

Biofuels and Employment Opportunities

International Conference

Stakes and Perspectives of Biofuels for Africa

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Overview

- Background & context
- Background to study
- Definitions
- Assumptions
- Outcomes
- How to realise the potential?
- Concluding remarks



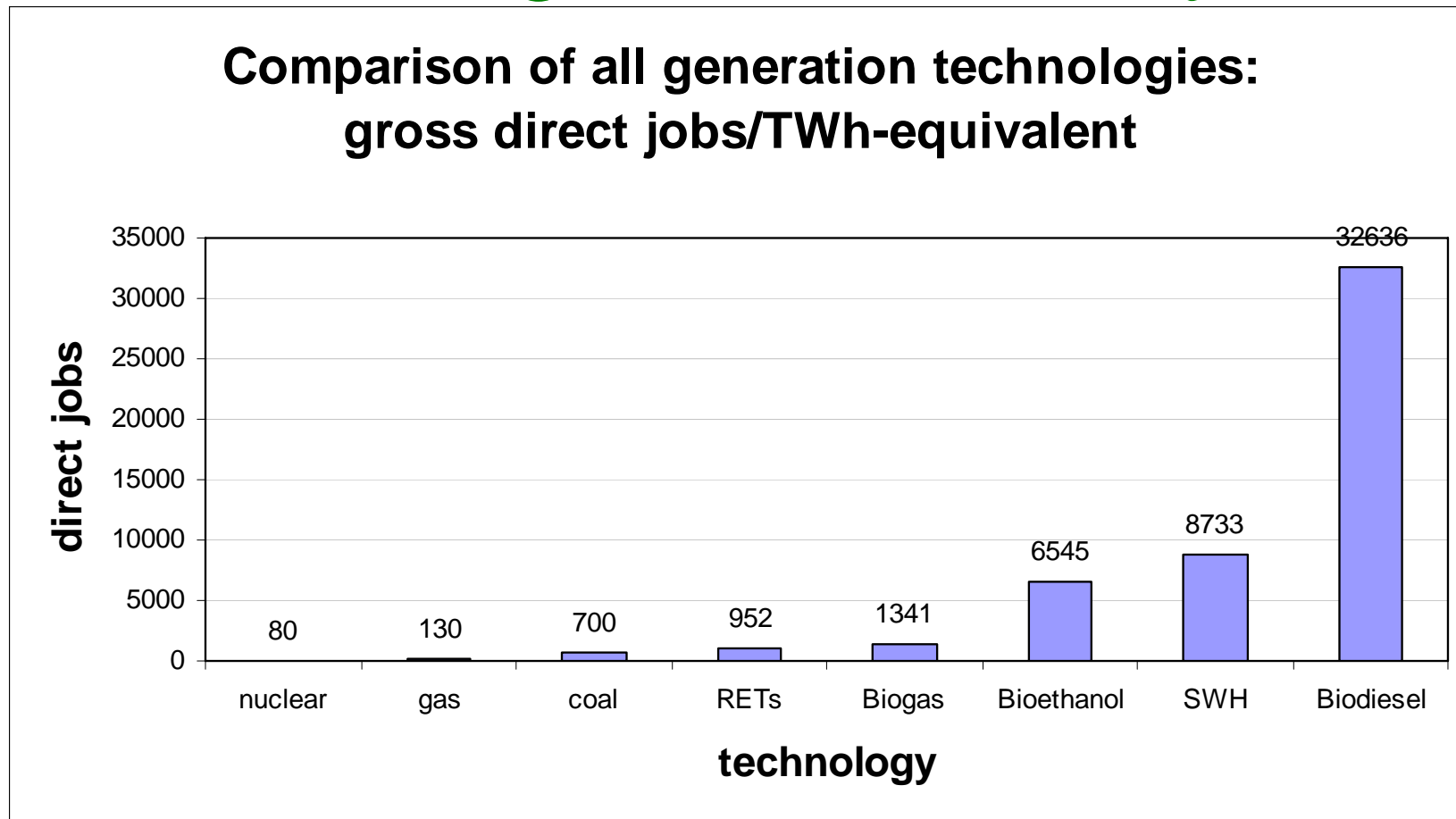
Background & context

- South Africa energy context:
 - 40 GW elec (92% coal), 12 & 8 billion litres/annum petrol/diesel, 30% of liquid fuels are synfuels from coal and gas, 8% biomass for HH energy
 - RE target of 10,000 GWh by 2013
 - Different sector strategies to achieve that
- Draft Biofuels Industrial Strategy, 2007
 - Average of B2 & E8 blend nationally
 - 1.3 billion litre biofuel market is expected to be produced by 2013
 - Will meet ~5% of demand i.e. move local production of liquid fuels from 35% to 40%
- Domestic biogas feasibility study, 2007
 - Technical potential for 310,000 HH biogas digesters in South Africa
- But, what does implementation look like, and what are the impacts? Jobs?

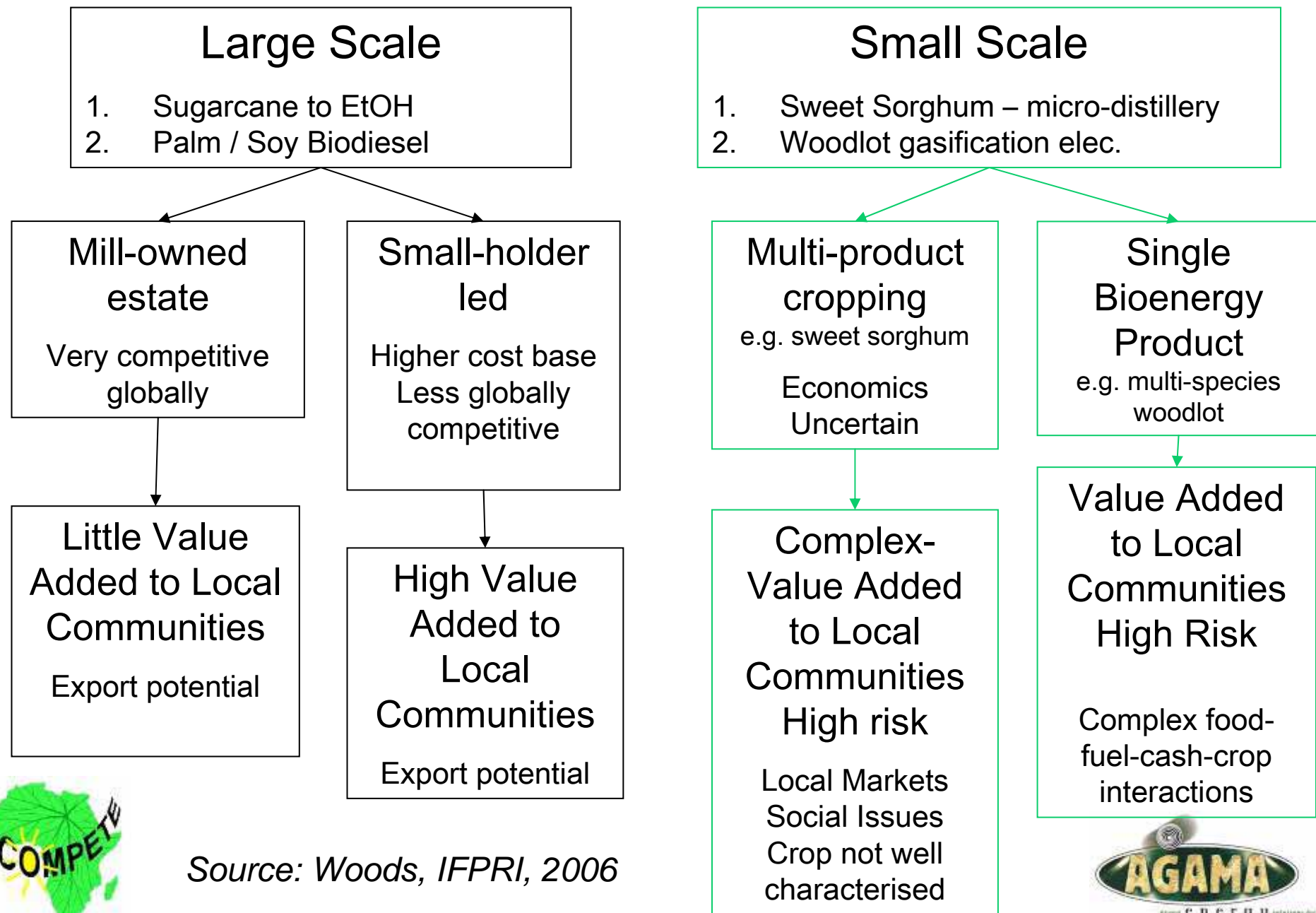


Background to study

**Comparison of all generation technologies:
gross direct jobs/TWh-equivalent**



Bioenergy Development Options - scale matters



Source: Woods, IFPRI, 2006



Some definitions ...

- *Direct jobs* - those jobs resulting directly from the renewable energy project or installation
- *Indirect jobs* - additional jobs for services and inputs to the direct processes
- *Induced jobs* - those jobs generated through the increased cash flow in the broader society that arises from the wages of those employed in direct and indirect jobs.
- Full Time Equivalent: 1 FTE = 1 job. Also, job-years, or just simply “jobs”.



Baseline assumptions - bioethanol

- Consumption of petrol = 12 billion litres/annum
- Different blend %s: 2%, 5%, 7.5%, 8% (= 8%)
- Only looked at gross production (agr) and O&M (distillery) jobs i.e. transport and job losses elsewhere are excluded
- Small-scale model of production
- Sweet sorghum as feedstock
 - Yield = 46 tonnes/ha per crop
 - Crop = 2/year (note: this could be 3)
 - Farm area = 5 ha (1 farmer)
 - EtOH yield = 54 litres EtOH/tonne sweet sorghum



Baseline assumptions – bioethanol 2

- 2% blend: using existing molasses production (1 m tpa) and diverting away from animal feed = 2.4 Ml/a
- Only new distillery jobs in 6 new distilleries = 1,400 jobs
- Why sweet sorghum?
 - More robust than sugarcane
 - Requires lower inputs in terms of water and fertilisers.
 - It requires very similar cultivation techniques to those for grain sorghum, which is a more widely known crop in the African context.
 - Extensive trials (in Zimbabwe, at the Triangle sugar mill and distillery), have shown it to be a very suitable crop for ethanol production.
 - Similar experience has been gained in other countries, the most relevant to our context being China.



Baseline assumptions - biodiesel

- Consumption of diesel = 8 billion litres/annum
- Different blend %s: S% (= 2%), 2.5%, 5%, 7.5%
- Only looked at gross production (agr) and O&M (refinery) jobs i.e. transport and job losses elsewhere are excluded
- Sunflower as feedstock
 - Yield = 1.2 tonnes/ha per annum
 - Feedstock = 4,800 tonnes of seed/refinery per annum
 - Farm area = 5 ha (1 farmer)
 - Refinery jobs = 15 per plant

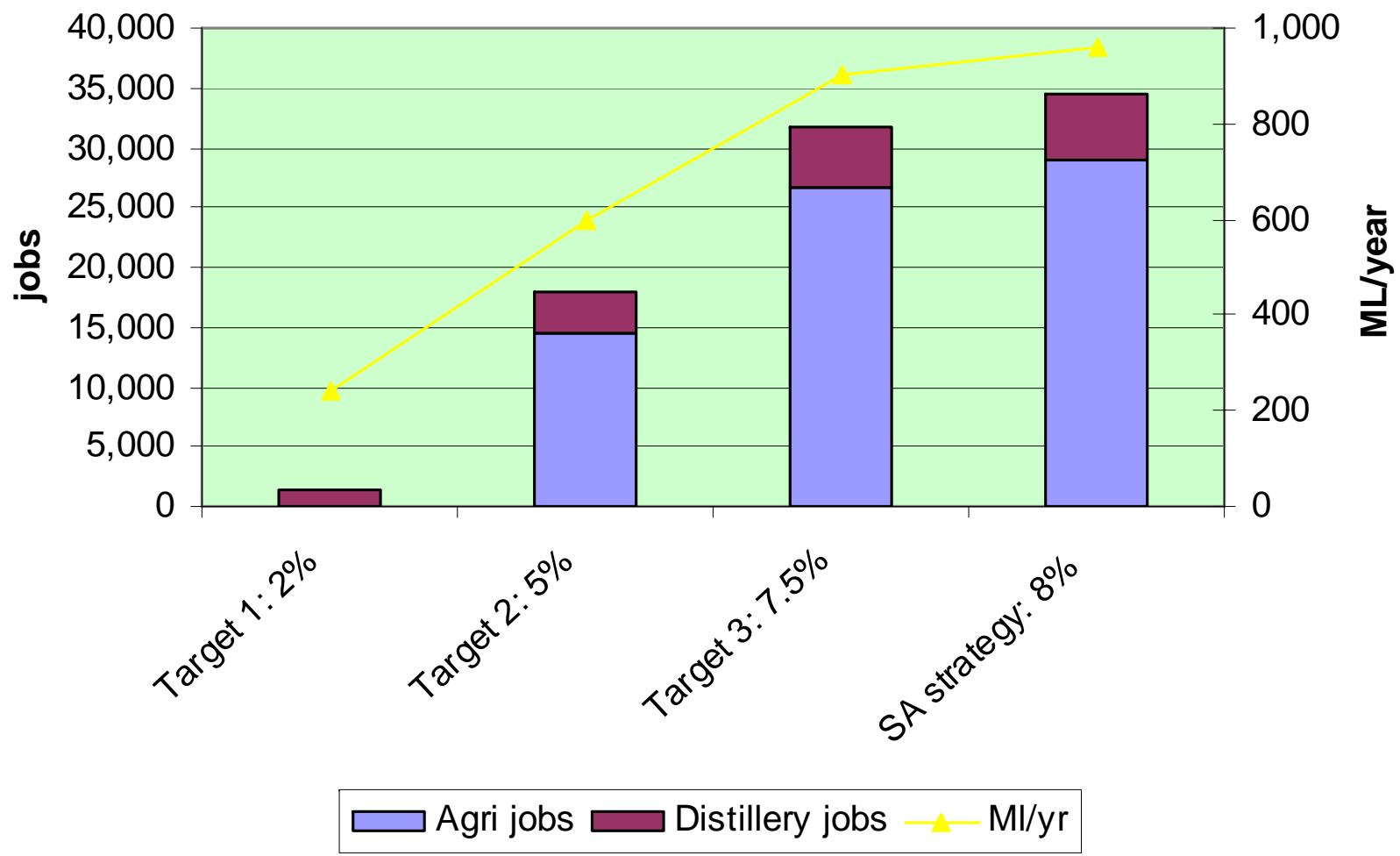


Baseline assumptions – biodiesel 2

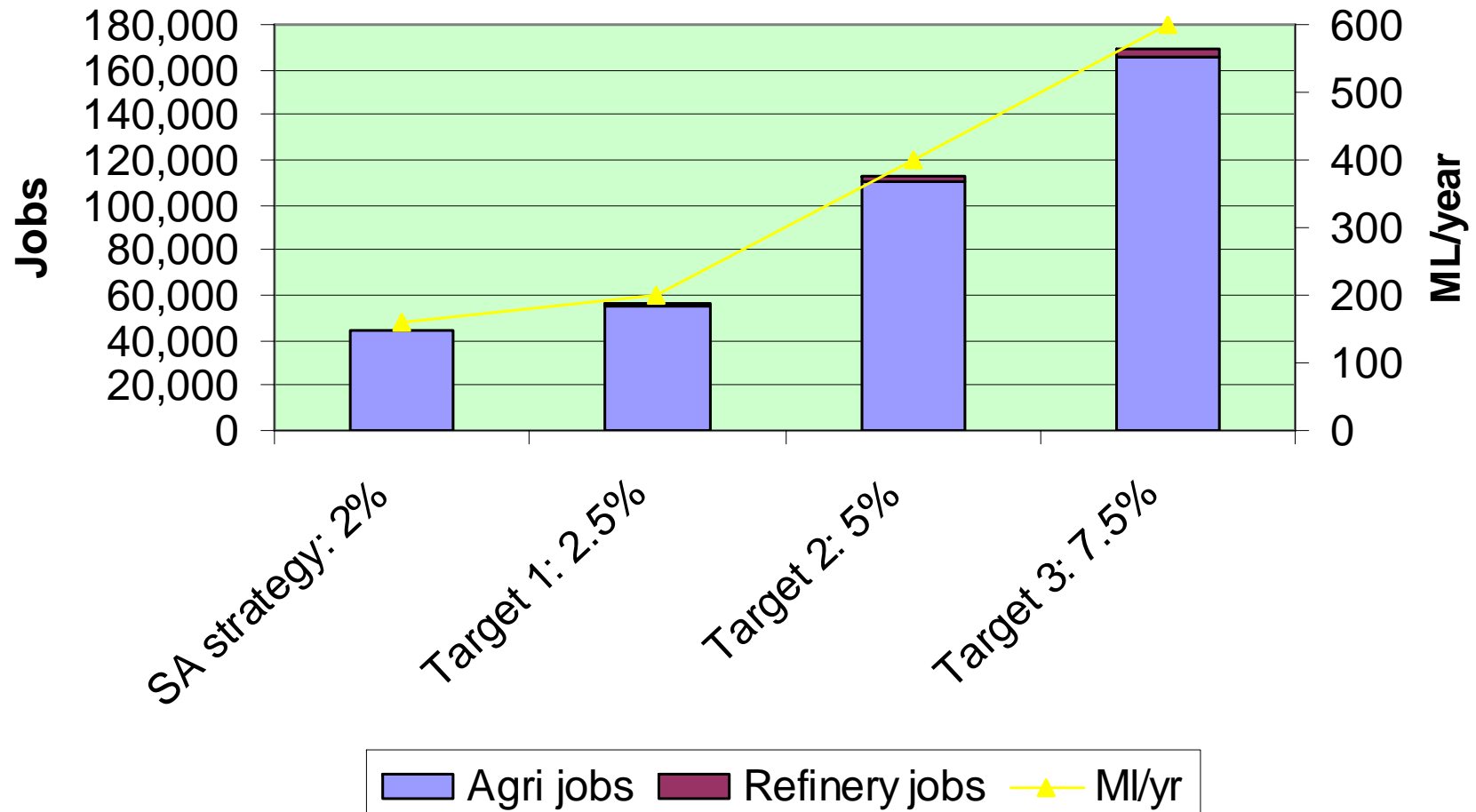
- Small-scale model of production
 - 8,000-litre/day facility operating for 300 days/year = 2.4 ML/annum
 - requires 16 tonnes/day of sunflower seed feedstock
 - requires the cultivation of 4,000 ha, within a radius of 30km from the biodiesel plant
 - with an area of 5 ha per producer, this would require 800 farmers per plant.
 - a further 15 jobs would be created at the biodiesel plant itself, thus giving a total potential of 1,615 jobs per 8,000 litre/day production unit



Bioethanol direct jobs



Biodiesel direct jobs



Biogas

- From domestic biogas feasibility study (2007), 4.2 m person-days for 310,000 HH BGDs, creates about 17,500 jobs @ 240 days/job (i.e. full-time 1-year jobs)
- Programme for 20,000 HH digesters over 5 years is proposed
- If proportionate then this first phase programme will deliver 1,130 direct jobs



Summary of results



- SA biofuels strategy will bring about the creation of
 - 34,500 direct jobs in the bioethanol industry
 - 45,000 direct jobs in the biodiesel industry
- SA domestic biogas feasibility and proposed first-phase programme will bring about the creation of
 - 1,150 direct jobs
- Biofuels jobs benefit the rural areas
 - Massive job creation, wealth creation, induced jobs



How to realise the potential?

- Sustainability criteria (social, environmental, economic, policy & institutional) have to be considered
 - A livelihoods approach focuses on the means, activities, entitlements and assets by which people make a living
 - Involves improved access of the rural poor to basic and facilitating infrastructure, with energy being a key component
 - Bioenergy projects can thus directly help to alleviate poverty by satisfying basic needs, creating opportunities for improved productivity and better livelihoods, and preserving the natural environment on which the rural poor depend
 - If designed with the involvement of local communities, a sensitivity toward local environmental constraints, and a clear objective of meeting the identified needs of the poor, bioenergy activities could thus greatly contribute to the sustainable livelihoods of rural populations.
- Large-scale small-farmer model has excellent promise, and creates 4x as many jobs as a purely large-scale large-farmer approach
 - Appropriate management models need to be used to achieve this e.g. Co-operatives
 - Co-ops exploit economies of scale
 - They inform small farmers about market conditions and technical advances.
 - They enable large investments of capital and labour that would not otherwise be feasible for individual farmers, and they spread risk.
 - Co-operatives endow small farmers with greater bargaining power.



Concluding remarks

- Approach and scale are very important when discussing biofuels impacts – benefits and costs
- Sustainability criteria need to be developed and projects assessed against those
- One approach is that of a large-scale small-farmer model – already employed successfully – where different management models lead to sustainable projects
- In this model, biodiesel has far greater job creation potential than bioethanol, in the order of 8x – agricultural jobs
- National domestic biogas programmes require training and job development – masonry jobs
- At this juncture in the global development of biofuels, Africa has a unique opportunity to extract maximum value for its own benefit



Thank you

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