, HEAT-PIPE-COOLED NUCLEAR REACTOR

There have been two main deterrents to the development of samportable nuclear reactors. One is the high development costs; the other is the inability to satisfy with assurance the questions of operational safety. This report shows how a split-core, heat-pipe cooled reactor could conceptually eliminate these deterrents, and examines and summarizes recent work on split-core, heat-pipe reactors. A concept for a small reactor that could be developed at a comparatively low cost is presented. The concept would extend the technology of subcritical radioisotope thermoelectric generators using 236 PuD2o to the evolution of critical space power reactors using 239 PuD2o. 

Author N74-20406 Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).

INVESTIGATION OF THE RELATIVE MERITS OF DIFFERENT POWER PLANTS FOR STOL-AIRCRAFT WITH BLOWN FLAP APPLICATION

The relative merits of different air supply systems for STOL-aircraft with blown flap application are investigated. Under consideration are self-sustained supply units, such as gas turbine driven compressors, remote compressors driven with hot gas from the cruise engines and 2 possibilities for off-take of compressed air from the cruise engines. The air supply systems reviewed are compared with respect to the design requirements, the operating behaviour including any reactions on the cruise
engines, the sensitivity to component failure and the weight penalty to be expected.


**ENGINE CYCLE SELECTION FOR COMMERCIAL STOL AIRCRAFT**


The cycle and design parameters pertinent to a turbofan to be used for STOL short haul applications have been studied. For the chosen aircraft configuration, the criteria that condition the choice of the cycle, listed in decreasing importance, have been determined as follows: (1) low noise level, (2) high specific thrust to obtain low-weight and reduced-size engines, and (3) low specific fuel consumption (s.f.c.). It is concluded that the controlling factor is the noise level requirement for airports in congested areas. In order to satisfy this and the mission operational requirements the turbofan engine is driven towards medium bypass ratios and high thrust weight ratios but with less emphasis on s.f.c.

**N74-20444** European Space Research Organization, Paris (France).

**THE INFLUENCE OF INDIVIDUAL COMPONENTS AND OF THEIR MECHANICAL ARRANGEMENT ON THE STATIONARY OPERATING BEHAVIOUR OF DUAL CYCLE PROPULSION ENGINES**


The influence of combustion chambers, compressors and augmentors, and their mechanical configuration, on the static performance of two-cycle turbojet engines with a high bypass ratio, was investigated. As a basis for comparison of the thermodynamic cycling processes, maximal thrust with and without afterburning, at sea altitude and a flight Mach number of 0.9 were chosen. The following conclusions were drawn with regard to the type of engine investigated: (1) within certain limits, a desired performance can be obtained with several thermodynamic designs; (2) the influence of the mechanical configuration of the static performance is small; (3) the technological state-of-the-art of the components is essential for the quality of stationary operating characteristics; (4) the optimal turning of the compressor characteristics to the expected load lines has considerable influence on the operation; (5) the design of low pressure compressor transition to medium pressure compressor and the bypass channel needs special attention besides mechanical conception.

**N74-20459** AFB, Ohio. Foreign Technology Div.

**PROBLEM OF THE APPLICATION OF TURBOFAN ENGINES IN AIR TRANSPORT: METHODS OF INCREASE IN EFFICIENCY OF TURBOFAN ENGINE WITH HIGH BYPASS RATIOS**


The report contains Soviet generated articles relative to the operating parameters of gas turbine engines, thermodynamic functions, gas dynamics, and acoustic characteristics.

**N74-20691** National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

**JET ENGINE EXHAUST EMISSIONS OF HIGH ALTITUDE COMMERCIAL AIRCRAFT PROJECTED TO 1990**


Projected minimum levels of engine exhaust emissions that may be practically achievable for future commercial aircraft operating at high-altitude cruise conditions are presented. The forecasts are based on: (1) current knowledge of emission characteristics of combustors and augmentors; (2) the status of combustion research in emission reduction technology; and (3) predictable trends in combustion systems and operating conditions as required for projected engine designs that are candidates for advanced subsonic or supersonic commercial aircraft fueled by either JP fuel, liquefied natural gas, or hydrogen. Results are presented for cruise conditions in terms of both an emission index (g constituent/kg fuel) and an emission rate (g constituent/hr).

**N74-20613** Office of the White House Press Secretary, Washington, D.C.

**NATIONAL ENERGY POLICY FOR MEETING US ENERGY REQUIREMENTS**

Richard Nixon. 18 Apr. 1973 19 p

Avail: NTIS HC $4.00

The President's energy policy proposals to Congress on April 18, 1973 are presented. Recommendations were made for the increased production of energy as well as more judicious use of energy resources. The following specific actions were proposed: (1) increased production and use of natural gas; (2) utilization of the oil and gas resources of the Outer Continental Shelf; (3) construction of the Alaska pipeline; (4) development of shale oil; (5) increased utilization of geothermal resources; (6) expanded development and utilization of coal resources; (7) rapid development of nuclear power plants; and (8) exploration of domestic mineral resources. The development of deepwater ports for facilitating imports was also recommended. The establishment of the Federal Energy Organization was outlined.

**N74-20614** New York State Office of Economic Research, Albany.

**CONSUMPTION OF ENERGY IN NEW YORK STATE: 1972 WITH ESTIMATES FOR 1973**


Revisions in the 1971 consumption data for fossil fuels reveal that energy consumption in New York State in 1971 was 4,239.3 T-BTU, a drop of 53.6 T-BTU from 1970 (1-2.2%). The decline was a result of an unprecedented drop in fossil fuel demand by the industrial sector from 577.6 T-BTU in 1970 to 455.4 T-BTU in 1971. In 1972 the industrial sector consumed 414.8 T-BTU from fossil fuels, a decline of 8.9% from the 1971 level. During both 1971 and 1972 the other three major energy consuming sectors continued their upward trend in energy consumption.


Public lands potentially available for geothermal leasing are described. These include principally: (1) public, withdrawn, and acquired lands administered by the Secretary of the Interior; (2) national forests and other lands administered by the Forest Service, Department of Agriculture; and (3) lands containing a reservation to the United States of the geothermal resources. These lands total 638 million acres. The most promising geothermal resource areas are located predominantly in the 11 western States and Alaska. Included in this proposed action are: (1) the promulgation of leasing and operating regulations pursuant to which the program would be administered; and (2) the leasing of federally owned geothermal resources for development in three specific areas: (a) Clear Lake-Geyser; (b) Mono Lake-Long Valley; and (c) Imperial Valley, all in California.

**N74-20617** Arkansas Univ., Fayetteville. Dept. of Physics.

**ENERGY IN THE NEAR TERM**

The dependence of the United States on petroleum as a primary energy source is discussed. Data are presented which outline energy consumption and production estimates. Techniques which would reduce energy consumption are outlined. Correlations are made between energy consumption and employment.

S.K.W.

N74-20619


ENERGY PROGRAM. 1972

Bill Linville and John D. Spencer 1973 115 p refs

Major areas of research by the Bureau of Mines in 1972 for the development of new and improved efficient methods of conservation and utilization for petroleum and natural gas, oil shale, and coal are described. The major objective of the energy research program was to develop the technology for the wise development and use of the nation's energy resources as clean primary energy sources. The document emphasizes general publications on energy resources, electric power, generation, energy uses, and reference on energy supply and demand studies. An appendix includes an author index, a simple title index, and a permuted index on titles.

N74-20647


PROSPECTS FOR LIQUID HYDROGEN FUELED COMMERCIAL AIRCRAFT

William J. D. Escher Sep. 1973 39 p refs

The use of hydrogen as a fuel for aircraft propulsion is discussed. The benefits of hydrogen with respect to air pollution reduction are analyzed. Liquid hydrogen as a potential future aviation fuel is considered to be the only practical chemical fuel producible from ultimate nonfossil energy primary sources. The trade-off between hydrogen as a fuel for a new aeronautical system and current superior designs of current aircraft is discussed. The anticipated growth of air transportation is in danger of being constrained by increased prices and insecure sources of petroleum-based fuel. Fuel-conversion possibilities attainable through the application of advances in aeronautical technology to aircraft design are identified with the intent of stimulating NASA R and T and systems-study activities in the various disciplinary areas. The material includes drag reduction; weight reduction; increased efficiency of main and auxiliary power systems; unconventional air transport, and operational changes.

N74-20687

Kansas State Univ., Manhattan.

OPTIMAL ELECTRICAL ENERGY GROWTH STRATEGIES IN AN ERA OF ENVIRONMENTAL CONCERN Ph.D. Thesis Jerry William Stauber 1972 151 p

A linear programming model of the United States' expanding electrical energy economy is presented. The model finds the minimum cost compromise among the three problems of rapid growth of electrical energy demand, a marginal fuel supply, and environmental protection. It was assumed that the electrical energy demand would be met primarily with nuclear and coal fueled power plants. Linear programming was selected as the optimizing tool. The objective was to minimize the total cost of generating the electrical energy demand in the time period of 1970 to 2000. The costs considered are capital, fuel, operating and maintenance, storage costs of certain fuels, and costs associated with environmental protection.

N74-20699


PATTERNS OF ENERGY CONSUMPTION IN THE UNITED STATES


The objectives of the study are to determine: (1) what significant purposes have fuels been used for in the United States; (2) what portion of the nation's energy requirements for the
various end uses have been met by each fuel; (3) what has been the rate of growth of consumption in the major end uses of each fuel; (4) what technical efficiency can be expected when each fuel is used for those end uses for which it is suitable. The emphasis of the study was on the residential, commercial, and industrial sectors, the use of electric power has also been incorporated, along with the transportation sector, in order to arrive at a total energy balance. This report is strictly a factual document; its purpose is to provide the most detailed information practicable on how the nation uses its energy.

Author


Results achieved with an experimental windmill are elaborated on: greatest efficiency of the mill was obtained at a wingtip velocity of 38 m/sec; effects caused by wind pressure should not exceed 500 kg/sq cm in any part of the wing or tower; and effects caused by gravity in the wings should not exceed 200-300 kg/sq cm. Experience has shown that the optimum height of the support tower should be from 18-24 m. A history of the Dutch windmill’s use and its construction, and also of various modern experimental wind power stations in various parts of the world is given. Costs of building wind power stations are discussed.

Author


The use of wind power plants for rural electrification is discussed. The application of various alternative power supply systems involving wind power plants is examined, and the advantages and disadvantages of each alternative are presented.

Author


The internal or stored energy of an open system was elaborated on as a basis for the description of a general energy conversion theory. The properties of the energy function as a state function were determined by 4 postulates of which 3 were basic and intuitive. This results in defining the entropy as an intensive quantity with a reversible property. The energy losses which lead to entropy increase in the interior should be treated independently. So-called inverse processes can be treated as equalization of flow conditions. The result is a dynamic system representation in which the methodology of system theory is used.

ESRO


The characteristics and applications of magnetoelectric machines are discussed. The development of improved permanent magnets for use with magnetoelectric machines has made it possible to broaden the field of application of the machines with respect to power and frequency. The specific characteristics of the permanent magnets for various applications are defined. It is stated that the selection of one type of magnet system and magnetoelectric generator design over another is usually determined by the magnetic and technological properties of the alloys and the purpose, power, speed, and frequency of the generator.

Author


An analysis is given of the dependence of efficiency, specific power, and specific energy of a fuel cell on the discharge conditions. General principles for selecting optimum conditions are examined.

Author


This bibliography consists of 121 citations on Energy Sources dated March 1933 to June 1952. These are not in the collection of the DDC Automated Data Banks. They are arranged by ATI (Air Technical Index) numbers, and are available via regular DDC document request procedures.

Author


The magnitude of stored energy required in high power bursts for modern experiments in physics has reached the point where capacitor banks previously used for this purpose are no longer practical. Although flywheels have been proven to be less expensive for this purpose and are one-hundredth the size, even the practicality of future flywheel-powered systems is being challenged by the magnitude of future experiment energy requirements. An existing steel flywheel capable of delivering 100 MJ at a rate of 100 MW costs $1,500,000 and weighs 60,000 pounds. Future experiments may require 20 times this energy. The report describes a Supperflywheel having a design goal of delivering 100 MJ at a rate of 500 MW. Its projected cost is less than $50,000. Also, it appears to be readily scalable to the larger size required for future experiments. Author (GRA)


The objective of this program was to improve the PC14 powerplant thermal cracker catalyst and to define its performance characteristics. Five areas were investigated: (1) the type of catalyst ceramic support and the level of nickel loading, (2) the effect of shock and vibration on performance, (3) performance on leaded gasoline and JP-4, (4) the effect of high sulfur fuel on performance, and (5) endurance on leaded gasoline. The results of the study are given in the report.

Author (GRA)
The author has identified the following significant results. This study was performed to investigate applications of ERTS-1 imagery in commercial reconnaissance for mineral and hydrocarbon resources. ERTS-1 imagery collected over five areas in North America (Montana; Colorado; New Mexico-West Texas; Superior Province, Canada; and North Slope, Alaska) has been analyzed for data content including linear features, lineaments, and curvilinear anomalies. Locations of these features were mapped and compared with known locations of mineral and hydrocarbon accumulations. Results were analyzed in the context of a simple-shear, block-coupling model. Data analyses have resulted in detection of new lineaments, some of which may be regional in extent, detection of many curvilinear patterns not generally seen on aerial photos, strong evidence of continental tectonic fracture zones, and realization that geological features can be explained in terms of a simple-shear, block-coupling model. The conclusions are that ERTS-1 imagery is of great value in photogeologic/geomorphic interpretations of regional features, and the simple-shear, block-coupling model provides a means of relating data from ERTS imagery to structures that have controlled emplacement of ore deposits and hydrocarbon accumulations, thus providing a basis for a new approach for reconnaissance for mineral, uranium, gas, and oil deposits and structures.

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02 p0050 W74-16333

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[PB-224119/6UA]

01 p0050 W74-16339

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[PB-224210/50A]

02 p0051 W74-16627
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NAS report on technological feasibility of 1975-1976 motor vehicle emission standards. Automotive spark ignition engine emission control systems to meet the requirements of the 1970 clean air assessments

[PB-224852/3CA] 02 p0065 774-16288


[PB-224861/5GA] 02 p0065 774-16289

NAS report on technological feasibility of 1975-1976 motor vehicle emission standards

[PB-224858/4CA] 02 p0066 774-16291

NAS report on technological feasibility of 1975-1976 motor vehicle emission standards. Manufacturability and costs to proposed low-emission automotive engine

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Compilation of air pollutant emission factors (second edition)

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[PB-224865/6GA] 02 p0066 774-16303

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[PB-224855/9GA] 02 p0066 774-16304

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[PB-225039/7GA] 02 p0066 774-16313


[PB-224859/9GA] 02 p0067 774-16406

NAS report on technological feasibility of 1975-1976 motor vehicle emission standards. Evaluation of catalyst as automotive exhaust treatment device, National Academy of Sciences

[PB-224860/7GA] 02 p0067 774-16407

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[AF-110] 02 p0073 774-19228

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[AP-110] 02 p0073 774-19229

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[AP-225026/4GA] 02 p0073 774-19240

A study of mandatory engine maintenance for reducing vehicle exhaust emissions. Volume 8: Experimental characterization of vehicle emissions and maintenance states

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Jet engine exhaust emissions of high altitude commercial aircraft projected to 1990

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Cryogenic engineering conference, University of Colorado, Boulder, Colo., August 6-11, 1972, Proceedings

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Aldehyde and reactive organic emissions from motor vehicles. Part 1: Advanced automotive control systems vehicles 01 p0035 N74-15692


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Determining the effects of gasoline price on use of metals in automobile manufacture 02 p0052 N74-17566

Energy potential from organic wastes: A review of the quantities and sources 02 p0072 N74-18152

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CITIZENS' ADVISORY COMMITTEE ON ENVIRONMENTAL QUALITY, WASHINGTON, D.C.

Report to the president and to the council on environmental quality

Major R&D programs to meet the energy crisis

CITY OF ST. LOUIS, MO.

Energy recovery from waste: Solid waste as a supplementary fuel in power plant boilers

COMMISSION OF THE EUROPEAN COMMUNITIES, BRUSSELS (BELGIUM).

The energy situation in the community, situation forecasts 1972

COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES (U.S. SENATE).

Energy-related research and development

NASA authorization for fiscal year 1975

COMMITTEE ON BANKING AND CURRENCY (U.S. HOUSE).

EPA pollution regulations and fuel shortage

NASA authorization for fiscal year 1975, part 1

COMMITTEE ON COMMERCY (U.S. SENATE).

Factors affecting the use of coal in present and future energy systems

National fuel and energy conservation act of 1973

Energy conservation and efficient use of energy, part 1

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS (U.S. SENATE).

Factors affecting the use of coal in present and future energy systems

Economic legitiacty of Federal agencies with respect to fuels and energy

The President's energy message and S. 1570

Summary of the energy conservation and development recommendations contained in the final report of the national commission on materials policy, June 1973

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A bibliography of congressional publications on energy from the 89th Congress to 1 July 1975

EPA pollution regulations and fuel shortage

Fuel shortages, part 1

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A review of energy issues and the 91st Congress

Compact to conserve oil and gas

Federal Energy Organization: A staff analysis

Geothermal energy resources and research

A review of energy policy activities of the 92d Congress

Energy conservation and S. 2176, part 2

The gasoline shortage: A national perspective

Conservation of energy

COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE (U.S. HOUSE).

Transportation controls under the Clean Air Act

COMMITTEE ON SCIENCE AND INSTRUMENTS (U.S. HOUSE).

Energy research and development and space technology

Solar energy for the terrestrial generation of electricity

Hardware for heating and cooling

Energy research and development: An overview of our national effort

University energy research centers

The federal government and energy: H and D historical background

An inventory of energy research, volume 1

An inventory of energy research, volume 2

Short term energy shortages

Energy research and development and space technology

Individual action for energy conservation

Geothermal energy

H.E. 11864: Solar Heating and Cooling

Demonstration Act of 1974. Background and legislative history

COUNCIL ON ENVIRONMENTAL QUALITY, WASHINGTON, D.C.

Energy and the environment: Electric power

CRANEFIELD INST. OF TECHNOLOGY (ENGLAND).

The assessment of an air-supported and propelled urban transport system

DEUTSCHE FORSCHUNGS-ZENTRUM FUER WERTE-UND BAUFAHRT, COLOGNE (WEST GERMANY).

The influence of individual components and of their mechanical arrangement on the stationary operating behaviour of diesel cycle propulsion engines

DEUTSCHE FORSCHUNGS- UND VEREINIGEINSTALT FUR LUFT- UND BAUFAHRT, PORE (WEST GERMANY).

Section 4: Propulsion and energy

DOW CHEMICAL CO., MIDLAND, MICH.

Characterization of particulates and other non-regulated emissions from mobile sources and the effects of exhaust emissions control devices on these emissions

DUKE UNIV., DURHAM, N.C.

Performance characteristics of a pneumatic tube transportation system
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Wind data for wind driven plant
ELECTRICITY COMMISSION OF NEW SOUTH WALES, SYDNEY (AUSTRALIA).
Electricity: The conversion industry
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ENERGY RESEARCH CORP., BETHEL, CONN.
Electrolyte for hydrocarbon air fuel cells
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Matrices for H3PO4 fuel cells
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ENVIROMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
The association of automotive fuel composition with exhaust reactivity
Applications of meteorology to natural resource planning
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Compilation of air pollutant emission factors (second edition)
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Air pollution aspects of emission sources: Petroleum refineries; a bibliography with abstracts
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ENVIROMENTAL PROTECTION AGENCY, WASHINGTON, D.C.
Energy conservation strategies
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ESCHER TECHNOLOGY ASSOCIATES, ST. JOHNS, N.Y.
A problem statement: Ocean based solar to hydrogen energy conversion nuclear system
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Prospects for liquid hydrogen fueled commercial aircraft
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Potential pollutants in fossil fuels
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Combustion and heat recovery of Air Force waste
Petroleum oils and lubricants
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NUCLEAR SPACE RESEARCH AND TECHNOLOGY CENTER, HOOVERVILLE (NETHERRLANDS).
Current European developments in solar paddle drives
[PB-37]


H

Harvard Univ., Cambridge, Mass., Mechanisms for achieving cleaner power, prices, and regulations 02 p0069 N74-18596.

Hittman Associates, Inc., Colubria, Md., Assessment of SO2 control alternatives and implementation patterns for the electric utility industry.

Hoffman, Inc., Minneapolis, Minn., Application and durability of solar absorber coatings.

Houston Univ., Tex., Production of hydrocarbons.


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Economic basis for energy and resource use usage.

Current energy shortage in the United States 01 p0015 N74-11730.


INDIANA GEOLOGICAL SURVEY, Bloomington, Indiana.

Study of application of BHT-1 imagery to fracture-related mine safety hazards in the coal mining industry [SB-10016].

Application of BHT-1 imagery to fracture-related mine safety hazards in the coal mining industry [SB-10230].

Application of BHT-1 imagery to fracture-related mine safety hazards and environmental problems in mining [SB-10258].

Study of application of BHT-1 imagery to fracture-related mine safety hazards in the coal mining industry [SB-10336].


Institute of Energy Economics of Japan.

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Institute of Gas Technology, Chicago, Ill.

Review of world energy supplies [T52/4-1-73].

Institute of Transport Aviation, Paris (France).

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Electric power generation system directly from water power [NASA-CASE-NPO-13308-1].


Joint Committee of Atomic Energy (U.S. Congress). The history of technology and engineering solutions.

Forecasting of technological programs for long-range planning of mining operations at coal mines.


Toads in the mechanization of the coal industry and guarantee of patents-ability of designs that are competitive on the world technological level.

The history of technology and engineering solutions.

Forecasting of technological programs for long-range planning of mining operations at coal mines.

Institute of Transport Aviation, Paris (France).

Aviation needs and public concern.


Evaluation of geothermal energy resources in the United States 01 p0017 N74-11795.

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Inversion layer solar cell fabrication and evaluation [NASA-CASE-NPO-136532].


Heat operated cryogenic electrical generator [NASA-CASE-NPO-13303-1].

Electric power generation system directly from water power [NASA-CASE-NPO-13308-1].


Joint Committee of Atomic Energy (U.S. Congress). The history of technology and engineering solutions.

Forecasting of technological programs for long-range planning of mining operations at coal mines.

Institute of Transport Aviation, Paris (France).

Aviation needs and public concern.


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Final environmental statement for the geothermal leasing program. Volume 1: Preliminary leasing and operating regulations 02 p0079 N74-20616.


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Research on the application of satellite remote sensing to local, spatial, regional, and national programs involved with resource management and environmental quality.
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KENTUCKY UNIV., LEXINGTON.
Proceedings: Energy Resource Conference (2nd)
02 p0071 W74-16834

KERNFORSCHUNGSANLAGE, JUWICH (WEST GERMANY).
Approach to the holistic analysis of the system man-energy-environment.
[7UL-982-E4]
02 p0080 W74-20626

KEKB-ACGF CORP., OKLAHOMA CITY.
Balancing the demand and supply of electricity and nuclear fuels.
02 p0052 W74-16659

LIBRARY OF CONGRESS, WASHINGTON, D.C.
Energy facts.
01 p0020 W74-12672

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02 p0063 W74-17787

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[81EL-CB-M237]
02 p0063 W74-17784

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Testing for thermal fatigue failures in solar arrays.
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02 p0070 W74-19710

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02 p0022 W74-12693

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02 p0023 W74-13428

Scientific and Technical Report. 17/73.
[81JS-TW-F-15064]
02 p0050 W74-16424

Translations on Eastern Europe Scientific Affairs, no. 363.
[81JS-TW-F-15064]
02 p0062 W74-17661

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Molecular energy Corp., Hayes Hill, N.J.

Construction of 850 and 4,000 square foot silver-dielectric cells using a single inorganic separator [AD-771397] 02 p0064 N74-17798

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Technical feasibility study for the development of a large capacity wind powered electrical generating systems 02 p0059 N74-16791

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Investigation of the relative merits of different power plants for STOL-aircraft with blown flap application 02 p0078 N74-20406

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Molecular energy Corp., Hayes Hill, N.J.

Construction of 850 and 4,000 square foot silver-dielectric cells using a single inorganic separator [AD-771397] 02 p0064 N74-17798

MONTANA STATE UNIV., BOZEMAN.

Technical feasibility study for the development of a large capacity wind powered electrical generating systems 02 p0059 N74-16791

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D.C.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.
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