

Surat Basin GHG Emissions Footprint

Multi-Regional Input Output Analysis

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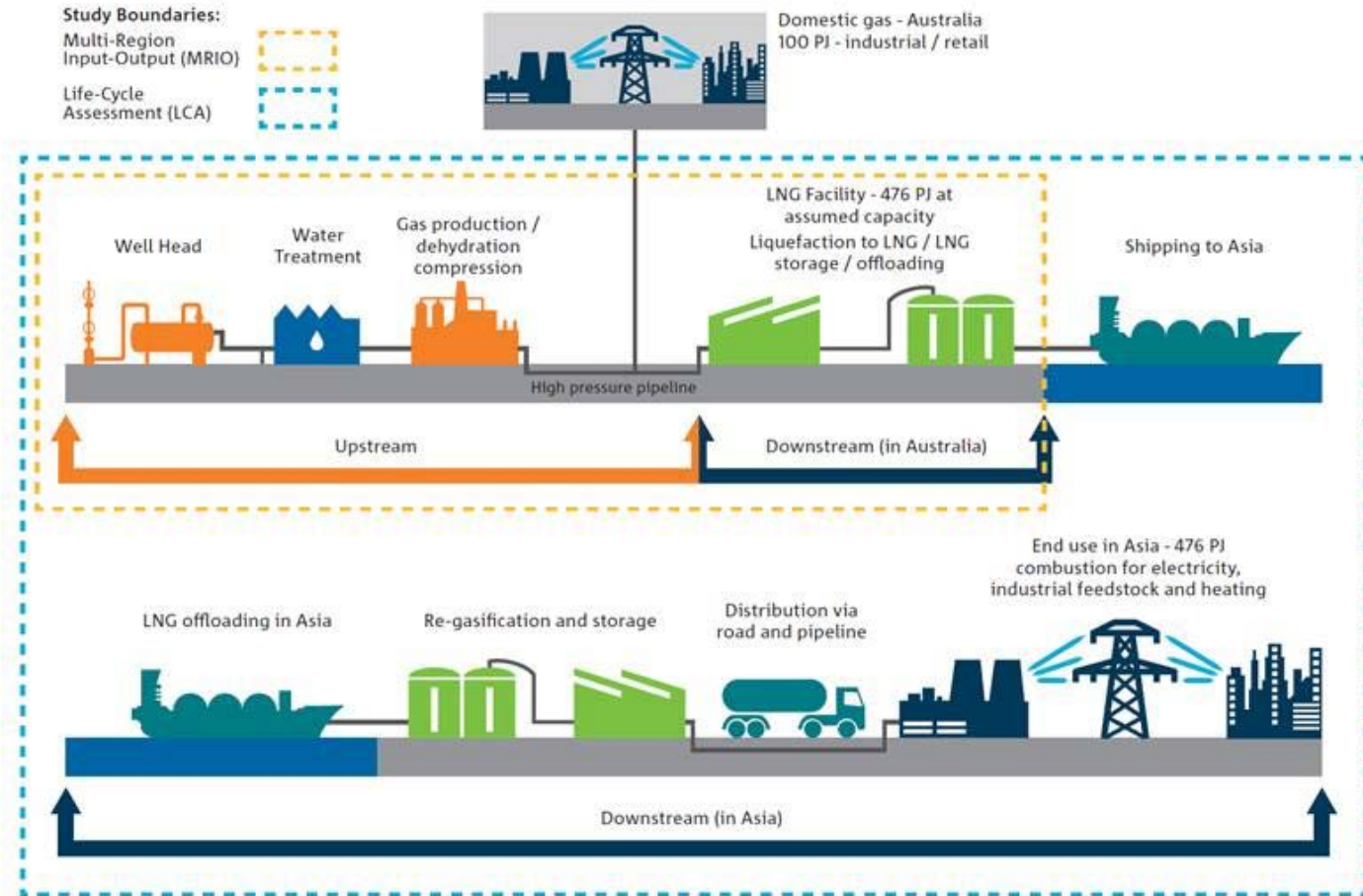
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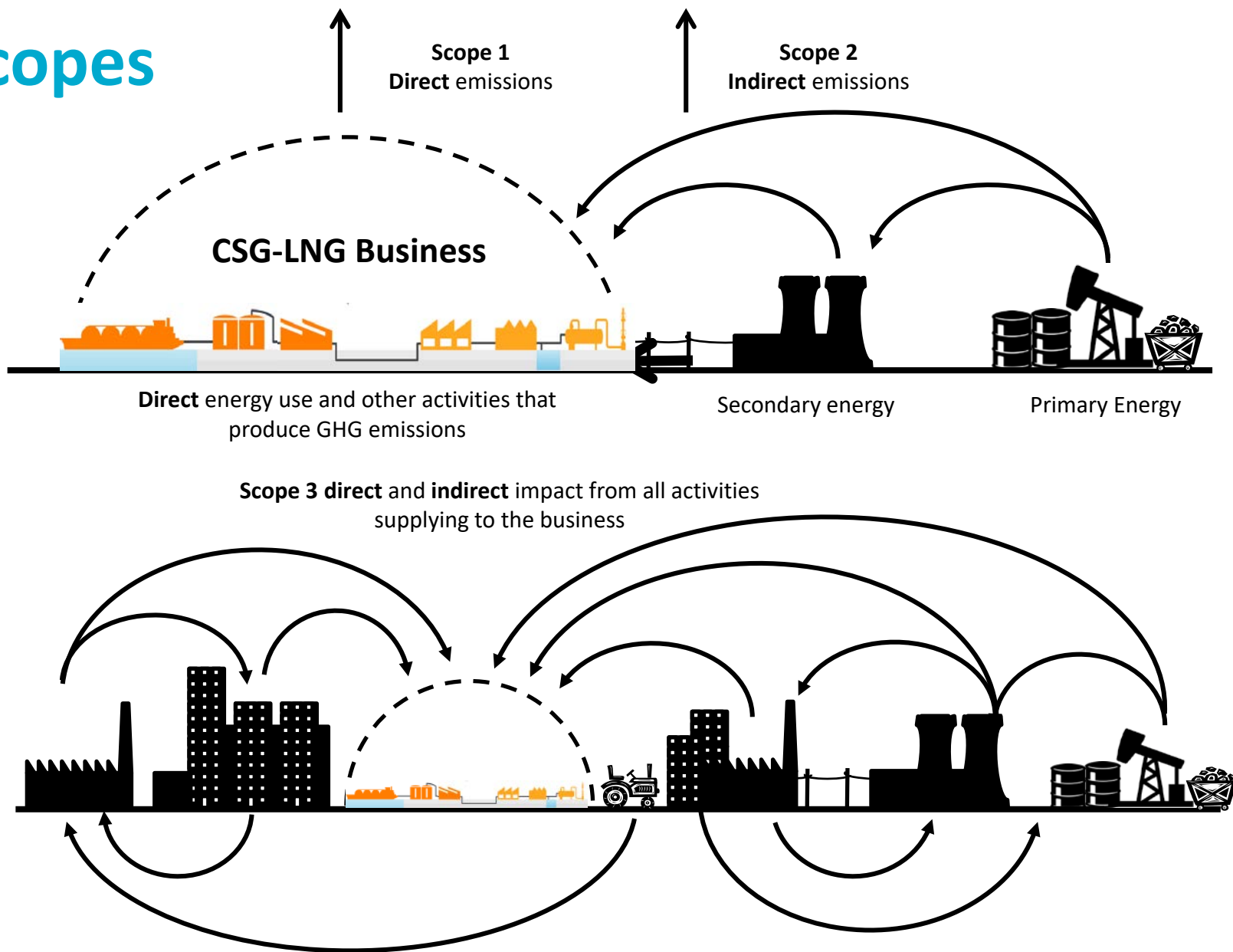
Purpose

- A GHG footprint of the whole CSG-LNG business in Surat
- A breakdown of emissions by Scope 1, 2, 3 including complete representation of supply chains to the CSG-LNG business
- Outer scope and direction to more detailed LCA
- Perspective on the relative importance of fugitive emissions

Scope: Study Boundary



Scopes



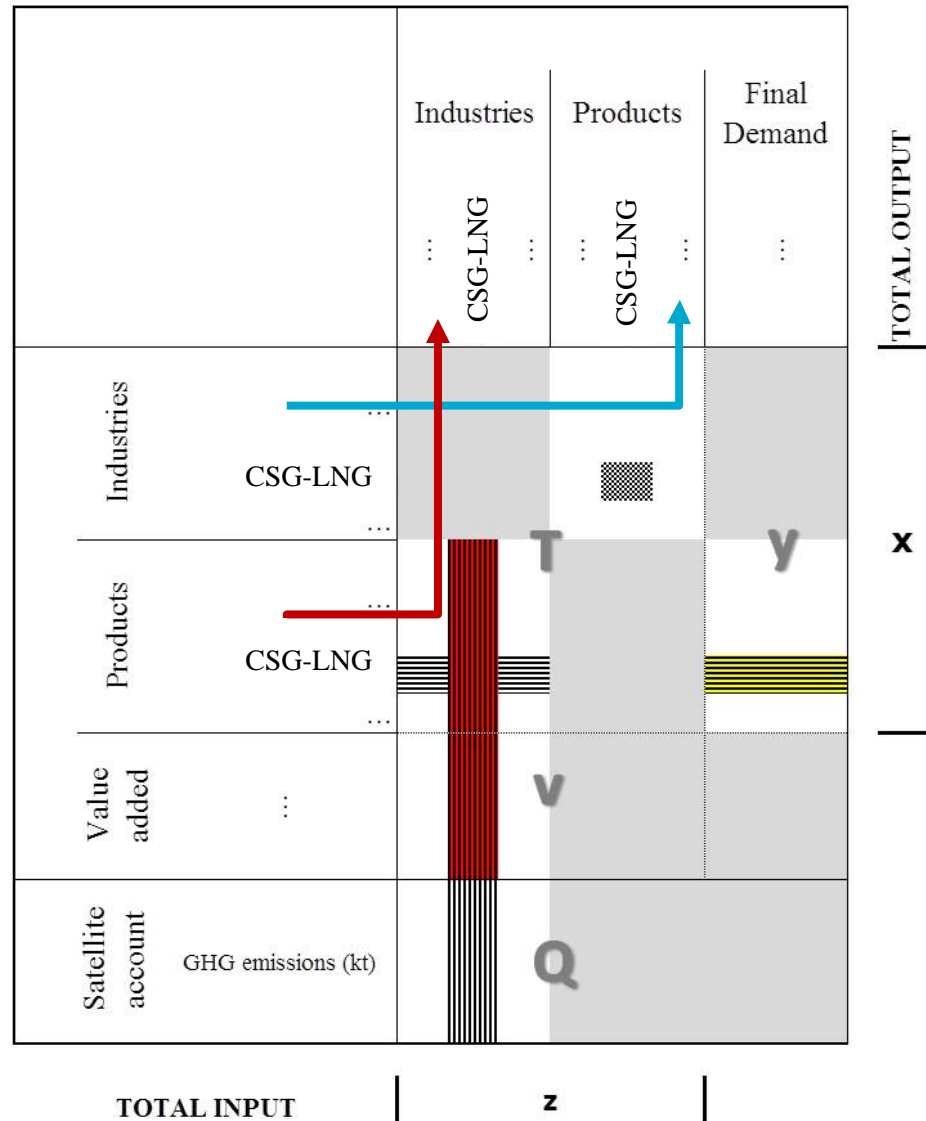
Approach: input output analysis

IELab

Based on ABS data for over 1000 products and Emissions data from National GHG Accounts and NGRS

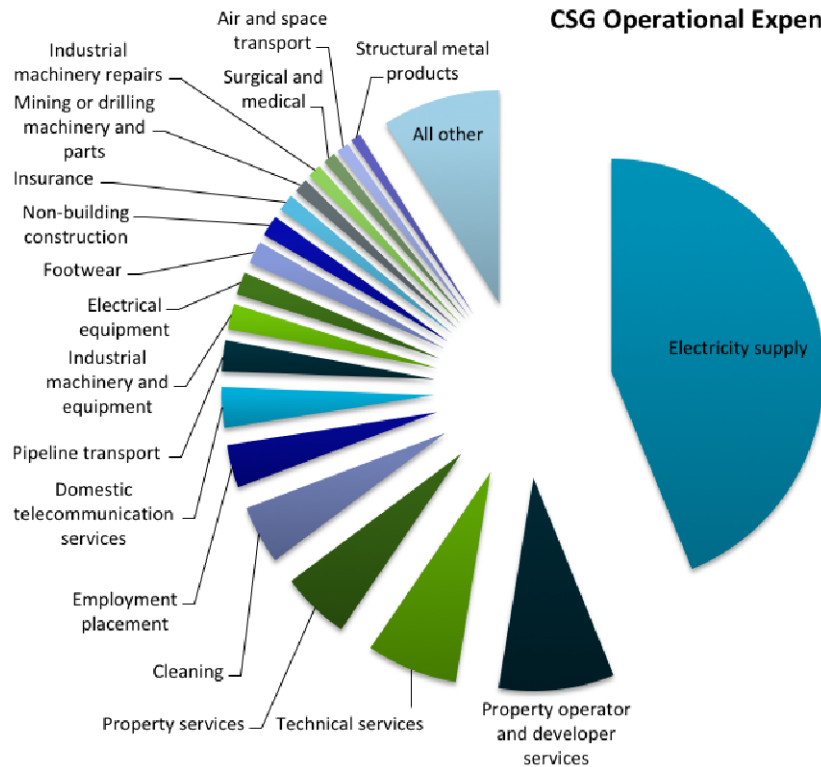


<https://ielab.info/>

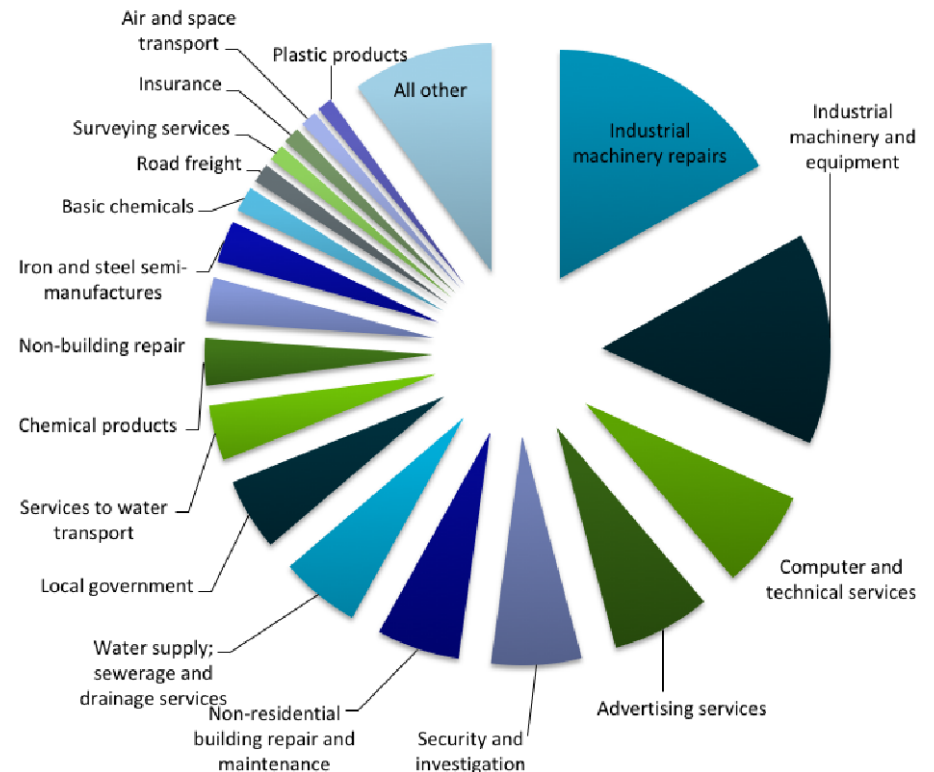


Inputs – expenditure records

CSG Operational Expenses



LNG Operational Expenses



Inputs and Assumptions



Direct access to company records

Site visit to Condabri

Access to technical data

NGERS reporting

Quarterly production reports

Annual Reports



Assumptions

Scenario of long-term average sales volume production based on known contracts. Natural gas flows are all CSG.

Destination of flows of sales production	Estimated Intensities for future operations (\$/PJ)
	55PJ/year
LNG Exports to Japan	(1000kton/year)
	421PJ/year
LNG Exports to China	(7600kton/year)
Natural Gas Consumption and Electricity Generation (Australia)	100PJ/year
Total energy value of average annual production	576PJ/year

Assumptions

Scope 1 GHG emissions intensities per PJ of LNG, and totals from the CSG and LNG operations at 2015/16 and for future scenario production levels .

	CSG	LNG	TOTAL
Estimated Direct GHG intensity (KtonCO _{2-e} /PJ)	1.499 ^c	3.956 ^b	4.77 (scenario)
Reported or Estimated total for 2015/16 (KtonCO _{2-e})	581.6 ^a (388PJ CSG)	454.7 ^d (98PJ LNG)	1036.3
Estimated total for Future Production Scenario (KtonCO _{2-e} /year)	863.4^e (576PJ CSG)	1883.1^e (476PJ LNG)	2746.5

Sources: a) reported in NGER data; b) for normal and occasional outage periods, not including commissioning and ramp up – emissions included in the total: CO_{2-e}, natural gas, diesel, oils, greases, refrigerants (propane and ethylene), fugitive emissions (venting and flaring), fugitive emissions (other than venting and flaring), SF₆, from commercial in confidence information; c) derived from a) and sales volumes of 388PJ of CSG; d) derived from b) and sales volumes of 98PJ LNG consistent with revenue data for 2015/16; e) based on the scenario of production .

Outputs

Direct and total impacts of production activities by APLNG, as an intensity (ktonsCO₂-e /PJ) and total (ktonsCO₂-e /year) for the future scenario of production (rounding affects some totals)

Scope	Emissions Intensity (Kt CO ₂ e/PJ)	Total Emissions CO ₂ e (Kt CO ₂ e/year)
Scope 1	4.77	2746
Scope 2*	2.58	1486
Scope 3**	0.28	149
Total	7.63	4394

* emissions from purchase of grid electricity in Queensland

** does not include shipping, re-gasification and final combustion of CSG or LNG

Meaning of Outputs

- Actually the additional Scope 3 emissions are small
- About two thirds of total emissions are on-site
- Most of the rest of emissions are from use of grid electricity in the gas fields and...
- Use of gas in turbines at the LNG facility
- From what we know about fugitive methane, they contribute ~ **3% of emissions during production**

Conclusions

- Most comprehensive Scope 3 GHG footprint assessment of CSG-LNG business in Surat Basin
- Results based on detailed data and access to on-the-ground information from the companies involved
- Total GHG Footprint for CSG-LNG production process is:
7.63 Kt CO₂e/PJ
- Most emissions arise on-site or through electricity use

Thank you

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