ECN

Energy research Centre of the Netherlands

Role of the hardware in the VSYNC Work Packages

K. Visscher – ECN

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Overview

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- Work planning
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Work packages

Work-package No	Work package title	Type of activity	Description	Lead contractor
1	Project co-ordination	Management	Project management and monitoring of work packages	ECN
2	Modelling and simulation	Research	Modelling and simulation of Virtual Synchronous Generator algorithms for various distributed electricity generators.	TUD
3	Short term energy stores	Research	Choice and tests of short term energy stores	ECN
4	Laboratory set-ups and validation	Research	Test and validation of control algorithms and prototypes	KUL
5	System development	Demonstration	Developing VSG power converter prototypes	KUL
6	Hardware for field demonstration	Demonstration	Acquiring or manufacturing of the necessary equipment, including the power electronics and short-term energy stores comprising the virtual synchronous machines (VSG's).	UfE
7	Field demonstration	Demonstration	Field test of most promising algorithms and short term energy stores	3E
8	Reporting and dissemination	Research	Reporting, publications, workshops	ECN

WP leaders and team leaders

Work Package Leaders and Team Leaders

Project number (acronym):
038584_VSYNC

29-10-2007

		Lead Contractor	=	Partners 1 ECN	2 TUE	3 TUD	4 KUL	5 UPB	6 LABEIN	7 3E	8 UfE	9 Electrica	10 Continuon
RTD/Innovation activities													
WP2	Modelling and simulation	TUD		Klaas Visscher	-	**Sjoerd de Haan**	-	Mihaela Albu	Asier Gil de Muro	-	-	-	-
WP3	Short term energy stores	ECN		**Josco Kester**	-	-	-	Mihaela Albu	Asier Gil de Muro	-	-	-	-
WP4	Laboratory set-ups and validation	KUL		Peter Heskes	-	Sjoerd de Haan	**Johan Driesen**	-	Asier Gil de Muro	-	Klaus Köln	-	-
WP8	Reporting and dissemination	ECN		**Josco Kester**	Anton Ishchenko	Sjoerd de Haan	Johan Driesen	Mihaela Albu	Asier Gil de Muro	Achim Woyte	Klaus Köln	Raul Toma	Marcel van Hest
Demonstration activities													
WP5	System development	KUL		Peter Heskes	Anton Ishchenko	Sjoerd de Haan	**Johan Driesen**	Mihaela Albu	-	-	-	-	-
WP6	Hardware for field demonstration	UfE		-	-	-	-	-	-	-	**Klaus Köln**	Raul Toma	-
WP7	Field demonstration	3E		-	-	-	-	-	-	**Achim Woyte**	-	Raul Toma	Marcel van Hest
Consortium management													
WP1	Project co-ordination	ECN		**Klaas Visscher**	X	X	X	X	X	X	-	-	-

Work planning

Work planning

	10-07	11-07	12-07	01-08	02-08	03-08	04-08	05-08	06-08	07-08	08-08	09-08	10-08	11-08	12-08	01-09	02-09	03-09	04-09	05-09	06-09	07-09	08-09	09-09	10-09	11-09	12-09	01-10	02-10	03-10	04-10	05-10	06-10	07-10	08-10	09-10

WP	Work Package title	Year 1												Year 2												Year 3											
		Months																																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1	Project co-ordination	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2	Modelling and simulation	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
3	Short term energy stores	•	•	•	•	•	•	•	•	•																											
4	Laboratory set-ups and validation										•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
5	System development										•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
6	Hardware for field demonstration													•	•	•	•	•	•	•	•	•	•	•	•												
7	Field demonstration																•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
8	Reporting and dissemination										•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Interdependence of work packages

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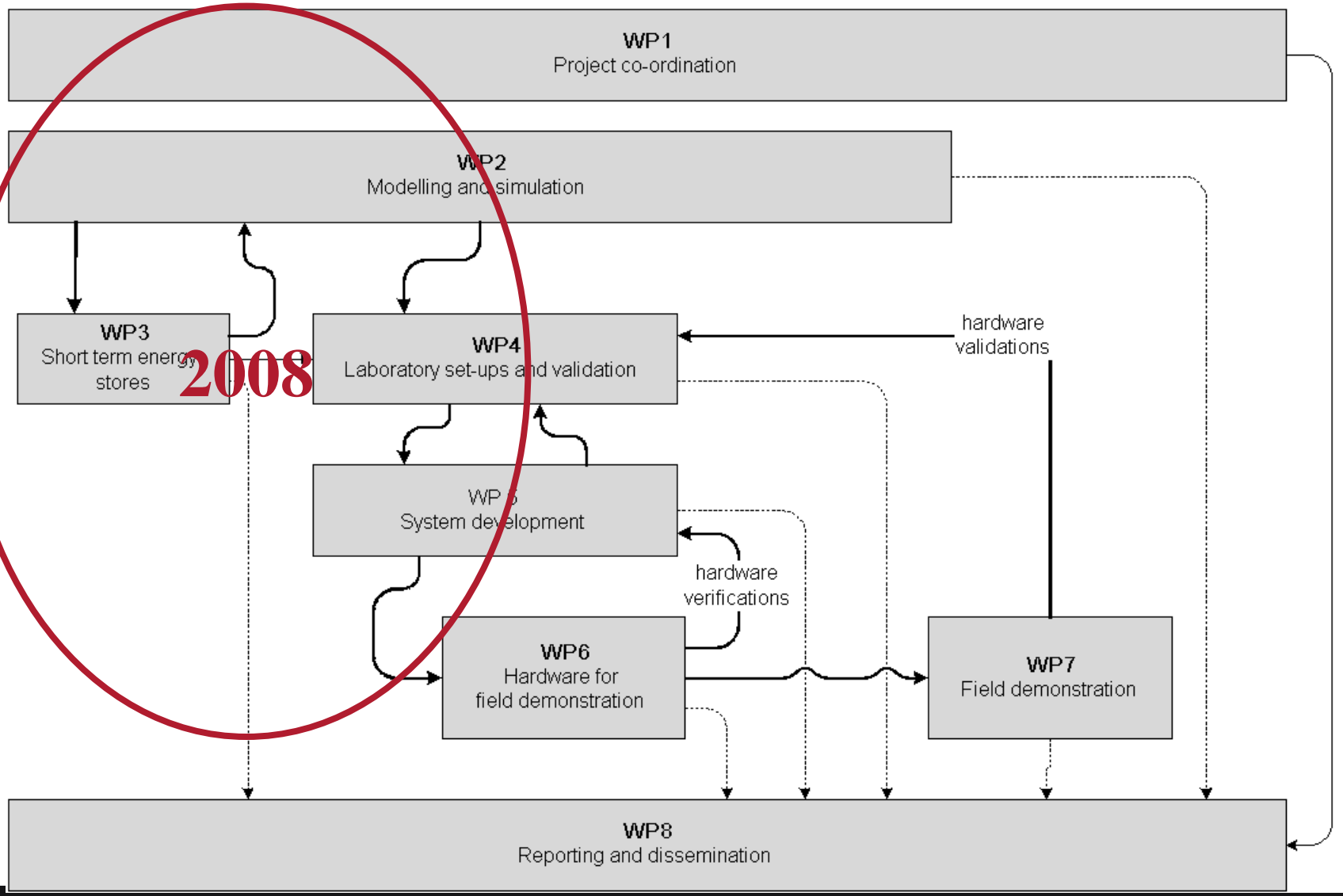
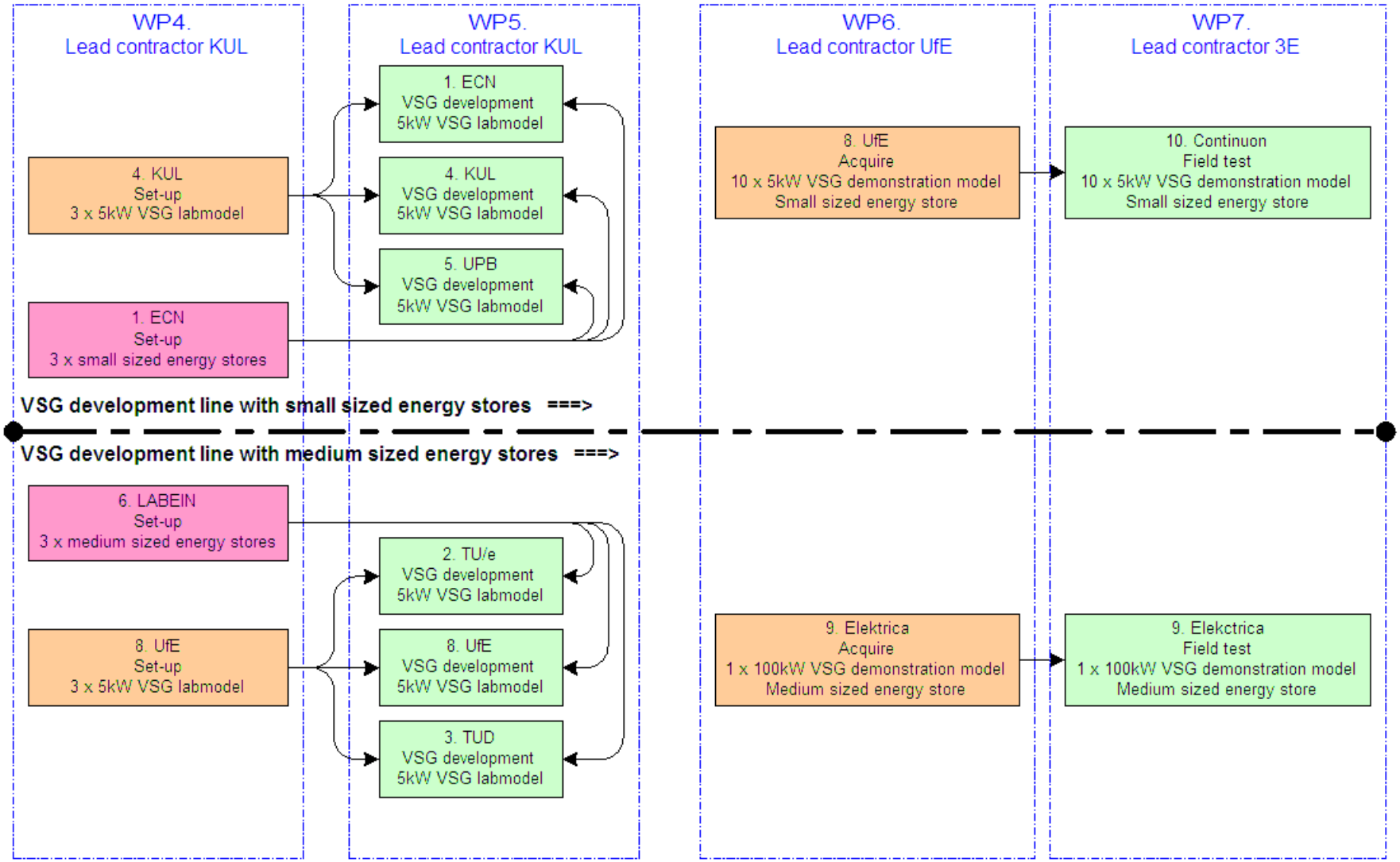


Hardware plan

http://www.vsync.eu



Work breakdown of laboratory hardware and hardware for field test

Work breakdown of laboratory hardware for field test

WP No.	Partner		Action	Deliverable
4	4	KUL	hardware for WP5	3 labmodel converters of about 5kW, to be shared over partners 2,4 and 5
4	8	UfE	hardware for WP5	3 labmodel converters of about 5kW, to be shared over partners 1,3 and 8
4	1	ECN	hardware for WP5	3 types of labmodels of small sized energy stores
4	6	LABEIN	hardware for WP5	3 types of labmodels of medium sized energy stores
6	8	UfE	hardware for WP7	a number of converters with a total power of about 50kW for field tests in NL
6	9	Electrica	hardware for WP7	one converter with a power of about 100kW for a field test in RO
7	9	Electrica	field test in RO	one central placed converter with a power of about 100kW
7	10	Continuon	field test in NL	10 decentral placed converters with a total power of about 50kW (10*5kW)

Deliverables timetable

Deliverables Time Table 9-1-2008 20:11

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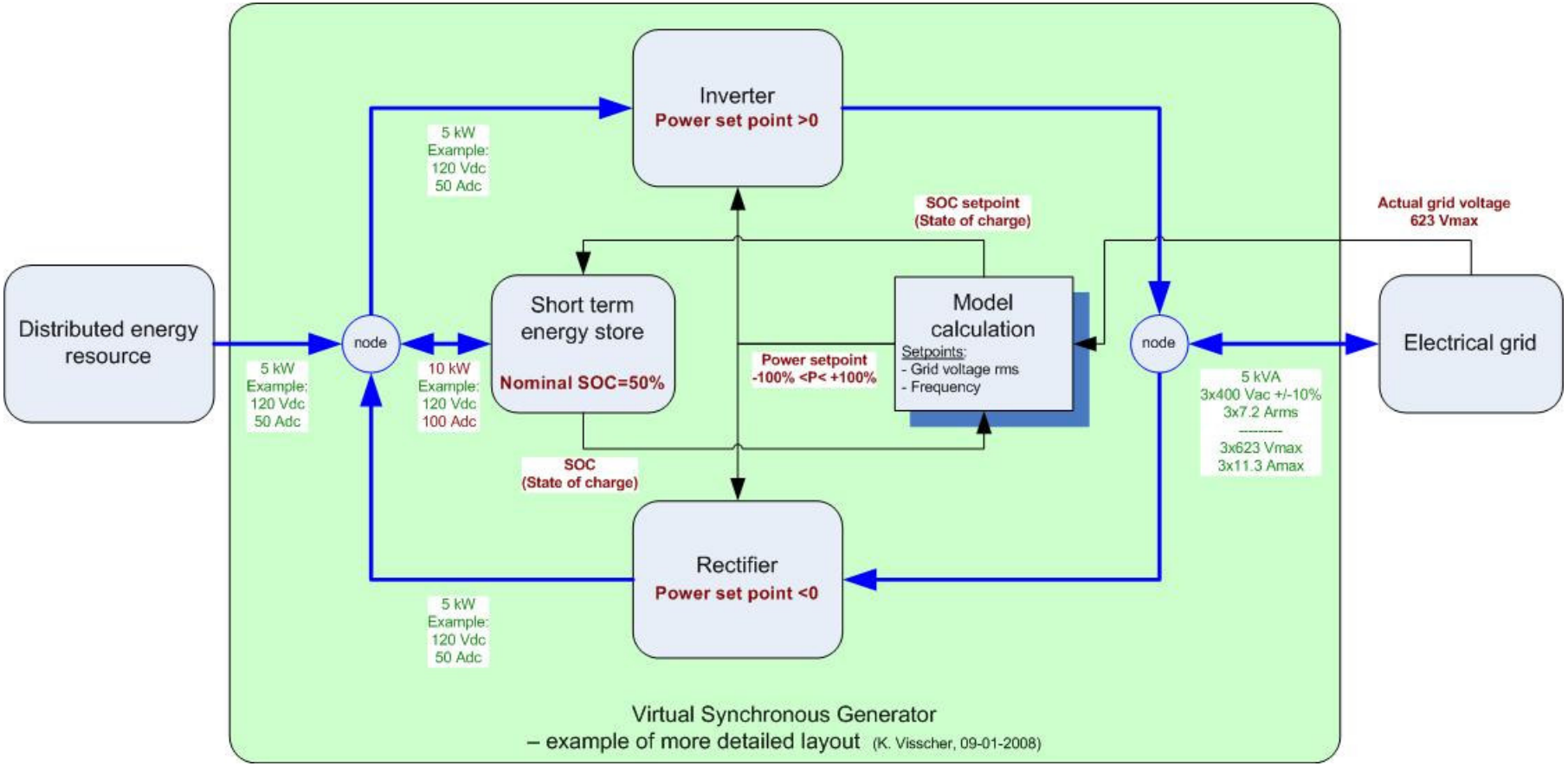
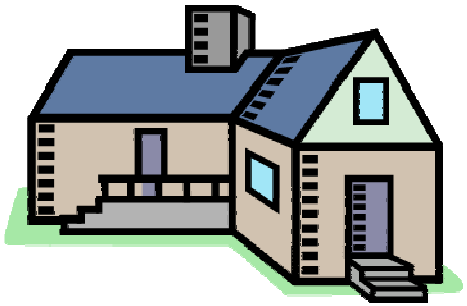
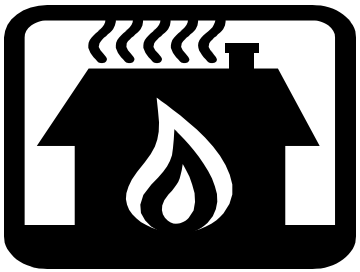
Som van Estimated person months

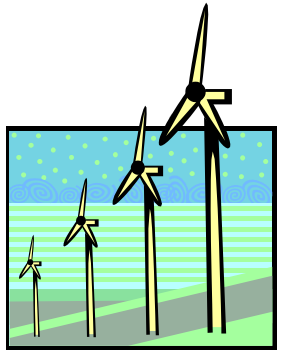
date 1	date 2	date 3	date 4	Deliverable	Lead participant	Deliverable title	Totaal
1-4-2008	1-10-2008	1-4-2009	1-10-2009	D1.1	ECN	Bi-annual progress reports (S+6,12,18,24,30)	4,0
				D8.1	ECN	Dissemination and use plan (S+6) (including Workshop Organisation Plan)	1,4
1-7-2008				D3.1	ECN	Summary of storage specifications needed for various system requirements	3,7
				D3.2	ECN	Summary of types of electrical storages that fulfil the specifications	3,7
				D3.3	ECN	Final Work Package report	0,8
1-9-2008	1-3-2009	1-9-2009	1-3-2010	D8.2	ECN	Four workshops (S+11, S+17, S+23, S+29)	11,0
1-10-2008	1-10-2009	1-10-2010		D1.2	ECN	Annual cost statements and associated management control reports (S+12,24,36)	2,0
				D2.1	TUD	Controller models to let storage devices and DG's emulate the behaviour of synchronous generators.	9,9
				D4.1	KUL	6 pieces of VSYNC labmodels with DSP structure and about 5kW power	19,2
				D4.2	KUL	3 types of labmodels of small sized energy stores	4,4
				D4.3	KUL	3 types of labmodels of medium sized energy stores	3,0
1-1-2009				D5.1	KUL	Selection of 'release-candidate (RC)' inverter control algorithm.	5,2
				D5.2	KUL	Selection of (preferably one) type short-term energy storage unit (capacitor, super capacitor and battery).	5,2
				D5.3	KUL	Blueprint for system to be realized in the field demonstration	41,3
				D5.4	KUL	Specification of system components that will be used as input to WP6.	41,3
1-4-2009				D6.1	UfE	Hardware for Netherlands field test, including VSYNC converters with a total power of about 50kW (10*5kW)	13,8
				D6.2	UfE	Hardware for Romania field test, including one VSYNC converter with a power of about 100kW	13,8
1-10-2009				D2.2	TUD	Concepts and algorithms for coordinated action of storage devices, synchronous generators and devices for maintaining grid stability.	9,9
				D6.3	UfE	Final Work Package report.	3,1
1-4-2010				D1.3	ECN	Financial audit reports (mainly subcontracted; cost equivalent in person-months)	1,8
				D2.3	TUD	Final Work Package report.	2,2
				D4.4	KUL	Final Work Package report.	3,0
				D5.5	KUL	Final Work Package report.	10,3
1-7-2010				D7.1	3E	Report on field test operation on the level of the individual owners	6,9
				D7.2	3E	Report on field test operation for groups of tens of distributed generators	6,9
				D7.3	3E	Report on field test operation of small and medium sized energy stores	6,9
				D7.4	3E	Final Work Package report.	2,3
1-10-2010				D8.3	ECN	Compilation report of journal and conference publications from the project (S+36)	11,0
				D8.4	ECN	Technology Implementation Plan (S+36)	1,4
				D8.5	ECN	Final Work Package report.	2,8
Eindtotaal							251,8

Example of a more detailed layout of a VSG









Thank you for your attention