

Articles Improved Energy Efficiency Of Air Cooled Chillers

The entire world, especially the United States, is in the midst of an energy revolution. Since the oil embargo of 1973, individuals, corporations, and other organizations have found ways to economically reduce energy use. In this book, Jim Sweeney examines the energy policies and practices of the past forty years and their impact on three crucial systems: the economy, the environment, and national security. He shows how energy-efficiency contributions to the country's overall energy situation have been more powerful than all the increases in the domestic production of oil, gas, coal, geothermal energy, nuclear power, solar power, wind power, and biofuels. The author details the impact of new and improved energy-efficient technologies, the environmental and national security benefits of energy efficiency, ways to amplify energy efficiency, and more. *Energy Efficiency: Building a Clean, Secure Economy* reveals how the careful nurturing of private- and public-sector energy efficiency--along with public awareness, appropriate pricing, appropriate policies--and increased research and development, the trends of decreasing energy intensity and increasing energy efficiency can be beneficially accelerated.

The book *Green, Energy-Efficient and Sustainable Networks* provides insights and solutions for a range of problems in the field of obtaining greener, energy-efficient, and sustainable networks. The book contains the outcomes of the Special Issue on "Green, Energy-

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Efficient and Sustainable Networks” of the Sensors journal. Seventeen high-quality papers published in the Special Issue have been collected and reproduced in this book, demonstrating significant achievements in the field. Among the published papers, one paper is an editorial and one is a review, while the remaining 15 works are research articles. The published papers are self-contained peer-reviewed scientific works that are authored by more than 75 different contributors with both academic and industry backgrounds. The editorial paper gives an introduction to the problem of information and communication technology (ICT) energy consumption and greenhouse gas emissions, presenting the state of the art and future trends in terms of improving the energy-efficiency of wireless networks and data centers, as the major energy consumers in the ICT sector. In addition, the published articles aim to improve energy efficiency in the fields of software-defined networking, Internet of things, machine learning, authentication, energy harvesting, wireless relay systems, routing metrics, wireless sensor networks, device-to-device communications, heterogeneous wireless networks, and image sensing. The last paper is a review that gives a detailed overview of energy-efficiency improvements and methods for the implementation of fifth-generation networks and beyond. This book can serve as a source of information in industrial, teaching, and/or research and development activities. The book is a valuable source of information, since it presents recent advances in different fields related to greening and improving the energy-efficiency and sustainability of those ICTs particularly

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addressed in this book.

This report focuses on the energy efficiency of electricity distribution networks mainly from the perspective of network losses. As proposed in Article 15 of the revised Energy Efficiency Directive, the European Commission after consulting relevant stakeholders, should prepare a common methodology in order to encourage network operators to reduce losses, implement a cost-efficient and energy efficient infrastructure investment programme and properly account for the energy efficiency and flexibility of the grid. This two-part report focuses on the status of regulatory policies in the EU-28 and recommendations that can be followed by the Member States in order to improve their grid efficiency. This first part of the report focuses on the electricity grids, with the interaction between regulation and network losses being conceptually analysed with the presently available regulation schemes and a survey on some research proposal being presented. After a brief introduction on the main standing-points of the EU framework, a comparative analysis of the regulation in EU member states is outlined. The "players' perspective" in terms of the opinion of crucial EU stakeholders and leading experts in EU are assessed through a set of interviews of which the outcomes are presented. Finally, some recommendations for Member States and conclusions are drawn.

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"Over the next few decades, we will see a profound energy transformation as society shifts from fossil fuels to renewable resources like solar, wind, biomass. But what might a one hundred percent renewable future actually look like, and what

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obstacles will we face in this transition? Authors explore the practical challenges and opportunities presented by the shift to renewable energy."--Page 4 of cover.

The Monthly Energy Review (MER) presents an overview of the Energy Information Administration's recent monthly energy statistics. The statistics cover the major activities of US production, consumption, trade, stocks, and prices for petroleum, natural gas, coal, electricity, and nuclear energy. Also included are international energy and thermal and metric conversion factors. 37 figs., 61 tabs.

Buildings are one of the main causes of the emission of greenhouse gases in the world. Europe alone is responsible for more than 30% of emissions, or about 900 million tons of CO₂ per year. Heating and air conditioning are the main cause of greenhouse gas emissions in buildings. Most buildings currently in use were built with poor energy efficiency criteria or, depending on the country and the date of construction, none at all. Therefore, regardless of whether construction regulations are becoming stricter, the real challenge nowadays is the energy rehabilitation of existing buildings. It is currently a priority to reduce (or, ideally, eliminate) the waste of energy in buildings and, at the same time, supply the necessary energy through renewable sources. The first can be achieved by improving the architectural design, construction methods, and materials used, as well as the efficiency of the facilities and systems; the second can be achieved through the integration of renewable energy (wind, solar, geothermal, etc.) in buildings. In any case, regardless of whether the energy used is renewable or not, the efficiency must always be taken into account. The most profitable and clean energy is that which is not consumed.

America's economy and lifestyles have been shaped by the low prices and availability of energy. In the last decade,

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however, the prices of oil, natural gas, and coal have increased dramatically, leaving consumers and the industrial and service sectors looking for ways to reduce energy use. To achieve greater energy efficiency, we need technology, more informed consumers and producers, and investments in more energy-efficient industrial processes, businesses, residences, and transportation. As part of the America's Energy Future project, Real Prospects for Energy Efficiency in the United States examines the potential for reducing energy demand through improving efficiency by using existing technologies, technologies developed but not yet utilized widely, and prospective technologies. The book evaluates technologies based on their estimated times to initial commercial deployment, and provides an analysis of costs, barriers, and research needs. This quantitative characterization of technologies will guide policy makers toward planning the future of energy use in America. This book will also have much to offer to industry leaders, investors, environmentalists, and others looking for a practical diagnosis of energy efficiency possibilities.

For multi-user PDF licensing, please contact customer service. Energy touches our lives in countless ways and its costs are felt when we fill up at the gas pump, pay our home heating bills, and keep businesses both large and small running. There are long-term costs as well: to the environment, as natural resources are depleted and pollution contributes to global climate change, and to national security and independence, as many of the world's current energy sources are increasingly concentrated in geopolitically unstable regions. The country's challenge is to develop an energy portfolio that addresses these concerns while still providing sufficient, affordable energy reserves for the nation. The United States has enormous resources to put behind solutions to this energy challenge; the dilemma is to identify

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which solutions are the right ones. Before deciding which energy technologies to develop, and on what timeline, we need to understand them better. America's Energy Future analyzes the potential of a wide range of technologies for generation, distribution, and conservation of energy. This book considers technologies to increase energy efficiency, coal-fired power generation, nuclear power, renewable energy, oil and natural gas, and alternative transportation fuels. It offers a detailed assessment of the associated impacts and projected costs of implementing each technology and categorizes them into three time frames for implementation.

This document presents an overview of the Energy Information Administration's recent monthly energy statistics. The statistics cover the major activities of U.S. production, consumption, trade, stocks, and prices for petroleum, natural gas, coal, electricity, and nuclear energy. Also included are international energy and thermal metric conversion factors. Energy is one of the most important factors of production. Its efficient use is crucial for ensuring production and environmental quality. Unlike normal goods with supply management, energy is demand managed. Efficient energy use—or energy efficiency—aims to reduce the amount of energy required to provide products and services. Energy use efficiency can be achieved in situations such as housing, offices, industrial production, transport and agriculture as well as in public lighting and services. The use of energy can be reduced by using

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technology that is energy saving. This Special Issue is a collection of research on energy use efficiency. Electricity, supplied reliably and affordably, is foundational to the U.S. economy and is utterly indispensable to modern society. However, emissions resulting from many forms of electricity generation create environmental risks that could have significant negative economic, security, and human health consequences. Large-scale installation of cleaner power generation has been generally hampered because greener technologies are more expensive than the technologies that currently produce most of our power. Rather than trade affordability and reliability for low emissions, is there a way to balance all three? *The Power of Change: Innovation for Development and Deployment of Increasingly Clean Energy Technologies* considers how to speed up innovations that would dramatically improve the performance and lower the cost of currently available technologies while also developing new advanced cleaner energy technologies. According to this report, there is an opportunity for the United States to continue to lead in the pursuit of increasingly clean, more efficient electricity through innovation in advanced technologies. *The Power of Change: Innovation for Development and Deployment of Increasingly Clean Energy Technologies* makes the case that America's advantages—world-class universities and national

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laboratories, a vibrant private sector, and innovative states, cities, and regions that are free to experiment with a variety of public policy approaches" position the United States to create and lead a new clean energy revolution. This study focuses on five paths to accelerate the market adoption of increasing clean energy and efficiency technologies: (1) expanding the portfolio of cleaner energy technology options; (2) leveraging the advantages of energy efficiency; (3) facilitating the development of increasing clean technologies, including renewables, nuclear, and cleaner fossil; (4) improving the existing technologies, systems, and infrastructure; and (5) leveling the playing field for cleaner energy technologies. *The Power of Change: Innovation for Development and Deployment of Increasingly Clean Energy Technologies* is a call for leadership to transform the United States energy sector in order to both mitigate the risks of greenhouse gas and other pollutants and to spur future economic growth. This study's focus on science, technology, and economic policy makes it a valuable resource to guide support that produces innovation to meet energy challenges now and for the future.

The Monthly Energy Review (MER) presents an overview of the Energy Information Administration's recent monthly energy statistics. The statistics cover the major activities of US production, consumption, trade, stocks, and prices for petroleum, natural gas, coal, electricity, and nuclear energy. Also included are international energy and thermal and metric

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conversion factors. The MER is intended for use by Members of Congress, Federal and State agencies, energy analysts, and the general public. EIA welcomes suggestions from readers regarding data series in the MER and in other EIA publications. 37 figs., 61 tabs.

Energy is an essential resource in the daily lives of humans. However, the extraction and use of energy has an impact on the environment. The industrial sector accounts for a large share of the global final energy use and greenhouse gas (GHG) emissions. The largest source of industrial GHG emissions is energy use. The production and processing of aluminium is energy- and GHG-intensive, and uses significant amounts of fossil fuels and electricity. At the same time, the global demand for aluminium is predicted to rise significantly by the year 2050. Improved energy efficiency is one of the most important approaches for reducing industrial GHG emissions. Additionally, improved energy efficiency in industry is a competitive advantage for companies due to the cost reductions that energy efficiency improvements yield. The aim of this thesis was to study improved energy efficiency in the individual companies and the entire supply chains of the aluminium industry. This included studying energy efficiency measures, potentials for energy efficiency improvements and energy savings, and which factors inhibit or drive the work to improve energy efficiency. The aim and the research questions were answered by conducting a literature review, focus groups, questionnaires and calculations of effects on primary energy use, GHG emissions, and energy and CO₂ costs. This thesis identified several energy efficiency measures that can be implemented by the individual companies in the aluminium industry and the aluminium casting foundries. The individual companies have large potentials for improving their energy efficiency. Energy efficiency measures within the electrolysis process have

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significant effects on primary energy use, GHG emissions, and energy and CO₂ costs. This thesis showed that joint work between the companies in the supply chains of the aluminium industry is needed in order to achieve further energy efficiency improvements compared to the companies only working on their own. The joint work between the companies in the supply chain is needed to avoid sub-optimisation of the total energy use throughout the entire supply chain. Better communication and closer collaboration between all the companies in the supply chain are two of the most important aspects of the joint work to improve energy efficiency. An energy audit for the entire supply chain could be conducted as a first step in the joint work between the companies in the supply chains. Another important aspect is to increase the use of secondary aluminium or remelted material waste rather than primary aluminium. The companies in the Swedish aluminium industry and the aluminium casting foundries have come some way in their work to improve energy efficiency within their own facilities. However, the results in this thesis indicate that cost-effective technology and improved management can, in total, save 126–185 GWh/year in the Swedish aluminium industry and 8–15 GWh/year in the Swedish aluminium casting foundries. This thesis identified several demands regarding economics, product quality and performance, and environment placed on the companies and products in the supply chains that affect energy use and work to improve energy efficiency. These demands can sometimes counteract each other, and some demands are more important to meet than improving energy efficiency. This implies that improving the energy efficiency of the supply chains as well as designing products so they are energy-efficient in their use phase can sometimes be difficult. The results in this thesis indicate that it would be beneficial if the companies reviewed these demands to see whether any of

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them could be changed. Both the economic aspects and demands from customers and authorities were shown to be important drivers for improved energy efficiency in the supply chains. However, placing demands on energy-efficient production and a company's improved energy efficiency would require those placing the demands to have deeper knowledge compared to demanding green energy, for example. Requiring a company to implement an energy management system to ensure active work to improve energy efficiency would be easier for the customer than demanding a certain level of energy efficiency in the company's processes. Additionally, energy audits and demands on conducted energy audits could act as drivers for improved energy efficiency throughout the supply chains. This thesis showed that the most important barriers to improved energy efficiency within the individual companies include different types of risks as well as the cost of production disruption, complex production processes and technology being inappropriate at the site. Similar to the supply chains, important drivers for improved energy efficiency within the individual companies were shown to be economic aspects and demands from customers and authorities. However, the factors that are most important for driving the work to improve energy efficiency within the individual companies include the access to and utilisation of knowledge within the company, corporate culture, a longterm energy strategy, networking within the sector, information from technology suppliers and energy audits.

Energi är en viktig resurs i människors dagliga liv, men utvinningen och användningen av energi påverkar miljön. Industrin står för en stor andel av den globala slutliga energianvändningen och de globala utsläppen av växthusgaser. Den största källan till industriella växthusgasutsläpp är energianvändning. Produktionen och bearbetningen av aluminium är energiintensiv och har stora

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utsläpp av växthusgaser och använder betydande mängder fossila bränslen och elektricitet. Samtidigt beräknas efterfrågan på aluminium öka avsevärt globalt till år 2050. Energieffektivisering är ett av de viktigaste medlen för att minska industriella växthusgasutsläpp. Dessutom är energieffektivisering inom industrin en konkurrensfördel för företagen på grund av de minskade kostnader som energieffektivisering medför. Syftet med den här avhandlingen var att studera hur energianvändningen kan bli effektivare i de enskilda företagen och hela försörjningskedjorna i aluminiumindustrin. Detta inkluderade att studera energieffektiviseringsåtgärder, potentialer för energieffektivisering och energibesparing samt vilka faktorer som hindrar eller driver arbetet med energieffektivisering. Syftet och frågeställningarna besvarades genom litteraturstudier, fokusgrupper, enkäter samt beräkningar av påverkan på primärenergianvändning, växthusgasutsläpp och energi- och koldioxidkostnader. Denna avhandling identifierade flera energieffektiviseringsåtgärder som kan genomföras av de enskilda företagen inom aluminiumindustrin och aluminiumgjuterierna. De enskilda företagen har stora potentialer för effektivare energianvändning. Energieffektiviseringsåtgärder inom elektrolysen har stor påverkan på primärenergianvändning, växthusgasutsläpp samt energi- och koldioxidkostnader. Denna avhandling visade att det gemensamma arbetet mellan företagen i aluminiumindustrins försörjningskedjor är viktigt för att uppnå ytterligare effektiviseringar av energianvändningen jämfört med om de individuella företagen skulle arbeta enbart på egen hand. Det gemensamma arbetet mellan företagen i försörjningskedjan är viktigt för att undvika suboptimering av den totala energianvändningen i hela försörjningskedjan. Bättre kommunikation och närmare samarbete mellan alla företagen

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i försörjningskedjan är två av de viktigaste aspekterna i det gemensamma arbetet för att uppnå effektivare energianvändning. En energikartläggning av hela försörjningskedjan kan genomföras som ett första steg i det gemensamma arbetet mellan företagen. En annan viktig aspekt är att öka användningen av sekundärt aluminium eller omsmält processkrot snarare än att använda primärt aluminium. Företagen i den svenska aluminiumindustrin och aluminiumgjuterierna har kommit en bit på vägen i deras arbeten mot effektivare energianvändning inom deras egna anläggningar. Dock visade resultaten i denna avhandling att kostnadseffektiv teknik och förbättrad energiledning totalt kan spara 126–185 GWh/år i den svenska aluminiumindustrin och 8–15 GWh/år i de svenska aluminiumgjuterierna. Denna avhandling identifierade flera krav rörande ekonomi, produktkvalitet och -prestanda samt miljö som ställs på företagen och produkterna i försörjningskedjorna och som påverkar energianvändningen och arbetet mot effektivare energianvändning. Dessa krav kan ibland motverka varandra och vissa krav är viktigare att möta än att effektivisera energianvändningen. Detta innebär att det ibland kan vara svårt att energieffektivisera försörjningskedjorna samt att designa energianvändande produkter så att de är energieffektiva i användningsfasen. Resultaten i denna avhandling visar att det skulle vara fördelaktigt om företagen granskar kraven för att se om något av kraven skulle kunna ändras. Både de ekonomiska aspekterna och krav från kunder och myndigheter visade sig vara viktiga drivkrafter för energieffektivisering i försörjningskedjorna. Om krav ställs på energieffektiv produktion och effektivare energianvändning inom ett företag behöver de aktörer som ställer kraven ha djupare kunskaper jämfört med om de till exempel skulle kräva användandet av grön energi. Ett krav på implementeringen av ett energiledningssystem för att

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säkerställa ett aktivt arbete med energieffektivisering skulle vara lättare för kunden att ställa än att kräva en viss energieffektiviseringsnivå i leverantörens processer. Dessutom kan energikartläggningar och krav på genomförda energikartläggningar fungera som drivkrafter för energieffektivisering i försörjningskedjorna. Denna avhandling visade att de viktigaste hindren mot energieffektivisering inom de enskilda företagen är olika typer av risker samt kostnader för produktionsstörningar, komplexa produktionsprocesser och att tekniken inte är applicerbar inom anläggningen. I likhet med försörjningskedjorna uppkom de ekonomiska aspekterna och krav från kunder och myndigheter som viktiga drivkrafter för energieffektivisering inom de enskilda företagen. Dock är de viktigaste faktorerna för att driva på arbetet med energieffektivisering inom de enskilda företagen tillgången till och utnyttjandet av kunskap inom företaget, företagskulturen, en långsiktig energistrategi, nätverkande inom branschen, information från teknikleverantörer och energikartläggningar.

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