The Drax Power (Generating Stations) Order

Land at, and in the vicinity of, Drax Power Station, near Selby, North Yorkshire

Environmental Statement
Appendix 5.5 – Trip Generation Methodology

The Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(a)

Drax Power Limited

Drax Repower Project

Applicant:	DRAX POWER LIMITED
Date:	May 2018
Document Ref:	6.2.5.5
PINS Ref:	EN010091

Trip Generation Methodology - Construction Period

Overview and General Assumptions

This Spreadsheet summarises the Light and Heavy Good Vehicle (LGV and HGV) figures calculated for the Drax Repower project for a 2 x 2+1 CCGTs and a 200MW battery storage facility.

For the purpose of this Spreadsheet one of the two units is called unit x and the other unit y.

In line with instructions from Drax the two units will be constructed separately, unit x in months 1-34 (34 months given by Drax although Siemens indicate a 37 month period), a 12 month break including the last three months of commissioning unit x and then the construction and commissioning of unit y.

Completion of electrical connection and gas connection installation works is timed to finish before commissioning of unit x begins.

A 5 day working week and 11 hour working day is assumed.

Car sharing of two people per car is assumed.

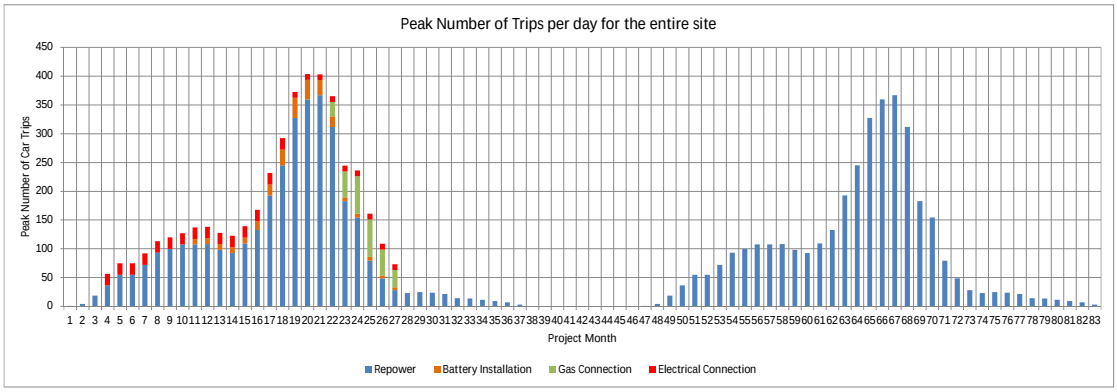
Lorry deliveries required for importing and removing material from site have been calcualted based on a lorry capacity of 8m3.

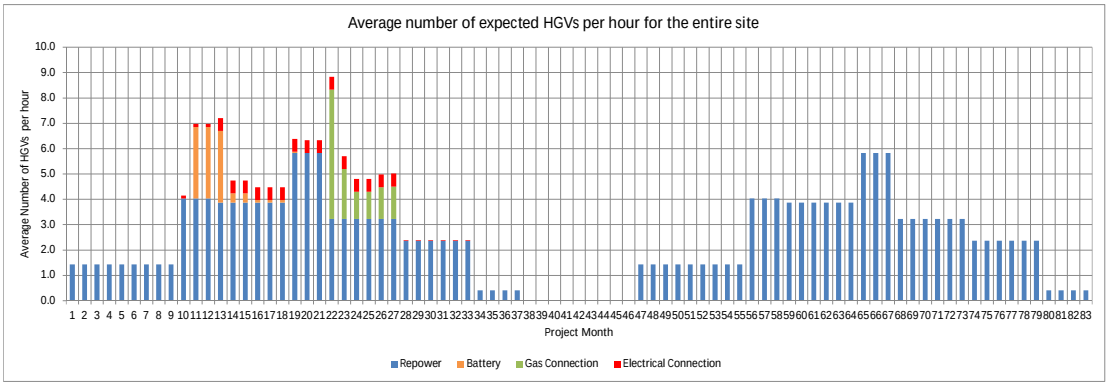
This spreadsheet does not calculate any peak spreading of the arrival of the cars to site.

Within each tab of the spreadsheet more specific assumptions and sources of information used have been given.

It should be noted that these are best estimates only, particularly when considering the amount of material to be removed from laydown and construction areas and exported off

Project Programme and Trip Generation

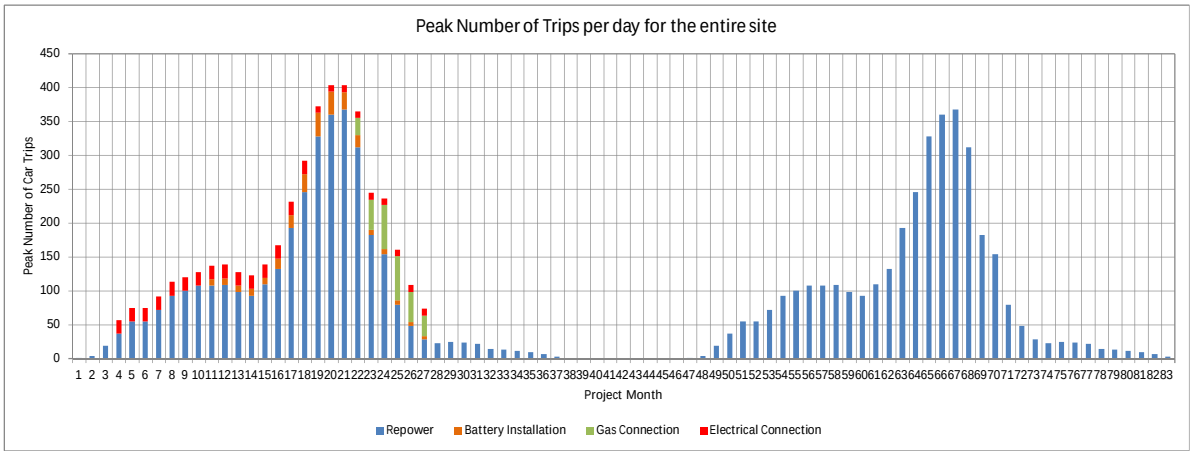


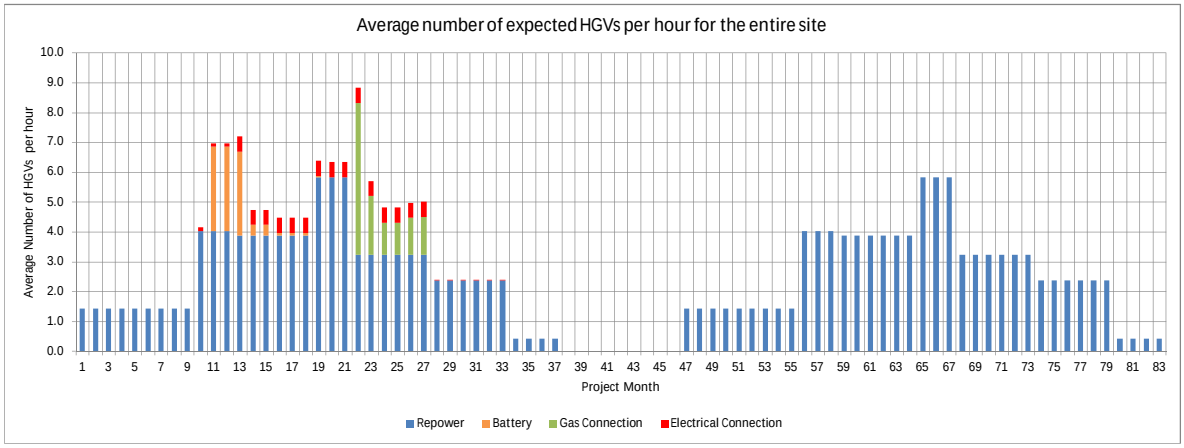


		2020			2021				2022				2023				2024				2025				2026				2027	
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29
Stage 0	Reconfiguration Works																													
Stage 1	Unit X Construction																													
	Electrical Connection																													
	Gas Connection /AGI / GRF																													
	Unit X Commissioning																													
	Battery Installation																													
Stage 2	12 Month Gap																													
	Unit Y Construction																													
	Unit Y Commissioning																													
Stage 3	Operation of X & Y																													

Total Trips Generated - All Vehicles and HGVs

Estimated Peak Car trips and HGV movement for 2 x (2+1) H class CCGTs and 200MW of battery storage





Number of Employees per vehicle
2

Total Trips Generated - All Vehicles and HGVs

Construction Workers Profile and HGV Numbers - Tables

	Daily Car Journeys and Hourly HGVs									
	Electrical Connection		Gas Connection		Repower		Battery		Demolition Work	
	Car	HGV	Car	HGV	Car	HGV	Car	HGV	Car	HGV
Q1	0.0	0.0	0.0	0.0	18.6	1.4	0.0	0.0		
Q2	20.0	0.0	0.0	0.0	54.3	1.4	0.0	0.0		
Q3	20.0	0.0	0.0	0.0	99.8	1.4	0.0	0.0		
Q4	20.0	0.1	0.0	0.0	108.2	4.0	10.0	2.8		
Q5	20.0	0.5	0.0	0.0	108.9	3.9	10.0	2.8		
Q6	20.0	0.5	0.0	0.0	245.0	3.9	27.0	0.1		
Q7	10.0	0.5	0.0	0.0	366.8	5.8	35.0	0.0		
Q8	10.0	0.5	65.0	5.1	311.9	3.2	18.0	0.0		
Q9	10.0	0.5	65.0	1.3	78.8	3.2	7.0	0.0		
Q10	0.0	0.0	0.0	0.0	24.5	2.4	0.0	0.0		
Q11	0.0	0.0	0.0	0.0	21.0	2.4	0.0	0.0		
Q12	0.0	0.0	0.0	0.0	10.9	0.4	0.0	0.0		
Q13	0.0	0.0	0.0	0.0	2.8	0.4	0.0	0.0		
Q14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Q15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Q16	0.0	0.0	0.0	0.0	18.6	1.4	0.0	0.0		
Q17	0.0	0.0	0.0	0.0	54.3	1.4	0.0	0.0		
Q18	0.0	0.0	0.0	0.0	99.8	1.4	0.0	0.0		
Q19	0.0	0.0	0.0	0.0	108.2	4.0	0.0	0.0		
Q20	0.0	0.0	0.0	0.0	108.9	4.0	0.0	0.0		
Q21	0.0	0.0	0.0	0.0	245.0	3.9	0.0	0.0		
Q22	0.0	0.0	0.0	0.0	366.8	5.8	0.0	0.0		
Q23	0.0	0.0	0.0	0.0	311.9	5.8	0.0	0.0		
Q24	0.0	0.0	0.0	0.0	78.8	3.2	0.0	0.0		
Q25	0.0	0.0	0.0	0.0	24.5	3.2	0.0	0.0		
Q26	0.0	0.0	0.0	0.0	21.0	2.4	0.0	0.0		
Q27	0.0	0.0	0.0	0.0	10.9	2.4	0.0	0.0		
Q28	0.0	0.0	0.0	0.0	2.8	0.4	0.0	0.0		

	Vehicles / day									
	Electrical Connection		Gas Connection		Repower		Battery		Demolition Work	
	Car	HGV	Car	HGV	Car	HGV	Car	HGV	Car	HGV
Q1	0.0	0.0	0.0	0.0	18.6	15.7	0.0	0.0		
Q2	20.0	0.0	0.0	0.0	54.3	15.7	0.0	0.0		
Q3	20.0	0.0	0.0	0.0	99.8	15.7	0.0	0.0		
Q4	20.0	1.3	0.0	0.0	108.2	44.3	10.0	2.8		
Q5	20.0	5.6	0.0	0.0	108.9	42.5	10.0	2.8		
Q6	20.0	5.6	0.0	0.0	245.0	42.5	27.0	0.1		
Q7	10.0	5.6	0.0	0.0	366.8	64.0	35.0	0.0		
Q8	10.0	5.6	65.0	56.1	311.9	35.4	18.0	0.0		
Q9	10.0	5.6	65.0	14.1	78.8	35.4	7.0	0.0		
Q10	0.0	0.3	0.0	0.0	24.5	26.0	0.0	0.0		
Q11	0.0	0.3	0.0	0.0	21.0	26.0	0.0	0.0		
Q12	0.0	0.0	0.0	0.0	10.9	4.5	0.0	0.0		
Q13	0.0	0.0	0.0	0.0	2.8	4.5	0.0	0.0		
Q14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Q15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Q16	0.0	0.0	0.0	0.0	18.6	15.7	0.0	0.0		
Q17	0.0	0.0	0.0	0.0	54.3	15.7	0.0	0.0		
Q18	0.0	0.0	0.0	0.0	99.8	15.7	0.0	0.0		
Q19	0.0	0.0	0.0	0.0	108.2	44.3	0.0	0.0		
Q20	0.0	0.0	0.0	0.0	108.9	44.3	0.0	0.0		
Q21	0.0	0.0	0.0	0.0	245.0	42.5	0.0	0.0		
Q22	0.0	0.0	0.0	0.0	366.8	64.0	0.0	0.0		
Q23	0.0	0.0	0.0	0.0	311.9	64.0	0.0	0.0		
Q24	0.0	0.0	0.0	0.0	78.8	35.4	0.0	0.0		
Q25	0.0	0.0	0.0	0.0	24.5	35.4	0.0	0.0		
Q26	0.0	0.0	0.0	0.0	21.0	26.0	0.0	0.0		
Q27	0.0	0.0	0.0	0.0	10.9	26.0	0.0	0.0		
Q28	0.0	0.0	0.0	0.0	2.8	4.5	0.0	0.0		

Trip Generation Methodology - HGVs for Units X, Y, Electrical and Gas Connection

Assumptions and References

Average HGV figures per hour have been calculated assuming an 11 hour working day.

Power Plant Site
The HGV figures for the power plant site at Drax have been calculated based on the vehicle requirements for
1. Site mobilisation, excavation, road works and piling
2. Foundations (including centreline and HRSG)
3. Structural Steel Erection (including Turbine Hall and ACC)
4. Installation
5. Commissioning

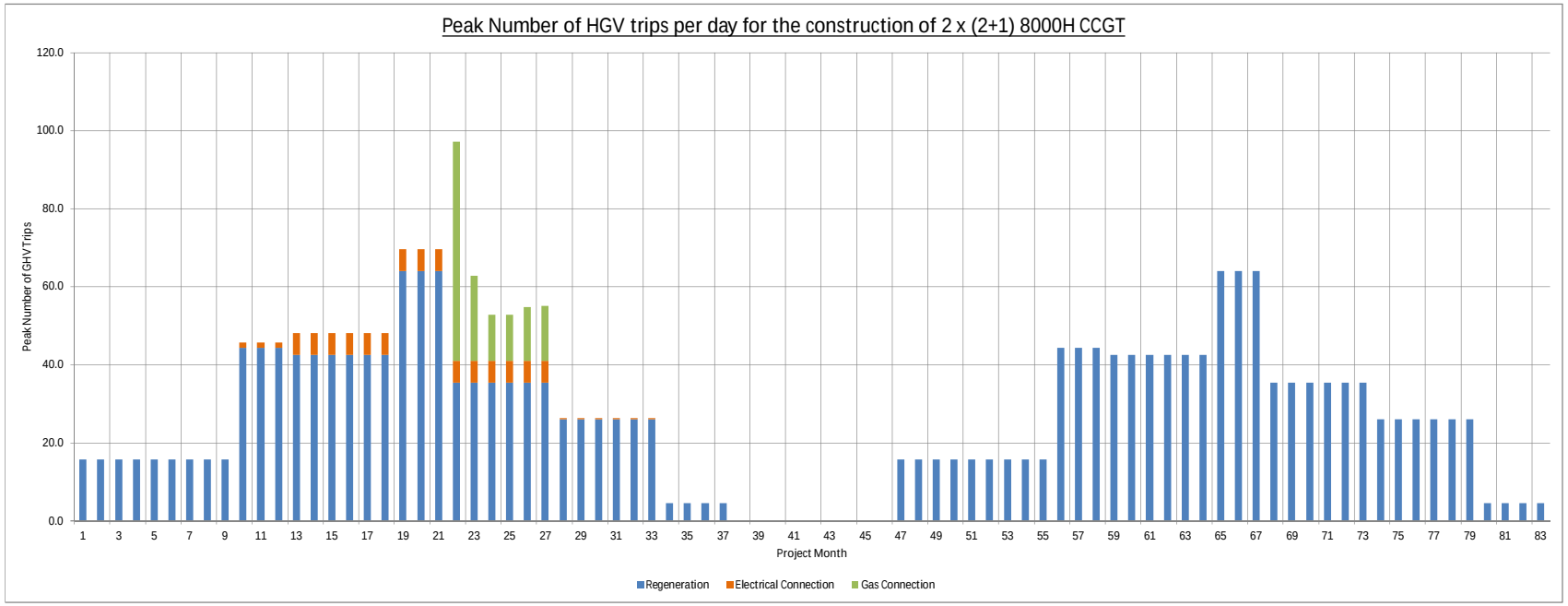
Siemens have provided a typical site mobilisation plan for the construction of a complete 2+1 8000H Combined Cycle Gas Turbine to be modified for the repowered project at Drax. The figures have been modified for the Drax project because the existing steam turbines and cooling towers will be reused therefore a less intense working programme is expected. In addition two 2+1 units will be installed sequentially at the site with a 12 month break between the two.

Eggborough power station has been used as a reference project for comparing the peak number of employees
https://infrastructure.planninginspectorate.gov.uk/projects/yorkshire-and-the-humber/eggborough-ccgt/
The figures for the expected employees on site are thought to be a reasonable compromise between the peak staff given for Eggbororugh and the numbers suggested by a linear scaling of the typical mobilisation plan provided by Siemens.

Electrical Connection
The electrical connection figures have been taken from the Millbrook open cycle F-class project because the scope of works for the electrical connection is comparable in terms of equipment required, civil works and connection works.
Electrical connection for Millbrook involves:
- a new 400kV air insulated substation;
- approx. 500m in length cabling;
- a new cable sealing compound; and
- connection into an existing OHL.

Electrical connection for new Drax Repower Project involves:
- a new 400kV gas insulated switchgear building;
- approx. 500m in length cabling;
- a new cable sealing compound; and
- connection into an existing 400kV substation.

Gas Connection



Trip Generation Breakdown - HGVs for Units X, Y, Electrical and Gas Connection

Estimated HGV vehicle movements for 2 x 2+1 H Class CCGTs

	Month	Regeration Project / day	Average Regeration Project / hour	Electrical / day	Average Electrical / hour	Gas / day	Average Gas / hour
Unit x Installation	1	15.7	1.4	0.0	0.0	0.0	0.0
	2	15.7	1.4	0.0	0.0	0.0	0.0
	3	15.7	1.4	0.0	0.0	0.0	0.0
	4	15.7	1.4	0.0	0.0	0.0	0.0
	5	15.7	1.4	0.0	0.0	0.0	0.0
	6	15.7	1.4	0.0	0.0	0.0	0.0
	7	15.7	1.4	0.0	0.0	0.0	0.0
	8	15.7	1.4	0.0	0.0	0.0	0.0
	9	15.7	1.4	0.0	0.0	0.0	0.0
	10	44.3	4.0	1.3	0.1	0.0	0.0
	11	44.3	4.0	1.3	0.1	0.0	0.0
	12	44.3	4.0	1.3	0.1	0.0	0.0
	13	42.5	3.9	5.6	0.5	0.0	0.0
	14	42.5	3.9	5.6	0.5	0.0	0.0
	15	42.5	3.9	5.6	0.5	0.0	0.0
	16	42.5	3.9	5.6	0.5	0.0	0.0
	17	42.5	3.9	5.6	0.5	0.0	0.0
	18	42.5	3.9	5.6	0.5	0.0	0.0
	19	64.0	5.8	5.6	0.5	0.0	0.0
	20	64.0	5.8	5.6	0.5	0.0	0.0
	21	64.0	5.8	5.6	0.5	0.0	0.0
	22	35.4	3.2	5.6	0.5	56.1	5.1
	23	35.4	3.2	5.6	0.5	21.7	2.0
	24	35.4	3.2	5.6	0.5	11.8	1.1
	25	35.4	3.2	5.6	0.5	11.8	1.1
	26	35.4	3.2	5.6	0.5	13.7	1.2
	27	35.4	3.2	5.6	0.5	14.1	1.3
	28	26.0	2.4	0.3	0.0	0.0	0.0
	29	26.0	2.4	0.3	0.0	0.0	0.0
	30	26.0	2.4	0.3	0.0	0.0	0.0
	31	26.0	2.4	0.3	0.0	0.0	0.0
	32	26.0	2.4	0.3	0.0	0.0	0.0
	33	26.0	2.4	0.3	0.0	0.0	0.0
	34	4.5	0.4	0.0	0.0	0.0	0.0
12 Month Gap	35	4.5	0.4	0.0	0.0	0.0	0.0
	36	4.5	0.4	0.0	0.0	0.0	0.0
	37	4.5	0.4	0.0	0.0	0.0	0.0
	38	0.0	0.0	0.0	0.0	0.0	0.0
	39	0.0	0.0	0.0	0.0	0.0	0.0
	40	0.0	0.0	0.0	0.0	0.0	0.0
	41	0.0	0.0	0.0	0.0	0.0	0.0
	42	0.0	0.0	0.0	0.0	0.0	0.0
	43	0.0	0.0	0.0	0.0	0.0	0.0
	44	0.0	0.0	0.0	0.0	0.0	0.0
	45	0.0	0.0	0.0	0.0	0.0	0.0
	46	0.0	0.0	0.0	0.0	0.0	0.0
Unit y Installation	47	15.7	1.4	0.0	0.0	0.0	0.0
	48	15.7	1.4	0.0	0.0	0.0	0.0
	49	15.7	1.4	0.0	0.0	0.0	0.0
	50	15.7	1.4	0.0	0.0	0.0	0.0
	51	15.7	1.4	0.0	0.0	0.0	0.0
	52	15.7	1.4	0.0	0.0	0.0	0.0
	53	15.7	1.4	0.0	0.0	0.0	0.0
	54	15.7	1.4	0.0	0.0	0.0	0.0
	55	15.7	1.4	0.0	0.0	0.0	0.0
	56	44.3	4.0	0.0	0.0	0.0	0.0
	57	44.3	4.0	0.0	0.0	0.0	0.0
	58	44.3	4.0	0.0	0.0	0.0	0.0
	59	42.5	3.9	0.0	0.0	0.0	0.0
	60	42.5	3.9	0.0	0.0	0.0	0.0
	61	42.5	3.9	0.0	0.0	0.0	0.0
	62	42.5	3.9	0.0	0.0	0.0	0.0
	63	42.5	3.9	0.0	0.0	0.0	0.0
	64	42.5	3.9	0.0	0.0	0.0	0.0
	65	64.0	5.8	0.0	0.0	0.0	0.0
	66	64.0	5.8	0.0	0.0	0.0	0.0
	67	64.0	5.8	0.0	0.0	0.0	0.0
	68	35.4	3.2	0.0	0.0	0.0	0.0
	69	35.4	3.2	0.0	0.0	0.0	0.0
	70	35.4	3.2	0.0	0.0	0.0	0.0
	71	35.4	3.2	0.0	0.0	0.0	0.0
	72	35.4	3.2	0.0	0.0	0.0	0.0
	73	35.4	3.2	0.0	0.0	0.0	0.0
	74	26.0	2.4	0.0	0.0	0.0	0.0
	75	26.0	2.4	0.0	0.0	0.0	0.0
	76	26.0	2.4	0.0	0.0	0.0	0.0
	77	26.0	2.4	0.0	0.0	0.0	0.0
	78	26.0	2.4	0.0	0.0	0.0	0.0
	79	26.0	2.4	0.0	0.0	0.0	0.0
	80	4.5	0.4	0.0	0.0	0.0	0.0
	81	4.5	0.4	0.0	0.0	0.0	0.0
	82	4.5	0.4	0.0	0.0	0.0	0.0
	83	4.5	0.4	0.0	0.0	0.0	0.0

Trip Generation Methodology - Cars for Units X, Y, Electrical and Gas Connection

Assumptions and References - Car Trips

Number of employees per vehicle.

Power Plant Site
Siemens have provided a typical site mobilisation plan for the construction of a complete 2+1 8000H Combined Cycle Gas Turbine to be modified for the repowered project at Drax. The figures have been modified for the Drax project because the existing steam turbines and cooling towers will be reused therefore a less intense working programme is expected. In addition two 2+1 units will be installed sequentially at the site with a 12 month break between the two.

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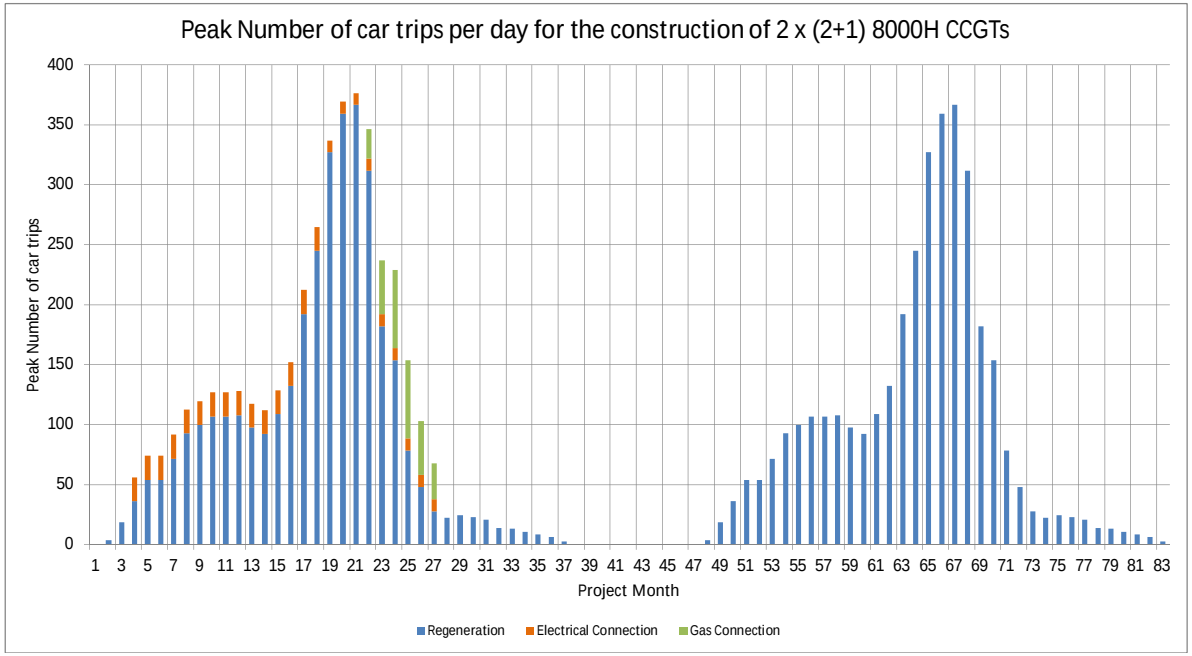
The figures for the expected employees on site are thought to be a reasonable compromise between the peak staff given for Eggbororugh and the numbers suggested by a linear scaling of the typical mobilisation plan provided by Siemens.

Electrical Connection
The electrical connection figures have been taken from the Millbrook open cycle F-class project because the scope of works for the electrical connection is comparable in terms of man power.
Electrical connection for Millbrook involves:
- a new 400kV air insulated substation;
- approximately 500m in length cabling;
- a new cable sealing compound; and
- connection into an existing OHL.

Electrical connection for new Drax Repower Project involves:
- a new 400kV gas insulated switchgear building;
- approx. 500m in length cabling;
- a new cable sealing compound; and
- connection into an existing 400kV substation.

Gas Connection
The gas connection figures have been developed using in house expertise on gas pipeline construction and been calculated based on required number of people to construct a 3.2km pipeline with a Minimum Offtake Connection from the National Grid Feeder and a Gas Receiving Facility on the site.



Car Trips Generated - for Units X, Y, Electrical and Gas Connection

Estimated peak car trips for 2 x 2+1 H class combined cycle power stations

	Month	Regeneration Project Worker Profile	Regeneration Car Trips	Electrical Connection Worker Profile	Electrical Connection Number of Cars	Gas Connection Worker Profile	Gas Connection Number of Cars
Unit x Installation	1	0.7	0.4	0.0	0.0	0.0	0.0
	2	7.7	3.9	0.0	0.0	0.0	0.0
	3	37.1	18.6	0.0	0.0	0.0	0.0
	4	72.8	36.4	40.0	20.0	0.0	0.0
	5	108.5	54.3	40.0	20.0	0.0	0.0
	6	108.5	54.3	40.0	20.0	0.0	0.0
	7	143.5	71.8	40.0	20.0	0.0	0.0
	8	185.5	92.8	40.0	20.0	0.0	0.0
	9	199.5	99.8	40.0	20.0	0.0	0.0
	10	214.2	107.1	40.0	20.0	0.0	0.0
	11	214.2	107.1	40.0	20.0	0.0	0.0
	12	216.3	108.2	40.0	20.0	0.0	0.0
	13	195.3	97.7	40.0	20.0	0.0	0.0
	14	184.8	92.4	40.0	20.0	0.0	0.0
	15	217.7	108.9	40.0	20.0	0.0	0.0
	16	264.6	132.3	40.0	20.0	0.0	0.0
	17	385.0	192.5	40.0	20.0	0.0	0.0
	18	490.0	245.0	40.0	20.0	0.0	0.0
	19	654.5	327.3	20.0	10.0	0.0	0.0
	20	718.9	359.5	20.0	10.0	0.0	0.0
	21	733.6	366.8	20.0	10.0	0.0	0.0
	22	623.7	311.9	20.0	10.0	50.0	25.0
	23	364.7	182.4	20.0	10.0	90.0	45.0
	24	308.0	154.0	20.0	10.0	130.0	65.0
	25	157.5	78.8	20.0	10.0	130.0	65.0
	26	96.6	48.3	20.0	10.0	90.0	45.0
	27	56.0	28.0	20.0	10.0	60.0	30.0
	28	45.5	22.8	0.0	0.0	0.0	0.0
	29	49.0	24.5	0.0	0.0	0.0	0.0
	30	46.2	23.1	0.0	0.0	0.0	0.0
	31	42.0	21.0	0.0	0.0	0.0	0.0
	32	28.0	14.0	0.0	0.0	0.0	0.0
	33	26.6	13.3	0.0	0.0	0.0	0.0
	34	21.7	10.9	0.0	0.0	0.0	0.0
12 Month Gap	35	17.5	8.8	0.0	0.0	0.0	0.0
	36	13.3	6.7	0.0	0.0	0.0	0.0
	37	5.6	2.8	0.0	0.0	0.0	0.0
	38	0.0	0.0	0.0	0.0	0.0	0.0
	39	0.0	0.0	0.0	0.0	0.0	0.0
	40	0.0	0.0	0.0	0.0	0.0	0.0
	41	0.0	0.0	0.0	0.0	0.0	0.0
	42	0.0	0.0	0.0	0.0	0.0	0.0
	43	0.0	0.0	0.0	0.0	0.0	0.0
	44	0.0	0.0	0.0	0.0	0.0	0.0
	45	0.0	0.0	0.0	0.0	0.0	0.0
	46	0.0	0.0	0.0	0.0	0.0	0.0
Unit y Installation	47	0.7	0.4	0.0	0.0	0.0	0.0
	48	7.7	3.9	0.0	0.0	0.0	0.0
	49	37.1	18.6	0.0	0.0	0.0	0.0
	50	72.8	36.4	0.0	0.0	0.0	0.0
	51	108.5	54.3	0.0	0.0	0.0	0.0
	52	108.5	54.3	0.0	0.0	0.0	0.0
	53	143.5	71.8	0.0	0.0	0.0	0.0
	54	185.5	92.8	0.0	0.0	0.0	0.0
	55	199.5	99.8	0.0	0.0	0.0	0.0
	56	214.2	107.1	0.0	0.0	0.0	0.0
	57	214.2	107.1	0.0	0.0	0.0	0.0
	58	216.3	108.2	0.0	0.0	0.0	0.0
	59	195.3	97.7	0.0	0.0	0.0	0.0
	60	184.8	92.4	0.0	0.0	0.0	0.0
	61	217.7	108.9	0.0	0.0	0.0	0.0
	62	264.6	132.3	0.0	0.0	0.0	0.0
	63	385.0	192.5	0.0	0.0	0.0	0.0
	64	490.0	245.0	0.0	0.0	0.0	0.0
	65	654.5	327.3	0.0	0.0	0.0	0.0
	66	718.9	359.5	0.0	0.0	0.0	0.0
	67	733.6	366.8	0.0	0.0	0.0	0.0
	68	623.7	311.9	0.0	0.0	0.0	0.0
	69	364.7	182.4	0.0	0.0	0.0	0.0
	70	308.0	154.0	0.0	0.0	0.0	0.0
	71	157.5	78.8	0.0	0.0	0.0	0.0
	72	96.6	48.3	0.0	0.0	0.0	0.0
	73	56.0	28.0	0.0	0.0	0.0	0.0
	74	45.5	22.8	0.0	0.0	0.0	0.0
	75	49.0	24.5	0.0	0.0	0.0	0.0
	76	46.2	23.1	0.0	0.0	0.0	0.0
	77	42.0	21.0	0.0	0.0	0.0	0.0
	78	28.0	14.0	0.0	0.0	0.0	0.0
	79	26.6	13.3	0.0	0.0	0.0	0.0
	80	21.7	10.9	0.0	0.0	0.0	0.0
	81	17.5	8.8	0.0	0.0	0.0	0.0
	82	13.3	6.7	0.0	0.0	0.0	0.0
	83	5.6	2.8	0.0	0.0	0.0	0.0