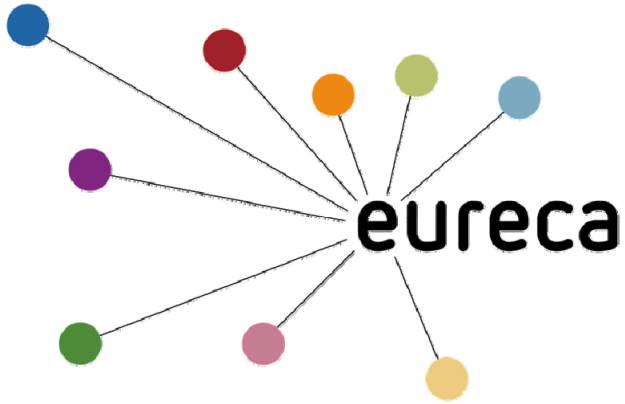
Fuel cells and hydrogen
Joint undertaking

Programme Review Day 2012
Brussels, 28th & 29th November 2012

New Energy World JU
fuel cells & hydrogen for sustainability

http://www.fch-ju.eu/



Efficient Use of Resources in Energy Converting Applications
(Grant Agreement N° 303024)

Dr. Alexander Dyck

NEXT ENERGY • EWE-Forschungszentrum für Energietechnologie e. V.

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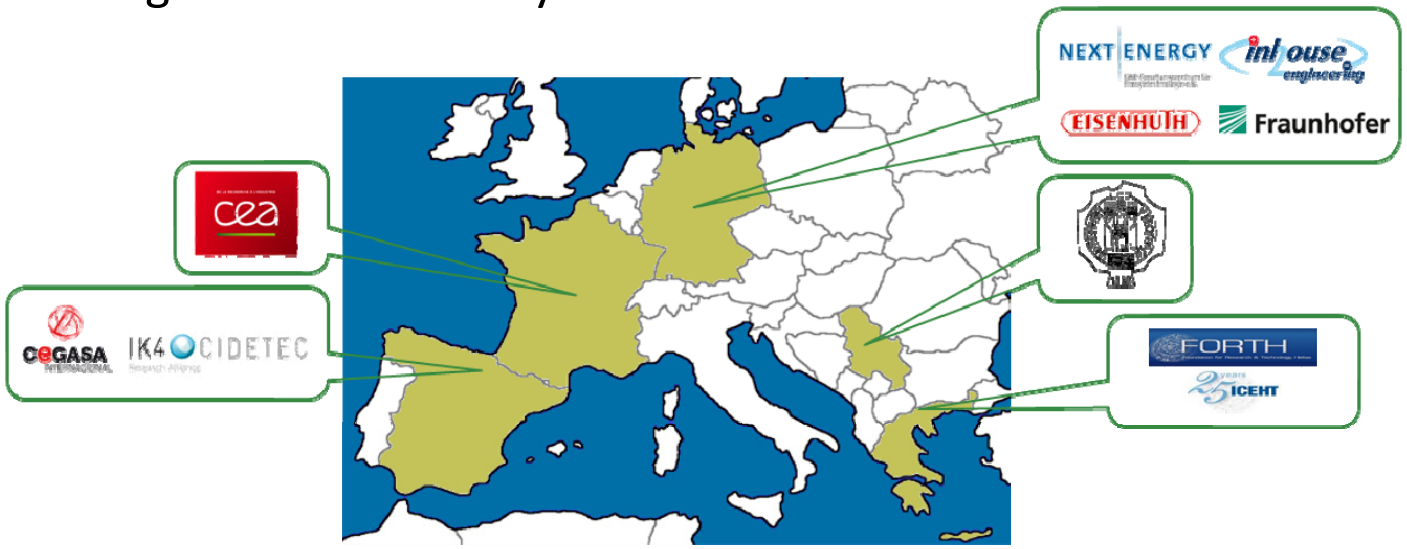
Project and Partnership

General Overview

- Developing the next generation of a micro combined Heat-and-Power (µ-CHP) systems based on advanced PEM stack technology
- Efficient Use of Energy Converting Applications
- Duration of the project: 07/2012 - 06/2015
- Total Budget: 6,314,505 €; FCH contribution: 3,557,295 €
- The consortium is well balanced along the supply chain. Component suppliers and system designer are backed by research institutions.



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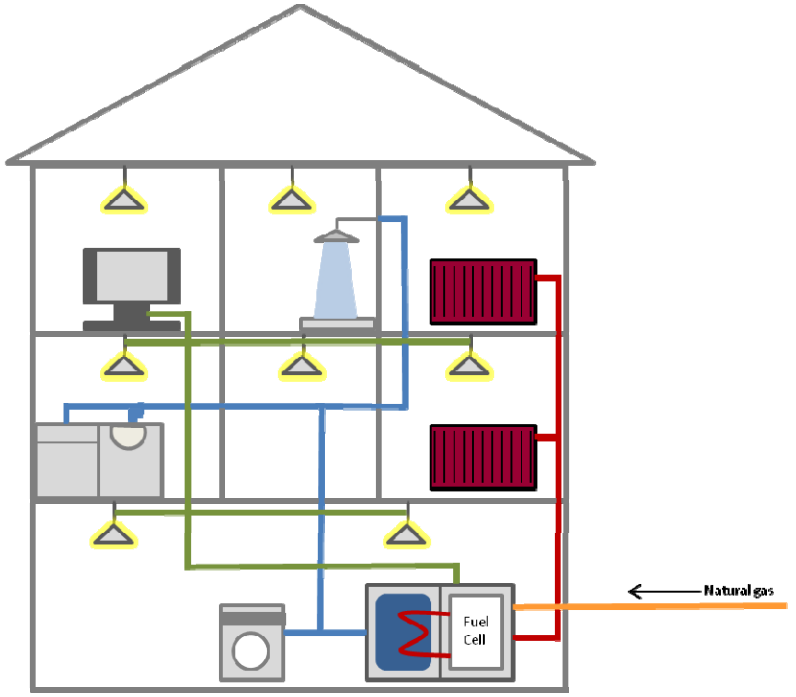
Objectives and Outcome

Principal objectives

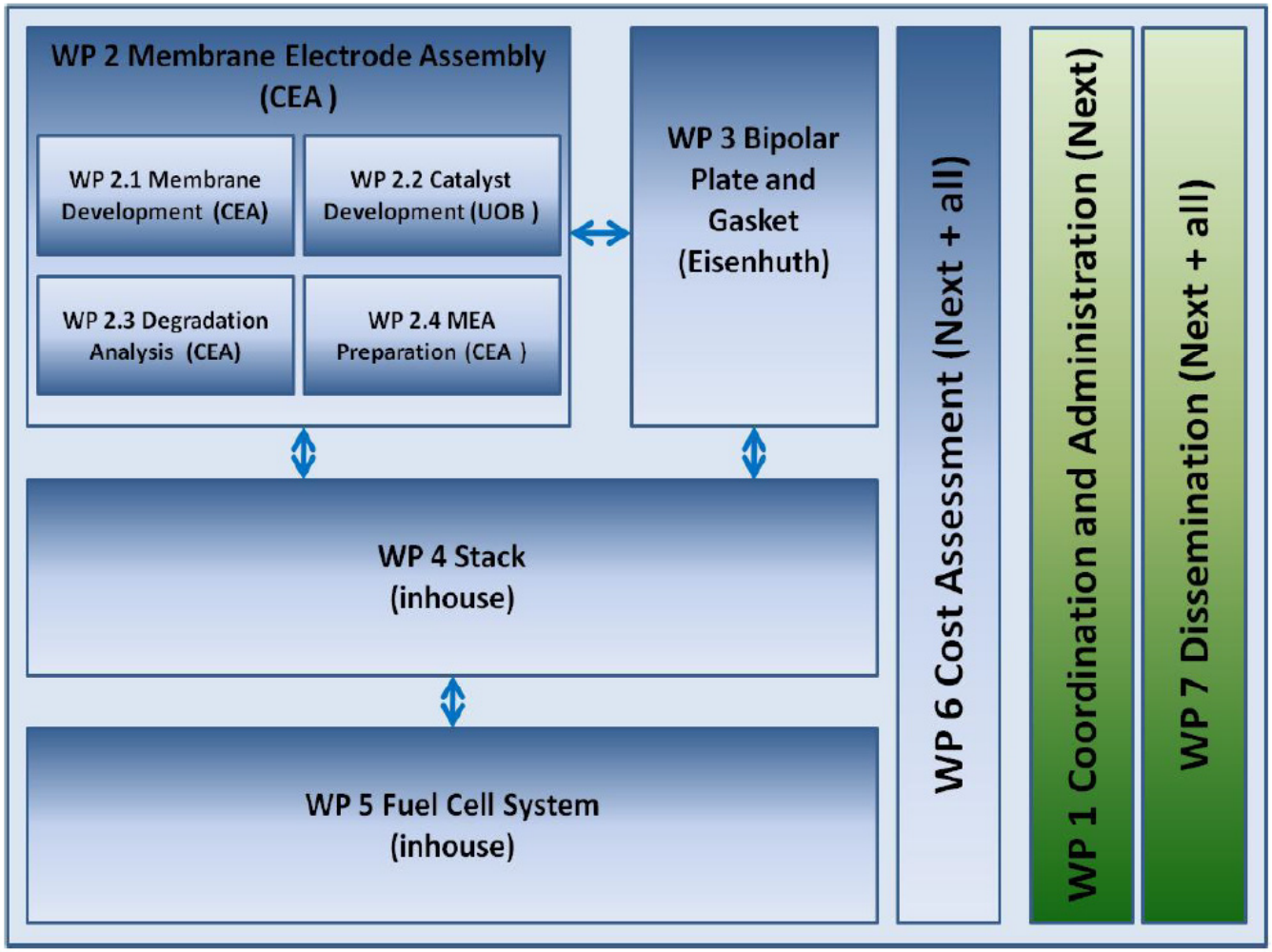
- Developing the next generation of a micro combined Heat-and-Power (µ-CHP) systems based on advanced PEM stack technology
- Overcome the disadvantages of complex gas purification, gas humidification, and the low temperature gradient for heat exchangers in a heating system
- Developing a new stack generation with operating temperatures of 90 to 120 °C



Main outcome

- A less complicated, high efficient, and therefore a robust µ-CHP system with reduced costs

Approach in performing activities



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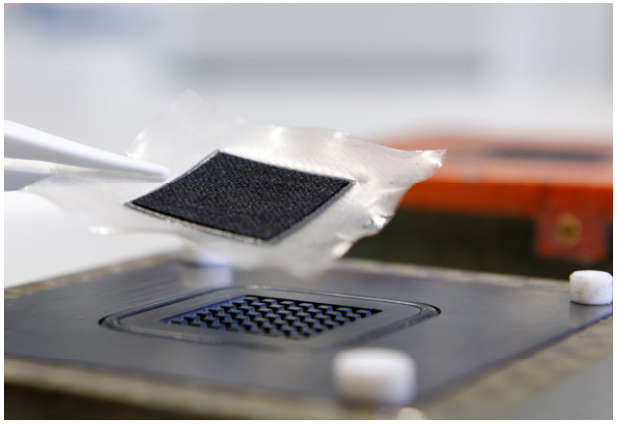
Management and MEA

WP1 – Management of the consortium

- ensure that the activities in the different work packages are in line
- manage communication with the FCH Joint Undertaking / European Commission
- ensure all requirements are met with respect to reporting and financial management
- pursue information technological developments and demonstrations within the project to the outside world

WP2 – Membrane Electrode Assembly



- propose membranes different from state of the art
- Development of catalyst materials allowing reduction in Pt metal catalyst loading
- prove the performance of the EURECA FC MEA component under different operational conditions
- propose MEAs including selected membranes and integrating the electrode components
- provide EURECA MEAs for their integration in the stacks of the project

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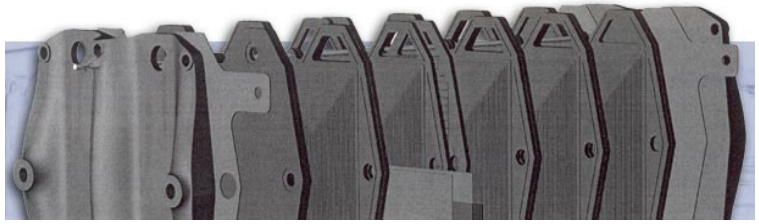
Bipolar Plate and Gasket, Stack

WP3 – Bipolar Plate and Gasket

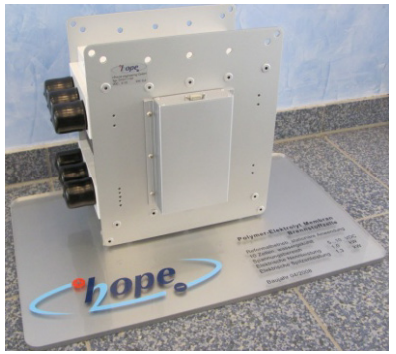
- Improvement of bipolar plates material in view of its technological properties
- Optimization of materials and manufacturing of gaskets
- To simplify bipolar plate design and optimization through computational modeling of flow distribution
- Test of performance of bipolar plates



http://www.eisenhuth.com/pages/bipolar.html

WP4 – Stack

- Adaption of cell and stack design and material to MT-PEM
- To guide stack design with modeling data on flow and concentration distribution
- Test of stack performance and degradation
- Delivery of stacks for system integration



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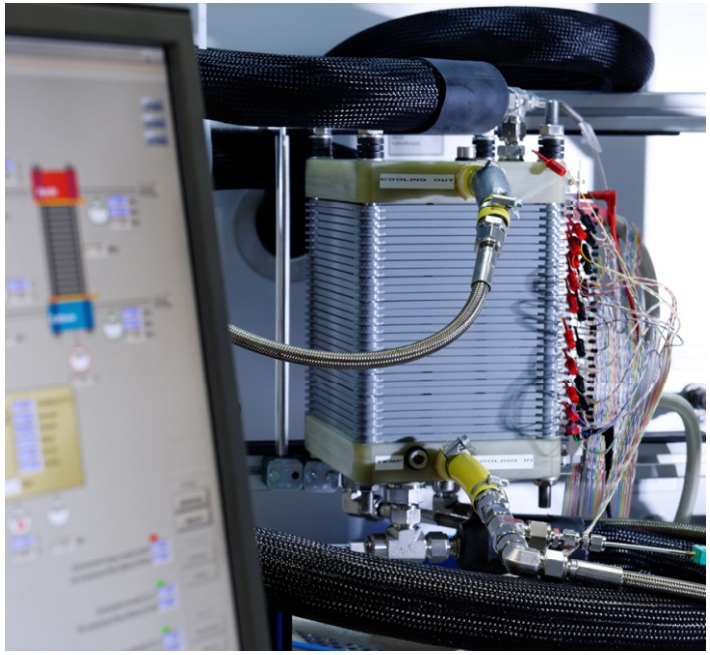
FC Systems, Cost Assessment and Disseminiation

WP5 – Fuel Cell System

- Adaption of µ-CHP-system design and components to MT-PEM-stack
- Test of µ-CHP-system performance and degradation

WP6 – Cost Assessment

- Monitoring the design-to-cost approach
- Estimation of costs at series production level
- Reach cost targets



WP7 – Dissemination and public Awareness

- Design of common project identity
- Development of external website
  an set-up of internal website
- To prepared a set of dissemination material including presentations, a final brochure and a descriptive flyer
- promote the utilization of the project results
- Workshop for selected experts and companies

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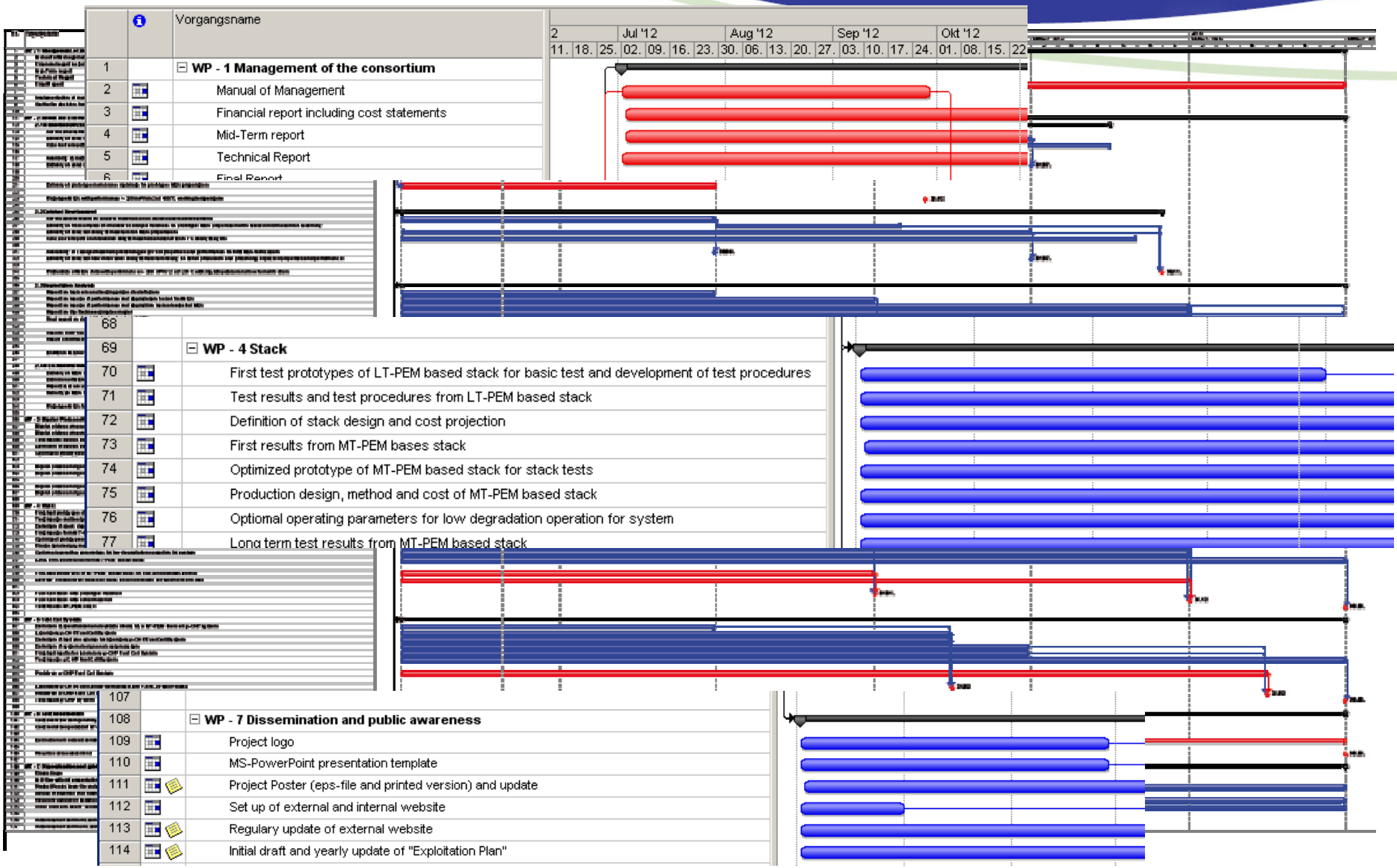
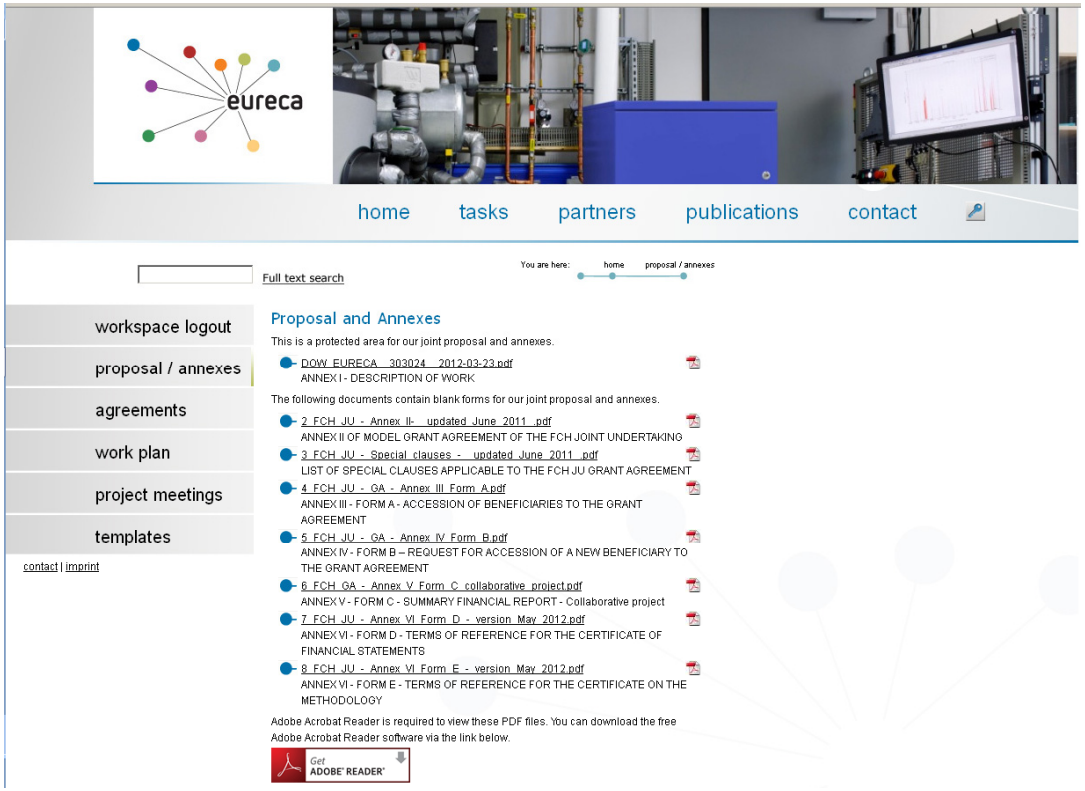
Project Plan



		Vorgangsname
1		**WP - 1 Management of the consortium**
2		Manual of Management
3		Financial report including cost statements
4		Mid-Term report
5		Technical Report
6		Final Report
68		
69		**WP - 4 Stack**
70		First test prototypes of LT-PEM based stack for basic test and development of test procedures
71		Test results and test procedures from LT-PEM based stack
72		Definition of stack design and cost projection
73		First results from MT-PEM bases stack
74		Optimized prototype of MT-PEM based stack for stack tests
75		Production design, method and cost of MT-PEM based stack
76		Optiomal operating parameters for low degradation operation for system
77		Long term test results from MT-PEM based stack
107		
108		**WP - 7 Dissemination and public awareness**
109		Project logo
110		MS-PowerPoint presentation template
111		Project Poster (eps-file and printed version) and update
112		Set up of external and internal website
113		Regulary update of external website
114		Initial draft and yearly update of "Exploitation Plan"

WP 1 – Management of the consortium

- A public website has been designed and available under: **www.project-eureca.com**
- An internal website has been included and serves as exchange server for documents



FCH JU expect the new generation to cover a range of objectives:

- Simplification of design and manufacturing of cells, stacks and/or stack modules
- New architectures, adaptation of cell and/or stack designs to specific applications and system designs
- New materials and/or strategies to improve tolerance to contaminants
- Design to cost
- Significant increases in performance, power density, efficiency and/or reliability applying harmonised test protocols
- Robustness to cycling and transient operating conditions

Project activities

- Kick-off on 05th of July 2012
- Definition of consistent test protocols following FCTES^{QA}
- Activities started in WP 2 and 3 with separate meetings for development roadmap
- MEA research has started
- First LT-PEM Stack will be delivered in 11/2012
- Test start is prepared at NE and F-ISE

Bottleneck

- Delivery of MEA for operation temperature of 120°C

Expected output AIP Topic: 3.3.3 Call: 2011		Objectives Project	Status at 50% of the project	Expected revised objectives
Electrical efficiency (%)	*>45*	*40*	N/A (tests not finished)	*40*
System efficiency (%)	*>80*	*>85*	N/A (tests not finished)	*>85*
Lifetime cell (h)	*40,000*	*>12,000*	N/A (tests not finalized)	*>12,000*
Lifetime stack (h)	*40,000*	*>12,000*	N/A (tests not finalized)	*>12,000*
Next generation cell and stack design	*poc*	*Proof of concept*	*Proof of concept for cell*	*Proof of concept for stack*

Dissemination & public awareness

- First publications are in preparation
- Workshop will be realised within the project

At the moment no collaborations are established

Perspectives:

- Run the first test with LT-PEM-Fuel Cell and Stack
- Establish the test procedures

Thank you for your attention

Any Questions?

www.project-eureca.com