

Strategic Environmental Assessment

for the Boegoebaai Port, Special economic Zone and Namakwa Region



Context & Objectives of the SEA

Dr Greg Schreiner
CSIR

27 November 2025
Microsoft Teams, 09:00 – 12:30



CSIR role in the Strategic Environmental Assessment (SEA)

- CSIR asked to lead this SEA based on 30-year track record
- Designers, facilitators & integrators of the SEA
- CSIR has no financial/ideological interest in the development
- Mandate in the interest of South Africa stakeholders
- This is **NOT** a public relations or rubber stamp exercise!
- Credible, transparent and objective assessment process

SEA vs EIA

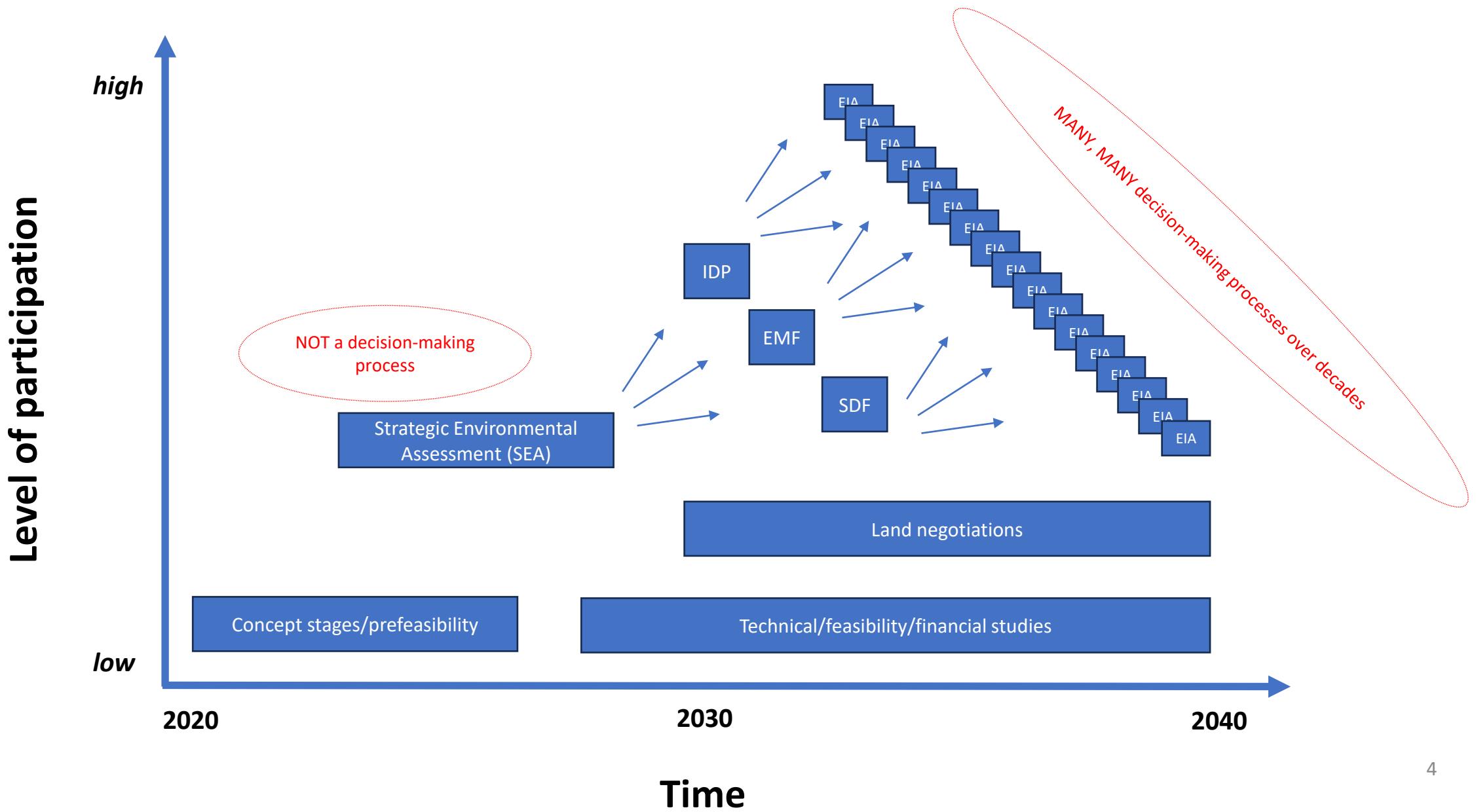
SEA is NOT a decision-making process

SEA: Unregulated knowledge-policy tool to guide sustainability planning at local, regional, national or international scale. Designed by the users.

EIA: Regulated knowledge-policy tool to guide specific (project scale) decision-making mandate, giving 'yes-no' answer, and if yes, under what conditions. Designed by regulators.

	EIA	SEA
Who pays?	Private sector	Usually donors & govt
Spatial scale	Project scale	Local, regional, national, inter
Time horizon	Short-medium (1-5 years)	Medium to long (scenarios)
Legislated	Yes, highly	No
Decision-level	Project (yes/no mandate)	Programme (guidance)
Cumulative impacts	No	Yes
Methods	Rote	Innovative, case specific
Participation	Standard PPP, town hall meetings	Coproduction, integrated governance

Where does this SEA fit in decision-making/planning?

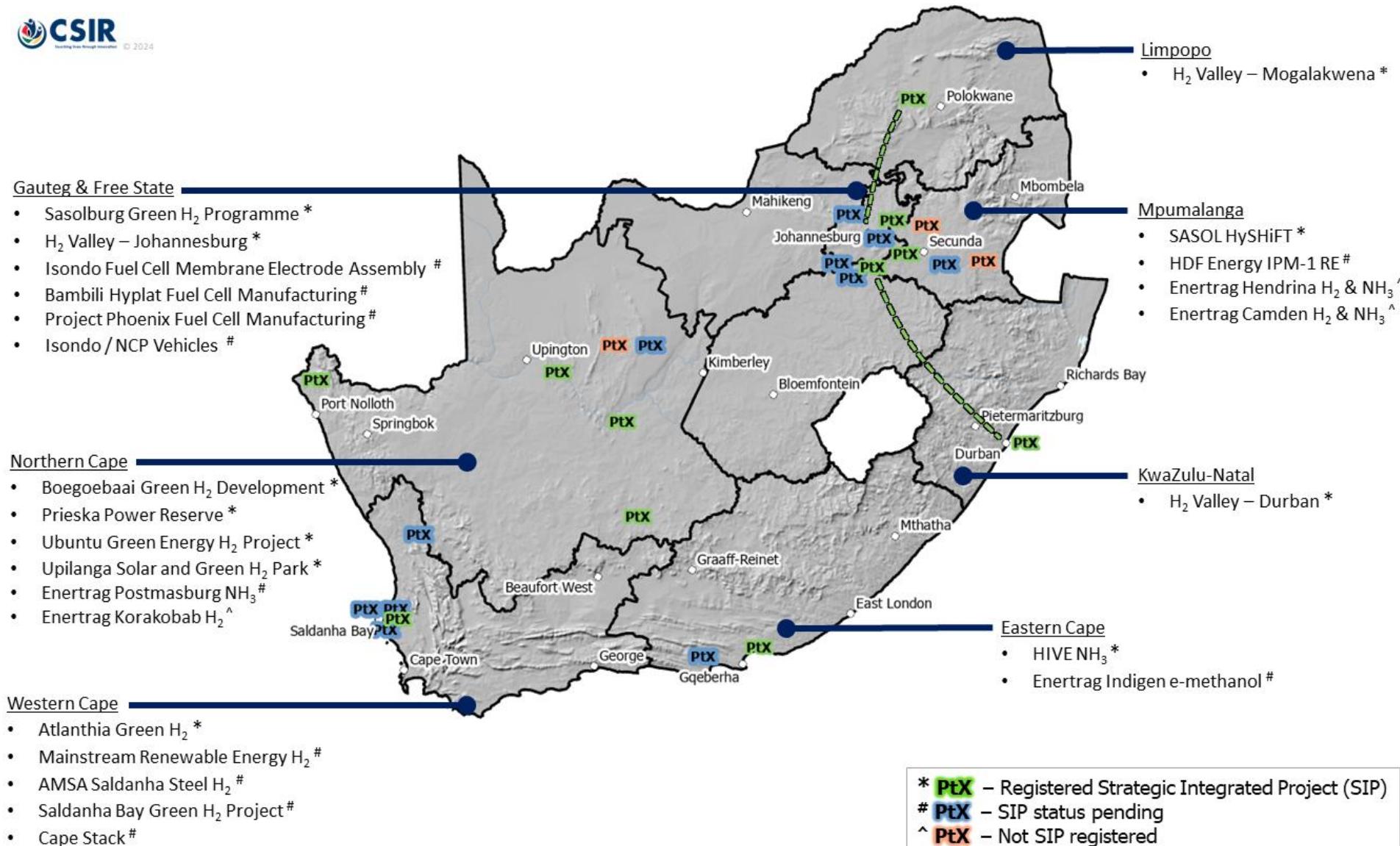


Need for the SEA

1. Political backing for development, consisting of:
 - i. A new breakwater port at Boegoebaai, dry and liquid bulk berths, and multi-purpose terminals
 - ii. A mixed-use Special Economic Zone (SEZ) located in the region adjacent to the proposed Boegoebaai port.
 - iii. An expansive regional renewable energy (wind and solar PV) generation and transmission infrastructure.
2. Substantial opportunity to decarbonize and diversify the South African energy economy, displace coal, generate new revenue, create jobs and skills
3. These are elegant, 'green', modern technologies but with large infrastructure footprints, occurring in a sparsely populated, but ecologically sensitive region.
4. Need for integrated, strategic planning and decision-making, conscious of cumulative impacts – guide future planning (not doing away with any decision-making process!)



Need for integrated, strategic planning and decision-making



SEA mission and objectives

Mission: To develop an integrated decision-making framework to guide the planning of the proposed Boegoebaai port, Special Economic Zone, and wider Namakwa region in a sustainable manner.



Objectives:

1. Assess the social and ecological sensitivity of local and regional receiving environments.
2. Classify spatial regions, based on multiple criteria, as being more, or less, suitable for future development.
3. Identify strategic-level constraints, opportunities, cumulative impacts, and management actions (mitigation/enhancement).
4. Provide an integrated decision-making framework and suite of tools, to guide project developers, practitioners, and policymakers.



NOT a decision-making process

One SEA process, 2 x Work Packages

Work Package 1: A local-scale, spatially focused SEA report identifying sensitivities around the proposed port and SEZ development covering ~33 500 ha (“Boegoebaai Port and SEZ SEA”). Site visits, data verification, higher resolution, higher confidence.

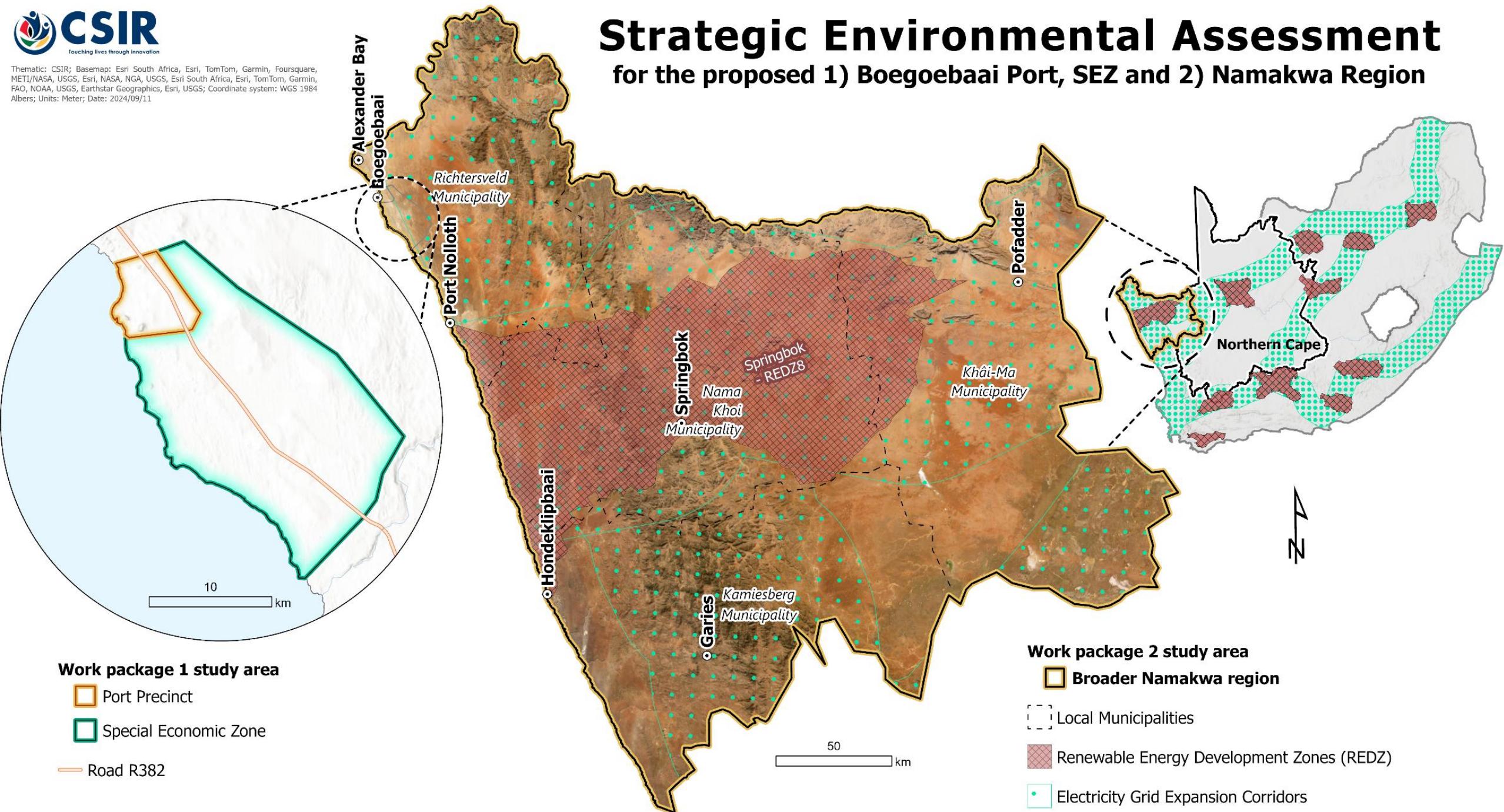
Focus = Sensitivity of the local receiving environment, informing Port & SEZ layouts

Work Package 2: A regional-scale, desktop SEA report covering the main sustainability issues associated with an expansive Northern Cape green hydrogen economy (“Namakwa Region SEA”). Extent defined by Municipal boundaries and covers an area of ~5.8 million ha. Desktop, scenarios-based, more strategic, lower resolution.

Focus = Cumulative opportunities and risks across the broader Namakwa region

Strategic Environmental Assessment

for the proposed 1) Boegoebaai Port, SEZ and 2) Namakwa Region



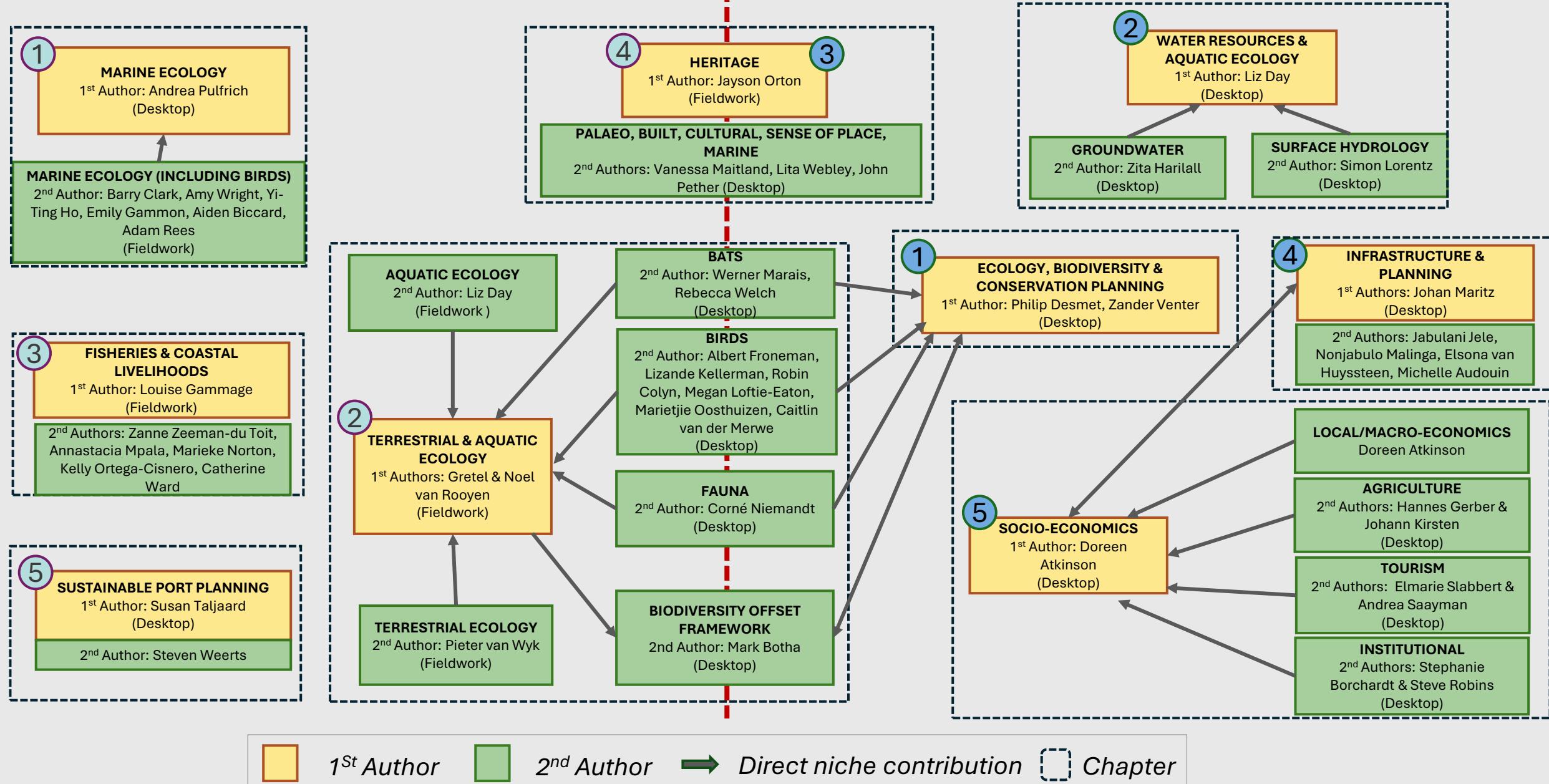
Specialist research teams

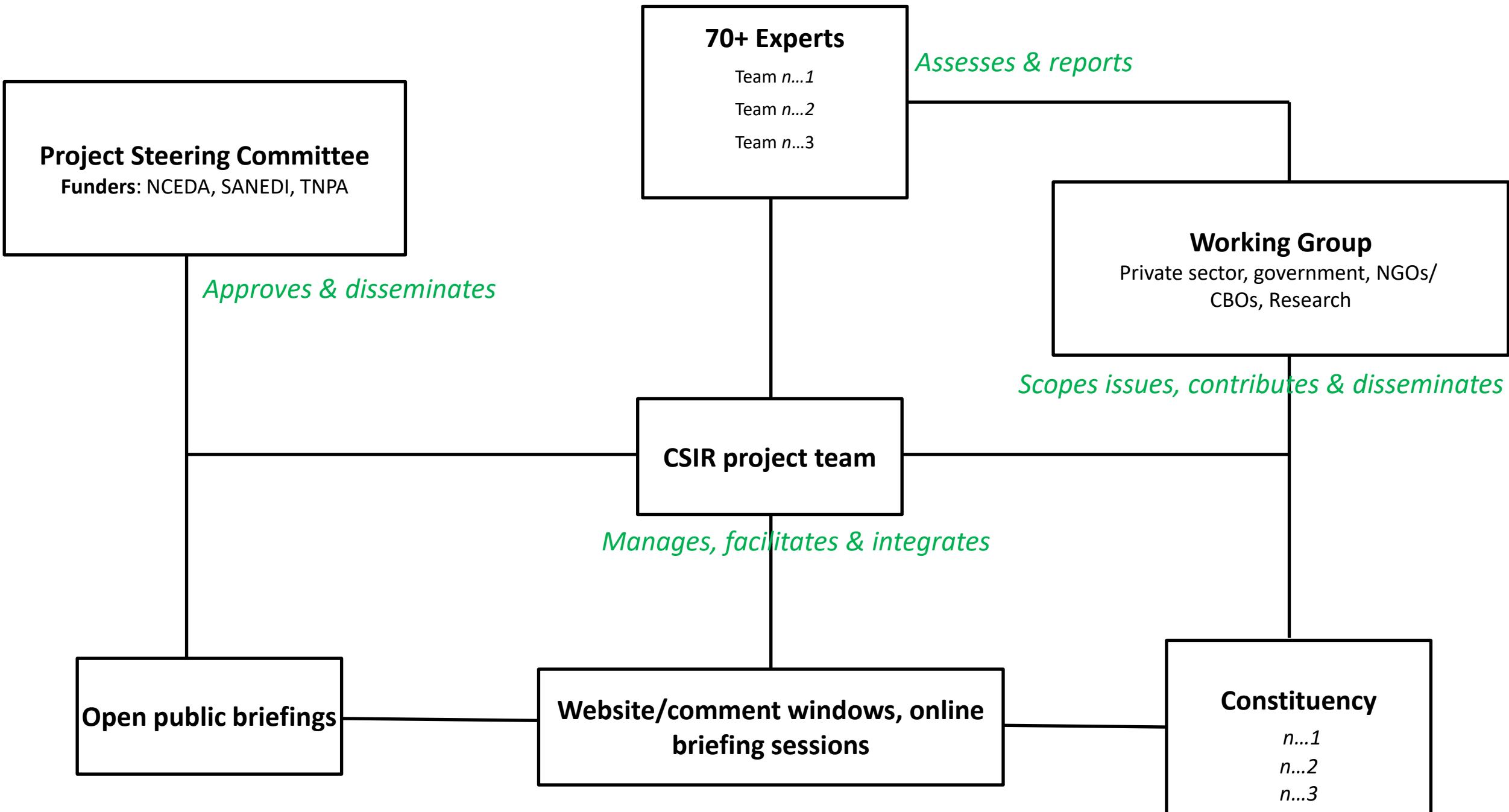
Chapter	Lead author	Contributing authors	Nominated peer reviewers (tbd)
Marine ecology & biodiversity (including coastal birds)	Andrea Pulfrich	Barry Clark, Yi-Ting Ho, Emily Gammon, Aiden Biccard, Adam Rees, Amy Wright	Prof George Branch & Dr Nina Steffani
Sustainable (green) port planning study	Susan Taljaard	Steven Weerts	Paul Lochner & Cebile Nzuza
Fisheries & coastal livelihoods			Dr Nina Rivers
Terrestrial ecology (including fa			Prof Norbert Juergens
Biodiversity offset framework			Conrad Geldenhuys & Nick Helme
Heritage			Susie Brownlie
Water / aquatic ecology (includ			David Halkett
			Dr Kevin Pietersen, Gary de Winnaar & Catherine Meyer
Socio-economics (including local/macro-economics, agriculture, tourism & institutional capacity)	Doreen Atkinson	Elmarie Slabbert, Andrea Saayman, Hannes Gerber, Johann Kirsten, Steve Robins, Stephanie Borchardt	Prof Lucius Botes, Prof Lochner Marais, Dr Igshaan Samuels
Regional infrastructure & planning	Johan Maritz	Jabulani Jele, Nonjabulo Malinga, Elsona van Huyssteen, Michelle Audouin	Dr Antony Cooper & Prof Mark Oranje

70+ expert appointed to produce
SEA content and findings

Work Package 1 – Local Port & SEZ

Work Package 2 – Regional





END

Survey of South African EAPs working in GH2 sector (Aug 2023)

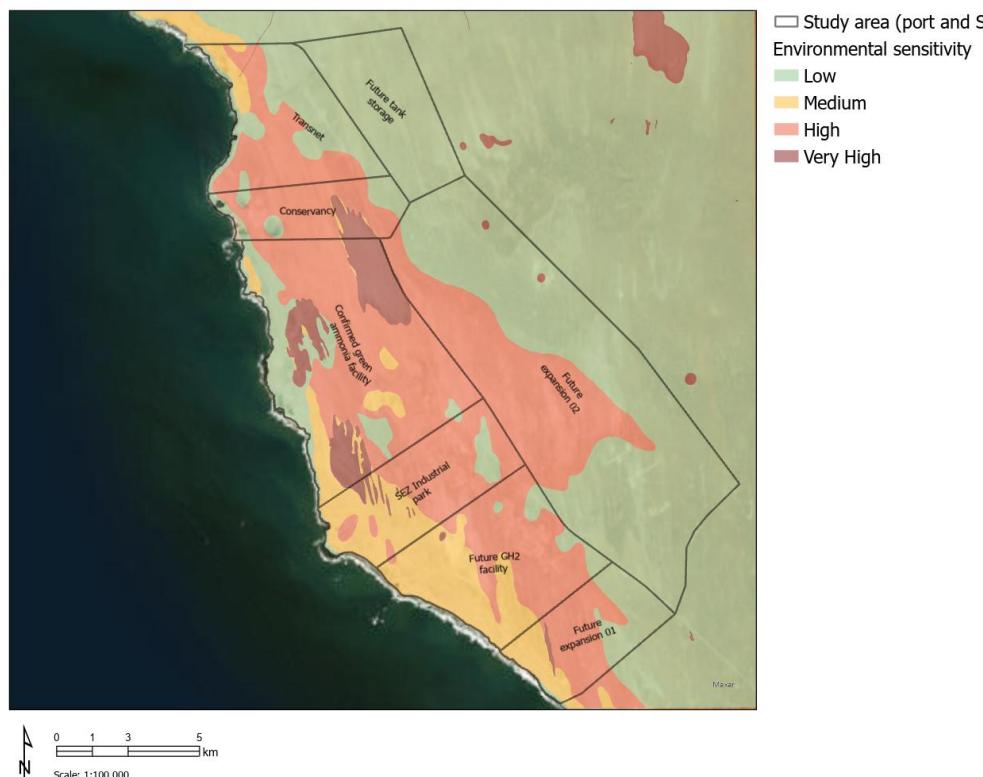
Impact	Rank	Mean (SD)	Median
<p>Opportunities: GHG reduction, new jobs, skills, new revenues & supply chains, energy sector modernization, coal displacement</p>			

Concerns: Biodiversity loss on land and at sea, land-use conflicts e.g., tourism, agriculture, conservation, burdens on small towns

Work Package 1: Port & SEZ

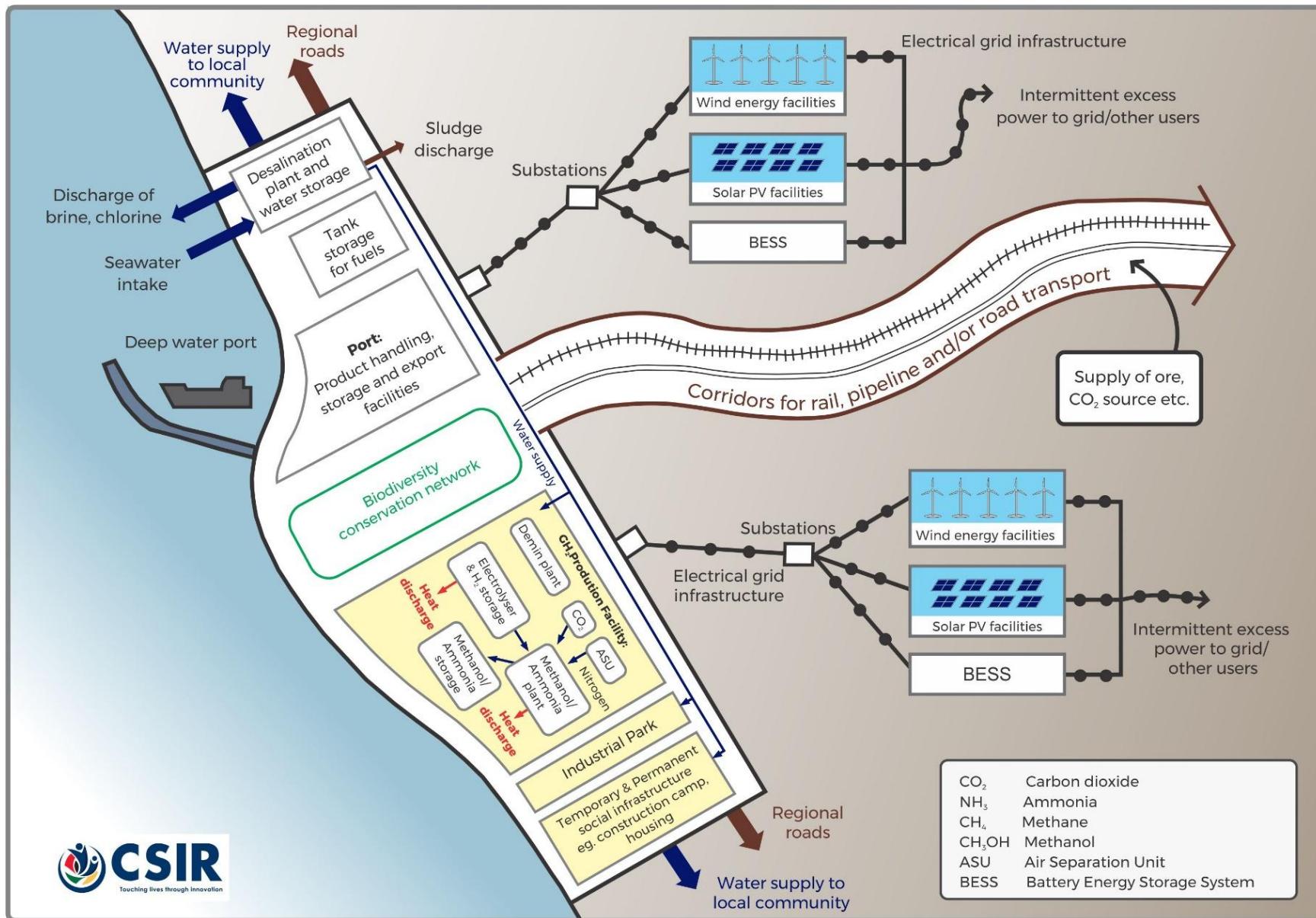
SEA reporting outputs

1. Executive Summary – 2 pages with headline findings/iconic images/recommendations
2. Description of the receiving environment:
 - Social/ecological dynamics and change trends (baseline)
3. Sensitivity mapping (spatial classification e.g., tiered sensitivity map)
4. Aspects and Impacts register
 - Describe potential impacts associated with identified infrastructure/activity or SEZ subzone, citing main affected environment.
5. Recommended Strategic Management Actions:
 - i. To enhance positive impact & reduce negative impacts
 - ii. To guide future Port/SEZ planning and layouts
 - iii. To guide future site & project specific EIAs within study area



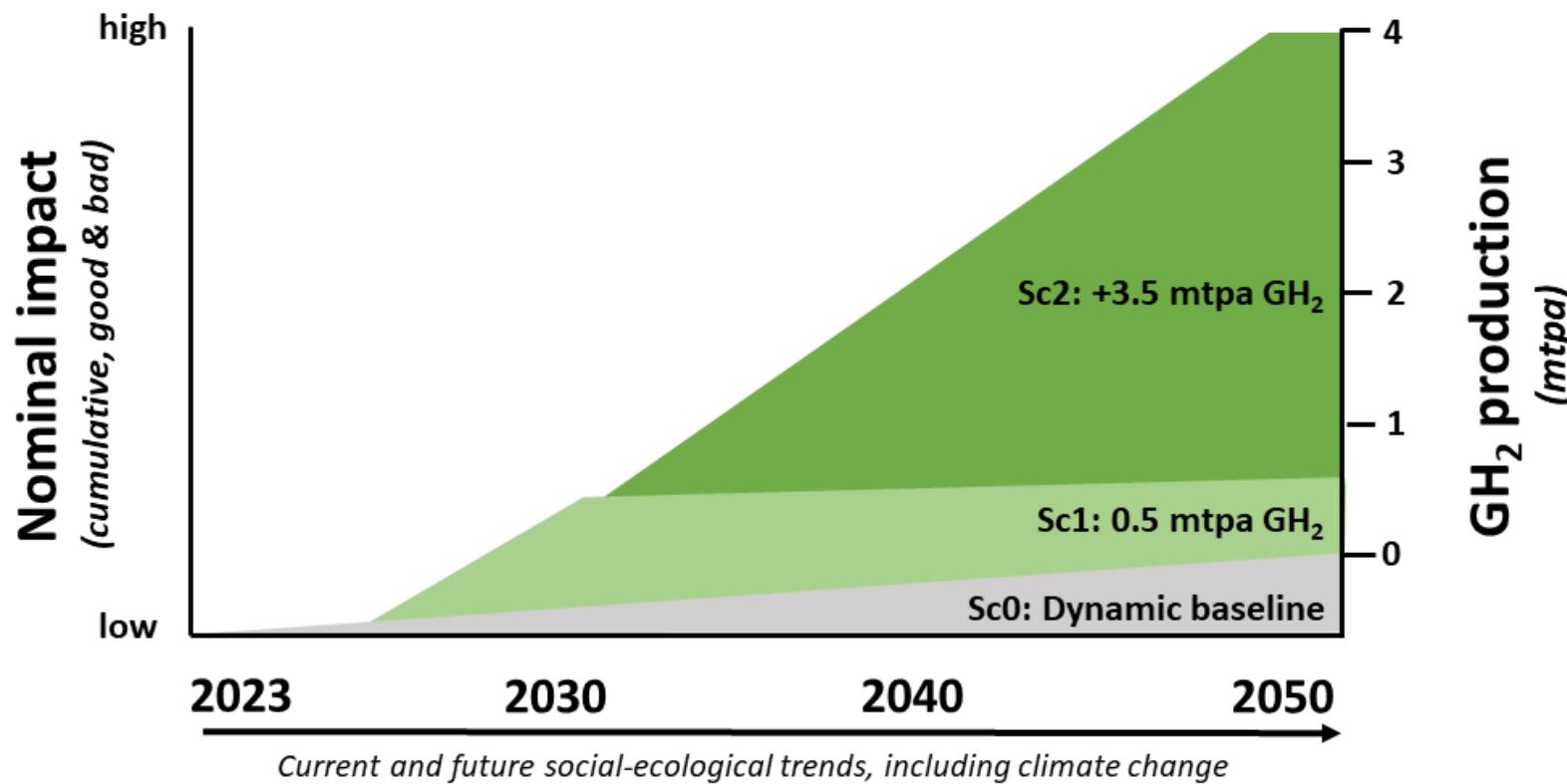
Port infrastructure aspect / SEZ subzone	Potential impact	Receiving environment of concern (spatially explicit)
Desalination plant located within the green ammonia facility subzone	Brine discharge from desalination plant causing increased salinity and loss of species	50m radius from diffuser points located along marine outfall
Expansion of development into Future expansion area 01	Vegetation clearance causing loss of biodiversity and species	Areas mapped Very high sensitivity for intact Richtersveld Coastal Duneveld habitat, as in Error! Reference source not found. (example)

Work Package 2: Regional



Work Package 2: Scenarios/risk-based approach

Year	Electrolyser	RE capacity	Key components footprint	GH ₂ product
2030	5 GW	10 GW	~21 000 ha	0.5 mtpa
2050	40 GW	80 GW	~142 000 ha	4 mpta



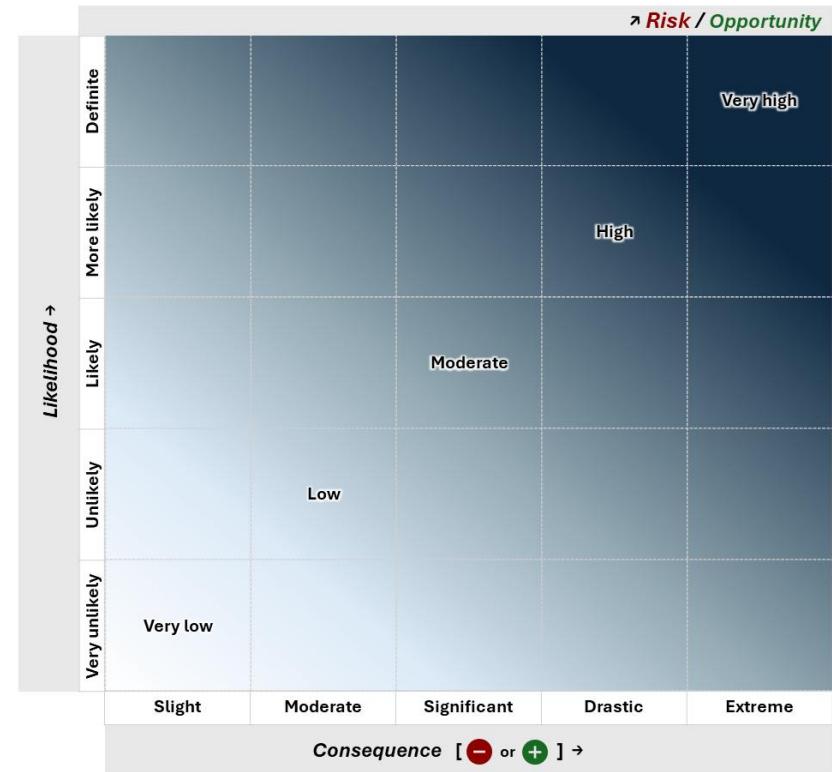
Scenario quantifications

Aspect	Unit	Sc1: Small GH ₂	Sc2: Big GH ₂	Assumptions
SEZ	Electrolyser capacity	GW	5	40
	Electrolyser footprint	ha	75	600
	GH ₂ volume	mtpa	0,5	4,0
	GH ₂ storage footprint	ha	250	2 000
	Ammonia volume	mtpa	2,8	22,7
	Ammonia footprint	ha	57	454
	Ammonia storage footprint	ha	28	227
	Desalination output volume	ML/day	36	286
	Desalination footprint	ha	7	57
	Desalination discharge	ML/day	48	387
REGION	Pipeline intake volume	ML/day	84	672
	RE capacity total	GW	10	80
	RE capacity - solar	GW	6	48
	RE footprint - solar	ha	12 000	96 000
	RE extent - solar		12 000	96 000
	RE facilities - solar	no of facilities	6	48
	RE capacity - wind	GW	4	32
	RE footprint - wind	ha	4 000	32 000
	RE extent - wind	ha	40 000	320 000
	RE facilities - wind	no of facilities	3	21
	Road length	km	300	600
	Road footprint	ha	1 200	2 400
	Rail length	km	550	550
	Rail footprint	ha	1 600	1 650
Pipeline length				
Sc1: NAM<BB>SB (300km); Sc2: BB>Prieska (300km)				
Pipeline footprint				
20 m servitude				
Powerline length				
Assume grid strengthening / shared infrastructure 30 km TX associated with each RE cluster.				
Powerline footprint				
50 m servitude (TRH 27 South African Manual for Permitting Services in Road Reserves)				
Main infrastructure components footprint		ha	21 082	142 240
Units: GW = gigawatt; mtpa = million tonne per annum; ha = hectare; ML/day = million litres per day; km = kilometre				

Work Package 2: Risk/opportunity assessment

SEA reporting outputs

1. Executive Summary – 2 pages with headline findings/rec
2. Spatial classification of receiving environment across study area
3. Description of likely baseline receiving environment up to 2050
4. Description of potential impacts
5. Define/calibrate consequence terms
6. Describe best practices mitigation/enhancement
7. Assess the risk or opportunity of impacts
8. Recommended management actions



Positive impact	Scenario	Spatial receiving environment / receptor	Without management			With management		
			Consequence (+)	Likelihood	Opportunity	Consequence (+)	Likelihood	Opportunity
Job and skills creation	S0: BASELINE	Port and SEZ	SLIGHT	LIKELY	VERY LOW	SLIGHT	LIKELY	VERY LOW
	S1: SMALL GH2		DRASTIC	LIKELY	HIGH	DRASTIC	NOT LIKELY	MODERATE
	S2: BIG GH2		EXTREME	VERY LIKELY	VERY HIGH	EXTREME	NOT LIKELY	MODERATE
	S0: BASELINE	XX Municipality	SLIGHT	LIKELY	VERY LOW	SLIGHT	LIKELY	VERY LOW
	S1: SMALL GH2		SUBSTANTIAL	LIKELY	MODERATE	SUBSTANTIAL	NOT LIKELY	LOW
	S2: BIG GH2		DRASTIC	VERY LIKELY	HIGH	DRASTIC	NOT LIKELY	MODERATE
XX municipality + XX municipality	S0: BASELINE	XX municipality + XX municipality	SLIGHT	LIKELY	VERY LOW	SLIGHT	LIKELY	VERY LOW
	S1: SMALL GH2		SLIGHT	LIKELY	VERY LOW	SLIGHT	LIKELY	VERY LOW
	S2: BIG GH2		MODERATE	VERY LIKELY	LOW	MODERATE	LIKELY	LOW
	S0: BASELINE	Northern Cape	SLIGHT	LIKELY	VERY LOW	SLIGHT	LIKELY	VERY LOW
	S1: SMALL GH2		SLIGHT	LIKELY	VERY LOW	SLIGHT	LIKELY	VERY LOW
	S2: BIG GH2		SLIGHT	LIKELY	VERY LOW	SLIGHT	LIKELY	VERY LOW

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SEA cont...

- Can be any number of different approaches, methods and processes, it all depends on the specific issues in the specific context
- SEA needs to be:
 - i. Sustainability-focused
 - ii. Interdisciplinary
 - iii. Credible
 - iv. Useful for decision-making
 - v. Coproduced

SEA is NOT...

- A mega Environmental Impact Assessment (EIA).
- A public relations exercise.
- A rubber stamp.

Project aspects and SEA Work Packages

