

## **ANNEXES**

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# 1. OIL RESERVES

## Oil

Proved reserves	At end 1997	At end 1997	At end 2006	Thousand million tonnes	At end 2007		R/P ratio
	Thousand million barrels	Thousand million barrels	Thousand million barrels		Thousand million barrels	Share of total	
US	35.4	30.5	29.4	3.6	29.4	2.4%	11.7
Canada	11.7	10.7	27.7	4.2	27.7	2.2%	22.9
Mexico	54.1	47.8	12.8	1.7	12.2	1.0%	9.6
<b>Total North America</b>	<b>101.2</b>	<b>89.0</b>	<b>70.0</b>	<b>9.5</b>	<b>69.3</b>	<b>5.6%</b>	<b>13.9</b>
Argentina	2.2	2.6	2.6	0.4	2.6	0.2%	10.2
Brazil	2.6	7.1	12.2	1.7	12.6	1.0%	18.9
Colombia	1.9	2.6	1.5	0.2	1.5	0.1%	7.4
Ecuador	1.6	3.7	4.5	0.6	4.3	0.3%	22.5
Peru	0.5	0.8	1.1	0.1	1.1	0.1%	26.4
Trinidad & Tobago	0.6	0.7	0.8	0.1	0.8	0.1%	14.1
Venezuela	58.1	74.9	97.0	12.5	87.0	7.0%	91.3
Other S. & Cent. America	0.6	1.1	1.3	0.2	1.3	0.1%	25.2
<b>Total S. &amp; Cent. America</b>	<b>68.1</b>	<b>93.4</b>	<b>111.0</b>	<b>15.9</b>	<b>111.2</b>	<b>9.0%</b>	<b>45.9</b>
Azerbaijan	n/a	n/a	7.0	1.0	7.0	0.6%	22.1
Denmark	0.4	0.9	1.2	0.1	1.1	0.1%	9.8
Italy	0.7	0.8	0.8	0.1	0.8	0.1%	17.6
Kazakhstan	n/a	n/a	39.8	5.3	39.8	3.2%	73.2
Norway	6.6	12.0	8.5	1.0	8.2	0.7%	8.8
Romania	1.3	0.9	0.5	0.1	0.5	*	12.4
Russian Federation	n/a	n/a	79.3	10.9	79.4	6.4%	21.8
Turkmenistan	n/a	n/a	0.6	0.1	0.6	*	8.3
United Kingdom	5.2	5.2	3.6	0.5	3.6	0.3%	6.0
Uzbekistan	n/a	n/a	0.6	0.1	0.6	*	14.3
Other Europe & Eurasia	61.7	68.0	2.2	0.3	2.1	0.2%	12.8
<b>Total Europe &amp; Eurasia</b>	<b>75.8</b>	<b>88.0</b>	<b>144.1</b>	<b>19.4</b>	<b>143.7</b>	<b>11.6%</b>	<b>22.1</b>
Iran	92.9	92.6	138.4	19.0	138.4	11.2%	96.2
Iraq	100.0	112.5	115.0	15.5	115.0	9.3%	*
Kuwait	94.5	96.5	101.5	14.0	101.5	8.2%	*
Oman	4.1	5.4	5.6	0.8	5.6	0.5%	21.3
Qatar	4.5	12.5	27.9	3.6	27.4	2.2%	62.8
Saudi Arabia	189.6	261.5	264.3	36.3	264.2	21.3%	69.5
Syria	1.7	2.3	3.0	0.3	2.5	0.2%	17.4
United Arab Emirates	98.1	97.8	97.8	13.0	97.8	7.9%	91.9
Yemen	1.1	1.8	2.8	0.4	2.8	0.2%	22.7
Other Middle East	0.1	0.2	0.1	†	0.1	*	10.9
<b>Total Middle East</b>	<b>566.6</b>	<b>683.2</b>	<b>756.3</b>	<b>102.9</b>	<b>755.3</b>	<b>61.0%</b>	<b>82.2</b>
Algeria	8.6	11.2	12.3	1.5	12.3	1.0%	16.8
Angola	2.0	3.9	9.0	1.2	9.0	0.7%	14.4
Chad	-	-	0.9	0.1	0.9	0.1%	17.2
Republic of Congo (Brazzaville)	0.7	1.6	1.9	0.3	1.9	0.2%	23.9
Egypt	4.7	3.7	3.7	0.5	4.1	0.3%	15.7
Equatorial Guinea	-	0.6	1.8	0.2	1.8	0.1%	13.2
Gabon	1.0	2.7	2.0	0.3	2.0	0.2%	23.8
Libya	22.8	29.5	41.5	5.4	41.5	3.3%	61.5
Nigeria	16.0	20.8	36.2	4.9	36.2	2.9%	42.1
Sudan	0.3	0.3	6.6	0.9	6.6	0.5%	39.7
Tunisia	1.7	0.3	0.6	0.1	0.6	*	16.7
Other Africa	1.0	0.7	0.6	0.1	0.6	0.1%	10.2
<b>Total Africa</b>	<b>58.7</b>	<b>75.3</b>	<b>117.1</b>	<b>15.6</b>	<b>117.5</b>	<b>9.5%</b>	<b>31.2</b>
Australia	3.2	4.0	4.2	0.4	4.2	0.3%	20.3
Brunel	1.6	1.1	1.2	0.2	1.2	0.1%	16.9
China	17.4	17.0	15.6	2.1	15.5	1.3%	11.3
India	4.4	5.6	5.7	0.7	5.5	0.4%	18.7
Indonesia	9.0	4.9	4.4	0.6	4.4	0.4%	12.4
Malaysia	3.3	5.0	5.4	0.7	5.4	0.4%	19.4
Thailand	0.1	0.3	0.5	0.1	0.5	*	4.1
Vietnam	†	1.2	3.3	0.5	3.4	0.3%	27.5
Other Asia Pacific	0.8	1.2	0.9	0.1	0.9	0.1%	11.0
<b>Total Asia Pacific</b>	<b>39.8</b>	<b>40.4</b>	<b>41.0</b>	<b>5.4</b>	<b>40.8</b>	<b>3.3%</b>	<b>14.2</b>
<b>TOTAL WORLD</b>	<b>910.2</b>	<b>1069.3</b>	<b>1239.5</b>	<b>168.6</b>	<b>1237.9</b>	<b>100.0%</b>	<b>41.6</b>
of which: European Union	9.0	8.8	6.9	0.9	6.8	0.5%	7.8
OECD	119.1	113.4	99.5	11.9	98.3	7.1%	12.6
OPEC	676.0	818.7	935.3	127.6	934.7	75.5%	72.7
Non-OPEC‡	174.7	184.1	176.2	23.6	175.0	14.1%	14.3
Former Soviet Union	59.5	66.5	128.0	17.4	128.1	10.4%	27.4
Canadian oil sands*	n/a	n/a	152.2	24.7	152.2		
<b>Proved reserves and oil sands</b>	<b>n/a</b>	<b>n/a</b>	<b>1391.7</b>	<b>193.4</b>	<b>1390.1</b>		

\* More than 100 years.

† Less than 0.05%.

\* Less than 0.05%.

‡ Remaining established reserves, less reserves 'under active development'.

‡ Excludes Former Soviet Union.

n/a not available.

Notes: Proved reserves of oil – Generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions.

Reserves-to-production (R/P) ratio – If the reserves remaining at the end of any year are divided by the production in that year, the result is the length of time that those remaining reserves would last if production were to continue at that rate.

Source of data – The estimates in this table have been compiled using a combination of primary official sources, third-party data from the OPEC Secretariat, World Oil, Oil & Gas Journal and an independent estimate of Russian reserves based on information in the public domain. Canadian proved reserves include an official estimate of 21.0 billion barrels for oil sands 'under active development'. Reserves include gas condensate and NGLs as well as crude oil.

Annual changes and shares of total are calculated using thousand million barrels figures.

Source: BP (2007). Oil reserves table. Website:

[http://www.bp.com/liveassets/bp\\_internet/globalbp/globalbp\\_uk\\_english/reports\\_and\\_publications/statistical\\_energy\\_review\\_2008/STAGING/local\\_assets/downloads/pdf/oil\\_table\\_proved\\_oil\\_reserves\\_2008.pdf](http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/downloads/pdf/oil_table_proved_oil_reserves_2008.pdf), consult at March 24, 2009.

## 2. NATURAL GAS RESERVES

### Natural gas

Proved reserves	At end 1987	At end 1997	At end 2006	At end 2007			R/P ratio
	T trillion cubic metres	T trillion cubic metres	T trillion cubic metres	T trillion cubic feet	T trillion cubic metres	Share of total	
US	5.30	4.74	5.98	211.08	5.98	3.4%	10.9
Canada	2.69	1.81	1.62	57.55	1.63	0.9%	8.9
Mexico	2.12	1.90	0.39	13.01	0.37	0.2%	8.0
<b>Total North America</b>	<b>10.11</b>	<b>8.34</b>	<b>7.99</b>	<b>281.65</b>	<b>7.98</b>	<b>4.5%</b>	<b>10.3</b>
Argentina	0.69	0.68	0.45	15.54	0.44	0.2%	9.8
Bolivia	0.14	0.12	0.74	26.13	0.74	0.4%	54.7
Brazil	0.11	0.23	0.35	12.89	0.36	0.2%	32.2
Colombia	0.10	0.20	0.12	4.41	0.13	0.1%	16.2
Peru	0.34	0.20	0.33	12.54	0.36	0.2%	*
Trinidad & Tobago	0.30	0.52	0.48	16.95	0.48	0.3%	12.3
Venezuela	2.84	4.12	5.10	181.87	5.15	2.9%	*
Other S. & Cent. America	0.15	0.15	0.07	2.51	0.07	*	21.0
<b>Total S. &amp; Cent. America</b>	<b>4.67</b>	<b>6.21</b>	<b>7.64</b>	<b>272.84</b>	<b>7.73</b>	<b>4.4%</b>	<b>51.2</b>
Azerbaijan	n/a	0.84	1.26	45.13	1.28	0.7%	*
Denmark	0.07	0.11	0.12	4.10	0.12	0.1%	12.6
Germany	0.28	0.26	0.16	4.94	0.14	0.1%	9.6
Italy	0.30	0.27	0.09	3.14	0.09	0.1%	10.0
Kazakhstan	n/a	1.87	1.90	67.20	1.90	1.1%	69.8
Netherlands	1.77	1.79	1.32	44.07	1.25	0.7%	19.4
Norway	2.29	3.65	2.89	104.57	2.96	1.7%	33.0
Poland	0.16	0.16	0.11	3.99	0.11	0.1%	26.4
Romania	0.20	0.37	0.63	22.18	0.63	0.4%	54.4
Russian Federation	n/a	45.17	44.60	1576.75	44.65	25.2%	73.5
Turkmenistan	n/a	2.71	2.67	94.22	2.67	1.5%	39.6
Ukraine	n/a	0.98	1.03	36.24	1.03	0.6%	54.0
United Kingdom	0.64	0.77	0.41	14.55	0.41	0.2%	5.7
Uzbekistan	n/a	1.63	1.74	61.60	1.74	1.0%	29.8
Other Europe & Eurasia	39.25	0.45	0.44	15.31	0.43	0.2%	39.4
<b>Total Europe &amp; Eurasia</b>	<b>45.06</b>	<b>61.02</b>	<b>59.37</b>	<b>2097.89</b>	<b>59.41</b>	<b>33.5%</b>	<b>55.2</b>
Bahrain	0.20	0.14	0.09	3.00	0.09	*	7.4
Iran	13.92	23.00	27.58	981.75	27.80	15.7%	*
Iraq	1.00	3.19	3.17	111.95	3.17	1.8%	*
Kuwait	1.21	1.49	1.78	63.00	1.78	1.0%	*
Oman	0.27	0.54	0.69	24.37	0.69	0.4%	28.6
Qatar	4.44	8.50	25.64	904.06	25.60	14.4%	*
Saudi Arabia	4.19	5.88	7.07	253.03	7.17	4.0%	94.4
Syria	0.13	0.24	0.29	10.17	0.29	0.2%	54.7
United Arab Emirates	5.68	6.06	6.11	215.07	6.09	3.4%	*
Yemen	0.11	0.48	0.49	17.23	0.49	0.3%	*
Other Middle East	†	†	0.05	1.73	0.05	*	18.5
<b>Total Middle East</b>	<b>31.18</b>	<b>49.53</b>	<b>72.95</b>	<b>2585.35</b>	<b>73.21</b>	<b>41.3%</b>	<b>*</b>
Algeria	3.16	4.08	4.50	159.45	4.52	2.5%	54.4
Egypt	0.31	0.93	2.05	72.85	2.06	1.2%	44.3
Libya	0.73	1.31	1.49	52.90	1.50	0.9%	98.4
Nigeria	2.41	3.48	5.22	186.99	5.30	3.0%	*
Other Africa	0.79	0.82	1.20	42.84	1.21	0.7%	*
<b>Total Africa</b>	<b>7.39</b>	<b>10.62</b>	<b>14.46</b>	<b>514.92</b>	<b>14.58</b>	<b>8.2%</b>	<b>76.6</b>
Australia	1.07	1.48	2.49	88.64	2.51	1.4%	62.8
Bangladesh	0.35	0.30	0.39	13.77	0.39	0.2%	24.0
Brunei	0.33	0.39	0.33	12.11	0.34	0.2%	28.0
China	0.89	1.16	1.68	66.54	1.88	1.1%	27.2
India	0.55	0.69	1.08	37.26	1.06	0.6%	35.0
Indonesia	2.37	2.15	2.63	105.94	3.00	1.7%	45.0
Malaysia	1.49	2.46	2.48	87.40	2.48	1.4%	40.9
Myanmar	0.27	0.28	0.54	21.19	0.60	0.3%	40.8
Pakistan	0.63	0.60	0.85	30.02	0.85	0.5%	27.6
Papua New Guinea	0.09	0.43	0.44	15.36	0.44	0.2%	*
Thailand	0.18	0.21	0.33	11.65	0.33	0.2%	12.7
Vietnam	†	0.17	0.22	7.77	0.22	0.1%	28.5
Other Asia Pacific	0.23	0.41	0.37	13.02	0.37	0.2%	21.9
<b>Total Asia Pacific</b>	<b>8.45</b>	<b>10.73</b>	<b>13.82</b>	<b>510.69</b>	<b>14.46</b>	<b>8.2%</b>	<b>36.9</b>
<b>TOTAL WORLD</b>	<b>106.86</b>	<b>146.46</b>	<b>176.22</b>	<b>6263.34</b>	<b>177.36</b>	<b>100.0%</b>	<b>60.3</b>
of which: European Union	3.75	3.95	2.94	100.26	2.84	1.6%	14.8
OECD	17.19	17.05	15.79	556.89	15.77	8.9%	14.4
Former Soviet Union	39.90	53.44	53.46	1890.24	53.53	30.2%	67.7

\*More than 100 years.

† Less than 0.05%.

\* Less than 0.05%.

n/a not available.

Notes: Proved reserves of natural gas – Generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions.

Reserves-to-production (R/P) ratio – If the reserves remaining at the end of any year are divided by the production in that year, the result is the length of time that those remaining reserves would last if production were to continue at that rate.

Source of data – The estimates in this table have been compiled using a combination of primary official sources and third-party data from Cedigaz.

Source: BP (2007). Natural gas reserves table. Website:

[http://www.bp.com/liveassets/bp\\_internet/globalbp/globalbp\\_uk\\_english/reports\\_and\\_publications/statistical\\_energy\\_review\\_2008/STAGING/local\\_assets/downloads/pdf/gas\\_table\\_of\\_proved\\_natural\\_gas\\_reserves\\_2008.pdf](http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/downloads/pdf/gas_table_of_proved_natural_gas_reserves_2008.pdf), consult at March 24, 2009.

### 3. COAL RESERVES

#### Coal

Proved reserves at end 2007					
Million tonnes	Anthracite and bituminous	Sub-bituminous and lignite	Total	Share of total	R/P ratio
US	112261	130460	242721	28.6%	234
Canada	3471	3107	6578	0.8%	95
Mexico	980	351	1211	0.1%	99
<b>Total North America</b>	<b>116592</b>	<b>133918</b>	<b>250510</b>	<b>29.6%</b>	<b>224</b>
Brazil	–	7068	7068	0.8%	*
Colombia	6578	381	6959	0.8%	97
Venezuela	479	–	479	0.1%	60
Other S. & Cent. America	172	1598	1770	0.2%	*
<b>Total S. &amp; Cent. America</b>	<b>7229</b>	<b>9047</b>	<b>16276</b>	<b>1.9%</b>	<b>188</b>
Bulgaria	5	1991	1996	0.2%	66
Czech Republic	1673	2828	4501	0.5%	72
Germany	152	6556	6708	0.8%	33
Greece	–	3900	3900	0.5%	62
Hungary	199	3103	3302	0.4%	336
Kazakhstan	28170	3130	31300	3.7%	332
Poland	6012	1490	7502	0.9%	51
Romania	12	410	422	*	12
Russian Federation	49088	107922	157010	18.5%	500
Spain	200	330	530	0.1%	29
Turkey	–	1814	1814	0.2%	24
Ukraine	15351	19522	33873	4.0%	444
United Kingdom	155	–	155	*	9
Other Europe & Eurasia	1025	19208	19233	2.3%	278
<b>Total Europe &amp; Eurasia</b>	<b>102042</b>	<b>170204</b>	<b>272246</b>	<b>32.1%</b>	<b>224</b>
South Africa	48000	–	48000	5.7%	178
Zimbabwe	502	–	502	0.1%	237
Other Africa	929	174	1103	0.1%	*
Middle East	1386	–	1386	0.2%	*
<b>Total Middle East &amp; Africa</b>	<b>50817</b>	<b>174</b>	<b>50991</b>	<b>6.0%</b>	<b>186</b>
Australia	37100	39500	76600	9.0%	194
China	62200	52300	114500	13.5%	45
India	52240	4258	56498	6.7%	118
Indonesia	1721	2607	4328	0.5%	25
Japan	355	–	355	*	249
New Zealand	33	538	571	0.1%	124
North Korea	300	300	600	0.1%	20
Pakistan	1	1981	1982	0.2%	*
South Korea	–	135	135	*	47
Thailand	–	1354	1354	0.2%	74
Vietnam	150	–	150	*	4
Other Asia Pacific	115	276	391	*	29
<b>Total Asia Pacific</b>	<b>154216</b>	<b>103249</b>	<b>257465</b>	<b>30.4%</b>	<b>70</b>
<b>TOTAL WORLD</b>	<b>430896</b>	<b>416592</b>	<b>847488</b>	<b>100.0%</b>	<b>133</b>
of which: European Union	8427	21143	29570	3.5%	50
OECD	162490	194420	356910	42.1%	168
Former Soviet Union	93609	132396	225995	26.7%	463
Other EMEs	174797	89786	264583	31.2%	70

\*More than 500 years.

\*Less than 0.05%.

Source of reserves data: Survey of Energy Resources 2007, World Energy Council.

Notes: Proved reserves of coal – Generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known deposits under existing economic and operating conditions.  
Reserves-to-production (R/P) ratio – If the reserves remaining at the end of the year are divided by the production in that year, the result is the length of time that those remaining reserves would last if production were to continue at that rate.

Source: BP (2007). Coal reserves table.

[http://www.bp.com/liveassets/bp\\_internet/globalbp/globalbp\\_uk\\_english/reports\\_and\\_publications/statistical\\_energy\\_review\\_2008/STAGING/local\\_assets/downloads/pdf/coal\\_table\\_of\\_proved\\_coal\\_reserves\\_2008.pdf](http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/downloads/pdf/coal_table_of_proved_coal_reserves_2008.pdf), consult at March 24, 2009.

## 4. RENEWABLE ENERGY POLICY

### ▪ Explanation definitions

**Feed-in-tariff:** The price per unit of electricity that a utility or supplier has to pay for renewable electricity from private generators. The government regulates the tariff rate. The regional or national electricity utilities are obligated to buy renewable electricity at above market rates set by the government (European environment agency).

**Green certificates:** an official record proving that a specified amount of green electricity has been generated. Green certificates represent the environmental value of renewable energy production. The certificates can be traded separately from the energy produced (European environment agency).

**kWh:** kilowatt hour. The kilowatt-hour (symbolized kWh) is a unit of energy equivalent to one kilowatt (1 kW) of power expended for one hour (1 h) of time. The kilowatt-hour is not a standard unit in any formal system, but it is commonly used in electrical applications (serachCIO-midmarket.com)

**kWp;** kilowatt-peak is the nominal electrical power provide by a solar module under standard test conditions (abc-solar)

### ▪ Subsidy regime - onshore wind energy

	Support system	Total revenue in 2008 (EUR/MWh)	Level of support in 2008 (EUR/MWh)	Duration of support (years)	Market electricity price estimate (EUR/MWh)	Subsidy decrease an inflation correction
Belgium	Hybrid green certificates	140-170 (variable)	100 (variable)	20 years <sup>1</sup>	60-70	Not relevant
France	Feed-in-tariff	82	82	10+5 <sup>2</sup>	Not relevant	Decrease by 2% per year, partly inflation corrected
Germany	Feed-in-tariff	80.20	80.20	5+15 <sup>2</sup>	Not relevant	Decrease by 2% per year, partly inflation corrected
Ireland	Feed-in-tariff	57	57	15	Not relevant	Fixed level, fully inflation corrected
Italy	Green certificates	160-200 (variable)	100-120 (variable)	15	60-80	Not relevant
Netherlands	Premium payment	110	30-50 (variable)	15 <sup>3</sup>	60-80	Fixed level, not inflation corrected
Poland	Green certificates	95 (variable)	65 (variable)	?	30	Not relevant
Portugal	Feed-in-tariff	74	74	15 <sup>3</sup>	Not relevant	Fixed level, not inflation corrected
Spain	Feed-in-tariff or Premium payment	73.22 OR 71.27 - 84.94	73.22 OR 29.29	20	50-60	Fixed level, partly inflation corrected
Turkey	Feed-in-tariff or Bilateral contracts	50-55 OR 60-90 (variable)	50-55 OR 60-90 (variable)	10	60-90	Level adjusted annually not inflation corrected
UK	Green certificates	90-110 GBP (variable)	50 GBP (variable)	Asset lifetime	40-60 GBP	Not relevant

1. Belgium government guarantees minimum GC price at 80 EUR/MWh for first 10 years.  
2. France and Germany have a subsidy system where the producers receive a high FIT for the first ten years (10 in France and 5 in Germany), and after that a lower tariff, depending site wind level.  
3. In the Netherlands and Portugal, the subsidy capped at a yearly maximum number of full load hours (1760 for the Netherlands, 2000 for Portugal)

Source: Rabobank International

## ▪ Subsidy regime - offshore wind energy

	Support system	Total revenue in 2008 (EUR/MWh)	Level of support in 2008 (EUR/MWh)	Duration of support (years)	Market electricity price estimate (EUR/MWh)	Grid connection paid by
Belgium	Hybrid green certificates	170 (variable)	107	20	60-70	Both
Denmark	Tender + premium payment	125 (varies per tender)	85 (varies per tender)	14 <sup>1</sup> (varies per tender)	30-50	Government
France	Feed-in-tariff	130	130	10 + 10 <sup>2</sup>	Not relevant	<sup>3</sup>
Germany	Feed-in-tariff	1503	150	12 + 8 <sup>2</sup>	Not relevant	Government
Ireland	Feed-in-tariff	140	140	15	Not relevant	Developer
Italy	Green certificates	180-220 (variable)	140 (variable)	15	60-80	<sup>3</sup>
Netherlands	Likely: tender plus premium payment	Unknown	Unknown	Unknown, likely 15	60-80	Developer
Spain	Premium payment	140 (variable)	84,30	20	50-60	<sup>3</sup>
UK	Green certificates	160 (variable)	65 (variable)	Asset lifetime	50-75	Developer

1. The Danish tender system works with a number of full load hours for which the premium payment is received. In the most recent tender, this is 50,000 full load hours, likely equal to approximately 14 years of production.

2. France and Germany have a subsidy system where the producers receive a high FIT for the first ten years (10 in France and 12 in Germany), and after that a lower tariff, depending on project circumstances (in Germany, water depth and distance to shore, and France wind level)

3. Currently, no offshore wind farms exist in these countries, and yet it is as yet unclear how the cost of the grid connection will be divided

Source: Rabobank International

## ▪ Subsidy regime – solar energy

Country	Subsidy policy																
Belgium	Green Certificates (with guaranteed minimum price): 0.15; Flanders from 1 January 2006: 0.45 EUR/kWh for 20 years. The support schemes used are investment subsidies, eco premiums, tax reductions, and interest reduced mortgages.																
Cyprus	Feed-in-tariff: 0.196 CYP€/kWh (0.342 EUR/kWh) for enterprises. If an investment grant is taken, the tariff is reduced to 0.012 CYP€/kWh. For enterprises, the grant is 40% of eligible costs and the maximum amount of the grant is 12,000 EUR																
France	Feed-in-tariff: 0.30 EUR/kWh for 20 years. For building-integrated PV installations there is a supplement of 0.25 EUR/kWh. 50% of the investments costs are tax deductible. Lower VAT of 5.5% on system costs (without labour). Accelerated depreciation of PV systems for enterprises.																
Germany	Feed-in-tariff for 20 years with built-in annual decrease of 5% from 2005 onward. For plants, neither on buildings nor sound barriers, the annual decrease is 6.5% from 2006 onward. Feed-in-tariff: - free standing systems: 0.3796 EUR/kWh - systems on buildings and sound barriers: 0.4921 EUR/kWh < 30 kWp 0.4682 EUR/kWh > 30 kWp and 0.4630 EUR/kWh > 100 kWp																
Greece	Feed-in-tariff: 0.45 EUR/kWh (0.50 EUR/kWh on islands) for systems < 100 kWp and 0.40 EUR/kWh (0.45 EUR/kWh on islands) for systems > 100 kWp guaranteed for 20 years. Commercial installations are eligible to grants (30 to 55% of total system costs), while domestic systems are eligible for a 20% tax deduction capped at EUR 700 per system																
Italy	Feed-in-tariff: guaranteed for 20 years.  <table border="1"> <thead> <tr> <th>Nominal power</th> <th>not intergrated</th> <th>partly intergrated</th> <th>building intergrated</th> </tr> </thead> <tbody> <tr> <td>1 - 3 kWp</td> <td>0.40 EUR/kWh</td> <td>0.44 EUR/kWh</td> <td>0.49 EUR/kWh</td> </tr> <tr> <td>3 - 20 kWp</td> <td>0.38 EUR/kWh</td> <td>0.42 EUR/kWh</td> <td>0.46 EUR/kWh</td> </tr> <tr> <td>&gt;20 kWp</td> <td>0.36 EUR/kWh</td> <td>0.40 EUR/kWh</td> <td>0.44 EUR/kWh</td> </tr> </tbody> </table>	Nominal power	not intergrated	partly intergrated	building intergrated	1 - 3 kWp	0.40 EUR/kWh	0.44 EUR/kWh	0.49 EUR/kWh	3 - 20 kWp	0.38 EUR/kWh	0.42 EUR/kWh	0.46 EUR/kWh	>20 kWp	0.36 EUR/kWh	0.40 EUR/kWh	0.44 EUR/kWh
Nominal power	not intergrated	partly intergrated	building intergrated														
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>20 kWp	0.36 EUR/kWh	0.40 EUR/kWh	0.44 EUR/kWh														
Netherlands	Feed-in-tariff: 0.097 EUR/kWh for 10 years																
Portugal	Feed-in-tariff: guaranteed for the first 15 years. - 0.45 EUR/kWh < 5 kWp - 0.28 EUR/kWh > 5 kWp																
Spain	Feed-in-tariff: - 0.44 EUR/kWh < 100 kWp for 25 years then 0.3523 EUR/kWh - > 100 kWp < 10 MWp: 0.4145 EUR/kWh for 25 years then 0.332 EUR/kWh. - 0.23 kWh > 10 MWp for 25 years																

Source: Rabobank International

▪ Subsidy regime - biomass energy

<b>EU biofuel legislation</b>	
Scope	Land (road & rail) transport 2010-2020. Note: rail not yet properly investigated
Blending target	A minimum 10 percent share of renewable energy by 2020, mandatory, of which: - first generation biofuels count 1x - next generation biofuels count 2x - Cars using electricity count 2.5x - Note: the methodology to monitor the use of green electricity is to be decided 2012 the latest.
Excise duties Greenhouse gas (GHG) emissions savings	No provisions yet - 2009: 35% for post 2008 plants - 2013: 35% for all plants - 2017: 50% for all pre-2017 plants and 60% for all new plants
Sustainability requirements feedstocks	"Sustainable" feedstock to be required - EU wide standard to overrule national initiatives - 2010: EC methodology proposal - 2012: EP & council decision - Bi-annual reviews from the EC
Fuel quality and GHG emissions	- 2020: fuel suppliers are required to realise a minimum of 6% less GHG emissions in fossil fuels by 2020 compared to 2010. On top of this there is an additional voluntary target of 4% emissions savings by 2020. These savings could be realised via many routes including the use of biofuels. - 2012: review of suggestion to add voluntary 4% GHG emissions reduction target on top of the 6% mandatory reduction.
Role of the EC	Providing bi-annual reporting on a wide range of sustainability issues  Suggestions for methodologies to measure sustainability of biomass feedstock; default values for GHG savings; and the use of green electricity cars.

Source: Rabobank International

Figure: final assumed mix of energy crops by member state in 2030 (1)

MS	Traditional arable crops						Whole crops					
	Rape seeds	Sunflower seeds	Sugar beets	Maize corn	Wheat corn	Barley/triticale corn	Maize whole plant	Rriticale whole plant	Wheat whole plant	Double cropping optimal	Double cropping reduced	Sweet sorghum
AT	10 %	10 %	0 %	30 %	25 %	25 %	0 %	0 %	0 %	0 %	0 %	0 %
BE	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
DE	10 %	0 %	0 %	10 %	20 %	15 %	0 %	0 %	0 %	20 %	10 %	0 %
DK	0 %	0 %	0 %	10 %	30 %	25 %	0 %	0 %	0 %	20 %	10 %	0 %
ES	0 %	10 %	0 %	10 %	30 %	20 %	0 %	0 %	0 %	0 %	0 %	15 %
FI	0 %	0 %	0 %	0 %	45 %	20 %	0 %	0 %	0 %	10 %	5 %	0 %
FR	0 %	5 %	0 %	15 %	40 %	10 %	0 %	0 %	0 %	10 %	5 %	0 %
GR	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
IE	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
IT	0 %	5 %	0 %	15 %	20 %	15 %	0 %	0 %	0 %	0 %	10 %	10 %
NL	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
PT	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
SE	0 %	0 %	0 %	0 %	30 %	25 %	0 %	0 %	0 %	10 %	5 %	0 %
UK	0 %	0 %	0 %	15 %	40 %	20 %	0 %	0 %	0 %	10 %	5 %	0 %
CZ	15 %	0 %	0 %	10 %	20 %	20 %	0 %	0 %	0 %	0 %	5 %	0 %
EE	0 %	0 %	0 %	0 %	35 %	40 %	0 %	0 %	0 %	0 %	5 %	0 %
HU	10 %	5 %	0 %	5 %	20 %	15 %	0 %	0 %	0 %	10 %	5 %	0 %
LT	0 %	0 %	0 %	0 %	30 %	30 %	0 %	0 %	0 %	10 %	5 %	0 %
LV	0 %	0 %	0 %	0 %	30 %	30 %	0 %	0 %	0 %	10 %	5 %	0 %
PL	15 %	0 %	0 %	10 %	15 %	15 %	0 %	0 %	0 %	15 %	5 %	0 %
SI	10 %	5 %	0 %	5 %	20 %	15 %	0 %	0 %	0 %	0 %	10 %	0 %

Source: estimating the environmentally compatible bio energy crops potential from agriculture.

Figure: final assumed mix of energy crops by member state in 2030 (2)

MS	Perennials					
	SRC poplar	SRC willow	Miscanthus	Reed canary grass	Giant reed	Switchgrass
AT	0 %	0 %	0 %	0 %	0 %	0 %
BE	0 %	0 %	0 %	0 %	0 %	0 %
DE	0 %	5 %	5 %	0 %	5 %	0 %
DK	0 %	0 %	0 %	5 %	0 %	0 %
ES	0 %	0 %	0 %	0 %	15 %	0 %
FI	0 %	0 %	0 %	10 %	0 %	10 %
FR	5 %	0 %	5 %	10 %	0 %	0 %
GR	0 %	0 %	0 %	0 %	0 %	0 %
IE	0 %	0 %	0 %	0 %	0 %	0 %
IT	0 %	0 %	5 %	0 %	10 %	10 %
NL	0 %	0 %	0 %	0 %	0 %	0 %
PT	0 %	0 %	0 %	0 %	0 %	0 %
SE	5 %	5 %	0 %	10 %	0 %	10 %
UK	0 %	0 %	0 %	5 %	0 %	5 %
CZ	0 %	5 %	10 %	0 %	0 %	15 %
EE	5 %	5 %	5 %	5 %	0 %	0 %
HU	0 %	5 %	10 %	0 %	0 %	15 %
LT	5 %	5 %	5 %	10 %	0 %	0 %
LV	5 %	5 %	5 %	10 %	0 %	0 %
PL	5 %	5 %	0 %	0 %	0 %	15 %
SI	0 %	5 %	10 %	5 %	0 %	15 %

Source: estimating the environmentally compatible bio energy crops potential from agriculture.

#### ▪ CO<sub>2</sub>-storage

There is no information available about subsidy regimes of CO<sub>2</sub>-storage of European countries. The Dutch government now subsidizes small demonstration projects for CO<sub>2</sub> capture (E.ON) and CO<sub>2</sub>-storage (Shell and GTI). The EU's made €250 million available for large-scale demonstration projects in the Netherlands and suggest a further 300 million allowances in prospect for 12-15 projects in Europe.



## 5. RISKS SUB-SECTORS CLEAN TECH

<b>Onshore wind energy</b>	Opposition from local action groups.	Radar and aviation interference issues.	Quality of wind measurement data.	Turbine availability, selection and quality.	Grid limitations.	
<b>Offshore wind energy</b>	Lack of turbines, installation vessels, and available capital.	Operational risks are complex compared to onshore market.	More complex problems when project failures occur.	Turbine reliability is in many cases unproven.	Permitting and regulatory challenges.	Quality of wind measurement data.
<b>Risks solar</b>	Shortage of commodities: As a result more expensive commodities.	Surplus of solar panels			Quality of wind measurement data.	
<b>Risks biomass</b>	Surplus of bio fuels.	Food for fuel debate – increasing food prices.	Limited availability of land and/or high land prices	Potential biodiversity and water threats	Soil erosion.	
<b>Risks CO<sub>2</sub>-storage</b>	Storage is forever and everlasting.	Opposition from local action groups	CO <sub>2</sub> pipelines: similar to or lower than those posed by hydrocarbon pipelines.	Geological storage: Comparable to risks of current activities (natural gas storage, EOR, disposal of acid gas).	Ocean storage: mortality of ocean organisms, ecosystem consequences, chronic effects unknown.	Operations

Source: author edit

## 6. QUESTIONNAIRE INTERVIEWS

### Vragenformulier, interview master scriptie:

### Is clean tech een aantrekkelijke alternatieve vastgoedbelegging?

#### Introductie

Functie en organisatie:

1. Welke functie bekleedt u binnen de organisatie en wat houdt dat in?
2. Hoe lang bent u werkzaam bij deze organisatie en hoe lang bent u werkzaam binnen dit vakgebied?
3. Welke visie en werkwijze heeft de organisatie?
4. Hoeveel werknemers heeft de organisatie?

#### Interviewvragen

Beleggen in vastgoed.

5. In welke typen vastgoed belegt uw organisatie?
6. Hoeveel bedraagt het belegde vermogen in vastgoed?

Is Clean Tech vastgoed?

7. Organisaties spelen steeds meer in op het thema clean tech. Op welke manier is uw organisatie betrokken bij clean tech?
8. Hoe typeert u de term clean tech?

Beleggen in clean tech.

9. Past beleggen in clean tech binnen jullie beleggingstrategie?
10. Beleggen jullie op dit moment in clean tech?

Risico/Rendement

11. Waar liggen volgens u de grootste risico's van beleggen in clean tech?
12. Wat vindt u van de getoonde rendementen?
13. Passen deze rendementen binnen jullie beleggingsstrategie?

Beleggingskarakteristieken

14. Beleggen in clean tech gaat gepaard met veel overheidsinvloed. Hoe kijkt uw organisatie aan tegen beleggingen met veel overheidsinvloed?
15. Beleggen in Clean Tech is managementintensief. Hoe kijkt uw organisatie tegen management intensieve beleggingen aan?
16. Uit onderzoek blijkt dat bepaalde landen de beste resultaten laten zien. Passen deze landen binnen jullie beleggingsstrategie? (Windmolens: Spanje & Duitsland. Solar: Spanje, Portugal. Biomassa: Frankrijk en Oost-Europa).
17. Wat verwacht u van de marktontwikkeling van beleggen in clean tech

#### Afsluiting

18. Gaat uw organisatie in de toekomst ook beleggen in clean tech?

