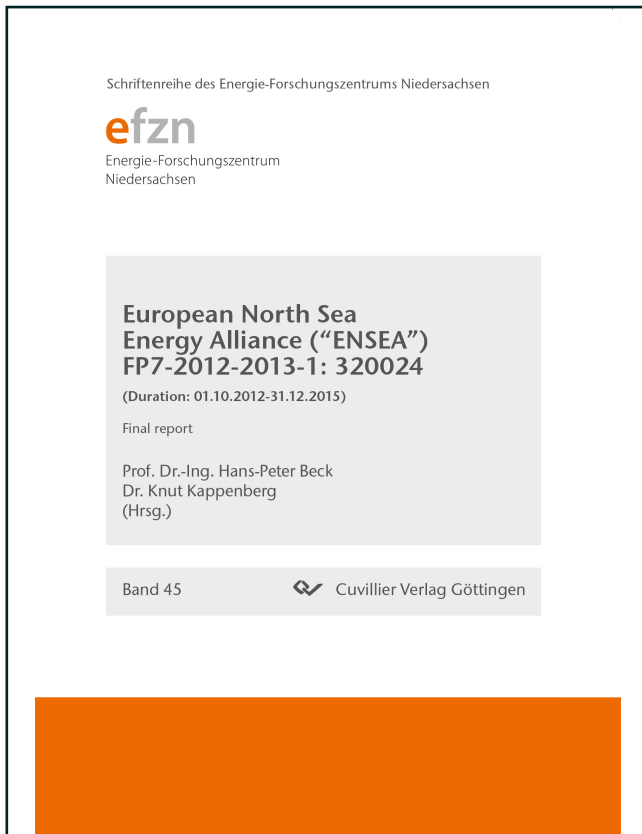




Hans-Peter Beck (Herausgeber)
Knut Kappenberg (Herausgeber)

**European North Sea Energy Alliance (“ENSEA”) FP7-
2012-2013-1: 320024**

(Duration: 01.10.2012-31.12.2015) Final Report



<https://cuvillier.de/de/shop/publications/7486>

Copyright:

Cuvillier Verlag, Inhaberin Annette Jentsch-Cuvillier, Nonnenstieg 8, 37075 Göttingen,
Germany

Telefon: +49 (0)551 54724-0, E-Mail: info@cuvillier.de, Website: <https://cuvillier.de>



Table of Contents

Ia	Vorwort	XI
Ib	Preface	XII
IIa	Zusammenfassung	XIII
IIb	Summary	XVIII
III	Innovation Capacities Analyses ENSEA	1
	Executive Summary	7
	Introduction	8
	Main findings and conclusions	11
	General Introduction, Scope and Methodology	17
	III 1 Introduction	18
	III 2 Overview of ENSEA project	21
	III 3 Methodology	25
	Regional Report of the Scottish Region	27
	List of Figures	28
	List of Tables	28
	1 General Overview of Scottish Region	30
	1.1 Geography	30
	1.2 Governance structures	30
	1.3 Economy	30
	1.4 Employment	31
	1.5 Scottish Academic Research in Energy	32
	2 Description of the Regional Energy System	36
	2.1 Overview	36
	2.2 Regional energy system	36
	2.3 Investment in Energy in Scotland	36
	2.4 Scottish Demand for Energy	36
	2.5 The Gas Supply Industry	38
	2.6 Electricity Supply Industry	38
	2.7 Heat Supply Industry	43
	3 Overview of Innovation and Collaboration	45
	3.1 The Scottish Innovation System	46
	3.2 EU Policy & Objectives	48
	3.3 EU Policy Support & Operations	50
	3.4 Use of EU Funding Programs	52
	3.5 Support for EU Collaboration in Scotland	53
	3.6 UK Policy Development & Implementation	54
	3.7 UK Renewable revenue support framework	56
	3.8 Scottish Formulation and Advocacy of Policy	57
	3.9 Facilitation and Direction of R&D	63
	3.10 Knowledge Creation and Development	69
	3.11 Knowledge Diffusion and Exchange	72



3.12 Research and Innovation Support	76
4 SWOT Analysis	81
4.1 SWOT Summary – Scottish Innovation	81
4.2 SWOT Summary – Scottish Region in General.....	86
4.3 SWOT Summary – Scottish Energy System.....	95
5 Summary and Conclusions	126
5.1 Next Steps.....	133
6 References	134
Regional Report of the Energy Valley Region	135
List of figures	136
List of tables.....	136
1 General overview of the Energy Valley region.....	137
1.1 Geography	137
1.2 Economy	138
1.3 Education / research.....	141
1.4 Important regional plans covering for example energy, climate change and economic development	141
2 Description of the regional energy system	145
2.1 Consumption, production, storage and transport of energy	145
3 Description of Innovation and Collaboration	154
3.1 Smart Specialization and Cluster Strategies	154
3.2 Some detailed data on energy companies	155
3.3 Knowledge generation.....	156
4 SWOT analysis.....	163
4.1 Triple-helix Matrix.....	166
5 Summary and conclusions	168
Regional Report of Wachstumsregion Ems-Achse e.V.	169
List of figures	170
1 Wachstumsregion Ems-Achse e.V. at a glance.....	171
1.1 Geography	172
1.2 Economy	174
1.3 Education/Research.....	175
2 Description of the regional energy system	182
2.1 Summary of the national and regional energy system	182
2.2 The Lower Saxony energy system	188
2.3 Energy generation in the Wachstumsregion Ems-Achse	197
3 Policies for research and technological development (RTD)	199
3.1 Cluster strategy	199
3.2 Smart Specialization	199
3.3 Internationalization	200
3.4 Actors facilitating research and technological development.....	201
3.5 Relevant policies at national and regional level	202
4 Description of the methodology	207
5 SWOT Analysis	210
5.1 Ems-Achse overall.....	210
5.2 Wind Energy.....	212
5.3 Bio Energy	214
5.4 Solar Energy	215



5.5 Geothermal Energy	216
5.6 Marine Power	217
5.7 Hydro Power	217
5.8 Fossil Energy	218
5.9 Energy Storage	219
5.10 Energy Supply/Infrastructure	220
5.11 Triple-Helix Matrix	221
6 Summary & Conclusion	224
7 Bibliography.....	225
Regional Report of Rogaland	227
List of figures	228
List of tables.....	228
1 Introduction.....	229
2 Objectives	231
3 Rogaland region in a glance.....	232
3.1 Geography and Demography.....	232
3.2 Higher Education and Research.....	232
3.3 Conditions for sustainable economic growth.....	233
4 Policy and support mechanisms.....	234
4.1 Policy.....	234
4.2 Support mechanisms – R&D and innovation programs	236
4.3 Commercialisation	239
5 Regional energy sector	240
5.1 Energy system from the national perspective.....	240
5.2 Electricity Production.....	240
5.3 Transmission infrastructure and system	246
5.4 Electricity consumption in various sectors	251
6 International cooperation	254
6.1 Energy Networks.....	254
6.2 Projects	258
7 ENSEA collaboration – expectations	261
7.1 Knowledge exchange and best practice	261
7.2 SWOT analysis in Rogaland region	261
7.3 Information and coordination	266
8 Summary and conclusions.....	267
8.1 Benefiting from regional SWOT analysis	267
8.2 Identification of demand driven research projects.....	271
9 References	272
Appendices	274
1 General appendices	275
2 Appendices Scottish Regional Report.....	290
IV ENSEA ‘Joint Action Plan’	295
IV 1. Introduction.....	298
IV 2. Vision of the European North Sea Energy Alliance	298
IV 3. Establishment of a North Sea Research Association.....	301
IV 4. Establishment of strategic partnerships in the North Sea area.....	302



IV 5. Establishment of a quadruple-helix cluster structure as operational level in the North Sea area.....	302
IV 6. Strategic objectives of the ENSEA cluster and elaboration of a JAP	306
IV 7. JAP methodology.....	306
IV 8. JAP results.....	308
IV 9. ENSEA Lighthouse Projects.....	312
IV 9.1 Educational North Sea Networks	313
IV 9.2 SME Networks around the North Sea	314
IV 9.3 Hydro Power – balancing and storage for the North Sea region	315
IV 9.4 North Sea Power Ring System	315
IV 9.5 Sustainable communities around the North Sea	315
IV 9.6 Green decommissioning: Exploring the potential for optimal (re-)use of existing Oil & Gas infrastructure in the North Sea	316
IV 9.7 Energy System Integration Doctoral Training Network	316
IV 10. Conclusion	317
Annex.....	318
V Measures Towards Implementation of the Joint Action Plan	331
V-ABBREVIATIONS	337
V EXECUTIVE SUMMARY	339
V 1. INTRODUCTION	340
V 1.1. Formalize ENSEA collaboration	340
V 1.2. Initiate internationalization strategy.....	341
V 1.3. Identification & definition of projects.....	341
V 1.4. Set up joint demand driven research program on system integration	342
V 2. INTRODUCTION TO WG REPORTING	343
V 3. THE WORKING GROUP ESTABLISHMENT	344
V 4. REPORT OF THE WORKING GROUPS	345
V 4.1. Governance & Modelling.....	345
V 4.2. North Sea Power Ring.....	348
V 4.3. Green Decommissioning	350
V 4.4. Energy Efficiency & Sustainable Communities.....	353
V 4.5. Educational Collaboration & Training	358
V 4.6. Innovation and SMEs	367
V 4.7. ENSEA Cluster (formalization)	370
V 4.8. Large-Scale Storage	373
V 4.9. Heat & Biomass	376
VI Energy Systems Integration: The Agenda for the Future – Policy Brief	397