Introducing

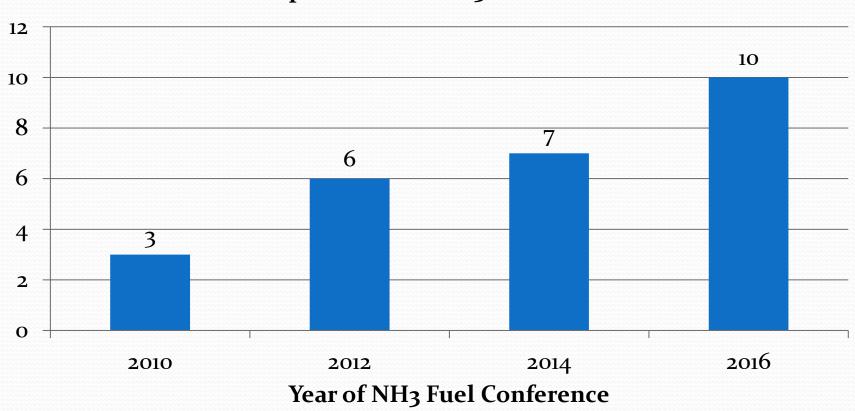
the

Global NH3 Fuel Federation

September 20, 2016

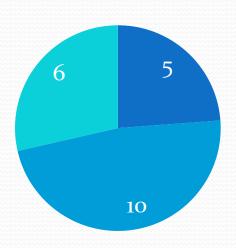
NH3 Fuel Is Becoming More Global

Countries Represented in NH3 Fuel Conference Talks



NH3 Fuel Is Becoming More Mainstream

NH3 Fuel Conference 2010 # Entities Represented in Talks



- Research Institutions
- Small Companies
- Individuals and Institutes

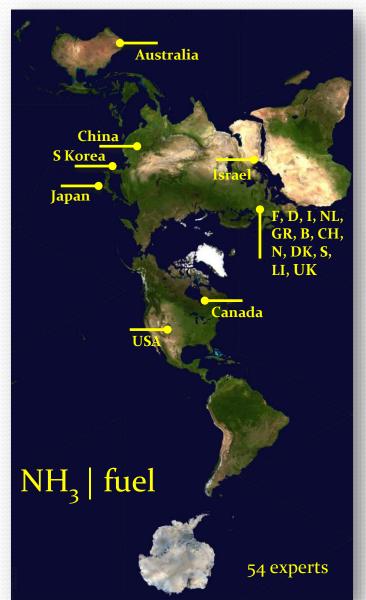
NH3 Fuel Conference 2016 # Entities Represented in Talks



- Research Institutions
- Small Companies
- Individuals and Institutes
- Large Companies



NH₃ FUEL CONFERENCE 2016

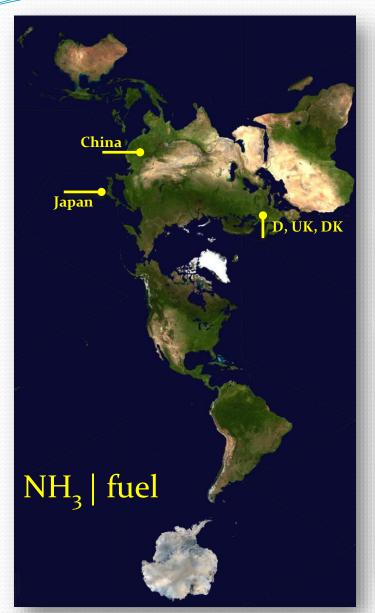








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HYDROGEN IMPLEMENTING AGREEMENT

HOME	ABOUT IEA HIA	ACTIVITIES	PUBLICATIONS	NEWS	RESOURCES	MEMBERS ONLY
	tional Energy Aç jen Implementi		ent (HIA)	Tower Gateway RV		
	llobal collaboration deployment of H					
WELCOME	E TO THE IEA HIA	CI	JRRENT TASKS			
With a 35 + ve	Vith a 35 + year operating history and significant accomplishments to its credit, the International energy Agency (IEA) Hydrogen Implementing	ignificant Ta	sk 29 - Distributed and Comn	nunity Hydrogen		2010-2014
accomplishm		national To	Task 30 - Global Hydrogen Systems Analysis			
Agreement (HIA) is a unique leader in the management of coordinated hydrogen redevelopment and demonstration activiting global basis.	e Ta	Task 32 - H2 Based Energy Storage			2013-2018	
	and demonstration activitie		sk 33 - Local H2 Supply for E	nergy Application	ons	2013-2016
		Ta	sk 34 - Biological Hydrogen f	or Energy and E	nvironment	2014-2017
annexes or ta managed a co Development analysis progr (country and i	creation and conduct of nearlasks, the IEA HIA has facilite omprehensive range of Resect & Demonstration (R, D&D) agrams among its Contracting international organizations) a ustry. PPP. non-profit) Membi		sk 35 - Renewable Hydrogen	Production		2014-2017
		earch, Ta and Ta	sk 36 - Life Cycle Sustainabi	lity Assessment		2014-2017
			sk 37 - Hydrogen Safety			2015-2018
			sk 38 - Power-To-Hydrogen a	nd Hydrogen-To-	-X	2015-2019
(country and						

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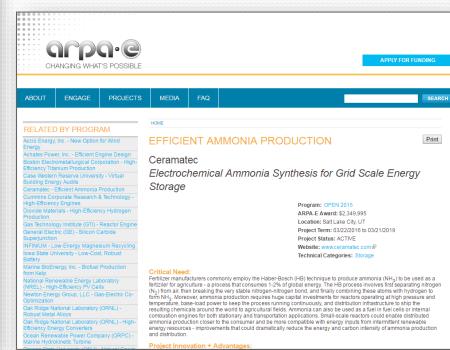
FINANCIAL ASSISTANCE FUNDING OPPORTUNITY ANNOUNCEMENT



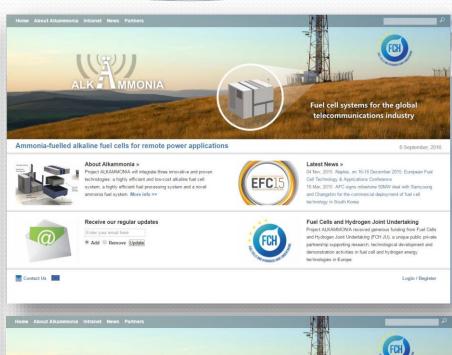


ADVANCED RESEARCH PROJECTS AGENCY – ENERGY (ARPA-E)
U.S. DEPARTMENT OF ENERGY

RENEWABLE ENERGY TO FUELS THROUGH UTILIZATION OF ENERGY-DENSE LIQUIDS (REFUEL) (SBIR/STTR)











6 September, 2016



PAUL SCHERRER INSTITUT

AFC Energy plc

Paul Scherrer Institute

AFC Energy (AFCEN) applies modern design principles and manufacturing methods to the fuel cell commercialisation, focussing specifically on the alkaline fuel cell.

The Paul Scherrer Institute, PSI, is the largest research centre for

natural and engineering sciences within Switzerland.





European Hydrogen Association - Federation of the Scientific and Technical Associations

The European Hydrogen Association was founded in 2000 by five national hydrogen organisations to promote the use of hydrogen as



Universität Duisburg-Essen The University of Duisburg-Essen (UDE) is one of the three universities of the German Ruhr Area, an industrial region where





Zentrum für Brennstoffzellentechnik ZBT Gmbh ZBT Focusing on application-oriented R&D ZBT bridges the gap between basic research at the University and requirements of

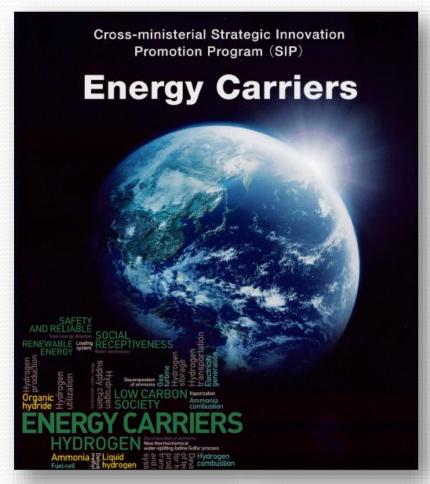
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Innovative Combustion Technology
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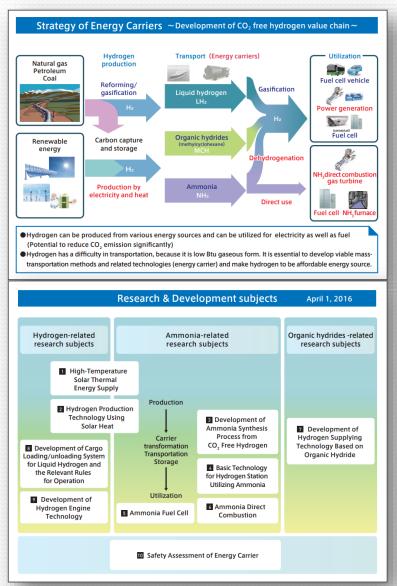






www.jst.go.jp/sip/pdf/SIP_energycarriers2015_en.pdf





www.jst.go.jp/sip/pdf/SIP_energycarriers2015_en.pdf





September 22, 2015

What Informal meeting

Where Chicago, IL (final evening of the 2015 NH3 Fuel Conference)

Who Anish Patil (Proton Ventures), Bill David (Oxford University),
Kenichi Aika (Tokyo Institute of Technology): John Holbrook

Kenichi Aika (Tokyo Institute of Technology); John Holbrook, Norm Olson, Steve Crolius, Trevor Brown (Board members of

the NH3 Fuel Association)

Why To discuss developing trends in ammonia energy and how

the NH3 Fuel Association should respond

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 - This requires country-specific advocacy by nationally rooted advocacy organizations
 - The NH3 Fuel Association is not equipped to engage in country-specific advocacy, but it can encourage such activity
- Decision: The NH3FA will launch an initiative to encourage national advocacy around the world

We announce the launch of the Global NH3 Fuel Federation (GNH3FF)!

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Near-Term

Investigate opportunities for nationally focused advocacy organizations

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- Investigate opportunities for nationally focused advocacy organizations
- Publish ammoniaenergy.org: "THE GLOBAL INFORMATION PORTAL FOR AMMONIA AS AN ENERGY VECTOR"

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Long-Term

 A coordinating body that can identify and act in areas of common interest across national advocacy organizations

GNH3FF Advisory Board

- Dr. Ken-ichi Aika
 Professor Emeritus, Tokyo Institute of Technology
 Japan
- Professor Bill David FRS
 STFC Senior Fellow, ISIS Facility, Rutherford Appleton Laboratory
 Professor of Materials Chemistry, University of Oxford
 United Kingdom
- M. James Grieve Chief Scientist, Corporate Advanced Engineering, Delphi Automotive Member, Board of Directors, NH3 Fuel Association United States
- Norm Olson
 Biomass and Alternative Fuels Program Manager, Iowa Energy Center President, NH3 Fuel Association
 United States
- Hans Vrijenhoef
 Managing Director, Proton Ventures
 The Netherlands
- Steve Wittrig
 Founder, Kinetic Emergy, LLC
 Senior Advisor, Advanced Energy Systems, Clean Air Task Force
 Director, Advanced Technology, BP (retired)
 Member, Board of Directors, NH3 Fuel Association
 United States

Ammonia Energy.org

Why

- Local empowerment comes from intelligence:
 - On the technical knowledge frontier
 - On the focus of public-sector policies and programs
 - On the flow of public- and private investment
- . . . And the intellectual legitimacy that such intelligence confers

Ammonia Energy.org

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What

- Web platform that will:
 - <u>Collect</u> information from all areas of activity
 - Organize and archive information in an optimally accessible manner
 - <u>Disseminate</u> information through an e-newsletter and on-line discussion forums

Please Be in Touch

- Ideas for national advocacy
- Founding of new organizations
- Plans for regional conferences

- For AmmoniaEnergy.org
 - Introduce new subscribers
 - Suggest news items
 - Corrections, expansions
 - Other feedback

Steve Crolius scrolius@ammoniaenergy.org