



Agence pour l'énergie nucléaire (AEN) et Agence internationale de l'énergie (AIE) de l'OCDE, à Paris, Programme de recherche

Vu la proposition du Département fédéral des transports, des communications et de l'énergie du 23 mai 1991

Vu les résultats de la procédure de co-rapport, il est

décidé:

1. Il est pris connaissance du rapport du Département fédéral des transports, des communications et de l'énergie et décide de la participation de la Suisse:
  - à l'Amendement de l'Accord pour le projet du réacteur Halden de l'OCDE (AF 25.9.1958/et AF 6.6.1963)
  - à deux projets du Programme de recherche et de développement en matière de chauffage et climatisation solaires (ACF: 24.02.1977)
    - Projet 17: Radiations influençant les systèmes et l'architecture solaire
    - Projet 18: Vitrages et matériaux solaires avancés



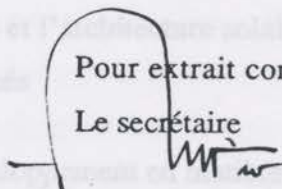
3003 Berno, le 23 mai 1991

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Al Consiglio federale

- à un projet du Programme de recherche et de développement en matière de bioénergie (ACF: 23.8.1989)
    - Projet 10: Utilisation de la biomasse
  - à un projet du Programme de recherche et de développement en matière de pompes à chaleur avancées (ACF: 2.10.1978)
    - Projet 20: Sécurité des réfrigérants
2. L'Office fédéral de l'énergie est habilité à signer le protocole d'amendement du projet de l'Agence pour l'énergie nucléaire et à annoncer la participation de la Suisse aux projets de l'Agence internationale de l'énergie mentionnés au point 1.

Pour extrait conforme,  
Le secrétaire



Kopieauszug an:			
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K.	Dep.	Anz.	Akten
X	EDA	8	—
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	EMD		
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X	EFK	2	—
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EIDGENÖSSISCHES VERKEHRS- UND ENERGIEWIRTSCHAFTSDEPARTEMENT  
 DEPARTEMENT FEDERAL DES TRANSPORTS, DES COMMUNICATIONS ET DE L'ENERGIE  
 DIPARTIMENTO FEDERALE DEI TRASPORTI, DELLE COMUNICAZIONI E DELLE ENERGIE  
 DEPARTAMENT FEDERAL DA TRAFFIC ED ENERGIA

3003 Berne, le 23 mai 1991

Au Conseil fédéral

Agence pour l'énergie nucléaire (AEN) et Agence internationale de l'énergie (AIE) de l'OCDE, à Paris, Programmes de recherche

Participation de la Suisse à:

- un projet du réacteur Halden de l'OCDE
- deux projets du Programme de recherche et de développement en matière de chauffage et climatisation solaires
  - Projet 17: Radiations influençant les systèmes et l'architecture solaire
  - Projet 18: Vitrages et matériaux solaires avancés
- un projet du Programme de recherche et de développement en matière de bioénergie
  - Projet 10: Utilisation de la biomasse
- un projet du Programme de recherche et de développement en matière de pompes à chaleur avancées:
  - Projet 20: Sécurité des réfrigérants



## 1. Généralités

L'article 16, alinéa 3, lettre a, LR autorise le Conseil fédéral à conclure de sa propre compétence, dans les limites des crédits ouverts, des accords de coopération scientifique internationale, tels que les Accords d'exécution des programmes de R&D de l'AEN et de l'AIE. Etant donné que le budget ordinaire est décidé par l'Assemblée fédérale sur une base annuelle, il faut encore relever ici que les Accords d'exécution AIE prévoient le retrait des parties contractantes soit par une annonce de retrait, avec 12 mois d'avance, au Directeur exécutif de l'Agence, soit, plus simplement, par décision unanime du Comité exécutif du programme concerné.

La participation au projet de l'OCDE sur le réacteur Halden s'inscrit dans le cadre de la participation suisse à l'Agence pour l'énergie nucléaire. Son coût pour la Suisse est de Fr. 1'110'000.-- réparti sur 4 ans et co-financé par les centrales atomiques. La part à la charge de l'OFEN est de Fr. 185'000.-- par an.

Dans sa décision du 18 avril 1984, le Conseil fédéral a chargé le DFTCE de prévoir, dès 1985, un accroissement limité du soutien à la recherche énergétique. Ce soutien s'adresse, entre autres, aux travaux de recherche dont les résultats sont susceptibles d'être intégrés aux programmes du cadre AIE ainsi qu'à leur analyse et dissémination. La décision d'internationaliser un projet reste cependant de la compétence exclusive du Conseil fédéral. Le 6 novembre 1985, le 10 septembre 1986, le 21 septembre 1987, le 29 juin 1988, le 23 août 1989 et le 28 mars 1990, le Conseil fédéral a déjà décidé de la participation de la Suisse à six groupes de projets AIE, financés de la sorte.

Ce septième groupe représente un montant de Fr. 500'000.-- par an pour une période de 1 à 4 ans. Les contrats et accords y relatifs ont déjà été passés ou le seront prochainement et les coûts portés au budget prévu à cet effet à l'Office fédéral de l'énergie. La participation officielle de la Suisse à ces projets n'attend plus que l'autorisation du Conseil fédéral.

Le tableau en annexe donne la vue d'ensemble des programmes de R&D de l'AIE. Ce tableau indique en outre, par programme, la liste des projets avec participation

suisse, la date de la décision du Conseil fédéral d'adhérer, ainsi que le statut actuel des projets.

## 2. Das OECD-Halden-Reaktor-Projekt

Seit 1957 befasst sich das OECD-Halden-Reaktor-Projekt mit Sicherheitsaspekten der Kernenergie. Die Schweiz hat sich vom 1. Juli 1958 bis zum 31. Dezember 1969 am Halden-Reaktor-Projekt beteiligt (BB 25.9.1958/AS 1958 / 772 und BB 6.6.1963/AS 1965 / 641). Das neue 3-jährige Forschungsprogramm (1991-1993) umfasst zwei Teile:

### a) Projektteil Mensch-Maschine-Kommunikation

Ziel der Arbeiten ist es, nachzuweisen, dass die Neuerungen im Kommandoraum, die Einführung neuer Diagnose- und Unterstützungssysteme und die damit einhergehenden veränderten Rollen des Operators den erwarteten Sicherheitsnutzen bringen.

Halden ist in Experimenten zur Bewertung von Operateurlösungen führend. Bei der Erforschung der Mensch-Maschine-Wechselwirkung handelt es sich um die Überprüfung experimenteller Daten über das Verhalten verschiedener Mensch-Maschine-Systeme, zwecks Erarbeitung qualitativer Modelle des Mensch-Maschine-Verhaltens.

### b) Projektteil Brennstoffverhalten und Materialien

Ziel ist es, die Kenntnis des Brennstoffverhaltens weiter zu erhöhen. Die Bedeutung für die Reaktorsicherheitsforschung liegt in der einzigartigen Möglichkeit, vorbestrahlte Brennelemente im Halden-Reaktor definierten Leistungs- und Störfallbedingungen auszusetzen und die auftretenden Vorgänge durch umfangreiche Messtechnik zu erfassen. Versagensmechanismen und damit verbundene Spaltproduktfreisetzung können erfasst und Hinweise zur Verbesserung gewonnen werden.

Untersuchungen zur wasserseitigen Korrosion verschiedener Materialien in speziellen Kreisläufen unter LWR-Druck, Temperatur, Neutronenfluss und Wasserchemie entsprechen einem Bedürfnis der Sicherheitsforschung. Die Versuchsanlagen in Halden sind dazu besonders gut geeignet.



Die Schweiz hat die Möglichkeit, mit relativ geringen Kosten wieder in das OECD-Forschungsprogramm des Halden-Reaktor-Projektes einzusteigen. Bei einer Beteiligung kann sie das Forschungsprogramm mitbestimmen, erhält direkten Zugang zu den Forschungsergebnissen und kann eigene Fachleute ausbilden. Partner der beabsichtigten Schweizer Beteiligung am Projekt sind die Hauptabteilung für die Sicherheit der Kernanlagen (HSK) des BEW, der Unterausschuss Kernenergie (UAK) der Konferenz der Überlandwerke und das Paul Scherrer Institut.

Der Schweizer Beitrag beläuft sich auf 2,2 % des gesamten Halden-Forschungsbudgets (228,5 Millionen Norwegische Kronen). Die HSK hat mit den KKW-Betreibern Gespräche über eine finanzielle Mitbeteiligung am Halden-Projekt geführt. Es liegt eine Zusage des UAK vor, mindestens die Hälfte der Kosten zu übernehmen.

Der Beitrag der HSK (Fr. 185'000.-- pro Jahr) wird aus dem ordentlichen Forschungskredit des BEW bezahlt.

### **3. Projets du Programme de recherche et de développement en matière de chauffage et réfrigération solaires**

La Suisse a adhéré à l'Accord d'exécution du 20.12.1976 (ACF: 24.2.1977), et a déjà participé à de nombreux projets (ACF du: 29.4.1980, 29.6.1983, 6.11.1985 et 23.8.1989). Il s'agit maintenant de la participation aux projets 17: "Radiations influençant les systèmes et l'architecture solaire" et 18: "Vitrages et matériaux solaires avancés".

L'utilisation de l'énergie solaire pénètre le marché beaucoup plus lentement que souhaité. Il est donc impératif d'intensifier les efforts de recherche en collaboration internationale pour la rendre économiquement attractive.

Dans le projet 17, d'une durée de 3 ans, il s'agit d'améliorer les techniques de mesure du spectre des radiations solaires et de ses variations provoquées par les conditions atmosphériques et climatiques. Dans le domaine de la lumière visible, la composition du spectre influence l'éclairage naturel des bâtiments. Les radiations infra-rouges influencent, elles, la balance énergétique des systèmes solaires, bâtiments inclus.

Dans le domaine à cheval entre le visible et l'infra-rouge, le spectre influence les performances des cellules solaires. Finalement dans le domaine ultraviolet, le spectre influence le vieillissement des matériaux, en particulier les vitrages plastiques des capteurs solaires, des serres ou des fenêtres.

Il est prévu entre autre de comparer les radiospectromètres, de les améliorer et de valider les modèles numériques décrivant le spectre des radiations solaires.

La participation suisse prévue sera effectuée par le groupe de recherche en énergie solaire de l'Université de Genève, et de la section "Instruments" de l'Institut suisse de météorologie à Payerne. D'autres organisations pourraient s'y joindre. Pour les 3 prochaines années les coûts à la charge du crédit "Recherche" de l'OFEN s'élèveront à Fr. 150'000.-- par an.

Pour le projet 18, aussi d'une durée de 3 ans, la participation suisse prévue est centrée sur la caractérisation des performances de vitrages avancés. Le développement, puis l'introduction rapide sur le marché de vitrages à haute performance peuvent fort bien apporter une contribution significative à Energie 2000.

Les options suivies vont du vitrage évacué à l'isolation transparente à structure capillaire en passant par l'aérosol. Alors que l'application du vitrage évacué vise prioritairement les fenêtres des bâtiments, les autres vitrages à haute performance devraient permettre la réalisation de capteurs-plan beaucoup plus attractifs économiquement.

L'Ecole technique supérieure de Rapperswil (ITR) est désignée comme coordonnateur de la contribution suisse. Plusieurs industries et chercheurs ont déjà mentionné leurs intérêts à participer. Pour ces 3 prochaines années les coûts à la charge du crédit "Recherche" de l'OFEN s'élèveront à Fr. 150'000.-- par an.

#### 4. Projets du Programme de recherche et de développement en matière de bioénergie

La Suisse a adhéré à l'Accord d'exécution amendé le 21.9.1988 (ACF: 23.8.1989) et a déjà participé à deux projets de ce programme. Le projet 10, "Utilisation de la



biomasse" représente l'approfondissement des travaux du projet "Procédés avancés de conversion". Il s'agit du problème de l'amélioration des procédés de combustion, de gazéification et de digestion anaérobie de la matière organique provenant du bois et des déchets de la biomasse.

L'Agent exécutif sont les Etats-Unis. Contre indemnité (fixée pour la Suisse à Fr. 40'000.-- par an), il analysera l'ensemble des résultats fournis par les participants.

Pour la participation suisse, c'est un bureau privé de Maschwanden-Zürich et Infosolar-Tänikon qui ont été mandatés pour coordonner les travaux des participants, essentiellement des constructeurs de chauffages à bois et l'EPF-Zürich.

Les coûts à la charge du crédit "Recherche" de l'OFEN seront de Fr. 150'000.-- par an pour une période de 4 ans.

##### **5. Projet du Programme de recherche et de développement en matière de pompes à chaleur avancées**

La Suisse a adhéré à l'Accord d'exécution du 27.7.1978 (ACF: 2.10.1978) et a déjà participé à de nombreux projets de ce programme (ACF du: 2.10.1978, 10.9.1986 et 28.3.1990). Face au défi de trouver des alternatives valables à l'emploi de CFC proscrits comme fluides caloporteurs dans les pompes à chaleur, une collaboration internationale s'était mise en route.

Le projet 20 complète en un certain sens le projet 18 en adressant le problème de la sécurité des réfrigérants. Il s'agit d'étudier, à partir des statistiques sur les dégâts provoqués par des réfrigérants connus tels que le  $\text{NH}_3$  et à partir des propriétés des composants de nouveaux réfrigérants, comme le R 134a, la sécurité des alternatives possibles aux fréons.

La participation à ce projet n'a pas seulement un intérêt pour le développement futur des pompes à chaleur mais aussi pour les installations de réfrigération. L'Agent exécutif pour ce projet est la Belgique. Nous attendons de ce projet des informations complètes et détaillées sur les risques relatifs des divers produits. Ces infor-



mations constitueront un critère de choix important, non seulement pour les constructeurs d'installations mais encore pour les autorités responsables de la protection de l'environnement.

La maison SULZER qui dispose de la plus vaste expérience en Suisse dans ce domaine, est prête à participer au projet.

Le projet est actuellement limité à 1 an et les coûts à la charge du crédit "Recherche" de l'OFEN s'élèveront à Fr. 50'000.--.

## 6. Base juridique

Le protocole d'amendement de l'Accord de l'AEN sur le projet du réacteur Halden de l'OCDE et les annexes à des accords d'exécution AIE qui font l'objet de cette proposition se rapportent à des projets de recherche énergétique au sens de la loi sur la recherche (RS 420.1). Les investigations scientifiques prévues vont de la recherche appliquée à l'analyse et la dissémination vers un public aussi large que possible des résultats relatifs à des procédés énergétiques innovateurs. Elles ne servent pas des buts commerciaux à court terme, c'est-à-dire qu'il ne s'agit aucunement de développement de produits. C'est pourquoi le Conseil fédéral peut passer les accords internationaux proposés avec l'AEN et l'AIE en s'appuyant sur l'article 16, 3e alinéa, lettre a de la loi. Le 6 novembre 1985, le 10 septembre 1986, le 21 septembre 1987, le 29 juin 1988, le 23 août 1989 et le 28 mars 1990, il a déjà fait usage de cette même compétence pour décider de la participation de la Suisse à 37 autres projets de recherche de l'AIE.

## 7. Conséquences financières et répercussions sur l'effectif du personnel

Le budget global de ces projets s'élève à Fr. 685'000.-- par an pour une période de 1 à 4 ans. Comme ces projets sont déjà intégrés aux programmes ordinaires de recherche énergétique de l'OFEN, la participation n'exige aucune modification du budget et ni n'influence l'effectif du personnel de la Confédération.

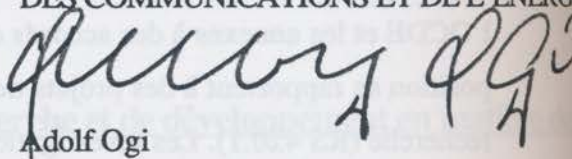
## 8. Résultats de la consultation préalable

Le groupe de coordination de la recherche énergétique de l'administration fédérale (CREDA), les offices fédéraux de l'éducation et de la science, des questions conjoncturelles, des affaires économiques extérieures, de la justice, de l'environnement, de la forêt et du paysage, de l'administration fédérale des finances et de la direction du droit international public approuvent la présente proposition.

## 9. Proposition

Nous vous proposons d'approuver le projet de décision ci-joint.

DÉPARTEMENT FÉDÉRAL DES TRANSPORTS,  
DES COMMUNICATIONS ET DE L'ÉNERGIE



Adolf Ogi

## Annexes

- Projet de décision du Conseil fédéral
- Vue d'ensemble des Programmes de R&D de l'AIE avec participation suisse
- Annexe (jointe à l'original):

Protocole d'amendement sur le projet du réacteur Halden de l'OCDE.

Annexes 17 et 18 à l'Accord d'exécution du Programme de recherche et de développement en matière de chauffage et climatisation solaires.

Annexes 10 à l'Accord d'exécution du Programme de recherche et de développement en matière de bioénergie.

Annexes 20 à l'Accord d'exécution du Programme de recherche et de développement en matière de pompes à chaleur avancées.



Pour co-rapport à:

- DFAE
- DFI (CEPF)
- DFJP
- DFF
- DFEP

Extrait du procès-verbal à:

- DFTCE (OFEN) 10 ex.
- DFAE (DDIP)
- DFI (OFES, CEPF)
- DFJP (OFJ)
- DFF (AFF)
- DFEP (OFAEE)

Vo la proposition du Département fédéral des transports, des communications et de l'énergie du 23 mai 1991

Vo les résultats de la procédure de co-rapport, il est

1991

Il est pris connaissance du rapport du Département fédéral des transports, des communications et de l'énergie et décide de la participation de la Suisse:

- à l'Aménagement de l'Accord pour le projet du réacteur Halden de l'OCDE (AF 25.9.1958/et AF 5.6.1963)
- à deux projets du Programme de recherche et de développement en matière de chauffage et climatisation solaires (ACF, 24.02.1977)
  - Projet 17: Radiations influençant les systèmes et l'architecture solaires
  - Projet 18: Vitrages et revêtements solaires avancés

## ENSEMBLE DES PROGRAMMES DE R &amp; D DE L'AE

Projet	Département fédéral des transports, des communications et de l'énergie (DTC)	Département fédéral de l'énergie (DÉ)	Statut
<b>Agence pour l'énergie nucléaire (AEN) et Agence internationale de l'énergie (AIE) de l'OCDE, à Paris, Programme de recherche</b>			
Vu la proposition du Département fédéral des transports, des communications et de l'énergie du 23 mai 1991			
Vu les résultats de la procédure de co-rapport, il est			
<u>décidé:</u>			
1.	Il est pris connaissance du rapport du Département fédéral des transports, des communications et de l'énergie et décide de la participation de la Suisse:		
	<ul style="list-style-type: none"> <li>• à l'Amendement de l'Accord pour le projet du réacteur Halden de l'OCDE (AF 25.9.1958/et AF 6.6.1963)</li> <li>• à deux projets du Programme de recherche et de développement en matière de chauffage et climatisation solaires (ACF: 24.02.1977) <ul style="list-style-type: none"> <li>- Projet 17: Radiations influençant les systèmes et l'architecture solaire</li> <li>- Projet 18: Vitrages et matériaux solaires avancés</li> </ul> </li> </ul>		
	I.	Processus de combustion	23.08.89
	I.	Etude conceptuelle	11.02.78
	I.	Systèmes à grande surface	21.02.78
	II.	Optimisation du système	20.10.82
	III.	Vitrages des collecteurs	21.02.78
	I.	Grands systèmes de stockage de chaleur	14.09.75
	II.	SPECS, Dalgry	20.10.82
	IV.	Stockage d'eau chaude à court terme	10.09.86
	VI.	Aspects socio-économiques	21.09.87



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- à un projet du Programme de recherche et de développement en matière de bioénergie (ACF: 23.8.1989)
    - Projet 10: Utilisation de la biomasse
  - à un projet du Programme de recherche et de développement en matière de pompes à chaleur avancées (ACF: 2.10.1978)
    - Projet 20: Sécurité des réfrigérants
2. L'Office fédéral de l'énergie est habilité à signer le protocole d'amendement du projet de l'Agence pour l'énergie nucléaire et à annoncer la participation de la Suisse aux projets de l'Agence internationale de l'énergie mentionnées au point 1.

Pour extrait conforme,

Le secrétaire

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<u>VUE D'ENSEMBLE DES PROGRAMMES DE R &amp; D DE L'AIE</u>			
<u>Programme</u>	<u>Projets avec participation CH</u>	<u>Décision</u>	<u>Statut</u>
<b>GROUPE: "TECHNOLOGIES POUR L'UTILISATION FINALE DE L'ÉNERGIE"</b>			
1. Bâtiment	I. Charge thermique III. Mesures d'économie d'énergie dans les bâtiments IV. Bilan énergétique d'un immeuble commercial V. Centre d'information sur les échanges d'air VIII. Comportement/aération IX. Echange d'air minimum X. Simulation de systèmes XI. Méthodes de contrôle de la consommation d'énergie XII. Systèmes de fenêtres XIII. Gestion énergétique hôpitaux XVIII. Ventilation à la carte XX. Aérolitique dans les bâtiments XXI. Calcul de la performance énergétique des bâtiments	21.02.78 11.07.79 11.07.79 11.07.79 06.11.85 25.02.81 29.06.83 29.06.83 29.06.83 06.11.85 23.08.89 29.06.88 28.03.90	Terminé Terminé Terminé En cours Terminé Terminé Terminé Terminé Terminé Terminé Terminé Terminé En cours En cours En cours
2. Pompes à chaleur avancées	I. Etude commune VIII. Stockage dans le sol avec PAC IX. Applications industrielles à haute température XII. Modélisation PAC à compression XIV. Transport dans systèmes à sorption XVII. Nouveaux réfrigérants XX. Sécurité de réfrigérants	02.10.78 10.09.86 10.09.86 10.09.86 10.09.86 28.03.90 Ouvverte	Terminé En cours En cours En cours Retrait En cours Nouveau
3. Phénomènes de combustion	I. Processus de combustion	23.08.89	En cours
4. Utilisation échelonnée	I. Etude commune	21.02.78	Terminé
5. Transfert et échange de chaleur	I. Systèmes à grande surface II. Optimisation du système III. Vibrations des échangeurs	21.02.78 20.10.82 21.02.78	Terminé Terminé Terminé
6. Stockage d'énergie	I. Grands systèmes de stockage de chaleur III. SPEOS, Dorigny IV. Stockage d'eau chaude à court terme VI. Aspects environnementaux	14.09.78 20.10.82 10.09.86 21.09.87	Terminé Terminé Terminé En cours



7. Piles à combustible avancées	(II.)	Piles polymères au méthanol	23.08.89	En attente
	III.	Piles céramiques au gaz naturel	28.03.90	En cours
<b>GROUPE: " ENERGIES RENOUVELABLES "</b>				
8. Hot Dry Rock	I.	Etude commune	06.10.77	Terminé
9. Chauffage et réfrigération solaires	I.	Performances de différents systèmes	24.02.77	Terminé
	II.	Coordination de la R&D sur les composants	24.02.77	Retrait
	III.	Tests de performance de capteurs et de systèmes	24.02.77	Terminé
	IV.	Guide de l'ensevelissement	24.02.77	Terminé
	V.	Etudes météorologiques	24.02.77	Terminé
	VI.	Systèmes à capteurs évacués	29.04.80	Terminé
	VII.	Centrales de chauffage avec accumulation saisonnière	29.04.80	Terminé
	VIII.	Architecture solaire pour l'habitat	29.06.83	Terminé
	IX.	Rayonnement solaire et pyranométrie	29.06.83	En cours
	X.	Nouveaux matériaux	06.11.85	En cours
	XI.	Architecture solaire pour bâtiments non-résidentiels	06.11.85	En cours
	XII.	Applications solaires aux bâtiments	23.08.89	En cours
	XIII.	Architecture basse énergie	23.08.89	En cours
	XIV.	Systèmes actifs avancés	23.08.89	En cours
	XV.	Centrales de chauffage solaire	23.08.89	En cours
	XVI.	Applications photovoltaïques à l'architecture solaire	23.08.89	En cours
	XVII.	Radiations et systèmes solaires	Ouverte	Nouveau
	XVIII.	Vitrages avancés	Ouverte	Nouveau
10. Petites centrales solaires	1.	SSPS Almeria	06.10.77	Terminé
	2.	Supplément	09.05.79	Terminé
	3.	Amendement (10.09.85)		
	I.	Entretien installation	10.09.86	Terminé
	II.	Amélioration des systèmes	10.09.86	Terminé
	III.	Chaudière haute température	10.09.86	En cours
	IV.	Stockage de chaleur à haute température	10.09.86	En cours
V.	Fuels solaires et autres applications	10.09.86	En cours	
VI.	Explorations en héliochimie	10.09.86	En cours	
11. Centre d'information technique sur la biomasse	I.	Centre d'information en Irlande	09.05.79	Terminé

12. Bioénergie (anciennement: Energie du bois)	I.	Elaboration de projets	29.04.80	Terminé
	VI.	Ressources de la forêt conventionnelle	23.08.89	En cours
	VII.	Procédés avancés de conversion	23.08.89	En cours
	X.	Utilisation de la biomasse	Ouverte	Nouveau
13. Conversion de l'énergie éolienne	VIII.	Systèmes décentralisés	06.11.85	Terminé
14. Production d'hydrogène à partir de l'eau	I.	Procédés thermochimiques	06.10.77	Retrait
	III.	Etude commune	09.05.79	Terminé
	VI.	Electrolyse photocatalytique	12.11.80	Terminé
	VII.	Transport et stockage	30.05.84	En cours
	VIII.	Evaluation technicoéconomique	21.09.87	En cours
	IX.	Procédés thermochimique, électrolytique et photocatalytique	23.08.89	En cours
<b>GROUPE: "ENERGIES FOSSILES"</b>				
15. Combustion sur lit fluidisé	II.	Combustion sur lit fluidisé à pression atmosphérique	29.04.80	Terminé
<b>GROUPE: "ENERGIE DE LA FUSION"</b>				
16. Aimants supraconducteurs	I.	Large Coil Task (LCT)	30.08.78	Terminé
17. Interactions plasma-paroi	I.	TEXTOR	02.10.78	En cours
18. Dégâts dus au rayonnement dans matériaux	II.	Expériences	20.10.82	En cours
<b>GROUPE: "SÉCURITÉ DES RÉACTEURS NUCLÉAIRES"</b>				
19. Echange d'information technique sur la sécurité des réacteurs		Echange d'information	20.05.76	Terminé
	LOFT	Loss of Fluid Test	09.05.79	Terminé
	HSST	Heavy Section Steel Technology	09.05.79	Terminé
	HDR	Heiss Dampf Reaktor	29.06.83	Terminé
20. OECD-LOFT	I.	Essais destructifs	29.06.83	Terminé



GROUPE: "ANALYSE DE SYSTÈMES"				
21. Analyse de systèmes de techniques énergétiques	I.	Etude commune (MARKAL)	25.02.81	Terminé
	II.	Echange d'information	30.05.84	Terminé
	III.	International Forum for Energy Environmental Studies (FEEST)	21.09.87	Terminé
22. Centre pour l'analyse et la dissémination des technologies énergétiques démontrées	I.	CADDET Center for the Analysis and Dissemination of Demonstrated Energy Technologies	29.06.88	En cours
23. Banque de données sur les techniques énergétiques	I.	ETDE Energy Technology Data Exchange	23.08.89	En cours
24. Evaluation de la supraconductivité à haute température	I.	Impact sur l'économie électrique	28.03.90	En cours

PROTOCOL  
 AMENDING THE AGREEMENT  
 ON THE OECD HALDEN REACTOR PROJECT  
 COVERING THE PERIOD  
 1st JANUARY 1991 TO 31st DECEMBER 1993

**PROTOCOL**  
**AMENDING THE AGREEMENT**  
**ON THE OECD HALDEN REACTOR PROJECT**  
**COVERING THE PERIOD**  
**1st JANUARY 1991 TO 31st DECEMBER 1993**

The Norwegian Institute for Energy Research (Energiforskningen), the Riso National Laboratory in Denmark, the Finnish Ministry of Trade and Industry, Gesellschaft für Reaktorbetrieb representing a German group of companies working in agreement with the German Ministry for Research and Technology, the Italian Commission for Atomic Energy Research, the Swedish Nuclear Research Institute, the Japanese Atomic Energy Research Institute, the Spanish Centre for Investigation, Development, Experimentation and Technology, and the Swiss Federal Nuclear Safety Inspectorate, hereinafter referred to as the "Parties", have agreed to amend the Agreement on the OECD Halden Reactor Project covering the period from 1st January 1991 to 31st December 1993, in accordance with the unanimous consent of the other signatories to the Agreement.

Consistent with the additional funds that have been made available to the reactor project, the Parties have agreed to amend the Agreement on the OECD Halden Reactor Project covering the period from 1st January 1991 to 31st December 1993, in accordance with the unanimous consent of the other signatories to the Agreement.

The Parties have agreed to amend the Agreement on the OECD Halden Reactor Project covering the period from 1st January 1991 to 31st December 1993, in accordance with the unanimous consent of the other signatories to the Agreement.

The Parties have agreed to amend the Agreement on the OECD Halden Reactor Project covering the period from 1st January 1991 to 31st December 1993, in accordance with the unanimous consent of the other signatories to the Agreement.

HAVE AGREED as follows:

3000	65.0	7.0	0.7	0.3
3050	60.0	10.0	0.5	0.5
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0040	05.8	00.3	0.7	0.5
0500	00.0	00.0	0.0	0.0



# PROTOCOL

## AMENDING THE AGREEMENT ON THE OECD HALDEN REACTOR PROJECT COVERING THE PERIOD 1st JANUARY 1991 TO 31st DECEMBER 1993

The Norwegian Institutt for Energiteknikk (hereinafter referred to as the "Institute"), the Risø National Laboratory in Denmark, the Finnish Ministry of Trade and Industry, Gesellschaft für Reaktorsicherheit, representing a German group of companies working in agreement with the German Federal Ministry for Research and Technology, the Italian Comitato Nazionale per la Ricerca e per lo Sviluppo dell'Energia Nucleare e delle Energie Alternative, the Japan Atomic Energy Research Institute, the Swedish Nuclear Power Inspectorate, the Nuclear Electric plc representing a group of nuclear research and industry organisations in the United Kingdom, and the United States Nuclear Regulatory Commission (hereinafter referred to as the "Signatories");

CONSIDERING that the Spanish Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas, representing a group of nuclear research and industry organisations in Spain, and the Federal Nuclear Safety Inspectorate, Switzerland, representing a group of nuclear research and industry organisations in Switzerland, have with effect from 1st January 1991, acceded to the Agreement on the OECD Halden Reactor Project covering the period 1st January 1991 to 31st December 1993 (hereinafter referred to as the "Agreement") with the unanimous assent of the other Signatories;

CONSIDERING FURTHER that additional funds have been made available pursuant to the accession of the Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas, Spain, and of the Swiss Federal Nuclear Safety Inspectorate;

HAVE AGREED as follows:

### *Article 1*

The Agreement shall be amended as follows:

- (1) The opening paragraph of the preamble shall read:
 

"The Norwegian Institutt for Energiteknikk (hereinafter referred to as the "Institute"), the Risø National Laboratory in Denmark, the Finnish Ministry of Trade and Industry, Gesellschaft für Reaktorsicherheit, representing a German group of companies working in agreement with the German Federal Ministry for Research and Technology, the Italian Comitato Nazionale per la Ricerca e per lo Sviluppo dell'Energia Nucleare e delle Energie

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Alternative, the Japan Atomic Energy Research Institute, the Spanish Centro de Investigaciones Energeticas, Medioambientales y Technologicas, representing a group of nuclear research and industry organisations in Spain, the Swedish Nuclear Power Inspectorate, the Federal Nuclear Safety Inspectorate, Switzerland, representing a group of nuclear research and industry organisations in Switzerland, the Nuclear Electric plc, representing a group of nuclear research and industry organisations in the United Kingdom, and the United States Nuclear Regulatory Commission (hereinafter referred to as the "Signatories")."

- (2) In Article 5(a), the figure "186,650,000 Norwegian Kroner" shall be replaced by the figure "199,150,000 Norwegian Kroner".

### Article 2

Annex I to the Agreement shall be amended as follows:

### Annex I

#### TENTATIVE BREAKDOWN OF TOTAL EXPENDITURES FOR THE JOINT PROGRAMME OF THE OECD HALDEN REACTOR PROJECT COVERING THE PERIOD 1st JANUARY 1991 TO 31st DECEMBER 1993

Items	1991	1992	1993	Total
<b>Reactor Plant Operation</b>				
Plant Operation & Health Physics	18.00	18.50	18.00	54.50
Engineering & Maintenance	5.00	5.00	5.00	15.00
<b>Fuel and Materials Research</b>				
Experiments Design and Manufacturing	6.50	7.00	6.50	20.00
Experiments Planning and Analysis	9.50	10.00	11.00	30.50
<b>Man-Machine Systems Research</b>				
Software Reliability/Man-Machine Interaction	9.50	10.50	11.00	31.00
Computer-Based Operator Support Systems	13.50	14.50	15.00	43.00
Electr. Graphics & Computer Base-Systems	7.50	8.00	8.50	24.00
Reserves	1.50	3.00	6.00	10.50
<b>Total</b>	<b>71.00</b>	<b>76.50</b>	<b>81.00</b>	<b>228.50</b>

Amounts in million Norwegian Kroner.



*Article 3*

Annex II to the Agreement shall be amended as follows:

*Annex II***CONTRIBUTIONS**

*(All amounts in Norwegian Kroner)*

*Contributions from Signatories*

The Norwegian Institutt for Energiteknikk	89,000,000
The Risø National Laboratory, Denmark	5,000,000
The Finnish Ministry of Trade and Industry	8,800,000
The Gesellschaft für Reaktorsicherheit, Federal Republic of Germany	17,200,000
The Italian Comitato Nazionale per la Ricerca e per lo Sviluppo dell'Energia Nucleare e delle Energie Alternative	9,000,000
The Japan Atomic Energy Research Institute	19,500,000
The Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas, Spain	7,500,000
The Swedish Nuclear Power Inspectorate	13,000,000
The Swiss Federal Nuclear Safety Inspectorate	5,000,000
Nuclear Electric plc, United Kingdom	12,400,000
The United States Nuclear Regulatory Commission	12,750,000
<b>Total Contributions from Signatories</b>	<b>199,150,000</b>

*Other Contributions*

Associated Industry Parties	17,500,000
Estimated Income from Sale of Steam	11,850,000
<b>Total Other Contributions</b>	<b>29,350,000</b>
<b>Grand Total Contributions</b>	<b>228,500,000</b>

*Article 4*

The above amendments shall take effect as from 1st January 1991.

DONE in Paris this 14th Day of December 1990.

For the NORWEGIAN INSTITUTT FOR ENERGITEKNIKK:

For the RISØ NATIONAL LABORATORY, DENMARK:

For the FINNISH MINISTRY OF TRADE AND INDUSTRY:

For GESELLSCHAFT FÜR REAKTORSICHERHEIT  
REPRESENTING A GERMAN GROUP OF COMPANIES  
WORKING IN AGREEMENT WITH THE GERMAN FEDERAL MINISTRY:

For the ITALIAN COMITATO NAZIONALE PER LA RICERCA  
E PER LO SVILUPPO DELL'ENERGIA NUCLEARE  
E DELLE ENERGIE ALTERNATIVE:

For the JAPAN ATOMIC ENERGY RESEARCH INSTITUTE:



For the SPANISH CENTRO DE INVESTIGACIONES ENERGETICAS,  
MEDIOAMBIENTALES Y TECNOLOGICAS,  
REPRESENTING TO THE CONSEJO DE SEGURIDAD NUCLEAR,  
EMPRESA NACIONAL DEL URANIO, S.A., UNIDAD ELECTRICA, S.A.  
AND ANOTHER ORGANIZATIONS ACTUALLY IN NEGOTIATION:

For the SWEDISH NUCLEAR POWER INSPECTORATE:

For the SWISS FEDERAL NUCLEAR SAFETY INSPECTORATE,  
REPRESENTING ALSO THE SWISS NUCLEAR UTILITIES (UAK)  
AND THE PAUL SCHERRER INSTITUTE:

For the NUCLEAR ELECTRIC plc, UNITED KINGDOM  
REPRESENTING A GROUP OF NUCLEAR RESEARCH  
AND INDUSTRY ORGANISATIONS:

For the UNITED STATES NUCLEAR REGULATORY COMMISSION:

development of solar heating and cooling systems in the tropics and subtropics. The main objective of the programme is to develop and test solar heating and cooling systems in the tropics and subtropics. The programme will be carried out in the form of a series of workshops and seminars. The first workshop will be held in 1981 in Geneva, Switzerland. The second workshop will be held in 1982 in Mexico City, Mexico. The third workshop will be held in 1983 in New Delhi, India. The fourth workshop will be held in 1984 in Nairobi, Kenya. The fifth workshop will be held in 1985 in Harare, Zimbabwe. The sixth workshop will be held in 1986 in Addis Ababa, Ethiopia. The seventh workshop will be held in 1987 in Kampala, Uganda. The eighth workshop will be held in 1988 in Lusaka, Zambia. The ninth workshop will be held in 1989 in Harare, Zimbabwe. The tenth workshop will be held in 1990 in Addis Ababa, Ethiopia.

INTERNATIONAL ENERGY AGENCY

IMPLEMENTING AGREEMENT  
FOR A PROGRAMME TO DEVELOP AND TEST  
SOLAR HEATING AND COOLING SYSTEMS

- 1) Broad-band spectral radiation data for the tropics and subtropics.
- 2) Broad-band spectral radiation data for the tropics and subtropics.
- 3) Broad-band spectral radiation data for the tropics and subtropics.

Coordination with other parts of the IAEA Solar Heating and Cooling Programme. The programme will be carried out in the form of a series of workshops and seminars. The first workshop will be held in 1981 in Geneva, Switzerland. The second workshop will be held in 1982 in Mexico City, Mexico. The third workshop will be held in 1983 in New Delhi, India. The fourth workshop will be held in 1984 in Nairobi, Kenya. The fifth workshop will be held in 1985 in Harare, Zimbabwe. The sixth workshop will be held in 1986 in Addis Ababa, Ethiopia. The seventh workshop will be held in 1987 in Kampala, Uganda. The eighth workshop will be held in 1988 in Lusaka, Zambia. The ninth workshop will be held in 1989 in Harare, Zimbabwe. The tenth workshop will be held in 1990 in Addis Ababa, Ethiopia.

In order to accomplish the above objectives, the participants shall carry out research and development activities in the following fields:

- 1) Broad-band spectral radiation data for the tropics and subtropics.
- 2) Broad-band spectral radiation data for the tropics and subtropics.
- 3) Broad-band spectral radiation data for the tropics and subtropics.

- 1) Broad-band spectral radiation data for the tropics and subtropics.
- 2) Broad-band spectral radiation data for the tropics and subtropics.
- 3) Broad-band spectral radiation data for the tropics and subtropics.



21 MAR 1991

IEA SOLAR HEATING AND COOLING PROGRAMME  
ANNEX 17  
MEASURING AND MODELLING SPECTRAL RADIATION  
AFFECTING SOLAR SYSTEMS AND BUILDINGS

## 1. OBJECTIVE

The objective of this Task is to improve the amount and quality of spectral radiation data, both broad-band and narrow-band, needed for design and analysis of solar systems and buildings. The objective shall be met by coordinated international cooperation contributing the knowledge and experience of the national experts and making use of existing national facilities and information sources.

## 2. SCOPE

This Task deals with three types of spectral radiation data:

- 1) Narrow-band spectral radiation data for applications to solar and building materials;
- 2) Broad-band spectral radiation data in the visible range that is visible light, for applications to natural illumination in buildings;
- 3) Broad-band spectral radiation data in the infrared range that is long-wave radiation, for applications to the energy balance of solar systems and buildings.

Coordination with other Tasks of the IEA Solar Heating and Cooling Programme, particularly with Task 12 and Task 16, will take place as appropriate.

## 3. MEANS

In order to accomplish the above objective, the Participants shall carry out research and development activities in the framework of the following six Subtasks:

### Subtask A: Narrow-band Spectral and Broad-band Infrared Radiometry

Subtask A will improve the quality of measuring spectral radiation data by comparison, characterization and standardized calibration of narrow-band spectral and broad-band infrared radiometers. Particularly, the Participants will

- 1) perform field intercomparisons of existing spectroradiometers and pyrometers in order to assess the state of the art;
- 2) characterize such instruments as function of inclination, temperature, direction and spectral composition of incoming radiation etc. in order to specify the uncertainty and to predict the performance;

- 3) develop and seek agreement on standardized calibration procedures;
- 4) seek agreement on recommendations for improvement of existing instruments and for measuring procedures adapted to specific applications.

#### **Subtask B: Broad-band Visible Radiometry**

Subtask B will improve the quality of measuring daylight data by comparison and characterization of light-meters. Particularly, the Participants will

- 1) perform field intercomparisons of existing luminance meters and illuminance meters in order to assess the state of the art;
- 2) characterize such instruments as function of inclination, temperature, direction and spectral composition of incoming radiation etc. in order to specify the uncertainty and to predict the performance.

#### **Subtask C: Narrow-band Spectral Radiation Data Acquisition and Analysis**

Subtask C will increase the available amount of narrow-band spectral radiation data by specific measurement, evaluation and analysis of such data and associated quantities. Particularly, the Participants will

- 1) establish recommendations for measurement and evaluation procedures in order to assure quality and comparability of data;
- 2) measure, evaluate and analyze narrow-band spectral solar radiation under various atmospheric conditions and climates;
- 3) compile and publish such data.

#### **Subtask D: Narrow-band Spectral Radiation Modelling**

Subtask D will increase the quality of modelled spectral radiation data by comparison, improvement and validation of narrow-band spectral radiation models. Particularly, the Participants will

- 1) compile narrow-band spectral radiation models for arbitrary atmospheric and ground surface conditions;
- 2) investigate and improve methods of estimating meteorological parameters needed as input to spectral radiation models;
- 3) improve and validate narrow-band spectral radiation models.

#### **Subtask E: Broad-band Visible Radiation Data Acquisition and Analysis**

Subtask E will increase the available amount of broad-band visible radiation data by specific measurement, evaluation and analysis of such data and related quantities. Particularly, the Participants will



- 1) acquire solar illuminance and luminance data and related solar irradiance and radiance data, following the guidelines of the International Daylight Measuring Program (IDMP);
- 2) exchange measured data between IDMP participants and conduct data analysis and model evaluation studies;
- 3) prepare summary reports identifying the data sets acquired by and made available to the Experts, and abstract the findings of analyses conducted by the Experts.

#### Subtask F: Broad-band Infrared Radiation Data Acquisition and Analysis

Subtask F will increase the available amount of broad-band infrared radiation data by specific measurement, evaluation and analysis of such data. Particularly, the Participants will

- 1) acquire and evaluate (longwave) atmospheric radiation and related data;
- 2) compile and archive such data acquired under various specified atmospheric conditions and climates;
- 3) review parameterizations of atmospheric radiation and define the necessary input requirements;
- 4) validate and improve the parameterizations for atmospheric radiation, referred to both horizontal and inclined surfaces.

#### 4. RESULTS

The results of the Task will be:

- (A) Reports on the intercomparisons of spectroradiometers and pyrgeometers; documentation on each characterized instrument; recommendations for improvement of instruments and measuring procedures.
- (B) Reports on the intercomparisons of luminance meters and illuminance meters; documentation on each characterized instrument.
- (C) Recommendations for measurement and quality control of spectral solar radiation data; a technical report on the natural variability of the spectral distribution of solar radiation; a compiled data base of spectral solar radiation data stored on computer media, including a written description of the data base.
- (D) A technical report on existing spectral radiation models; a technical report on methods of estimating meteorological input parameters; a technical report on the validation of spectral radiation models.
- (E) A summary of the data sets of daylight and related data acquired by and made available to the Experts; a technical report on the findings of the analyses of these data.

direction and spectral composition of incoming radiation etc. in order to specify the uncertainty and to predict the performance;

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- (F) A compiled data base of (longwave) atmospheric and related data, including a written description of the data base; a technical report on existing parameterizations of atmospheric radiation; a technical report on the validation of the parameterizations.

## 5. RESPONSIBILITIES OF THE OPERATING AGENT

The Operating Agent shall be responsible for the overall planning and management of the Task, for coordinating the work of the Subtasks, for implementing the actions required by the Executive Committee, and for delivering periodic status reports to the Executive Committee and to the Participants.

## 6. RESPONSIBILITIES OF THE LEAD COUNTRIES

The Lead Countries will coordinate and lead the work of the Subtasks and will deliver periodic status reports to the Operating Agent.

## 7. MEETINGS

The Operating Agent will convene Task meetings annually or more frequently, if required. Attendance by all Participants is required. The Lead Countries may also organize Subtask meetings.

## 8. PARTICIPATION REQUIREMENTS

Participation in this Task involves a minimum level of effort of one person year per year of each Participant. Each Participant must actively contribute to the work of the Task and report on his work as requested by the Operating Agent or the Lead Countries.

## 9. FUNDING

The Participants and the Operating Agent will bear their own costs in carrying out their work under this Task, including the costs of reporting and the travel expenses of their representatives and experts.

## 10. INFORMATION AND INTELLECTUAL PROPERTY

In addition to the intellectual property provisions contained in Article 7 of the Agreement, the following provision shall apply to this Annex. Inventions made or conceived in the course of or under activities referred to in paragraph 3 (arising inventions) shall be owned in all countries by the inventing Participant. Information regarding inventions on which patent protection of is to be obtained by the Participant shall not be published or publicly disclosed by the other Participants until a patent application has been filed; however, this restriction on publication or disclosure shall not extend beyond six months from the date of receipt of such information.

It shall be the responsibility of the inventing Participant to appropriately mark reports which disclose inventions that have not been appropriately protected by the filing of a patent application. Each Participant agrees to



license all arising inventions and all preexisting inventions necessary for and used in the activities under paragraph 3 to the other Participants, their Governments and the nationals of their respective countries designated by them on reasonable terms and conditions for use in all countries.

**11. TIME SCHEDULE**

This Annex shall enter into force on 1 July 1991 and shall remain in force until 30 June 1994. It may be extended by agreement of the Participants, acting in the Executive Committee, and taking into account any recommendations of the Agency's Committee on Energy Research and Development concerning the terms of this Annex.

**12. OPERATING AGENT AND LEAD COUNTRIES**

The Operating Agent for this Task is Forschungszentrum Jülich GmbH, Germany acting through Deutscher Wetterdienst, Meteorologisches Observatorium Hamburg. The Lead countries are for

- Subtask A: Germany
- Subtask B: Sweden
- Subtask C: Germany
- Subtask D: USA
- Subtask E: USA
- Subtask F: Norway

**13. PARTICIPANTS IN THIS TASK (TENTATIVE)**

- Canada
- Denmark
- Germany
- Norway
- Sweden
- Switzerland
- USA

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## Annex 18 : Advanced Glazings and associated Materials for Solar and Buildings Applications

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### 1. OBJECTIVE

The objective of this Task is to develop the scientific, engineering and architectural basis which will support the appropriate development and use of advanced glazings and associated materials in buildings and other solar applications with the aim of realising significant energy and environmental benefits.

### 2. SCOPE

The scope of this Task shall be to investigate advanced glazings and associated materials which can be incorporated into components and systems that are expected to lead to energy savings or environmental benefits in buildings and other solar applications.

It is proposed that the new Task should build on the work of Task X, which is currently nearing completion, and that it should have a more specific focus on the application, use, and technology transfer of new materials and components. The emphasis will be on near market or emerging market technology, but future developments which may be more remote from application will not be excluded.

For the purposes of this Annex, glazings are defined as clear and translucent media for building and other solar applications. Associated materials include the necessary support systems required to realise usable components, eg frames, sealants, switching controls.

The advanced glazing materials that will be considered for work in this Task include selections from the following materials categories:

#### High Performance Glazings

- Monolithic and granular aerogels
- Geometric media, i.e. honeycomb and capillary structures
- High transmittance polymers and anti-reflecting glass
- Evacuated glazings

#### Chromogenic - Optical Switching Devices

Electrochromic, thermochromic, photochromic and other media which include the capability to switch from:

- ◆ transparent to absorbing
- ◆ transparent to reflecting
- ◆ reflecting to absorbing

#### Transparent, Wavelength Selective Coatings

- Solar Transmitting Low-e Coatings
- Visible Transmitting Low-e Coatings
- UV blocking Low-e coatings



## Light Transport and Other Materials

Angular selective materials  
 Light guide materials  
 Holographic films

### 3. MEANS

It is proposed that the work of the Task be managed under 3 Subtasks:

A : Materials Evaluation

B : Device and Materials Systems Characterisation and Test Procedures

C : Applications and Technology Transfer

Nine Materials Case Study Projects have been identified on materials and window components of recognised importance. The 9 materials case study projects are:

- Monolithic and granular aerogels
- Geometric media (honeycombs and capillary structures)
- Chromogenic Glazings
- Low-emittance coatings
- Evacuated glazings
- Advanced solar collector covers
- Angular selective transmittance coatings
- Light transport and holographic media
- Frame and edge seal technology

Materials Case Studies are projects which integrate a series of activities and enable an extensive, in-depth study of materials properties and use in advanced glazing systems.

The Subtasks contain projects which enable data sets, test procedures and comparisons of performance to be described for all (or a wide range of) advanced glazing materials. As such the Subtasks provide the integrating elements of the Task.

Subtask A and Subtask B effectively service the needs of the Materials Case Study (MCS) Projects by performing measurements required to advance the MCS Projects. Subtasks A and B will be concerned with a limited range of specialist measurements which will be carried out on a wide range of advanced glazing materials and components. The Subtasks can present the data obtained from these studies in different ways to those which will result from an individual materials case study project. In this way integration of activities occurs and comprehensive summaries and comparisons can be made on the properties of advanced glazing materials. Subtasks A and B have particular responsibility for the dissemination of information in appropriate forms to industry and end users.



Subtask C is the *raison d'être* of the Task. Without a proper understanding of the potential energy benefits, appropriate applications and necessary performance requirements of advanced glazing materials it will be difficult to demonstrate the effectiveness and potential advantages which will result from the use of these materials in solar and building applications. Potential energy benefits to be derived from advanced glazings will not be realised unless building services can be controlled to respond appropriately. The results of Subtask C are of extreme importance to industry in making decisions related to product development, in the marketing of new products and in ensuring effective and appropriate choice of materials for particular uses. Subtask C will interact strongly with Subtasks A and B in establishing performance criteria and defining failure limits. Through the use of computer simulations it will be able to explore a wide range of options and designs for particular applications and climate types.

In practice Task participants will divide into small working groups closely tied to the Subtask structure and each Subtask Leader will be aware of the needs of work to be performed to support the individual materials case study projects. This will greatly assist the time planning of the work to ensure that all participants are contributing effectively throughout the duration of the Task. Without a Subtask structure the Task would lack cohesion and would run the risk of splitting into 9 parallel projects with much replication of effort.

Each Subtask and Materials Case Study Project will have an identified Lead Country responsible for co-ordination.

Participants to Task 18 will include materials scientists, physicists, chemists, mechanical engineers, design engineers, architects and representatives of industry. Participants will not be required to participate in all Subtasks or Materials Case Study Projects.

### 3.1 Subtask A : Materials Evaluation

This Subtask will involve evaluation and characterisation work on the development of advanced glazings with optical or thermal properties which make them of special interest to designers of buildings or other solar applications. Subtask A will normally be involved with specialist measurements, e.g. spectrophotometric work, using small samples of candidate materials. Selected inter-laboratory comparisons will be undertaken where appropriate. The objectives of Subtask A are to perform appropriate measurements and research available literature to enable information to be provided on:

- Essential properties of advanced glazing materials, particularly with reference to optical, mechanical and acoustic properties where appropriate.
- Identification and ranking of candidate materials.
- Presentation of reliable data sets and identification of reduced data sets for specific applications for use by industry, engineers, architects, designers and other interested parties.
- The influence of deposition and manufacturing processes on observed properties.
- Availability and selection guidance for advanced glazing materials.



Where appropriate some analysis of degradation mechanisms in aged advanced glazing materials may be undertaken with a view to identifying compositional and microstructural information and interpreting the response of a material to a particular degradation factor.

3 projects will be performed within Subtask A which will enable comparison of results to be made across a wide range of candidate advanced glazing materials. 2 projects are concerned with measurements of the optical properties and the mechanical properties respectively of advanced glazing materials. The third project places responsibility on Subtask A for the dissemination of technical information, in the forms of a handbook of properties and technology summary sheets, to relevant parties in industry, architectural practice and building design and construction.

It is envisaged that the work will be organised into studies of different material types, and that participants working on similar materials will be expected to collaborate.

The projects to be undertaken within Subtask A are:

- A1 *Advanced glazings materials properties handbook and technology summaries*
- A2 *Investigation of the optical properties and scattering behaviour of advanced glazing materials*
- A3 *Measurement of mechanical properties of advanced glazing materials and components*

### **3.2 Subtask B : Device and Materials Systems Characterisation and Test Procedures**

This Subtask will focus on the development of test methods for the characterisation of identified optical and thermal properties of advanced glazing components and systems. Inter-laboratory measurement activities will be organised to compare the results obtained from using different test methods, and to determine their accuracy and repeatability. Many issues of importance have been considered for inclusion in Subtask B but the scope of the Subtask has been limited to the determination of those properties of advanced glazing systems which are perceived to be of the greatest importance at the present time. These are measurements of the total energy transmittance, the directional optical properties of advanced glazing systems and the measurement of thermal conductance and U-values, the latter to include the effect of the frame. Detailed durability assessment are not to be undertaken at this time and durability work will only be undertaken within a Materials Case Study Project where necessary. Data obtained from the measurements undertaken within Subtask B will provide input values for simulation studies to be undertaken in Subtask C.

Subtask B will concentrate upon determination of the gross optical and thermal properties necessary to specify the performance of advanced glazing systems. In this Subtask measurements will be performed on large area samples of advanced glazing materials and there will be particular emphasis on investigating the properties of whole windows comprising advanced glazing materials and their associated frames and sealant materials.



In this way the influence of the boundary conditions can be determined and appropriate values of key parameters determined for use as input data for the modelling studies to be carried out in Subtask C. The present situation is not unlike that which faced earlier work such as Task 3 for the characterisation of solar collector thermal performance. Two key parameters, the total energy transmittance and the U-value, are required for characterisation and subsequent prediction of thermal performance of a glazing system. Advanced glazing materials present difficulties for the measurement of total energy transmittance because of internal absorption, scattering and incident angle effects. Total energy transmittance can be determined from radiation measurements (indoor and outdoor) or by calorimetric methods. No international standards exist for such measurements. Subtask B will undertake a project to determine the total energy transmittance of advanced glazing materials, compare results obtained using different experimental methods and make recommendations on test procedures to be employed.

The low thermal conductance of advanced glazing materials mean that it is important to determine not just the U-value of such materials but the influence of the frame on the total heat transfer. A project will be undertaken to determine the influence of core versus edge effects and boundary conditions employed in the measurement of the U-value of advanced glazing systems.

The objectives of Subtask B are to perform appropriate measurements and research available literature to enable information to be provided on:

- Definition of measurable parameters necessary for determination of the thermal performance of advanced glazing systems.
- Evaluation of existing test methods in national and international standards for the measurement of such parameters and following a process of inter-laboratory comparisons, recommendations for the improvement or modification of existing test methods.
- Evaluation of experimental techniques employed with respect to instrumentation, calibration, reference conditions, accuracy, error analysis, limitations and any sample dependent effects which may need to be considered in the making of such measurements.
- Comparison of values of parameters obtained from different experimental techniques and investigation of the potential for the calculation of these parameters in the light of experimental results.

The results of the work may be published as recommended procedures supported by technical reports which summarise the results of trials in which the repeatability, precision and accuracy of the methods have been demonstrated at an international level. Some of these publications may, if selected by appropriate national organisations, form the basis of future international standards.

Standard forms of Specification may be produced, so that designers can include the new materials and components with confidence in their building and product designs.



The projects to be undertaken within Subtask B are:

- B1 *Measurement of the total energy transmittance of advanced glazing systems*
- B2 *Directional optical properties of advanced glazings*
- B3 *Measurement of the U-value of advanced glazing systems*

### 3.3 Subtask C : Applications and Technology Transfer

This Subtask will focus on the application of advanced glazing systems in building and other solar applications. In order to facilitate technology transfer, it will be necessary to evaluate the energy and environmental benefits of the application of advanced glazings and their interaction with other aspects of building and systems design. This will involve the development of more credible methods of assessing the performance of buildings and systems containing advanced glazings. It will also be necessary to investigate other issues that will determine performance targets for these systems in relation to the thermal and visual environment.

In order to identify appropriate applications, investigate climate dependence and predict potential energy and environmental benefits to be derived from the use of advanced glazing systems, Subtask C will need to include projects which require computer simulation using state-of-the-art design tools. It is not the intention of Task 18 to devote considerable time to programme and model development but rather to employ those tools which are available and improvements to such tools as may have been developed in related tasks such as Task 12. Where appropriate deficiencies and limitations in these tools in their application to advanced glazing systems will be identified. From the modelling of heat transfer in advanced glazing materials (Subtask B) recommendations will be made for modification of existing tools. Discussions with Task 12 have commenced with the aim of defining more specifically the nature of collaborative links. In addition the work of Annex XII of the IEA Energy Conservation in Buildings Programme have been reviewed.

Subtask C will both, draw from the materials case study projects, and to some extent drive the direction that these projects take. The primary objective of the Subtask will be to determine the energy and environmental implications of the real world objectives of advanced glazing materials. In order to achieve this objective 5 projects have been defined which in sequence build upon each other and individually require strong links with Subtasks A and B and other IEA Tasks. The first project, *Applications, potentials and characteristics*, aims to determine appropriate applications for advanced glazing materials and the potential for their exploitation. As part of this project the parameters required to characterise materials and systems will be reviewed to ensure that designers are provided with the necessary information to allow the specification of new products in this area. Having established basic applications data, work in Subtask C will continue to evaluate and develop methods of modelling the performance of these materials in building applications. This second project will be undertaken in close cooperation with IEA Task 12 and others involved in relevant model development work. In parallel with these modelling activities, a third project will investigate in more detail the control strategies required for the optimum performance of switchable glazings and the implications for the



control of building services in buildings containing advanced glazing materials.

The results of the first three projects in Subtask C, together with data generated from measurements in Subtasks A and B, will form the inputs to a project to determine the energy and environmental impact of the applications of advanced glazing materials. This project will provide information on the likely impact for different climatic regions and will represent the achievement of the primary objective of the Subtask. Finally, in order to ensure that the best possible use is made of the results of the Task, a project will be established to collate important information into applications guidance material that can be incorporated into the dissemination programmes of each member state taking account of differences in climate and construction culture.

The objectives of the work to be undertaken within Subtask C are:

- Investigation of the technical and economic potential of advanced glazing systems.
- Establishment of physical properties of advanced glazing materials and control strategies critical to performance.
- Evaluation of design tools and provision of applications guidance to aid the selection of advanced glazing systems.
- For defined building types and reference zones to study the climate dependence of performance.
- Comparison of performance obtained with different materials.
- Assessment of cost and benefits and the setting of target costs against other solutions.
- Determination of the influence of degradation on thermal performance.

The projects to be undertaken within Subtask C are:

- C1 *Applications and Technology Transfer*
- C2 *Modelling*
- C3 *Control Strategies*
- C4 *Environmental and energy impacts*
- C5 *Applications guidance*



#### 4. INFORMATION AND INTELLECTUAL PROPERTY

In addition to the intellectual property provisions contained in Article 7 of the Agreement, the following provisions shall apply to this Annex. Inventions made or conceived in the course of or under activities referred to in paragraph 3 above shall be owned in all countries by the inventing Participant. Information regarding inventions on which patent protection is to be obtained by the Participant shall not be publicly disclosed by the other participants until a patent application has been filed; however, this restriction on publication or disclosure shall not extend beyond six months from the date of receipt of such information.

It shall be the responsibility of the inventing Participant to appropriately mark reports which disclose inventions that have not been appropriately protected by filing a patent application. Each Participant agrees to license all arising inventions and all pre-existing inventions necessary for and used in the activities under paragraph 3 above to the other Participants, their Governments and the nationals of their respective countries designated by them on reasonable terms and conditions for use in all countries.

#### 5. TIME SCHEDULE

The research phase of this Task shall enter into force on 1st January 1992 and shall remain in force for five years (until 31st December 1996).

At the outset of the Task, interested Participants need commit only to participation in the Project Definition Phase (PDP). At the end of the PDP, those Participants who intend to continue their participation, and any other signatories to this Implementing Agreement who desire to participate in the Task, shall indicate their intent to participate in the research phase of the Task and provide the necessary resource for that work.

The Task may be extended by agreement of the Participants and the Executive Committee taking into account any recommendation of the Agency's Committee on Energy Research and Development concerning the Terms of this Annex.

#### 6. RESULTS

The results of the research phase will include a number of documents some of which will be published as IEA Technical Reports. These will be complemented by an extensive series of National and International publications from the participants, who will acknowledge the support of this IEA Task. There will also be an increase in the body of knowledge and experience amongst researchers, producers and users in the participating countries. The following will be produced by each Subtask:

- A. Subtask A will produce working papers and technical reports on the evaluation and characterisation of advanced glazing materials properties. It will provide basic physical properties of materials, films and coatings including where appropriate information pertaining to stability and lifetime. Basic properties of materials will be reported including optical, thermal, mechanical, acoustical and electrical properties. The information will be presented in forms useful to materials designers, modellers, industry and end users. This Subtask will provide information which could be

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incorporated into a data base of advanced glazing materials for use with information retrieval systems.

- B. Subtask B will produce test results on the optical and thermal properties of commercially available and prototype advanced glazing products and components. It may also produce new documented test methods which may form the basis of future international standards. These methods will be concerned with testing procedures for optical and thermal parameter determination. Liaison with the appropriate Standards bodies (ISO, CEN etc.) could be established at an early stage in the work by representatives of appropriate national organisations with a view to ensuring that the publications of the Sub-Task are as useful as possible to future Standards committees.
- C. Subtask C will publish the results of modelling studies showing the potential for energy savings and improved comfort conditions resulting from the application of advanced glazing systems in buildings for various climatic conditions. Integral to this will be a number of improved advanced glazing system models and algorithms. In addition to performance studies, Sub-Task C will report on the other technical issues which are expected to influence the uptake and market penetration of these new materials in buildings.

Each Materials Case Study Project will produce a state-of-the-art report detailing results obtained from the in-depth studies undertaken. Technical reports detailing individual materials properties and performance will be produced throughout the duration of the Task. Information contained within each of the Materials Case Study Project reports will be reviewed by the Subtask Leaders to enable reports to be written which summarise and compare the properties and performance of a wide range of advanced glazing materials, components and systems.

## **7. RESPONSIBILITIES OF THE OPERATING AGENT**

The Operating Agent shall be responsible for overall management of this Task, co-ordinating the work and publications of the Subtask Leaders and the Materials Case Study Project Leaders, preparing periodic reports to the participants, Executive Committee, and the Executive Director of the Agency, and implementing actions required by the Executive Committee.

## **8. RESPONSIBILITIES OF THE SUBTASK LEADERS AND THE MATERIALS CASE STUDY PROJECT LEADERS**

The Subtask Leaders will plan and lead the Subtask activities in co-ordination with the Operating Agent and provide status reports to the Operating Agent and other participants. They will be responsible for reviewing the needs of individual materials case study projects to ensure that necessary measurements can be planned to be completed within acceptable timescales. They will attend Plenary meetings of the Task and represent the interests of participants in their Subtask.



The Materials Case Study Project Leaders will be responsible for the planning of activities within each case study project and for the preparation of all documentation and technical publications relevant to the project. They will report to the Subtask Leaders their requirements for testing and measurements in order that the advancement of the 9 case study projects can be progressed in parallel without unnecessary delay.

## 9. MEETINGS

There will be Plenary meetings of the Task at intervals of approximately 6 months. Sub-tasks may arrange meetings in between or in association with Plenary meetings of the Task. It will be normal practice for all participants to attend the Plenary Meetings of the Task. Each participating country would normally be expected to host at least one meeting during the period of the Task. Participants will normally submit results and reports for discussion at meetings in good time to enable circulation of documents by the Operating Agent and Subtask Leaders (no less than 4 weeks ahead of the next meeting). The Operating Agent shall receive copies of all such results and reports.

## 10 FUNDING

Each country will bear the costs of its own participation in the Task, including necessary travel costs.

## 11. LEVEL OF EFFORT

Participants will be expected to contribute a minimum of at least 1 man-year per year of technical effort directed in accordance with the agreed work programme of the Task.

## 12. OPERATING AGENT AND SUBTASK LEADERS

	<u>Project Definition</u>	<u>Research Phase</u>
Operating Agent :	UK, Oxford Polytechnic	Oxford Polytechnic?
Subtask A Leader :	USA, Lawrence Berkeley Laboratories (LBL)	LBL?
Subtask B Leader :	Canada University of Waterloo	TNO, The Netherlands?
Subtask C Leader :	UK, Halcrow Gilbert Associates	Australia, University of New South Wales

### 13. PARTICIPATING COUNTRIES

The following countries have expressed an interest in participating in the Task:

Australia	Japan	Switzerland
Canada	Netherlands	United Kingdom
Denmark	Norway	United States
Germany	Sweden	CEC ?
Italy		

From the above countries possible Materials Case Study Project Leaders have been identified as detailed below:

<u>Materials Case Study Project</u>	<u>Lead Country</u>
Monolithic and granular aerogels	Denmark
Geometric media (honeycombs and capillary structures)	Germany
Chromogenic Glazings	Japan/U.S.A
Low-emittance coatings	Sweden
Evacuated glazings	Denmark
Advanced solar collector covers	Switzerland
Angular selective transmittance coatings	Australia
Light transport and holographic media	to be decided
Frame and edge seal technology	to be decided (action Norway)

Materials Case Study Project Leaders will have additional responsibilities over and above normal participation.





## 1. Definitions

Conversion of biomass feedstocks means both biological and thermal methods for producing usable energy and includes feedstock pretreatment prior to conversion as such. Usable energy forms include heat and electricity as well as gaseous, liquid and solid fuels.

## 2. Objective

The objective of this Task is to increase the utilization of wood and other biomass feedstocks by improving technologies for producing energy and chemicals. The Task will address specific issues in the following areas:

- (a) Thermal processing of biomass, including improvement of technologies for combustion of wood and wet biomass, and improvement of technologies for gasification and pyrolysis of biomass feedstocks.
- (b) Biological processing of biomass including the use of biotechnology and biocatalysis to improve fermentation and digestion technologies.
- (c) Processing of specialized feedstocks including straw and related agricultural wastes to improve resource utilization.
- (d) Generic utilization topics which apply to more than one technology area, including examination of environmental effects of conversion systems, development of standardized analytical techniques, and interface activities to improve information exchange.

## 3. Means

### (a) Activities

Participants will achieve the foregoing objective by undertaking co-operative Activities on specific biomass conversion topics. The Activities will consist of information exchange and co-ordination of national programmes.

Within the countries of the Participants of this Task there are substantial ongoing national research and development programmes on biomass conversion. The Participants agree to undertake co-operative research and development work based on national programmes and apply commonly-agreed procedures and methodologies in the following areas:

#### *Area A – Thermal Processing of Biomass*

Activities will be established to improve the efficiency and environmental acceptability of using biomass in thermal processes. An Activity on combustion will be established dealing with wood combustion in boilers and stoves as well as, the combustion and partial oxidation of wet biomass feedstocks. An Activity on gasification will examine the production of fuel or synthesis gases for end uses including gas turbines and the production of methanol or other products. An Activity on biomass pyrolysis/liquefaction



will determine methods to improve the technology for producing low-cost fuels and chemicals.

*Area B – Biological Processing of Biomass*

Activities will be established to improve the biological conversion of biomass with emphasis on the use of biocatalysis and biotechnology. An Activity on the fermentation of biomass materials will improve the yields and economics of producing liquid fuels and chemicals from biomass. A second Activity will address issues relating to the anaerobic digestion of agricultural and farm residues.

*Area C – Processing of Specialized Feedstocks*

An Activity will be established to improve utilization of biomass resources including straw and related agricultural wastes. This cooperative effort will integrate studies of resource collection, preparation and densification, and studies of mass burning with environmental topics as appropriate.

*Area D – Generic Utilization Topics*

Activities will be established to deal with issues common to several utilization and conversion technologies. An Activity will examine environmental issues including analysis and treatment of aqueous and solid effluents. Information exchange will be improved by establishing voluntary standardized analytical techniques. An activity will be formed to specifically provide an interface between the biomass production, harvesting, and utilization annexes, and will also deal with feedstock preparation and handling issues, and will also deal with feedstock preparation and handling issues.

(b) *Responsibilities of the Participants*

- (1) Each Participant will provide its contribution to the common fund as provided in paragraph 7 below.
- (2) In order to support the work under this Task each Participant will provide the Operating Agent with Task-relevant information from its national research and development programme on converting biomass feedstocks into usable energy forms, subject to the provisions of paragraph 9 below.

(c) *Activity Leaders*

An Activity Leader for each Activity shall co-ordinate the work performed under that Activity. The Activity Leader shall be a Participant who provides to the Activity high level expertise and undertakes substantial research and development in the field of the Activity. The Activity Leader shall be designated by the Operating Agent in agreement with the Participant and after consultation with the Technical Advisory Committee.

(d) *Technical Advisory Committee*

The Participants shall establish a Technical Advisory Committee consisting of one expert designated by each Participant. The Technical Advisory Committee shall assist the Operating Agent through the provision of Task-relevant information on national energy programmes as described in subparagraph (b) (2) above and shall advise the Operating Agent on other questions related to the performance of the Task.



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#### 4. Specific Responsibilities of the Operating Agent

The Operating Agent shall be responsible for the overall management of the work under this Annex and for implementing the decisions of the Executive Committee. To that end, the Operating Agent shall:

- (a) Prepare and submit for approval to the Executive Committee not later than three months after the adoption of this Annex and thereafter not later than three months before the following calendar year a detailed programme of work and budget, structured by Activity;
- (b) Report to the Executive Committee on the results and progress of the work under the Annex, at least semi-annually;
- (c) Upon completion of the Task, compile and disseminate to all Participants a final report and other documentation.

#### 5. Results

- (a) The results of this Task will be:
  - (i) Topical reports, manuals, meeting proceedings, and other documentation of the progress made by individual biomass utilization Activities; in addition, an integrated final report summarizing overall progress of the Task;
  - (ii) The format for the final report approved by the Operating Agent and the Executive Committee; formats for topical reports and other publications determined on an individual basis by the Operating Agent and the responsible Activity Leader.
- (b) Copies of each report, manual, proceedings, or other documentation will be distributed to each Participant by the Operating Agent and the responsible Activity Leaders.

#### 6. Time Schedule

This Annex will enter into force on 1st January, 1992, and remain in force for a period of three years. It may be extended by decision of the Executive Committee, acting by unanimity and taking into account any recommendation of the Agency's Committee on Energy Research and Development concerning the term of this Annex.

#### 7. Funding

- (a) The Participants agree to establish a common fund to finance the work to be performed under this Task including the work of the Operating Agent and the research work of the Participants performed by request of the Operating Agent under this Task.



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- (b) The expenditures covered by the common fund shall be borne by the Participants in shares as set out in sub-paragraph (d) below and shall not exceed US\$ 1,793,100 at current prices. The Executive Committee, acting by unanimity, may agree to increase the level of expenditure.
- (c) If significant changes occur, the Executive Committee, acting by unanimity, shall decide whether to adjust the Programme of Work or the Budget.
- (d) Participants' Anticipated Contributions to the Common Fund.

Participant	Anticipated financial contributions in US\$
Austria	85,200
Canada	213,600
Denmark	81,600
Finland	213,600
Italy	155,400
Japan	32,400
Netherlands	106,800
New Zealand	57,600
Norway	105,600
Sweden	170,100
Switzerland	79,800
United Kingdom	206,400
United States	187,500
Commission of European Communities	97,500
<b>Total</b>	<b>1,793,100</b>

- (e) Each Participant shall bear directly all the costs not covered by the common fund pursuant to sub-paragraph (a) above, including the costs of reimbursing its employees and the expert it designates for the Technical Advisory Committee for travel and other per diem expenses incurred in connection with the work.

## 8. Operating Agent

U.S. Department of Energy.



## 9. Information and Intellectual Property

- (a) *Executive Committee's Powers.* The publication, distribution, handling, protection and ownership of information and intellectual property provided to or arising from activities conducted under this Annex shall be determined by the Executive Committee, acting by unanimity, in conformity with this Annex.
- (b) *Right to Publish.* Subject only to the patents and copyright restrictions of this Annex, the Participants in this Annex (referred to in this Annex as the "Participants") shall have the right to publish all information provided to or arising from this Annex except proprietary information, but they shall not publish it with a view to profit, except as agreed by the Executive Committee, acting by unanimity. Neither the Participants nor personnel designated by them shall introduce into the Facility proprietary information unless such information is specifically identified and the terms and conditions for its introduction are agreed upon in writing by the Operating Agent and the concerned Participant.
- (c) *Proprietary Information.* The Participants shall take all necessary measures in accordance with this Annex, the laws of their respective countries, and international law to protect proprietary information. For the purposes of this subparagraph, proprietary information shall mean information of a confidential nature acquired prior to or outside the scope of this Annex, such as trade secrets and know-how (for example, computer programmes, design procedures and techniques, chemical composition of materials, or manufacturing methods, processes or treatments), which is appropriately marked, provided such information:
- (1) Is not generally known or publicly available from other sources;
  - (2) Has not previously been made available by the owner to others without obligation concerning its confidentiality; and
  - (3) Is not already in the possession of the recipient Participant without obligation concerning its confidentiality.
- It shall be the responsibility of each Participant supplying proprietary information to identify the information as such and to ensure that it is appropriately marked.
- (d) *Production of Relevant Information.* The Operating Agent should encourage the governments of all Agency Participating Countries to make available or to identify to the Operating Agent all published or otherwise freely available information known to them that is relevant to the Task. The Participants should notify the Operating Agent of all pre-existing information and information developed independently of the Task known to them which is relevant to the Task and which can be made available to the Task without contractual or legal limitations.
- (e) *Reports on Programme Work.* Reports containing arising information and pre-existing information necessary for and used in the Task, including proprietary information, shall be provided to the Operating Agent by each Participant performing the work. Each Participant agrees to provide to the Operating Agent all information which is utilized in the activities under this Annex or which is necessary for practising the results of the undertakings in this



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Annex. The Operating Agent shall provide all such information to all Participants. The Operating Agent shall provide summary reports of work performed under this Annex and results thereof (arising information), excluding proprietary information, to the Executive Committee.

- (f) *Arising Information.* All information developed in connection with and during activities carried out under this Annex (arising information) shall be provided to each Participant by the Operating Agent, subject only to the need to retain information concerning patentable inventions in confidence until appropriate action can be taken to protect such inventions in accordance with sub-paragraph (h) below.
- (g) *Licensing of Pre-existing Inventions.* Each Participant agrees to negotiate – to the extent permitted by law – licences to all pre-existing inventions, and will not unreasonably withhold such licences covered by patents owned or controlled by it which are necessary for and used in the Task to the other Participants, their governments and the nationals of their respective countries designated by them on reasonable terms, for use in all countries and to the government of any Agency Participating Country for use in its own country of any such invention on reasonable terms and conditions, subject to the laws and regulations governing the patent holding country, in order to meet its energy needs.
- (h) *Arising Inventions.* Inventions made or conceived in the course of or under the Task (arising inventions) shall be owned in all countries by the inventing Participant, subject to an irrevocable non-exclusive royalty-free licence to each of the other Participants, their governments, and the nationals of their respective countries designated by them. Information regarding inventions on which patent protection is to be obtained by the Participants shall not be published or publicly disclosed by the other Participants until a patent application has been filed, provided, however, that this restriction on publication or disclosure shall not extend beyond six months from the date of receipt of such information. It shall be the responsibility of the inventing Participant to appropriately mark reports which disclose inventions that have not been appropriately protected by the filing of a patent application. In order that public disclosure of inventions shall not adversely affect the patent interest of the Participants, patent approval for release or publication of information generated by or made a part of the activities under this Annex shall be obtained from the Operating Agent prior to any release or publication. Each Participant agrees to license such arising inventions to the Government of any Agency Participating Country for use in its own country on reasonable terms and conditions in order to meet its energy needs.
- (i) *Copyright.* The Operating Agent or each Participant for its own work may take appropriate measures necessary to protect copyrightable material generated under the Task. Copyrights obtained shall be the property of that Participant or the Operating Agent for the benefit of the Participants, provided, however, that Participants may reproduce and distribute such material, but shall not publish it with a view to profit.
- (j) *Inventors and Authors.* Each Participant shall, without prejudice to any rights of inventors or authors under its national laws, take all necessary steps to provide the co-operation from its inventors and authors required to carry out the provisions of this paragraph. Each Participant will assume the responsibility to pay awards or compensation required to be paid to its employees according to the laws of its country.



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## ANNEX X

## BIOMASS UTILIZATION

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- (k) *Determination of "National"*. The Participants may establish guidelines to determine what constitutes a "national" of a Participant.

## 10. Participants

The Contracting Parties which are Participants in this Task are the following:

The Republic of Austria,  
Canada Department of Forestry,  
The Ministry of Energy (Denmark),  
The Ministry of Trade and Industry (Finland),  
Comitato Nazionale per la ricerca e per lo sviluppo dell'Energia Nucleare e delle Energie Alternative (ENEA) (Italy),  
The New Energy and Industrial Technology Development Organization (NEDO) (Japan),  
Netherlands Agency for Energy and the Environment  
The Forest Research Institute (New Zealand),  
The Royal Norwegian Ministry of Petroleum and Energy,  
The National Energy Administration (Sweden),  
The Swiss Federal Office of Energy,  
The United Kingdom Atomic Energy Authority,  
The United States Department of Energy  
The Commission of European Communities.





Annex XX :

WORKING FLUID SAFETY

Legal document

1. Objectives

The objectives of this Task are to collect and evaluate data obtained by international experience regarding the safety of refrigeration machines and heat pumps as related to their working fluids.

2. Means

The work shall be carried out as a Common Study which will include the collection of data on the experience with heat pumps and refrigeration machines as it relates to their safety. In addition the potential hazards of heat pumps and refrigeration machines related to their working fluids will be investigated and evaluated.

3. Responsibilities of the Operating Agent

- (a) The Operating Agent, in consultation with the Participants and in conformity with paragraph 2 above, shall develop a detailed programme of work and budget, including methodology and time schedule. This programme shall be submitted to the Executive Committee for approval within three months of the adoption of this Annex.
- (b) The Operating Agent shall provide to the Executive Committee periodic reports describing the progress of the Study.
- (c) The Operating Agent shall integrate the results of this Task into a final report containing the Operating Agent's evaluation of those results, and, if appropriate, recommendations for future co-operative Tasks in this field, and shall distribute the report to all Participants.
- (d) The Operating Agent may arrange periodic meetings of experts on safety aspects of heat pumps and refrigeration machines to bring about collaboration in this field.



#### 4. Responsibilities of the Participants

- (a) Each Participant shall nominate an individual to assist in the management of this Task.
- (b) Each Participant shall provide data regarding the experience with heat pump and refrigeration machine safety in its own country. He will also provide information regarding relevant safety regulations valid in his country.

#### 5. Results

The results of this Task shall be :

- (a) Periodic documents and reports on the results achieved under the Programme of Work;
- (b) A final report containing the results of this Task and recommendations for such additional activities as may be appropriate.

#### 6. Funding

- (a) The expenditure incurred by the Operating Agent in the management of the Task shall be jointly borne by the Participants as provided in Article 6(g) hereof in the amounts set forth below. Such expenditure is not expected to exceed 6.500.000,-Belgian Francs at Januari 1991 price levels, and may not exceed such level except upon unanimous agreement of the Executive Committee. If significant changes in price levels or in the scope of activities under this Task occur, the Executive Committee, acting by unanimity, shall consider whether to adjust the Programme of Work to the available funds or to increase the Budget.

#### (b) Scale of contributions (in Belgian Francs)

Austria	500.000,-
Belgium	500.000,-
Canada	750.000,-
Italy	750.000,-
Japan	1.000.000,-
Netherlands	500.000,-
Norway	500.000,-
Sweden	500.000,-
Switzerland	500.000,-
U.S.A.	1.000.000,-
	6.500.000,-

- (c) In addition, each Participant shall bear all costs it incurs in carrying out the work under paragraph 4 above including the expenses for the participation in experts meetings. The effort of each Participant under paragraph 4 above is estimated to amount to no more than the equivalent of six man-months.

#### 7. The Operating Agent

The Government of Belgium.

#### 8. Information and Intellectual Property

- (a) Executive Committee's Powers. The publication, distribution, handling, protection and ownership of information and intellectual property arising from this Annex shall be determined by the Executive Committee, acting by unanimity, in conformity with this Agreement.
- (b) Right to Publish. Subject only to copyright restrictions, the Participants shall have the right to publish all information provided to or arising from this Task, except proprietary information, in accordance with subparagraph (i) below.
- (c) Propriety Information. The Participants and the Operating Agent shall take all necessary measures in accordance with this paragraph, the laws of their respective countries and international law to protect proprietary information provided to or arising from this Task. For the purposes of this Annex, propriety information shall mean information of a confidential nature such as trade secrets and know-how (for example, computer programmes, design procedures and techniques, chemical composition of materials, or manufacturing methods, processes or treatments) which is appropriately marked provided such information :
- (1) Is not generally known or publicly available from other sources;
  - (2) Has not previously been made available by the owner to others without obligation concerning its confidentiality;
  - (3) Is not already in the possession of the recipient Participant without obligation concerning its confidentiality.

It shall be the responsibility of each Participant supplying propriety information, and of the Operating Agent



for arising propriety information, to identify the information as such and to ensure that it is appropriately marked.

- (d) Production of Relevant Information by Governments. The Operating Agent should encourage the governments of all Agency Participating Countries to make available or to identify to the Operating Agent all published or otherwise freely available information known to them that is relevant to the Task.
- (e) Production of Available Information by Participants. Each Participant agrees to provide to the Operating Agent all previously existing information, and information developed independently of the Task, which is needed by the Operating Agent to carry out its functions in this Task and which is freely at the disposal of the Participant and the transmission of which is not subject to any contractual and/or legal limitations :
- (1) If no substantial cost is incurred by the Participant in making such information available, at no charge to the Task therefore;
  - (2) If substantial costs must be incurred by the Participant to make such information available, at such charges to the Task as shall be agreed between the Operating Agent and the Participant with the approval of the Executive Committee.
- (f) Use of Confidential Information. If a Participant has access to confidential information which would be useful to the Operating Agent in conducting studies, assessment analysis, or evaluations, such information may be communicated to the Operating Agent but shall not become part of reports of other documentation, nor be communicated to the other Participants except as may be agreed between the Operating Agent and the Participant which supplies such information.
- (g) Acquisition of Information for the Task. Each Participant shall inform the Operating Agent of the existence of information that can be of value to the Task, but which is not freely available, and the Participant shall endeavour to make the information available to the Task under reasonable conditions, in which event the Executive Committee may, acting by unanimity, decide to acquire such information.
- (h) Reports on work Performed under the Task. The Operating Agent shall provide report of all work performed under the Task and the results thereof, including studies, assessment, analyses, evaluations and other documentation,



but excluding propriety information, in accordance with paragraph 3 above.

- (i) Copyright. The Operating Agent may take appropriate measures necessary to protect copyrightable material generated under this Task. Copyrights obtained shall be the property of the Operating Agent, for the benefit of the Participants provided, however, that Participants may reproduce and distribute such material, but shall not publish it with a view to profit, except as otherwise directed by the Executive Committee.
- (j) Authors. Each Participant shall, without prejudice to any rights of authors under its national laws, take necessary steps to provide the co-operation from its authors required to carry out the provisions of this paragraph. Each Participant shall assume the responsibility to pay awards or compensation required to be paid to its employees according to the laws of its country.

9. Time Schedule.

This Annex entered into force on January 1, 1991 and shall remain in force for an initial period of one year. It may be extended by agreement of two or more Participants, acting in the Executive Committee, and taking into account any recommendation of the Agency's Committee on Energy Research and Development concerning the term of this Annex which shall thereafter only apply to these Participants.

10. Participants in this Task

The Contracting Parties which are Participants in this Task are the following :

(to be specified)

Protokoll	
<input checked="" type="checkbox"/> ohne	
z.V.	z.K.
	X
X	
	X
	X
	X