

PULLING UP THE PYRAMID

LOCAL CONTENT REQUIREMENTS AS A CATALYST FOR GROWTH OF SCIENCE,
ENGINEERING AND TECHNOLOGY SKILLS IN THE SOUTH AFRICAN WIND PROGRAMME

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FRAMING THE STUDY

- Presentation of partial results from a Doctoral study conducted through the *Energy Research Centre (ERC)* at *UCT*, commenced in 2013
- Partially funded through the *NRF* and *JG Afrika Engineering & Environmental Consulting*
- Anticipated completion: Q1 2017



BACKGROUND

- Local Content Requirements form a fundamental part of the Department of Trade and Industry's (DTI) policy towards the promotion of South African involvement in the Renewable Energy Independent Power Producer Procurement Programme (REI4P)

- Where did we start...?

	Economic Development Criteria	Weighting
1	Job Creation	25%
2	Local Content	25%
3	Ownership	15%
4	Management Control	5%
5	Preferential Procurement	10%
6	Enterprise Development	5%
7	Socio-Economic Development	15%
	Total	100% of 30 points

Bidding Round 1 Economic Development Criteria

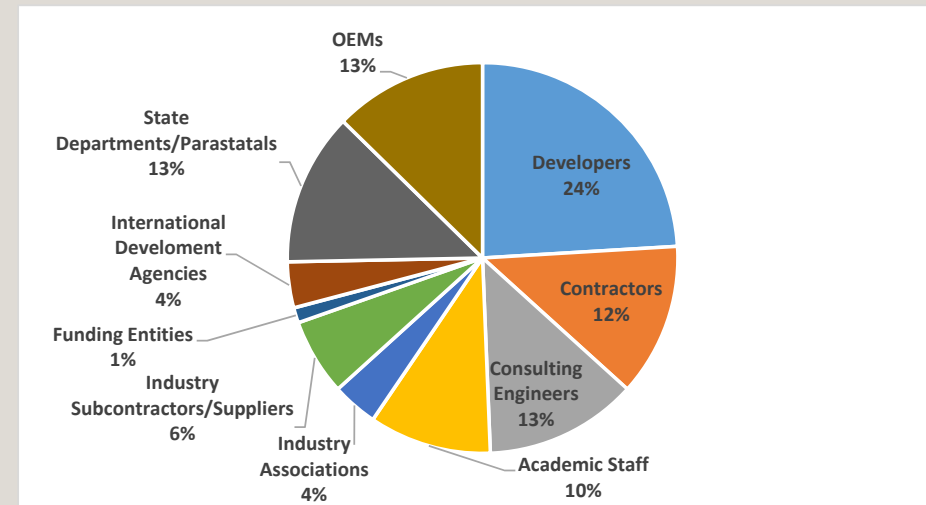
(DOE, 2011)

BACKGROUND

- What about the different types of skills involved?
- Higher order Scientific, Engineering & Technology (SET) skills? Certification by ECSA & SACNASP.
- Where have the SET skills been coming from for the wind programme?
- To what extent are South Africans participating in this space?
- Do LCRs stimulate the creation of STE skills?
- Does it matter...?

BACKGROUND

- Adaptive approach to Technological Innovation Systems (TIS) theory
- 83 semi-structured interviews with industry stakeholders
- Thematic sampling using a diachronic, contextual, discovery-focused approach: the skill-bearing individuals themselves forming the unit of analysis



SITUATIONAL CONTEXT

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Bidding Round I Economic Development Criteria

(DOE, 2011)



SITUATIONAL CONTEXT

SA-based employees: SA Citizens
50% threshold, 80% target

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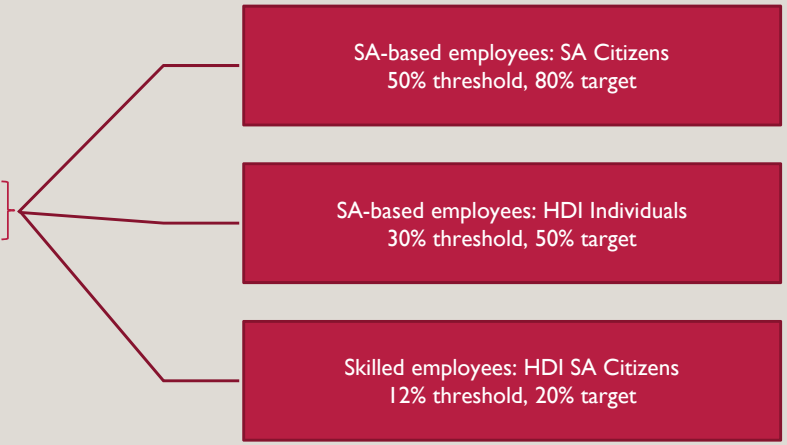
SA-based employees: HDI Individuals
30% threshold, 50% target

Bidding Round I Economic Development Criteria

(DOE, 2011)

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Bidding Round I Economic Development Criteria

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SITUATIONAL CONTEXT

- National Development Plan (adopted 2011). Notes the need to:

“relax immigration requirements for highly skilled science and mathematics teachers, technicians and researchers”

It also adds that

“all graduates from foreign countries should be granted seven-year work permits”

National Planning Commission, 2011

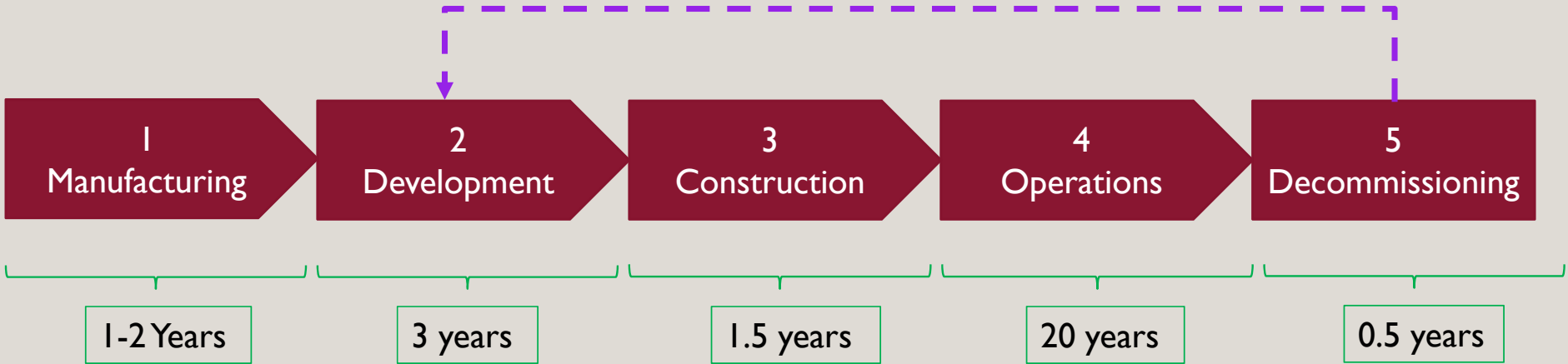
THE WIND DEVELOPMENT PIPELINE



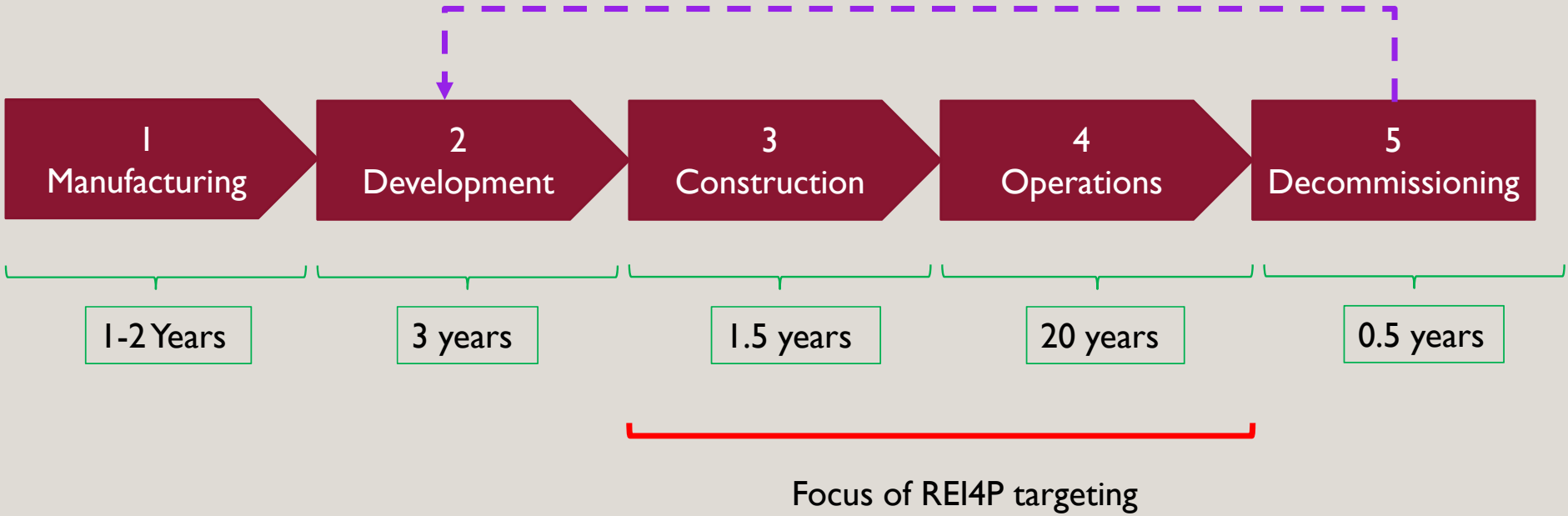
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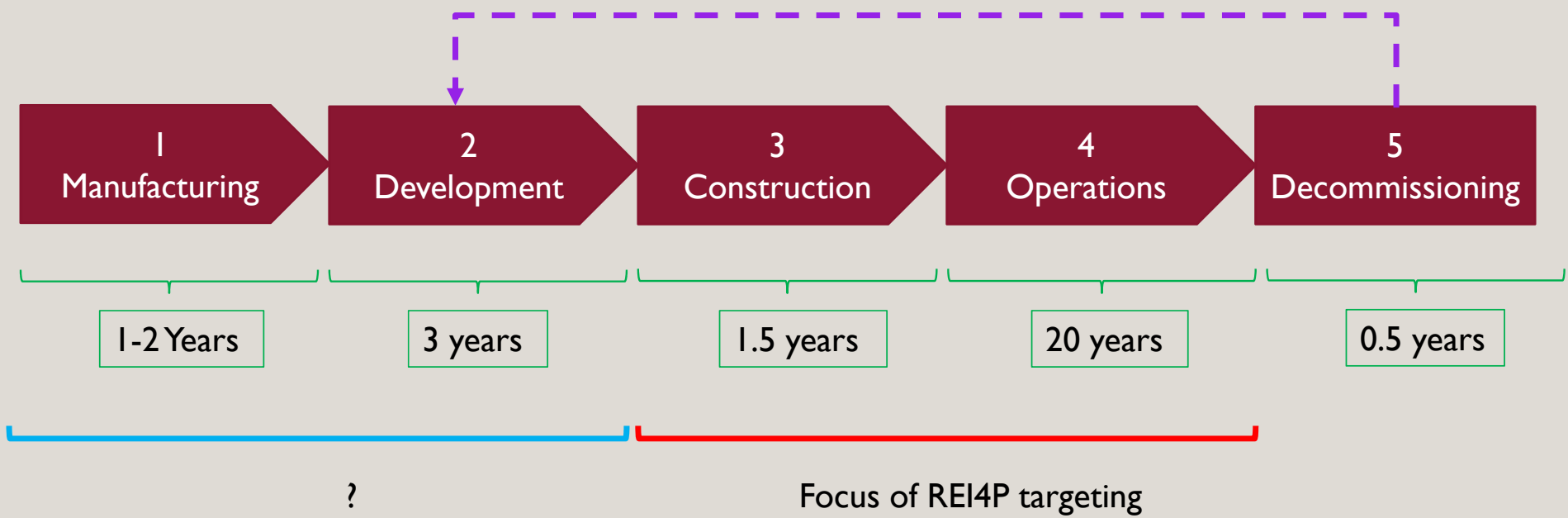
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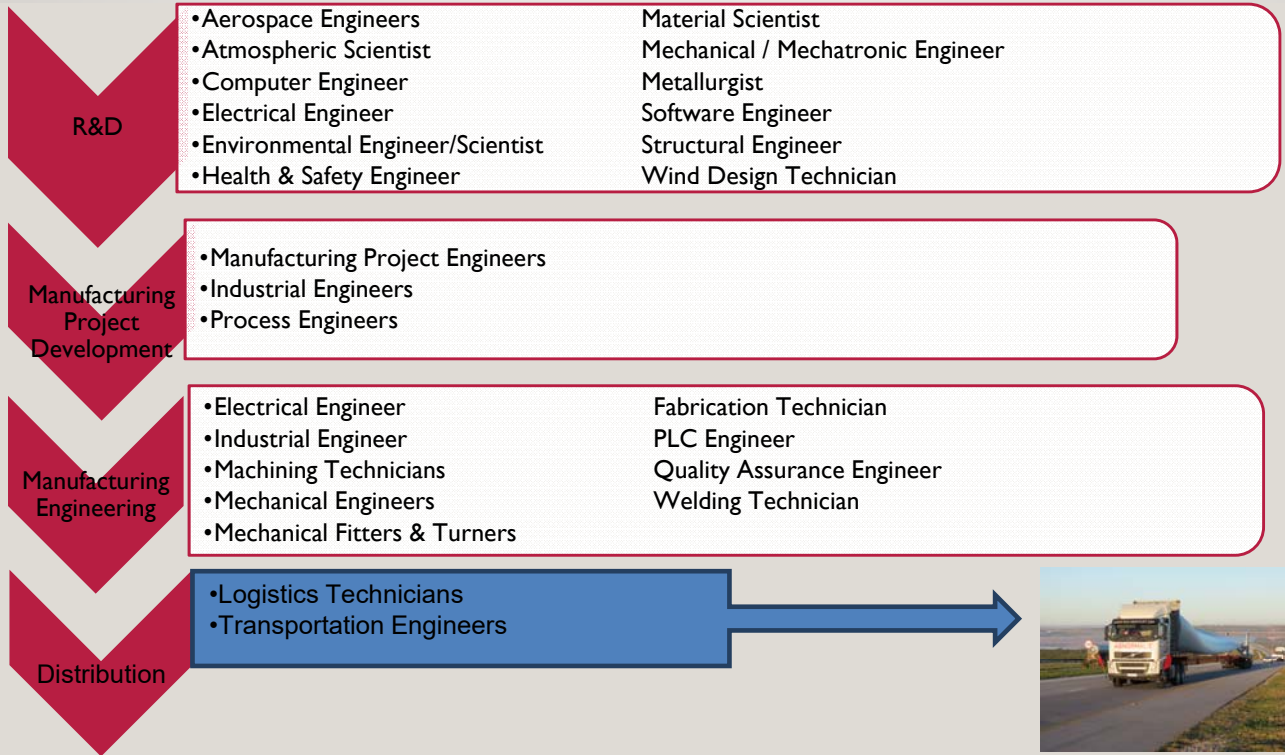
SA MANUFACTURING

- Long history of innovation in manufacturing
- Established industries to provide certain components, and skills capable of transferring to emergent wind manufacturing

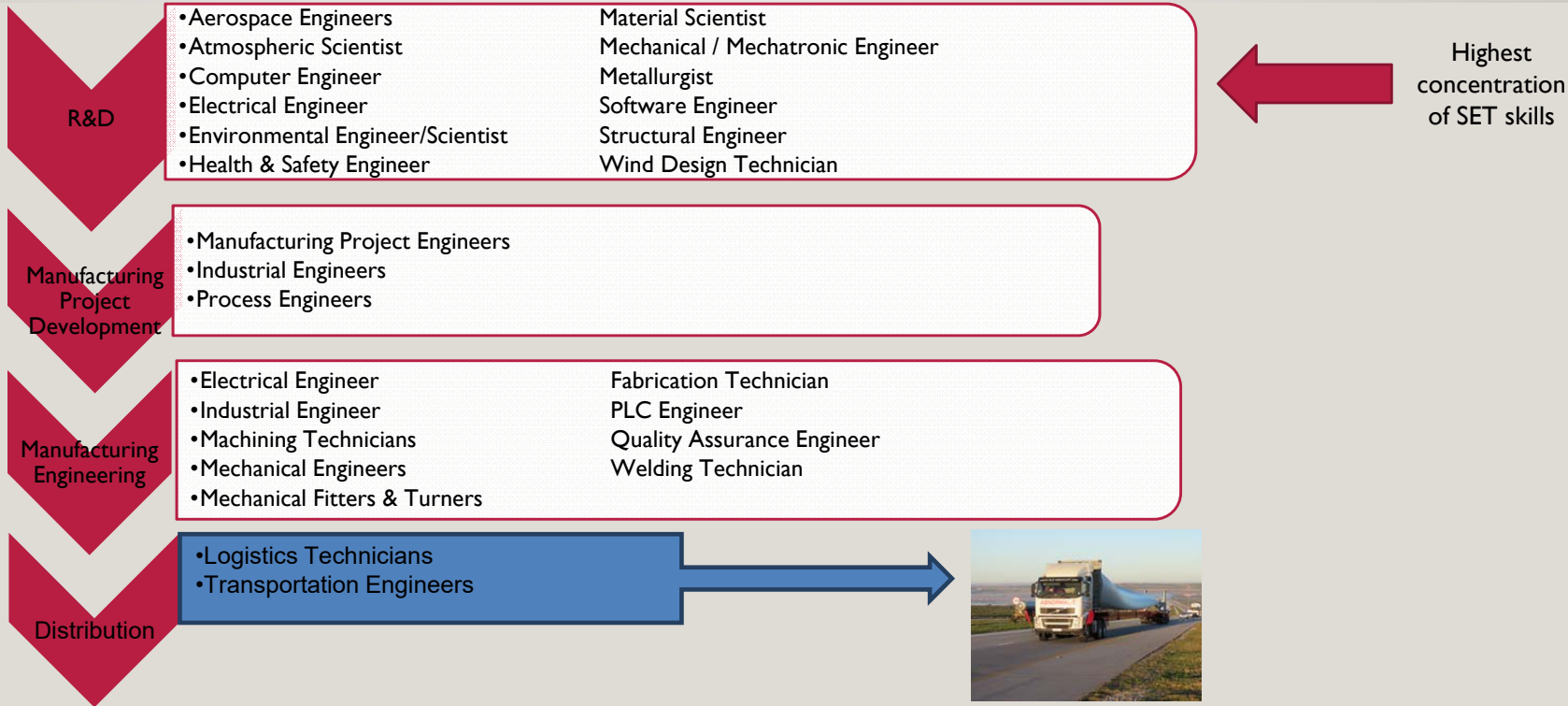
Category	OEMs	Heavy Engineering Component Manufacturing	Light Engineering Component Manufacturing	Component Transportation
Description	Full turbine supply	Steel and concrete towers	Foundation bolts, flanges, rings, cages, plastics	Blades, nacelles, towers transport and hoist cranes
Geographic Origins	International	International and local	International and local	International and local

- I-WEC (Isivunguvungu Wind Energy Converters) – liquidated October 2013.
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SA MANUFACTURING: SET SKILLS

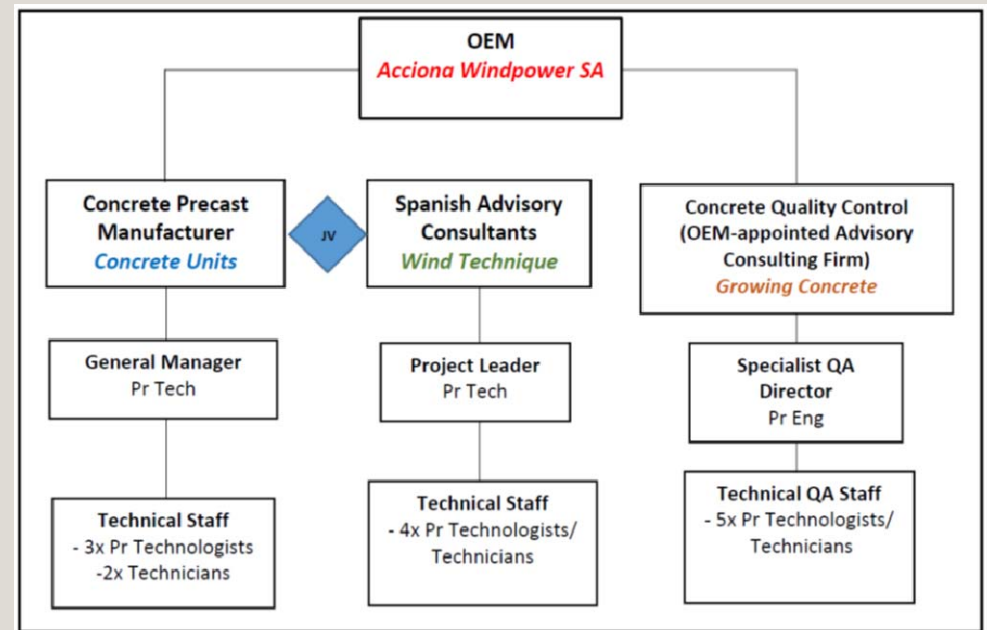
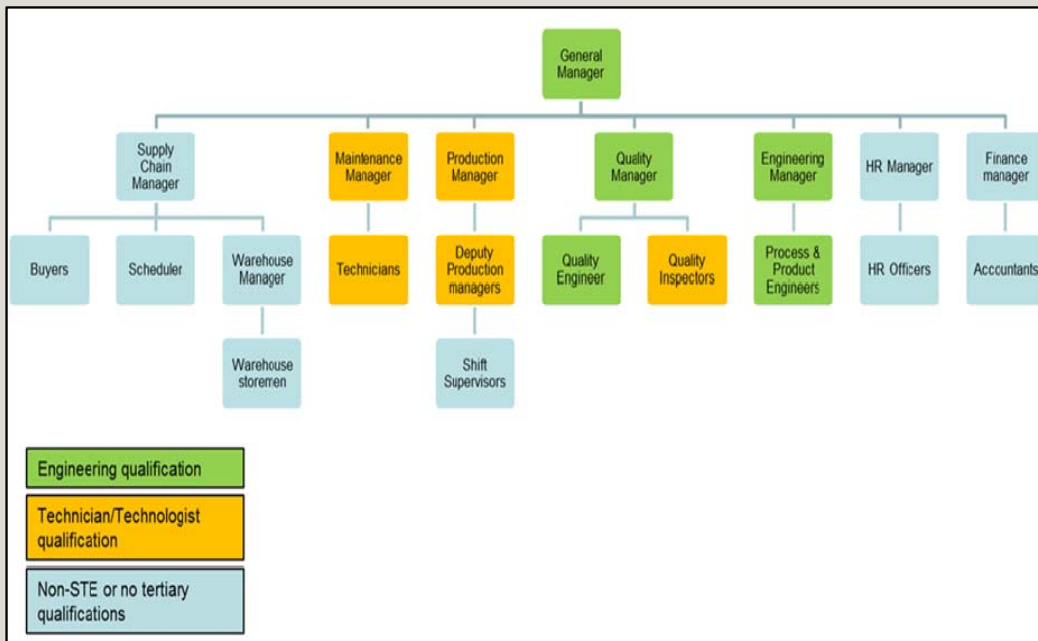


SA MANUFACTURING: SET SKILLS



SA MANUFACTURING

- Organogram for a typical tower manufacturing plants – SET skills



SA MANUFACTURING

- Selection of existing SA Light Engineering Component Manufacturers currently actively supplying:

Supplier	Component	Location
Aberdare Cables	LV, MV and HV electrical cables	National as well as international
Actom Power Systems	Pad Mounted Transformer Kiosks (PTKs), Substations	Germiston
ArcelorMittal SA	Heavy steel plate	Vanderbijlpark
DCD	Flanges, foundation rings, anchor cages, foundation bolts	Vereeniging
Electro Inductive Industries	Pad-mounted Transformer Kiosks (PTKs)	Blackheath
Graymaur Plastics	Synthetic bolt covers, transformer heat shields, cable inlet protectors, customised plastics	Port Elizabeth
Hempel Coatings	Paint and industrial coatings	Vereeniging
Jotun Coatings	Paint and industrial coatings	Blackheath
SA Bolt	Anchor cages, foundation bolts	Nigel
Verbolt	Foundation bolts, flanges	Vereeniging

SA MANUFACTURING: ISSUES FACING GROWTH

- Transparency and certainty in the REI4P single largest contributing factor
- Local pricing of materials and labour having knock-on to domestic pricing for steel towers – cheaper to import
- Certain technical skills are still absent (heavy roller machine operators, welders)
- Use of state incentive programmes by manufacturers
- Development of knowledge at a point source in a system, unless it is shared and transferred between actors, is dead knowledge. Nature of the industry is proprietary R&D, however much being done in SA in a participatory and co-ordinated manner: GIZ/Dept of ED; SAWEA Working Groups etc.

SA MANUFACTURING

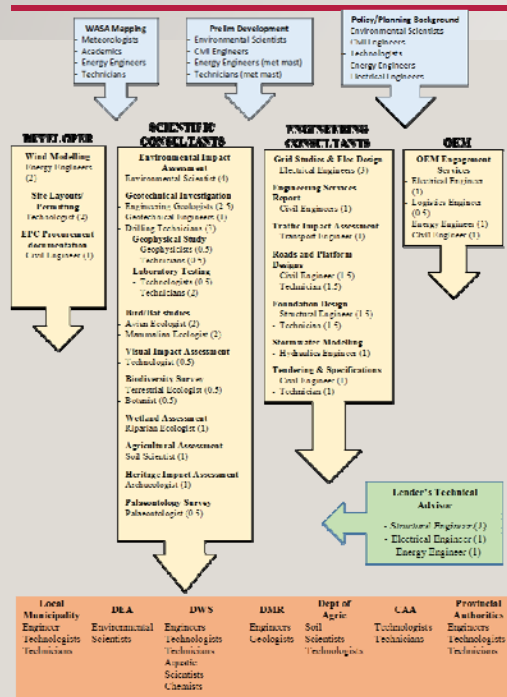
“The decision not to build wind turbines in South Africa isn’t a technical one - it’s an economic one, a political one. We can build the most advanced attack helicopter in the world – a turbine is simply a propeller spinning in the opposite direction, that’s not a problem”

(South African SOE Industry Commentator)

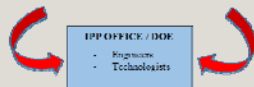
DEVELOPMENT

- Highest concentration of Scientist employed during this phase
- Use of these Scientist viewed largely as a “developmental expense”
- 8900 registered Scientists on SACNASP books – majority are female
- SET skills employed by Developers (elect, mech, civil and env engineers) and Consulting firms (“one man band” up to multinationals)
- Growth of small developer firms peaked around BR I/2. Up to 90% of work stream was renewables for a respondent Botanist. 1000% growth within some Consulting firms’ Renewable Energy Bus over 3 year period

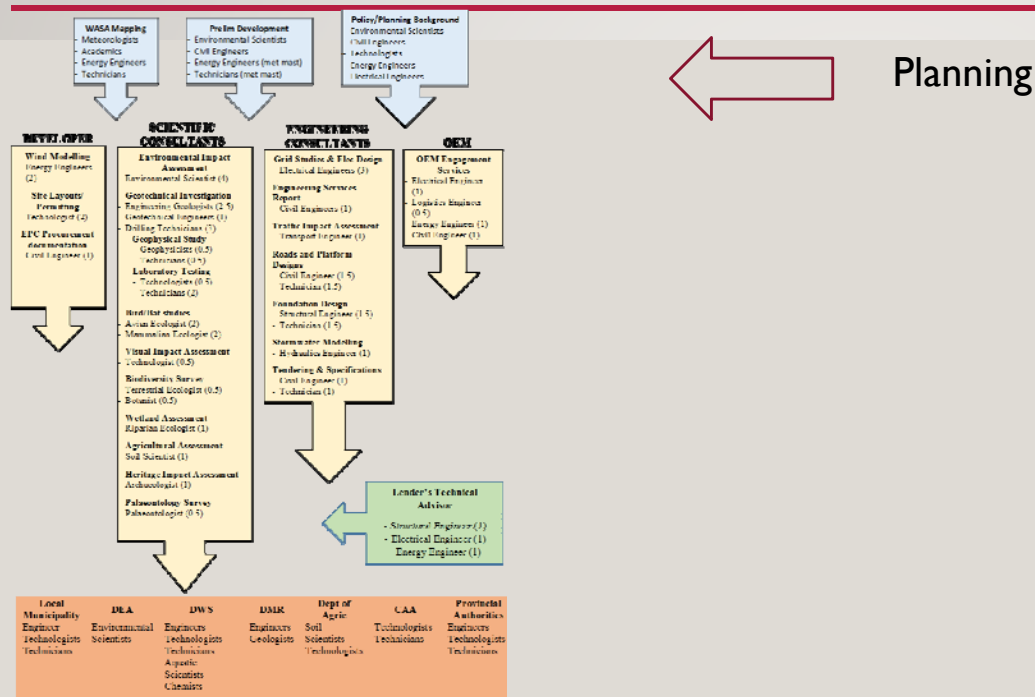
DEVELOPMENT: DEPLOYMENT OF SET SKILLS



* (1) Estimated man-months



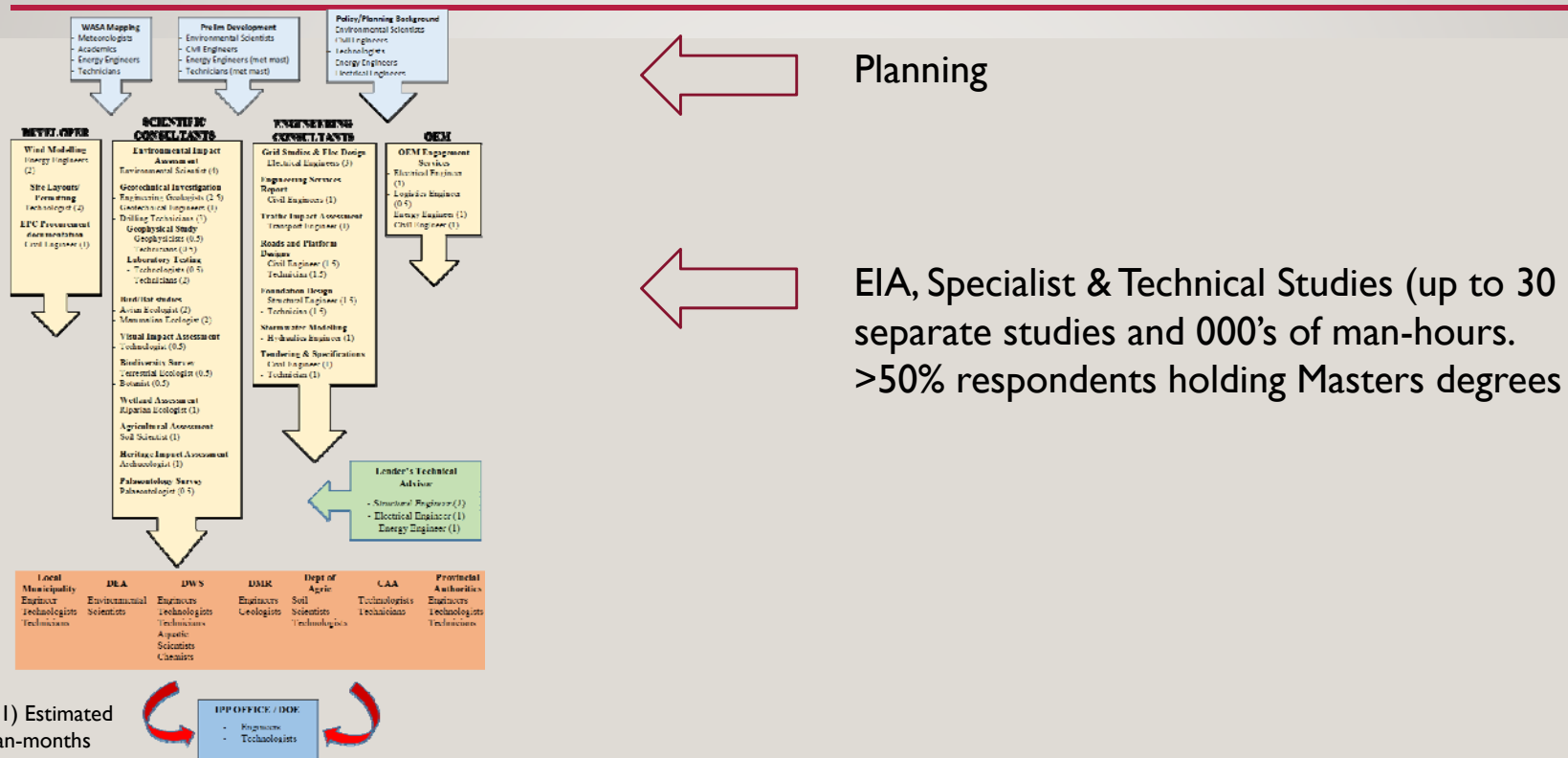
DEVELOPMENT: DEPLOYMENT OF SET SKILLS



* (I) Estimated man-months

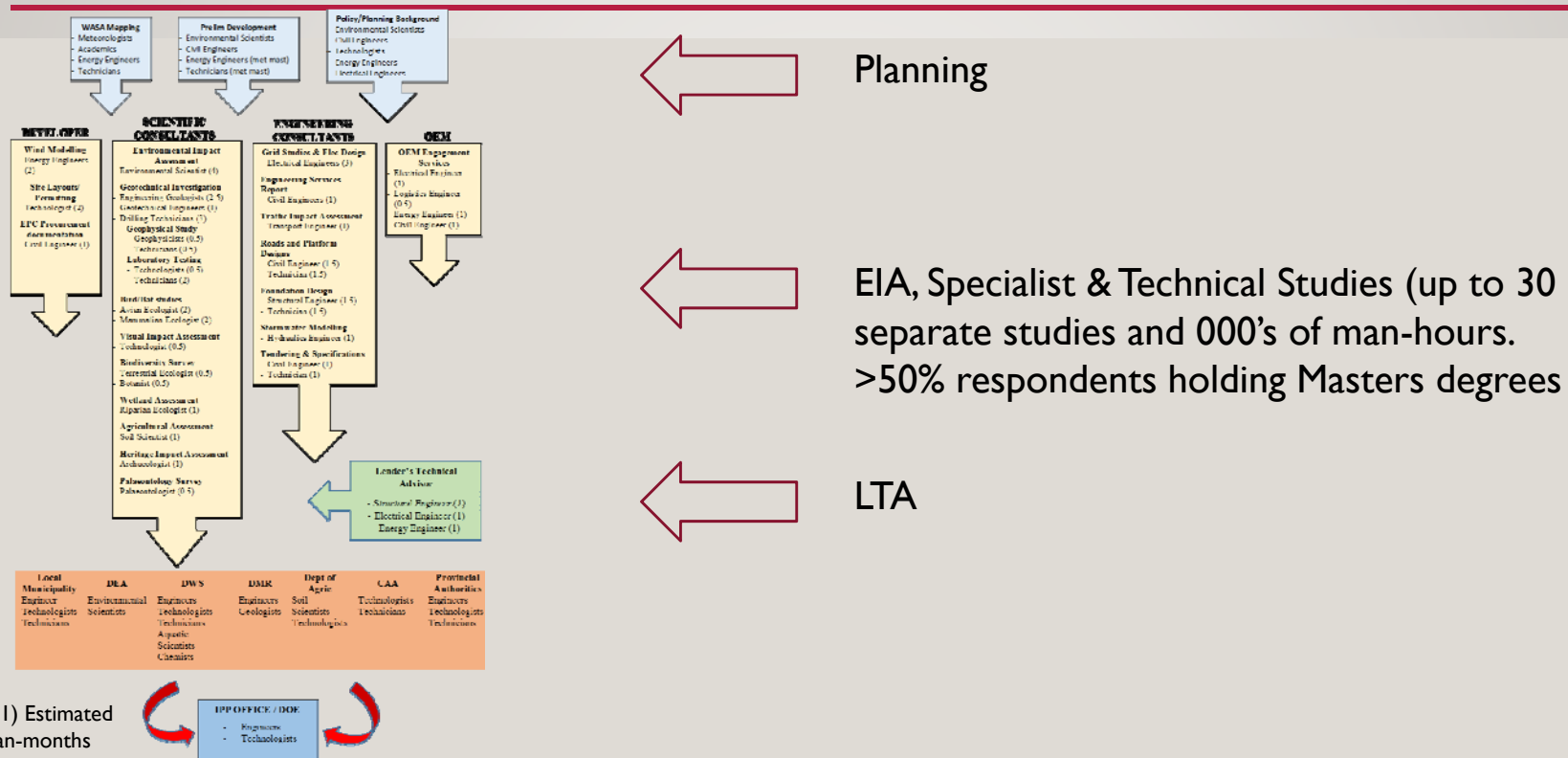
IPPOFFICE / DOE
- Engineers
- Technologists

DEVELOPMENT: DEPLOYMENT OF SET SKILLS

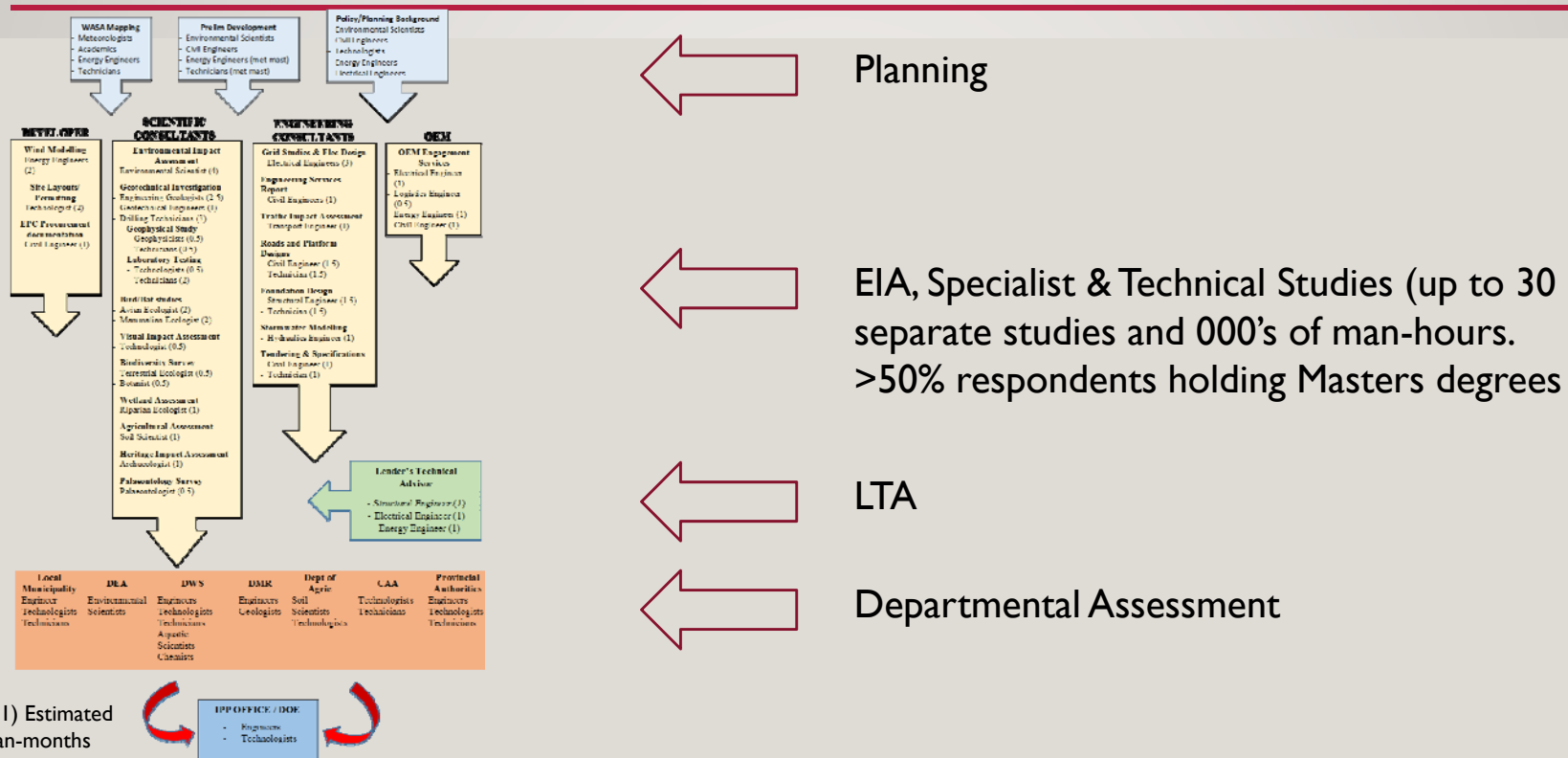


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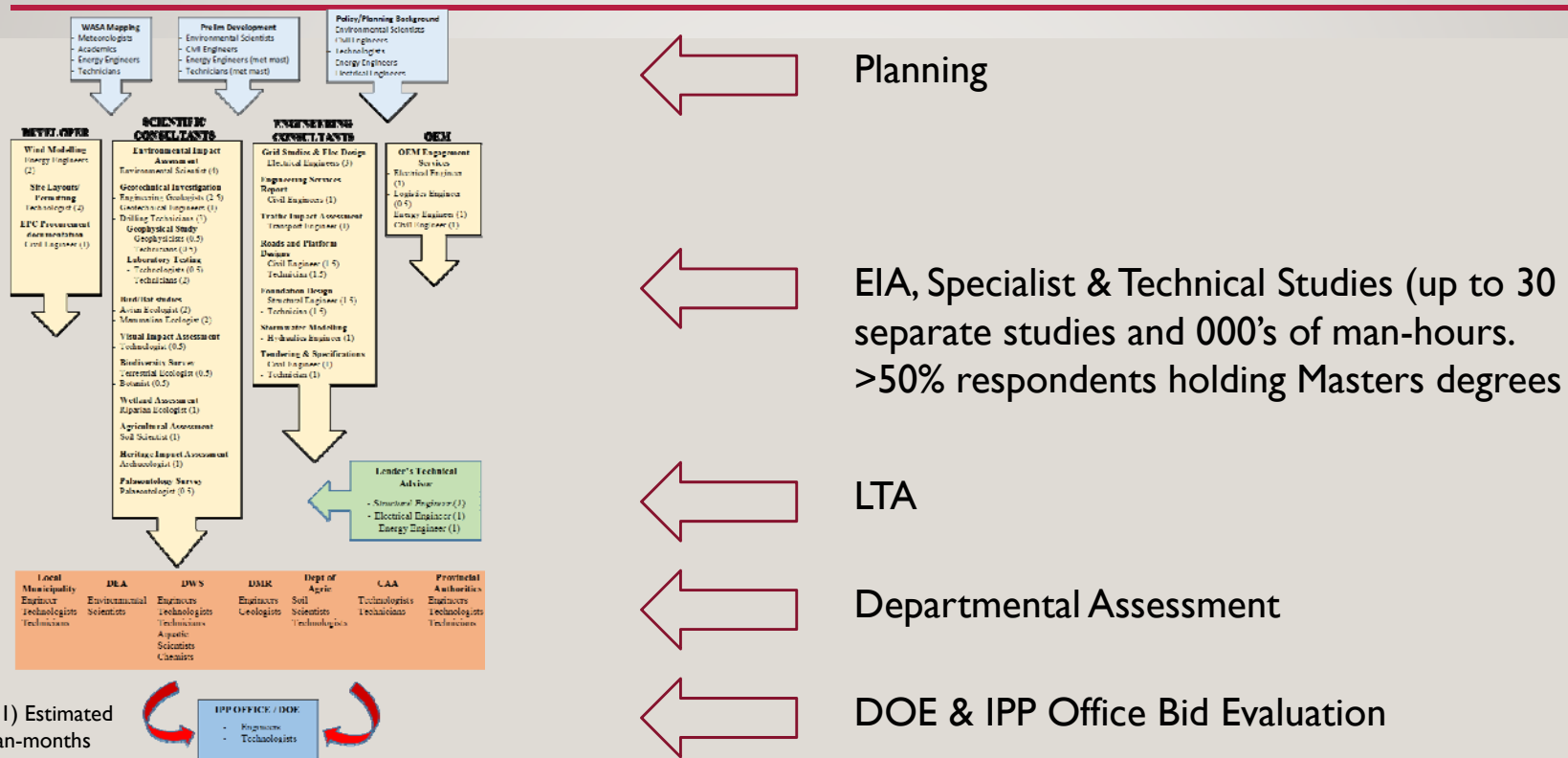
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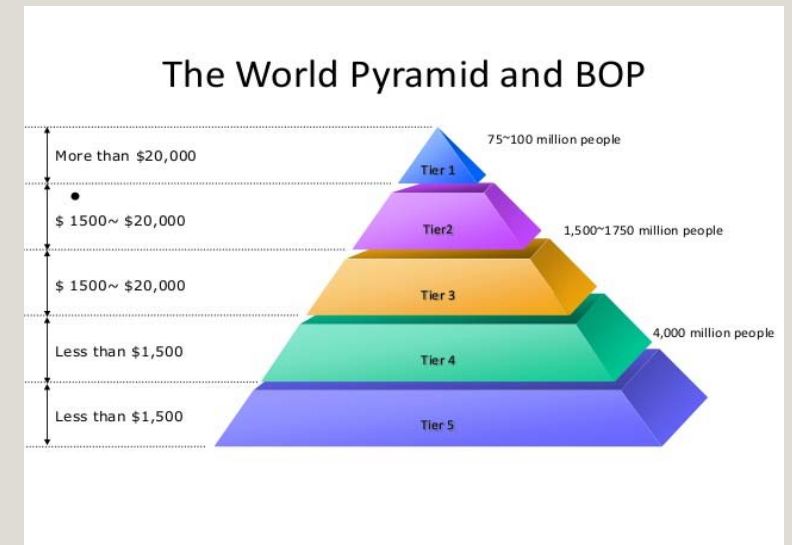
DEVELOPMENT: DEPLOYMENT OF SET SKILLS



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SUMMING UP

- “Bottom of the Pyramid” – Franklin D. Roosevelt (1932): *The Forgotten Man*
- Prof’s C.K. Prahalad & Stuart L. Hart
- SA’s National Research and Developmental Strategy (2002):
*...based upon the pillars of innovation, SET resources
and creating an effective governmental science
and technology system.*
- SET skills are the enablers in the system – points of disruptive entrepreneurship.



THANK YOU

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