HYDROGEN IMPLEMENTING AGREEMENT  水素実施協定

END-OF-TERM REPORT  期末報告  |  2004-2009
STRATEGIC PLAN    戦略計画  |  2009-2014
END-OF-TERM REPORT | 2004-2009
STRATEGIC PLAN | 2009-2014

SUBMITTED TO IEA REWP
IEA REWPに提出

BY 作成

IEA AGREEMENT
ON THE PRODUCTION AND
UTILIZATION OF HYDROGEN
IEA水素製造利用協定

MARCH 2009 2009年3月
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Preface

The IEA Agreement on the Production and Utilization of Hydrogen, commonly known as the Hydrogen Implementing Agreement (HIA) was created in 1977. Its most recent term of operation, which spans the period 2004-2009, ends 30 June 2009.


This report was prepared by the Secretariat, Mary-Rose de Valladares of M.R.S. Enterprises, LLC after the fourth quarter 2008 HIA Executive Committee meeting pursuant to preparations by and under the guidance of the HIA Strategic Planning Committee and leadership (Chairman and Co-Chairs). The HIA Strategic Planning Committee was chaired by Dr. Carole Read of the U.S. Department of Energy. The other Committee members were Mr. Antonio G. García-Conde, HIA Chair, from Spain’s Instituto Nacional de Técnica Aerospacial; Mr. Jan Jensen, HIA Co Vice-Chair, from the Danish Gas Technology Center; Dr. Steven Pearce, HIA Co Vice-Chair, from Solid Energy New Zealand Ltd.; and Mr. Jürgen Hake from Germany’s Institut of Energy Research, Forschungszentrum Jülich GmbH.

The planning process for the five year term 2009-2015 included a strategic planning session for the entire
Executive Committee, which was held at the fourth quarter meeting. The in-person exchange was followed by submission of written comments from members and Operating Agents. The resulting Strategic Plan for the period 2009-2015 is consistent with CERT Strategic Plan 2007-2011. Following review and approval by the Executive Committee, the EOT Report and Strategic Plan will be sent to the Renewable Energy Working Party (REWP) for review and approval. On REWP approval, the EOT and Strategic Plan will be sent to the CERT for final review and approval.

The 2004-2009 term of the International Energy Agency (IEA) Agreement on Production and Utilization of Hydrogen, commonly known as the IEA Hydrogen Implementing Agreement (HIA), ends 30 June 2009. As planned, the HIA experienced substantial growth in activity level, accomplishments, membership and Secretariat capacity during this five year period. The 2004-2009 term marked the beginning of the “Second Generation HIA,” following 25+ years of productive R,D&D cooperation. The HIA recognizes that a near, mid and long-term R,D&D is required to realize the significant technological potential of hydrogen technologies. While its core business is collaborative R,D&D, the HIA effort considers the entire technology system and the entire value chain. HIA activities also feature techno-economic analysis and outreach. Interest in hydrogen technologies has heightened in the recent past, driven by the sharpening global focus on energy and the challenge of climate change. With its track record for collaboration, Strategic Plan and increased Secretariat capacity, the HIA was well-positioned to convert this resurgence of interest into effective cooperation on H2 R,D&D.

**Membership and Participation 加盟国と参加状況**

Nearing the end of the 2004-2009 term, membership in the HIA had increased ~60%, from 14 to 22 members. All members are Contracting Parties. There were no withdrawals during the five year period 2004-2009. Members are: Australia, Canada, Denmark, European Commission, Finland, France, Germany, Greece, Iceland, Italy, Japan, Korea, Lithuania, New Zealand, Norway, Spain, Sweden, Switzerland, the Netherlands, Turkey, UK and USA. All HIA members have discrete hydrogen programs or significant hydrogen activities. There are several potential members in the pipeline. Near-term candidates for accession include two Gleneagles “+ Five” countries and the United Nations Industrial Development Organization (UNIDO), which would be the first international organization to join the HIA. The role of industry in the HIA has grown during the 2004-2009 term. Although the HIA as yet has no industry sponsors, several tasks, notably Task 16 and Task 23, consist predominantly of industry participants.

As a task-shared Agreement, the aggregate level of effort over the five year 2004-2009 term came to 712 person years, conservatively valued at $71 million USD in monetary terms.

As a task-shared Agreement, the aggregate level of effort over the five year 2004-2009 term came to 712 person years, conservatively valued at $71 million USD in monetary terms.

The current status of tasks active during this term appears in the Table A below.

今期活動したタスクの現況を下表Aにまとめる。

<table>
<thead>
<tr>
<th>TASK タスク</th>
<th>TASK NAME タスク名</th>
<th>STATUS 現況</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Photo-biological production of H₂ 光生物学的水素製造</td>
<td>Completed完了</td>
</tr>
<tr>
<td>16</td>
<td>H₂ from Carbon-Containing Materials 炭素含有物からの水素製造</td>
<td>Completed完了</td>
</tr>
<tr>
<td>17</td>
<td>Solid &amp; Liquid State H₂ Storage Materials 固相および液相の水素貯蔵</td>
<td>Completed完了</td>
</tr>
<tr>
<td>18</td>
<td>Integrated Systems Evaluation 統合システム評価</td>
<td>Continuing進行中</td>
</tr>
<tr>
<td>19</td>
<td>Hydrogen Safety 水素安全性</td>
<td>Continuing進行中</td>
</tr>
<tr>
<td>20</td>
<td>H₂ from Waterphotolysis 水の光分解による水素製造</td>
<td>Completed完了</td>
</tr>
<tr>
<td>21</td>
<td>BioHydrogen バイオ水素</td>
<td>Continuing進行中</td>
</tr>
<tr>
<td>22</td>
<td>Fundamental and Applied H₂ Storage Materials Development 基礎的および工学的水素貯蔵材料開発</td>
<td>Continuing進行中</td>
</tr>
<tr>
<td>23</td>
<td>Small-Scale Reformers for On-Site H₂ Supply (SSR for Hydrogen) オンサイト水素供給用小型改質器(水素SSR)</td>
<td>Continuing進行中</td>
</tr>
<tr>
<td>24</td>
<td>Wind Energy and Hydrogen Integration 風力エネルギーと水素の統合</td>
<td>Continuing進行中</td>
</tr>
<tr>
<td>25</td>
<td>High Temperature Production of Hydrogen 水素の高温製造</td>
<td>Continuing進行中</td>
</tr>
<tr>
<td>26</td>
<td>Advanced materials for Waterphotolysis 水の光分解のための先進材料</td>
<td>Continuing進行中</td>
</tr>
<tr>
<td>27</td>
<td>Near-Term Market Routes to H₂ by Co-Utilisation of Biomass as a Renewable Energy Source with Fossil Fuels 再生可能エネルギーとしてのバイオマスと化石燃料の併用による短期的な水素市場ルート</td>
<td>Continuing進行中</td>
</tr>
</tbody>
</table>

For the 5 year period 2004-2009, the HIA's Strategic Framework featured three goals, each of which has three scopes. Tasks and activities are shown in Table A by goals and scopes.

2004-2009期の5ヵ年について、HIAの戦略枠組は3つの目標を掲げ、それぞれに3つの対象範囲を設定した。目標と範囲別のタスクおよびその活動内容を表Aに示す。

Over its lifetime, the HIA has created a broad portfolio of twenty-seven (27) tasks. Nine of these tasks, 33% of the entire HIA portfolio, were approved during this five year term: eight in science and technology (seven [7] in production and one [1] in storage); and two (2) in market environment. At the end of the term, nine tasks were active and another market environment task related to infrastructure was in definition. Selected success stories appear below in Table B.

HIAは設立以来、27タスクという幅広いポートフォリオを構築してきた。これらのうち9タスク、すなわちHIAポートフォリオの33%が今5ヵ年期で承認されたものであり、うち8タスクが科学技術（製造7、貯蔵1）、2タスクが市場環境である【合計10で数が合わない】。期末時点では9タスクが活動しており、他に市場環境1タスクが定義中であった。成功例の一部を下表Bに示す。

**Table B - Success Stories**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 15</td>
<td>Photo-biological Prod. タスク15</td>
<td>R&amp;D Progress toward development of H2 production by microalgae 微細藻類による水素製造開発に向けて前進あり</td>
</tr>
<tr>
<td>Task 16</td>
<td>H2 from Carbon-Containing Materials タスク 16</td>
<td>State of the Art reports for all three subtasks: Subtask A-Large Scale Integrated H2 Production Decarbonisation; Subtask B – Prospects for H2 from Biomass; Subtask C – Small-scale Reformers for Stationary H2 Production with Minimum CO2 emissions. -Substantial industry participation is a benchmark for future industry participation -サブタスクA「炭素除去と一体化した水素大量生産」、サブタスクB「バイオマスからの水素製造」およびサブタスクC「二酸化炭素排出量を最小とする定置式水素製造小型改質器」の3サブタスクの全てが最先端状況報告書を提出 -業界が大きく参加しており、今後の業界参と水準の目安となっている</td>
</tr>
<tr>
<td>Task 17</td>
<td>Solid &amp; Liquid Storage タスク17</td>
<td>Huge contribution to literature -900+ publications and presentations plus 17 patents -発表論文が増大。900以上の論文/プレゼンテーションと17件の特許</td>
</tr>
</tbody>
</table>

### Task 18 Integrated Systems Evaluation

- World’s best address for worldwide information and analysis on H₂ and integrated systems; used technical simulations that may be applied to other projects to replicate results
- General conclusions in critical areas plus lessons learned and trend analysis
- Water and integrated system evaluation

### Task 19 Safety

Laying foundation for codes and standards regulatory framework

### Task 20 H₂ from Waterphotolysis

- Development, acceptance and operation of two multi-year R&D PEC programs, one at U.S. DOE and the other, “NanoPEC” under EU 7th Framework Program
- Photocatalytic (PEC) work on tungsten trioxide led to development of novel, reliable and low-cost pollution control sensors for auto industry
- Development of new PEC technology for water splitting with high efficiency and stability

### Task 21 BioH₂

- Better genomic understanding of H₂ strict anaerobes

### Task 22 Fundamental & App. H₂ Storage Materials

- World’s largest collaboration to-date on hydrogen storage materials R&D
- As of December 2008 it produced 450+ publications/articles, 450+ presentations and 16 patents

### Task 23 SSR for H₂

Contribution to development of norms for small-scale reformers to harmonize industrialization and carbon capture for H₂ infrastructure and future distributed generation capability as well as fast-tracking technology deployment

### Task 24 Wind Energy and H₂ Integration

- Setting the stage for large-scale use of renewable wind energy for hydrogen production in the near future by addressing the entire wind to hydrogen production chain from technical, economical, social, environmental, market and legal perspectives

### Task 25 High Temp H₂ Prod.

- Producing summary sheets on high temperature processes in both general and detailed versions

### Information Dissemination

The HIA’s outreach program is communicating the potential of hydrogen energy as well as the substance and value of the Agreement’s work to members, the IEA, external stakeholders and decision makers around the world. Currently, our outreach activities primarily serve IEA/OECD governments. Efforts are underway to expand HIA outreach efforts to non-IEA member countries. The HIA produced over 20 major publications (including Annual Reports and its 25th Anniversary Report: In Pursuit of the Future) as well as some 1,153 publications/articles (see http://www.ieahia.org/page.php?s=glance&p=plan). Task experts delivered 1,015 presentations. In addition, the HIA redesigned its website, developed a biannual newsletter, an exhibition display and brochures. The HIA also developed a conference/meeting/event strategy at the Executive Committee level organized by internal (to IEA) and external (to IEA) conferences. External conferences were then segmented by target audience. During this term, the HIA made 12 presentations internally; externally, at the Executive Committee level, the HIA made 37 conference presentations and exhibited at 8 conferences. In 2008 the HIA co-sponsored a seminar in Athens Greece to launch Roads2HyCom.
HIA's public relations program is about communicating the potential of hydrogen energy, as well as the importance and value of HIA activities, to member countries and other stakeholders including international organizations and decision-makers around the world. The program focuses on member countries of IEA/OECD, with efforts also being expanded to non-member countries.

HIA has published over 25 significant reports (annual reports and 25th anniversary report “In Pursuit of the Future”), as well as 1153 articles/papers, and made 1015 presentations. HIA has also refreshed its website, issued a newsletter once every half year, and created a promotional display and pamphlets. At the Executive Committee level, the Agreement created an Analysis Group to focus on development of HIA analytic products, starting with a study on "Where the H2 will come from" that remains a work-in-progress.

Analysis
Analysis has played a large role in HIA activities at the task level (e.g., Tasks 18, 19, 23 and 24) during this term. At the Executive Committee level, an Analysis Group was created to focus on development of HIA analytic products, beginning with a study of "Where the H2 will come from" that remains a work-in-progress.

Coordination and Collaboration
The HIA cooperates with the IEA on an ongoing basis. In 2004, at the request of the IEA Secretariat in satisfaction of Mr. Claude Mandil's directive to the Hydrogen Coordinating Group (HCG), the HIA undertook a thorough and in-depth examination of near, mid and long-term gaps and priorities in hydrogen production and storage, the two key challenges to widespread, large scale use of hydrogen. The IEA then published the HIA findings and conclusions in Hydrogen Production and Storage: R&D Priorities and Gap. The HIA has contributed to the IEA's Energy Technologies at the Cutting Edge and the Open Bulletin. The HIA has been fortunate to participate in all the Networks of Expertise in Energy Technology (NEET) workshops and hopes to soon count the Gleneagles +5 nations as HIA members. The Agreement worked with the Ad-hoc Group on Science and Energy Technology (AGHSET) and will be part of the Steering Committee for its successor, the IEA Expert Group on Science for Energy (EGSE). The HIA has been a resource for the FEWP and the EUWP as well as the REWP. The Agreement has cooperated with several sister Agreements: Advanced Fuel Cells (AFC); Bioenergy; Electricity Networks Analysis, Research and Development (ENARD); Greenhouse Gas Programme; Wind (WIA); and Energy Technology Data Exchange (ETDE). Outside the IEA, the HIA has entered into a Memorandum of Understanding (MOU) with the International Partnership for a Hydrogen Economy (IPHE).

HIA has been working with the IEA on an ongoing basis. In 2004, at the request of the IEA Secretariat in satisfaction of Mr. Claude Mandii's directive to the Hydrogen Coordinating Group (HCG), the HIA undertook a thorough and in-depth examination of near, mid and long-term gaps and priorities in hydrogen production and storage, the two key challenges to widespread, large scale use of hydrogen. The IEA then published the HIA findings and conclusions in Hydrogen Production and Storage: R&D Priorities and Gap. The HIA has contributed to the IEA's Energy Technologies at the Cutting Edge and the Open Bulletin. The HIA has been fortunate to participate in all the Networks of Expertise in Energy Technology (NEET) workshops and hopes to soon count the Gleneagles +5 nations as HIA members. The Agreement worked with the Ad-hoc Group on Science and Energy Technology (AGHSET) and will be part of the Steering Committee for its successor, the IEA Expert Group on Science for Energy (EGSE). The HIA has been a resource for the FEWP and the EUWP as well as the REWP. The Agreement has cooperated with several sister Agreements: Advanced Fuel Cells (AFC); Bioenergy; Electricity Networks Analysis, Research and Development (ENARD); Greenhouse Gas Programme; Wind (WIA); and Energy Technology Data Exchange (ETDE). Outside the IEA, the HIA has entered into a Memorandum of Understanding (MOU) with the International Partnership for a Hydrogen Economy (IPHE).
Much technical progress has been achieved as a result of HIA coordinated research. Much growth is evident in the Agreement's organizational capacity. With successful completion of the 2004-2009 term the HIA is poised to begin a new five year term of cooperation.

HIA傘下で実施された研究の成果により、大きな技術的進展があった。HIAの組織としての能力に大きな成長があったことは明白である。2004-2009期が成功裏に満了となったことが、新たな協力の5年間につながっていること。
Executive Summary
Part II Strategic Plan 2009-2014
要旨
第2部 2009 – 2014年戦略計画

The forecast for 2009-2014 is for continued HIA expansion, progress toward fulfillment of the HIA mission and enhancement of the HIA value proposition.

2009-2014年において、HIAはさらなる発展を遂げ、使命の実現に向けて前進し、バリュープロポジションの拡充を図っていく。

Strategic Framework 戦略的枠組
The Agreement’s vision for hydrogen remains unchanged:

HIAの水素ビジョンは従来通りである。

*The HIA vision for a hydrogen future is one based on a clean, sustainable energy supply of global proportions that plays a key role in all sectors of the economy.*

地球的規模のクリーンな持続可能なエネルギー源を基盤とし、全ての経済分野において重要な役割を果たす水素による未来 [NEDO研究員の報告書から引用]

The HIA has adopted a mission statement for 2009-2014 that contemplates both the advancement of hydrogen and the role of the Agreement in achieving its vision:

HIAは水素の利用推進とビジョンの実現における任務を踏まえ、2009-2014年の使命(ミッションステートメント)を採択した。

*Accelerate hydrogen implementation and widespread utilization to optimize environmental protection, improve energy security and promote economic development internationally while establishing the HIA as a premier global resource for expertise in hydrogen.*

水素の導入と普及を加速化し、環境保護の最適化、エネルギー安全保障の強化、国際的な経済開発促進を図るとともに、水素知見の世界最高の発信源としてHIAを確立する。

To fulfill its mission and achieve its vision, the HIA’s will continue to employ its existing strategy:

今後も、次の従来の戦略を踏襲し、使命の遂行とビジョンの実現を目指していく。

*Facilitate, coordinate and maintain innovative, research, development and demonstration activities through international cooperation and information exchange.*

国際協力と情報交換を通じて、革新的な研究開発・実証活動の促進、連携、継続を行う。

For the period 2009-2014, the HIA has identified three major themes that stem from its mission and vision. These themes are at once goals and priorities. Each theme is associated with a set of portfolios that contain the tasks and activities. The themes and portfolios are listed below

HIAは使命とビジョンに立脚し、2009 – 2014期の主要テーマを3本決定した。これらは目標であると同時に優先課題である。各テーマにポートフォリオを設定し、ポートフォリオにはタスクと活動内容が記載されている。テーマとポートフォリオを下記に紹介する。

• Collaborative R,D&D that advances hydrogen science and technology

水素の科学技術の推進に向けた協同RD&D
The four Collaborative R,D&D portfolios are:

- Hydrogen Production 水素製造
- Hydrogen Storage 水素貯蔵
- Integrated Hydrogen Systems 統合水素システム
- Hydrogen Integration in Existing Infrastructure 水素の既存インフラへの統合

- Analysis that Positions Hydrogen for technical progress and optimization
  for market preparation and deployment
  for support in political decision-making
- Hydrogen Awareness, Understanding and Acceptance  
  that fosters technology diffusion and commercialization
- Hydrogen Integration in Existing Infrastructure  
  水素の既存インフラへの統合

The three Analysis portfolios are:

- Technical 技術
- Market 市場
- Support for Political Decision-Making 対政策決定支援

The three Hydrogen Awareness, Understanding and Acceptance portfolios are:

- Information Dissemination 情報普及
- Safety 安全性
- Outreach – inform and engage critical subset of HIA stakeholders and decision makers 広報活動 - 重要性の高い一部のHIA関係者や意思決定者を対象にした、情報提供と参画促進

Potential Participants 参加拡大

As it looks forward to continued growth in membership, the HIA seeks to engage other IEA member and non-member countries. The HIA is most especially interested in attracting members who are willing and able to commit to active participation in Agreement tasks and activities. It is also clear from the example of other Agreements that industry sponsors have the potential to make significant contributions to the advancement of hydrogen technology and the realization of the HIA mission. The HIA will consider parameters for sponsorship early in the new term. In tandem, the HIA will continue to encourage greater participation by industry experts at the task level. Each task will be asked to set a target for industry participation. Finally, the identification and training of potential experts, Operating Agents and Sub-task leaders will continue to be a priority activity.

Program of Work 事業計画(Program of Work)

In formulating the 2009-2014 Strategic Plan there was a clear sense in the Executive Committee that the Program of Work must contemplate the big picture needs of near, mid and long term hydrogen R,D&D. In addition, however, the Executive Committee stressed that the Program of Work must also address issues germane to the 2009-2014 timeframe, the term for this Strategic Plan. All nine tasks in place as of 2009 will continue in the new term. Another task, now in definition, is expected to launch just before or right after the new term begins. Six (6) of the existing tasks are expected to be extended during the term: Task 18, Task 19, Task 21, Task 22, Task 23 and Task 24. Some seven (7) tasks are expected to be formed as successors to current tasks: Remote Community Modeling (Task 18); Regulatory Framework (Task 19); new BioHydrogen (Task 21); Applied Storage (Task 22); Market Studies for SSR (Task 23); Componentry and Low Temperature Electrolysis (Task 24); and High Temperature Electrolysis (Task 25). Finally, five (5) other new tasks...
are forecast: PEC Devices; Gasification and Gas Clean-up; Production Componentry; Catalyst Research; and Analysis.

2009–2014期戦略計画の策定にあたり執行委員会は、事業計画が水素研究開発実証の短・中・長期ニーズの全体像を考慮したものでなければならぬという意識を明確に抱いていた。と同時に、本戦略計画の対象期間である2009–2014年という時期にまさって迫った課題や選択した内容にもこだわった。2009年度で実施中の9のタスクすべてが来期も継続する。現在、定義中のタスクも来期開始後に前後して開始の予定。現行のタスクのうち6つ（タスク18、タスク19、タスク21、タスク22、タスク23およびタスク24）が来期中に延長され、7つほどのタスクが現行タスクの後継版として発足すると見られる。後継タスクは、遠隔地域モデルリング（タスク18）、規制枠組み（タスク19）、新規バイオ水素（タスク21）、工学的貯蔵（タスク22）、小型改質器（SSR）の市場調査（タスク23）、コンポーネントを低電解（タスク24）、高温電解（タスク25）である。加えて、PEC設備、ガス化をガス精製、製造コンポーネント、触媒研究、分析の5件の新規タスクが想定されている。

While HIA efforts in fundamental R,D&D will continue, there will be an increasing emphasis on applied R&D. In addition, this term will feature an “Analysis Imperative.” The HIA understands that the ultimate success of the Analysis Imperative depends upon effective information dissemination. Therefore, both expansion in the HIA information products – resulting in significant part from the analysis efforts — and more frequent use of distribution channels are planned. In addition, new platforms for information dissemination such as webinars will also be adopted. New this term is a conference/meeting initiative that will allow the HIA to hold meetings/conferences to discuss progress, activities and achievements. Activities in the Outreach Portfolio will focus not only on informing, but more importantly on engaging, a critical subset of HIA stakeholders and decision makers. See Table C below for a Timeline on the 2009-2014 Programme of Work.

<table>
<thead>
<tr>
<th>Task 18: Integrated Systems Evaluation</th>
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<tr>
<td><strong>Successor:</strong> Remote Community Modeling</td>
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<tr>
<td><strong>後継タスク:</strong> 遠隔地域モデリング</td>
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<td>Task 19: Hydrogen Safety</td>
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<tr>
<td><strong>Successor Safety:</strong> Regulatory Framework</td>
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<td><strong>後継タスク 安全性:</strong> 規制の枠組み</td>
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<tr>
<td>Task 21: BioHydrogen</td>
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<tr>
<td><strong>Successor BioHydrogen</strong></td>
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<td><strong>後継タスク:</strong> バイオ水素</td>
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<td>Task 22: Fundamental and Applied Hydrogen Storage Materials</td>
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<tr>
<td><strong>New Task:</strong> Applied Storage</td>
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<td>新規タスク: 工学的貯蔵</td>
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<td>Task 23: Small-Scale Reformers for On-Site Hydrogen Supply (SSR)</td>
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<tr>
<td><strong>Successor:</strong> Market Studies for SSR</td>
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<tr>
<td><strong>後継タスク:</strong> 小型改質器(SSR)の市場調査</td>
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<tr>
<th>Mid 2009 2009 中期</th>
<th>Mid 2014 2014 中期</th>
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<td>2010</td>
<td>2011</td>
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<tr>
<th>Task</th>
<th>Description</th>
<th>Successor</th>
<th>Description</th>
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<tr>
<td>Task 24:</td>
<td>Wind Energy &amp; H₂ Integration</td>
<td><strong>Successor:</strong> Componentry &amp; Low Temp Electrolysis</td>
<td>コンポーネントと低温電解</td>
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<td><strong>Successor:</strong> High Temperature H₂ Production</td>
<td>水素の高温製造</td>
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<tr>
<td>Task 25:</td>
<td>High Temperature H₂ Production</td>
<td><strong>Successor:</strong> High Temp Electrolysis</td>
<td>高温電解</td>
</tr>
<tr>
<td>Task 26:</td>
<td>Advanced Materials for Water Photolysis</td>
<td><strong>Successor:</strong> Gasification &amp; Gas Cleanup</td>
<td>ガス化とガス精製</td>
</tr>
<tr>
<td>Task 27:</td>
<td>Near-Term Market Routes to H₂ by Co-Utilization of Biomass as RE with Fossil</td>
<td><strong>Successor:</strong> Analysis</td>
<td>分析</td>
</tr>
<tr>
<td>Task 28:</td>
<td>Infrastructure and Mass Storage</td>
<td><strong>New Task:</strong> Catalyst Research</td>
<td>触媒研究</td>
</tr>
<tr>
<td>Task 29:</td>
<td>Production Componentry</td>
<td><strong>New Task:</strong> Production Componentry</td>
<td>製造コンポーネント</td>
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第1部: 2004－2009期末報告

1.0 Introduction 序

1.1 Background 背景

The International Energy Agency (IEA) Agreement on Production and Utilization of Hydrogen, commonly known as the IEA Hydrogen Implementing Agreement (HIA), was created in 1977. Its current term (2004-2009) ends in June 2009. As planned, the HIA experienced substantial growth in its membership, activity level, accomplishments and Secretariat capacity during this five year period. The 2004-2009 term marked the beginning of the “Second Generation HIA,” following 25+ years of productive RD&D cooperation. The growth in the HIA portfolio, as measured in tasks, was accompanied by Agreement-wide growth in two critical areas, analysis and outreach. The HIA also marked a major organizational milestone by opening a fully dedicated office as called for in its 2004-2009 Strategic Plan. Interest in hydrogen technologies has heightened in the recent past, driven by the sharpening global focus on energy and the challenge of climate change. With its track record for collaboration, Strategic Plan and increased Secretariat capacity, the HIA was well-positioned to convert this resurgence of interest into effective collaboration on hydrogen RD&D.

IEA水素実施協定(HIA)として知られる国際エネルギー機関(IEA)水素製造利用協定の2004-2009期は2009年6月30日をもって満了する。この5年間でHIAは計画通り、活動量、業績、加盟国数および事務局能力において大きな成長を遂げてきた。2004-2009期は、25年以上に渡って実績を挙げてきた協同RD&D活動に続いて「第2世代HIA」の幕開けとなった。タスクの数が示すようにHIAポートフォリオは拡大し、水素協定全体に分析と広報という重要な2分野における成長をもたらした。HIAはまた、2004－2009年の戦略計画で目指した専用事務所を開設し、組織としての成長においてひとつの節目を迎えた。世界的に、エネルギーと気候変動問題がいかに緊急な課題であるかが明白になる一方であり、これが近年の水素技術への関心の高まりの原動力となっている。協同体制や戦略計画、また事務局能力の強化という実績を伴ったHIAは、水素に対する注目が再び高まりを見せている今、この機会を逃さず水素RD&Dの効果的な協同活動に転換していくにふさわしい位置にある。

1.2 Guiding Principles 理念

The members of the IEA HIA agree that energy related hydrogen technologies merit serious attention. The following are the guiding principles on which the scope of the Agreement is based:

IEA HIAの加盟国はエネルギーに関連する水素技術は真剣な取組みに値するとの見解で一致している。本協定は、以下の理念に基づいてその範囲を定義している。

- Hydrogen—now mainly used as a feedstock for upgrading fossil-based energy carriers—will in the future increasingly become an energy carrier itself. It is necessary to carry out the analysis, studies, research, development and outreach that will facilitate a significant role for hydrogen in the future.

水素は現在、化石燃料由来のエネルギーキャリアの改良原料として主として使用されているが、将来は水素自体がエネルギーキャリアとなっていく。将来的に水素が重大な役割を果たしていけるようにするための分析、研究、調査、開発そして広報活動を行っていく必要がある。

- Significant use of hydrogen will contribute to the reduction of energy-linked environmental impacts,

第1部: 2004－2009期末報告および2009－2014戦略計画
including climate change due to anthropogenic carbon emissions, mobile source emissions such as CO, NOx, SOx, and NMHC (non-methane hydrocarbons), and particulate matter.

水素を大きく利用するならば、人間による炭素排出や、CO、NOx、SOx、NMHC（メタン以外の炭化水素）などの車両由来の排出物質、ならびに微粒子に起因する気候変動など、エネルギー関連の環境への影響の低減に寄与することになる。

- Hydrogen has the potential for short, medium and long-term applications. The steps to realize the potential for applications in appropriate time frames must be understood and implemented.

水素には短期、中期そして長期的なアプリケーションの可能性がある。それぞれの時間枠において然るべき用途を実現していく上で必要な段階を理解し、実施する必要がある。

- All sustainable energy sources require conversion from their original form. Conversion to electricity and/or hydrogen will constitute two prominent, complementary options in the future.

持続可能なエネルギーは全て、本来の形態からエネルギー転換を必要とする。電気または水素への転換こそ、将来の大きな、そして互いに補完的な2つの選択肢となるであろう。

- Hydrogen can assist in the development of renewable and sustainable energy sources by providing an effective means of storage, distribution and conversion; moreover, hydrogen can broaden the role of renewables in the supply of clean fuels for transportation, heating, back-up power, portable power and combined heat and power (CHP) or cogeneration.

水素の貯蔵、流通およびエネルギー転換において効果的な方法を提供することが可能となれば、再生可能かつ持続可能なエネルギー源の開発に貢献することができる。しかも、輸送、暖房、非常用電源、可搬式電源、熱電併給(CHP)すなわちコジェネレーションへのクリーンな燃料供給という意味で、再生可能エネルギーの役割を拡大することができる。

- Hydrogen is an energy carrier that can be produced as a storable, clean fuel from the world's sustainable non-fossil primary energy sources - solar energy, wind energy, hydropower, biomass, geothermal, nuclear, or tidal. Hydrogen also has the unique feature that it can upgrade biomass to common liquid and gaseous hydrocarbons, thus providing a flexible, sustainable fuel.

水素は、太陽エネルギー、風力、水力、バイオマス、地熱、原子力、そして潮力などの世界中の持続可能な非化石燃料系一次エネルギーから製造できる、貯蔵可能でクリーンなエネルギーキャリアである。水素はまた、バイオマスの品位を上げて一般的な液体や気体の炭化水素とすることができ、それによってフレキシブルかつ持続可能な燃料を提供するという、水素ならではの特性を備えている。

- Hydrogen can be used as a fuel for a wide variety of end-use applications including important uses in the transportation and utility sectors.

水素は輸送部門および電力部門における重要な用途をはじめ、広範囲に渡って最終用途の燃料として利用できる。

- All countries possess some form of sustainable primary energy sources; hence, hydrogen energy technologies offer an important potential alternative to fossil fuel energy supply (in many instances to imported fuels). Utilization of hydrogen technologies can contribute to energy security, diversity and flexibility.

全ての国が何らかの形で持続可能な一次エネルギー源を有しているのであるから、水素エネルギー技術は(多くの場合は輸入されている)化石燃料によるエネルギーの代替となる大きな可能性を提供するものである。

- Barriers, both technical and non-technical, to the introduction of hydrogen are being reduced through advances in renewable energy technologies and hydrogen systems including progress in addressing hydrogen storage and safety codes & standards concerns.

水素導入における障害は、技術的なものであれ技術以外のものであれ、再生可能エネルギー技術の前進、それに水素貯蔵と安全性規基準に関する取組みの進展をはじめとする水素システムにおける前進によって減じられつつある。

Hydrogen energy systems have potential value for locations where a conventional energy supply infrastructure does not exist. The development of hydrogen technologies in niche applications will result in improvements and cost reductions that will lead to broader application in the future.

The members of the Agreement recognize that a near, mid and long-term research, development and demonstration effort is required to realize the significant technological potential of hydrogen technologies. This effort can help to create competitive hydrogen energy production and end-use technologies, and to support development of the infrastructure required for its use. The HIA effort considers the entire technology system and the entire value chain. While its efforts consist largely of R,D&D, they also feature techno-economic analysis and outreach.

If the technological potential of hydrogen is realized, it will contribute to the sustainable growth of the world economy by facilitating a stable supply of energy and by helping to reduce future emissions of carbon dioxide. Cooperative efforts among nations can help speed effective progress towards these goals.

1.3 Contribution to IEA Shared Goals

In 1993 IEA Ministers adopted a policy framework whose shared goals were intended, among other objectives, to “create conditions in which the energy sectors of their economies can make the fullest possible contribution to sustainable economic development and to the well-being of their people and of the environment.” The HIA is pleased to report that, during the 2004-2009 term, its members have sought to strengthen their respective policy frameworks in keeping with the spirit and letter of the Shared Goals.

Because hydrogen can be made from highly diverse sources, HIA member country efforts in this field stand to contribute to future energy supply diversity. In terms of environmental sustainability, hydrogen is a winner: When made from renewable and nuclear sources, hydrogen has very low emissions taking into account the full value chain. When made from carbon sources, emissions can be managed with carbon capture and sequestration. Member commitments to the IEA collaboration, in addition to their own national efforts, make critical contributions to R,D&D and deployment of hydrogen.

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2 Shared Goals, http://www.iea.org/about/sharedgoals.htm
水素は非常に様々な原料から製造され得ることから、HIA加盟国のこの分野における努力は将来のエネルギー供給の多様化に貢献することになる。環境持続可能性という点において、水素は非常に優秀だ。再生可能なエネルギーや原子力に由来する水素は、バリューチェーン全体でみた場合に温室効果ガス排出量が非常に低い。炭素材料を原料とする場合は、炭素回収・隔離により排出量を管理することができる。HIA加盟国は、自国の努力に加え、IEAとの協同体制への取組みにより、水素のRD&Dと実施に向けてなくてはならない貢献を行うものである。

All HIA members have discrete national hydrogen programs or significant hydrogen activities. Their participation in the HIA reflects their interest and commitment to hydrogen. It also reflects their national priorities and concerns, which contribute directly to formation of the HIA portfolio of tasks and activities.

HIA加盟国の全てが、個別に水素プログラムを有しているか、かなりの水素事業を行っている。HIAへの参加は、各国の水素への関心と姿勢を反映したものであるとともに、それぞれの優先課題と懸念を示すものであり、これがHIAのタスクと活動のポートフォリオの形成に直接役立てられている。

1.4 Trends 傾向

Beyond the borders of hydrogen R&D, the energy market is in transition. The future has never been brighter for the wind industry. Markets are opening to photovoltaics and biomass. The nuclear industry is on the verge of a comeback in some places. The coal industry is fighting for competitive advantage in a low carbon market even as it enjoys phenomenal growth in emerging countries.

水素R&Dの域を超えて、エネルギー市場は移行期にある。風力エネルギー産業にとって、将来はこれまでにない明るい。光電変換やバイオマスには市場が開かれつつあり、ところによっては原子力が復活の兆しを見せている。石炭産業は、振興国においてすさまじい成長を遂げているとはいえ、低炭素市場における競争力で苦戦している。

Vigorous debate about carbon policy has also taken center stage, resulting in the 2006 award of the Nobel Peace Prize to the Intergovernmental Panel on Climate Change (IPCC) and former U.S. Vice-President Albert Gore “for their efforts to build up and disseminate great knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change.”3 Growing demand, constrained conventional supply and uncertain costs have spurred sobering discussions among government policy makers about the full range of alternatives, their level of technology maturity, their safety and their emissions implications. These alternatives include nuclear and coal, as well as renewable energy, a modest but growing contributor to the world energy supply. They also include hydrogen. Hydrogen may well be considered the energy solution for environmental protection, offering significant CO₂ reduction possibilities. It can also contribute to energy security and economic development.

炭素政策に関する活発な論議も世界の注目を集め、2006年には「人類の手によって生じている気候変動に関する多大なる知見の集積と普及、またかかる変動の対策として必要な行動の基盤構築に対する努力」に対し、国連・気候変動に関する政府間パネル(IPCC)とアル・ゴア元米国副大統領にノーベル賞が授与されることになった。エネルギー需要の伸びに対する従来型エネルギーの供給量の制約、そしてコストの不安が、あらゆる代替エネルギー、その技術成熟度、安全性、温室効果ガス排出量について真剣な検討を行うように政策決定者を駆り立てている。代替エネルギーとしては原子力や石炭のほか、世界のエネルギー供給において比率はまだ小さいのが成長しつつある再生可能エネルギーも含まれており、水素もそのひとつである。水素は、二酸化炭素の大幅削減の可能性を持つことから、環境保護の

3 R K Pachauri, Chairman, IPCC, “Acceptance Speech for the Nobel Peace Prize Awarded to the Intergovernmental Panel on Climate Change (IPCC),” Oslo, 10 December 2007.
Over the past five years many nations have begun or deepened investigation of hydrogen for energy applications. These investigations have often included hydrogen roadmaps. Some 400 significant hydrogen and fuel cell technology demonstration and deployment projects have been funded and constructed around the world (North America, Europe and Japan) in both stationary and transport sectors. A similar number of demonstrations have taken place in the distributed power sector. Several nations have established hydrogen highways in some part of their territory, often in cooperation with their states and provinces. These include Canada, the European Union, Japan, Norway and the U.S.

In 2003, the International Partnership for a Hydrogen Economy (IPHE) was established as an international institution to accelerate the transition to a hydrogen economy (refer to 5.2.2). Its large (16 countries and the EC) membership attests to increased global interest in hydrogen and the benefits it can bring.

Today, hydrogen is primarily used as a chemical feedstock in the refining, petrochemical, food, electronics, and metallurgical processing industries, but it is rapidly emerging as a major component of clean sustainable energy systems. Fuel cells, an important energy conversion device, operate on hydrogen, so access to hydrogen is key to development of that business. Hydrogen is relevant to all of the energy sectors - transportation, buildings, utilities, and industry. It can be produced in both centralized and distributed generation systems. Hydrogen is found in carbon containing materials (fossil energy and biomass). A diverse array of primary sources (renewables, nuclear and solar) can be used for watersplitting. The global diversity of production options enhances hydrogen’s appeal for energy security.

Hydrogen can be used to provide back-up power, portable power and combined heat and power. For these applications, fuel cells may often be the energy conversion technology of choice.

4 http://www.netinform.net/h2/H2Stations/Default.aspx
Hydrogen can also provide bulk energy storage options for intermittent renewable technologies such as solar and wind, and when combined with emerging decarbonization technologies, it can reduce the climate impacts of continued fossil fuel utilization.

1.5 Technology Status  技術面の現況
In 2004, at the request of the IEA Secretariat in satisfaction of Mr. Claude Mandil’s directive to the Hydrogen Coordinating Group (HCG), the HIA undertook a thorough and in-depth examination of near, mid and long-term gaps and priorities in hydrogen production and storage, the two key challenges to widespread, large scale use of hydrogen. The results were captured in two papers. The IEA then published the HIA’s findings and conclusions in Hydrogen Production and Storage: R&D Priorities and Gaps. This effort served to inform the HIA’s work during this term and also facilitated strategic planning for upcoming 2010-2014 period. Key findings and conclusions from this report are included in the 2010-2014 Strategic Plan discussion of important research areas. A few comments about the status of hydrogen production and storage technology follow.

The development of a clean, sustainable hydrogen supply propels the HIA’s investigation of hydrogen production from renewable energy sources such as wind and biomass, and from nuclear energy. Wind is mature technology. Biomass gasification is well understood technically but still in the demonstration/pilot phase. Photo-electrochemical and photobiological processes, as well as hydrogen from nuclear processes, require extensive fundamental and applied research and development. Much of both fundamental and applied research and development is materials related. Because production of hydrogen from fossil fuels offers a likely approach for early adoptors of hydrogen technologies, the HIA is exploring R&D in reformation of low emission natural gas and coal that has been decarbonized and subject to carbon capture and sequestration.

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5 The hydrogen production analysis was prepared by Trygve Riis and Elisabet Fjermestad-Hagen. Dr. Gary Sandrock was primarily responsible for the storage analysis. The corresponding authors of the papers were Preben S.J. Vie and Øystein Ulleberg. Trygve Riis および Elisabet Fjermestad-Hagen が執筆。Dr. Gary Sandrock が貯蔵を担当。論文については Preben S.J. Vie と Øystein Ulleberg が執筆。
Hydrogen storage has been referred to as the “Grand Challenge.” The challenge pertains most directly to the transportation applications, where storage capacity, energetics, form factor and performance requirements have yet to be satisfied technically and economically. There has been steady progress, however, and the focus is clearly on solid materials as the preferred storage medium to enable greater driving range for transportation applications. As liquid and gas storage options are limited in their potential to meet longer term goals, new materials and solutions are needed to meet this challenge.

2.0 HIA Framework HIAの枠組

Coming into the 2004-2009 five year period, the HIA adopted a Strategic Plan reflecting its 26 year history of collaborative international RD&D hydrogen programs as well as the opportunities and challenges associated with the first five years of the “Second Generation HIA.” This Five Year Strategic Plan included focal points, mission, vision, strategy, goals and scope. The Strategic Plan also retained the generic objectives and actions set forth in the HIA Handbook of Policies and Procedures and listed above in Section 1.2 Guiding Principles. Finally, the Agreement’s strategic framework for the completed term 2004-2009 was organized to support realization of the IEA’s Shared Goals.

2.1 Focal Points 主眼点

As it embarked on the “Second Generation HIA”, the Implementing Agreement strove to advance its leadership role in the advancement and communication of hydrogen science and technology by identifying five focal points. These focal points are listed below and also illustrated in Figure 1:

「第2世代HIA」の幕開けとともに、HIAは水素の科学技術の進展と広報においてさらなるリーダーシップをとるべく、5つの柱を同定した。これら5項目を以下に列挙し、図1で説明する。

---

7 http://www1.eere.energy.gov/hydrogenandfuelcells/storage/national_proj.html
Designing and conducting **collaborative RD&D** programs that address pre-commercial and basic needs;

Undertaking **independent analyses** of hydrogen science, technology systems and economics that support RD&D and outreach programs;

Increasing **membership participation**;

Involving a broad range of **industry partners**; and

Raising the level of **hydrogen awareness, understanding, knowledge and support** throughout all sectors of the economy.

---

**2.2 HIA Vision, Mission, Strategy**

The **HIA Vision** for a hydrogen future is based on a clean, sustainable energy supply of global proportions that plays a key role in all sectors of the economy.

水素の将来に関するHIAのビジョンは、経済の全部門で重要な役割を担う、地球規模のクリーンかつ持続可能なエネルギー供給を基本とする。

The overarching **HIA Mission** is to accelerate hydrogen implementation and widespread utilization.

HIAの最大の使命は水素[技術]の実施と普及を促進することにある。

The **five year (2004-2009) specific Mission** of the HIA was to advance the adoption of a hydrogen economy through strategic implementation of collaborative RD&D and outreach programs that addressed key issues and barriers.

この5ヵ年(2004-2009)を対象に特に設けられた使命は、主要課題や障壁に向けた協同RD&Dおよび広報プログラムの戦略的実施を行い、水素経済を推進していくことであった。

**2.3 5 Year Goal**

5ヵ年目標
The HIA embraced three principal goals for the 5 year period 2004-2009:

HIAは2004-2009期の5ヵ年に、3つの基本目標を掲げていた。

- **Advancement of science and technology** via pre-commercial collaborative RD&D programs
  - 商品化前段階協同RD&Dプログラムによる科学技術の前進
- **Assessment of market environment**, including the non-energy sector
  - 非エネルギー部門も含めた市場環境の評価
- **Implementation of outreach program**, aiming at community acceptance and support.
  - 社会の受容と支援を目的とした広報プログラムの実施

### 2.4 Scopes 対象分野

Each goal has specific focus areas called scopes. The scopes are listed below under their goal.

各目標には対象分野と呼ばれる、具体的な分野が特定されている。目標ごとの対象分野を以下に列挙する。

**Advancement of Science and Technology 科学技術の前進**
- Hydrogen Production 水素製造
- Hydrogen Storage 水素貯蔵
- Hydrogen Systems 水素システム

**Assessment of Market Environment 市場環境の評価**
- Codes & Standards 規基準
- Non-Energy Processes 非エネルギー部門
- Infrastructure Options インフラのオプション

**Implementation of Outreach Program 広報プログラムの実施**
- Membership and Participation 加盟と参加
- Information Dissemination 情報普及
- Synchronisation Worldwide 国際社会の同期化

### 3.0 Participation of Countries and Industry 国と業界の参加

#### 3.1 Current Membership 加盟状況

Nearing the end of the 2004-2009 term, membership in the HIA had increased ~60%, from 14 to 22 members. With each new member, the HIA’s capabilities have grown. All members are Contracting Parties (21 countries and the European Commission) as the HIA presently has no sponsors. There were no industrial participants among the Contracting Parties. A list of member countries and their Contracting Parties appears below in Table 1, categorized according to status (government, research institutes and other).

2004-2009期末が近づくにつれ、HIA加盟国数は14から22ヵ国と、60%近くの伸びを見せた。新たな会員が加わることに、HIAの能力も成長した。HIAには現在スポンサーはなく、会員(21カ国および欧州委員会)は全てが委託機関である。委託機関に企業は入っていない。下表1で加盟国とその委託機関を、種類(政府、研究機関その他)別に分類して示す。

<table>
<thead>
<tr>
<th>Table 1: Member Country/ Contracting Party/ Status 表1: 加盟国/委託機関/種類</th>
<th></th>
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<th></th>
</tr>
</thead>
</table>
### Table 2: List of Countries that Joined the HIA 2004-2009

<table>
<thead>
<tr>
<th>COUNTRY 国</th>
<th>CONTRACTING PARTY 委託機関</th>
<th>STATUS 種類</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia オーストラリア</td>
<td>Commonwealth Scientific and Industrial Research Organization (CSIRO)</td>
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<tr>
<td>Canada カナダ</td>
<td>Natural Resources Canada</td>
<td>G</td>
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<tr>
<td>Denmark デンマーク</td>
<td>Danish Energy Authority</td>
<td>G</td>
</tr>
<tr>
<td>European Commission 欧州委員会</td>
<td>European Commission, DG JRC</td>
<td>R</td>
</tr>
<tr>
<td>Finland フィンランド</td>
<td>Energy and Environment National Technology Agency of Finland</td>
<td>G</td>
</tr>
<tr>
<td>France フランス</td>
<td>Commissariat à l’énergie atomique (CEA)</td>
<td>R</td>
</tr>
<tr>
<td>Germany ドイツ</td>
<td>Institut of Energy Research, Forschungszentrum Jülich GmbH Head of Programme Group Systems Analysis and Technology Evaluation (IEF-STE)</td>
<td>R</td>
</tr>
<tr>
<td>Greece ギリシャ</td>
<td>Centre for Renewable Energy Sources CRES &amp; Hydrogen Technologies</td>
<td>R</td>
</tr>
<tr>
<td>Iceland アイスランド</td>
<td>National Energy Authority</td>
<td>G</td>
</tr>
<tr>
<td>Italy イタリア</td>
<td>ENEA IDROCOMB Casaccia Research Center</td>
<td>G</td>
</tr>
<tr>
<td>Japan 日本</td>
<td>The New Energy and Industrial Technology Development Organization (NEDO)</td>
<td>G</td>
</tr>
<tr>
<td>Korea 韓国</td>
<td>Ministry of Commerce, Industry, and Energy (MOCIE)</td>
<td>G</td>
</tr>
<tr>
<td>Lithuania リトアニア</td>
<td>Lithuanian Energy Institute</td>
<td>R</td>
</tr>
<tr>
<td>New Zealand ニュージーニュージー</td>
<td>NZ Business Council for Sustainable Development Inc.</td>
<td>O</td>
</tr>
<tr>
<td>Norway ノルウェー</td>
<td>The Research Council of Norway</td>
<td>G</td>
</tr>
<tr>
<td>Spain スペイン</td>
<td>Instituto Nacional De Técnica Aeroespacial (INTA)</td>
<td>G</td>
</tr>
<tr>
<td>Sweden スウェーデン</td>
<td>Swedish Energy Agency</td>
<td>G</td>
</tr>
<tr>
<td>Switzerland スイス</td>
<td>Swiss Federal Office of Energy</td>
<td>G</td>
</tr>
<tr>
<td>The Netherlands オランダ</td>
<td>Senter Novem</td>
<td>G</td>
</tr>
<tr>
<td>Turkey トルコ</td>
<td>TUBITAK Marmara Research Center Energy Institute</td>
<td>R</td>
</tr>
<tr>
<td>UK 美国</td>
<td>Department of Energy &amp; Climate Change</td>
<td>G</td>
</tr>
<tr>
<td>USA 米国</td>
<td>Department of Energy</td>
<td>G</td>
</tr>
</tbody>
</table>

G: Government 政府 R: Research Institute 研究機関 O: Other その他

Table 2 lists the countries that joined the HIA during this term, along with their year of accession.

表2には今期HIAに加盟した国を、加盟年とともに列記する。

### Table 2: List of Countries that Joined the HIA 2004-2009

<table>
<thead>
<tr>
<th>COUNTRY 国</th>
<th>ACCESSION YEAR 加盟年</th>
</tr>
</thead>
<tbody>
<tr>
<td>France フランス</td>
<td>2004</td>
</tr>
<tr>
<td>Finland フィンランド</td>
<td>2005</td>
</tr>
<tr>
<td>Australia オーストラリア</td>
<td>2005</td>
</tr>
<tr>
<td>Korea 韓国</td>
<td>2005</td>
</tr>
</tbody>
</table>

While Germany and Turkey rejoined the HIA, the other new members were first time HIA participants. Non IEA member country participants were Lithuania and Iceland, which acceded to the Implementing Agreement during the previous 1999-2004 term. There were no withdrawals during the five year period 2004-2009.

ドイツとトルコは再加盟、その他は初のHIA参加である。IEA非加盟国としてリトアニアとアイスランドがあるが、HIAには前期中(1999-2004)に加盟している。2004-2009の5年間に脱退はなかった。

### 3.2 Task Participation by Current Members 現加盟国によるタスク参加

Table 3 introduces the tasks active during the 2004-2009 term by number and name.

表3では2004-2009期に活動したタスクの番号と名称を紹介する。

<table>
<thead>
<tr>
<th>TASK #</th>
<th>タスク番号</th>
<th>TASK NAME タスク名</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Photo-biological production of H₂ 光生物学的水素製造</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>H₂ from Carbon-Containing Materials 炭素含有物からの水素製造</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Solid &amp; Liquid State H₂ Storage Materials 固相および液相の水素貯蔵</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Integrated Systems Evaluation 統合システム評価</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Hydrogen Safety 水素安全性</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>H₂ from Waterphotolysis 水の光分解による水素製造</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>BioHydrogen バイオ水素</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Fundamental and Applied Hydrogen Storage Materials Development 基礎的及び工学的水素貯蔵材料開発</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Small-Scale Reformers for On-Site Hydrogen Supply (SSR for Hydrogen) オンサイト水素供給用小型改質器(水素SSR)</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Wind Energy and Hydrogen Integration 風力エネルギーと水素の統合化</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>High Temperature Production of Hydrogen 水素の高温製造</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Advanced materials for Waterphotolysis 水の光分解のための先進材料</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Near-Term Market Routes to H₂ by Co-utilisation of Biomass as a Renewable Energy Source with Fossil Fuels 再生可能エネルギーとしてのバイオマスと化石燃料の併用による短期的な水素市場ルート</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 shows task participation by current members. It includes the total number of members who participate in each task and the total number of tasks each member participates in.

表4には現加盟国によるタスク参加状況を示す。各タスクにおける参加者数合計と各メンバーが参加したタスクの合計数も記載した。

### Table 4: HIA Task Participation by HIA Members HIA加盟国のHIAタスク参加状況
3.3 Industry Participation 業界参加
The role of industry in the HIA has grown during the 2004-2009 term and promises to be of increasing importance to the Agreement in the future. Presently, there are no industry sponsors in the Implementing Agreement.

HIAにおける業界の役割は2004-2009期に成長し、将来もさらに重要性を増すことは確実である。現在HIAには業界スポンサーはない。

The Executive Committee includes two individuals from industry, one from the Danish Gas Technology Institute and the other from Solid Energy of New Zealand Ltd., who serve on behalf of their Contracting Parties.

執行委員会には業界から2名が参加しており、うち1名はDanish Gas Technology Institute、もう1名はニュージーランドのSolid Energy of New Zealand社からであり、加盟国委託機関の代表者として執行委員を務めている。

Significant industry participation has occurred in the tasks. For example, Hydro, formerly Norsk Hydro, served as Operating Agent for completed Task 16. The Operating Agents for Tasks 17, 18 and 19, and a Co-Operating Agent for 27 are with private sector consulting firms. Industry presence is strongest in the area of expert participation, most notable in Tasks 16 and Task 23. Task 16 expert participation consisted largely of industry, as is almost entirely the case with Task 23, one of its successor tasks. Industry is also well represented in Task 18 and Task 24.
タスクにおいては、業界からの参加が大きかった。例えばHydro(前Norsk Hydro)は、完了したタスク16で幹事を務めていた。タスク17、18、19の幹事とタスク27の共同幹事は民間のコンサルティング企業である。業界の存在は専門家の参加分野、とりわけタスク16と23で顕著だった。タスク16に参加した専門委員は大半が業界からであり、その後継タスクの1つであるタスク23に至っては、ほぼ全員が業界出身である。タスク18および24でも業界が活躍した。

Table 5: Industry Participation in HIA Tasks 表5: HIAタスクへの業界参加

<table>
<thead>
<tr>
<th>Companies 企業名</th>
<th>15</th>
<th>16</th>
<th>17*</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
<th>25</th>
<th>26</th>
<th>27</th>
</tr>
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<tbody>
<tr>
<td>Air Liquide</td>
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<td>ALPHEA</td>
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<tr>
<td>BP-Amoco</td>
<td>USA</td>
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<td>BP</td>
<td>UK</td>
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<td>SWE</td>
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<td>Chevron Texaco</td>
<td>USA</td>
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<tr>
<td>Danish Gas Tech</td>
<td>USA</td>
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<tr>
<td>Directed Technologies Inc</td>
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<td>DNV</td>
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3.4 Potential for Increased Participation さらなる参加の可能性

3.4.1 Near-term Candidates for HIA Accession 直近のHIA加盟候補国

Both the Russian Federation and Brazil, IPHE members, have formally expressed interest in joining HIA by signing official Letters of Intent (LOI) to this effect. These LOIs were executed under the framework of an HIA Memorandum of Understanding (MOU) between the HIA and the International Partnership for a Hydrogen Economy (IPHE.)

ロシア連邦およびブラジルは両国ともIPHEメンバー国であり、正式なレター・オブ・インテント(LOI)に署名してHIA加盟への関心を公表している。これらLOIはHIAと水素経済のための国際パートナーシップ(IPHE)間のHIA覚書(MOU)枠組の下で作成されたものである。

In the near future, the United Nations Industrial Development Organization (UNIDO) is expected to become the first international organization to join the HIA. UNIDO’s accession to the HIA will be a watershed event for the IEA as it will mark the first time a UN organization has joined an IEA implementing agreement.

近い将来、国連工業開発機関(UNIDO)がHIAに加盟する初の国際組織となることが期待されている。UNIDOのHIA加盟は、IEAの実施協定への国連組織の初参加となることから、IEAにとっては画期的な出来事となるだろう。

3.4.2 Qualified Prospective Participants 適格な参加有望国

Austria hosted the second quarter 2004 Executive Committee meeting as a first step in exploring HIA membership. Although Austria did not then follow through on accession it has been closely involved in definition of the new HIA Task 27 - Near-Market Routes to Hydrogen by Coutilisation of Biomass as a Renewable Energy Source with Fossil Fuels. Austria also has an active interest in hydrogen storage and photoelectrolytic production of hydrogen. Similarly, Portugal has closely followed HIA Task 27 and Task 21 - BioHydrogen, to the extent that one of its research institutes sponsored a Task 21 meeting in 2008. Portugal is also interested in Task 26, Advanced Materials for Waterphotolysis. Portugal has received HIA invitations to Executive Meetings but has not yet been able to attend.

biohydrogen, has not yet accepted an invitation to attend an Executive Committee meeting. Belgium attended an Executive Committee meeting but did not follow through on membership in view of its current R,D&D priorities.

オーストリアはHIA加盟の可能性を探る第一歩として、2004年第2四半期執行委員会会議の開催国となった。その後加盟には踏み切らなかったものの、HIAの新規タスク27「再生可能エネルギーとしてのバイオマスと化石燃料の併用による短期的な水素市場ルート」の定義に密接に関与している。オーストリアはまた、水素貯蔵および光電気分解による水素製造にも積極的な関心を示している。同様にポルトガルもHIAのタスク27とタスク21「バイオ水素」の動きを注視しており、ある研究所は2008年のタスク21会議のひとつでスポンサーとなったほどである。ポルトガルはさらにタスク26「水の光分解のための先進材料」にも関心を寄せている。同国はHIAから執行委員会出席の招請を受けているが、参加は未だ実現していない。バイオ水素の知見に高い評価のあるハンガリーも、執行委員会への出席招請に応じるように至っていない。ベルギーは執行委員会会議に一度参加したが、同国の現在のRD&Dの優先度に鑑み、加盟には至らなかった。

Singapore, a non-IEA member country that hosted the fourth quarter 2005 Executive Committee meeting, has not yet acted on its invitation to join the HIA. However, Singapore remains very interested in Task 21, BioHydrogen.

2005年第4四半期の執行委員会会議の開催国であったシンガポールはIEAに加盟しておらず、HIA加盟の呼びかけに対し未だ行動を起こしていない。しかしタスク21「バイオ水素」には依然として大きな関心を抱いている。

Poland, an IEA member country, is interested in Task 26, Advanced Materials for Waterphotolysis as is Israel, a non-IEA member country. Poland will be invited to participate in an Executive Committee meeting pending contact with appropriate officials. Although it has as yet been unable to attend, Israel has been invited to participate in an Executive Committee meeting. Argentina, a non-IEA member country, has expressed interest in Task 24 and will be invited to a future Executive Committee meeting.

IEA加盟国であるポーランドは、IEA非加盟のイスラエルと同様にタスク26「水の光分解のための先進材料」に関心を抱いている。適当な行政官と連絡が取れれば、ポーランドは執行委員会会議への参加に招聘されることになる。イスラエルは執行委員会会議参加に招かれているが、出席は未だ実現していない。非IEA国のアルゼンチンはタスク24への関心を表明しており、将来は執行委員会会議に招かれることがなる。

Taiwan has participated as an observer at HIA Executive Committee meetings. Further action toward accession is not possible at this time.

台湾はHIA執行委員会会議にオブザーバとして参加した。加盟に向けた行動は現時点では不可能という。

3.4.3 Potential IPHE and G8 Plus Five Participants  IPHE国とG8+G5による参加の可能性
In addition to the Russian Federation and Brazil, IPHE members that have already declared their intent to join the HIA through the IPHE MOU mechanism, the People’s Republic of China and India are also IPHE members. People’s Republic of China and India are likewise G8 “+ 5” member countries, and therefore prime targets of the NEET initiative. Extremely interested in HIA Task 25, High Temperature Production of Hydrogen, the Oil and Natural Gas Corporation Limited (ONGC) India has expressed a strong interest in India’s accession to the HIA. By ONGC request, a special dossier on the HIA has been prepared for Indian authorities. India has also been invited as an observer at Executive Committee meetings, but has thus far been unable to attend. In the case of the
People’s Republic of China, the HIA participated in the NEET China workshop.

IPHE加盟国であり、すでにIPHE覚書方式に従ってHIA加盟の意志を表明しているロシア連邦とブラジルのほかに、中華人民共和国とインドもIPHE加盟国である。中華人民共和国とインドは同様にG8+G5のメンバーであり、それゆえにNEETイニシアチブにとっては積極的に勧誘したいところである。インド石油天然ガス公社（ONGC）はHIAタスク25「水素の高温製造」に著しく興味を示しており、インドのHIA加盟に強い関心を表明している。ONGCの要請により、インド当局のためにHIAに関する詳細な報告書がまとめられている。インドは執行委員会に会議のオブザーバとしても招かれたが、現時点では出席に至っていない。中華人民共和国については、HIAはNEETの中国ワークショップに参加している。

Two pathways to HIA membership are possible for China and India. As IPHE members, they can accede through the MOU mechanism. Alternatively, they can accede through the regular process.

中国およびインドにはHIA加盟するための2つの道がある。IPHE国として、覚書方式で加盟することも、通常の手続きによって加盟することもできる。

The HIA also had the opportunity to participate in a NEET workshop for South Africa, another Gleneagles “+ 5” nation. The HIA has extended invitations for South Africa to attend an HIA Executive Committee meeting. While interested, South Africa has not yet been able to attend. Mexico, another Gleneagles “+5” nation, is interested in hydrogen and several of the HIA activities. However, it is unable to pursue membership at this time due to funding priorities.

HIAはさらに、もうひとつのグレンイーグルズサミットG5である南アフリカのために開かれたNEETワークショップに参加する機会を得た。HIAは南アにHIA執行委員会会議への参加を呼びかけたが、南アは興味は持っているものの、出席は未だ実現していない。同様にグレンイーグルズG5のメキシコは水素と複数のHIA活動に関心を持っているが、資金配分の優先順位の問題から、現時点では加盟に動くことはできない。

3.4.4 Sponsorship Possibilities スポンサーシップ
The HIA will consider the possibility of sponsors, most likely industry, during the 2009-2015 term.

HIAは2009–2015期にスポンサーの可能性を検討する。業界に働きかける可能性が高い。

4.0 The Work Program 作業プログラム

4.1 Introduction 序
The HIA addresses many innovative, short and long-term pre-commercial R,D&D issues related to hydrogen production, storage, safety, codes & standards, integrated systems, analysis, economics and markets. Collaborative R,D&D, near and long-term, is in fact the HIA’s core business, one whose history dates to the 1977 formation of the Agreement. During this term, there has also been increasing emphasis on analysis of near and mid-term applications, as well as systems and infrastructure issues related to technology development and deployment. There has been an increasing focus on outreach as well. But the major focus of the HIA’s R,D&D continued to be production and storage.

HIAは水素の製造、貯蔵、安全性、規基準、統合システム、分析、経済および市場に関連した、数多くの革新的な短中期の商品化前RD&Dに取り組んでいる。短期および長期の協同RD&DこそまでしくHIAの中枢事業であり、その歴史は1977年の本協定の設立にまで遡る。今期は短期および中期的なアプリ
ケーションの分析と、技術開発および実施に関連するシステムとインフラに対し、一層の重点が置かれるようになった。また広報活動もさらに強化されている。しかしHIAのRD&Dの最大の主眼が製造と貯蔵であることに変わりはない。

4.1.1 Production and Storage 製造と貯蔵
In 2004, as discussed in Section 1.5, the HIA undertook a thorough and in-depth examination of near, mid and long-term gaps and priorities in hydrogen production and storage, the two key R&D challenges to widespread, large scale use of hydrogen technologies. On-board storage in vehicles is, in particular, a major hurdle to introduction of hydrogen powered vehicles to the global mass market. The HIA’s gap analysis ultimately resulted in publication of Hydrogen Production and Storage: R&D Priorities and Gaps, which the HIA utilized to guide development of its production and storage tasks for the balance of the current term and the upcoming 2009-2015 term. Given the diversity of production options, the HIA began to classify production approaches into high temperature and low temperature midway through the current term in order to facilitate development of production activities.

1.5で述べた通り、HIAは2004年に水素技術の広範かつ大規模な利用のためのR&Dにおける2大課題である水素製造および貯蔵に関し、短期、中期および長期的なギャップと優先度について徹底的な評価を行った。特に車載貯蔵こそ、世界の市場に水素自動車を導入する上での一大障壁である。HIAのギャップ分析は最終的に「Hydrogen Production and Storage: R&D Priorities and Gaps」として発表され、HIAはこれを今期の残存期間と来るべき2009–2015期において製造貯蔵関連タスクを進める上での指針として活用した。HIAは製造オプションの多様性に鑑み、製造事業の開発を促進するため、今期半ばになって製造方法を高温製造と低温製造に区分することにした。

4.1.2 Systems システム
The integration of production, storage and end-use components optimized for cost savings and energy efficiency is requisite to deployment and market penetration of hydrogen energy systems. Detailed life cycle assessments, component models and system models provide the platform for standardized comparison of application specific energy systems.

水素製造、貯蔵、それにコスト節減およびエネルギー効率のために最適化された製品のインテグレーションが、水素エネルギーシステムの実施と市場普及において不可欠である。詳細に渡るライフサイクル評価、コンポーネントモデルとシステムモデルによって、エネルギーシステムを標準的に比較するための基盤をアプリケーション別に提供する。

4.1.3 Outreach and Analysis 広報と分析
The Outreach strategy, a new HIA initiative, was key to membership recruiting, information dissemination and coordination of hydrogen related R&D efforts worldwide. As the outreach strategy began to succeed, the HIA’s concern with analysis intensified. In order to influence policy and investment decisions in R&D and infrastructure, the HIA had to be able to reach stakeholders and decision makers with information that increased their knowledge of and comfort with hydrogen. This resulted in creation of an Analysis Group in late 2007.

HIAの新イニシアチブである広報戦略は、加盟団募集や情報発信、さらに世界中の水素連R&D活動の調整のうえでカギであった。広報戦略が成果を見せ始めるにつれ、HIAは分析に大きな関心を寄せていった。R&Dやインフラに関する政策および投資の決定に影響を及ぼすには、HIAは関係者や意志決定者に対し、水素に対する知識と信頼感を高める情報を提供する必要があったからである。そこから2007年下期になって「分析グループ」Analysis Groupが生まれることになった。

4.1.4 Safety  安全性
The scopes of the market environment goal were: Codes & Standards, Non-Energy Processes and Infrastructure Options. However, as the Executive Committee’s focus gravitated toward analysis of strategic importance, safety emerged as a dominant theme.  Hydrogen safety is recognized as a critical issue that cross cuts all R&D, infrastructure and market considerations.

市場環境関連タスクの対象分野には、規基準、非エネルギー部門、インフラオプションがあった。しかし戦略的重要性の分析に執行委員会の焦点が傾いたことから、安全性が最大テーマとして浮上してきた。水素安全性は、R&D、インフラ、市場性などすべてに共通する必須事項であると認識されている。

4.2 The HIA Portfolio and its Tasks HIAのポートフォリオとタスク
Over the course of its lifetime, the HIA has created a broad portfolio of twenty-seven (27) tasks.  Nine of these tasks, 33% of the entire HIA portfolio, were approved during this five year term. While the HIA EOT Report for 1999-2004 considered activities and progress in six tasks (Tasks 13-18), the EOT Report for 2004-2009 reviews progress and activities in thirteen tasks (Tasks 1527), as well as one task that is in definition.  This is more than double the activity level reported in the previous EOT. Four of these tasks have been completed; nine are current and one is in definition. As measured in number of tasks, the actual size of the HIA’s 2004-2009 portfolio (13 tasks) exceeds the number of tasks (8) targeted in the 2004-2009 Strategic Plan by some 40%.


See Table 6 below for the status of tasks active during the 2004-2009 term:
2004-2009期に活動したタスクの現況は下表6の通り。

Table 6: Status of Tasks Active during 2004-2009 Term 表6: 2004-2009期に活動したタスクの現況

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<td>15</td>
<td>Photo-biological production of H₂ 光生物学的水素製造</td>
<td>1999-2004</td>
<td>Completed 完了</td>
</tr>
<tr>
<td>16</td>
<td>H₂ from Carbon-Containing Materials 炭素含有物からの水素製造</td>
<td>2002-2006</td>
<td>Completed 完了</td>
</tr>
<tr>
<td>17</td>
<td>Solid &amp; Liquid State H₂ Storage Materials 固相および液相の水素貯蔵</td>
<td>2001-2006</td>
<td>Completed 完了</td>
</tr>
<tr>
<td>18</td>
<td>Integrated Systems Evaluation 統合システム評価</td>
<td>2004-2009</td>
<td>Continuing 進行中</td>
</tr>
<tr>
<td>19</td>
<td>Hydrogen Safety 水素安全性</td>
<td>2004+</td>
<td>Continuing 進行中</td>
</tr>
<tr>
<td>20</td>
<td>H₂ from Waterphotolysis 水の光分解による水素製造</td>
<td>2005+</td>
<td>Completed 完了</td>
</tr>
<tr>
<td>21</td>
<td>BioHydrogen バイオ水素</td>
<td>2005</td>
<td>Continuing 進行中</td>
</tr>
<tr>
<td>22</td>
<td>Fundamental &amp; Applied H₂ Storage Materials Development 基礎的および工学的水素貯蔵材料開発</td>
<td>2006-2009</td>
<td>Continuing 進行中</td>
</tr>
</tbody>
</table>
Among the four tasks completed in 2004-2009, it is significant that all generated successor tasks. One task, Task 16, actually produced two successor tasks. See Table 7 for the list of Successor tasks.

The table below depicts the organization of the HIA portfolio by strategic goal and scope of work. A discussion of each task follows, ordered by its position in the strategic framework. Major Achievements and Success Stories for all tasks may be found in Table 14.

Table 7: Task Succession 表7: 後継タスク

<table>
<thead>
<tr>
<th>Predecessor Task #</th>
<th>Predecessor Task Name</th>
<th>Successor Task(s) #</th>
<th>Successor Task(s) Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 15</td>
<td>Photo-biological production of H₂ 光生物学的水素製造</td>
<td>Task 20</td>
<td>H₂ from Waterphotolysis 水の光分解による水素製造</td>
</tr>
<tr>
<td>Task 20</td>
<td>H₂ from Waterphotolysis 水の光分解による水素製造</td>
<td>Task 26</td>
<td>Advanced Materials for H₂ from Waterphotolysis 水の光分解による水素製造のための先進材料</td>
</tr>
<tr>
<td>Task 16</td>
<td>H₂ from Carbon-Containing Materials 炭素含有物からの水素製造</td>
<td>Task 23</td>
<td>Small-scale Reformers for On-Site H₂ Supply オンサイト水素供給用小型改質器</td>
</tr>
<tr>
<td>Task 16</td>
<td>H₂ from Carbon-Containing Materials 炭素含有物からの水素製造</td>
<td>Task 27</td>
<td>Near-Market Routes to Hydrogen by Co-utilisation of Biomass as a Renewable Energy Source with Fossil Fuels 再生可能エネルギーとしてのバイオマスと化石燃料の併用による短期的な水素市場ルート</td>
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<tr>
<td>Task 17</td>
<td>Solid &amp; Liquid State H₂ Storage Materials 固相および液相の水素貯蔵</td>
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Table 8: HIA Portfolio by Strategic Goal and Scope of Work 表8: 戦略目標と作業範囲別HIAポートフォリオ

### GOAL

<table>
<thead>
<tr>
<th>Subject</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GOAL</strong></td>
<td><strong>Science &amp; Technology</strong> SCOPES&lt;br&gt;Advancement of Science via Pre-Commercial Collaborative RD&amp;D&lt;br&gt;Market Environment SCOPES&lt;br&gt;Outreach Program SCOPES</td>
</tr>
</tbody>
</table>

### SCOPES

<table>
<thead>
<tr>
<th>TASKS</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Science &amp; Technology</strong></td>
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</tr>
</tbody>
</table>

### 4.2.1 Tasks Related to Science and Technology Goal – Advancement of Science via Pre-Commercial Collaborative RD&D Science技術関連タスク – 商品化前協同RD&Dによる科学の前進

#### 4.2.1.1 Production Tasks 製造関連タスク

**Task 15 Photobiological Production of Hydrogen** (completed) 光生物学的水素製造(完了)

Task 15, originally planned as a five year effort, was approved in 1999 and concluded in 2004. The overall objective of Task 15 was to advance the basic and early-stage applied science in biophotolysis, i.e., the biological production of hydrogen from water and sunlight using microalgal photosynthesis. The main objective was to develop hydrogen production by microalgae (both green algae and cyanobacteria) emphasizing early-stage applied research on biophotolysis processes with intermediate CO₂ fixation. The work in Task 15 was divided into four subtasks: Subtask A Light-driven Hydrogen Production by Microalgae; Subtask B Maximizing Photosynthetic Efficiencies; Subtask C Hydrogen Fermentations; Subtask D Improved Photobioreactor Systems for Hydrogen Production. The Task 15 Final Report may be found on the HIA website at [http://www.ieahia.org/page.php?s=d&p=documents&t=task&id=15](http://www.ieahia.org/page.php?s=d&p=documents&t=task&id=15).


**Task 16 – Hydrogen from Carbon-Containing Materials** (completed) 炭素含有物からの水素製造 (完了)

Task 16 officially began in 2002 and concluded in 2006. Its overall objective was to promote the development of economically viable and environmentally acceptable processes for hydrogen production via thermal processing of carbon-containing materials. Task 16 examined hydrogen production from carbon-containing
materials in three subtasks carried out in parallel. Industrial companies dominated the participation in Subtask A and C, while R&D companies and institutes were participation more represented in Subtask B (Figure 2). The 22 industry participants included major companies as well as medium and small enterprises (SMEs), mostly from IEA countries.

Subtask A Large-scale Integrated Hydrogen Production with Precombustion Decarbonization. This task entailed development of a detailed engineering study coordinated by the IEA Greenhouse Gas (GHG) R&D Programme with the support of the CO2 Capture Project (CCP) partners. 10 The CCP is an international effort of the world’s leading energy companies (BP, Chevron, Texaco (now part of Chevron), ENI, Hydro, EnCana, Shell, Statoil Hydro, and Suncor Energy) to develop new low-cost technology options for CO2 capture and storage. In a departure from standard HIA procedure, Jacobs Engineering was hired and paid by the CPP and Klimatek to carry out the cost reduction engineering study entitled Large-Scale Integrated Hydrogen Production for Power Generation/Precombustion Decarbonization.

Subtask B Hydrogen from Biomass Biomass represents a major direct pathway from renewable energy sources to hydrogen that can be implemented on a large scale without major R&D breakthroughs. This subtask performed a complete technology assessment that resulted in a set of summary conclusions and identification of major gaps in technology development, R&D needs and recommendations geared toward an industry audience. The Subtask B Report is called Prospects for Hydrogen from Biomass. Task 27 is the successor to Task 16 Subtask B.

10 The CCP is a project of the IEA Greenhouse Gas R&D Programme, an implementing agreement of the IEA.
Subtask C Small-scale Reformer for Distributed Hydrogen Production

Subtask C performed a comprehensive technology assessment and analysis of market requirements for a small-scale reforming business. A task-shared activity with nine industrial companies, six academic institutes and R&D companies, Subtask C investigated issues associated with reformer suppliers, customer requirements as well as issues such as CO2 handling, other emissions and research linked to interfacing institutes and organizations. The Subtask C Final Report, Small-scale Reformers for Stationary Hydrogen with Minimum CO2 Emissions and final reports for Subtasks A and B may be found at http://www.ieahia.org/page.php?s=d&p=documents&t=task&id=16. Task 23, Small-Scale Reformer Technology, is the successor to Task 16 Subtask C.

Task 20 Hydrogen from Waterphotolysis (completed) タスク20「水の光分解による水素製造」(完了)

From 2004-2007, HIA Task 20 investigated photoelectrochemical (PEC) watersplitting. PEC cells can decompose water into hydrogen and oxygen upon solar illumination. PEC cells employ photoelectrodes that are immersed in an aqueous electrolyte or directly into water (sea water included). Photon conversion efficiency and durability are considered the main measures of Task 20 success. Task 20 succeeded Task 14. Key objectives included:

- Advancement of photoelectrode materials science, especially as to low-cost materials and corrosion challenges 特に低コスト材料や耐食性に関連した、光電極材料科学の前進
- Development of engineering challenges with a focus on thin-film deposition as well as powder techniques and system integration 薄膜蒸着やパウダー技術およびシステム統合を主眼とするエンジニアリング
- Demonstration of the leading concepts 先端概念実証

Task 21 BioHydrogen (continuing) タスク21バイオ水素 (進行中)

The BioHydrogen task, approved in 2005 for three years, is the successor to Task 15, Photobiological Production of Hydrogen. Task 21 recently received a two year extension, as foreseen in the original work plan. Over the course of this task, global interest in biohydrogen has grown. Task 21 is carrying out collaborative research activities in the biological production of hydrogen using bacterial dark fermentation, photosynthetic microbes, and in-vitro or bio-inspired systems. The overall objective is not only to advance the basic and applied science but also to evaluate biohydrogen from the perspectives of economics and social acceptance. The first three subtasks are R,D&D related while the fourth is analytical. Task 21 includes industrial participation.
Subtask A: BioHydrogen Systems. Subtask A is focusing on:

サブタスクA：バイオ水素システム サブタスクAは以下を主眼とする。

- Metabolism, genetics, and thermodynamics of H₂ producing bacteria to identify critical genes, pathways, and regulatory components for high yield H₂ production 水素産生菌の代謝、遺伝学、熟力学を研究し、水素生産能力を高めるために重要な遺伝子、経路、制御因子の同定
- Genetic and physiological interventions to maximize H₂ production – identification of bacteria and conditions that allow for high H₂ production rates 水素産生を最大化するための遺伝的および生理学的介人。水素産生能力が高い微生物と条件の同定
- Fermentations that produce H₂ from organic substrates under high yield conditions 有機基材から水素を高い歩留まりで産生する発酵

Subtask B: Basic Studies for BioHydrogen Production. To demonstrate potentially practical processes for the conversion of water or organic substrates to H₂ using solar energy. Subtask B is focusing on:

サブタスクB: 生物学的水素製造基礎研究 太陽光エネルギーによって水性基材や有機基材を水素に転換する、実用化の可能性のあるプロセスを実証する。サブタスクBは以下を焦点とする。

- Genetics and metabolism of H₂ production in photosynthetic microbes (Green algae and cyanobacteria are key areas of investigation) 光合成微生物による水素製造における遺伝子と代謝(主な研究対象は緑藻と藍藻)
- Physiology and cultivation of photosynthetic microbes to maximize H₂ production from water or organic wastes 水や有機廃棄物からの水素製造を最大化するための光合成微生物の生理研究と培養
- Overcoming limiting factors of photosynthesis 光合成の制約因子の克服

Subtask C: Bio-Inspired Systems. Subtask C is focusing on:

サブタスクC: 擬似生体組織 サブタスクCは次を主眼とする。

- Enzyme systems for hydrogen production 水素製造のための酵素系
- Bio-inspired systems or hydrogen production 擬似生体組織もしくは[orではなくfor(のための)では]水素製造
- Biological fuel cells coupling enzymes and even whole organisms to electrodes 生物学的燃料電池 - 酵素および場合によっては生物体全体を電極に接続

Subtask D: Overall Analysis. This analysis focuses on: 1) the effects of biohydrogen on societal systems and human life; 2) analysis of critical factors and risks to economic and social conditions necessary to implement biohydrogen in the future.
サブタスクD: 総合分析 本分析は次を主眼とする。1)社会制度と生活に対するバイオ水素の影響 2)将来においてバイオ水素を導入するために必要となる経済社会条件の主要素とリスク

Task 23 Small Scale Reformers for On-Site Hydrogen Supply (continuing) タスク23: オンサイト水素供給用小型改質器 (進行中)
Task 23 succeeds Task 16, Subtask C – Reformer Technology.  Approved in 2007 for three years, Task 23’s main objective is to provide a basis for harmonization of the technology for on-site hydrogen production from hydrocarbons – fossil and renewable biomass. On conclusion of its initial term, it is anticipated that Task 23 will seek an approximately one year extension. Task 23 is expected to directly enable development of hydrogen refueling infrastructure development and promote introduction of on-site hydrogen reformers. This task consists almost entirely of industry participants. Industry participation in Task 23 is expected to accelerate the process of market introduction and penetration of small-scale reformers for on-site hydrogen supply. Two subtasks focus on information exchange among members according to the agreed-upon work program, while the third subtask consists of market studies.

タスク23はタスク16サブタスクC「改質器技術」の後継タスクであり、2007年に期間を3年間として承認された。タスク23の主な目的は化石燃料や再生可能なバイオマスなどの炭化水素を使ったオンサイト水素製造技術を調和化させるための基礎を提供することである。第1期の満了時には、1年間の延長が求められるものと見られている。タスク23は水素燃料補給インフラの開発に直接貢献し、[Developmentが重なっている]、オンサイト水素改質器の導入を促進していくと期待されている。タスクメンバーはほとんど全員が業界からであり、こうした業界参加によって、オンサイト水素供給用小型改質器の市場導入と普及が加速される。サブタスクのうち2つは合意された作業プログラムに従ってメンバー間の情報交換に注力しており、第3のサブタスクは市場性調査を行なっている。

Subtask 1: Harmonized Industrialization.  Develop an understanding about a harmonized approach to reformer capacity that will facilitate industrialization and cost reduction.

サブタスク1: 工業化における調和 [タイトルはNEDOに倣っています] 工業化とコスト削減につながる改質能力構築に向けた取組みの調和化に関する理解を築く。

Subtask 2: Sustainability and Renewable Sources.  Facilitate on-site hydrogen production based on small-scale reformer technology. The approach entails development of systems for fuel diversification and use of renewable sources. Nine feedstocks are under consideration, among them: biogas, ethanol, bio-diesel, dimethylether, glycerin, ammonia and sugars. Other topics of investigation are emissions and their handling.

サブタスク2: 持続可能性と再生可能原料 小型改質器技術に立脚したオンサイト水素製造を促進する。燃料多様化と再生可能な原料の利用のためのシステム開発に取り組む。現在9原料が検討されており、バイオガス、エタノール、バイオディーゼル、ジメチルエーテル、グリセリン、アンモニア、糖などがその例である。研究テーマとして別に、温室効果ガス排出とそのハンドリングがある。

Subtask 3: Market Studies.  Facilitate market development by preparation of market studies and dissemination of results. The market studies will compare Japanese, North American and Northern European markets.

サブタスク3: 市場性調査 市場調査を行い、結果を発信することで市場開発を促進する。市場性調査では日本、北米および北欧市場を比較する。

Task 24 Wind Energy and Hydrogen Integration (continuing) タスク24: 風力エネルギーと水素の統合
Task 24 was approved in 2006 with a four year term of operation. It is expected to contribute directly to hydrogen supply through mid-term R&D featuring shared activities and information exchange associated with the entire wind to hydrogen production chain. The task objectives are: 1) to explore in detail all possible issues (technical, economic, social, environmental, market and legal) related to hydrogen production using electrolysis with wind energy; and 2) to explore in detail possible applications for this hydrogen, with special emphasis on wind and hydrogen integration by means of hydrogen storage and electrical conversation that balances the original wind energy production. Task 24 has four subtasks:

Subtask A: State of the Art. Subtask A is conducting an in-depth review of the current state of the art in wind turbines, electrolysers, and intermediate equipment, as well as a survey of market and electrical system regulation.

Subtask B: Improvements Needed & System Integration Technology Development on Main Equipment and System Integration Concepts. This subtask is developing specifications for two main components for hydrogen production, the wind turbine and the electrolyzer as well as the intermediate components (including power electronics and control or system integration equipment).

Subtask C: Business Concept Development. Subtask C will include an economic assessment and forecast of market potential with a detailed hydrogen production cost study of different concepts within representative markets.

Subtask D: Applications, Emphasis on Wind Energy Management. This subtask will consider near-term applications for wind-generated hydrogen with a special focus on one of the main applications specified in Subtask C, wind energy management within the wind and hydrogen full integration concept. An analysis similar to those undertaken in tasks A to C will be performed for relevant components not previously taken into account. These components include hydrogen to electricity converters such as fuel cells, internal combustion engines and gas turbines.
Task 25 High Temperature Production of Hydrogen (continuing) タスク25: 水素の高温製造 (進行中)

https://www-prodh2-task25.cea.fr/

Task 25 was approved in 2007 for a three year term of operation. The purpose of Task 25 is to support production of massive quantities of zero-emission H₂ through use of high temperature processes (> 500°C) coupled with nuclear and/or solar heat sources. Task 25 research focuses on three process families: steam electrolysis; thermochemical cycles (including pure and hybrid thermochemical processes); and innovative direct water splitting. The overarching objective is to share existing worldwide knowledge on high temperature processes (HTPs) and to develop expertise in global assessment of the HTPs that can be integrated in Hydrogen Production Road Mapping. The specific objectives appear below followed by a subtask list with descriptions:

- To identify and classify HTPs and establish different and coherent criteria for each family of HTPs identified, based on a scientific/technological approach. HTPを同定および分類し、同定された各HTP群別に、科学的/技術的観点から個別かつ一貫性のある基準を確立する。
- To establish the state of the art and investigation of the existing knowledge, programs, projects on HTPs and other innovative ideas for massive production of hydrogen. 水素大量製造のためのHTP、その他革新的なアイデアに関する既存の知見、プログラム、事業など、最先端技術と研究をまとめること。

Subtask A: Scientific, Technological Review and Analysis of Temperature Processes and State of the Art. Develop summary sheets for each process using the same evaluation method presentation format.

サブタスクA: 高温プロセスと先端技術の科学技術的評価および分析。同一の評価方法と同一の表示形式を用いて各方式のサマリーシートを作成する。

Subtask B: Development of a Methodology Approach and Integration of HTPs. Define the main criteria for integration of HTPs into the hydrogen chain, including the interface and primary energy source.

サブタスクB: HTP方法論の開発と統合。一次エネルギー源とのインタフェースなど、HTPの水素チェーン統合における主要条件を定義する。

Subtask C: Establishment of Benchmarks, Recommendations for HTP R&D and Future Industrial Deployment. Identify the most promising technologies and recommendations for R&D needs based on the Subtask A review. Develop further studies and recommendations to meet the needs in large future facilities and/or demonstration programs and to facilitate accelerated introduction of HTPs.

サブタスクC: HTP研究開発と将来的な産業化のためのベンチマークと提言の作成。サブタスクAの評価に基づいてR&Dニーズに対して最も有望な技術と提言を同定する。HTP導入の加速化を進めるべく、将来の大型施設や実証プログラムのニーズに応える研究や提言をさらに開発していく。
Subtask D: Coordination and Links with Other International Organizations; Dissemination of Information. Develop and maintain communication and coordination with other projects and groups. It is also facilitating utilization of experimental facilities.

サブタスクD: 他の国際機関との調整と連携; 情報の普及。他のプロジェクトやグループとのコミュニケーションと連携を図り、維持していく。実験施設の[相互]利用も促進する。

Task 26 Advanced Materials for Hydrogen from Waterphotolysis (continuing) タスク26: 水の光分解による水素製造のための先進材料 (進行中)

This task, the successor to Task 20, was approved in 2008 for a three year term to pursue development and optimization of new photoelectrochemical (PEC) material systems that integrate the newest theory, synthesis and characterization techniques. Task 20 strongly recommended an acute focus on advanced materials research to the exclusion of work on PEC devices. Emphasizing intensified international collaboration, that includes the U.S. PEC working group organized by USDOE, the task looks to advance photoelectrode materials science, demonstrate stable and efficient water-splitting, and promote water photolysis through four sub-tasks:

本タスクはタスク20の後継タスクであり、最新の理論、合成および解析技術を取り入れた新たな光電気化学的(PEC)材料によるシステムの開発と最適化を追求するため、2008年に3年を期間として承認された。タスク20はPEC装置に関する作業を排除し、先進材料に専ら注力することを強く推奨した。タスク26は、米国エネルギー省により編成された同国PEC作業班を含めて、国際的協同作業の強化に力を入れ、以下の4タスクを通じて光電極材料科学と光分解の安全性および効率の実証、水の光分解の推進に努力していく。

Subtask A: Materials theory. Calculation of materials electronic structure and properties; modeling of semiconductor-electrolyte junctions

サブタスクA: 材料理論。材料の電荷構造および電気特性の計算、それに半導体・電解質の界面モデリング

Subtask B: Materials Synthesis. Materials discovery via synthesis of enhanced PEC surfaces “traditional” synthesis; advanced materials discovery techniques

サブタスクB: 材料合成。「従来型」合成と強化PEC表面合成による材料の発掘。先進材料発見のための手法。

Subtask C: Materials/Interface Characterizations. Materials characterizations; PEC-interface and in-situ characterizations; standardized PEC-device performance measurements

サブタスクC: 材料/インタフェース特性解析。材料特性解析、PECインタフェースおよびin-situ解析、PEC性能測定の標準化

Subtask D: PEC Information Coordination/Database. Database development; research coordination; database management and promotion

サブタスクD: PEC情報整理/データベース。データベース開発、研究提携調整、データベースの管理と促進

Task 27 Near-Market Routes to Hydrogen by Co-utilisation of Biomass as a Renewable Energy Source with
Fossil Fuels (continuing) タスク27 再生可能エネルギーとしてのバイオマスと化石燃料の併用による短期的な水素市場ルート（進行中）

This task, successor to Task 16 Subtask B, was approved at year end 2008 for a three-year term. In early 2009 this task remained at a start-up stage. Cooperation is planned with the Bioenergy Implementing Agreement whose portfolio does not include hydrogen. The four subtasks and their objectives appear below:

Subtask A: Co-gasification of Biomass with Fossil Fuels. Identify and evaluate the most attractive and realistic process pathways towards a large-scale demonstration of biomass cogasification with fossil fuels.

Subtask B: Hydrogen Market Facilitation – Based on Distributed Processing of Biomass to New Tradable Intermediates. Establish the potential for a renewable-based hydrogen supply chain based on the distributed production of a “biomass carrier,” its commercial transport and use in centralized gasification plants.

Subtask C: Near Term Stand-Alone Biomass Gasification. Evaluate the most attractive ways of utilizing stand-alone biomass gasification technology in near-to-medium-term H2 markets.


This research, information-exchange and analysis task is “task-shared,” as is customary, but includes two Co-Operating Agents, one with the lead on strategy and the other the lead on administration.

4.2.1.2 Storage Tasks 貯蔵タスク

Task 17 Solid and Liquid State Storage (completed) タスク17: 固相および液相の水素貯蔵（完了）
Task 17 was approved in 2001 for a three year term and extended another two years in 2004. It succeeded Task 12. While HIA tasks are typically structured in subtasks, Task 17 consisted of a series of 36 R&D projects led by project leaders from participating countries. The projects and Final Report
were divided into three categories by media: Hydride, Carbon, and combined Hydride + Carbon. There were various categories of projects, including experimental, engineering, theoretical and modeling efforts. The main application of interest was onboard vehicular storage, although stationary storage was also a topic of interest. The three task objectives were:

1) To develop a reversible H\textsubscript{2} storage medium with >5 wt. % H\textsubscript{2} recoverable at <80\textdegree C and 1 bar absolute pressure, with charging and discharging rates suitable for practical use in a fuel cell or internal combustion engine H\textsubscript{2} fueled vehicle.

2) To develop low-cost, reversible hydrogen storage medium that can be rapidly charged and discharged at near-ambient temperatures, is tolerant to impurities in the H\textsubscript{2} used, and discharges hydrogen of ultra high purity for use directly in a PEM fuel cell.

3) To develop the fundamental and engineering understanding of hydrogen storage by advanced storage media that have capability of meeting Targets 1 and 2.

Substantial progress was made towards these objectives. In addition, Task 17 participants contributed substantially to the review of gaps and priorities in storage. The series of hydride databases (http://hydpark.ca.sandia.gov) created under Task 12 were updated as well. At its conclusion, Task 17 recommended continuation of HIA storage research in a new task.

Task 22 Fundamental and Applied H\textsubscript{2} Storage Materials Development (continuing)

Following on Task 17, Task 22 was approved in late 2006 for a three year term. Like Task 17, the successor task is built on projects where international collaboration is strongly encouraged. Task 22 is the world’s largest collaboration in hydrogen storage, even larger than its predecessor. Task 22 is open to the same broad spectrum of project types (experimental, engineering, theoretical and modeling). Material reactivity aspects of hydrogen storage materials are also included on the list, which includes 53 projects, a 50% increase over the size.
of Task 17. All projects have been approved by the task experts. The projects are classified into three categories: Hydride; Nanoporous; and combined Hydride Nanoporous. The following classes of materials are included: reversible metal hydrides; regenerative hydrogen storage materials (chemical hydrides); nanoporous materials; rechargeable organic liquids and solids. The investigations highlight transportation uses but also include stationary applications. Task 22 retains Task 17’s objectives. To meet the challenge of hydrogen storage, particularly for vehicular applications, Task 22 experts share the conviction that new materials and solutions (as opposed to simple, incremental improvements in current technologies) are needed.

Progress to date on this significant international collaboration includes the following: new promising complex hydrides including different boron-based compounds; new results on several physisorption systems, like metal-assisted carbon-material; and new simple methods for synthesis of Mg-based compounds.

4.2.2 Tasks and Activities Related to Market Environment Goal – Assessment of Market Environment, including non-Energy Sector

4.2.2.1 Tasks

Task 18 - Integrated Systems Evaluation (continuing) タスク18: 統合システム評価（進行中）

Task 18 was approved for a 2004 start and a three year term. Initially, Task 18 had two subtasks: Subtask A Information Base Development; and Subtask B Demonstration Project Evaluation. It was then extended another two years through December 2009. The second phase includes a third subtask, Synthesis and Learning. The overall goal of Task 18 is to provide information about hydrogen integration into society around the world. The final reports from Phase I of Subtask A and Subtask B, as well as the Gillie/Platt Survey of Support Mechanisms for the Development and Demonstration of Hydrogen Systems, have been published and posted on the Task 18 website and the IEA HIA website.

The subtasks are described below:

タスク18は2004年を初年度に期間を3年として承認された。当初は2サブタスク、すなわちサブタスクAとサブタスクBで構成されており、その後2年間延長された。第2のフェーズにはサブタスクC:合成と学習が追加された。タスク18の総合的な目標は、水素燃料の社会へのインテグレーションに関する情報を提供することである。第1フェーズの最終報告書として、サブタスクAとサブタスクBの報告書、およびギリィ/プラットの支援制度調査「水素システムの開発と実証に関する支援制度」が発表されて、ウェブサイトに掲載されている。

A「情報データベースの構築」およびサブタスクB「実証プロジェクトの評価」を有していた。その後2009年12月まで2年間延長され、第2期には第3のサブタスクである「総括と学習」が加わった。タスク18の全体的目標は水素インテグレーションに関する情報を世界中に提供することがある。サブタスクAおよびBの第1期の最終報告、さらにGillie/Platt「Survey of Support Mechanisms for the Development and Demonstration of Hydrogen Systems」が発表されており、タスク18とIEA HIAウェブサイトに掲載されている。サブタスクの内容を以下に記載する。

Subtask A: Information Base Development. Provides data and analysis to the hydrogen community and the public in the form of inventory databases and compiled summaries

サブタスクA: 情報データベースの構築。インベントリデータベースやサマリーシートの集積などの形で水素関係者や一般市民にデータと分析を提供する。

Subtask B: System Studies – Demonstration Project Evaluation for the Future. Employs modeling and analysis tools: 1) to evaluate hydrogen demonstration projects; 2) to guide their design; 3) and to validate models and assumptions. The project portfolio consists of 16 projects in which hydrogen is produced either from renewables or fossil fuel (natural gas) and is used either in an electric power production application (grid), a transportation fuel application or a combination thereof. There have also been an infrastructure demonstration and a residential heat and power evaluation. Subtask B also includes six descriptive case studies.

サブタスクB: システム研究 - 将来向け実証プロジェクトの評価。モデリングおよび分析ツールを用いた1)水素実証プロジェクトの評価 2)実証事業立案の指針の提供 3)モデルと前提条件の検証を目的とする。対象としたのは16プロジェクトで、水素は再生可能燃料もしくは化石燃料(天然ガス)から生産され、発電(系統)、輸送燃料、その組み合わせのいずれかに使用されている。またインフラの実証と住宅用熱電併給の評価も行ってきた。サブタスクBにはまた、6つの記述的事例研究も含まれている。

Subtask C: Synthesis and Learning. Bridging the other two subtasks, Subtask C is developing products that disseminate the learning from spectrum of Task 18 activities. Nine new case studies are being developed under this task.

サブタスクC: 総括と学習。サブタスクCは他の2サブタスクのかけ橋であり、サブタスク18の活動から学んだものを普及させるための資料を作成する。本タスクの下で新規事例研究9件が進行中である。

Task 19 -Safety (continuing) タスク19: 安全性 (進行中)
http://www.ieahydrogensafety.com
This cross-cutting task, which lays the foundation for codes and standards and the accelerated adoption of hydrogen systems, was approved in 2004 for three years and then extended an additional three years. Its goal, through task-sharing and information exchange, is to survey and analyze effective risk management techniques, testing methodologies, and test data; and to develop targeted information products that will facilitate market introduction and penetration. Task 19 has four subtasks, each with multiple subtasks, which are briefly described below:

本タスクは全分野に渡るもので、規基準と水素導入の迅速化のための基礎を築くものとして2004年に期間3年として承認され、その後さらに3年間延長された。タスクの共有と情報交換を通じ、効果的なリスク管理手法や試験方法論、試験データを調査分析すること、市場への導入普及を促進する情報を絞り込んで開発することを目標とする。タスク19には4サブタスクがあり、それぞれが複数のサブタスクを有す。以下に概要を述べる。
Subtask A: Risk Management. Addresses quantitative risk analysis (QRA) and development of testing methodologies around which collaborative testing programs can be conducted.

サブタスクA: リスク管理。定量性リスク評価(QRA)と協同試験プログラムの実施が可能となる試験方法論の開発に取り組んでいる。

Activity A1: Survey of existing risk assessment methodologies for relevant case studies. Develop uniform risk acceptance criteria and link with risk-informed codes and standards

活動A1: 関連する事例研究について現行のリスク評価方法論を調査。統一化されたリスク受容基準を開発し、リスクを踏まえた規基準と整合させる。

Activity A2: Comparative Risk Assessment of H2 Systems with Hydrocarbon Fuel Systems

活動A2: 炭化水素燃料による水素システムの比較リスク評価


活動A3: 確率論的リスク被害解析

Subtask B: Experimental Testing. Collaborative program to close knowledge gaps on consequences of equipment or system failures and effects of mitigation measures through actual testing. There will be an emphasis on Subtask B activities in the second phase of Task 19.

サブタスクB: 実験と試験。装置やシステムの不具合によって何が生じるのか、対策を講じた場合にどういう効果があるか、に関する知見ギャップを、実際に試験を実施して埋めようという協同プログラム。タスク19の第2期にはサブタスクBに重点を置いていくことになる。

Subtask C: Development of Targeted Information Packages for Stakeholder Groups.
Targeted stakeholder groups include permitting officials, insurance providers, and early adopters of these new products and systems. The suite of existing products and future Task 19 products will be packaged for dissemination to stakeholder groups.

サブタスクC: 対象者別に選定した情報パッケージの開発。
ターゲットグループには許認可当局、保険業者、水素関連製品やシステムの早期導入者などがある。
タスク19の現行成果物と将来的な成果物を組み合わせてパッケージを作成し、各ターゲット別に発信していく。

New Task in Definition: Large-Scale Hydrogen Infrastructure and Mass Storage

定義中の新タスク: 大規模水素インフラと大量貯蔵

The September 2007 IEA Green House Gas Programme Study on Co-production of Hydrogen and Electricity by
Coal Gasification with CO₂ Capture \(^{12}\) concludes that further work on large scale underground hydrogen storage is worthwhile and suggests that the HIA carry out this work. Currently in definition is a new task with a three + year time horizon and the following objectives:

- To establish an international basis for the academic techniques and industrial practices required to implement a hydrogen pipeline distribution system and mass storage 水素パイプライン配送システムと大量貯蔵の実施に必要とされる学術的技術および産業実務の国際的基盤の構築
- Provide an overview of existing and planned hydrogen infrastructure 既存および計画中の水素インフラの総括
- Explore and research options for mass storage of hydrogen 水素大量貯蔵の多様な可能性の調査
- Technical and economic comparison of different infrastructure options by modeling モデリングによる技術・経済面から異なるインフラ間の比較

The preliminary draft work program for the new task identifies the following subtasks: infrastructure, pipelines, mass storage, system modeling, economic modeling, coordination and dissemination.

新タスクの活動内容の素案では、インフラ、パイプライン、大量貯蔵、システムモデリング、経済性モデリング、調整と普及などのサブタスクが同定されている。

4.2.2.2 Executive Committee Directed Analysis & HIA Analysis Group 執行委員会指示による分析とHIA分析グループ

The emphasis on analysis at the Executive Committee level has increased over the past five years. The Executive Committee decided to take a more direct approach to the HIA’s analytic needs and activities by pursuing development of the HIA’s own analytic products. These products are expected to promote the adoption and market penetration of hydrogen technology by providing stakeholders and decision makers, at the IEA and around the world, with clear and coherent information that advances the business case for hydrogen energy and simultaneously enhances the HIA’s reputation as a premier global resource for technical expertise in hydrogen. This effort began with design of a study of where the hydrogen will come from. However, with the late 2007 creation of the Analysis Group, \(^{13}\) that study was folded into a broader analytic effort that will also include non-energy uses of hydrogen. The Analysis Group made the following recommendations:

執行委員会において分析がこの5年間でさらに強調されるようになった。執行委員会は、分析ニーズおよび活動についてHIAが直接取り組んでいく方針を固め、HIAの分析成果物の独自開発に努めることにした。こうした成果物は、IEAおよび世界中の関係者や意志決定者に水素エネルギーの事業性の理解を推進させる明快かつ整合性のある情報を提供して、水素技術の市場導入と普及を促進すると同時に、水素に関する技術的知見を求めるならばHIAが世界第一人者であるという評価を高めると期待される。この取組みは、水素はどこから得ることになるかという研究の設計からそもそも始まったものであるが、2007年後半に分析グループが設立されたことをきっかけに、水素の非エネルギー利用も含む幅広い分析作業の一部として組み込まれた。分析グループは以下を提言した。

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\(^{12}\) Co-Production of Hydrogen and Electricity by Coal Gasification with CO₂ Capture, IEA Greenhouse Gas R&D Programme, Technical Study/Report Number: 2007/13, S

\(^{13}\) The Analysis Group consists of ExCo Representatives, Operating Agents, experts and the Secretariat
1) Structure a *Hydrogen Resources Study* effort in the following parts: a literature review that will examine major existing assessments of hydrogen supply and demand; a demand side assessment and a supply side assessment.

「水素供給源研究」を、既存の水素需給評価を調査する文献研究、水素の需要側評価、供給側評価という作業に分割する。

2) Because cooperation with the IEA on its analytic and infrastructure efforts is requisite to success, contribute to IEA analysis efforts through all pertinent IEA vehicles, notably the Energy Technology Perspective (ETP) and the World Energy Outlook (WEO), from the beginning of their production cycles. Cooperate on other studies and activities as appropriate. In late 2008, Chairman García-Conde and Secretariat Manager Ms. de Valladares visited with the IEA Secretariat to request cooperation beginning in 2009. The Chief Economist’s office has welcomed input to the 2009 WEO.

分析およびインフラに関する作業において、IEAとの協力が成功に不可欠であることから、特にEnergy Technology Perspective (ETP)とWorld Energy Outlook (WEO)をはじめとするIEAの全ての情報媒体に対し、出版サイクルの開始から終了にいたるまで協力し、IEAの分析活動に貢献する。必要に応じ他の研究や活動にも協力する。2008年後半にはGarcia-Conde議長およびde Valladares事務局長が2009年初年度とする[新期における]協力を求めるためにIEA事務局を訪れた。IEAの筆頭エコノミストは2009年版WEOへの寄稿を歓迎すると述べている。

4.2.2.3 The Role of Analysis in HIA Activities at the Task Level タスクレベルにおけるHIA活動分析の役割

Analysis has played a large role in the HIA activities at the task level during this term. Consider the major modeling and analyses efforts in Task 18, Integrated Hydrogen Systems Evaluation and the groundbreaking, fundamental analyses in Task 19, Hydrogen Safety. From the early 1990’s to 2006, the Executive Committee funded a consultant to prepare descriptive studies of hydrogen. This activity then became part of Task 18. Altogether, 11 case studies have been produced to date. As a sub-task level activity, analysis plays a crucial supporting role in Task 21, BioHydrogen; Task 23, SSR for Hydrogen; and Task 24, Wind and Hydrogen Integration.

今期はタスクにおけるHIA活動において、分析が大きな役割を果たした。タスク18「統合水素システム評価」の大なるモデリングおよび分析作業、またタスク19「水素安全性」における画期的な基礎解析を思い浮かべていただきたい。1990年代前半から2006年までに、執行委員会はコンサルタントを雇用し水素の記述的研究を委託したが、これは後にタスク18に組み入れられ、現在までに合計11の事例研究が行なわれている。サブタスクの活動で見ると、タスク21「バイオ水素」、タスク23「オンサイト水素供給用小型改質器」、そしてタスク24「風力エネルギーと水素の統合化」において、分析がサポート作業のカギとなっている。

As both a stand-alone activity and a component of individual tasks, analysis will play an even larger role in the HIA’s new term. This enhanced role reflects the critical importance of timely information in supporting the IEA shared goals for collaborative R&D, the CERT and REWP technology policy development and deployment objectives, as well as the HIA’s goals for adoption and use of hydrogen.

分析は、単独の活動としても個々のタスクのコンポーネントとしても、HIAの次期においてさらに大きな役割を担うことになる。これは、協同R&DにおけるIEAとの共有目標、CERTおよびREWPの技術ポリシーの作成実施、それに水素の導入利用におけるHIAの目標実現にとって、時宜を得た情報が非常に重要であることを反映している。
4.2.3 Activities Related to Outreach Program Goal – Confidence with Hydrogen 広報プログラム目標に関連した活動 – 水素への信頼感

4.2.3.1 Introduction 序

The HIA’s Outreach Program aims to raise the level of awareness, knowledge and understanding about hydrogen technologies and thereby build community acceptance and support. It also builds awareness about the Agreement’s purpose and activities. This activity, informally known as Communication and Outreach, welcomes and actively pursues cooperation and liaison with a full range of interested groups in public and private sectors. The implementation of the IEA HIA’s Outreach Program is primarily the responsibility of the Secretariat, which coordinates this HIA-wide function under the direction of the Executive Committee.

HIAの広報プログラムは水素技術に関する認知と知見、理解の水準を高めることであり、それによって社会の受容と支援を築くことにある。さらに協定の目的と活動に関する認識を広げることにもなる。本活動は非公式にはコミュニケーションと広報(Communication and Outreach)として知られており、官民におけるあらゆる分野の関係者グループ間の協力と連絡を通じてまた積極的に求めてもいる。IEA HIAの広報プログラムは主に事務局が担当しており、執行委員会の指示のもとでこのHIA全般に渡る任務を運営している。

The HIA’s outreach activities primarily serve IEA/OECD governments. Efforts are underway to expand HIA outreach efforts to non-IEA member countries. This is occurring through IEA programs, particularly the NEET program, HIA interaction with the IPHE and incipient cooperation with UNIDO. Moreover, industry participation is growing and is expected to increase.

HIAの広報活動は主にIEA/OECD諸国に向けたものであるが、IEA非加盟国への広報活動を広めるべく作業中である。これはIEAプログラム、とりわけNEETプログラム、IPHEとの連携、そして緒についたUNIDOとの協力を通じて進行している。

The HIA Outreach goal has three scopes: membership and participation, information and synchronization worldwide.

HIA広報の目標は3つある。すなわち加盟と参加の促進、情報の普及、そして国際社会の同期化である。

4.2.3.2 Membership and Participation 加盟と参加

The first scope of HIA Outreach goal is membership and participation. One clear measure of outreach success is a rise in membership. As previously mentioned, membership has grown 60% since the beginning of this term (please refer to Table I which lists the 22 current members) and other members are in pipeline. Recruiting continues and prospects for continued growth are good. The membership recruiting effort is a natural outgrowth of interest in HIA tasks and activities.

HIA広報目標の中の第一は加盟と参加の促進であり、広報活動の成功の明快な目安のひとつが加盟国の増加である。前述したように、加盟国数は今期開始時から60%増加しており(表1を参照。現加盟国を列記している)、加盟の途にある国も複数ある。募集活動は継続しており、成長の見通しは引き続き良好だ。加盟国募集活動[加盟国の増加では]はHIAタスクリ活動に対する関心の当然の所産である。

The cornerstone of the HIA is the task, as is the case in most implementing agreements. Adequate participation is requisite to successful execution of all tasks. The HIA is a task-shared Agreement, meaning that Members pay their experts directly. The same holds true in the case of Operating Agents, i.e., Members who support an Operating Agent(s) pay them directly. In both instances, payment amounts are made according to prevailing
labor rates. The minimum time commitment for an Operating Agent is 0.33 person years per annum. The minimum expert time commitment is set by each task and applies to all classes of participants, including industry, in that task.

As a task-shared implementing agreement, expert participation is committed and measured by the number of experts per task and person years/year (the annualized aggregate of person hours or person months). See Expert Participation Summary Table 9 below for the level of effort during this term expressed in person years.

Table 9: Expert Participation in Person Years over 2004-2009 Term 表9: 2004-2009期の専門家参加状況

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<tr>
<th>Task #</th>
<th>Minimum Required Person years/year</th>
<th>Experts Total by Task</th>
<th>Total Person years per year for each Task</th>
<th># Years Active in Term</th>
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Total 合計 712.68

*Note that the Task 16 data include all three sub-tasks. Subtask A was funded by a ~$400,000 contribution from the GHG and the CCP, which has been converted to person years.

*タスク16のデータは3サブタスク全てを含む。サブタスクAはGHGおよびCCPから最高40万ドルの資金供与を受けており、これを人年に換算している。

Table 9: arrays participation information (where available) as follows: minimum required person years/year; experts total by task; total person-years/task per year; number of years active during this term; cumulative
person years during this term.

In addition to the experts accounted for in the table above, there is another category of unofficial expert participation, the non-industry “contributor.” This contributor category is open to HIA members who are also members of a particular task and thus already supporting an official task expert. The contributor can provide input to the task but it is neither supported through institutional member commitment nor entitled to direct access to information task matters. The contributor is also exempt from the minimum time contribution. This participation innovation resulted from a proposal by Task 24, Wind Energy and Hydrogen Integration.

4.2.3.3 Information Dissemination 情報の普及

The second scope of the HIA Outreach Program is Information Dissemination. The IEA places high value on this activity, which is intended to disseminate information to participating countries, IEA member countries and non-member countries as well. The HIA Executive Committee likewise places much emphasis on its effort to diffuse the nature and results of the HIA’s R,D&D collaboration. At the HIA, information dissemination encompasses the full range of HIA information vehicles and products, including: the HIA Annual Report, technical reports and articles, website, newsletter, exhibition display, brochures, presentations, press releases, etc. The Secretariat is primarily responsible for implementation of the Outreach Program, including Information Dissemination. However, the Executive Committee, Operating Agents, experts and Secretariat all contribute to development and dissemination of information vehicles and products.
The Executive Committee meeting itself serves as a valuable internal vehicle for information exchange among members, observers and IEA representatives as well. During this term all of these mechanisms have been used to increase the visibility of the Agreement.

The HIA also contributes on a regular basis (five articles during this term) to the IEA’s Open Bulletin. In addition, it has contributed to the IEA’s periodic publication, *Energy Technologies at the Cutting Edge*.

A list of the major HIA publications during this term appears below. The majority of these high quality publications are of a summary nature. While the list is substantial, it does not by itself convey the extent of either the HIA’s productivity in information dissemination or technical progress during this term. Another aspect of the HIA information dissemination story is found in Table 10, which reports the HIA publications/articles, presentations and patents by task. Note that Task 22 alone has produced over 900 publications and presentations in less than 3 years; its predecessor, Task 17, produced some 900 publications and presentations between 2004 and 2006. Yet another part of the HIA’s information dissemination story is told through its major communication and outreach products, which are also discussed later in this section.

**Major (summary) Publications**

- **2008 Annual Report** (publication pending)

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• Hydrogen Production and Storage: R&D Gaps and Priorities
• Final Report Task 15 タスク15最終報告
• Final Reports Task 16 タスク16最終報告
  ○ Subtask A – Large-Scale Integrated Hydrogen Production Decarbonisation
    http://www.ieahia.org/pdfs/finalreports/Task16AFinal.pdf
  ○ Subtask B – Prospects for Hydrogen from Biomass
    http://www.ieahia.org/pdfs/finalreports/Task16BFinal.pdf
  ○ Subtask C – Small-Scale Reformers for Stationary H2 Production with Minimum CO2 Emissions
    http://www.ieahia.org/pdfs/finalreports/Task16CFinal.pdf
• Final Report Task 17 タスク17最終報告
  http://www.ieahia.org/page.php?s=d&p=documents&t=task&id=17
  ○ Introduction 序
  ○ Carbon Section 炭素
  ○ Carbon-Hydride Section 炭化水素
  ○ Hydride Section 水素貯蔵合金
• Final Report Task 18 phase 1 タスク18第1期最終報告
  ○ Subtask A: Information Base Development
    http://www.ieahia.org/pdfs/finalreports/Task18AFinal.pdf
  ○ Subtask B: Hydrogen Demonstration Projects Development
    http://www.ieahia.org/pdfs/finalreports/Task18BFinal.pdf
• Case Studies (Task 18) 事例研究(タスク18)
  http://www.ieahia.org/page.php?s=d&p=casestudies
• Task 19 タスク19
  ○ Knowledge Gaps White Paper (知見格差白書)
  ○ Survey of Hydrogen Risk Assessment Methods (水素リスク評価法調査)
  ○ Risk Assessment Studies of Hydrogen and Hydrocarbon Fuels Fuelling Stations (水素と炭化水素燃料ステーションのリスク評価)
    http://www.ieahia.org/pdfs/Task19/RA_studies_comparison%20Rev1.pdf

Task Publications/Articles, Presentations and Patents タスク別論文/記事、プレゼンテーションおよび特許
The table below reports this term’s publications/articles, presentations and patents. Fundamental and earlier stage tasks, such as Task 15, 17, 21 and 22 – tended to produce a relatively larger volume of publications and articles than near, mid-term and engineering analysis tasks.
Table 10: Summary of Publications/Articles, Presentations and Patents

<table>
<thead>
<tr>
<th>Task #</th>
<th>Task Name</th>
<th>Publications/Articles</th>
<th>Presentations</th>
<th>Patents</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Photobiological Production</td>
<td>72</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Hydrogen from Carbon-Containing materials</td>
<td>7</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>17</td>
<td>Solid and Liquid State Storage</td>
<td>420</td>
<td>465</td>
<td>17</td>
</tr>
<tr>
<td>18</td>
<td>Integrated System Evaluation</td>
<td>19</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td>19</td>
<td>Hydrogen Safety</td>
<td>9</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>20</td>
<td>Hydrogen From Waterphotolysis</td>
<td>unavailable</td>
<td>unavailable</td>
<td>-</td>
</tr>
<tr>
<td>21</td>
<td>BioHydrogen</td>
<td>159</td>
<td>unavailable</td>
<td>-</td>
</tr>
<tr>
<td>22</td>
<td>Fundamental and Applied Hydrogen Storage Materials Development</td>
<td>450</td>
<td>450</td>
<td>16</td>
</tr>
<tr>
<td>23</td>
<td>Small-Scale Reformers for On-Site Hydrogen Supply (SSR for Hydrogen)</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>24</td>
<td>Wind Energy and Hydrogen Integration</td>
<td>16</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>25</td>
<td>High temperature Production of Hydrogen</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>26</td>
<td>Advanced materials for waterphotolysis</td>
<td>New</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>27</td>
<td>Near-Term Market Routes to H2 by Co-utilisation of Biomass as a Renewable Energy Source with Fossil Fuels</td>
<td>New</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Totals</td>
<td>1,153</td>
<td>1,015</td>
<td></td>
</tr>
</tbody>
</table>

Note that not all tasks reported the number of their publications/articles and presentations. Therefore, it is believed that the actual numbers in both categories exceed the reported numbers. To be eligible for inclusion, the subject of the task publication/article and/or presentation had to be entirely task related content.
The major HIA communication and outreach products and vehicles are described below.

**Annual Report** 年次報告
The HIA’s Annual Report contains substantive updates for each task and each Member. In addition, it features an article by the Chair on current progress and an article by the Secretariat on a topic of timely importance. Some 750 copies of the HIA’s annual report are distributed each year. Members, Operating Agents and task experts, as well as the IEA, are key recipients. In addition, HIA Annual Reports are distributed at conferences and other events that include non-HIA and non-IEA member countries.

HIAの年次報告には各タスクおよび加盟国の最新情報が記載されているほか、議長による現況報告やその時々の重要課題に関する事務局発の記事も掲載している。HIA年次報告は毎年750部ほど配布されており、主な配布先は会員、幹事、タスク専門委員、そしてIEAなどである。さらにHIA年次報告はHIAやIEAの非加盟国を含む会議や他のイベントでも配布されている。

**HIA Website** ウェブサイト  www.ieahia.org
During this term the HIA website was redesigned to address the growing global interest in hydrogen, incorporate advances in information technology and convey the Agreement’s new corporate identity. There is now a public website and a private website. The latter is password restricted to members and participants. The existence of the private website, which includes all matters germane to governance, is not apparent to public site users. A Content Management System (CMS) serves as a permanent archive for HIA documents. The website includes a “What’s New” and “Search” features. It is updated continuously to capture the latest HIA developments.

HIAのウェブサイトは今期一新されたが、これは水素に対する世界の関心の高まりに対応するとともに、先進のITを取り入れ、HIAの新たなCIを伝えていくためである。現在は一般公開サイトと非公開サイトがあり、後者は会員ならびに参加者のみがパスワードによってアクセスできる。ガバナンス関連事項全てが含まれている非公開サイトの存在は、公開サイトユーザーには見えない。コンテンツマネジメントシステム(CMS)がHIA書類の永続的アーカイブとなっている。ウェブサイトは「What’s New(最新情報)」のページと検索機能を備えており、常に更新してHIAのニュースを提供している。一般公開サイトのサイトマップは以下の通りである。
Newsletter ニュースレター
The first edition of the biannual IEA HIA News was published in the Fall of 2006; four issues have been published to date. The newsletter is posted on the website, distributed electronically and printed for distribution at conferences and events as budget permits. In the IEA HIA Technology Spotlight section, each issue features a task, explaining the task and the associated technology and research. The companion Tech Talk column contains an interview with the Operating Agent. The other regular newsletter features are: The IEA HIA Today overview; Publication Alert; Task Ink (Task news); DiploTech (newsworthy related developments around the world); and a Message from the Chair.

Brochures パンフレット
Beginning in the 1999-2004 term, the IEA HIA began production of a one page flyer that has proven very effective for a broad range of uses. It is updated as needed.

HIAは1999-2004期から1ページのパンフレットを制作しているが、これが幅広い用途に非常に有用なため、必要に応じて更新している。
Exhibit Booth Display 展示会出展
During this term the HIA developed a simple, low-cost, easy to transport display for Exhibit Booths. The display covers the following topics: IEA HIA framework (e.g. mission, vision, strategy); member list; list and description of current tasks; list of entire HIA portfolio. While all banners are produced in English, they have also been produced in Japanese and French for the convenience of the host country at the major biennial hydrogen conference, the World Hydrogen Energy Conference. The Exhibit booth display is used on average 1-2 times/year.

HIAは今期、展示ブース用として簡素かつ低コスト、輸送も容易なディスプレイを制作した。IEA HIA枠組(使命、ビジョン、戦略など)、加盟国リスト、現行タスク一覧とその内容、HIA全体のポートフォリオなどを掲載したもので、バナーは全てが英語で制作されているが、隔年開催の主要水素会議である世界水素エネルギー会議の開催国への便宜を囲り、日本語とフランス語でも作られた。展示ブース用ディスプレイは平均して年1-2回使用している。

4.2.3.4 Worldwide Synchronization 国際社会の同期化
The third scope of the HIA Outreach Program is Worldwide Synchronization. The HIA intent in adopting this scope was to facilitate coordination of hydrogen energy development efforts around the world in pursuit of our mission. It is another key aspect of outreach. Of course, the major avenue for synchronization is the HIA’s collaborative R,D&D Program, which has already been discussed. The breadth and depth of our RD&D portfolio and the growing membership, including the world’s largest national programs in hydrogen, attest to synchronization success during this term.

HIA広報プログラムの第3は国際社会の同期化である。HIAは、HIAの使命の達成に向け、世界中の水素エネルギー開発作業の連携を促進することをこのテーマに込めている。これは広報のもと一つの重要な側面である。むろん、同期化の王道はHIAの協同RD&Dなのであり、これについてはすでに述べた。HIAのRD&Dポートフォリオの広さと深さ、また水素に関する世界最大級の国家事業もその下に入る、拡大する加盟国リストこそ、今期の同期化における成功の証である。

The outreach aspects of the synchronization process are important as well. If the IEA and HIA truly seek to influence policy and technology deployment by synchronizing efforts worldwide, then the Agreement must be visible and its messages must reach relevant communities, stakeholders and decision makers.

同期化プロセスにおける広報の側面もまた重要である。IEAおよびHIAが真剣に、世界中の取り組みの同期化によって政策や技術の実施に影響を与えているからである。HIAの存在を知らしめ、関連コミュニティや利害関係者、そして意志決定者にHIAのメッセージを伝えなくてはならない。

Conference/Meeting/Event Strategy 会議/ミーティング/イベント戦略
The HIA developed a conference/meeting/event strategy at the Executive Committee level that speaks to both the information dissemination and world synchronization scopes of the Communication and Outreach Program. The impetus for the conference strategy is straightforward: it is a standard mechanism for dissemination of information to target audiences on a global scale.

コミュニケーションおよび広報プログラムの目的である情報普及と国際社会の同期化に鑑み、HIAは執行委員会レベルの会議/ミーティング/イベント戦略を策定した。会議戦略の狙いは、世界中のターゲットに情報普及を図るための標準的な仕組みという明快なものである。

The HIA organized its conference strategy into internal (to IEA) and external (to IEA) conferences. The HIA
then segmented the external conference market into the following categories: hydrogen and fuel cell; renewable/sustainable; environmental; conventional energy; transportation; and utilities/infrastructure.

HIAは、会議戦略をIEA内部と外部向けに分け、その上で外部会議を水素・燃料電池、再生/持続可能エネルギー、環境、従来型エネルギー、輸送、電力/インフラに分類している。

Whether internal or external, conference participation typically consisted of delivering an oral paper on the overall Agreement, its activities and progress. Written papers were often submitted for conference proceedings. Conference participation sometimes included an exhibit booth, generally engaged at a discount or no cost. Brochures and Annual Reports were distributed at the conference booth.

内部にしても外部にしても、会議では通常はHIA全般とその活動や進捗に関する論文の口頭発表が行われた。会議手続き上、論文を提出することも多かった。会議参加がブース展示も含むこともあり、それも通常は減額もしくは無料であった。ブースではパンフレットや年次報告書を配布した。

During this term, the HIA gave presentations at a dozen key internal IEA conferences/events, which are listed in the table below. A comment about the HIA’s 2007 Ministerial participation is in order. Through member generosity, the HIA was able to exhibit a vehicle sized fuel cell (with open housing to expose the actual fuel cell stack) (courtesy of CEA) and an illuminated scale model of the Utsira Wind/Hydrogen Project (courtesy of Hydro). This proved an excellent opportunity for many Ministerial participants to gain firsthand experience with hydrogen and fuel cell hardware.

Table 11: Internal Presentations (HIA Presentations to IEA) 表11: 内部プレゼンテーション(HIAからIEAへのプレゼンテーション)

<table>
<thead>
<tr>
<th>2004</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CERT</td>
<td>Chairman’s Presentation of 1999-2004 EOT and SP 1994-2004期期末報告および戦略計画につき議長がプレゼンテーション</td>
</tr>
<tr>
<td>Hydrogen Coordinating Group 水素調整グループ</td>
<td>Presentation on Hydrogen Gaps and Priorities 水素関連ギャップと優先課題に関するプレゼンテーション</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2005</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CERT</td>
<td>Presentation on Hydrogen Gaps and Priorities 水素関連ギャップと優先課題に関するプレゼンテーション</td>
</tr>
<tr>
<td>IEA/IPHE Infrastructure Workshop インフラワークショップ</td>
<td>Overview and Update Presentation 概要と現況のプレゼンテーション</td>
</tr>
<tr>
<td>REWP Conference 会議</td>
<td>Renewable Hydrogen Presentation 再生可能水素プレゼンテーション</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2006</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NEET Kick-off Meeting キックオフミーティング</td>
<td>Overview Presentation 概要プレゼンテーション</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2007</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa NEET Workshop 南アフリカNEET</td>
<td>Overview Presentation 概要プレゼンテーション</td>
</tr>
</tbody>
</table>

Table 12: Conference Participation Score Card below reports HIA participation in external conferences by year and target market segment. As the first order of outreach business, the HIA has focused its conference efforts on the hydrogen community: nearly forty of the presentations and exhibits during the 2004-2009 term took place at hydrogen events. Highlights of HIA conference participation included the three WHEC conferences in 2004, 2006 and 2008, all of which included exhibits as well as presentations. The scale of the HIA presence at WHEC has grown from a single presentation on the HIA in 2004; to multiple HIA presentations in 2006; and, in 2008, an entire dedicated HIA track that included a plenary session.

The conference strategy has yielded manifold benefits. Conference presentations have helped to clarify the Agreement’s purpose and activities as well as fundamental misconceptions about how the IEA and the HIA function. And of course, conference participation contributes to the HIA’s dissemination of information to participating countries and IEA member countries as well as IEA non-member countries. It also facilitates networking. The HIA’s success with its conference strategy led it to co-sponsor the Roads to HyCom Workshop in 2008.

本会議戦略は様々な面で利益をもたらした。会議のプレゼンテーションはHIAの目的と活動を明確にし、IEAとHIAがどのように機能しているかに関する根本的な誤解をあぶりだしてくれるなど、有用であった。会議に出席することで、参加国やIEA加盟国、さらにIEA非加盟国に対するHIAの情報普及にも役立ったことはもちろんである。会議に参加すればネットワーキングの促進ともなる。会議戦略の成功により、HIAは2008年のRoads To HyComワークショップの共同スポンサーとなるに至った。

**Networking Appreciation Dinner** ネットワーキング感謝ディナー
All too often, neither HIA experts nor the greater hydrogen community ever have the opportunity to meet or visit either with other HIA experts or the Executive Committee. To provide an opportunity for networking that strengthens the implementing agreement, the HIA has instituted the tradition of a no-host “Appreciation” dinner on the occasion of major conferences.

HIA専門委員もその他の水素関係者も、普段は他のHIA専門委員や執行委員会と顔を合わせることも訪問しきることもない。HIAは本協定を強化するネットワークの機会を提供するため、主要コンフェレンスの折に会費制の『感謝』ディナーを慣例として設けた。

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16 For example, even entities within the hydrogen community thought the IEA was a fund granting entity.
Additional Public Relations and Media Engagement Activities さらなる広報と対マスコミ活動

IEA Prize IEA賞

The creation of a hydrogen prize was proposed early in the 2004-2009 term. By mid-term, the Executive Committee decided to proceed with two prizes, one for an Individual and the other for a Project. The IEA HIA Individual Prize was created to celebrate hydrogen research and development distinguished by technical excellence and harmony in international cooperation that contributes to the understanding and advancement of basic and applied science. The Agreement awarded its inaugural IEA HIA Individual Prize in June 2008 to Dr. Gary Sandrock. Although the Individual Prize was conceived as a single award, the Executive Committee determined that special circumstances call for special treatment: the late Dr. Tapan Kumar Bose, who passed away in 2008, was honored as the recipient of the IEA HIA Memorial Prize for lifetime achievements in hydrogen R&D.

It is expected that the first Project Prize will be awarded in 2009.

Media Engagement: Press Conference, Press Releases and Letter to the Editor メディア対策: 記者会見、プレスリリース、編集者宛書簡

To announce the release of our 25th anniversary report, In Pursuit of the Future, the HIA held a press conference at the National Press Club in Washington, D.C. in early September 2004. Then Chairman Trygve Riis presented the report and discussed the HIA’s current activities. Dr. Giorgio Simbolotti spoke on behalf of the IEA Secretariat in Paris, and Mr. Steve Chalk spoke on behalf of the U.S. Department of Energy. The event was attended by members of the press, representatives of member embassies and members of the metropolitan Washington energy and environmental community.

HIAは25周年記念報告書「In Pursuit of the Future」出版の発表に当たり、2004年9月上旬にワシントンDCの全米記者クラブにて記者会見を行った。当時のTrygve Riis議長が報告書を提示し、HIAの現況を述べた。IEAパリ事務局代表のGiorgio Simbolotti博士、また米国エネルギー省代表のSteve Chalk氏がスピーチを行った。この会見には報道関係者、HIA加盟国の在米大使館関係者、ワシントン首都圏のエネルギーおよび環境コミュニティの代表者らが出席した。

The centerpiece of the HIA media engagement strategy involves preparation of press releases to launch HIA reports. Some dozen press releases were prepared during this term. In addition, the HIA responds to relevant

17 The Executive Committee selects the winners from nominations proposed through its members, in the case of the Individual Prize, and also the Operating Agents, in the case of the Project Prize.
articles and media press about events with letters to the editor, of which a half dozen have been prepared to date, all but one in English.

HIAの対マスコミ戦略はHIA報告書を発表するプレスリリースを中心としている。今期は数十件のプレスリリースを作成した。さらにHIAは、関連する論文やイベントに関する報道について、編集者へ手紙を書いて対応している。現在までに5-6通ほどを作成したが、1通を除きすべて英語である。

5.0 Coordination with Other Bodies 他組織との連携

The main strength of the HIA is its position as technical leader in hydrogen R&D. With an established tradition of cooperation, RD&D and a sizeable membership (21 member countries and the European Commission, plus a pipeline of prospective members) the HIA has the capacity and track record for effective coordination with the IEA and external entities, as well as its own membership. Coordination enhances productivity in the HIA’s portfolio of tasks and activities, reduces duplication and provides a larger and stronger platform for information dissemination in pursuit of the Agreement mission to accelerate adoption of hydrogen technology.

HIAの基本的な強みは水素R&Dにおける技術的リーダーという立場である。RD&Dにおける協力の伝統があり、また加盟国数(21ヵ国および欧州委員会、さらに複数の加盟予定国の存在)数が大きいおかげで、HIAは自らのメンバーはもちろん、IEAおよび外部組織間において効果的な調整を行う能力があり、またその実績もある。水素技術の採用を促進するかHIAの使命を遂行するか、連携調整はHIAのタスクと活動のポートフォリオにおける生産性を向上させ、重複を低減し、情報普及のための大規模にして強力な基盤を提供するものである。

5.1 Internal to IEA 対IEA内部

The HIA cooperates with the Paris Secretariat on an on-going basis.

HIAはパリの事務局と常に協力している。

5.1.1 CERT

By invitation of the CERT, then Chairman Riis made a presentation at a 2005 CERT meeting on the HIA reports that were subsequently published by the IEA as Hydrogen Production and Storage: R&D Priorities and Gaps. The HIA has followed the activities of the CERT created Ad-Hoc Group on Science and Energy Technology (AGSET). In addition, the HIA contributed to the IEA Study on Transmission Markets and Technology.

CERTの招聘を受け、当時のRiis議長が2005年CERT会議において、後日IEAにより出版されたHIA報告書「Hydrogen Production and Storage: R&D Priorities and Gaps」のプレゼンテーションを行った。HIAはCERTにより創設されたAd-hoc Group on Science and Energy Technology (AGSET; 科学エネルギー技術アドホックグループ)の活動に注視してきた。さらにHIAはIEA研究「送電市場と技術」にも貢献している。

5.1.2 Hydrogen Coordinating Group (HCG) HCG (水素連携グループ)

In view of its technical capabilities and at the express request of Desk Officer Dr. Simbolotti, the HIA prepared reports on hydrogen gaps and priorities in production and storage. These reports enabled the IEA Secretariat to respond to Executive Director Claude Mandil’s directive to the Hydrogen Coordinating Group (HCG) to provide this information.

HIAは、水素製造および貯蔵におけるギャップと優先課題に関する報告書の作成を、それだけの事務能力があることと、HCGのDesk OfficerであるSimbolotti博士の要請があったために実施した。これら
5.1.3 Working Parties 作業班
As the premier technical resource on hydrogen, the HIA is a resource for its own working party, the Renewable Energy Working Party (REWP) and other working parties as well.

HIAは水素技術の主たる情報源として、自らの作業班、再生可能なエネルギー作業班(REWP)、そして他の作業班のリソースとなっている。

REWP
Executive Committee member Mr. Ray Eaton and REWP Vice-Chair Antonio Pflüger presented Hydrogen Production and Storage: R&D Priorities and Gaps at a REWP meeting.

Fossil Energy Working Party 化石燃料作業班

End-Use Working Party 最終用途作業班
By special request of the End-Use Working Party (EUWP) the HIA contributes on a semi-annual basis to the EUWP survey on implementing agreement activities.

5.1.4 NEET
IEA created the NEET initiative in response to the G8’s clarion call for strategies aimed at a “clean, clear and competitive energy future” that includes the “+ 5” nations. The HIA was very pleased to have participated in all NEET workshops held to date, including the initiative on “Rural Energisation.” NEET provides a valuable marketing service that supplements the HIA’s outreach activities in member recruiting and information dissemination. The HIA coordinates with NEET on an on-going basis.

IEAは、G8が声高らかに呼びかけた、「グレンイーグルスプラス5」諸国を含めた「クリーンにして明快、競争力のあるエネルギーの未来(clean, clear and competitive energy future)」に向けた戦略の要請に応え、NEETイニシアチブを創設した。HIAが「僻地のエネルギー供給(Rural Energisation)」をはじめとする現在までのNEETワークショップ全てに参加したことは非常に喜ばしいことである。NEETは、HIAの加盟国募集や情報普及のための広報活動を補完する、価値の高いマーケティングサービスを提供している。HIAは恒常的にNEETと協力している。

5.1.5 Other Implementing Agreements 他の実施協定
Many IEA implementing agreements have a considerable interest in hydrogen. In an effort to leverage resources and avoid duplication, the HIA seeks to cooperate, as appropriate, with other implementing
agreements on issues of direct and complementary concern.

IEAの実施協定の多くが水素にかなりの関心を持っています。それぞれの原資の相乗効果と重複回避を図るため、HIAは直接関わる課題ならびに相互補完的な課題に関し、他の実施協定と適宜協力してい

Advanced Fuel Cells 先進燃料電池
Because fuel cell technologies operate on hydrogen, the HIA is very interested in the Advanced Fuel Cell Implementing Agreement tasks and activities. A joint meeting of the two IAs was held in 2004, resulting in several joint activities. Another meeting is planned for 2010. Task 17 held a joint meeting with the Advanced Fuel Cell Task 20 in 2005. Information exchange also takes place via the Executive Committee Chairs and Secretariats on a regular basis.

燃料電池技術は水素を使用することから、HIAは先進燃料電池実施協定のタスクおよび活動に非常に関心を抱いている。2004年には両実施協定間の共同会議が開かれ、複数の共同活動が誕生した。共同会議は2010年にも計画されている。タスク17は2005年にAFCのタスク20と共同会議を開いた。また執行委員長および事務局間でも、定期的に情報交換を行っている。

Bioenergy バイオエネルギー
Task 27, Near-Term Market Routes to H2 by Co-utilisation of Biomass as a Renewable Energy Source with Fossil Fuels will include participation by the Bioenergy IA.

タスク27「再生可能エネルギーとしてのバイオマスと化石燃料の併用による短期的な水素市場ルート」はバイオエネルギーIAの参加を得ることになる。

Electricity Networks Analysis, Research and Development (ENARD) 電力網の解析研究開発(ENARD)
The HIA plans to participate in ENARD’s fall 2009 workshop on load balancing. Load balancing is an important topic for renewable energy and the production of hydrogen from renewable energy sources such as wind.

HIAは負荷分散に関するENARDの2009年秋ワークショップへの参加を予定している。負荷分散は再生可能エネルギーと、風力などの再生可能エネルギーを原料とする水素製造にとって重要な問題である。

Greenhouse Gas (GHG) 温室効果ガス(GHG)
The Greenhouse Gas Programme was the subtask leader for Task 16 Subtask A. At their request, the HIA reviewed the IEA Greenhouse Gas Study on Electricity and Hydrogen.

温室効果ガスプログラムはタスク16サブタスクAのリーダーであった。その要請に従い、HIAはIEAの「電力および水素に関する温室効果ガス研究」のレビューを実施した。

Wind (WIA) 風力(WIA)
Motivated by its interest in WIA Task 25, HIA Task 24 (Wind Energy and Hydrogen Integration) proposed formal information exchange with the WIA. The Executive Committee approved WIA Task 25 liaison with HIA Task 24.

タスク24「風力エネルギーと水素の統合化」はWIAタスク25に関心を寄せ、WIAとの正式な情報交換を提案した。執行委員会はWIAタスク25とHIAタスク24のリエゾンを承認した。
ETDE will cooperate with the HIA on archiving its publications and reports, facilitating access to a wider audience.

ETDEは論文や報告書のアーカイブにおいてHIAと協力し、より多くの人に読んでもらえるように努力する。

5.2 External to IEA 対IEA外部

5.2.1 EU Hydrogen and Fuel Cell Technology Platform and Joint Technology Initiative 欧州水素・燃料電池テクノロジー・プラットフォームと共同技術イニシアチブ

Past Chair Trygve Riis (2002-2005) served as a member of the EU Mirror Group of the then newly launched EU Hydrogen and Fuel Cell (HFP) Technology Platform. In 2006, an industry-led Joint Technology Initiative (JTI) was created and is expected to implement the HFP’s key Strategic Research Agenda (SRA) and Deployment Strategy (DS). As the European Commission (EC) representative to the HIA, the Directorate General (DG) of Joint Research Petten has extensive involvement in all EC hydrogen matters. The Eurocentric nature of the EC focus is at once both its strength and its limitation. The EC efforts are both a resource for and a contributor to the HIA. For its part, the HIA will continue coordinate with EC efforts as appropriate.

Trygve Riis元執行委員長(2002-2005)は、EU水素・燃料電池(HFP)テクノロジー・プラットフォームが立ち上げられた当時、そのEUミラーグループのメンバーとして参加していた。2006年には業界主導による共同技術イニシアチブ(JTI)が設立され、これがHFPの主要戦略研究アジェンダ(SRA)と実施戦略(DS)を実行していくと予想される。Joint Research Petten[JRCペッテン本部の間違いかDG;Directorate General]が、欧州委員会代表としてHIAに参加しているが、彼はECの水素関連案件すべてに広く関与している。主眼を欧州に置くECの性格は、長所も限界も合わせ持つ。ECの活動はHIAにとってはリソースであるとともに貢献でもある。HIAとしてはこれからも、適宜ECの作業との連携を継続していく。

5.2.2 IPHE

The International Partnership for a Hydrogen Economy (IPHE) was established in 2003 “as an international institution to accelerate the transition to the hydrogen economy. The IPHE provides a mechanism for partners to organize, coordinate and implement effective, efficient, and focused international research, development, demonstration and commercial utilization activities related to hydrogen and fuel cell technologies. The IPHE provides a forum for advancing policies, and common technical codes and standards that can accelerate the cost-effective transition to a hydrogen economy; and it educates and informs stakeholders and the general public on the benefits of, and challenges to, establishing the hydrogen economy.”

水素経済のための国際パートナーシップ(IPHE)は2003年に「水素経済への移行を促進する国際機関として」設立された。IPHEは、水素・燃料電池技術に関する効果的かつ効率的、焦点を絞った国際的な研究、開発、実証および商品化を編成、調整、実施する仕組みをその参加パートナーに提供するものである。IPHEは水素政策の促進とコスト効果の高い水素経済への移行を促進する共通の技術規基準のためのフォーラムを提供するとともに、水素経済の利点、およびその確立に向けた課題に関し、関係者と一般市民を教育し、情報を提供する。

From the outset, there was considerable overlap in membership between the HIA and the IPHE, the initial exceptions being Brazil, People’s Republic of China, Germany, India and the Russian Federation. Moreover, in
many cases, the actual representatives to both groups were the same individuals. Consequently, the HIA made immediate efforts to promote cooperation in pursuit of mutual goals. The HIA also sought to minimize IPHE duplication and overlap with HIA activities. Such duplication was adversely affecting some of the HIA experts, and thus had a negative impact on research efforts. The process of establishing relations took some time.

In November 2007, the two groups agreed to a protocol for cooperation in the form of a Memorandum of Understanding (MOU). (The IPHE is not eligible to join the HIA because, legally, it is not an international organization and therefore does not meet the eligibility requirements.) This MOU provides for cooperation on an activity or task basis. A proposed cooperation (activity or task) is then codified in a separate Annex to the MOU. Presently, two annexes have been executed. One is on Task 22, Fundamental and Applied Hydrogen Storage Materials Development, and the other is on Task 19, Hydrogen Safety. The agreements provide that those IPHE countries which are not currently HIA members must execute a Letter of Intent (LOI) to join the HIA within a certain timeframe in order to participate in either task. Essentially, the MOU provides a “fast track” to participation for non-HIA members, while also respecting the HIA membership structure and no-observer policy.

The HIA and the IPHE clearly share an interest in fostering widespread use of hydrogen in the economy. However, their approaches and areas of expertise differ. Our core competence is in planning, executing and analyzing R,D&D as witnessed by the Agreement’s long tradition of working successfully in this area. The HIA employs a strategy of internal growth in R,D&D tasks and supporting activities. In contrast, the IPHE has elected an acquisition growth strategy that gathers various types of projects under its umbrella through a labeling process. From inception, the IPHE has set its sights on influencing policy and the political process, as well as promoting hydrogen demonstrations. These activities are both worthy and necessary for the advancement of hydrogen. However, they are by no means the HIA’s primary focus. Thus, the HIA welcomes IPHE’s policy intervention at high levels of government in support of widespread adoption and application of hydrogen.
5.2.3 IAEA 国際原子力機関

The International Atomic Energy Agency (IAEA) is slated to hold a technical meeting in March with the IEA and the HIA on application of nuclear methods to advanced material studies for fuel cell and hydrogen cycle technology. This first meeting will include HIA expert participation. The IAEA is then expected to launch a Coordinated Research Project (CRP) on this subject. At a minimum, HIA Task 22 on Fundamental and Applied Hydrogen Storage Materials Development will invite a CRP project within the task framework. It is expected that the subject matter of the IAEA investigation will complement HIA research efforts.

6.0 Management and Scale of Activities 活動の管理と規模

6.1 Management 管理

The 2004-2009 Strategic Plan called for expanding the Secretariat function to deliver a higher level of service to meet the growth requirements of the implementing agreement. The Plan also called for an independent HIA office. Both ambitions have been realized under the direction of the Executive Committee and the capable leadership of three Chairmen: Trygve Riis (2002-mid to mid-2005); Nick Beck (mid-2005-mid 2008); and Antonio G. García-Conde (mid-2008 to present).

At the end of 2005, the IEA HIA opened its own fully dedicated office. In late 2003, the Executive Committee engaged M.R.S. Enterprises, LLC to manage the Secretariat. The M.R.S. management approach combined attention to the HIA fundamentals of R&D administration and basic information dissemination with value added activities in outreach and communication. The value-added activities were intended: 1) to increase awareness and appreciation of the HIA activities and accomplishments in pursuit of the HIA mission; and 2) to position HIA for relevance with and influence on IEA and greater global direction of R&D for the benefit of the HIA, its members and the greater IEA.


2005年末、IEA HIAは独立事務所を開設した。執行委員会は2003年後半、事務局運営のためにM.R.S. Enterprises, LLCを雇用した。M.R.S. Enterprises, LLCは、HIAのR&Dおよび基本的情報普及に関する原則を尊重し、それに広報・コミュニケーションにおける付加価値型活動を組み合わせるというアプローチをとっている。付加価値型活動とは、1）HIAの使命を達成するため、HIAの活動と業績に対する認識と評価を高める 2）HIAとその加盟国、ならびに広くIEAの利益に寄与すべく、IEAと広く世界的なR&D

19 The office is on the 17 acre campus of FASEB, a federation of technical research societies located in Bethesda, MD near the U.S. National Institute of Health. Some 150 federation members have been awarded Nobel Prizes. Easily accessible by public transportation, the campus includes meeting and small conference facilities. 事務所はメリーランド州ベセスダの米国国立衛生研究所のほど近くにある技術研究機関連合であるFASEB[Federation of American Societies of Experimental Biology]の7ha近くに位置する。FASEBのメンバーからはこれまでに約150人のノーベル賞受賞者を輩出している。キャンパスは交通機関で、ミーティングや小会議を開催できる施設も備えている。
方向性に関し、HIAが意義ある位置を占め、影響力を有すようにする活動である。

Meetings

The HIA held Executive Committee meetings twice a year. Ten Executive Committee meetings took place during this term. \(^{20}\) The number of participants/meeting ranged from 35-45 people. The entire portfolio of tasks is reviewed at each meeting. Communication and Outreach activities are also reviewed, as are analysis efforts. The meetings, which take place over two days, typically include a technical tour. An IEA representative attended half the Executive Committee meetings held during this term. \(^{21}\)

HIAは年に2回、執行委員会を開催した。今期は10回の執行委員会が持たれた。委員会の参加者数は35-45人であった。各会議でタスク全体が検討された。コミュニケーションおよび広報活動、さらに分析作業もまた審議された。ミーティングは2日間に渡って開催され、通常は視察も組み込まれていた。今期の執行委員会はその会議の半数にIEA代表が参加した。

HIA tasks also meet twice a year, typically for a two day period. The storage tasks, Task 17 and Task 22, are an exception to the standard practice. These tasks hold two week-long "Gordon-Conference" style meeting that provide intense networking opportunities with formal and informal information exchange.

HIAタスクも年2回のミーティングを、一般的に2日間に渡って開催した。貯蔵関連のタスク17とタスク22は例外で、正式および非公式の情報交換を伴う白熱したネットワーキングの機会を提供する「ゴードン・コンファレンス」形式のミーティングを、2週間に渡って行った。

Unless otherwise indicated, observers are permitted to attend task meetings a limited number of times (once is the standard) and by invitation only. Table 13: HIA Task Meeting Participation and Context lists the tasks, average task attendance, and the number of task meetings held over this term. The practice of holding meetings in conjunction with or at the margin of another conference or event is common among the HIA tasks. In order to convey a sense of the scale of HIA activities, this table lists some of the key conferences, meetings or events coordinated with task meetings. Typical attendance at such events ranged from 200 to 2000.

別途指示のない限り、オブザーバは回数制限付きで(通常は1回)、または招聘のあった場合にのみ、タスク会議への参加を認められている。表13「HIAタスク会議参加状況と概要」にタスク名、平均参加者数、今期開催された会議数を列記した。HIAタスクの会議は他の会議やイベントに並行して、あるいは前後に関催するのが通例である。HIA活動の規模を感じていたため、タスクと連携した主要コンファレンス、会議、イベントも一部掲載している。こうしたイベントの参加者数は大半が200人から2000人であった。

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\(^{21}\) Assumes IEA representation at the second quarter 2008 Executive Committee meeting
### Table 13: Task Meeting Participation and Context

<table>
<thead>
<tr>
<th>Task (15-27)</th>
<th>Task Name ダスク名</th>
<th># Task Meetings 回数</th>
<th>Average Task Attendance 参加者数</th>
<th>Context and Coordination with other conferences, meetings and events 会議/ミーティング/イベントの背景と連携状況</th>
</tr>
</thead>
</table>
| 15            | Photobiological Production of Hydrogen 光生物学的水素製造 | 10                  | 15                            | -WHEC 15 2004  
- European Cooperation in the field of Science and Technology (COST);  
- 6th Int. Conf on the Molecular Biology of Hydrogenases;  
- Marine Biotechnology Conference;  
-Nordic Bioenergy Research Program |
| 16            | Hydrogen from Carbon-containing Materials 炭素含有物からの水素製造 | 8                   | 38                            | -GHG IA meetings (as Subtask A leader)  
GHG IAミーティング(サブタスクAのリーダーとして) |
| 17            | Solid and Liquid State Storage 固相および液相の水素貯蔵 | 7                   | 45                            | -stand-alone Gordon Conference style meetings  
単独のゴードン・コンファレンス形式ミーティング |
| 18            | Integrated Systems Evaluation 統合システム評価 | 11                  | 26                            | -HIA Task 24;  
HIAタスク24  
-HIA Task 23  
HIAタスク23  
-International Seminar – "Hydrogen in Islands" and RES2H project commissioning  
国際セミナー、「Hydrogen in Islands」とRES2Hプロジェクト委託 |
| 19            | Hydrogen Safety 水素安 | 11                  | 30                            | -2005 and 2007 HySafe Conferences 2005 |
Relative to task participation in conferences, refer also to Table 10 which provides numbers on task presentations made by task experts and Operating Agents at conference and meetings external to IEA during this term. Refer as well to Table 12: Conference Participation Scorecard which reports on Agreement participation (at the Executive Committee/Secretariat level) in conference/meetings. Typical attendance at such events ranges from 200-2000+, a significant indicator of the scale of HIA activities.

<table>
<thead>
<tr>
<th>全性</th>
<th>項目</th>
<th>年および2007年のHySafe会議</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Hydrogen from Waterphotolysis 水の光分解による水素製造</td>
<td>6</td>
</tr>
<tr>
<td>21</td>
<td>BioHydrogen バイオ水素</td>
<td>10</td>
</tr>
<tr>
<td>22</td>
<td>Fundamental and Applied Hydrogen Storage Materials Development 基礎的および工学的水素貯蔵材料開発</td>
<td>5</td>
</tr>
<tr>
<td>23</td>
<td>Small-Scale Reformers for On-Site Hydrogen Supply オンサイト水素供給用小型改質器</td>
<td>5</td>
</tr>
<tr>
<td>24</td>
<td>Wind Energy and Hydrogen Integration 風力エネルギーと水素の統合化</td>
<td>7</td>
</tr>
<tr>
<td>25</td>
<td>High Temperature Production of Hydrogen 水素の高温製造</td>
<td>3</td>
</tr>
<tr>
<td>26</td>
<td>Advanced Materials for Waterphotolysis 水の光分解のための先進材料</td>
<td>2</td>
</tr>
<tr>
<td>27</td>
<td>Near-Term Market Routes to H2 by Co-utilisation of Biomass as a Renewable Energy Source with Fossil Fuels 再生可能エネルギーとしてのバイオマスと化石燃料の併用による短期的な水素市場ルート</td>
<td>1</td>
</tr>
</tbody>
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コンフェレンスにおけるタスクの参加状況については、表10も参照されたい。今期IEA外部における会議やコンファレンスでタスク専門委員や幹事が行ったプレゼンテーション数が示されている。また会議/コンファレンスにおけるHIAからの参加状況(執行委員会/事務局レベル)を報告している表12「会議参加実績」も参照されたい。これらイベントには通常200-2000超の参加者があり、HIA活動の大きさを物語っている。

HIA Sponsored Seminars HIAをスポンサーとするセミナー

In 2008 the HIA co-sponsored a seminar in Athens Greece to launch Roads2HyCom. In 2009, the HIA will co-sponsor a technical meeting with the IAEA at the IEA. In the future, the HIA plans to hold seminars/workshops on Agreement activities with participation on the order of 50-200. The Agreement is also exploring sponsorship or co-sponsorship of a larger conference on a major aspect of hydrogen.

HIAは2008年にギリシャのアテネで開催されたRoads2HyCom発起セミナーの共同スポンサーとなった。2009年にはIAEAとともにIEAで開催された技術ミーティングひとつの共同スポンサーとなる。将来的には、50-200人の参加を得てHIA活動に関するセミナー/ワークショップを開催する計画だ。HIAは水素の主要分野に関する大型会議のスポンサーや共同スポンサーとなる可能性も探っている。

6.2 Common Fund 共同基金

The HIA has a Common Fund for administration and promotion. The Secretariat is responsible for administration (bookkeeping, accounting, reporting) of the Common Fund.

HIAは総務および広報活動のための共同基金を有す。共同基金の管理(経理、会計、財務報告)は事務局が担当している。

Common Fund dues were set at 5,000 USD for over a decade before the Executive Committee raised dues to 7,500 USD for most member countries effective 2005. The 5000 USD dues level was retained for smaller member countries.

共同基金の負担金は、10年間以上、5000ドルに設定されていたが、執行委員会が2005年から大半の国の額を7500米ドルに引き上げた。小国の負担金は現在も5000米ドルに据え置かれている。

The U.S. had been fully supporting the Secretariat function since 1995. It generously continued to fund the Secretariat until mid-2006. At that time the Agreement assumed full responsibility for this vital function. In view of the increased demand on the HIA Common Fund, the Executive Committee decided to raise the Common fund dues to 10,000 USD beginning in 2007, still retaining the 5000 USD level for the smaller members. The U.S. now contributes 20,000 USD level annually.

事務局機能は1995年から米国が全面的に支えてきた。この事務局に対する幅大な資金援助は2006年半ばまで続き、そこからこの重要な機能の全責任はHIAが負うことになった。そのためHIA共同基金に対するニーズが増したことから、執行委員会は2007年に負担金額を1万米ドルに引き上げたが、小国に対してはまだ5000米ドルで据え置いている。米国は現在、年間2万米ドル前後の貢献を行っている。

There has been an increase in the total amount of the HIA Common Fund during this term. The increase in the HIA Common Fund is partly attributable to the increase in dues and partly attributable to the 60% growth in membership during this term. However, the HIA’s financial condition did not change greatly. This is, as previously explained, because the Agreement now supports the Secretariat entirely from the Common Fund.

There has been an increase in the total amount of the HIA Common Fund during this term. The increase in the HIA Common Fund is partly attributable to the increase in dues and partly attributable to the 60% growth in membership during this term. However, the HIA’s financial condition did not change greatly. This is, as previously explained, because the Agreement now supports the Secretariat entirely from the Common Fund.

今期はHIA共同基金の総額が増加した。一部は負担金額の引き上げ、一部は加盟国増によるもので、加盟数は今期60％伸びている。しかしHIAの財務状況には大きな変化はない。これは前述したように、HIAが事務局費用全額を共同基金で賄っているためである。

Below please see the budgets for 2008 - the most recently completed year, and 2009 - the current year.

Below please see the budgets for 2008 - the most recently completed year, and 2009 - the current year.

Table 14: Common Fund Budgets 表14: 共同基金予算

### INCOME 収入

<table>
<thead>
<tr>
<th>Category</th>
<th>Budget 2008</th>
<th>Budget 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Fund dues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Income (USD)</td>
<td>215,000</td>
<td>215,000</td>
</tr>
</tbody>
</table>

### EXPENSES 支出

<table>
<thead>
<tr>
<th>Category</th>
<th>Budget 2008</th>
<th>Budget 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract labor - Secretariat 委託人件費 - 事務局</td>
<td>114,520</td>
<td>125,972</td>
</tr>
<tr>
<td>Administrative Assistant and Other Contract Labor 事務補助員その他委託人件費</td>
<td>25,175</td>
<td>22,960</td>
</tr>
<tr>
<td>Dues and Subscriptions 各種会費および購読料</td>
<td>500</td>
<td>1,000</td>
</tr>
<tr>
<td>Professional Services: Biennial Financial Review 専門サービス: 隔年の財務評価</td>
<td>-</td>
<td>6,000</td>
</tr>
<tr>
<td>Insurance 保険</td>
<td>1,450</td>
<td>2,000</td>
</tr>
<tr>
<td>Office supplies and Equipment 事務所備品/機器</td>
<td>2,750</td>
<td>2,500</td>
</tr>
<tr>
<td>Annual Report Printing (including tax) 年次報告印刷代(税込)</td>
<td>19,500</td>
<td>14,000</td>
</tr>
<tr>
<td>Annual Report Postage and event shipping 年次報告郵送費/イベント用品輸送費</td>
<td>2,250</td>
<td>4,000</td>
</tr>
<tr>
<td>Non-event postage and shipping イベント以外の郵送/輸送費</td>
<td>750</td>
<td>850</td>
</tr>
<tr>
<td>Promotion and outreach 広報宣伝費</td>
<td>11,905</td>
<td>8,000</td>
</tr>
<tr>
<td>Rent 賃借料</td>
<td>7,700</td>
<td>7,868</td>
</tr>
<tr>
<td>Telephone (plus internet and e-mail) 電話代(インターネットとEメールを含む)</td>
<td>2,500</td>
<td>4,800</td>
</tr>
<tr>
<td>Travel 出張費</td>
<td>14,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Website ウェブサイト</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Contingency 準備金</td>
<td>10,000</td>
<td>3,050</td>
</tr>
<tr>
<td>Total Expenses (USD) 総支出(米ドル)</td>
<td>215,000</td>
<td>215,000</td>
</tr>
</tbody>
</table>

All figures in USD 単位は全て米ドル

In 2006, in anticipation of future growth, the HIA also put a financial review in place through a regional accounting firm. The CPA firm of McLean, Koehler, Sparks & Hammond furnished an Accountant’s Review Report of the HIA’s financial condition as of December 31, 2006. The review concluded that the HIA’s financial statements were in conformity with generally accepted accounting principles in the United States. Future reviews will occur on a biennial basis.

将来の成長を予期したHIAは2006年、地元会計事務所による財務評価も実施した。McLean, Koehler, Sparks & Hammond公認会計士事務所が2006年11月31日現在のHIA財務状況に関する会計評価報告を作成した。この報告はHIAの財務報告書は米国の一般会計原則に準じていると結論している。今後も隔年ベースで評価が行われる。

**In-kind Contributions 現物寄与**

As a task-shared Agreement, no money changes hands at the Secretariat/Executive Committee level since members pay their experts and Operating Agents directly at local prevailing labor rates. Member participation is measured by the number of experts and person years/year. This practice applies to industry as well as government and research institutes. In essence, all task labor entails in-kind contribution. See Table 9 for participation data.
HIA is a task-oriented agreement and the member countries pay directly to their own national representatives at the level of their national pay systems. The costs are paid to the Secretariat/Executive Committee through the member countries. The participation rate is calculated based on the number of task participants and the years of employment. This applies to industry, governments, and research institutions. The participation rate is described in Table 9.

A few other contributions should be cited in the in-kind category: 他にも現物寄与と見なされるべきものが数件ある。

- Hosting of Executive Committee Meetings 執行委員会会議の主催
- Hosting of Task Meetings タスク会議の主催
- $400,000 GHG contribution for Task16 Subtask A タスク16サブタスクAへの40万ドルのGHG対策援助
- Hosting of our website free of charge by Mr. Darius Carpenter Darius Carpenter氏による無料ウェブサイトホスティング
- Hardware displays for Ministerial Conference 関僚会議における実機展示

To acknowledge extraordinary service to the HIA that includes in-kind contributions, the HIA has created an Angel Gallery at www.ieahia.org/pages/glance/AngelGallery.html.

現物寄与を含め、HIAに対する多大な貢献に謝意を表すため、HIAはAngel Gallery (www.ieahia.org/pages/glance/AngelGallery.html)を創設した。

7.0 Achievements and Benefits 業績と利益

Section 1.3 Shared Goals and Section 2.0 HIA Strategic Framework provide part of the context for assessment of HIA achievements and benefits during this term. 1.3「HIA共通目標」および2.0「HIA戦略枠組」に、今期のHIAの業績と利益を評価するための背景情報の一部が記載されている。

7.1 Technology Development and Deployment Success Stories 技術開発と成功例の実施

The HIA is pleased to report that there have been many successes. Every task has a story to tell. Accomplishments, benefits and success stories in technology development and deployment are captured in the table below. The success stories are bolded for emphasis.

多くの成功例を報告できるのは喜ばしいことである。全てのタスクが何らかにおいて成功している。技術の開発と実施における業績、利益そして成功例を下表にまとめた。成功例は太字で示した。

Table 15: Accomplishments, Benefits and Success Stories in Completed Term 表15：今期末における業績、収穫および成功例

<table>
<thead>
<tr>
<th>Task</th>
<th>Accomplishments, Benefits and Success Stories in Completed Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task</td>
<td>今期末の業績/収穫/成功例</td>
</tr>
</tbody>
</table>

Advancement of Science and Technology via pre commercial collaborative Production RD&D programs 商品化前の協同製造RD&Dプログラムを通じた科学技術の前進
**Task 15**

**Photobiological Production**

- R&D Progress toward development of H₂ production by microalgae
  - A novel sustainable photobiological production of molecular hydrogen upon a reversible inactivation of the oxygen evolution in the green alga Chlamydomonas reinhardtii (Subtask A)
  - Identification of accessory genes and gene products necessary for the photoproduction of H₂ in Chlamydomonas reinhardtii. Finding that STA7 and starch metabolism play an important role in C. reinhardtii H₂ photoproduction. (Subtask A) Chlamydomonas reinhardtiiの光合成による水素製造に必要な関連遺伝子と遺伝子派生物を同定。STA7と澱粉代謝がC. reinhardtiiの光合成による水素製造に重要な役割を担うことを発見（サブタスクA）
  - Identification and characterization of tla1, a novel gene involved in the regulation of the Chl antenna size in photosynthesis in C. reinhardtii (Subtask B) C. reinhardtiiの光合成におけるアンテナクロロフィルのサイズ制御に関連する新奇遺伝子tla1を同定、解析（サブタスクB）
  - The generation of 11.6 mol of H₂ per mol of glucose-6-phosphate using enzymes of the oxidative pentose phosphate cycle coupled to a hydrogenase purified from Pyrococcus furiosus (Subtask C) 酸化ペントースリン酸サイクルの酵素にPyrococcus furiosusから精製したヒドロゲナーゼを併用し、グコース6-リン酸1モルあたり11.6モルの水素を生産（サブタスクC）

**Task 16**

**Hydrogen from Carbon-Containing Materials**

- State of the Art reports for all three Task 16 subtasks: Subtask A on the potential for cost reduction of large-scale processing from natural gas with pre-combustion de-carbonization of fossil energy; Subtask B on prospects for H₂ from biomass from an industry perspective; and Subtask C on small-scale reformer technology for distributed near to medium term H₂ supply.

**Task 20**

**Hydrogen from Waterphotolysis**

- Development, acceptance and operation of two multi-year R&D PEC programs, one at the U.S. DOE and the other, called “NanoPEC”, under EU 7th Framework Program. 複数年に渡るPECのR&Dプログラム2件を開発、承認および運用。1件はDOEが実施、もう1件はEUのFP7計画に基づくもので「NanoPEC」と呼ばれている。
  - Pioneered Fe₂O₃ (Hematite) as very promising, abundant, low-cost and environmentally benign photoanode material. 非常に有望かつ豊富、低コストにして環境に優しい光電極材料としてFe₂O₃（ヘマタイト）を提唱。
  - Maturing PEC water-splitting tandem concepts PEC水分解タンデムの概念を発展
  - Photoelectrochemical (PEC) work on tungsten trioxide led to development of novel, highly sensitive, reliable and low-cost pollution control sensors for auto industry. 三酸化タングステンの光電気化学(PEC)の研究が、自動車産業向けの新奇かつ高感度、信頼に足る低コストの汚染制御センサーの開発につながる。

**Task 21**

**BioHydrogen**

- Better genomic understanding of hydrogen-producing strict anaerobes 水素を発生する偏性嫌気性菌のゲノムに知見を深める
  - New assessment method for overall analysis of BioHydrogen (Subtask D) has been screened バイオ水素の総合分析に関する新たな評価方法を選定

Task 23 • Small-Scale Reformers for On-Site Hydrogen Supply (SSR for Hydrogen)

- Contributing to development of norms for small-scale reformers to harmonize industrialization. This effort, which includes carbon capture, is crucial to development of the hydrogen infrastructure and future distributed generation capability.

 Task 24 • Wind Energy and Hydrogen Integration

- Setting the stage for large-scale use of renewable wind energy for hydrogen production in the near future by addressing the entire wind to hydrogen production chain from technical, economical, social, environmental, market and legal perspectives.

 Task 25 • High Temperature Production of Hydrogen

- Poised to elaborate world-wide knowledge on specific high temperature (>500ºC) processes (solar and nuclear) that will support production of massive quantities of zero-emission hydrogen.

 Task 26 • New

- On track to create data base on advanced materials for waterphotolysis
<table>
<thead>
<tr>
<th>Task 18 Integrated Systems Evaluation</th>
<th>World’s best address for worldwide information and analysis on hydrogen and integrated systems</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>水素および統合システムに関する全世界の情報と分析における世界最高の取組み</td>
</tr>
<tr>
<td>- Database with 200+ National Documents 200以上の国家文書データベース</td>
<td></td>
</tr>
<tr>
<td>- National Organizations database 国家運営組織データベース</td>
<td></td>
</tr>
<tr>
<td>- National Projects database 国家事業データベース</td>
<td></td>
</tr>
<tr>
<td>- State of the art analysis entitled Demonstration Project Evaluations 最先端の分析を 「Demonstration Project Evaluations(実証事業評価)」として集大成</td>
<td></td>
</tr>
<tr>
<td>- used technical simulations that may be applied to other projects to replicate results 使用した技術シミュレーションは他のプロジェクトに適用して反復性の検証が可能</td>
<td></td>
</tr>
<tr>
<td>- General conclusions in critical areas of system evaluations, data monitoring, modeling tools, system design, control systems and cost-benefit analysis 統合システム評価、データモニタリング、モデリングツール、システム設計、制御システムおよび費用対効果分析といった主要分野を全般的に総括</td>
<td></td>
</tr>
<tr>
<td>- Synthesis, lessons learned and trend analysis relate to permitting, funding and technology performance 許可、資金調達および技術性能に関する合成と教訓およびトレンド分析</td>
<td></td>
</tr>
<tr>
<td>- More than a dozen relevant case studies 1ダース以上の関連事例研究</td>
<td></td>
</tr>
</tbody>
</table>

| Task 19 Hydrogen Safety | -Contribution to global understanding of H safety through studies and databases laying foundation for codes and standards 研究やデータベースにより水素安全性に対する世界の理解を構築 |
|                        | -Phase 1 laid theoretical groundwork for phase two testing program to evaluate the effects of equipment or system failures under a range of real life scenarios, environments & mitigation measures 第一期では、第二期に計画されている様々な現実的なシナリオにおける機器やシステムの不具合による影響、環境、緩和措置を評価する試験プログラムのための理論的基礎を築く |
|                        | -Subtask A Activity 1 produced a Survey of Hydrogen Risk Methods in Phase 1. サブタスクAの活動1は第1期で「Survey of Hydrogen Risk Methods (水素リスク[評価]法調査)」を作成 |
|                        | -Subtask A Activity 2 produced Comparative Risk Assessment Studies of Hydrogen and Hydrocarbon Fuel Fuelling Stations. サブタスクA活動2は「Comparative Risk Assessment Studies of Hydrogen and Hydrocarbon Fuel Fuelling Stations (水素および炭化水素燃料供給ステーションのリスク比較評価研究)」を作成 |
|                        | -Subtask A Activity 3 produced a Knowledge Gaps White Paper サブタスクA活動3は「Knowledge Gaps White Paper (知見格差白書)」を作成 |

### 7.2 Policy Relevance 政策関与
While neither policy formulation nor policy promotion is a core HIA activity, the HIA is acutely aware both of their importance. The HIA is also aware that concern for energy policy is central to the CERT’s objectives for itself, the working parties and the implementing agreements. Therefore, during this term, the HIA has deliberately begun to position itself for policy relevance by contributing to effective energy and environmental policymaking through select Executive Committee/Secretariat and task activities.
All HIA policymaking contributions recognize that the environmental benefits of hydrogen technology are crucial to mitigating the impact of climate change and improving urban air quality. This assessment is directly related to future prospects for hydrogen use. Hydrogen can be a near zero emission energy carrier when produced from renewable or nuclear energy. It can be a low carbon energy carrier when produced from fossil fuels subject to carbon capture and storage.

In its spring 2008 message to the Executive Committee, the new HIA Analysis Group emphasized that all Agreement analysis must focus on the emissions side of the equation and the “clean, sustainable” aspects of hydrogen use. During this term, emissions issues have also come under scrutiny in HIA tasks. Task 16 addressed the topic of pre-combustion de-carbonization. Task 23 is addressing integration of reformer and carbon capture unit and the implications for carbon capture technology.

The recent Task 18 Survey of Mechanisms for the Development and Demonstration of Hydrogen Systems analyzed methods used to fund effective (fostering long term growth) and efficient demonstration projects in 11 developed countries. The survey provided some significant conclusions, notably that the most successful projects were not necessarily from the richest or most populous countries and that a range of funding mechanisms are recommended to address the potential range of applications. One of the Task 18 Subtask C activities is examining the role of policy in stimulating commercial potential of hydrogen systems in niche or early markets.

The Task 18 Survey of Mechanisms for the Development and Demonstration of Hydrogen Systems (水素システムの開発および実証メカニズム調査)で、先進11ヵ国における長期的な成長を育む効率的かつ効果的な実証事業の資金調達に用いられている手法を分析した。調査は複数の有意義な結論をもたらし、最も成功した事業が必ずしも最も富める国や人口の多い国のものとは限らないこと、また可能性のある幅広いアプリケーションに取り組むためには、資金調達のメカニズムにも幅を持たせることが推奨されることなどが目立った。タスク18サブタスクCの活動のひとつは、ニッチ市場もしくは初期市場における水素システムの商業化の可能性を奨励する上で、政策が持ちうる役割を検討するというものである。

Outreach activities such as the IEA Ministerial Conference have afforded the HIA the opportunity to interact directly with policy makers in support of research, adoption and penetration of hydrogen technology. Other internal IEA meetings and events have provided the HIA with a platform from which to discuss the status of the technology, the Agreement’s portfolio and future prospects.

Notwithstanding the importance of these activities, the HIA recognizes that its analytic efforts and products alone will not be sufficient to influence policy development. Therefore, the HIA is also actively requesting involvement in IEA analysis efforts from their earliest stages.

7.2.1 Committee on Energy Research and Technology (CERT)

The CERT vision is that “technology will have an increasingly decisive impact on progress in the world wide quest for a globally clean, clear and competitive energy future.” The CERT’s mission is “to maximize energy technology by optimizing international collaborative RD&D and deployment, by initiating timely technology assessment, analysis and scenarios, by engaging non-IEA countries and crucially, by delivery policy guidance that will make a difference.” CERT objectives provide leadership that informs the development and implementation of HIA’s Strategic Plan. Since the HIA’s 2004-2009 term spans the period of two CERT Strategic Plans, HIA task and activity accomplishments are related to CERT objectives for both periods, 2003-2007 and 2007-2011.

Table 16: 2003-2007 CERT Strategic Plan Objectives and HIA Activities

<table>
<thead>
<tr>
<th>CERT Obj.#</th>
<th>CERT Objectives</th>
<th>HIA Activities in completed term (2004-2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To better identify and promote effective and innovative policies that stimulate energy technology R&amp;D</td>
<td>-Task 18 Subtask A products and Subtask B Final Report; Survey of Support Mechanisms for the Development and Demonstration of Hydrogen Systems plus Subtask C -Synthesis タスク18サブタスクAの成果物およびサブタスクB最終報告、「Survey of Support Mechanisms for the Development and Demonstration of Hydrogen Systems」サブタスクC「統合」タスク18 - 三つのサブタス ( \Box )クール、サブタスク19「安全」</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Task 16 – all three subtasks; Task 19 – Safety; Task 24 -incipient Analysis Group efforts タスク16の3サブタスク全て、タスク19「安全」</td>
</tr>
</tbody>
</table>

Table 16: 2003-2007 CERT戦略計画目標とHIA活動
Table 17: 2007-2011 CERT Strategic Plan Objectives and HIA Activities

<table>
<thead>
<tr>
<th>CERT Obj. #</th>
<th>CERT Objectives</th>
<th>HIA Activities in completed term (2004-2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Leadership and dialogue to support the CERT Working Parties, IAs and expert/ad hoc groups</td>
<td>- Active HIA cooperation with IEA: Secretariat, IAs, working parties, expert/ad hoc groups</td>
</tr>
<tr>
<td></td>
<td>CERT作業班、実施協定および専門委員/アドホックグループを支援するリーダーシップと対話</td>
<td>IAEAとの積極的な協力: 事務局、[他の]実施協定、作業班、専門委員/アドホックグループ</td>
</tr>
<tr>
<td>2</td>
<td>To more clearly define and analyze energy technology issues and opportunities, and to enhance development of analytic tools that inform and support policy and program development in member countries.</td>
<td>- Definition and analysis of issues and opportunities activities: cross-cuts all tasks 課題と機会に関する定義と分析活動 - 全タスクにて実施</td>
</tr>
<tr>
<td></td>
<td>- Enhance development of analytic tools —Tasks 18, 19, 23, 24, 26, 27 分析ツール開発を強化 - タスク18, 19, 23, 24, 26, 27</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>To more vigorously foster international networking and collaboration in energy technology R&amp;D</td>
<td>- Entire HIA Portfolio, including Outreach Program 広報プログラムを含むHIAポートフォリオ全般</td>
</tr>
<tr>
<td></td>
<td>- Cooperation with other Agreements: AFC, Bioenergy, GHG, Wind, ENARD, ETDE 他の実施協定との協力: AFC、バイオエネルギー、GHG、風力、ENARD、ETDE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Participation in all four NEET workshops NEETの4ワークショップ</td>
<td>すべてに参加</td>
</tr>
<tr>
<td></td>
<td>- External networking 外部ネットワーキング</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>To more effectively communicate key lessons learned through the CERT’s activities to IEA member country government and agencies, the research sector and other interested parties. CERT活動を通じて、IEA加盟国の政府および機関、リサーチ部門その他利害関係者により効果的に新たな知見を伝えていく</td>
<td>- 40 external conference presentations by Executive Committee and 6+ HIA Conference exhibits 行政委員会およびHIA会議で40回のプレゼンテーションを実施。6件以上のHIA会議展示</td>
</tr>
<tr>
<td></td>
<td>CERT活動を通じて、IEA加盟国の政府および機関、リサーチ部門その他利害関係者により効果的に新たな知見を伝えていく</td>
<td>- IEA内部プレゼンテーション12回</td>
</tr>
<tr>
<td></td>
<td>- 25+ key publications; over 1100 task publications, over 1000 presentations 25以上の本格出版物、1100超のタスク出版物</td>
<td>-continuous website improvement ウェブサイトの改善を継続</td>
</tr>
<tr>
<td></td>
<td>- 40 external conference presentations by Executive Committee and 6+ HIA Conference exhibits 行政委員会およびHIA会議で40回のプレゼンテーションを実施。6件以上のHIA会議展示</td>
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</tr>
<tr>
<td></td>
<td>- IEA内部プレゼンテーション12回</td>
<td></td>
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<td>- 25+ key publications; over 1100 task publications, over 1000 presentations 25以上の本格出版物、1100超のタスク出版物</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-continuous website improvement ウェブサイトの改善を継続</td>
<td></td>
</tr>
</tbody>
</table>
| 2 | Stronger focus on the role of technology policy in developing cleaner, more efficient energy technologies and in deploying them, and on the role of policy in catalyzing the scientific innovation needed to generate new energy technology approaches; constant efforts to distil for policy makers the important policy messages from work of the IEA energy technology network. | - Outreach Program  
広報プログラム  
- Analysis Group and analysis of issues and opportunities: cross-cuts all tasks  
分析グループと課題と機会の分析 - 全タスクに共通  
- Enhance development of analytic tools —Tasks 18, 19, 23, 24, 26, 27  
分析ツール開発の強化 - タスク18, 19, 23, 24, 26, 27 |
| 3 | Frequent, effective communication to policymakers of messages and perspectives extracted from analysis drawing on works and findings in the IEA’s collaborative R&D networks, notably from the implementing Agreements, Working Parties, expert and ad-hoc groups, and from associated private sector players and financial institutions. | - Outreach Program - Analysis group  
広報プログラム - 分析グループ |
| 4 | More fruitful liaison within the IEA family | - Active HiA cooperation with IEA: Secretariat, IAs, working parties, expert/ad hoc groups  
IEAとの積極的協力: [他の]実施協定、作業班、専門委員/アドホックグループ  
- Proactive efforts to expand IEA cooperation with Directorates of Global Energy Dialogue (GED), Sustainable Energy Policy and Technology (SPT) and Office of the Chief Economist (OCE):  
IEAとGlobal Energy Dialogue (GED)、Sustainable Energy Policy and Technology (SPT)、Office of the Chief Economist (OCE)との協力拡大に向け能動的に活動: AFC、バイオエネルギー、GHG、風力、ENARD、ETDE  
- Participation in all four NEET workshops  
NEETの4ワークショップ全てに参加  
- External networking  
外部ネットワーキング |
| 5 | More vigorous collaboration with non-IEA countries | Gleneagles 5, IPHE, UNIDO Icht  
グレンアイーグルズ5、IPHE、UNIDO Icht |

### 7.2.2 Renewable Energy Working Party (REWP) 再生可能なエネルギー作業班(REWP)

The HIA falls under the umbrella of REWP. The 2007-2009 REWP Strategic Plan and Mandate established four objectives, three of which apply to implementing agreement performance. Table 17 lists these three objectives and then indicates HIA Tasks and activities that contribute to their realization.
HIA is REWP’s umbrella organization. 2007-2009期REWP戰略計劃および任務は4目標を掲げており、うち3件がHIAの実績状況に関連するものであった。表17にこれらの目標とその現実に貢献したHIAのタスクと活動を記載する。

<table>
<thead>
<tr>
<th>REWP Objective #</th>
<th>REWP Objective 目標</th>
<th>HIA Tasks and Activities 2004-2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Continue to strengthen the Working Party’s role as the primary source of analysis and information on renewable energy technologies and their implementation for IEA committees and offices and non-IEA stakeholders. IEA 委員会や部門およびIEA外の利害関係者に対する、再生可能エネルギー技術とその実施に関する分析と情報の第一の発信源として、作業班の役割を引き続き強化していく</td>
<td>-HIA tasks with RE orientation and analysis component: 18, 21, 23, 24, 25 and 26 再生可能エネルギーをテーマもしくは分析コンポーネントとするHIAタスク: 18, 21, 23, 24, 25, 26, -New analysis group is strengthening Agreement’s role in analysis of hydrogen from renewable energy resources 分析グループの新設により再生可能エネルギー由来の水素の分析におけるHIAの役割を強化 - HIA Chair and Secretariat met with REWP to foster closer working relationship 緊密な協同関係を目指し、HIA議長と事務局がREWPと面談</td>
</tr>
</tbody>
</table>

7.3 Networking ネットワーキング
The support of HIA members is a formidable asset that allows the Agreement to bring the best experts in the world together for cooperative purposes. Essentially, the HIA serves as an “über” technical expert network, a value-added network of expert networks. It doesn’t substitute for particular academic networks, bilateral links between countries, international research or trade associations. Rather, it functions as a hub that enables and encourages participants to bring their best understanding and best practices from all these networks to benefit the well-leveraged, democratically developed problem-solving and horizon-expanding activities of the Agreement.

For networking purposes, one great HIA strength is the group’s composition, which cross-cuts all relevant communities: academic, research institutes, government and, increasingly, industry. Another great strength is that, as described in 5.0 Coordination with other Bodies, the HIA endeavors on an on-going basis to expand internal IEA and external linkages to increase the flow of information to a variety of stakeholders, including end-users. Internally, the HIA contributes wherever possible to IEA networking efforts, for example, to NEET workshops. As reported in 6.0 Management and Scale of Activities, HIA tasks frequently hold their meetings in conjunction with other conferences, meetings and events, thereby enhancing networking opportunities for researchers. Please refer to Table 13 for a list, by task, of select conferences and meetings that contribute to networking. Specific task contributions to HIA networking, some of which are also technology development and deployment success stories, are called out in the Table 18 below.

### Table 19: Task Contributions to Networking

<table>
<thead>
<tr>
<th>TASK #</th>
<th>TASK NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 15</td>
<td>Photobiological Production 光生物学的水素製造</td>
</tr>
<tr>
<td>Task 16</td>
<td>Hydrogen from Carbon-Containing Materials 炭素含有物からの水素製造</td>
</tr>
</tbody>
</table>

- Linked effectively with all type and size of entities interested in photobiological hydrogen around the world, notably in the EC and Asia
  - 世界中、特にECおよびアジアの光生物学的水素に関心を持つあらゆる種類と規模の事業体と効果的に連携
- Significant cooperation with other IEA IAs: Greenhouse Gas (GHG) led Sub-Task A; and IEA Bioenergy IA Task 33 on Biomass Gasification

- Innovation in industry participation: extensive and integral to performance of this work, the linkage with industry opened doors and expanded future opportunities for the HIA

Task 17  
**Solid and Liquid State Storage**

Status as world’s largest collaboration in H storage and “Gordon Conference style” meetings assured networking opportunities in research and government communities

Task 18  
**Integrated Systems Evaluation**

- Participation by sixteen national groups
- Ten national groups have hosted meetings at hydrogen demonstration locations; guests from other agencies and nations have been invited to observe

Task 19  
**Hydrogen Safety**

- Strong affiliation with HySafe Conference, recently created hydrogen safety conference with worldwide participation

Task 20  
**Hydrogen from Waterphotolysis**

- Effective networking activities enabled 2007 formation of two highly coordinated photoelectrode materials research groups, the USDOE PEC Working Group and the European Nanopec

Task 21  
**BioHydrogen**

- Task 21 has linked effectively with the rapidly expanding network of entities and individuals around the world interested in photobiological production of hydrogen (EU – Solar-H, Nordic BioHydrogen, Asia BioHyLinks) like its predecessor Task 15

Task 22  
**Fundamental and Applied Hydrogen Storage Materials**

- Globally recognized as world’s ultimate forum on hydrogen storage

Task 23  
**Small-Scale Reformers for On-Site Hydrogen Supply (SSR for Hydrogen)**

- Networking with industry, research institutes and hydrogen projects (notably with Hydrogen Islands and UNIDO-Ichet) is positioning this task to foster H₂ production from wind energy to non-IEA countries as well as IEA countries

Task 24  
**Wind Energy and Hydrogen Integration**

- Networking with industry, research institutes and hydrogen projects (notably with Hydrogen Islands and UNIDO-Ichet) is positioning this task to foster H₂ production from wind energy to non-IEA countries as well as IEA countries

Task 25  
**High Temperature Production of Hydrogen**

- Research results will flow out Task 25 network to the established international nuclear community and the emerging high temperature solar community

Task 26  
**Advanced Materials for Waterphotolysis**

7.4 More Efficient Use of R&D Resources より効果的な人財活用

The Agreement investment numbers – the monetary contribution to the HIA Common Fund and the person years of labor — tell a compelling story about the Agreement’s efficiency in cost sharing and resource pooling that
reduces the total costs of technology development.

HIA共同基金への出資と提供されている労務人年数が、費用分担と人財共有においてHIAは優れた効率を実現しており、技術開発の総費用の削減に有用であるかを明確に示している。

Table 9 in Section 4.2.3.2 aggregates the person year level of effort during this term. This figure comes to 712 person years. Expressed in monetary terms, this level of effort is conservatively valued at $71 million USD.

The Common Fund investment per member during this term totaled $42,500 (except for the three smallest and one largest) broken down as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>$ 2,500 (half year)</td>
</tr>
<tr>
<td>2005</td>
<td>$ 7,500</td>
</tr>
<tr>
<td>2006</td>
<td>$ 7,500</td>
</tr>
<tr>
<td>2007</td>
<td>$10,000</td>
</tr>
<tr>
<td>2008</td>
<td>$10,000</td>
</tr>
<tr>
<td>2009</td>
<td>$ 5,000 (half year)</td>
</tr>
<tr>
<td>Total</td>
<td>$42,500</td>
</tr>
</tbody>
</table>

In essence, the investment of $42,500/per member enabled the HIA’s 712 person year level of effort during this term. Whether monetized or expressed in labor terms, this a noteworthy return on the member’s Common Fund investment. The cost-benefit relationship is very attractive: a modest investment leveraged a substantial return.

For all national programs, the leverage factor has great significance. While member programs vary in size, scope and depth, members actively follow HIA progress and activities in order to maximize their investment, which translates into benefit for their programs. While most HIA members do not belong to every task, they receive regular in-depth reports on all activities. The Agreement has strengthened national R&D capabilities by providing participants with improved information and exposure to national hydrogen programs around the world.

全ての国にとって、費用対効果の高さは大きな意味を持つ。加盟国の[水素]プログラムは規模も対象範囲も奥の深さも様々だが、各国とも投資が最大に活かされる、すなわち自国のプログラムに資するよう、HIAの前進や活動を注視している。HIA加盟国の多くは全タスクには参加していないが、全活動に関し詳細な報告を受けている。HIAは加盟国に高度な情報と世界各国の水素プログラムへの広報を提供することによって、各国のR&D能力を強化してきた。

The factor used as an investment multiplier is $100,000 USD. This represents an average value of a person year of labor among HIA members.労務人年の換算係数は10万米ドルである。これはHIAメンバーの平均年間労務価額にあたる。
By way of concrete illustrations of the value of cost sharing and technology development to members, consider the HIA contribution in the following areas: fundamentals of hydrogen science; near and mid term production; norms and standards for future deployment, and analysis that fosters market adoption and training.

コスト分担と技術開発が具体的にどれほど加盟国の利益となっているかについては、水素の基礎科学、短中期における製造、将来的な水素技術実施のための規基準整備、市場導入や教育の礎となる分析といった分野を思い浮かべていただきたい。

In the mid-long term production arena, Tasks 15 and 21 deal with biological methods, Task 20 and Task 26 focus on advanced materials for photoelectrolytic methods, and Task 25 addresses high temperature nuclear and solar. Near and mid-term, Task 24’s work in wind hydrogen integration and Task 27’s efforts in biomass offer compelling examples of value added to technology evolution. In the storage area, Tasks 17 and 22 deal with advanced materials for storage. These efforts enable and sustain extensive, in-depth long-term research in basic and applied science wherein collective effort is expected to yield quicker results that benefit all concerned. In many of these cases, individual member efforts would either not be possible or would be severely restricted. Moreover, the existence of Task 20 and Task 26 has enabled members from these tasks to create new or larger, better-funded research member initiatives, specifically in the U.S. and the European Union.

中長期における製造分野では、タスク15と21が生物学的手法、タスク20と26が光電気分解のための先進材料、そしてタスク25が原子力と太陽光による高温製造に取り組んでいる。短中期的には、タスク24の風力エネルギーと水素の統合、およびタスク27のバイオマス研究などが、進化する技術に付加価値をもたらしているよい例である。貯蔵分野では、タスク17と22が貯蔵用先進材料を取り上げている。これらの作業は基礎および応用科学における奥深い長期的な研究を可能とし、また持続させるものであり、その努力を集結させることで、全関係者の利益となる結果を、協同で行わなかった場合よりも早く生み出すものと期待されている。これらの作業のほとんどは、会員が各々で行うのとは不可能であるか、非常に限られたものとなるかであろう。またタスク20および26があったからこそ、具体的には米国とEUにおいて、新規研究、または既に存在していてもより大規模で資金も十分な研究イニシアチブを創設することができたのである。

Relative to creation of norms and standards that advance the case for hydrogen, there is Task 19’s work on hydrogen safety and Task 23’s work on small scale reformers. Such work by definition requires international cooperation to produce results that will be acceptable to the international community.

水素を前進させるための規基準の策定については、タスク19の水素安全性とタスク23の小型改質器の取組みがある。自明のことではあるが、これらのタスクで国際社会に受け入れられる規基準を生み出すためには、国際協力を必要とする。

In terms of information-exchange and analysis, the HIA has assembled and is continuing to create robust databases such as the Task 18 Subtask A Information Bases for Integrated Systems Evaluation and the new PEC database in Task 26. Task 25, High Temperature Production, will map high temperature production programs and link with projects around the world. Task 16 Subtask A developed Large-Scale Integrated Hydrogen Production for Power Generation/Precombustion Decarbonization. This $400,000 USD study was funded by the huge industrial CCP countries in the GHG IA: it is a classic example of efficient use of R&D resources.

情報交換と分析に関しては、HIAはタスク18サブタスクA「統合システム評価のためのデータベース」とタスク26の新PECデータベースなどの強力なデータベースを構築しており、また引き続き創設してい。タスク25「水素の高温製造」は高温製造プログラムのマッピングを行い、世界中のプロジェクトを連携していく。タスク16サブタスクAは「Large-Scale Integrated Hydrogen Production for Power Generation/Precombustion Decarbonization」
Generation/Precombustion Decarbonization. (発電/燃焼前炭素除去のための大規模統合水素製造)」を作成した。これはGHG実施協定の先進CCP大国の出資による40万米ドル規模の研究であり、R&D原資の効率的活用の好例である。

In the training area, a couple examples bear mention. The Spanish Co-Operating Agent for Task 24, Wind Energy and Hydrogen Integration, is spending part of 2009 at the National Renewable Energy Laboratory in the U.S. Task 25, High Temperature Production of Hydrogen, contemplates embedding a task analyst at various facilities around the world for short periods to perform techno-economic analysis.

研修活動については2件が報告に値する。タスク24「風力エネルギーと水素の統合化」のスペイン共同幹事が2009年に、米国の国立再生可能エネルギー研究所に派遣され滞在した。タスク25「水素の高温製造」はアナリスト1名を世界中の様々な施設に短期間派遣し、技術経済性分析を行わせることを検討している。

In all of these cases, the accomplishments associated with collaborative Agreement efforts far exceed the potential output of any single member, illustrating the HIA’s claim to efficient use of its R&D resources.

これらの事例の全てにおいて、協定における協同作業関連の業績は加盟国が単独で生み出し得るいかなる成果をもはるかに凌ぐものであり、HIAの自負するR&D原資の効果的な活用を示すものである。

7.5 Acknowledgments 謝辞

The HIA would like to acknowledge its appreciation to the Office of the Legal Counsel for their advice and assistance during the 2004-2009 on several issues of importance, notably creation of the MOU with the IPHE and membership matters. The HIA would also like to acknowledge the cooperation of former Desk Officer Dr. Giorgio Simbolotti in the ongoing operations of the Agreement and particularly in connection with the HIA’s gaps and priorities effort.

HIAは法律顧問に対し、2004-2009期における複数の重要案件、とりわけIPHEとの覚書の創設や加盟関連の助言および支援に感謝する。またHIA業務の運営と、特にHIAのギャップおよび優先課題に関する努力について、前Desk OfficerであるGiorgio Simbolotti博士にも謝意を表したい。

7.6 Overall Significance of Agreement HIAの今期総合実績

To recap, the HIA made substantial progress toward or exceeded all benchmarks set in its 20042009 Strategic Plan.

まとめると、HIAは2004-2009期戦略計画で設定された全ての目標項目につき大きく近づいたか、それらを凌ぐまでとなった。

Table 20 below summarizes key statistics for the 2004-2009 term, providing a comparison of actual results with projections from the Strategic Plan for that period, where possible:

下表は2004-2009期実績集計であり、今期戦略計画に対する当初の予想が入手できた場合は、これを記載し実際の結果と比較している。

Table 20: Key Outcomes 表20: 主な実績
<table>
<thead>
<tr>
<th>Membership</th>
<th>加盟数</th>
<th>Number of members at end of term 期末時点の加盟数</th>
<th>14</th>
<th>~28</th>
<th>22 + three pending 3ヶ国が申請中</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tasks</td>
<td>タスク</td>
<td>Number of R&amp;D Tasks active during period 期間中活動したR&amp;Dタスク数</td>
<td>6-7</td>
<td>~8</td>
<td>13 + 1 in Definition 定義中</td>
</tr>
<tr>
<td>Level of Effort</td>
<td>作業量</td>
<td>Number of person years 就業人年数</td>
<td>~300</td>
<td>~500</td>
<td>740</td>
</tr>
<tr>
<td>Expert Meetings</td>
<td>専門家ミーティング</td>
<td>HIA summary publications HIA総括関連の刊行出版</td>
<td>38</td>
<td>~50</td>
<td>88</td>
</tr>
<tr>
<td>Publications/Articles</td>
<td>論文/記事</td>
<td>Expert publications/articles 専門委員による論文/記事</td>
<td>&gt;200</td>
<td>&gt;200</td>
<td>1,153</td>
</tr>
<tr>
<td>Presentations</td>
<td>プレゼンテーション</td>
<td>HIA ExCo/Secretariat – Internal to IEA HIA執行委員会/事務局  対IEA内部</td>
<td>-</td>
<td>-</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HIA ExCo/Secretariat – External to IEA HIA執行委員会/事務局  対IEA外部</td>
<td>~10</td>
<td>~25</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expert 専門家</td>
<td>-</td>
<td>-</td>
<td>1,015</td>
</tr>
<tr>
<td>Support</td>
<td>支援</td>
<td>Direct member support for Operating Agents 加盟国による幹事への直接支援</td>
<td>~1 mil USD 最高100万米ドル</td>
<td>~1mil USD 最高100万米ドル</td>
<td>~2 mil USD 最高200万米ドル</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Person Years (includes Operating Agent labor) 合計人年数(幹事就業時間を含む)</td>
<td>-</td>
<td>-</td>
<td>712 person years</td>
</tr>
<tr>
<td>HIA Budget</td>
<td>予算</td>
<td>Cumulative Operating Budget 累計運営予算</td>
<td>0.4 USD M 40万米ドル</td>
<td>1.0 USD M 100万米ドル</td>
<td>~0.85 USD M 85万米ドル</td>
</tr>
</tbody>
</table>

The four main HIA achievements of the period 2004-2009, the first term in the Second Generation HIA, are:

第2世代HIAの第一期5ヵ年である2004-2009期の主な業績には以下の4件がある。

1) the strong performance of its substantial portfolio, which features the HIA’s core business of long-term precompetitive R&D, but also includes mid-term R&D and near-term system-analysis that fosters technology deployment readiness;

2) organizational growth as measured by:

- number of members 加盟国数
- level of effort in person years 就業人年
- creation of an independent office 独立事務所の開設
- operation of a dedicated professional Secretariat fully funded by the HIA HIAの全額負担による専従スタッフが事務局運営を担当

3) an outreach effort that is communicating the potential of hydrogen energy as well as the substance and value of the Agreement’s work to members, the IEA, external stakeholders and decision makers around the
A burgeoning analytic effort designed to support the HIA’s RD&D and outreach efforts in pursuit of its mission to accelerate the widespread adoption of hydrogen.

7.7 Publications

For a complete list of publications mentioned or referred to in Part I of this report, please refer to http://www.ieahia.org/page.php?s=glance&p=plan.

本報告第1部で触れた刊行物の一覧はhttp://www.ieahia.org/page.php?s=glance&p=plan に掲載されている。
Part II Strategic Plan 2009 – 2014
第2部 2009–2014年戦略計画

1.0 Introduction はじめに
The HIA has a rich and long-standing tradition of international collaboration in hydrogen R,D&D. The Agreement’s tasks and activities encompass the full spectrum of research issues in production, storage, conversion, safety, integrated systems and infrastructure. The HIA is further committed to analysis and outreach in support of its R,D&D activities. Much technical progress has been achieved as a result of HIA coordinated research. Much growth is evident in the Agreement’s organizational capacity. The forecast for 2009-2014 is for continued HIA expansion, progress toward fulfillment of the HIA mission and enhancement of the HIA value proposition.

HIAは水素のRD&Dの国際協調において長年に渡る豊かな実績を誇る。HIAのタスクと活動は、製造、貯蔵、変換、安全性、統合システムおよびインフラに渡る研究課題の全範囲を包含している。さらに、RD&D活動を通じたため、分析および広報・普及活動にも取り組んでいる。HIAの協調的研究の成果として大きな技術的な進歩が遂げられた。HIAの組織力も大幅に強化されてきた。2009-2014年において、HIAはさらなる発展を遂げ、使命の実現に向けて進むし、バリュープロポジションの拡充を図っていく所存である。

2.0 Strategic Framework 戦略枠組

Figure 3: HIA Strategic Framework 2009-2014 図3: HIA 2009-2014年戦略枠組
2.1 Vision ビジョン
The Agreement’s vision for hydrogen remains unchanged: HIAの水素ビジョンは従来通りである。

The HIA vision for a hydrogen future is one based on a clean, sustainable energy supply of global proportions that plays a key role in all sectors of the economy.

地球の規模のクリーンな持続可能なエネルギー源を基盤とし、全ての経済分野において重要な役割を果たす水素による未来

2.2 Mission 使命
The HIA has adopted a mission statement for 2009H2014 that contemplates both the advancement of hydrogen and the role of the Agreement in achieving its vision: HIAは水素の利用推進とビジョンの実現における任務を踏まえ、2009-2014年の使命(ミッションステートメント)を採択した。

Accelerate hydrogen implementation and widespread utilization to optimize environmental protection, improve energy security and promote economic development internationally while establishing the HIA as a premier global resource for expertise in hydrogen.

水素の導入と普及を加速化し、環境保全の最適化、エネルギー安全保障の強化、国際的な経済開発促進を図るとともに、水素知見の世界最高の発信源としてのHIAを確立する。

2.3 Strategy 戦略
To fulfill its mission and achieve its vision, the HIA’s will continue to employ its existing strategy: 今後も次の従来の戦略を踏襲し、使命の遂行とビジョンの実現を目指していく。

Facilitate, coordinate and maintain innovative, research, development and demonstration activities through international cooperation and information exchange.

国際協力と情報交換を通じて、革新的な研究開発・実証活動の促進、調整、継続を行う。

2.4 Themes テーマ
For the period 2009H2014, the HIA has identified three major themes that stem from its mission and vision. These themes, at once goals and priorities, will direct and shape the HIA’s portfolios of tasks and activities during the period 2009-2014.  They are:

HIAは使命とビジョンに立脚し、2009-2014期の主要テーマを3本決定した。これらは目標であると同時に優先課題であり、これらのテーマを指針とし、2009-2014期中のタスクと活動のポートフォリオを作成する。

• Collaborative R,D&D

  That advances hydrogen science and technology

水素の科学技術の推進に向けた協同RD&D

• Analysis that Positions Hydrogen
For technical progress and optimization
For market preparation and deployment
For support in political decision-making

2.5 Portfolios
Each of the three themes for 2009-2014 is associated with a set of portfolios.

The four portfolios associated with the theme of Collaborative R,D&D are:
- Hydrogen Production 水素製造
- Hydrogen Storage 水素貯蔵
- Integrated Hydrogen Systems 統合水素システム
- Hydrogen Integration in Existing Infrastructure 水素の既存インフラへの統合

The three portfolios associated with the Analysis that positions Hydrogen theme are:
- Technical 技術
- Market 市場
- Support for Political Decision-Making 対政策決定支援

The three portfolios associated with Hydrogen awareness, Understanding and Acceptance are:
- Information Dissemination 情報普及
- Safety 安全性
- Outreach 広報活動

2.6 Governance and Management
The Executive Committee is the governing body of the HIA, comprised of one representative per member. The Executive Committee meets twice a year. Respectful and cognizant of the IEA’s mission, Shared Goals and objectives for 2007-2011, the Agreement complies with all IEA CERT management requirements. It

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cooperates, as well, with the Renewable Energy Working Party, the IEA Secretariat and, wherever possible, with its sister Implementing Agreements (IAs).

The HIA has an independent office managed by its Secretariat. The Secretariat Manager’s responsibilities include operations, management and coordination, communications and outreach, and representation. The Secretariat has strong capabilities in outreach and analysis as well as management of R,D&D. The HIA Executive Committee is committed to support such Secretariat expansion during the 2009-2014 term as is appropriate for the ongoing functioning and growth of the HIA.

3.0 Portfolio Planning: Rationales and Content ポートフォリオの企画立案：根拠と内容
This section presents the HIA’s portfolio planning rationales. It includes a brief statement on the state of the art and/or the status of current activities for each portfolio. Tasks that are now in place and are slated to continue in the new term are identified in the context of their respective portfolios. Discussion follows on the direction of HIA efforts and potential/proposed activities for each portfolio during the 2009-2014 term.

本項では、HIAポートフォリオの企画立案の原理を説明する。また各ポートフォリオの最新状況や活動の現況を簡単にまとめた。現在進行中のタスクは来期にも継続される予定で、それぞれのポートフォリオの説明で取り上げられている。続いて、HIAの取り組みの方向性と、2009-2014期中、実施の可能性がある活動案件または提案されている活動案件をポートフォリオごとに紹介する。
3.1 Collaborative R,D&D Theme

Collaborative R,D&D is the HIA’s core business. This R,D&D is typically medium and long-term in scope and pre-competitive in nature. The HIA’s Hydrogen Production and Storage: Gaps and Priorities examined near, mid and long term research needs in hydrogen production and storage.\(^{25}\) The HIA’s 2009-2014 Strategic Plan will address many or all of these research needs in its quest to advance hydrogen science and technology. Wherever possible and appropriate, the HIA will engage other IEA Agreements in its R&D activities as has been its practice in the past. Cooperation is currently in place with the Advanced Fuel Cell, Wind and Bioenergy IAs.

3.1.1 Production Portfolio

Meaningful progress has been made in new technologies for hydrogen production. However, Hydrogen Production and Storage: Gaps and Priorities concluded that, overall, there are significant needs for improvement in increased plant efficiency, reduction of capital costs, and reliability and operating flexibility for all production processes.

With respect to near-term options, Electrolysis and natural gas reforming are proven technologies that can be used in the early phases of building a hydrogen infrastructure. While alkaline electrolysis is a mature technology, PEM electrolysis stands to benefit from work in materials development and cell stack design. Task 24, Wind Energy and Hydrogen Integration, is working to efficiently combine electrolysers (a constant input device) with variable output wind turbines for production of hydrogen as a transportation fuel and on-site conversion of hydrogen to electricity for load balancing. There may be additional applied R&D in low temperature electrolysis later in the term.

Small scale natural gas reformers remain the subject of research: there are several demonstration cases but limited commercial availability. Task 23, Small Reformers for Hydrogen Production, is investigating both technical and marketing issues related to small scale reformers. This effort includes carbon capture and storage.

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\(^{25}\) Hydrogen Production and Storage: R&D Priorities and Gaps was published by the IEA in 2006.
There are several medium to long-term hydrogen production options.

In the mid-term, central fossil based production with CO$_2$ capture and storage could play a significant role. Research is needed on absorption and other types of separation processes as well as overall process layout and configuration.

Biomass to hydrogen processes are also a midterm option. More focus on feedstock preparation is needed. Logistics pose a challenge for this method and production appears economical only at large scale. Task 27, Near-Market Routes to Hydrogen by Co-utilisation of Biomass as a Renewable Energy Source with Fossil Fuels, addresses the full range of biomass to hydrogen issues.

Farther out on the time scale, basic and applied research is needed for both photoelectrolytic and biohydrogen production methods. These early-stage hydrogen production methods are the subjects of Task 26, Advanced Materials for Waterphotolysis (photoelectrolysis) and Task 21, BioHydrogen.

Photoelectrolysis faces significant materials and system integration issues. So vital is the materials challenge to development of photoelectrolysis that Task 26 has elected to concentrate on advanced materials research rather than continue at this time with design and development of photoelectrochemical (PEC) devices. However, it is anticipated that the Agreement will address fundamental and applied research in development of (PEC) devices later in this term, assuming sufficient progress in advanced materials research.
Hydrogen production in Biological processes that entail the use of hydrogenases (enzymes) as well as genetically engineered organisms is characterized by low conversion efficiencies. Fundamental research is needed to understand the natural processes and genetic regulation involved in these reactions. It is anticipated that this work will continue through much or all of this term.

High temperature (>500ºC) production of hydrogen is also an important area of investigation for the mid and long term. Key high temperature research topics include materials development, high temperature membranes and heat exchangers. Currently, Task 25 is investigating high temperature hydrogen production from nuclear and solar, which offers the potential for production of massive quantities of hydrogen. This effort will likely generate successor research efforts. High temperature electrolysis has been identified as an important, discrete research topic for the coming term.

The need for continuing or additional advanced materials research was a recurring topic in the HIA’s strategic assessment for 2009-2014. The need for research on catalysis was another recurring motif. Consequently, new basic and applied research activities in these areas are anticipated in this term.

As systems evolve for all types of hydrogen production methods, the HIA expects a heightened interest in applied technology research and development efforts on the componentry necessary for various hydrogen production methods.

3.1.2 Storage Portfolio ポートフォリオ：貯蔵
Both compressed gas and liquid hydrogen are commercially available today but research in these areas continues to improve performance and reduce costs. R&D issues related to compressed gas include fracture mechanics, safety, compression energy, and volume. In liquid hydrogen important R&D issues include: more efficient liquefaction, lower cost/better insulated containers, automated boil off capture (e.g., via hydrides), re-liquefaction and volume.

圧縮水素ガスも液体水素も市販されているが、性能の向上と低コスト化に向けた研究が続けられてい る。圧縮水素の研究開発課題としては、破壊力学、安全性、圧縮エネルギー、体積などが挙げられる。
液体水素では、より効率の高い液化方法、より安価かつ断熱性の高い容器、(水素化物などによる)ボイルオフ自動回収および再液化、体積などの重要な研究開発課題がある。

For on-board hydrogen storage applications, research has focused on materials-based solid state storage, which is currently in the development phase. The potential advantages of materials-based storage are lower volume, lower pressure (greater energy efficiency), and higher purity of hydrogen output. Important materials storage R&D issues include: volume, weight, lower desorption temperatures, improved desorption kinetics, recharge time & pressure, heat management, cost, chemical and environmental reactivity, durability, container compatibility and optimization.

車載用の水素貯蔵では、現在開発段階にある水素貯蔵材料による固相貯蔵の研究が中心的に行われてきた。貯蔵材料を使用することで、コンパクト化、低圧化(エネルギー効率向上)、水素の純度向上などのメリットがあると考えられる。水素貯蔵材料による貯蔵の研究開発課題の主なものには、容積、重量、放出反応の低温化、放出キネティクスの改善、再充填時間と圧力、熱管理、コスト、化学/環境反応性、耐久性、容器の適合性と最適化がある。

Task 22 is a current research task that focuses in large part on materials R&D for transportation. It is anticipated that Task 22 will be extended mid-term. The main objectives of Task 22 are to develop reversible or regenerative hydrogen storage media that meet international targets for hydrogen storage, while contributing to fundamental and applied understanding and development of storage materials and systems in stationary application.

タスク22は現行のタスクで、水素の輸送アプリケーション向け材料の研究開発に主眼をおいており、中期研究に拡大されると予想されている。本タスクの主な目的は、水素貯蔵において国際的に目標とされている水準を達成する可逆性または再生可能な水素貯蔵媒体を開発することであり、同時に定置アプリケーションのための貯蔵材料とシステムの基礎および応用研究と開発に資することである。

In parallel, it is expected that a more application oriented storage task, again related to the automotive sector, will be proposed. Substantial industry participation will be solicited for this task. Potential topics include: 1) technologies for hydrogen storage (compressed gas, liquid and materials); 2) comparison between different alternatives (engineering aspects, economics etc). Likewise anticipated as a research topic are the interfaces with conventional resource chains.

同時に、同じく自動車産業に関連したよりアプリケーションを絞った貯蔵タスクが提案される見込み。本タスクでは業界から多数の参加者を募る予定である。検討される可能性があるテーマは、1) 水素貯蔵技術(圧縮ガス、液体、水素貯蔵材料)、2)異なる貯蔵方法の比較(エンジニアリング面、経済性など)。他にも従来型資源サプライチェーンとのインタフェースも研究テーマも取り上げられることが予想される。

Later in this term, as storage systems meet technical targets, emphasis will shift to include R&D on componentry for all applications.

2009-2014期もさらに進み、各種貯蔵システムが技術目標をクリアすれば、すべてのアプリケーションにおいてコンポーネントの研究開発に向けて重点がシフトしていくであろう。

3.1.3 Integrated Systems Portfolio ポートフォリオ: 統合システム

Systems integration is an essential next step in collaborative hydrogen
R&D. Systems integration brings component subsystems together, ensuring their efficient functioning. Task 18 has undertaken modeling and evaluation of a broad collection of hydrogen demonstration projects expressly for the purpose of analyzing and modeling their overall design and performance. This will continue into the next term and may be extended during the term, modeling resources permitting.

Market introduction and penetration of hydrogen technology require optimized, well-integrated systems. Therefore, as time goes on, the Agreement will focus increasing effort and attention on 1) the componentry, devices and sensors that comprise the systems; and 2) their engineering as integrated systems. This will likely translate into new activities and new tasks during the 2009-2014 term. Relative to production, potential component development and system integration activities might begin with carbon-containing materials and conventional production methods and proceed to advanced production methods. Relative to storage, there are opportunities for component development and system integration in transport, stationary, mass storage and delivery applications.

As an energy conversion device, the fuel cell is one of the most important hydrogen technologies, one in which the HIA has an abiding interest. As systems integration efforts advance, the HIA will certainly investigate fuel cell issues more closely, likely in cooperation with the IEA Advanced Fuel Cell Implementing Agreement.
engineering; operation and maintenance; and codes and standards. While all these factors warrant attention, the HIA’s focus is on R,D&D issues and technical barriers. This augurs for potential research activities that 

interface with conventional resource chains (the grid, pipelines, trucking and other delivery systems). Likewise at issue are centralized and distributed hydrogen production, as well as mass storage.

A task on Infrastructure and Mass Storage that will consider the hydrogen distribution network from production sites to end users is already in definition. The scope of this task is likely to include pipelines (pumps and valves), as well as both gas and liquid mass storage above ground and underground storage in man-made and natural structures.

3.2 Analysis that Positions Hydrogen Theme テーマ：水素の推進に向けた分析

In less than a decade, the avalanche of interest in hydrogen has translated into development of roadmaps and a wide array of analytic efforts on R,D&D, infrastructure and market issues around the world. Some fine analytic work on hydrogen is available today. But a comprehensive analysis of global energy conditions that incorporates hydrogen in the world’s energy future is a complex and challenging proposition, complicated by high levels of political, technical, environmental and economic uncertainty. The HIA experience clearly suggests that some stakeholders and decision makers have unanswered questions about hydrogen, the collective efforts-to-date of the HIA, IEA and others notwithstanding. There is, in effect, a hydrogen information gap that needs to be filled with coherent and balanced information, providing a clearer picture of hydrogen R&D needs and the future of hydrogen in the economy. Furthermore, the
information needs to be appropriately packaged for specific target audiences.

10年足らずの間に水素への関心が急激な高まりを見せ、世界各国でロードマップの作成や研究開発・実証、インフラ、市場課題における幅広い分析活動が進められてきた。現在では、多少なりとも水素に関する優れた分析資料が入手できるようになっている。しかしながら、水素を組み込んだ将来的なグローバルなエネルギー事情の包括的な分析は複雑かつ難しい課題であり、政治、科学技術、環境、経済的な不確定性が高いためにさらに複雑である。関係者や政策立案者の一部が水素について依然疑問を抱いているのも事実で、HIA、IEAなどが共にこれまで努力を傾けてきたにも関わらず、解消されていない。つまり、水素の情報ギャップが存在しており、偏重のない一貫性のある情報でこのギャップを埋め、水素研究開発のニーズと経済における水素の未来を明確化する必要がある。さらに対象者に合わせて情報を適切にパッケージ化する必要がある。

Therefore, the HIA has reaffirmed its commitment to rigorous, independent analysis that supports collaborative R&D efforts and addresses the larger issue of the transition to hydrogen in the economy. This commitment amounts, in no uncertain terms, to an “Analytic Imperative.” As the premier global resource for technical expertise in hydrogen energy, who is better positioned to offer balanced analysis on these questions than the HIA?

The HIA has traditionally played a role in techno-economic analysis on a technology specific basis. It will continue to play this role in the new term, which cross-cuts R&D portfolios.

During the last term, the HIA began the process of organizing for analysis that will address important questions about hydrogen demand, supply, and infrastructure. This process, spearheaded by the Executive Committee Analysis Group, is growing into an analysis task that will position hydrogen for widespread adoption and penetration. Definition of the Analysis Task will begin immediately in the new term. The task will endeavor to optimize the resources dedicated to analysis, maximizing the benefits of the HIA’s analysis investment. The results of the analysis task will be packaged into appropriate products that best meet the needs of its target audiences. The products will then be disseminated through all available and appropriate channels. The Executive Committee expects that development of these products will not only contribute to filling the information gap but also more firmly establish the HIA as the leading technical resource in hydrogen.

There is an additional critical focus to the analysis theme, which concerns the HIA’s contribution to IEA
analytics. Pursuant to the Analysis Group’s recommendation, the HIA has approached the IEA to propose close cooperation on IEA analytic efforts that currently include or in the future might appropriately include hydrogen. The HIA has asked that its involvement begin early in the research and analysis process. The well regarded Energy Technology Perspectives (ETP) and the World Energy Outlook (WEO) publications are high on the list of noteworthy targets for HIA analytic cooperation.

Three portfolios are associated with the Analysis theme: technical, market and support for political decision-making. The expectation is that clear, carefully crafted technical, market, and public policy analysis will positively influence every aspect of development and deployment of hydrogen. Collectively, these three portfolios will provide the analyses needed to provide relevant stakeholders and policy makers with balanced information that stimulates R, D&D, market adoption and widespread application of hydrogen.

Some elements in the technical portfolio will consist of technology specific analyses conducted in various tasks, e.g., Task 24, Wind Energy and H₂ Integration, Subtask B – Needed Improvements and Systems Integration Technology Development on Main Equipment and System Integration Concepts; and technical materials developed for Task 25, High Temperature H₂ Production, Subtask B – Development of a Methodology Approach and Integration of HTPs. There is, in fact, a need to make the technical case for individual technologies. It is anticipated that the Analysis Task will interact with individual tasks and cooperate on the process of performing full life-cycle analyses.

3.2.1 Technical Portfolio ポートフォリオ: 技術

The technical portfolio comprises analysis intended, first and foremost, to promote advancement and optimization of the technology. This effort is also intended to ensure that the HIA provides a clear picture of evolving hydrogen R,D&D needs.

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There is a larger need to make a cross-cutting technical case for all hydrogen technologies – production, storage, conversion (including fuel cell) delivery and infrastructure. This effort will be based in the Analysis Task. The foundation for the effort is underway in the form of a literature review and gap analysis.

さらに必要性が高いのは、製造、貯蔵、エネルギー変換(燃料電池など)、輸送、インフラなど水素技術全般において、横断的に有望性を示すことであり、この作業は分析タスクが中心となって行う。文献研究やギャップ分析といった形で、本作業の基礎固めが進められている。

3.2.2 Market Portfolio 市場ポートフォリオ

The market portfolio of analysis activities will deal expressly with issues of market preparation and deployment. These issues include the topic of market transformation that supports the deployment of innovative technology, bridging the early, and often fatal, stage of market introduction and the later stage of market penetration. The analytic market portfolio effort will make the business case for hydrogen, positioning hydrogen for competitive advantage in the marketplace. This analysis will entail both supply and demand side assessments, including the non-energy sector. The supply side analysis will incorporate a market perspective. As previously stated, techno-economic analysis with a market perspective will be performed on individual technologies.

分析活動の市場ポートフォリオは、市場整備と導入の課題に特化して取り組む。市場導入の初期、すなわち成否を決定しかねない段階とその後の市場普及段階の橋渡しを行い、革新的技術の導入を促進するような市場変化とは何かというのも課題のひとつだ。市場ポートフォリオの分析作業は、市場において水素に競争上の優位性があることを示し、水素の事業性を立証する。すなわち、エネルギー以外の部門も含めて供給側と需要側両方のアセスメントを行う。供給側の分析には市場の展望も盛り込む。前述通り、市場展望を盛り込んだ技術経済分析は、個々の技術ごとに実施する。

3.2.3 Support for Political Decision-Making 対政策決定支援

While the technical portfolio speaks to technology, and the market portfolio speaks to market adoption, penetration and the "business case" for hydrogen, there is yet another important variable in the technology advancement equation: support for political decision-making. The CERT Strategic Plan 2007-2011 emphasizes the CERT's commitment to policy. The REWP’s Strategic Plan 2007-2009 also addresses policy factors that affect market deployment of renewable energy technologies. Therefore, the rationale for the analysis portfolio in support of political decision-making is: 1) that public policy will play a crucial role in development of hydrogen technology and its deployment in the marketplace; and 2) that support for political decision-making is considered indispensable to a future with hydrogen energy.

技術ポートフォリオは技術を、市場ポートフォリオは市場導入、普及、水素の「事業性」を対象とする一方、技術推進の成否のカギを握る要素がもう一つある。政策決定への支援である。CERTは、CERT戦略計画2007-2011[前半と統一要]で同委員会の政策への取り組みを強調している。REWP戦略計画2007-2009[上半]ともまた、再生可能エネルギー技術の市場への導入に影響を与える政策要素を取り上げている。対政策決定支援の分析ポートフォリオは次をその根拠とする。①公共政策は、水素技術の開発と市場への導入において極めて重要な役割を果たす。②政策決定への支援は、水素エネルギーの未来にとって不可欠であると考えられる。

The Support for Political Decision-making Portfolio will undertake analysis that aligns investment in hydrogen
technology with global public policy concerns, notably climate change and emissions reduction. Wherever appropriate, this analysis will utilize findings and conclusions from the technical and market analyses. The results will be presented in position papers and briefs. This analysis activity will be undertaken in coordination with CERT strategic objectives, in particular Strategic Objective #3.26

政策決定への支援ポートフォリオは水素技術への投資を、気候変動や排出量削減を筆頭とする世界的な公共政策課題と調和させる分析を実施する。技術分析や市場分析の調査結果や結論も、活用していく。分析結果はポジションペーパー(方針説明書)や概要報告において発表する。本分析活動は、CERTの戦略目標、具体的には戦略目標#3.26に調和して実施していく。

### 3.3 Hydrogen Awareness, Understanding and Acceptance Theme テーマ: 水素の認知・理解度、受容性向上

The Hydrogen Awareness, Understanding and Acceptance theme complements the HIA’s principal theme - Collaborative R&D, and its supporting theme - Analysis. It acknowledges that awareness, understanding and acceptance are requisite to technology diffusion and commercialization. It recognizes that the benefits of hydrogen must be articulated to stakeholders and decision makers. And it accepts a major role for the HIA in the communications process. Through this three portfolio effort to foster technology diffusion and commercialization, the HIA expects to increase its visibility as the reference institute for hydrogen.

HIAの最大のテーマ、「協同研究開発」およびそれを支えるテーマ「分析」を補完するのが、「水素の認知、理解、受容性向上」のテーマである。技術の普及と実用化には、認知、理解、受容が不可欠であることを認識すると共に、水素のメリットを関係者や政策立案者に明確に伝達する必要性を認め、伝達にお

26  Frequent, effective communication to policy makers of messages and perspectives extracted from analysis drawing on work and findings on the IEA’s collaborative RD&D network, notably from the Implementing Agreements, Working Parties, expert and ad-hoc groups and from associated private sector players and financial institutions.

IEAの協同 RD&D ネットワーク、各実施協定、作業部会、専門家部会および臨時部会、関連する民間部門の関係者と金融機関による作業および研究結果に基づく分析から導き出されたメッセージや見解を、政策立案者に頻繁かつ効果的に伝達する CERT Strategic Plan, 2007-2011, IEA Committee on Energy Research and Technology (CERT), p5. IEA エネルギー開発および技術 (CERT) 委員会 2007-2011年 CERT 戦略計画 p5

3.3.1 Information Dissemination Portfolio 情報普及ポートフォリオ

This function is basic to building hydrogen awareness, understanding and acceptance. It targets key stakeholders in the science, energy and environmental communities, as well as the media. It also targets key stakeholders and decision makers in government and industry, who are of great and growing importance. And, of course, regular information dissemination to member countries is one of the benefits of HIA membership. In addition, the HIA appreciates that the IEA is itself an important target audience. As an Agreement whose membership includes non-IEA member countries, the HIA appreciates the potential benefits of the IEA’s call to disseminate information beyond the borders of IEA member countries. Further, the information dissemination function aims to inform and educate the interested public(s).

The HIA understands that the ultimate success of the Analysis Imperative depends upon effective information dissemination. At the end of the 2004-2009 term, information dissemination entailed distribution of various HIA products through a number of channels at both the Executive Committee level and at the task level. For the 2009-2014 term, both expansion in the HIA information products – resulting in significant part from the analysis efforts — and more frequent use of distribution channels are planned. In addition, new platforms for information dissemination will also be adopted.

At the Executive Committee level, utilizing the Secretariat, information is now developed and disseminated through the website, newsletter, brochures and the Annual Report. The HIA also contributes to IEA publications. Information is also disseminated through the HIA’s conference strategy, which divides conferences into those internal to the IEA and those external to the IEA. The external market is further segmented into the following categories: hydrogen and fuel cell; renewable/sustainable; environmental; conventional energy; transportation; and utilities/infrastructure. The conference strategy entails preparation and delivery of abstracts, papers and related presentations as well as exhibits. Finally, there is a public relations and media strategy that also contributes to information dissemination. All of these activities will continue in the new term.
In addition, the HIA will expand its conference participation in the new term budget permitting. First, it will add value to established conference opportunities by expanding the HIA presence at these conferences, via a larger number or higher profile speaking opportunities, or exhibition. Second, it will add conference participation in new market segments to broaden its audience exposure opportunities.

New this term is a conference/meeting initiative that will allow the HIA to hold meetings/conferences to discuss progress, activities and achievements. These gatherings may be held at IEA Headquarters in Paris, the HIA office in metropolitan Washington, D.C., and as yet unidentified venues. Expected attended would range from 50-200. New also this term is pursuit of a major technical conference as an HIA sponsorship (or co-sponsorship) and branding opportunity.

During the 2009-2014 term, the HIA expects to make increased use of Information Technology (IT) to create new platforms and channels for information dissemination. Webinars and podcasts are prime candidates. The Agreement also expects to enhance delivery of HIA news through Really Simple Syndication (RSS). These platforms will allow the HIA to tailor information offerings to target audiences from its substantial, and growing, knowledge and analysis base.

At the task level, HIA experts have produced over 1,000 HIA related publications/reports and 1,000 HIA related presentations. The trend toward increased production of information in publications/reports and presentations is expected to continue during this term.

As hydrogen progresses toward commercialization during the 2009-2014 term, the HIA newsletter will expand or possible evolve into two products. This expansion is intended to capture growing interest in hydrogen
demonstrations and the hydrogen marketplace.

2009-2014期中に水素の商業化に向けて前進するにつれ、HIAニュースレターを拡充するか、2つに分割する可能性がある。水素実証と水素市場へ高まる関心を捉えることを目的とする整備である。

The HIA also plans to coordinate to the greatest extent possible with its sister Agreement, the IEA Energy Technology Data Exchange (ETDE).

また姉妹協定であるIEAエネルギー技術データ交換(ETDE)ともできる限り積極的に連携していく考えである。

3.3.2 Safety Portfolio 安全性ポートフォリオ

Hydrogen safety and consumer comfort with hydrogen are vital ingredients for acceptance of hydrogen. Hydrogen safety considerations cross-cut the HIA R,D&D portfolios. Task 19 explicitly deals with safety through analysis, testing and the development of target information products. During, as safety information products become available, Task 19 plans to distribute them as broadly as possible. The Secretariat will participate directly in distribution and promotion of the Task 19 safety products. Further, the Secretariat will incorporate Task 19’s findings and conclusions on safety into other HIA communication vehicles whenever possible. Additional safety activities – one or more tasks – are projected for the new term. Precise topics will be defined as Task 19 nears its 2010 conclusion; the regulatory framework for codes and standards is likely to be included in the mix.

水素が受け入れられるためには、水素の安全性と水素に対する消費者の信頼感が不可欠である。水素安全性はHIAのRD&Dポートフォリオ全般にまたがる課題である。タスク19は安全性に特化したタスクであり、分析、試験、利用者を絞った情報資料の開発を通して安全性に取り組む。来期中、安全性の情報資料がまとまるに従い、タスク19は可能な限り広範囲に配布していく予定である。事務局もタスク19の安全性情報パッケージの配布と広報に直接携わる。さらに事務局は、タスク19の安全性に関わる研究所見や成果を、できる限り他のHIAの情報伝達媒体にも組み込んでいく。安全性に関する新たな活動(タスク1件かそれ以上)が来期に実施される見通し。タスク19の終了期限である2010年近くになれば、明確なテーマが決定されるが、規基準に関する規制枠組みもテーマの一つに取り上げられる予定。

3.3.3 Outreach Portfolio広報活動ポートフォリオ

The Outreach Portfolio focuses not only on informing but more importantly on engaging a critical subset of HIA stakeholders and decision makers. In so doing, it builds on the function and activities of the Information Dissemination Portfolio, which seek to inform a variety of target audiences and interested publics. However, the Outreach Portfolio goes beyond information dissemination in pursuit of active engagement with the HIA.

広報活動ポートフォリオでは、一般広報活動はもちろんであるが、重要度の高い一部のHIA関係者や意思決定者の参画を促進することに比重を大きく置いている。本ポートフォリオはこのうえで、多様な対象者層や関心を寄せている一般市民向けに情報を提供する情報普及ポートフォリオの役割と活動を支えるものであるが、情報普及からさらに敷衍してHIAへの積極的な参画の促進を図る。

Engagement with the HIA may take several forms, including participation as an HIA expert, a member or possibly a sponsor. Engagement may also imply cooperation on a more limited timeframe or for a particular purpose. Engagement categories are discussed later in this section.
HIA専門委員として、あるいは会員、スポンサーとしてなど、様々な形態でHIAに参加することが可能である。期間を限定して協力する、または所定の目的のために協力することで参画することもできる。参加区分については本項で後述する。

To engage this important subset of the greater target audiences, the Outreach Portfolio will employ the full array of HIA information and analysis products and materials. It will utilize all available channels and vehicles, including networking opportunities. Active participation of the Executive Committee Members and Operating Agents, who are well-positioned to carry out these activities in strategic situations around the world, is considered essential. The Secretariat will support this effort.

Potential Participants: Experts 参加形態: 専門委員
HIA Experts are the labor force that carries out the HIA’s Strategic Plan and Program of Work. Operating Agents and Sub-task leaders positions are mission-critical management functions in every HIA task. As a task-shared Agreement, experts are contracted and compensated directly by members. Nevertheless, the identification and training of potential experts, Operating Agents and Sub-task leaders is a continuous process for the HIA. This process involves current experts, Operating Agents, Sub-task leaders and members as well as the Secretariat.

HIA専門委員はHIA戦略計画と事業計画実施の実務を担う存在である。幹事およびサブタスクリーダーは、どのHIAタスクにおいても、任務遂行の指揮をとる重要な役割を果たす。タスク共有協定であることから専門委員は加盟国が直接雇用するが、専門委員、幹事、サブタスクリーダー候補の特定および養成は、HIAにとって恒常的な業務である。これは、現行専門委員、幹事、サブタスクリーダー、会員、事務局が行っている。

Potential Participants: Members 参加形態: 会員
Today, HIA membership is comprised entirely of Contracting Parties — countries and the European Commission. International organizations are also eligible for membership as Contracting Parties; UNIDO, a leading international organization, is now in the HIA membership pipeline. Additional countries, IEA member and non-member (including the Gleneagles “+ 5”) countries, are either in the membership pipeline or in discussions with the HIA about membership. The HIA seeks to engage other IEA member and non-member countries as it looks forward to continued growth in membership. The HIA is most especially interested in attracting members who are willing and able to commit to active participation in Agreement tasks and activities.

現在HIAに加盟しているのは国家と欧州委員会のみである。国際機関も加盟資格がある。国連工業開発機関(UNIDO)は主要な国際機関であるが、現在、HIAの加盟手続き中である。さらに、IEA加盟国も非加盟国(グレンイーグルズG5を含む)も含めて、HIA加盟手続き中であるか、加盟についてHIAと協議中である。HIAは加盟国のさらなる拡大を目指し、他のIEA加盟国、非加盟国の参画を募っている。とりわけHIAのタスクと活動に意欲的な参加を奨励してくれる加盟国を求めている。

Potential Participants: Sponsors 参加形態: スポンサー
Industry is eligible to join in the sponsor category. As of the end of the 2004-2009 term the HIA had no “sponsor” members but industry has sponsored a number of task experts, often up to 100% over the task period. It is clear from the example of other Agreements that industry sponsors have the potential to make significant

contributions to the advancement of hydrogen technology and the realization of the HIA mission. The HIA will consider parameters for sponsorship early in the new term.

企業(産業界)はスポンサーとして参加資格がある。2004-2009期末において、スポンサーとしてのHIA会員はいないが、企業はこれまで数多くのタスク専門委員のスポンサーを努めており、タスク期間の100%、専門委員を出したケースも少なくな。企業スポンサーが水素技術の推進とHIA使命の実現に多大な貢献をし得ることは、他の実施協定の例からも明白であり、HIAは2009-2010期早々にスポンサーシップの募集要項を検討する予定。

In tandem, the HIA will continue to encourage greater participation by industry experts at the task level. Each task will be asked to set a target for industry participation.

同時く、引き続きタスクレベルにおける業界専門家の参加拡大を呼びかけていく。タスクごとに業界参加度の目標を立てるように要請する。

Cooperation within the IEA  IEA内協力
The HIA looks forward to cooperation with the IEA family at all levels. Continued engagement with the IEA Secretariat and Office of Legal Counsel is important to the success of our ongoing operation. HIA Analysis and Outreach activities are expected to provide especially important opportunities for IEA cooperation during this term. The HIA hopes to enhance its ties to the REWP and cooperate with sister Agreements wherever possible.

HIAはあらゆるレベルでIEA傘下団体と協力していく所存である。IEA事務局および法務部との関わりを継続していくことが、HIAの業務の成功に欠かせない。2009-2014期は、特にHIAの分析、広報活動においてIEAと協力する機会があると思われる。またREWとの関係を強化し、姉妹協定ともできる限り協力していきたいと考えている

Cooperation with the Hydrogen Community 水素関係者との協力
The HIA will continue to engage the greater hydrogen community, which includes the International Partnership for a Hydrogen Economy (IPHE) and trade organizations, in cooperative efforts to accelerate widespread use and application of hydrogen. The HIA recognizes that the greater hydrogen community, and certainly the IPHE, has the capacity to reach out effectively to key stakeholders and decision makers for support in policymaking and development of the marketplace.

HIAは今後も、水素経済のための国際パートナーシップ(IPHE)や業界団体など、水素関連組織との連携を広げ、水素の普及と応用の加速化に向けた協調的な取組みを行っていく。諸水素関連組織、とりわけIPHEは、政策立案や市場開発の支援要請のために主だった利益関係者や意思決定者に対し効果的に働きかけることができるはずである。

Cooperation with the Renewable Community 再生可能エネルギー関係者との協力
The HIA will seek to engage and educate the renewable energy community about hydrogen to foster harmonious relationship in pursuit of mutual objectives. As part of this process, the HIA will seek closer ties with other implementing agreements in the REWP, the REWP itself, renewable trade organizations and the renewable industry.

再生可能エネルギー関係者に対し連携を働きかけ、水素について啓発し、共通の目的に取り組んでいくうえで協和的関係の構築を図る。この過程において、REWの実施協定、REWそのもの、再生可能エネルギーの業界団体および再生可能エネルギー産業との絆を強化していく方針。
Outreach to Key Stakeholders and Decision Makers 主要関係者や意思決定者への広報活動

Certain prospects — key stakeholders and decision makers in government and industry — are high priority targets of this outreach effort because their influence and support are needed for R,D&D prioritization and funding, policy formulation and market development. The HIA will make every effort to identify, inform and engage key stakeholders who are likely to contribute to the diffusion and commercialization of hydrogen science and technology.

広報活動は、対象者の中でも潜在的に重要性の高い人々 — 主要関係者や意思決定者 — を優先的にターゲットとする。RD&D優先順位設定および原資配分、政策策定、市場開発にその影響力と支援が必要だからである。HIAは、水素科学技術の普及と実用化に貢献する可能性がある重要関係者を特定し、情報提供、参画促進に尽力していく。

Country Outreach: IEA Member Countries and IEA non-Member 対国家情報普及: IEA加盟国および非加盟国

The HIA will pursue engagement with IEA member and non-member countries via HIA membership or cooperation in areas of mutual interest. Country prospects will be prioritized according to their inclination and capacity for HIA cooperation. The new HIA conference strategy, a part of the information dissemination portfolio of activities, is expected to facilitate engagement efforts.

HIAへの加盟、もしくは共に関心のある分野における協力関係を通して、IEA加盟国および非加盟国との連携を強めていく。HIAとの協力に対する意欲と能力に応じて候補国の優先順位を定める。情報普及活動ポートフォリオの一環である、新たなHIA会議戦略も連携への働きかけを促進することになろう。

Finally, the HIA continues to welcome and plans to actively pursue cooperation and liaison with a full range of interested groups in public and private sectors. Examples of groups in the public sector include the International Atomic Energy Association (IAEA), the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Environment Programme (UNEP). Examples of groups in the private sector include energy and automobile industry trade associations.

最後になるが、公共および民間部門の関心を持つ団体全般との協力と連携を積極的に推進していく。公共部門の団体には、国際原子力機関(IAEA)、気候変動に関する政府間パネル(IPCC)および国連環境計画(UNEP)などがある。民間部門の団体としては、エネルギーや自動車産業の諸業界団体が挙げられる。

4.0 Work Program 事業計画

In formulating the 2009-2014 Strategic Plan there was a clear sense in the Executive Committee that the Program of Work must contemplate the big picture needs of near, mid and long term hydrogen R,D&D. In addition, however, the Executive Committee stressed that Program of Work must also address issues germane to the 2009-2014 timeframe, the term for this Strategic Plan. Accordingly, the Work Program will be revisited at regular intervals during the 2009-2014 term to ensure maximum relevance to near and long-term time horizons.

2009-2014期戦略計画の策定にあたり執行委員会は、事業計画が水素RD&Dの短中長期ニーズの全体像を考慮したものでなければならないという意識を明確に抱いていた。と同時に、本戦略計画の対象期間である2009-2014年という時期にまさに適した課題を抜いた内容であることにもこだわった。このため、2009-2014年中、周期的に事業計画の見直しを行い、短期的にも長期的にも最大限の関連性を持つものであることを確認する。

4.1 Work Program Table 事業計画表
Table 1 summarizes the Program of Work. The table is organized by Theme & Portfolio, Key Issues and Approach. The Approach is broken into two parts: those tasks and activities that were in place at the beginning of the term in mid-2009; and those activities and tasks that have been proposed as potential additions to the Program of Work during the 2009-2014 term.

表1に作業計画の概要をまとめた。本表はテーマポートフォリオ、重要課題、アプローチに分類されており、アプローチは、2009-2014期初めにあたる2009年半ばに進行中のタスクや活動と、同期間中の作業計画への追加案件として提案された活動やタスクの2つに分かれている。

<table>
<thead>
<tr>
<th>THEME &amp; PORTFOLIO</th>
<th>KEY ISSUES</th>
<th>APPROACH In place</th>
<th>APPROACH Proposed/Potential</th>
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<tbody>
<tr>
<td>テーマ&amp;ポートフォリオ</td>
<td>重要課題</td>
<td>アプローチ(2009年進行中)</td>
<td>アプローチ(案)</td>
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<tr>
<td>-Anaerobic use of bacterial dark fermentations and photosynthetic microbes; increased yields; biomimetics; biohydrogen acceptance</td>
<td>Task 21, BioHydrogen</td>
<td>Extend Task 21 past 2010</td>
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<tr>
<td>嫌気暗条件下の微生物発酵と光合成微生物、生産量向上、バイオミメティックス、バイオ水素受容性</td>
<td>Task 26, Advanced Materials for Waterphotolysis</td>
<td>Possible extension of Task 26 past 2011</td>
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<tr>
<td>-Advanced materials for photoelectrochemical (PEC) watersplitting 光電気化学的(PEC)水分解のための先進材料</td>
<td>Task 26, Advanced Materials for Waterphotolysis</td>
<td>Possible extension of Task 25</td>
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<tr>
<td>-Advanced materials (catalysts) for other production methods</td>
<td>Task 25, High Temperature Production</td>
<td>High temperature electrolysis activity</td>
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<tr>
<td>他の製造方法のための先進材料(触媒)</td>
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<tr>
<td>-High temperature production from nuclear and solar</td>
<td>Task 24, Wind Energy and Hydrogen Integration</td>
<td>-Possible one year Task 23 extension past 2009</td>
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<tr>
<td>原子力、太陽光による高温製造</td>
<td>Task 24, Wind Energy and Hydrogen Integration</td>
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<td>Task on Purification/ separation, ICE for on-site reformers</td>
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<td></td>
<td>-Possible successor to Task 26 on development of PEC devices</td>
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期末報告および2009-2014戦略計画
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<tr>
<th>THEME &amp; PORTFOLIO</th>
<th>KEY ISSUES</th>
<th>APPROACH In place 2009</th>
<th>APPROACH Proposed/Potential</th>
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<tbody>
<tr>
<td>R&amp;D Storage</td>
<td>Reversible/regenerative H₂ storage media fulfilling int. targets</td>
<td>Task 22, Fundamental and Applied H₂ Storage Materials Development</td>
<td>Task 22 seeking 2-3 year Extension past 2009; there-After, disposition of activity TBD</td>
</tr>
<tr>
<td></td>
<td>-fundamental &amp; engineering understanding基礎的および工学的知見</td>
<td></td>
<td>-Possible Task/activities on H₂ interactions with materials水素と材料の相互作用に関するタスク/活動の可能性あり</td>
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<td></td>
<td>-materials for stationary applications定置式の材料</td>
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<td>-Compression圧縮</td>
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<td>-Metal Embrittlement金属脆化</td>
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<td>Applied Aspects of H₂ storage systems in vehicles: compressed gas, liquid and materials-based;車載用水素貯蔵システム応用・圧縮ガス、液体、貯蔵材料</td>
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- **Co-utilisation of Biomass as a Renewable Energy Source with Fossil Fuels**
  - 可再生エネルギーとしてのバイオマスと化石燃料の併用による短期的な水素市場ルート

- **PEC設備開発に関するタスク26の延長の可能性あり**

- **Follow-up activities/successor task on low temperature electrolysis低温電解に関するフォローアップ活動/後継タスク**

- **Follow-on efforts TBD 継続活動 - 未定**
### Key Issues

<table>
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<tr>
<th>APPROACH</th>
<th>Analysis and Potential Use of Hydrogen (2009)</th>
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<tr>
<td><strong>APPROACH in place</strong></td>
<td><strong>Analysis and Potential Use of Hydrogen (2009)</strong></td>
</tr>
<tr>
<td><strong>Analysis Group Task 18 - Literature Review</strong></td>
<td><strong>Analysis Task: Supply, Demand</strong></td>
</tr>
<tr>
<td><strong>Comprehensive report on technical potential that includes CO-reduction technology</strong></td>
<td><strong>Possible one year extension of Task 23</strong></td>
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### Possible one year extension of Task 23: Small-Scale Reformers for On-Site Supply of Hydrogen (2009-2010)

- **Task 23:** Possible one year extension of Task 23
- **Subtask B:** Possible one year Task 23 extension past 2009

### Analysis Group Task 18 - Literature Review

- **In Definition – Infrastructure and Mass Storage Task**
- **PART OF PROPOSED STORAGE TASK:** Techno-economic analysis of alternatives in automotive industry, including CO-reduction technology.

### Technical and Economic Aspects

- **Analysis Group Task 18:** Comprehensive report on technical potential that includes CO-reduction technology.
- **Subtask B:** Possible one year Task 23 extension past 2009.
### Analyses that position H₂: Market

**水素利用推進に向けた分析**

**“Where will the H₂ come from” 「何から水素を作り出すか’**

- What role will H₂ play? 水素の果たす役割
- Including non-energy sector 非エネルギー部門を含む


**Lack of information and clarity about the benefits of hydrogen (notably, CO₂ and pollution reduction) among stakeholders and decision makers whose influence is needed and useful for R&D, planning, demonstration and deployment.**

| R&D/企画/実証/普及に必要かつ有益な影響力を有する関係者や意思決定者の間における、(特にCO₂および汚染低減をはじめとする)水素の利点に関する情報と明快な論点の不足 |

### Analyses that position H₂: Support for Political Decision-making

**水素利用推進に向けた分析**

**APPROACH In place 2009**

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<th>THEME &amp; PORTFOLIO</th>
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**APPROACH Proposed/Potential**

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| Analysis Group | Analysis Task: Briefs and Position Papers that address all issues, including CO₂ reduction, climate change. |
| Analysis Task: Supply, Demand from a market perspective – a comprehensive report that includes CO₂ reduction market, cap & trade. Proactive cooperation with IEA analytics. IEA analysis and market ‘in the 2009–2014 period, and the critical success factor: political decision-making. | Analysis Task: Support for Political Decision-making 水素利用推進に向けた分析

**Lack of information and clarity about the benefits of hydrogen (notably, CO₂ and pollution reduction) among stakeholders and decision makers whose influence is needed and useful for R&D, planning, demonstration and deployment.**

| R&D/企画/実証/普及に必要かつ有益な影響力を有する関係者や意思決定者の間における、(特にCO₂および汚染低減をはじめとする)水素の利点に関する情報と明快な論点の不足 |

### Analysis Task: Briefs and Position Papers that address all issues, including CO₂ reduction, climate change. Proactive cooperation with IEA analytics. IEA analysis and market ‘in the 2009–2014 period, and the critical success factor: political decision-making.

**APPROACH Proposed/Potential**

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| CROSSCUTTING | Awareness, Understanding and Acceptance Information Dissemination | Broader and deeper information dissemination needed along with targeted dissemination. | An element of Outreach Program managed by Secretariat, it features:
- Website
- Annual Report
- Conference strategy
- Communication/Promotion on materials
- Public relations and media
- Contributions to IEA events and publications

| | | - Website
- Annual Report
- Conference strategy
- Communication/Promotion on materials
- Public relations and media
- Contributions to IEA events and publications |
| | | Increase information Dissemination by Continuing current activities And augmenting with: 情報普及の促進－現行活動の継続と次による活動強化 |
| | | - Enhanced Conference Strategy that features HIA seminars/workshops <200; and possible sponsorship of larger conference; |
| | | 200名以下セミナー、ワークショップ開催などによる会議戦略強化、大規模会議のスポンサーシップ |
| | | - webinars, possible pod-casts and other IT vehicles |
| | | オンラインセミナー、ポッドキャスト利用(案)によるIT化 |
| | | - dissemination of safety Products 安全性の情報資料の普及 |
| | | - dissemination of analysis products |
| | | - cooperation with ETDE to Expand market for information ETDEと協力し、情報提供の対象層の拡充を図る |
| | | Expand target audiences Non-IEA member countries/ Developing world Greater energy community ターゲット層の拡大 |
| | | IEA非加盟国/途上国、水素以外のエネルギー産業界 |
| | | Target audiences include:
IEA member countries and IEA family Gleneagles “+5” and potential H: members Hydrogen community 主なターゲットは以下の通り。
IEA加盟国とIEA参加組織グレニーグルズサミットG5、水素業界の潜在的会員候補、水素関係者 |
| | | Task 19 concludes in 2010. High potential for multiple follow-up tasks in key areas; definition of successor tasks to occur early in term. Task 19 to complete information products and distribute with Secretariat support. |
| | | タスク19 - 2010年終了。主要分野における継続タスクが複数発足する予定。来期早々、後継タスクの定義を実施する方針。情報資料の作成完了、事務局の支援により配布。 |
| | | All aspects of hydrogen safety and consumer comfort with hydrogen 水素安全性と水素に対する消費者信頼感の全分野 |
| | | Task 19 タスク19 |
| | | Task 19 concludes in 2010. High potential for multiple follow-up tasks in key areas; definition of successor tasks to occur early in term. Task 19 to complete information products and distribute with Secretariat support. |

| CROSSCUTTING | Awareness, Understanding and Acceptance Safety 水素の認知・理解度、受容性の向上 安全性 |
| | |分野横断型 |
4.2 Work Program Timeline 事業計画予定表

Table 2 sets forth a tentative timeline for the tasks and activities proposed in the Program of Work with the exception of the activities covered in Outreach and Information Dissemination Portfolios connected with the Hydrogen Awareness, Understanding and Acceptance theme. In summary, all nine (9) current tasks will continue in the new term 2009–2014. Another task, now in definition, is expected to launch just before or right after the new term begins. Six (6) of the existing tasks are expected to be extended during the term. Some seven (7) tasks are expected to be formed as successors to current tasks. Finally, five (5) other new tasks are forecast. Altogether, it is expected that 12 tasks will be approved during the new term. Of these tasks, nine are expected to continue past mid 2014, the end of the new term. If the Work Program is realized as planned, the End of Term Report for 2009–2014 would report on progress in a total of twenty-one tasks.

Table 2 事業計画予定表

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Solid black line = current task</td>
<td></td>
</tr>
<tr>
<td>• Solid grey line = task in definition</td>
<td></td>
</tr>
<tr>
<td>• Short dash broken line = task extension</td>
<td></td>
</tr>
<tr>
<td>• Long dash green black broken line = successor task</td>
<td></td>
</tr>
</tbody>
</table>

Key to Work Plan below:

- Solid black line = current task
- Solid grey line = task in definition
- Short dash broken line = task extension
- Long dash green black broken line = successor task
• Long dash red broken line = new task
• Arrow at end = means task is expected to continue after end of 2014 term

下表の見方
• 黒の実線 = 現行タスク
• グレーの実線 = 定義中タスク
• 点線 = タスクの延長
• 緑の破線 = 後継タスク [原文はgreen black]
• 赤の破線 = 新規タスク
• 終点の矢印 = 2014年期末以降の継続が予想されるタスク

Table 2: Work Program Timeline

<table>
<thead>
<tr>
<th>Task 18: Integrated Systems Evaluation</th>
<th></th>
<th></th>
<th></th>
<th>Mid 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Successor: Remote Community Modeling
後継タスク: 遠隔地域モデリング

Task 19: Hydrogen Safety
タスク19: 水素安全性

Successor Safety: Regulatory Framework
後継タスク: 規制の枠組み

Task 21: BioHydrogen
タスク21: バイオ水素

Successor: BioHydrogen Storage Materials
後継タスク: バイオ水素貯蔵材料

Task 22: Fundamental and Applied Hydrogen
タスク22: 基礎的および工学的水素貯蔵材料開発

New Task: Applied Storage
新規タスク: 工学的貯蔵

Task 23: Small-Scale Reformers for On-Site Hydrogen Supply (SSR)
タスク23: オンサイト水素供給用小型改質器 (水素SSR)

Successor: Market Studies for SSR
後継タスク: 小型改質器(SSR)の市場性調査

Task 24: Wind Energy & H₂ Integration
タスク24: 風力エネルギーと水素の統合化

Successor: Componentry & Low Temp Electrolysis
後継タスク: コンポーネントと低温電解

Task 25: High Temperature H₂ Production
タスク25: 水素の高温製造

Successor: High Temp Electrolysis
後継タスク: 高温電解
4.3 Pyramid Summary ピラミッド型サマリー
This image integrates all the elements or “building blocks” of the HIA’s 2009-2014 Strategic Plan in a layered pyramid diagram that communicates the Plan’s strategic essentials at a glance. A key feature of the pyramid is that each layer supports the achievement of the layer above.

本図はHIA2009-2014期戦略計画の全要素、すなわち構成内容をピラミッド型に図式化したもので、同一計画の戦略大綱がひと目で分かることになっている。本図の特長はピラミッドの各層が、その上の層の達成を支えていることである。

Figure 4: Pyramid Summary of HIA Strategic Plan 2009-2014 図4: 2009-2014期HIA戦略計画概要図
5.0 Actions for Improvement – Specific IEA Support

In order to improve the Agreement’s performance in a manner that is consistent with the IEA’s mission, Shared Goals and Strategic objectives for 2007-2011, and that takes into account the IEA business model for Implementing Agreements, the HIA respectfully requests the following support:

- Encourage IEA member countries that are qualified prospective members in the HIA to follow through
with the accession process at the earliest possible time.

IEA加盟国で、適格なHIA加盟有望国に、加盟手続きを及早および短縮させるよう勧告する

- Endorse the HIA’s Analytic Imperative by calling for HIA participation and cooperation in IEA analysis efforts 1) that involve hydrogen; or 2) that stand to benefit from consideration of hydrogen. HIA participation would begin in early stages of IEA analysis and continue to completion.

HIAの分析至上主義(Analytic Imperative)を支持し、IEAの分析活動で①水素に関連したもの、もしくは②水素を検討することで恩恵を受けるものについて、HIAへの参画と協力を要請する。

- Support the Hydrogen Awareness, Understanding and Acceptance theme by sharing contact information that builds the HIA database for purposes of information dissemination.

情報普及用のHIAデータベース拡充のため、関係情報を共有し、「水素の認知・理解、受容性の向上」テーマを支援する。

- Provide administrative assistance for HIA outreach efforts to inform and engage stakeholders and decision makers in order to increase participation, membership and sponsorship. In particular, the HIA welcomes participation in IEA conferences, meetings and events that may provide appropriate opportunities for networking with government and industry.

HIA広報活動への実務支援。関係者や意思決定者への情報提供と参画促進。参加、加盟国/組織、スポンサーの拡大を図る。特に、政府および業界とネットワークの機会を提供してくれるIEA コンフェレンス、会議、イベントへの参加を呼びかける。

- Continue to invite HIA participation in NEET meetings and events

NEETミーティングやイベントにHIAの参加を引き続き呼びかける。

- Continue to provide legal counsel where necessary and appropriate

必要かつ適当な場合、法務サービス提供を今後も継続する。

- Host HIA conferences, seminars and workshops for a variety of IEA and non IEA member countries and industry audiences.

様々なIEA加盟/非加盟国および業界関係者向けに、HIA会議、セミナー、ワークショップを開催する。

6.0 Projected Outcomes and Closing 成果の見通しとまとめ

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Membership</td>
<td>Number of members at end of term</td>
<td>22 + three pending 3ヶ国が申請中</td>
<td>30</td>
</tr>
<tr>
<td>Tasks</td>
<td>Number of R&amp;D Tasks active during period</td>
<td>13 total + 1 in Definition 合計~20</td>
<td></td>
</tr>
<tr>
<td>Level of Effort</td>
<td>Number of person years</td>
<td>~712</td>
<td>~875</td>
</tr>
<tr>
<td>Expert Meetings</td>
<td>88</td>
<td>~120</td>
<td></td>
</tr>
<tr>
<td>Publications/Articles</td>
<td>HIA summary publications HIA総括の出版</td>
<td>22 ~25</td>
<td></td>
</tr>
<tr>
<td>Expert publications/articles</td>
<td>1,153</td>
<td>1,500</td>
<td></td>
</tr>
</tbody>
</table>
**Presentations**

<table>
<thead>
<tr>
<th>Description</th>
<th>HIA ExCo/Secretariat – Internal to IEA</th>
<th>12</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HIA ExCo/Secretariat – External to IEA</td>
<td>37</td>
<td>40</td>
</tr>
<tr>
<td>Expert</td>
<td></td>
<td>1,015</td>
<td>1,200</td>
</tr>
</tbody>
</table>

**Support**

<table>
<thead>
<tr>
<th>Description</th>
<th>Direct member support for Operating Agents</th>
<th>~2 mil USD</th>
<th>~2.8 mil USD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>加盟国による幹事への直接支援</td>
<td>最高200万米ドル</td>
<td>最高28万米ドル</td>
</tr>
</tbody>
</table>

**HIA Budget**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cumulative Operating Budget</th>
<th>0.85 mil USD</th>
<th>~1.0 mil USD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>累計運営予算</td>
<td>85万米ドル</td>
<td>最高100万米ドル</td>
</tr>
</tbody>
</table>

The Strategic Plan for 2009-2014 forecasts progress in HIA R,D&D and continuing growth in the Agreement. These outcomes are expected to enhance the Agreement’s value proposition, contributing to realization of the HIA’s mission and recognition of the HIA as the world reference for hydrogen energy.

2009-2014期戦略計画を通して、HIAのRD&Dの前進とさらなる発展が見込まれる。こうした成果は、HIAのバリュープロポジションの拡充、使命の実現、世界の水素エネルギー知見の権威としての認知の実現に資するものと考える。