



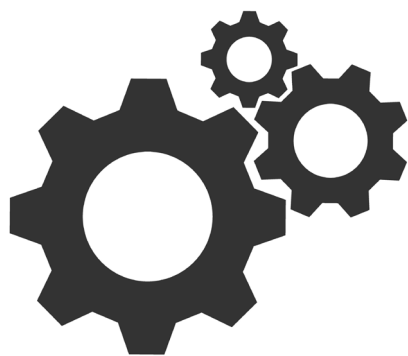
INTERNATIONAL FLAME RESEARCH FOUNDATION

2021

# ANNUAL REPORT

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Including financial statements

**Legal status:**

Company Limited by Guarantee; Company Registration No. 10573161

**Registered office:**

Translational Energy Research Centre, Sheffield Business Park, Europa Avenue, S9 1ZA

**Bank:**

Lloyds TSB Bank, Sheffield Church Street, Chelmsford Legg St OSC,  
1 Legg St, Essex, CM1 1JS, UK

## IFRF Council

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### Directors of IFRF Ltd (Group A)

General Secretary - Mohamed Pourkashanian\*  
Executive Director - Greg Kelsall

### National Committee Representatives

America - Dave Schalles  
China - Yong Yan  
France - David Honoré, Vice-Chair  
Germany - Reinhold Kneer  
Italy - Massimiliano Fantuzzi  
Netherlands - Rob Bastiaan  
Sweden - Nils Skoglund

### Non-Directors of IFRF Ltd (Group B)

President - Sauro Pasini\*  
IFRF Vice President - International - Sébastien Caillat  
Company Secretary - Melissa Ayres

### Co-opted Specialists

New fuels - Chuck Benson\*  
Safety - Jacques Dugué  
Early Career Researchers - Karen Finney  
Academia - Mikko Hupa  
Regional (Asia) - Yong Yan

\*Member of Executive Committee



## Keeping the flame burning in difficult times

The world is going through very difficult times. Covid is always around the corner, as we can see from what is currently happening in China, and the war in Ukraine generates enormous uncertainties about the future.

Despite these not-very-simple scenarios, the activity of the IFRF is consolidating, and glimmers are opening for a more rosy future. In recent years, the problem of non-uniformity in the quotas of the various National Committees has created various problems for normal operation, some National Committees have decided to leave the foundation and to operate only within their own countries, and among the options considered for the future, for the first time the decision to close the IFRF has also appeared.

I think the network of specialists who participate in the life of the foundation in various ways and, above all, the skills they can make available, is a great value that should not be lost: maintaining the possibility of meeting and discussing each other, now that fortunately it is also possible to do "de visu", must be preserved in every way, also because the skills available in this network can be functional to help solve the climatic and environmental problems that are affecting us more and more closely.



I don't think that in the future we will be interested, for example, in the scaling of coal burners, although I expect that in several countries, including China and India, coal will play a very important role at least for the next 20 years.

However I think research scenarios will open on the combustion of CO<sub>2</sub> free fuels: hydrogen, ammonia, etc. The industrial community has to find ways to decarbonize high energy intensive industries, such as glass and steel, processes in which large quantities of heat are supplied through more or less intense oxidation reactions.

# PRESIDENT'S REPORT



There are many new issues to explore and develop in the sector in which the foundation operates.

Last but not least, the TERC laboratory at the University of Sheffield is becoming operational, so it is possible for IFRF members to have access to information from research activities such as, for example, the performance of a dry-low NOx burner for gas turbines in operation with increasing fractions of hydrogen.

European-wide research projects are being evaluated again, as an opportunity to raise funds for collaborative R&D activities.

IFRF is currently planning events for the future of the Foundation, of varying sizes. These include a hydrogen short course for interested parties to attend, more TOTeMs, including both the 49th and 50th editions, on chemical energy carriers for the transport of renewable energies and hydrogen for the glass industry respectively. Please keep your eyes peeled for these events and more.

There are therefore many positive signs about the revitalization of the life of the Foundation, which make me optimistic when I think about its future: research in the energy sector is critical for our well-being and in the future we won't just talk about renewables and batteries.

Fuels, both fossil and innovative, will continue to have a significant importance, at least in the next two decades, and much work will have to be done to use them efficiently and cleanly. There are indications that some of the national committees that had left the foundation are interested in returning. The IFRF is there and has all the credentials to contribute significantly to these developments.

**Sauro Pasini, IFRF President**



## A difficult year with significant challenges

2021 was again a difficult year for IFRF, driven to a large extent by an enforced curtailment of activities in many of IFRF's member countries as a result of ongoing Covid-19 issues.

Severe travel restrictions for much of 2021 meant that planned activities to consolidate new member initiatives in China and Japan, to increase the number of members within the existing nine National Committees and to start to develop potential new associate members in Middle East and Africa, and Central and South America, did not take place.

On the contrary, at the Council Meeting held in January 2021, the existing nine National Committee members were invited to consider if they wished to continue as IFRF member organisations. The outcome of this was that both the British and Finnish National Flame Committees decided to withdraw completely from IFRF, whilst the German National Flame Committee suspended its membership for 2022 and the American National Flame Committee gave its individual member organisations the option to continue as IFRF fee-paying members.

Later in the year, the American National Flame Committee advised that none of its individual members had taken up the



option to continue, and in fact they did not pay any fees for 2021. The remaining five National Committee members and the Associate Members, however, confirmed their commitment to IFRF.

2021 also saw the announcement that Philip Sharman would step down as Executive Director at the end of 2021. As part of a phased transition, I was appointed as Deputy Director in February 2021 with the intention, subject to IFRF Council approval, to take over the Executive Director role in 2022.

To introduce myself, I'm an independent energy expert, having previously worked for GE, Alstom and British Coal in a range of combustion and future energy related roles. I have taken on the Deputy Director role as a part-time activity within a portfolio of energy-related activities.

# DIRECTOR'S REPORT



The build of the University of Sheffield's £21 million Translational Energy Research Centre (TERC) was completed in 2021. This is a significant achievement as the organisation is the host to IFRF and is its primary Preferred Research Partner (PRP).



As a result of the significantly reduced cash flow in to IFRF through the reduced membership payments in 2021, coupled with the inability to generate cash through training and conferences due to Covid 19 related restrictions, the activities of the IFRF and in particular its Executive/Deputy Directors were curtailed.

The focus for 2021 within the reduced budget was to continue to issue the IFRF bi-weekly newsletter, negotiate with potential partner organisations to extend the IFRF PRP network and to initiate IFRF industrial sponsorship of three engineering doctorates in the UK. These three aspects are discussed in more detail below.

IFRF Newsletter - Monday Night Mail (MNM), IFRF's bi-weekly newsletter continued to be published throughout 2021. This contains topical items of interest, combustion industry news roundup, and updates on IFRF activities.

With a circulation in excess of more than one thousand subscribers, it is the primary route to keep in touch with IFRF's members and partner organisations.

PRP Network - The PRP network of IFRF was extended during the course of 2021, with Zhejiang University, China in October 2021 and Fives Pillard, France/Italy in November 2021 becoming IFRF's third and fourth PRP organisations.

This PRP network forms the primary route for IFRF to carry-out its objective of providing/co-ordinating collaborative research and development, as well as individual contracted capabilities to its members and partner organisations.

Engineering Doctorates - IFRF also became an industrial sponsor for three engineering doctorate students in the UK's Centre for Doctoral Training entitled 'Resilient, decarbonised fuel energy systems'. During the first year of studies, the students will be part of a group of other EngD students within their cohort, undertaking compulsory or elective courses including hands-on experience at the IFRF's preferred research partner, TERC.

# DIRECTOR'S REPORT



Their planned projects where IFRF will provide technical input and guidance are:

- Amine-based post-combustion carbon capture on oxygen furnaces improving the overall performance of proton exchange membrane fuel cells by reducing contact losses between the gas diffusion layer and the bipolar plate through the use of a double-sided microporous layer.
- Bacterial enzymes derived from methanogenesis bacteria to convert CO<sub>2</sub> into methanol.

Outlook for 2022 - As 2022 is already over the outlook to 2022 includes an initial update on some completed activities, with more information to be provided in next year's 2022 IFRF report.

My appointment as Executive Director was confirmed by IFRF Council and I took on the role from January 2022. The administration of IFRF has been transferred to the University of Sheffield TERC team as IFRF's host organisation.

The TERC team includes Melissa Ayres, Lisa Shepley, Rhianne Spurden and Siobhan Green. In addition, Melissa Ayres became the IFRF Company Secretary in January 2022 and the registered address of IFRF with Companies House was moved to the TERC address in March 2022.

Now that Covid restrictions are being generally relaxed globally, efforts will be increased again to attract new IFRF members, to plan and execute Topic Orientated Technical Meetings (TOTeM), specifically one held in Paris, France entitled 'Hydrogen for decarbonisation', and the exploration of joint training and conference/workshops with external partners such as Cenertec and the Combustion Institute.

The completion of IFRF's PRP network is also planned, with Air Liquide in France and Glass Futures in the UK becoming the fifth and sixth PRP organisations, both in June 2022.

Finally, opportunities will be explored with the IFRF PRP network and member organisations to bid for collaborative research and development external funding opportunities. Based on feedback from members, this is seen as an important IFRF offering.

Thank you once again for your membership this year, and for your continued support. We hope that 2022 and 2023 will see significant re-growth for IFRF, and look forward to many more activities.

A handwritten signature in black ink, appearing to read 'G. Kelsall'.

**Greg Kelsall, Executive Director**



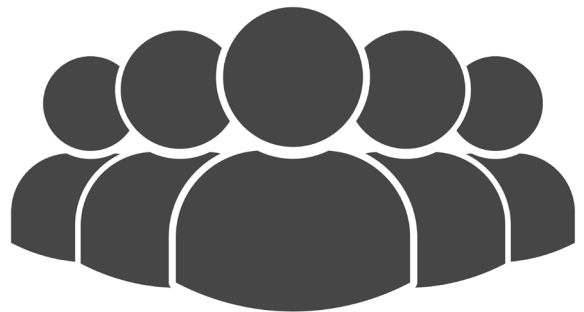
# MEMBERS

IFRF has members in each corner of the world, from the USA to Japan, and from Finland to South Africa.

Here is how the IFRF Membership looked at the end of 2021:



**6** national committees



**128** members -  
**120** organisations  
**8** individuals



**22** countries





# COMMUNICATIONS

IFRF has three main platforms for communicating with its members and the wider audience - Monday Night Mail (MNM) a bi-weekly member e-newsletter; the IFRF website ([www.ifrf.net](http://www.ifrf.net)); and social media pages.

**MONDAY NIGHT MAIL**  
IFRF'S BI-WEEKLY MEMBER NEWSLETTER

**953**  
subscribers at  
the end of 2021

**26 MNMs**  
published

**23.7%**  
subscribers  
engaged with  
MNM on average

## Top 10 stories of 2021

1. EPRI - Low-Carbon Resources Initiative - An Introduction to Low-Carbon Fuels
2. Mitsubishi Power to develop ammonia combustion systems for thermal power plant boilers
3. Memories of former IFRF Investigator John Smart (1958-2021)
4. First UK trial of hydrogen-blended gas hailed a success
5. Finland's Betolar develops green cement as construction races to decarbonise
6. JERA studying ammonia co-firing at coal-fired Japanese power station
7. UK picks East Coast Cluster and HyNet as its 'Track-1' industrial cluster projects
8. IFRF launches LinkedIn
9. Testing of MHI's KS-21 solvent confirms 95-98% CO<sub>2</sub> capture level and demonstrates 99.8% capture is achievable
10. Fives Pillard confirmed as IFRF's fourth Preferred Research Partner



# EVENTS

In 2021, Covid-19 regulations prevented many large gatherings, meaning that no ToTEMs or other large events took place for IFRF, and many smaller meetings were held virtually.

Several National Committee Flame Days still took place, however, and the ones we were made aware of are listed below.

## National Committees Flame Days

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The **Italian Committee** had two meetings, both virtual:

- January 26th, to discuss 2021 topics of interest
- December 3rd, to summarize the activities of the year

The **Comité Français de la FRIF** (France) had two general assemblies:

- Assemblée Générale du Comité Français de la FRIF, 3rd June 2021, ICARE CNRS Orléans / Virtual
- Assemblée Générale du Comité Français de l'IFRF, 18th November 2021, Laboratoire Gestion des Risques et Environnement (LGRE), Mulhouse, Université de Haute-Alsace

The **American Flame Research Committee** (AFRC) had an Industrial Combustion Symposium on 10th October - 12th October



## REPORT OF THE DIRECTORS AND UNAUDITED FINANCIAL STATEMENTS FOR THE YEAR ENDED 31 DECEMBER 2021 FOR

### IFRF LIMITED

IFRF LIMITED (REGISTERED NUMBER: 10573161)

## CONTENTS OF THE FINANCIAL STATEMENTS FOR THE YEAR ENDED 31 DECEMBER 2021

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## IFRF LIMITED

COMPANY INFORMATION FOR THE YEAR ENDED 31 DECEMBER 2021

### **DIRECTORS:**

Dr S Caillat

Professor M Pourkashanian

### **SECRETARY:**

Mrs M J Ayres

### **REGISTERED OFFICE:**

C/O Translational Energy Research Centre

Europa Avenue

Sheffield

South Yorkshire

S9 1ZA

### **REGISTERED NUMBER:**

10573161 (England and Wales)

### **ACCOUNTANTS:**

Bronsens

Chartered Certified Accountants

Hillside

Albion Street

Chipping Norton

Oxfordshire

OX7 5BH



## REPORT OF THE DIRECTORS FOR THE YEAR ENDED 31 DECEMBER 2021

The directors present their report with the financial statements of the company for the year ended 31 December 2021.

### **DIRECTORS**

The directors shown below have held office during the whole of the period from 1 January 2021 to the date of this report.

Dr S Caillat  
Professor M Pourkashanian

Other changes in directors holding office are as follows:

Mr R Dudill - resigned 3 March 2021

This report has been prepared in accordance with the provisions of Part 15 of the Companies Act 2006 relating to small companies.

### **ON BEHALF OF THE BOARD:**

A handwritten signature in black ink, appearing to read 'M. Pourkashanian', is written over a horizontal dotted line.

**Professor M Pourkashanian - Director**

**Date: 22nd September 2022**



## INCOME STATEMENT FOR THE YEAR ENDED 31 DECEMBER 2021

	Notes	31.12.21 £	31.12.20 £
<b>TURNOVER</b>		63,880	106,196
Administrative expenses		59,388	77,225
<b>OPERATING SURPLUS</b>	4	4,492	28,971
Interest receivable and similar income		-	34
<b>SURPLUS BEFORE TAXATION</b>		4,492	29,005
Tax on surplus	5	691	384
<b>SURPLUS FOR THE FINANCIAL YEAR</b>		3,801	28,621

The notes form part of these financial statements



## BALANCE SHEET 31 DECEMBER 2021

	Notes	31.12.21 £	31.12.20 £
<b>CURRENT ASSETS</b>			
Debtors	7	6,052	4,207
Cash at bank		14,194	14,417
		<u>20,246</u>	<u>18,624</u>
<b>CREDITORS</b>			
Amounts falling due within one year	8	14,248	16,427
		<u>5,998</u>	<u>2,197</u>
<b>NET CURRENT ASSETS</b>			
<b>TOTAL ASSETS LESS CURRENT LIABILITIES</b>		<u>5,998</u>	<u>2,197</u>
<b>RESERVES</b>			
Income and expenditure account		<u>5,998</u>	<u>2,197</u>
		<u>5,998</u>	<u>2,197</u>

The company is entitled to exemption from audit under Section 477 of the Companies Act 2006 for the year ended 31 December 2021.

The members have not required the company to obtain an audit of its financial statements for the year ended 31 December 2021 in accordance with Section 476 of the Companies Act 2006.

The directors acknowledge their responsibilities for:

- ensuring that the company keeps accounting records which comply with Sections 386 and 387 of the Companies Act 2006 and
- preparing financial statements which give a true and fair view of the state of affairs of the company as at the end of each financial year and of its surplus or deficit for each financial year in accordance with the requirements of Sections 394 and 395 and which otherwise comply with the requirements of the Companies Act 2006 relating to financial statements, so far as applicable to the company.

The financial statements have been prepared in accordance with the provisions applicable to companies subject to the small companies regime. The financial statements were approved by the Board of Directors and authorised for issue on 22 September 2022 and were signed on its behalf by:

Professor M Pourkashanian - Director



## STATEMENT OF CHANGES IN EQUITY FOR THE YEAR ENDED 31 DECEMBER 2021

	Retained earnings £	Total equity £
<b>Balance at 1 January 2020</b>	(26,424)	(26,424)
<b>Changes in equity</b>		
Total comprehensive income	28,621	28,621
<b>Balance at 31 December 2020</b>	<u>2,197</u>	<u>2,197</u>
<b>Changes in equity</b>		
Total comprehensive income	3,801	3,801
<b>Balance at 31 December 2021</b>	<u><u>5,998</u></u>	<u><u>5,998</u></u>

The notes form part of these financial statements





## NOTES TO THE FINANCIAL STATEMENTS FOR THE YEAR ENDED 31 DECEMBER 2021

### 1. STATUTORY INFORMATION

IFRF Limited is a private company, limited by guarantee, registered in England and Wales. The company's registered number and registered office address can be found on the Company Information page.

The presentation currency of the financial statements is the Pound Sterling (£).

### 2. ACCOUNTING POLICIES

#### **Basis of preparing the financial statements**

These financial statements have been prepared in accordance with Financial Reporting Standard 102 "The Financial Reporting Standard applicable in the UK and Republic of Ireland" including the provisions of Section 1A "Small Entities" and the Companies Act 2006. The financial statements have been prepared under the historical cost convention.

#### **Turnover**

Turnover is measured at the fair value of the consideration received or receivable, excluding discounts, rebates, value added tax and other sales taxes.

#### **Tangible fixed assets**

Depreciation is provided at the following annual rates in order to write off each asset over its estimated useful life.

Computer equipment - 33% on cost

#### **Taxation**

Taxation for the year comprises current and deferred tax. Tax is recognised in the Income Statement, except to the extent that it relates to items recognised in other comprehensive income or directly in equity.

Current tax is recognised at the amount of tax payable using the tax rates and laws that have been enacted or substantively enacted by the balance sheet date.

#### **Deferred tax**

Deferred tax is recognised in respect of all timing differences that have originated but not reversed at the balance sheet date.

Timing differences arise from the inclusion of income and expenses in tax assessments in periods different from those in which they are recognised in financial statements. Deferred tax is measured using tax rates and laws that have been enacted or substantively enacted by the year end and that are expected to apply to the reversal of the timing difference.

# FINANCIAL STATEMENTS



Unrelieved tax losses and other deferred tax assets are recognised only to the extent that it is probable that they will be recovered against the reversal of deferred tax liabilities or other future taxable profits.

## 3. EMPLOYEES AND DIRECTORS

The average number of employees during the year was 2 (2020 - 3).

## 4. OPERATING SURPLUS

The operating surplus is stated after charging:

	31.12.21	31.12.20
	£	£
Depreciation - owned assets	-	115
	<u>          </u>	<u>          </u>

## 5. TAXATION

### Analysis of the tax charge

The tax charge on the surplus for the year was as follows:

	31.12.21	31.12.20
	£	£
Current tax:		
UK corporation tax	691	6
<u>Underprovision prior years</u>	-	378
	<u>          </u>	<u>          </u>
Tax on surplus	691	384
	<u>          </u>	<u>          </u>



## 6. TANGIBLE FIXED ASSETS

	Computer equipment £
<b>COST</b>	
At 1 January 2021 and 31 December 2021	459
<b>DEPRECIATION</b>	
At 1 January 2021 and 31 December 2021	459
<b>NET BOOK VALUE</b>	
At 31 December 2021	-
At 31 December 2020	-

## 7. DEBTORS: AMOUNTS FALLING DUE WITHIN ONE YEAR

	31.12.21 £	31.12.20 £
Trade debtors	6,052	-
Prepayments	-	4,207
	<u>6,052</u>	<u>4,207</u>

## 8. CREDITORS: AMOUNTS FALLING DUE WITHIN ONE YEAR

	31.12.21 £	31.12.20 £
Trade creditors	10,071	8,321
Tax	697	6
Accrued expenses	3,480	8,100
	<u>14,248</u>	<u>16,427</u>

## 9. LIMITED BY GUARANTEE

The company is Limited by Guarantee. Accordingly the company has no shareholders and no reconciliation of movement in shareholders' funds is present. The liability of each member shall not be more than £1 in the unlikely event of the company being wound up.

# FINANCIAL STATEMENTS



## ON THE UNAUDITED FINANCIAL STATEMENTS OF IFRF LIMITED (REGISTERED NUMBER: 10573161)

In order to assist you to fulfil your duties under the Companies Act 2006, we have prepared for your approval the financial statements of IFRF Limited for the year ended 31 December 2021 which comprise the Income Statement, Balance Sheet, Statement of Changes in Equity and the related notes from the company's accounting records and from information and explanations you have given us.

As a practising member firm of the Association of Chartered Certified Accountants, we are subject to its ethical and other professional requirements which are detailed at <http://www.accaglobal.com/rulebook>.

This report is made solely to the Board of Directors of IFRF Limited, as a body, in accordance with our terms of engagement. Our work has been undertaken solely to prepare for your approval the financial statements of IFRF Limited and state those matters that we have agreed to state to the Board of Directors of IFRF Limited, as a body, in this report in accordance with the requirements of the Association of Chartered Certified Accountants as detailed at <http://www.accaglobal.com/factsheet163>. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the company and its Board of Directors, as a body, for our work or for this report.

It is your duty to ensure that IFRF Limited has kept adequate accounting records and to prepare statutory financial statements that give a true and fair view of the assets, liabilities, financial position and profit of IFRF Limited. You consider that IFRF Limited is exempt from the statutory audit requirement for the year.

We have not been instructed to carry out an audit or a review of the financial statements of IFRF Limited. For this reason, we have not verified the accuracy or completeness of the accounting records or information and explanations you have given to us and we do not, therefore, express any opinion on the statutory financial statements.

Bronsens  
Chartered Certified Accountants  
Hillside  
Albion Street  
Chipping Norton  
Oxfordshire  
OX7 5BH

Date: .....22 September 2022.....

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## DETAILED INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31 DECEMBER 2021

	31.12.21		31.12.20	
	£	£	£	£
<b>Turnover</b>				
Membership fees	63,880		101,179	
Other income	-		5,017	
	<u>        </u>	63,880	<u>        </u>	106,196
<b>Other income</b>				
Deposit account interest		-		34
		<u>        </u>		<u>        </u>
		63,880		106,230
<b>Expenditure</b>				
Insurance	1,765		1,690	
Wages	-		8,260	
Social security	-		842	
Pensions	-		248	
Sub contractor fees	52,113		46,809	
Telephone, computer and website costs	1,658		2,264	
Sundry expenses	-		13	
Accountancy	1,320		1,380	
Subscriptions	30		-	
Consultancy	2,000		9,544	
Bad debts	-		5,607	
	<u>        </u>	58,886	<u>        </u>	76,657
		4,994		29,573
<b>Finance costs</b>				
Bank charges		502		453
		<u>        </u>		<u>        </u>
		4,492		29,120
<b>Depreciation</b>				
Computer equipment		-		115
		<u>        </u>		<u>        </u>
<b>NET SURPLUS</b>		4,492		29,005
		<u>        </u>		<u>        </u>

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