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HYROGEN ENERGY

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TOPIC OF CURRENT AWARENESS SERVICES@PUSTAKA FOR JANUARY: HYDROGEN ENERGY

According to Gale eBooks, Hydrogen, the first element in the periodic table, is one of the most common elements found on Earth and the lightest one known to exist. An estimated 90 percent of the universe is composed of hydrogen. It can be found in nearly everything organic (that is, any material that contains the element carbon except diamond and graphite) and in all living organisms. In its pure gaseous form, hydrogen is odorless, colorless, tasteless, highly flammable, but not poisonous.

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List of Resources on Hydrogen Energy in Pustaka's Collection

LIST OF BOOKS

Note: Kindly scan the QR Code for full text online.



Title	:	Alternative Energy				
Editor	:	Neil Schlager and Jayne				
		Weisblatt				
Publisher	:	Gale				
Location	:	Pustaka Negeri Sarawak				
Format	:	e-Book				
material						
Online	:	Gale eBooks				
database						
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Many experts believe that hydrogen could be used as a fuel source to provide energy to the world. In order for this to happen, the gas must be in its pure form. This is problematic because hydrogen bonds (connects or attaches) relatively easily to other elements. In fact, it does not occur as a gas in nature but rather is found in combination with other elements. For example, hydrogen combines with oxygen to form water. Because water is so common, most methods to produce hydrogen gas focus on extracting it from water.



Title	:	Hydrogen Energy: Economic and Social Challenges
Editor	:	Paul Ekins
Publisher	:	Routledge
Call	:	665.81/HYD
Number		
ISBN	:	9781844076802
Location	:	Pustaka Negeri Sarawak
		(Kuching)
Format	:	Book
material		



Description:

This books, based on four years of detailed research, subjects the promise and potential of hydrogen to searching, in-depth sosio-economic analysis. It discussed the different technologies for the production, distribution, storage and use of hydrogen, and analyses the economics if the technologies and their current market prospects.



Description:

Hydrogen, Batteries and Fuel Cells provides the science necessary to understand these important areas, considering theory and practice, practical problem-solving, descriptions of bottlenecks, and future energy system applications. The title covers hydrogen as an energy carrier, including its production and storage; the application and analysis of electrochemical devices, such as batteries, fuel cells and electrolyzers; and the modeling and thermal management of momentum, heat, mass and charge transport phenomena.

LIST OF ARTICLES

Note: Kindly scan the QR Code for full text online.

Title

: Building the hydrogen economy through niche experimentation and digitalisation

Authors Online Database Format

- David Walwn, Andreas Bertoldi and Christian Gable
- Emerald Insight
- : e-Article

The current issue and full text archive of this journal is available on Emerald Insight at: www.emeraldinsight.com/1741-038X.htm

Building the hydrogen economy through niche experimentation and digitalisation

Building the hydrogen economy

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David Walwyn

Department of Engineering and Technology Management, University of Pretoria - Groenkloof Campus, Pretoria, South Africa, and Andreas Bertoldi and Christian Gable Rebel Group, Johannesburg, South Africa

Received 4 January 2018 Revised 4 April 2018 13 September 2018 Accepted 12 October 2018

Abstract

Abstract Purpose – Hydrogen fuel cells could play an important role in meeting the challenges of the Two Degrees Scenario. The purpose of this paper is to review the development of this technology in South Africa with the inin of understanding how the country can transform its existing socio-technical systems and act to support a hydrogen-based technological innovation system (TIS). Design/methodology/approach – A mixed methods approach has been followed in this study. Secondary data analysis was used initially to build a profile of South Africa's present energy systems, followed by a stakeholder survey of the emerging hydrogen economy. Respondents were selected based on a convenience/ snowball sampling approach and were interviewed using a semi-structured questionnaire, covering opportunities for South Africa's in the global hydrogen economy; sources of competitive advantage; the present phase of development; the maturity of each function and the main weaknesses within the TIS, and finally the appropriate policy instrument to remedy the weakness and/or maximise opportunities for local companies. Findings – The research has shown that the hydrogen economy is still at a pre-competitive level and requires ongoing government support to ensure an energy transition is realised. In particular, it is important that niche experimentation, a proven strategy in respect of successful sustainability transitions, is further pusced. Importantly, the net cost of hydrogen-based transportation, which is still several times larger than the cost of transport based on the internal combustion engine (ICE), must be reduced, especially in the key applications of public transport and underground vehicles. Furthermore, the development of digital **Criginality/value** – The South Africa economy will be severely affected by the replacement of the ICEs with barket for platinum but the hydrogen TS is still at a vulnerable point in its development; without policy support, it will not contribute to a successful socio-techni

Keywords Government policy, Digitization, Green manufacturing Paper type Research paper

1. Introduction

Global energy systems continue to rely on the non-renewable resources of coal, oil and natural gas, as shown in Figure 1. Collectively these three feedstocks account for 87 per cent of the global carbon dioxide emissions, with the latter now exceeding 35 trillion metric tonnes per year (Decourt et al., 2014). Energy usage is spread over all economic sectors but the major emissions of carbon dioxide arise from electricity production (42 per cent), transport (23 per cent) and industry (19 per cent) (IEA Statistics, 2015).

It is widely acknowledged that unprecedented levels of carbon dioxide emissions are causing climate change. The existing concern and impending crisis for global ecosystems has led to the adoption of the Paris Agreement which requires all ratifying countries to contain and reduce their greenhouse gas emissions with the goal of peaking such emissions "as soon as possible" and continuing the reductions thereafter, thereby keeping global temperatures from rising no more than 2°C by 2100, referred to as the Two Degrees Scenario (2DS), with the ideal target being a rise of not more than 1.5°C (Robbins, 2016).



Title	:	The current status of hydrogen energy: an overview
Authors	:	Phuoc-Anh Le, Vuong Dinh Trung, Phi Long Nguyen,
		Thi Viet Bac Phung, Jun Natsukicd and Toshiaki Natsuki*
Format	:	e-Article



been assessed as having the same significance as the previous industrial revolution.

1 Introduction

DOI: 10.1039/d3ra05158g rsc.li/rsc-advances

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"Institute of Frontier Fibers, Institute for Fiber Engineering (IFES), Interdisciplinary Cluster for Cutting Edge Research (ICCER), Shinshu University, Ueda, Nagano 386-8567, Japan. E-mail: natsuki@shinshu-u.ac.jp



Phuoc-Anh Le currently works at the Center for Environmental the Center for Environmental Intelligence and College of Engineering & Computer Science, Vin University, Viet-nam. He received his PhD from the National Yang Ming Chiao Tung University, Taiwan, in 2021. His research focuses on the development of novel materials for energy storage and conversion applications.

28262 | RSC Adv., 2023, 13, 28262-28287

Over the past ten years, there has been a noticeable and significant shift in the global fuel supply. Traditional fossil fuels like coal, gas, and oil will progressively be phased out; this is also an unavoidable tendency of civilization, with negative implications and effects on the climate, water resources, land resources, and people. Renewable energy sources, including the sun, wind, ocean waves, hydrogen, and others, have emerged as the most promising and likely prospects for the future of energy supply.^{1,2} In which hydrogen energy is anticipated to become widely used in the future, exerting significant influence on



Vuong Dinh Trung is currently a PhD student at the Interdisciplinary Graduate School of Science and Technology, Shinshu University in Natsuki's group. He received his Master degree from the Department of Mechanical Engineering and Robotics, Shinshu University in 2022. His research interests focus on nanomaterials for energy harvesting and storage.

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Title

: Hydrogen as the futuristic fuel for the aviation and aerospace industry – review

Authors Online Database Format

- P.Gunasekar, S. Manigandan, Praveen Kumar T.R
- : Emerald Insight
- : e-Article

Hydrogen as the futuristic fuel for the aviation and aerospace industry – review



P. Gunasekar and S. Manigandan Department of Aeronautical Engineering, Sathyabama Institute of Science and Technology, Chennai, India, and Praveen Kumar T.R.

Department of Construction Technology and Management, Wollega University, Nekemte, Ethiopia

Abstract Purpose – The rise in demand and high utilization of fuel causes severe environmental threat for the nations on the globe. Rapid burning potential of hydrogen produces enormous amount of thrust, and it is mainly owing to wide flame range and less onset of ignition.

Design/methodology/approach — The significant contribution of hydrogen as fuel has been explored by several researchers around the globe recently to use in aviation sector owing to its eco-friendly nature. Hydrogen is a safe and clean fuel, and it can be generated from several sources. The effects of addition on hydrogen on gas turbine on combustion characteristics and emission concentration level on atmosphere have been reviewed in this paper.

Findings - Incorporation of hydrogen is effective reducing nitrous oxide emission, high calorific value and flame less combustion. Addition of hydrogen to higher proportions enhances the combustion performance, minimizing the setbacks of conventional fuel and meets the specified standards on emission.

Originality/value - From the literature review, the comparative study on hydrogen with other fuel is explained. This paper concludes that addition of hydrogen in fuel enhances the performance of combustion on gas turbine engine along with significant reduction in emission levels

Keywords Hydrogen, Gas turbine engine, Alternate fuels, Aviation iet fuel

Paper type General review

Introduction

Around 80% of global energy system is mainly attributed to utilization of nonrenewable resources includes coal, gas, etc. These resources are forecasted to be exhausted in few decades (Manigandan et al., 2019). In near future, the cost of this fossil fuel will face sudden uprise due to rise in demand. Hence, substitution of alternative fuels for these fossil fuels is of growing significance (Ko *et al.*, 2019). The significant parameter needs to be concentrated on using fossil fuels is the pollution associated with the utilization. The researchers around the globe have identified the problems which are produced from burning the fossil fuels. The substitution of alternate fuels which provides safe and clean energy safeguards the environment from global warming and associated health effects of our planet (Daggett *et al.*, 2007). Hence, the effective solution to replace the fossil fuels with clean, safe, quality and inexhaustible fuel includes hydrogen will address the solution of previously mentioned drawbacks. The long-distance transportation of passengers, reusing of launch vehicle and some other aerospace utilization can be high dependent on the efficient propulsion system (Mehrabian *et al.*, 2006). Utilization of conventional fuels creates major environmental

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Aircraft Engineering and Aerospace Technology 93/3 (2021) 410–416 © Emerald Publishing Limited [ISSN 1748-8842] [DOI 10.1108/AEAT-07-2020-0145]

problem due to release of various gases includes carbon monoxide, hydrocarbon, SOx, NOx, CO₂ and so on in the atmosphere. Contribution of nitrous oxide and carbon dioxide generation in the atmosphere only due to air transportation was here 20% or 40 cf. about 3% and 2.6%, respectively. These percentages of NOx and CO₂ emission levels will rise in future due to rise in global air traffic. Enhancing propulsion systems in aircraft should not be considered as an alternative way to reduce the greenhouse gas emission as an antennative way to reduce the greenhouse gas emission in atmosphere (Xu *et al.*, 2016; Qiu *et al.*, 2017; Chen *et al.*, 2018). Several policies were framed by national leaders to reduce the usage of fossil fuels to use alternative fuels in various industrial sectors. Global leaders pledged to reduce the greenhouse gas emissions in UNCCP agreement. The efficient way to reduce those emissions is to find the renewable energy resources. Hydrogen as a fuel can be used in aviation sector due to its positive impact on environment and improved performance on combustion property. In the late 1966, Henry Cavendish, a British scientist, first recognized hydrogen Cavenish, a binar sections, instruction in the recognized hydrogen through the process between Zn and HCI (Vilanci al, 2009). Later, Antoine Lavoisier coined the name as hydrogen. A first balloon flight was launched in the year 1783 without human being up to a height of 3 m. Later Hans Von Ohain developed turbine fueled by hydrogen (Akansu *et al.*, 2004). In 1955, the Wright brothers tried to use hydrogen as fuel in turbine (Chiesa et al., 2005; Lee et al., 2010). Aircraft sectors significantly uses turbine engines for generation of power and generation of

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LIST OF CASE STUDY

Note: Kindly scan the QR Code for full text online.

Title	:	Potential analysis of hydrogen energy technology in the power grid based on carbon tax: A case study in Japan
Authors	:	Fanyue Qian , Weijun Gao,Dan Yu, Yongwen Yang and Yingjun Ruan
Online Database Format	э: S : F	Sage Research Article

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Energy Exploration & Exploitation 2023, Vol. 41(2) 534–560

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Research Article

Potential analysis of hydrogen energy technology in the power grid based on carbon tax: A case study in Japan

Fanyue Qian¹, Weijun Gao^{2,3}, Dan Yu⁴, Yongwen Yang⁵ 🕞 and Yingjun Ruan¹ 😳

Abstract

Electrolytic hydrogen storage technology of renewable energy is considered as one of the important measures to realize the high proportion of renewable energy. However, developing this technology has been slow due to the cost. This study proposes highlighting the environmental advantages of renewable power combined with a carbon tax at the national level to expand the application space of hydrogen storage technology. First, the economy and technical characteristics of hydrogen storage technology and conventional energy-storage technology were compared. Then, Japan's top 10 power companies, which account for 90% of the power supply, were taken as the research objects. The proportion of change in renewable power after introducing a carbon tax was studied, taking the weighted minimum of the feed-in tariffs as the optimization objective. The contribution of hydrogen storage technology to the change in renewable power share was analyzed. Next, a sensitivity analysis was conducted on the fossil energy price and cost of renewable power equipment that affects the research. Finally, the contribution of a carbon tax and hydrogen storage technology to Japan's emission reduction target was calculated and analyzed. The results showed that the characteristics of long-distance transportation of hydrogen

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⁴School of Engineering, Sanda University, Shanghai, China

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LIST OF NEWSPAPER ARTICLE

Note: Kindly scan the QR Code for full text online.

Article Name	:	2024 set to be a critical year for hydrogen sector
Authors	:	Mathew Perry
Newspaper	:	The Press and Journal (Inverness, Highlands, and Islands)
Date of Published	:	8 Jan 2024
Online Database	:	PressReader





BY MATHEW PERRY

BY MATHEW PERRY The UK, hydrogan industry is used and period "Leading into 2004 as the master sector strices to prove its viability in the Jace of international source of data promising source of data sectory. The lay dropen sector has stringfled to bring down its assis arough to ensite layers ender industry.



Article Name Authors Newspaper Date of Published : 22 Feb 2024 Online Database

- : Title: Ready for great potential in 3 years
- : Marilyn Ten
- : The Borneo Post
- : PressReader

Ready for great ential ı 3 years I

Premier: Sarawak poised to lead country's renewable energy exports by 2027



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"At the same time, we call and occan around wood tennes.

Sarawak Les all the resources and if we combine these. with technology, therefore the state's potential is very vast. capenally in terms. of the National Energy Transition Reacting (METR) pointy. It is possible that we can become the decisive factor. in us transitioning from the old intol the new energy.

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Article Name Newspaper Date of Published Online Database

Enabler of transition

China Daily Global Edition (USA)

: 25 Jan 2024

:

:

PressReader :

LUO TIANYI AND EMANUELE BIANCO Enabler of transition



Green hydrogen can help pave the way for a sustainable energy future

The year 2023 was the warmest on record, overtaking the previous record year by a large manyin, with the 2023 average approaching the key Paris agreement threshold of 1.5 C above pre-industrial levels, the World Mete orological Organization officially confirmed at the beginning of 2024. The WMO has consolidated six international datasets to arrive at a global temperature of 1.45 C above the 1850-1900 baseline, plus or minus 0.12 C. In the World Energy Transitions Outlook 2023, the international Renewable Energy he year 2023 was the warmest on

In the World Elergy Transitions Outcook 2023, the International Renewable Renergy Agency (IRENA) calls for raised global ambition in renewables deployment, ena-blod by renewable energy, clean hydrogen, and sustainable biomass solutions, and for

abate" sectors such as steel making and the chemical industry, clean hydrogen interest has been growing caponentially around the world in recent years. Despite this, decision-makers, investors, making and another and him while in

Despite this, decision-makers, investors, technicians, and other people involved in the industry should be deeply aware of the fact that water availability is a critical factor for any hydrogen carcey production facili-ty. Currently, many hydrogen production projects are located in water-stressed regions of the world. For example, 59 per-cent of India's existing and planned green and blue hydrogen capacity is likely to be under extremely water stressed conditions by 2040. Green hydrogen, which is renewables-based, is the most water-efficient clean



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