

Appendix 1

List of Carbon Bombs

Name (* new project) Fuel GtCO2

Algeria

*Tannezuft Shale	Oil&Gas	2.3
Hassi R'Mel (Domestic)	Oil&Gas	2.3
Hassi Messaoud	Oil&Gas	1.2

Argentina

Vaca Muerta Shale	Oil&Gas	5.2
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Australia

*Red Hill Coal Project	Coal	4.6
*Goldwyer Shale	Oil&Gas	4.5
Loy Yang Coal Mine	Coal	3.1
*Wards Well Coal Mine	Coal	2.7
*Alpha North Coal Mine	Coal	2.5
Peak Downs Coal Mine	Coal	2.3
Goonyella-Riverside Coal Mine	Coal	2.2
*Carmichael Coal Project	Coal	2.1
*Valeria Coal Mine	Coal	2.0
*Wilton and Fairhill Coal Projects	Coal	1.9
Gorgon LNG T1-T3	Oil&Gas	1.9
Byerwen Coal Mine	Coal	1.8
*Galilee Coal Mine	Coal	1.8
Hunter Valley North Coal Mine	Coal	1.7
*Hutton Coal Mine	Coal	1.7
*Olive Downs Coal Mine	Coal	1.4
*Saraji East Coal Mine	Coal	1.3
Ensham Coal Mine	Coal	1.3
Hunter Valley South Coal Mine	Coal	1.2
*Velkerri Shale	Oil&Gas	1.1
Yallourn	Coal	1.1
Mount Pleasant Coal Mine	Coal	1.1
Blackwater Coal Mine	Coal	1.0

Azerbaijan

ACG (Azeri-Chirag-Guneshli Deep Water)	Oil&Gas	1.7
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Bahrain

*Central Arabian Offshore	Oil&Gas	1.4
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Bangladesh

*Phulbari Coal Mine	Coal	1.4
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Botswana

*Project Motheo	Coal	2.2
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Brazil

*Santos Offshore	Oil&Gas	4.3
*Llandovery Shale	Oil&Gas	4.3
Buzios (x-Franco)	Oil&Gas	3.6
*Irati Shale	Oil&Gas	2.7
Lula (X-Tupi)	Oil&Gas	2.5
*Parnaiba Onshore	Oil&Gas	2.0
*Libra	Oil&Gas	1.9
*Candeias Shale	Oil&Gas	1.6
*Campos Offshore	Oil&Gas	1.6
Mero (Libra NW)	Oil&Gas	1.3

Bulgaria

Maritsa Coal Mines	Coal	2.5
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Canada

Montney Play	Oil&Gas	13.7
Murray River Coal Mine	Coal	8.5
Spirit River (Notikewin, Falher, Wilrich)	Oil&Gas	3.0
Gething Coal Mine	Coal	2.1
Horizon Oil Sands Project	Oil&Gas	2.0
Kearl	Oil&Gas	1.9
Duvernay	Oil&Gas	1.9
Athabasca Oil Sands Project	Oil&Gas	1.4
Christina Lake	Oil&Gas	1.2
Liard Shale	Oil&Gas	1.2
Syncrude Mildred Lake/Aurora	Oil&Gas	1.2
Fording River	Coal	1.0

China

Tashan Coal Mine	Coal	9.0
Hongshaquan No.1 Coal Mine	Coal	9.0
*Dahaize Coal Mine	Coal	8.0
*Jiangjun Gebi No.2 Coal Mine	Coal	7.8
Dananhu No.1 Coal Mine	Coal	7.2
*Balasu Coal Mine	Coal	6.4
Hongqinghe Coal Mine	Coal	5.7
Longmaxi Shale	Oil&Gas	5.7
*Baijia Haizi Coal Mine	Coal	5.0
Changqing	Oil&Gas	4.9
Xiaojihan Coal Mine	Coal	4.6
Shengli East No.2 Coal Mine	Coal	4.6
Buertai Coal Mine	Coal	4.5
*Xinwen Ili No.1 Coal Mine	Coal	4.5
Chahasu Coal Mine	Coal	4.2
Ningtiaota Coal Mine	Coal	4.0
Hulusu Coal Mine	Coal	4.0

*Shilawusu Coal Mine	Coal	3.9
Jinjie Coal Mine	Coal	3.9
Xiaobaodang No.1 Coal Mine	Coal	3.8
*Yingpanhao Coal Mine	Coal	3.8
Menkeqing Coal Mine	Coal	3.7
*Dananhu No. 7 Coal Mine	Coal	3.6
*Zhundong Surface Mine	Coal	3.5
Meihuaqing Coal Mine	Coal	3.5
*Qinghua No.7 Coal Mine	Coal	3.4
*Shaanxi Caojiatan Coal Mine	Coal	3.3
*Wucuiwan No.1 Coal Mine	Coal	3.3
Majialiang Coal Mine	Coal	3.2
Hongliulin Coal Mine	Coal	3.1
*Hetaoyu Coal Mine	Coal	3.0
*Taran Gaole Coal Mine	Coal	2.9
Ningxia Hongliu Coal Mine	Coal	2.9
*Dalaihushuo Coal Mine	Coal	2.9
Yushuwan Coal Mine	Coal	2.8
*Dananhu West No.2 Coal Mine	Coal	2.7
Wangjialing Coal Mine	Coal	2.7
Shenhua Heidaigou Surface Coal Mine	Coal	2.7
Pingshuo East Coal Mine	Coal	2.6
Yili No.4 Coal Mine	Coal	2.6
Daqing	Oil&Gas	2.6
*Shitoumei No.1 Coal Mine	Coal	2.4
*Cambrian/Silurian Marine Shale	Oil&Gas	2.4
*Xinzhuan Coal Mine	Coal	2.3
Sandaogou Coal Mine	Coal	2.3
Huangyuchuan Coal Mine	Coal	2.3
*Inner Mongolia Erlintu Coal Mine	Coal	2.2
Shenhua Bulianta Coal Mine	Coal	2.2
Zhangji Coal Mine	Coal	2.2
*Jinjitai Coal Mine	Coal	2.2
*Pangpangta Coal Mine	Coal	2.2
*Guojiatan Coal Mine	Coal	2.2
Dongzhouyao Coal Mine	Coal	2.2
Longmaxi Shale (Sichuan/Changyu)	Oil&Gas	2.2
Haerwusu Surface Mine	Coal	2.1
Suancangou Coal Mine	Coal	2.1
Yimin Surface Coal Mine	Coal	2.0
Guqiao Coal Mine	Coal	2.0
*Boli Coal Mine	Coal	2.0
Gaojialiang No.1 Coal Mine	Coal	2.0
Hongqingliang Coal Mine	Coal	2.0
Tarim (CNPC)	Oil&Gas	2.0
*Xiaobaodang No.2 Coal Mine	Coal	1.9
*Zhaoshipan Coal Mine	Coal	1.9
Longwanggou Coal Mine	Coal	1.9
Guojiawan Coal Mine	Coal	1.9
Gaotouyao Coal Mine	Coal	1.9
*Madaotou Coal Mine	Coal	1.8
Qingshuiying Coal Mine	Coal	1.8
Buliangou Coal Mine	Coal	1.8
Shanxi Lu'an Gucheng Coal Mine	Coal	1.8
Shangwan Coal Mine	Coal	1.8

Hanglaiwan Coal Mine	Coal	1.8
Xiaojiawa Coal Mine	Coal	1.8
*Southeast Uplift Onshore Heilongjiang Province	Oil&Gas	1.8
*Chagannur No.1 Coal Mine	Coal	1.7
*Muduchaideng Coal Mine	Coal	1.7
*Qiyuan Coal Mine	Coal	1.7
Weijiamao Open Pit Mine	Coal	1.7
*Nalin River No.2 Coal Mine	Coal	1.7
Dingji Coal Mine	Coal	1.7
Baode Coal Mine	Coal	1.7
Wangjiata Coal Mine	Coal	1.6
Wudong Coal Mine	Coal	1.6
*Shengli No.1 Open-Pit Coal Mine	Coal	1.6
Baiyinhu No.3 Surface Mine	Coal	1.6
Tongxin Coal Mine	Coal	1.6
Shenhua Baorixile Surface Coal Mine	Coal	1.6
Sijiazhuang Coal Mine	Coal	1.6
Gaohe Coal Mine	Coal	1.5
Xiwan Surface Coal Mine	Coal	1.5
Liuzhuang Coal Mine	Coal	1.5
*Yadian Coal Mine	Coal	1.5
Lijiahao Coal Mine	Coal	1.5
Shicaocun Coal Mine	Coal	1.5
Shengli	Oil&Gas	1.5
Shangyuquan Coal Mine	Coal	1.4
Qingchunta Coal Mine	Coal	1.4
*Taohe Coal Mine	Coal	1.4
Xiaozhuang Coal Mine	Coal	1.4
Wucuiwan No.1 Surface Mine	Coal	1.4
Shaqu No.1 Coal Mine	Coal	1.4
*Sanjiao No.1 Coal Mine	Coal	1.4
*Zhong Yu Coal Mine	Coal	1.4
*Mengcun Coal Mine	Coal	1.4
Huangling No.2 Coal Mine	Coal	1.4
Dafosi Coal Mine	Coal	1.4
Oil shale China	Oil&Gas	1.4
Xinjiang (CNPC)	Oil&Gas	1.4
Zhangjiamao Coal Mine	Coal	1.3
Talahao Coal Mine	Coal	1.3
Baishihu Surface Mine	Coal	1.3
Halagou Coal Mine	Coal	1.3
*Wenjiazhuang Coal Mine	Coal	1.3
*Yuwang No.1 Coal Mine	Coal	1.3
*Baiyanghe Coal Mine	Coal	1.2
Yangquan No.1 Coal Mine	Coal	1.2
Daliuta Coal Mine	Coal	1.2
*Xinjiang Hongshan Coal Mine	Coal	1.2
Antaibao Surface Mine	Coal	1.2
Shahaiji No.1 Coal Mine	Coal	1.2
Shigetai Coal Mine	Coal	1.2
Fengjiata Coal Mine	Coal	1.2
Gaojiabao Coal Mine	Coal	1.1
Shajihai No.2 Coal Mine	Coal	1.1
*Taliike District No. 2 Coal Mine	Coal	1.1

Huojiutu Well Of Daliuta Coal Mine Coal	1.1
*Changcheng No.3 Coal Mine Coal	1.1
Yangjiacun Coal Mine Coal	1.1
Yangchangwan No.1 Well Coal Mine Coal	1.1
*Wangwa Coal Mine Coal	1.1
*Ba Leng Coal Mine Coal	1.1
Zaoquan Coal Mine Coal	1.1
Anjialing Open-Pit Mine Coal	1.0
*Longwan Coal Mine Coal	1.0
*Shanxi Dongda Coal Mine Coal	1.0
Kouzi East Coal Mine Coal	1.0
*Hongshuliang Coal Mine Coal	1.0
*West Well of Faer Second Coal Mine Coal	1.0
Sihe Coal Mine Coal	1.0
*Central Uplift Onshore Xinjiang Uygur Autonomous Region	Oil&Gas 1.0
Colombia	
El Descanso Coal Mine Coal	4.1
Cerrejón Coal Mine Coal	2.4
*La Luna Shale Oil&Gas	1.6
*San Juan Coal Mine Coal	1.6
Pribbenow Coal Mine Coal	1.4
Denmark	
*Kronprins Christian Offshore Oil&Gas	2.2
Germany	
Hambach Coal Mine Coal	1.7
Garzweiler Coal Mine Coal	1.3
Greece	
West Macedonia Lignite Centre (WMLC) Coal	2.2
Guyana	
*Greater Turbot (Stabroek) Oil&Gas	1.1
Greater Liza (Liza) Oil&Gas	1.0
India	
Rajmahal Coal Mine Coal	5.8
Gevra Coal Mine Coal	2.4
*Barail Shale Oil&Gas	2.1
*Siarmal Coal Mine Coal	1.9
*Kerandari BC Coal	1.8
Talaipalli Coal Mine Coal	1.5
Lakhanpur Coal Mine Coal	1.5
*Integrated Belpahar, Lakhanpur, Lilari Coal Mine	Coal 1.5
*Bankui Coal	1.6
*Balaram Coal Mine Coal	1.4
*Gare Pelma Sector II Coal	1.3
*Mandakini B Coal	1.3
Kaniha Coal Mine Coal	1.2
Dipka Coal Mine Coal	1.2
Kusmunda Coal Mine Coal	1.2

*Banhardih Coal	1.1
*Saharpur Jamarpani Coal	1.0
Moher Amlohri Coal Mine Coal	1.0
Indonesia	
PTBA Coal Mines Coal	8.9
KPC Operation Coal Mine Coal	3.1
*East Natuna (x-Natuna D-Alpha) Oil&Gas	2.2
*GAM Coal Mine Coal	1.3
Indexim Coalindo Coal Mine Coal	1.1
*Pakar North Coal Mine Coal	1.1
Tutupan Coal Mine Coal	1.1
MHU Coal Mine Coal	1.1
BIB Coal Mine Coal	1.1
Pasir Coal Mine Coal	1.0
Israel	
*Leviathan Oil&Gas	1.1
Iraq	
Rumaila North & South Oil&Gas	7.8
Qurna West Oil&Gas	4.0
Baghdad East Oil&Gas	2.7
*Central Arabian Onshore Oil&Gas	2.6
Majnoon Oil&Gas	2.5
Zubair Oil&Gas	1.7
Qurna West-2 Oil&Gas	1.6
Halfayah Oil&Gas	1.4
Nahr bin Umar Oil&Gas	1.3
Ratawi Oil&Gas	1.1
Basrah Gas project Oil&Gas	1.0
Iran	
Marun Oil&Gas	2.4
Azadegan Oil&Gas	2.3
Ahwaz Asmari Oil&Gas	2.2
*Central Arabian Offshore Oil&Gas	2.1
Gachsaran Oil&Gas	1.7
Agha Jari Oil&Gas	1.6
Ahwaz Bangestan Oil&Gas	1.4
Pazanan Oil&Gas	1.4
South Pars (Phases 9-10) dry gas Oil&Gas	1.3
*Kish Gas Project Oil&Gas	1.2
*Pars Southwest Oil&Gas	1.1
South Pars (Phases 4-5) dry gas Oil&Gas	1.1
Mansouri Bangestan Oil&Gas	1.0
South Pars (Phases 22-24) Oil&Gas	1.0
South Pars (Phases 20-21) Oil&Gas	1.0
South Pars (Phases 2-3) dry gas Oil&Gas	1.0
Kazakhstan	
Bogatyr Coal Mine Coal	7.3
Kashagan Oil&Gas	5.1
Tengiz Oil&Gas	3.4
*Carboniferous Shale Oil&Gas	1.3

Karachaganak Oil&Gas	1.2
Borly Coal Mines Coal	1.0
Shubarkol Coal Mine Coal	1.0
Kuwait	
Greater Burgan Oil&Gas	8.3
Project Kuwait Oil&Gas	4.4
*Central Arabian Onshore Oil&Gas	3.6
*Khafji Oil&Gas	1.4 ¹
Libya	
*Sirte Shale Oil&Gas	1.7
El Sharara Oil&Gas	1.0
Mexico	
*Eagle Ford Shale Oil&Gas	5.1
*Gulf Deepwater Offshore Oil&Gas	2.2
Ku-Maloob-Zaap Project Oil&Gas	2.0
*Yucatan Platform Offshore Oil&Gas	1.0
Mongolia	
*Tavan Tolgoi Coal Mine Coal	16.0
Mozambique	
*Zambezi Coal Mine Coal	4.1
*Chirodzi Coal Mine Coal	2.9
*Revuboe Coal Mine Coal	1.4
*MZLNG Joint Development (T1-T2) Oil&Gas	1.3
*Area-1 Future Phases Oil&Gas	1.0
*Area 1 LNG (T1&T2) Oil&Gas	1.0
Nigeria	
NLNG Base Project Oil&Gas	1.0
North Korea	
Saebyoil Coal Mining Complex Coal	3.2
Norway	
Troll Oil&Gas	1.8
Johan Sverdrup Oil&Gas	1.1
Pakistan	
*Sembar Shale Oil&Gas	2.8
Thar Coal Mine Coal	1.9
Poland	
*Lublin Basin Silurian Shale Oil&Gas	5.6
Qatar	
¹ This project is located in the Neutral Zone between Saudi-Arabia & Kuwait and is included in both country lists.	

*North Field Oil&Gas	11.6
*North Field C LNG Oil&Gas	7.8
*North Field E Oil&Gas	4.6
*QatarGas LNG T8-T11 (NFE-East) Oil&Gas	3.4
*Barzan Oil&Gas	3.1
*Central Arabian Onshore Oil&Gas	2.2
Qatargas 2 LNG T4-T5 Oil&Gas	1.8
*QatarGas LNG T12-T13(NFE-South) Oil&Gas	1.8
Dolphin Oil&Gas	1.6
Rasgas 2 LNG T3-T5 Oil&Gas	1.5
Rasgas 3 LNG T6-T7 Oil&Gas	1.5
QatarGas 1 LNG T1-T3 Oil&Gas	1.3
Al Khaleej Gas project Oil&Gas	1.1
Russia	
Bovanenkovo Zone (Yamal Megaproject)	
	Oil&Gas 11.2
Gazprom dobycha Yamburg Oil&Gas	8.9
*Tunguska Basin CBM Oil&Gas	8.8
*Shtokman Oil&Gas	6.1
Urengoyskoye Oil&Gas	5.2
*Kuznetsk Depression (Kuzbass) CBM Oil&Gas	4.9
*Elga Coal Mine Coal	4.5
Yuganskneftegaz Oil&Gas	4.3
Eastern Gas Program Oil&Gas	4.3
Stepnoy Coal Mine Coal	3.6
*West Siberia Offshore Oil&Gas	2.9
*Lensky Basin CBM Oil&Gas	2.7
*Timan - Pechora Basin Offshore Oil&Gas	2.5
*Tambey Zone (Yamal Megaproject) Oil&Gas	2.5
*Timan - Pechora Basin Onshore Oil&Gas	2.4
*Beisky-Zapadny Coal Mine Coal	2.4
Raspadskaya Coal Mine Coal	2.4
Listvianskaya Coal Mine Coal	2.4
Elegest Coal Mine Coal	2.3
Taldinsky Coal Mine Coal	2.2
*Ulug-Khem Project Coal	2.2
Samotlorneftegaz (TNK-BP) Oil&Gas	1.9
*Sugodinsk-Ogodzhinsky Coal Mine Coal	1.8
*Leningradskoye (Kara Sea) Oil&Gas	1.8
Arshanovsky Coal Mine Coal	1.7
*Usinsk-1 Coal Mine Coal	1.7
Pereyaslovskiy Coal Mine Coal	1.6
Gazprom dobycha Orenburg Oil&Gas	1.6
*Arctic LNG 2 T1-3 Oil&Gas	1.5
*Pervomaisky Coal Mine Coal	1.5
*Volga - Urals Onshore Oil&Gas	1.4
Romashkino Oil&Gas	1.3
*Rusanovskoye (Kara Sea) Oil&Gas	1.3
Gazprom dobycha Nadym Oil&Gas	1.3
*Inaglinskaya-2 Mine Coal	1.3
*Taymyr Basin CBM Oil&Gas	1.2
*North Kara Sea Offshore Oil&Gas	1.2
*West Siberia Onshore Oil&Gas	1.2

SeverEnergia Project	Oil&Gas	1.1
Erkovetskiy Coal Mine	Coal	1.0
*Shurapskaya Coal Mine	Coal	1.0

Saudi Arabia

Ghawar Uthmaniyah	Oil&Gas	19.2
Safaniya	Oil&Gas	11.9
Khurais project	Oil&Gas	7.6
Ghawar Haradh	Oil&Gas	7.0
*Central Arabian Offshore	Oil&Gas	6.9
Ghawar Shedgum	Oil&Gas	5.7
Qatif project	Oil&Gas	5.1
Manifa (redevelop)	Oil&Gas	5.0
Ghawar Hawiyah	Oil&Gas	4.6
*Central Arabian Onshore	Oil&Gas	4.4
Shaybah	Oil&Gas	4.3
Berri	Oil&Gas	3.6
*Zuluf (CR in field)	Oil&Gas	3.5
Zuluf	Oil&Gas	2.4
Khursaniyah	Oil&Gas	2.4
Ghawar Ain Dar N	Oil&Gas	2.1
Marjan	Oil&Gas	1.9
*Safaniya YTF Concession	Oil&Gas	1.8
*Zuluf (expansion)	Oil&Gas	1.8
Abqaiq	Oil&Gas	1.6
Ghawar Ain Dar S	Oil&Gas	1.4
*Khafji	Oil&Gas	1.4 ²
*Sudair Shale	Oil&Gas	1.0
Harmaliyah	Oil&Gas	1.0

Serbia

Kolubara	Coal	2.5
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South Africa

Grootegeluk Mine	Coal	6.9
*Greater Soutpansberg Coal Project	Coal	2.8
*Boikarabelo Coal Mine	Coal	2.4
*Collingham Shale	Oil&Gas	1.8
*Paardekop Coal Mine	Coal	1.7
*New Largo Coal Mine	Coal	1.4
*Bernice-Cygnus Coal Mine	Coal	1.1

Syria

*Tanf Shale	Oil&Gas	1.4
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Turkey

Afşin-Elbistan Coal Mine	Coal	4.1
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Turkmenistan

Yolotan (Iolotan) South	Oil&Gas	9.5
*Yashlar Vostochnyy (East)	Oil&Gas	2.1
Dovletabad-Donmez	Oil&Gas	1.6

Tanzania

*Tanzanian Coastal Offshore	Oil&Gas	1.0
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Ukraine

*Menilite Shale	Oil&Gas	1.7
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United Arab Emirates

Upper Zakum	Oil&Gas	6.4
Bu Hasa	Oil&Gas	4.9
Bab	Oil&Gas	4.2
Lower Zakum	Oil&Gas	2.4
Umm Shaif/Nasr	Oil&Gas	1.9
Bab (Gasco)	Oil&Gas	1.7
Asab	Oil&Gas	1.4

United Kingdom

*Bowland Shale	Oil&Gas	1.5
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United States

Permian Delaware Tight	Oil&Gas	27.8
Marcellus Shale	Oil&Gas	26.7
Permian Midland Tight	Oil&Gas	16.6
Haynesville/Bossier Shale	Oil&Gas	13.2
Utica Shale	Oil&Gas	7.7
Bakken Shale	Oil&Gas	5.9
Eagle Ford Shale	Oil&Gas	5.9
DJ Basin Tight Oil	Oil&Gas	5.9
Western Gulf Province_Texas	Oil&Gas	5.1
Woodford Shale	Oil&Gas	3.4
North Antelope Rochelle Coal Mine	Coal	2.9
MC #1 Coal Mine	Coal	2.9
PRB Tight Oil	Oil&Gas	2.8
*Chukchi Sea Offshore	Oil&Gas	2.5
Meramec Shale	Oil&Gas	2.4
Permian Conventional_Texas	Oil&Gas	2.1
*North Slope Onshore	Oil&Gas	2.0
Cumberland Coal Mine	Coal	1.9
Anadarko Shelf_Oklahoma	Oil&Gas	1.8
*Baltimore Canyon Offshore	Oil&Gas	1.6
Austin Chalk Tight	Oil&Gas	1.4
Barnett Shale	Oil&Gas	1.4
Black Thunder Coal Mine	Coal	1.4
*Beaufort Sea Offshore	Oil&Gas	1.3
Hamilton County No. 1 Mine	Coal	1.2
*Gulf Coast Centre Offshore	Oil&Gas	1.1
*West Florida Offshore	Oil&Gas	1.1
*Youngs Creek Coal Mine	Coal	1.1

Uzbekistan

*Angren Coal Mine	Coal	2.4
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Venezuela

Orinoco Joint Ventures	Oil&Gas	6.7
*La Luna Shale	Oil&Gas	1.1

Zimbabwe

Sengwe Colliery	Coal	1.0
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Source: Kjell Kühne, currently under submission, do not cite without author's permission

² See footnote 1.