

LETS TAKE SAFETY OF OUR LIVES  
INTO OUR HANDS

European Environment Society

Management: 30-150  
Kraków POLÁND Armii  
Krajowej street 2/24  
mobile. 0517875905

www.esos.org.pl  
biuro@esos.org.pl

Chairman: JerzyWalosikPH.D.  
Mobile: 0 517 875 905  
fax: 012 256 03 29  
biuro@esos.org.pl

Chairman of Scientific Council:  
prof. T Petrys  
mobile. 0606946317  
phone. 012411 1785  
petrys.t@esos.org.pl



Krakov 06.03.2009

Czech Presidency of the EU Council  
President of the E.C.  
Prime Minister of Czech Republic  
Mr Mirek Topolánek  
Nabreží Edvarda Beneše 4  
J1801 Praha 1  
Česká republika

Věc:

Návrh na spuštění během trvání Czech Presidency of EU (1 jan. - 30 June 2009) mezinárodního vědecko-výzkumného programu - jako programu České republiky se sídlem v Čechách pod názvem

„Využití průmyslového CO<sub>2</sub> odpadu  
z LCPs k výrobě plyných a kapalných syntetických paliv “  
*Akronym: CO<sub>2</sub> Syntefu (Synthetic Fuels)*

Výše uvedený program může být mezinárodním úspěchem v rámci „Priority of Czech Presidency“ - v oblasti hospodářství a energetika.

Vážený pane Předsedo vlády České republiky

Jsme si jistí, že prezentovaným na předchozí stránce vědecko-výzkumným programem se Česká republika zapíše trvale v dějinách Evropy jako významná činnost z čestné funkce Presidency of the EU Council - 2009.

Plynná, kapalná paliva a energetika tvoří náročný politicko-ekonomický problém zemí nejen Evropské Unie, ale také zemí celého světa, nemajících přístup k nerostným palivovým surovinám.

Víme, že palivových surovin z toho ropy rychle ubývá. Kolem zemního plynu se objevují stále politicko-hospodářské machinace. Uhlí jako palivo, není žádáno v EU a ve světě s ohledem na to, že se během spalování vylučují obrovská množství škodlivého kysličníku uhličitého. Nápad skladování kondenzovaného CO<sub>2</sub> v geologických ložiskách v množstvích stovek milionů tun považujeme za šílenství a sebevražední činnost pro lidi v zemské biosféře.

Pane Předsedo vlády navrhovaný Vám vědecko-výzkumný program COs *Syntefu* se stane druhým v Evropě vlajkovým celosvětově významným programem.

Prvním vlajkovým programem EU je mezinárodní program ITER realizován ve Francouzsku, za účasti 7 bohatých zemí světa. (Příloha 112 listů)

Energie z jaderné fúze získaná z realizace programu ITER bude mílovým krokem nejen pro Evropu a dokonce svět.

Pamatuji, když se před 15-ti léty mí kolegové fyzikové na Univerzitě posmívali a žertovně hovořili o programu ITER - tvrdíc, že je tento nereálný. Tato podezření neobstála a máme už hmatatelné úspěchy a staví se hlavní experimentální reaktor

Pane Prezidente of E.C.

Navrhujeme, aby se dle vzoru programu ITER spustil v Čechách jako iniciativa české vlády mezinárodní program CO<sub>2</sub> *Syntefu*.

Program výroby syntetických paliv z CO<sub>2</sub> jsme prezentovali jako akreditovaní na Klimatické konferenci OSN v Poznani 2008. Pokud si pamatují, jeden výtisk v anglickém jazyce této koncepce byl umístěn ve skřínce určené pro českou delegaci. (Příloha 2 - anglický text - 4 listy)

Naše prezentace vzbudila oprávněný zájem.

Přicházíme k závěru, že existují příznivé okolnosti v EU aby program výroby syntetických paliv z CO<sub>2</sub> byl spuštěn českou vládou, v rámci české presidency of EU

Víme z naše korespondence s komisařem Barroso a komisaři Potocznic a Dimas a také s Evropským Parlamentem, že je tato koncepce akceptována. Není divu, vždyť CO<sub>2</sub> je pořád a bude po mnoho let obrovským problémem pro ochranu životního prostředí a tento program přinese vážná a účinná řešení

Žádáme přidat věci prioritní režim usnesením vlády o připravenosti k realizaci programu CCh *Syntefu*.

Na základě programu CO<sub>2</sub> Syntefu jako programu přijatého českou vládou bude možnost zahájit organizování sídla mezinárodního konsorcia v České republice ve vládou určeném městě.

Organizační podrobnosti jsme připraveni prezentovat instituci a osobám určeným Předsedou vlády Žádáme o uvedení termínu a místa schůze z osobami zmocněnými k věci.

Předběžné poznámky

- V případě kladného rozhodnutí navrhujeme stanovit sídlo programu (Praha? Brno?)
- Navrhujeme jmenovat organizační výbor ve složení chemiků a fyziků z českých 2-3 vysokých škol technických a akademií věd. Rádi se připojíme k organizačním pracím
- K realizaci programu CO<sub>2</sub> Syntefu navrhujeme pozvat vlády 20 nejbohatších zemí světa. Toto bude mezinárodní konsorcium vlád.
- K realizaci výzkumného programu CO<sub>2</sub> Syntefu navrhujeme pozvat 20 - 30 výzkumných ústavů chemie, fyzika, energetika, ekonomie, informatika)
- K dozorování realizovaného výzkumu navrhujeme jmenovat Vědeckou radu ve složení - zástupci 20 členských států.
- Vytvoříme konsorcium za účasti 30 - 40 nejbohatších koncernů z oboru energetických surovin, technologie energie, těžkého průmyslu.

Navíc si Vás dovoluujeme upozornit, pane Předsedo vlády na skutečnost, že zde navrhovaný program CC>2 Syntefu realizován v České republice bude mít celosvětový význam, stejně jako třeba program ČERN realizován ve Švýcarsku.

(Příloha 3-11 listů)

Plnou podporu pro vládu České republiky získáme ze strany The European Institute for Innovation and Technology EIT (Budapešť).

(Příloha 4-2 listy)

### **Zdroje získání finančních prostředků k realizaci programu „CO<sub>2</sub> Syntefu“**

Celkové náklady na realizaci mezinárodního programu „CO<sub>2</sub> Syntefu“ mohou činit, jak je patrné z prezentovaných předpokladů etap 1 - IV cca 1501 mil. eur Finanční prostředky mohou být původem jako dotace ze:

- Světové banky (40%)
- Evropské banky rozvoje (20%)
- Evropské komise (20%)

A také z konsorcium:

- např 8-10 států EU
- 5-6 zemí ze skupiny G8+5
- 28-30 velkých energetických koncernů

Vklad České republiky je to jen cca 2-3 mil. eur

Naše rozeznání ukazuje na reálné možnosti získání finančních prostředků k realizaci programu „CO<sub>2</sub> Syntefu“ z více zdrojů.

Chceme podotknout, že spuštění programu „CO<sub>2</sub> Syntefu“ jako mezinárodního programu, financovaného ze zdrojů výše uvedených organizací si žádá jeho přijetí jako vládního programu.

## NÁKLADY NA PROGRAM ODHADEM

### Koncepce etap realizace programu „CO<sub>2</sub> Syntefu" 2009-2022

Předpokládáme tři, případně čtyři etapy k realizaci technologicko-výzkumného programu „CO<sub>2</sub> Syntefu"

#### I etapa

Organizační práce mezinárodní technologické plošiny CO<sub>2</sub> Syntefu-2009 1

Stvoření a spuštění programu

2. Spuštění programu CO<sub>2</sub> Syntefu.
3. Přizvání k výzkumnému konsorciu ústavů a dalších výzkumných jednotek z České republiky
4. Přizvání ke konsorciu zahraničních ústavů
5. Stanovení výzkumných metod a rámců spolupráce v rámci výzkumného konsorcia „CO<sub>2</sub> Syntefu"
6. Přizvání ke konsorciu 30-40 koncernů
7. Zpracování výzkumných metod týkajících se syntézy paliv z odpadového CO<sub>2</sub> získaného z výrobních závodů.
8. Stvoření vědecké rady (mezinárodní) CO<sub>2</sub> Syntefu.
9. Zpracování nezbytných žádostí určených vybraným mezinárodním organizacím o financování výzkumu utilizace odpadu CO<sub>2</sub> cestou syntézy plyných a kapalných paliv

Náklady na I.etapu - cca 1 mil eur

#### II etapa (2009-2013)

Realizace laboratorních a napůl technických zkoušek, za účelem stanovení nejvhodnějších pro technologické procesy výroby syntetických paliv metod syntézy odpadového CO<sub>2</sub>.

Zahájení předběžných projektových prací týkajících se výstavby experimentální napůl technické výrobní linky pro třetí etapu (2013-2015).

Náklady na II.etapu cca 100 mil eur

#### III. etapa (2014-2017)

Výstavba a spuštění experimentální, napůl technické výrobní linky syntetických paliv z odpadového kysličníku uhličitého odebíraného od velkých spalovacích závodů LCP - Large Combustion Plants).(V České republice) Předpokládaná výkonnost experimentální technologické linky- 1 T/hod.paliv

Náklady na III.etapu - cca 200 mil. eur

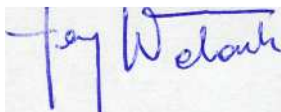
Předpokládá se potřebu spuštění I.etapy

IV. etapa (2018-2022)

Předpokládá se potřeba realizace IV. etapy tj. výstavbu experimentálního závodu na výrobu syntetických paliv z odpadu CO<sub>2</sub> s výkonností cca 12 mil tůn kapalných paliv ročně.

Tento experimentální první ve světě závod na výrobu syntetických paliv z postavíme jako vzorový

Náklady na IV etapu — cca 1200 mil. eur



S úctou

Dr Jerzy Walosik



Prof. Dr Tibor Petrys

**Le programme ITER. Une coopération intergouvernementale européenne réussie dans le domaine scientifique et technique**

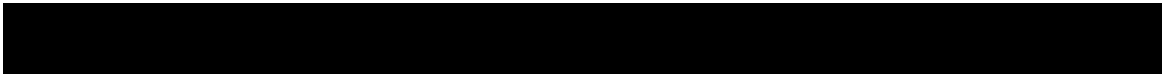
**The ITER Programme. Successful European Inter-Governmental Cooperation in the Scientific and Technical Fields**

*Claudie Haignere et Bernard Bigot*

At a time when energy questions – be it global warming or the depletion of sources of fossil fuels – are increasingly in the news, nuclear fusion seems, in the very long term, to raise the possibility of providing humanity with virtually inexhaustible energy. Europe is in the forefront of research in this field. It is the leader in a major international collaborative exercise which should lead to the establishment of the International Thermonuclear Experimental Reactor (ITER). After a presentation of the issues surrounding fusion, Claudie Haignere and Bernard Bigot, who are closely involved, through their respective activities, in this venture, outline the genesis of the ITER project and the manifold inter-governmental negotiations – both between EU member states and with the other members of the project (Japan, USA, Russia etc.) – that have accompanied its development. Those negotiations led to the signing in November 2006 of a precise Cooperation agreement on the ITER programme (with sharing of the financial burden), which came into force in October 2007. ITER (which is to be built at Cadarache in France) thus represents a particularly successful example of inter-governmental cooperation in the scientific and technical fields. For this reason, the authors see it as a model to be followed in many other fields included within the European Research Area (ERA) – which the EU intends to develop in the coming years.

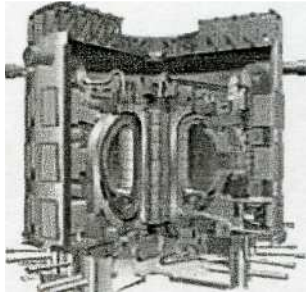
Revue Futuribles, no 339 – March 2008, 100 pages, Paris.

1 / 12



# : FUSION FOR ENERGY

THE EUROPEAN JOINT UNDERTAKING FOR ITER AND THE DEVELOPMENT OF FUSION ENERGY



**The European Joint Undertaking for ITER and the Development of Fusion Energy or 'Fusion for Energy' helps to realise fusion as a future source of energy.**

'Fusion for Energy' was established in March 2007 and its offices are located in Barcelona, Spain

## Mews

**27 February 2009**

**Colloquium on the ITER-CODAC "Plant Control Design Handbook" EU Procurement of Control and Instrumentation for ITER**

Bringing together over a hundred participants from industry and associations, the ITER-CODAC meeting, held 27-28 October 2008, was organised in order to offer constructive criticism of the PCDH to the ITER International Organisation and to encourage those who are involved in building the plant systems to contribute to this process.

Read [»](#)

**27 February 2009**

at

New vacancy notices for recruitment at Fusion for Energy have been published

**15 December 2008**

of validity of

The validity of certain reserve lists has been extended until 31 December 2009 Read **more** [»](#)

**28 November 2008**

[http://fusionforenergy.europa.eu/index\\_en.htm](http://fusionforenergy.europa.eu/index_en.htm)

2009-03-02

The first meeting of the ILO (Industrial Liaison Officers) Network kicked off on Tuesday 18 November in Barcelona bringing together 57 participants from different European countries.

[more »](#)

### **27 November 2008**

ITER Headquarters Inauguration

The inauguration of the new ITER IO Headquarters took place on Thursday 20 November and brought together Kaname Ikeda, Director of ITER IO, Didier Gambier, Director of F4E, Francois Gauche, Director of Agence ITER France and local representatives of the PACA region.

[Read more »](#)

### **26 November 2008**

**Engineers discuss the mechanics of fusion energy!**

The Academy of Industrial Engineers of Catalonia has decided to organise two workshops to discuss the science behind fusion reactors and the opportunities stemming from fusion energy for the Catalan economy, industry and academia [Read more »](#)

### **22 October 2008**

IAEA Fusion Energy Conference

Celebrating fifty years of fusion and entering into the burning plasma era' was the theme of the 22nd IAEA Fusion Energy Conference (FEC)

[more »](#)

### **16 October 2008**

**Meeting Catalan**

Fusion For Energy (F4E) met with the Catalan authorities in order to communicate better its mission, offer an update on the progress of the ITER experiment and explore ways of tighter collaboration with the Catalan policy makers in areas of research, science and innovation, energy and environment.

[Read »](#)

### **5 October 2008**

at SOFT **Maurizio Gasparotto**

With ITER being high on the agenda at this year's Symposium of Fusion Technology (SOFT), I decided to catch up with Maurizio Gasparotto, Chief Engineer at the ITER Department, for some fusion hard talk.

[Read »](#)

### **25 September 2008**

Highlights

Rostock is known for having Northern Europe's oldest university and Germany's largest city forest. Between 14-19 September it also became a new mecca for the fusion community by hosting the 25th Symposium on Fusion Technology (SOFT)

[»](#)



## Events

### 4-5 March 2009

1st on **buildings** for ITER  
Fusion for Energy (*i-it*: the organization for Europe's contribution to ITER, is inviting you to register to its first thematic meeting where F4E will present the procurement packages for the construction of ITER Buildings [Read more »](#)

### 27-28 October 2008

**Control and Instrumentation Workshop**  
A meeting was held in Barcelona between 27-28 October to discuss the ITER-CODAC Plant Control Design Handbook and formulate the EU Procurement strategy for ITER Control and Instrumentation  
**All PowerPoint presentations are available online »**

### October 13-18, Geneva

**22nd IAEA Fusion Energy Conference**  
The 22nd IAEA Fusion Energy Conference (FEC) will take place in Geneva, Switzerland from October 13 to 18, 2008 The conference is organised by the International Atomic Energy Agency (IAEA) and hosted by the Government of Switzerland FEC 2008 provides a forum to present and discuss current progress and developments in fusion experiments, theory and technology F4E will be participating to this event through members of staff Paul Thomas, Gabriella Saibene, Alfredo Portone and Jesus Izquierdo who will be presenting research papers F4E will also be present with its stand at the ITER exposition that will be held at the Hall des Pas Perdus, adjacent to the main Assembly Hall of the Palace of Nations of the UN organization in Geneva [Read more »](#)

### 15-19 September 2008

SOFT (Rockstock,  
The 25th Symposium on Fusion Technology will bring together more than 600 participants from research and industry to exchange information on the design, construction and technology of current and future fusion machines. Didier Gambier, Director of Fusion for Energy and Maurizio Gasparotto, Chief Engineer at the ITER Department, will deliver keynote lectures. Members of staff of Fusion for Energy will participate at different scientific sessions offering information on the progress of the ITER project. Fusion for Energy will have a stand at the R&D exhibition of the Fusion Technology Forum »

### 17 - 22 August 2008

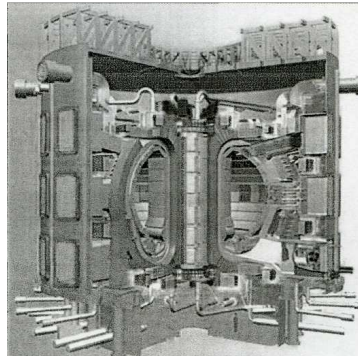
ASC  
The next biennial Applied Superconductivity Conference, ASC 2008, is to be held in Chicago, Illinois from Sunday through Friday, August 17 - 22, 2008 Fusion for Energy will be participating to this event through members of staff

Alexander Vostner, Alessandro Bonito Oliva and Alfredo Portone who will be chairing sessions on ITER and fusion research Alessandro Bonito Oliva is a member of the Organising Technical Committee of the ASC Conference [more »](#)

**Agenda**  
Selection of fusion-related **scientific**

[http://ftisionforenergy.europa.eu/index\\_en.htm](http://ftisionforenergy.europa.eu/index_en.htm)  
2009-03-02

ITER-Central  
ITER China  
ITER-Japan  
ITER-Europe  
ITER-US DOE  
HER US Project Office  
ORNL  
ITER GA  
ITPA  
ARIES  
Fusion Links  
Fusion Meetings  
ITER ITA Newsletter



U . S .

## **Recent U.S. ITER Activities (For additional information - see the FIRE Web page)**

- US ITER Project reports progress to FESAC N. Sauthoff
- ITER Project submits Preliminary Safety Report as formal start of the licensing process.
- Impact of Omnibus Appropriations Bill on US Participation in ITER
  - o Orbach Interview on Impact of Budget Cuts on US Science - ScienceNOW
  - o DOE Outlines Plan for Near Term Plan for US ITER Participation **January 11, 2008**
  - o US physics begins to crumble under budget strain, New Scientist **January 8, 2008**
  - o The DOE Science Budget section of the Omnibus Appropriations Bill December 18, 2007
  - o Reaction From Capitol Hill to FY 2008 S&T Funding Levels -American Institute of Physics, Jan 5, 2008
  - o Congressman Ehlers' Statement on Federal Science Spending, December 21, 2007
  - o ITER. Looking Back, Looking Ahead - history of FY 2008 budget for

- fusion. American Institute of Physics, Jan 4, 2008
- o Statement of APS Division of Plasma Physics Officers , December 2007
- o US Fusion Program Leaders Protest ITER Budget Cuts January 4, 2008
- o Energy Project(ITER) Down but not Out, Senator Lamar Alexander Pledges help, January 5, 2008
- Researchers Seek to Recreate Fusion Power. - ITER Segment on National Public Radio-
- US ITER Project Advisory Committee to meet at ORNL January 18-19, 2007
- 1st ITER Project Vendor Information Forum will be held November 15, 2006 at Museum in Oak Ridge, Oak Ridge, Tennessee
- APS-DPP Town Meeting on ITER Progress
  - o Status of ITER - N Holtkamp
  - o US ITER Project, Providing a Facility for Burning Plasma Research - N. Sauthoff
  - o US Burning Plasma Organization - R. Fonck «
- ITER Sessions at IAEA Fusion Energy Conference Chengdu, China
  - o The Engineering Challenges of ITER - N Holtkamp
  - o Review of ITER Physics Issues and Possible Approaches to Their Solution - R. Stambaugh
  - o Edge Pedestal Physics and its Implications for ITER - Y Kamada
  - o Plasma Surface Interaction and Scrape-off Layer Physics Implications for ITER - B. Lipshultz
  - o The Design and Implementation of Diagnostic Systems on ITER - A. Costley
  - o Broader Approach Activities toward Fusion DEMO Reactors - S. Matsuda
- ITER Design Review Process described by PDDG Holtkamp
- US ITER Management team has been named (OAK RIDGE, Term., Aug. 17, 2006) - A team of scientists and engineers has been chosen to manage the United States' role in a multinational project to harness the power of fusion. The US ITER Project plans will be reviewed by DOE September 24-28. The overall ITER project will have a design status/review meeting in mid November It is anticipated that the ITER parties will sign the ITER Implementing agreement in late November 2006.
- **ITER Deputy Directors Nominated** at ITER Preparatory Committee (IPC) meeting at Cadarache on July 13 The IPC approved the proposal from the ITER Director General nominee Deledalle for nominees to fill ITER Deputy Director positions. The nominees for ITER Deputy Directors (Photos) are: Carlos ALEJANDRE (DDG for Safety and Security ) EU/Spain, Valery Alekseevich CHUYANOV (DDG for Fusion Science and Technology) RF, WANG Shaoqi (DDG for Administration) CN, Gary Johnson (DDG for Tokamak) US, Yong Hwan KIM (DDG for Central Engineering and Plant Support) KO and Dhiraj BORA (DDG for CODAC, Heating & Current Drive System and Diagnostics) IN and (Press Release and Resume)The next major milestone is to authorize the project when the parties "sign" the ITER Implementing Agreement in the November 2006 time frame.

- President Bush attends 2006 US-EU Summit - ITER (fusion) considered part of a Joint Energy Security Initiative.
- Bold Step by the World to Fusion Energy: ITER 2006 Con Edison Lecture, Professor Gerald Navratil, Columbia University
- US ITER Plans presented to FES AC on March 1, 2006
  - Report on ITER Negotiations and Status of Agreement, Warren Marton, Office of Fusion Energy Sciences
  - Status of U.S. ITER Project, Dr Ned Sauthoff, Director US ITER Project Office
- US ITER Project Office (USIPO) invites individuals and institutions to nominate US candidates for ITER Deputy Director General (DDG) and other positions on the International Team and on the USIPO Team. Additions to the US IPO web page,
- Japan to Reward South Korea with Construction contracts for ITER Support (AFP) -The Mainichi Shinbun newspaper reported that Japan has decided to give 20 percent, or about 11 billion yen (93 million dollars), worth of its ITER construction orders to the South Koreans.
- US Fusion Energy Sciences Advisory Committee (FESAC) will review US preparations for participation in ITER.
- European Commission Discusses Implementation of the European Legal Entity for ITER -S. Chatzipanagiotou EU commission
  - European Joint Undertaking for ITER and the Development of Fusion Energy
  - Personnel needs for ITER and the European Joint Undertaking for ITER
- Nuclear Fusion. ITER Project Update N Sauthoff, presented at the Emerging Technologies Conference organized by Energy Frontiers International
- The new US ITER Contributions are described in the FY 2007 Budget Plan for Magnetic Fusion-
- The US ITER Project team participated in a DOE Office of Science cost review held at Oak Ridge National Lab February 1-3 The team presented cost estimates for the US Contributions to ITER as well as overall assessments of the issues within the international and domestic ITER project. The review team is finalizing its report.
- U.S. ITER Project Office to move from PPPL to ORNL to optimize the roles of the Laboratories. Ned Sauthoff of PPPL is continuing as the US ITER Project Manager, and PPPL will continue to play a major role in the partnership.
- US ITER Contributions to ITER have been revised to optimize the cost sharing among the parties and to account for India as a new partner Details are not available. Preparations for the DOE Office of Science cost estimate review of the US contributions to ITER on Feb 1-3 continue.
- ITER and the Promise of Fusion Energy - Rob Goldston, presented to US Congressional R & D Caucus
- What is HER? 2 page brochure prepared by US ITER Project Office at PPPL.

- Status and Plans for the US Contributions to ITER Carl Strawbndge presented to USBPO Workshop
- U.S. Preparations for ITER - N Sauthoff, US ITER Project Office, presented at SOFE 2005
- Status of ITER Project - P Barabaschi, ITER Team, presented at SOFE 2005
- US ITER Project Office solicits Expressions of Interest. Individuals interested in participating in the US ITER project activities are invited to fill out a questionnaire. This is a Request for Expressions of Interest (RFEI) announcement, not a solicitation. After consideration of response information, the USIPO will issue solicitations for management positions within the USIPO and possibly close R&D and Design support.
- **Official Statements from the Ministerial Meeting** for the ITER Siting Decision, June 28, 2005, Moscow
  - o Russian..FederationStatement Academician Alexander Yu. Rumanyetsev, Head of Rosatom o IAEA Staterrient Dr Werner Burkart, Deputy Director General Head, Department of Nuclear Sciences and Applications o Japan Statement Mr Nariaki Nakayama,Mimster of Education, Culture, Sports, Science and Technology (MEXT) o Europe Statement Dr Janez Potocnik, European Commissioner for Science and Research o United States Statement Dr Raymond L. Orbach, Director, Office of Science o Republic of Korea Statement Mr ChoiSeok-Sik ,Vice Minister of Science and Technology o People's Republic of China Statement Mr Xu Guanhua, Minister of Science and Technology
  - o Joint Declaration signed by the six ITER parties, o Joint EU JA Agreement with additional details.
- Ned Sauthoff US ITER Project Office interviewed on NPR Science Friday.
- ITER Siting Decision Clears One Important Obstacle in Congress -(AIP) "This is real we've got a project on our hands." - DOE Office of ScienceDirector Ray Orbach
- U.S.DOE Statements on International Fusion Reactor (ITER) Siting Decision.
- US ITER Project Advisory Committee (US ITER PAC) First meeting held at PPPL May 12-13,2005
- US ITER Presentations to Industry meeting held May 11, 2005
- US ITER Project Plans presented at the DOE Budget Planning Meeting March 16,2005
  - o Status of ITER Negotiations Michael Roberts
  - o Overview of ITER Project Activities in the U.S. Ned Sauthoff
- US ITER Project Activities were presented to a meeting of the University Fusion Association at the APS-DPP meeting in Savannah GA.
  - o US In-kind Contributions to ITERand Starting Burning Plasma Research N Sauthoff/D Meade

o Diagnostic Challenges and Opportunities on ITER D Johnson

- A Joint US ITER Project VLT meeting was held at PPPL on October 18-21, 2004. For details, contact Ned Sauthoff, US ITER Project Office Director
- Achieving US Burning Plasma Science and Technology Goals on ITER, An Overview of US ITER Project Activities, PPPL Colloquium, Ned Sauthoff, U.S. ITER Project Manager, Oct 6, 2004
- . Status of ITER Activities described at SOFT September 13-16, 2004. These presentations are descriptions of work in progress and should not be referenced in publications. Contact the authors for additional details.
  - o ITER. Towards the Construction Y Shimomura, Acting Director of the ITER International Team
  - o The Need for Fusion , Sir Chris Llewellyn Smith, Chair EU CCFU
- Status of ITER Activities described at ANS Topical Meeting on Fusion September 20-24, 2004. These presentations are descriptions of work in progress and should not be referenced in publications. Contact the authors for additional details.
  - o ITER Status, Pietro Barabaschi
  - o European Technological Effort in Preparation for ITER Construction, Roberto Andream
  - o Relation of the U.S. Program to ITER, Charles Baker
  - o Overview of Recent Japanese Activities in Fusion Technology, M. Seki
  - o U.S. ITER Project Activities, Ned Sauthoff
- ITER Project Status, Preparing for an Efficient Start of ITER Construction, presentation to FES AC on N Sauthoff July 27, 2004
- US ITER Project Organization Proposed organization for US ITER Project Office circulated to fusion community July 19, 2004
- ORNL snares prime fusion energy project U.S. Energy Secretary Spencer Abraham announced Tuesday that the U.S. project office for the International Thermonuclear Experimental Reactor will be at Princeton, N.J The Princeton/ORNL team was selected to run the office, which will oversee procurement of major components for the prototype fusion reactor and assign U.S. scientists and engineers to work on the giant project. July 14, 2004
- U.S. ITER Project Office will be Located at Princeton Plasma Physics Laboratory' WASFfLINGTON, DC - The U.S. Department of Energy announced today that the U.S. project office for ITER, a major international fusion experiment, will be located at Princeton Plasma Physics Laboratory (PPPL). The U.S. ITER Project Office at PPPL will be responsible for project management of U.S. activities to support construction of this international research facility These will include securing technical assistance from the U.S. fusion community; procuring and shipping U S. hardware contributions, arranging for U.S. personnel to work abroad at the ITER site; representing the U.S. with the international ITER organization on construction and preparation for ITER operations; and coordinating and integrating the U S. fusion community's ITER project activities with the international ITER project. July 13, 2004
- A US/ITER Town meeting and ITER/NIF session were held on April 22, 2004 as

# CERN

/ 11

From Wikipedia, the free encyclopedia

*CERN is also the ticker symbol for Cerner*

## The European Organization for Nuclear Research

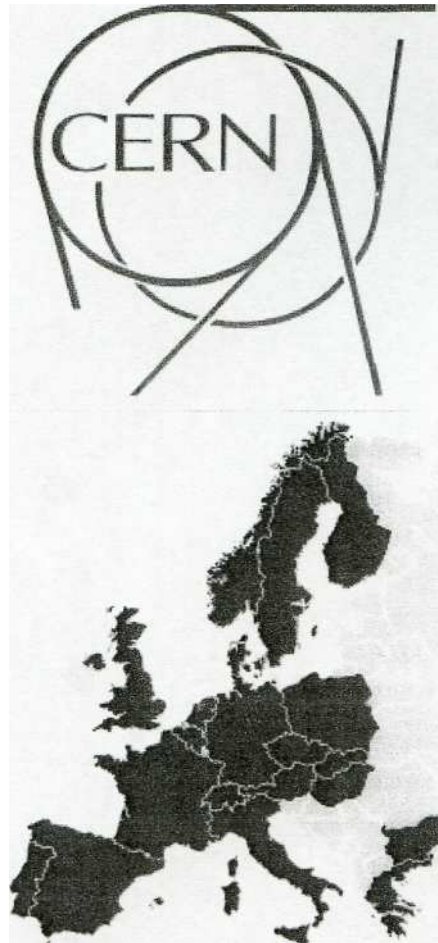
(French. *Organisation Européenne pour la Recherche Nucleaire*), known as **CERN** (see *Naming*), pronounced *I'syn/* (IPA. [SERn] in French), is the world's largest particle physics laboratory, situated in the northwest suburbs of Geneva on the Franco-Swiss

border, established in 1954/ ^ The organization has twenty-European member states, and is currently the workplace of approximately 2,600 full-time employees, as well as some 7,931 scientists and engineers (representing 580 universities and research facilities and 80 nationalities).

CERN's main function is to provide the particle accelerators and other infrastructure needed for high-energy physics research. Numerous experiments have been constructed at CERN by international collaborations to make use of them. The main site at Meyrin also has a large computer centre containing very powerful data processing facilities primarily for experimental data analysis, and because of the need to

<http://en.wikipedia.org/wiki/CERN>

## European Organization for Nuclear Research Organisation Européenne pour la Recherche Nucleaire



<b>Formation</b>	Member states
<b>Type</b>	29 September 1954^
<b>Headquarters</b>	Particle physics laboratory-
<b>Membership</b>	Geneva
	20 member states and 8
	observers
<b>Director</b>	Rolf-Dieter Heuer

2009-03-02



make them available to researchers elsewhere, has historically been (and continues to be) a major wide area networking hub.

As an international facility, the CERN sites are officially under neither Swiss nor French jurisdiction. Member states' contributions to CERN for the year 2008 totalled CHF 1 billion (approximately €664 million. US \$1 billion). [2]

## Contents

- 1 History
  - 1.1 Scientific achievements
    - 1.1.1 Computer science
  - 2 Particle accelerators
    - 2.1 Current complex
      - 2.1.1 The Large Hadron Collider
    - 2.2 Decommissioned accelerators
- 3 Sites
- 4 Member states
- 5 Public exhibits
- 6 In popular culture
- 7 See also
- 8 Notes
- 9 References
- 10 External links

## History

### General

### Website

<http://www.cern.ch/>



The 12 founding member states of CERN in 1954 <sup>a</sup>  
W (map borders from 1989)



54 years after its foundation, membership to CERN increased to 20 states, 18 of which are also EU members as of 2008

The convention establishing CERN was signed on 29 September 1954 by 11 countries in Western Europe. ^ -" The acronym CERN originally stood, in French, for *Conseil Europeen pour la Recherche Nucleaire* (European Council for Nuclear Research), which was a provisional council for setting up the laboratory, established by 11 European governments in 1952. The acronym was retained for the new laboratory after the provisional council was dissolved, even though the name changed to the current *Organisation Europeenne pour la Recherche Nucleaire* (European Organization for Nuclear Research) in 1954.<sup>L J</sup> According to Lew Kowarski, a former [31] director of CERN, when the name was changed, the acronym could have become the awkward OERN, and Heisenberg said "But the acronym can still be CERN even if the name is [not]"

Soon after its establishment, the work at the laboratory went beyond the study of the atomic nucleus, into higher-energy physics, an activity which is mainly concerned with the study of interactions between particles. Therefore the laboratory operated by CERN is commonly referred to as the **European laboratory for particle physics** (*Laboratoire europeen pour la physique des particules*) which better describes the current research being performed at CERN

## Scientific achievements

Several important achievements in particle physics have been made during experiments at CERN These include, but are not limited to, the following.

- " 1973. The discovery of neutral currents in the Gargamelle bubble chamber -"
- 1983 The discovery of W and Z bosons in the UA1 and UA2 experiments^ \*
- m 1989' The determination of the number of neutrino families at the Large Electron Positron Collider (LEP) operating on the Z boson peak.
- " 1995 The first creation of antihydrogen atoms in the PS210 experiment^ -•
- 1999- The discovery of the direct CP-violation in the NA48 experiment^ \*

The 1984 Nobel Prize in physics was awarded to Carlo Rubbia and Simon van der Meer for the developments that led to the discoveries of the W and Z bosons.

The 1992 Nobel Prize in physics was awarded to CERN staff researcher Georges Charpak "for his invention and development of particle detectors, in particular the multiwire proportional chamber"

## Computer science

*See also. History of the World Wide Web*

The World Wide Web began as a CERN project called ENQUIRE, initiated by Sir Tim Berners-Lee in 1989 and Robert Cailhau in 1990 [3] Berners-Lee and Cailhau were jointly honored by the ACM in 1995 for their

contributions to the development of the World Wide



Web.

Based on the concept of hypertext, the project was aimed at facilitating sharing information among researchers. The first website went on-line in 1991 On 30 April 1993, CERN announced that the World Wide Web would be free to anyone. A copy of the original first webpage, created by Berners-Lee, Sir Tim Berners-Lee at is still published on the World Wide Web Consortium website CERN became the first as a historical document.

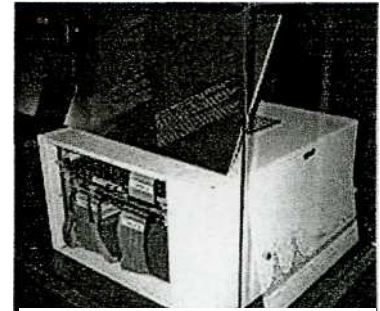
This NeXT Computer used by British scientist Sir Tim Berners-Lee at CERN became the first

Web server

Prior to the Web's

development, CERN had been a pioneer in the introduction of Internet technology, beginning in the early 1980s. A short history of this period can be found here.

More recently, CERN has become a centre for the development of Grid computing, hosting among others the Enabling Grids for E-science (EGEE) and LHC Computing Grid projects. It also hosts the CERN Internet Exchange Point (CIXP), one of the two main Internet Exchange Points in Switzerland. CERN's computer network is connected to JANET (formerly UKERNA), the research and education network, JANET aids CERN to disperse large data over a network grid for closer analysis.



This Cisco Systems router at CERN was probably one of the first IP routers deployed in Europe.

## Particle accelerators

### Current complex

CERN operates a network of six accelerators and a decelerator Each machine in the chain increases the energy of particle beams before delivering them to experiments or to the next more powerful accelerator Currently active machines are:

- \* Two linear accelerators generate low energy particles for injection into the Proton Synchrotron. The 50 MeV Lmac2 is for protons, and the 4.2 MeV/u Lmac3 is for heavy ions.' '
- The Proton Synchrotron Booster increases the energy of particles generated by the proton linear accelerator before they are transferred to the other accelerators.

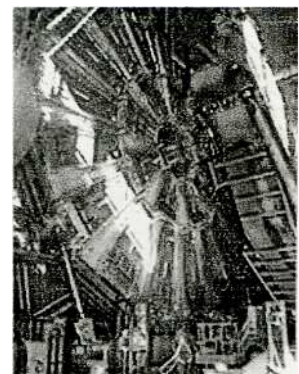
Map of the Large Hadron Collider at CERN

- The Low Energy Antiproton Ring (formerly "LEIR") accelerates the ions from the ion linear accelerator, before transferring them to the Proton Synchrotron (PS). This accelerator was commissioned in 2005, after having been reconfigured from the previous Low Energy Anti-proton Ring (LEAR).
- The 28 GeV Proton Synchrotron (PS), built in 1959 and still operating as a feeder to the more powerful SPS.
- The Super Proton Synchrotron (SPS), a circular accelerator with a diameter of 2 kilometres built in a tunnel, which started operation in 1976. It was designed to deliver an energy of 300 GeV and was gradually upgraded to 450 GeV. As well as having its own beamlines for fixed-target experiments, it has been operated as a proton-antiproton collider, and for accelerating high energy electrons and positrons which were injected into the Large Electron-Positron Collider (LEP). From 2008 onwards, it will inject protons and heavy ions into the Large Hadron Collider (LHC).
- The On-Line Isotope Mass Separator (ISOLDE), which is used to study unstable nuclei. Particles are initially accelerated in the PS Booster before entering ISOLDE. It was first commissioned in 1967 and was rebuilt with major upgrades in 1974 and 1992.
- The Antiproton Decelerator (AD), which reduces the velocity of antiprotons to about 10% the speed of light for research into antimatter

## The Large Hadron Collider

Most of the activities at CERN are currently directed towards building a new collider, the Large Hadron Collider (LHC) and the experiments for it. The LHC represents a large-scale, worldwide scientific cooperation project.

The LHC tunnel is located 100 metres underground, in the region between the Geneva airport and the nearby Jura mountains. It uses the 27 km circumference circular tunnel previously occupied by LEP which was closed down in November 2000. CERN's existing PS/SPS accelerator complexes will be used to pre-accelerate protons which will then be injected into the LHC.



Construction of the CMS detector for LHC at CERN

Six experiments (CMS, ATLAS, LHCb, TOTEM, LHC-forward and ALICE) are currently being built, and will be running on the collider; each of them will study particle collisions under a different point of view, and with different technologies. Construction for these experiments required an extraordinary engineering effort. Just as an example, to lower the pieces for the CMS experiment into the underground cavern which will host it, a special crane will have to be rented from Belgium, which will be able to lift the almost 2000 tons for each piece. The first of the approximately 5,000 magnets necessary for construction was lowered down a special shaft at 13:00 GMT on 7 March 2005

stream to laboratories around the world for distributed processing (making use of a specialised grid infrastructure, the LHC Computing Grid). In April 2005, a trial successfully streamed 600 MB per second to seven different sites across the world. If all the data generated by the LHC is to be analysed, then scientists must achieve 1,800 MB per second before 2008

The initial particle beams were injected into the LHC August 2008, ^ ^ the first attempt to circulate a beam through the entire LHC was at 0830Z on 10 September 2008, ^ •" but the system was taken down for repairs on 19 September 2008 and due to a faulty magnet it must be reheated, repaired, and recooled. With this and the previously scheduled winter shutoff due to power consumption, no results are expected before July 2009

## Decommissioned accelerators

- The original linear accelerator (Linacl).
- The 600 MeV Synchrocyclotron (SC) which started operation in 1957 and was shutdown in 1991
- The Intersecting Storage Rings (ISR), an early collider built from 1966 to 1971 and operated until 1984.
- The Large Electron-Positron Collider (LEP), which operated from 1989 to 2000 and was the largest machine of its kind, housed in a 27 km-long circular tunnel which now houses the Large Hadron Collider
- The Low Energy Antiproton Ring (LEAR), commissioned in 1982, which assembled the first pieces of true antimatter, in 1995, consisting of nine atoms of antihydrogen. It was closed in 1996, and superseded by the Antiproton Decelerator

## Sites

The smaller accelerators are located on the main Meyrin site (also known as the West Area), which was originally built in Switzerland alongside the French border, but has been extended to span the border since 1965. The French side is under Swiss jurisdiction and so there is no obvious border within the site, apart from a line of marker stones. There are six entrances to the Meyrin site:



CERN's main site, as seen from Switzerland looking towards France.

- A, in Switzerland. Open for all CERN personnel at specific times.
- /?, in Switzerland. Open for all CERN personnel at all times. Often referred to as the *main entrance*

- C, in Switzerland. Open for all CERN personnel at specific times.

- *D*, in Switzerland. Open for goods reception at specific times.
- *E*, in France. Open for French-resident CERN personnel at specific times. Controlled by customs personnel. Named "Porte Charles de Gaulle" in recognition of his role in the creation of the CERN \*• -\*
- *Tunnel entrance*, in France. Open for equipment transfer to and from CERN sites in France by personnel with a specific permit. This is the only permitted route for such transfers. Under the CERN treaty, no taxes are payable when such transfers are made. Controlled by customs personnel.

The SPS and LEP/LHC tunnels are located underground almost entirely outside the main site, and are mostly buried under French farmland and invisible from the surface. However they have surface sites at various points around them, either as the location of buildings associated with experiments or other facilities needed to operate the colliders such as cryogenic plants and access shafts. The experiments themselves are located at the same underground level as the tunnels at these sites.

Three of these experimental sites are in France, with ATLAS in Switzerland, although some of the ancillary cryogenic and access sites are in Switzerland. The largest of the experimental sites is the Preveessin site, also known as the North Area, which is the target station for non-collider experiments on the SPS accelerator Other sites are the ones which were used for the UA1, UA2 and the LEP experiments (the latter which will be used for LHC experiments).

Outside of the LEP and LHC experiments, most are officially named and numbered after the site where they were located. For example, NA32 was an experiment looking at the production of charmed particles and located at the Preveessin (North Area) site while WA22 used the BEBC bubble chamber at the Meyrin (West Area) site to examine neutrino interactions. The UA1 and UA2 experiments were considered to be in the Underground Area, i.e. situated underground at sites on the SPS accelerator




## Member states

The original twelve CERN signatories from 1954 were:

- I Belgium
- Denmark
- \*"" Germany (at first only West Germany)
- s I France
- = Greece
- « 1 Italy
- s ~T~ Norway
- 55 Sweden
- Switzerland













Member states of CERN as of 2008  
 Founding **members**  
 Members who joined ChRN later

-  Netherlands
-  United Kingdom
-  Yugoslavia (later withdrawn)

All founding members have so far (as of 2008) remained in the CERN organisation, except Yugoslavia which left in 1961 and never re-joined.

Since its foundation, CERN regularly accepted new members. All new members have remained in the organisation continuously since their acceptance, except Spain which joined in 1961, withdrew eight years later, and joined anew in 1983 CERN's membership history is as follows.




-  Austria joined in 1959, bringing the total number of members to 13
-  Yugoslavia left in 1961 (12 members)
-  Spain joined in 1961 (thus increasing the number of member states to 13 again), left in 1969 (12 members), rejoined in 1983 (13 members)
-  Portugal joined in 1985 (14 member states)
-  Finland joined in 1991
-  Poland joined in 1991 (together with Finland bringing the number of participating member states to 16)
-  Hungary joined in 1992 (17 members)
-  Czech Republic joined in 1993
-  Slovakia joined in 1993 (together with Czech Republic increasing the total members to 19)
-  Bulgaria joined in 1999 (20 member states)

































There are currently twenty member countries, 18 of which are also European Union member states.

Eight additional international organizations or countries have observer status.

-  European Commission
-  India
-  Israel
-  Japan
-  Russia
-  Turkey
-  UNESCO
-  United States

Non-Member States (with dates of Co-operation Agreements) currently involved in CERN programmes are.

-  Algeria
-  Argentina 11 March 1992
-  Armenia - 25 March 1994

-  Australia 1 November 1991
-  Azerbaijan 3 December 1997
-  Belarus 28 June 1994
-  Brazil - 19 February 1990 & October 2006
-  Canada - 11 October 1996
-  Chile - 10 October 1991
-  China - 12 July 1991, 14 August 1997 & 17 February 2004
-  Colombia - 15 May 1993
-  Croatia 18 July 1991
-  Cuba
-  Cyprus 14 February 2006
-  Estonia 23 April 1996
-  Georgia - 11 October 1996
-  Iceland - 11 September 1996
-  Iran 5 July 2001
-  Ireland
-  Lithuania - 9 November 2004
-  Mexico - 20 February 1998
-  Montenegro - 12 October 1990
-  Morocco - 14 April 1997
-  New Zealand - 4 December 2003
-  Pakistan 1 November 1994. The possibility of Pakistan becoming an Observer State has been raised on various occasions.
-  Peru - 23 February 1993
-  Romania - 1 October 1991 Since 12 December 2008 it has the Status of Candidate for Accession to Membership.
-  Serbia - 8 June 2001 It might apply for accession to CERN as a Member State.
-  Slovenia 7 January 1991
-  South Africa 4 July 1992
-  South Korea - 25 October 2006. It might become a candidate for CERN Observer Status in a few years.
-  Taiwan
-  Thailand
-  Ukraine - 2 April 1993
-  Vietnam

Maps of the history of CERN [show]  
membership

## Public exhibits

Facilities at CERN open to the public include-

- The *Globe of Science and Innovation*, which opened in late 2005 and is used four

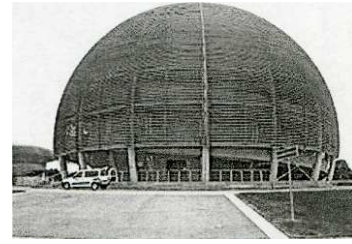


times a week for special exhibits.

- The Microcosm museum on particle physics and CERN history

## In popular culture

- CERN is mentioned in several works of fiction and science fiction such as Robert J Sawyer's *Flashforward* and Dan Brown's *Angels and Demons* in which the theoretical Higgs Boson figures prominently
- CERN's Large Hadron Collider is the subject of a (scientifically accurate) rap video featuring some of the facility's own staff\* \*



The Globe of Science and Innovation at CERN

## See also

- Fermilab
- Leon Van Hove
- List of Directors General of CERN
- ROOT
- SLAC
- Ultra high vacuum

## Notes

- <sup>A</sup> a: The twelve founding member states of CERN in 1954 were: Greece, Yugoslavia, Italy, Switzerland, France, Belgium, Netherlands, West Germany, Denmark, Great Britain, Norway, and Sweden.

## References

**i**

- <sup>A</sup> CERN Website Resources Planning and Control <sup>A</sup> The CERN Name, on the CERN website. Last accessed on 25 October 2006. <http://public.web.cern.ch/public/en/About/History73-en.html>
- <sup>A</sup> <http://public.web.cern.ch/public/en/About/History83-en.html>
- <sup>A</sup> <http://public.web.cern.ch/public/en/About/History95-en.html>
- <sup>A</sup> V Fanti et al., Phys. Lett. B465 (1999) 335 (hep-ex/9909022)
- <sup>A</sup> CERN Website LINAC <sup>A</sup> Overbye, Dennis (29 July 2008). "Let the Proton Smashing Begin. (The Rap Is Already Written.)" *The New York Times*



CERN- where the Web was born

10 <sup>A</sup> **CERN** press release, 7 August 2008

Coordinates: 46°14′03″N 6°03′10″E﻿ / ﻿46.234167°N 6.052778°E﻿ / 46.234167; 6.052778

11 <sup>A</sup> "Red Carpet for CERN's 50th" *CERN bulletin*. November 2004.

12. <sup>A</sup> [2]

## External links

- Official site
- *CERN at 50*
- m* CERN Courier - International journal of high-energy physics
- CERN chronology
- CERN e-Recrmtment site - students and fellows programmes and staff employment opportunities
- CERN podcast
- CERN ultra high vacuum solar thermal collector
- CERN visits
- Engineering the large hadron collider at CERN, Dr Lyn Evans CBE, *Ingenia* magazine, June 2008.
- Globe of science and innovation info
- Hands-On-CERN (educational site about CERN and particle physics)
- Microcosm museum info
- NYT's a giant takes on physics' biggest questions
- The cloud experiment
- The six billion dollar experiment (documentary)

Retrieved from "<http://en.wikipedia.org/wiki/CERN>"

Categories. CERN Organizations established in 1954 Organisations based in Geneva International nuclear energy organizations Science and technology in Europe International organizations of Europe | Nuclear research centers Particle physics facilities International research institutes

Hidden categories. Wikipedia indefinitely move-protected pages Articles containing French language text All articles with unsourced statements Articles with unsourced statements since November 2007 Articles containing potentially dated statements from 2008 | All articles containing potentially dated statements

---

- This page was last modified on 1 March 2009, at 19'04.
- All text is available under the terms of the GNU Free Documentation License. (See Copyrights for details.)  
Wikipedia® is a registered trademark of the Wikimedia Foundation, Inc., a U.S. registered 501(c)(3) tax-deductible nonprofit charity

BG CS DA DE EL EN ES ET FI FR HU IT LT LV MT NL PL PT RO SK SL SV	BG CS DA DE EL EN ES ET FI FR HU IT LT LV MT NL PL PT RO SK SL SV
pl	en

Decyzja podjęta w drodze porozumienia między przedstawicielami rządów państw członkowskich z dnia 18 czerwca 2008 r w sprawie lokalizacji siedziby Europejskiego Instytutu Innowacji Technology (2008/634/WE)

PRZEDSTAWICIELE RZĄDÓW PAŃSTW CZŁONKOWSKICH,

uwzględniając art. 289 Traktatu ustanawiającego Wspólnotę Europejską

a także mając na uwadze, co następuje:

(1) O utworzeniu Europejskiego Instytutu Innowacji i Technologii

Parlamentu Europejskiego i Rady (WE) postanowiono w rozporządzeniu nr 294/2008 z dnia 11 marca 2008 r ustanawiającym Europejski Instytut Innowacji i Technologii [1]

(2) Należy zdecydować o lokalizacji siedziby instytutu,

STANOWIA, CO NASTĘPUJE.

Artykuł 1

Europejski Instytut Innowacji i Technologii ma siedzibę w Budapeszcie.

opublikowana w Dzienniku Urzędowym Unii Europejskiej, staje się skuteczna z dniem jej przyjęcia

Artykuł 2

Niniejsza decyzja, która zostanie

Decision taken by common agreement between the Representatives of the Governments of Member States of 18 June 2008

on the location of the seat of the European Institute for Innovation and Technology (EIT)

(2008/634/EC)

THE REPRESENTATIVES OF THE GOVERNMENTS OF THE MEMBER STATES,

Having regard to Article 289 of the Treaty establishing the European Community,

Whereas:

(1) The establishment of a European Institute for Innovation and

(EC) No 294/2008 of the European Technology was decided by Regulation Parliament and of the Council of 11 March 2008 establishing the European Institute for Innovation and Technology [1]

(2) The location of the seat of this Institute should be determined, HAVE DECIDED AS FOLLOWS.

Article 1

The European Institute for Innovation and Technology (EIT) shall have its seat in Budapest.

in the Official Journal of the European Union, shall take effect on the date of its publication

Article 2

This Decision, which will be published

Done at Brussels, 18 June 2008.

<http://eur-lex.europa.eu/Notice.do?mode=dbl&lang=pl&ihmlang=pl&lngl=pl,en&lng..>  
.. 2009-02-23

Sporządzono w Brukseli, dnia 18 czerwca 2008 r

M Kucler Dolinar

Przewodniczący

[1] Dz.U. L 97 z 9.4.2008, s. 1

The President

M. Kucler Dolinar

[1] OJ L 97, 9.4.2008, p. 1

**Zarządzane przez Urząd Publikacji**

