

Presentation to IRP Public Hearing:

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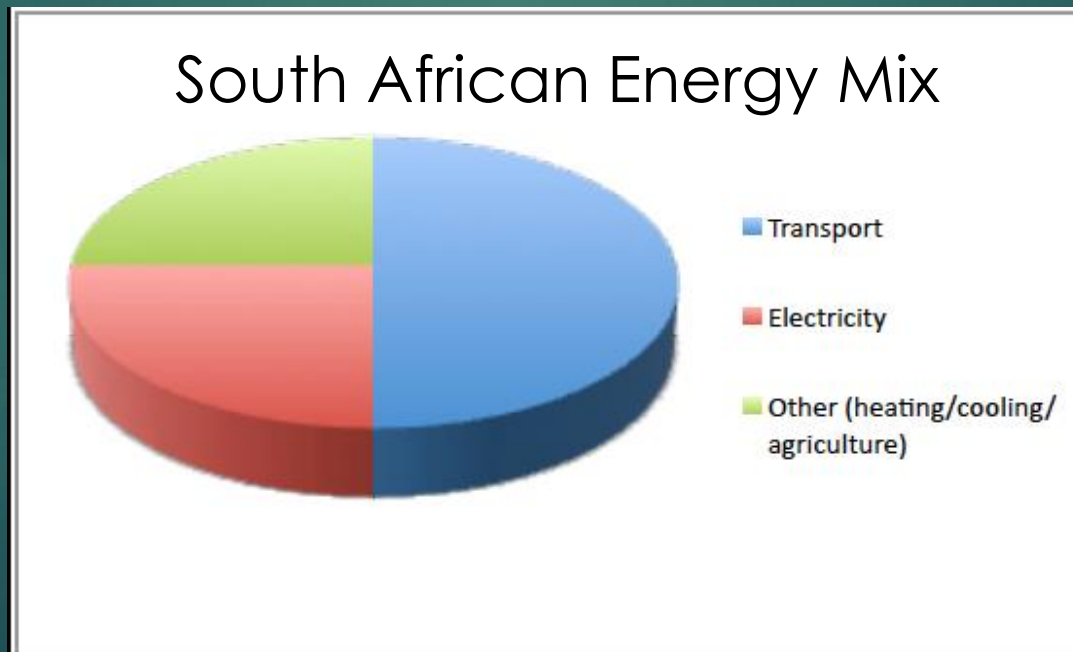
Transitions

Endowment

Storage

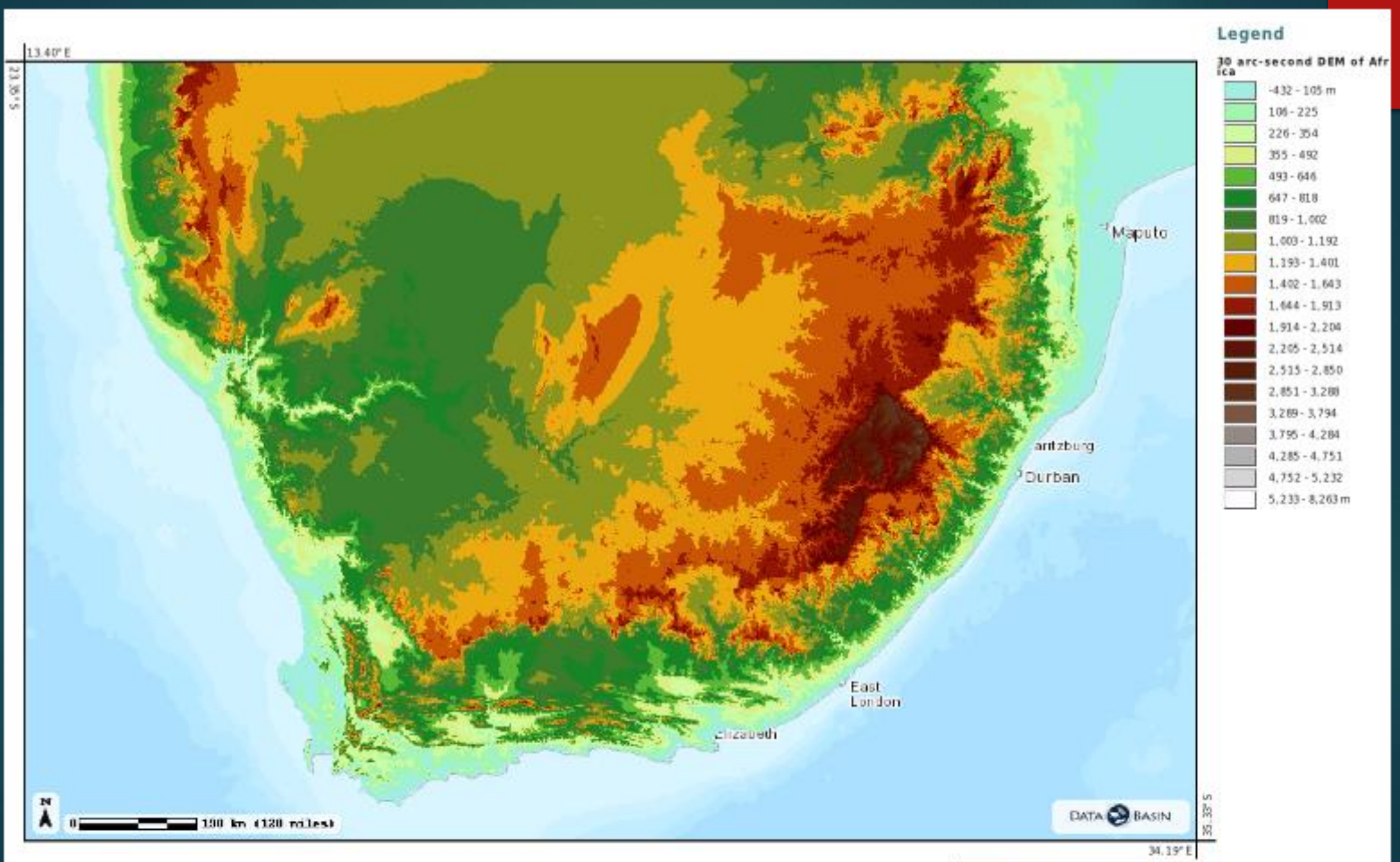
Transitions

- ▶ World needs to transition to sustainable energy
- ▶ Needs to transition as much as possible energy to electricity
- ▶ Potential tripling of electricity required



Sustainable Energy Endowment

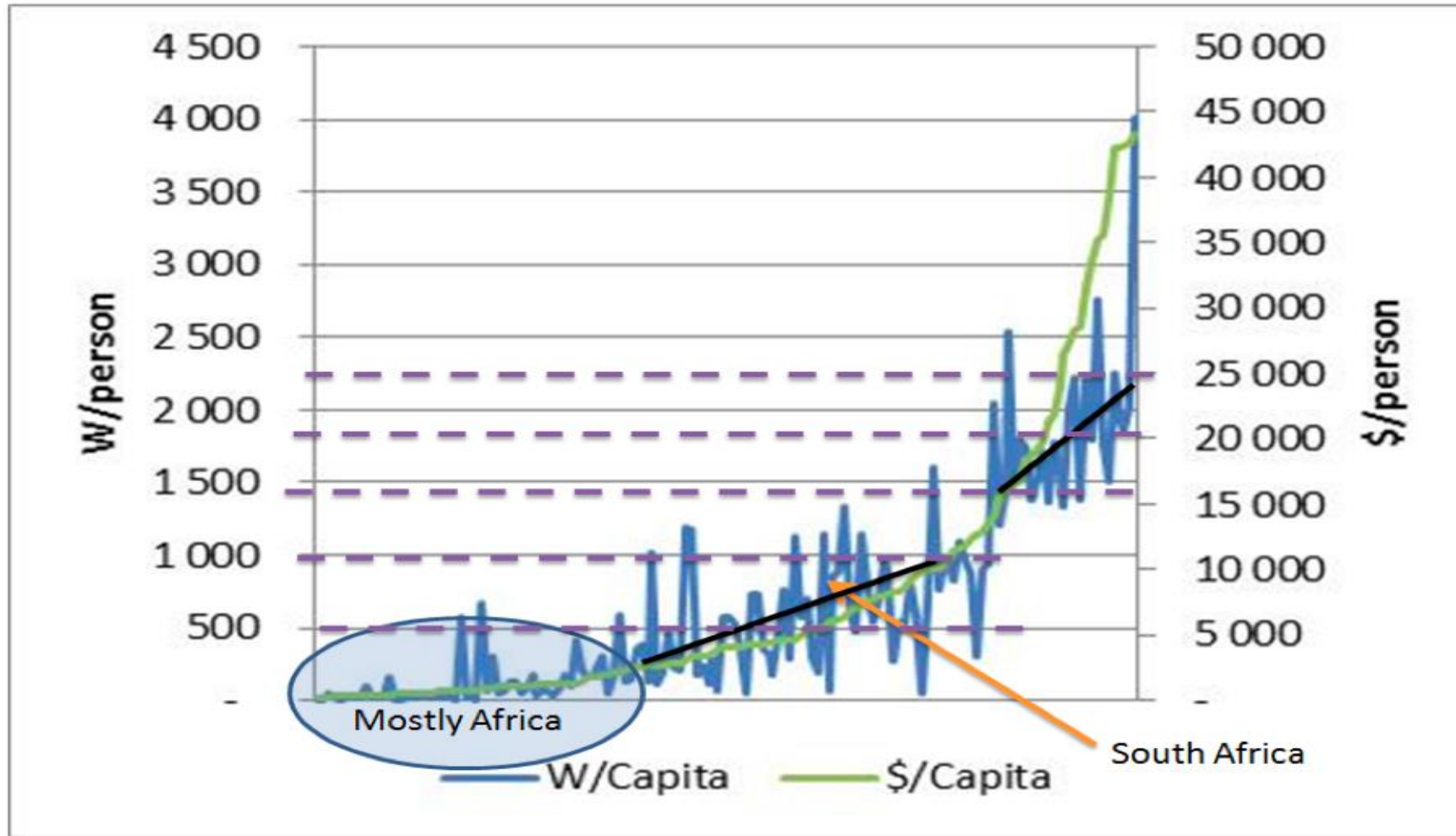
- ▶ South Africa's wind and solar resources in particular are exceptional
- ▶ Not sure that we fully appreciate just how exceptional
- ▶ Element of geological control
- ▶ Good transmission grid infrastructure
- ▶ Good demand



Storage

- ▶ Power vs. Energy
- ▶ Eskom, lots of energy, insufficient power
- ▶ Transmission and Distribution grids designed to handle maximum power; generally underutilised for 80% of the time
- ▶ Estimated ten year spend of R200b required to upgrade, strengthen and maintain transmission grid, and similar amount estimated for distribution grid
- ▶ Recommend 12 000 MWh of battery storage, at an estimated cost of R60b
- ▶ Urgent study required to calculate T&D grid savings, with the strategic placement of 4 000MW of battery storage
- ▶ Corporate PPAs based on time of use (TOU) tariffs renders energy arbitrage economic at current TOU tariff rates
- ▶ Storage is already effectively valued or priced based on tariffs afforded CSP for electricity dispatched during the 5 hour late afternoon-early evening period

Watts & \$ per person based on 2010 gross national income figures for 190 countries



Graph from Dudley Baylis

Conclusions

- ▶ The world needs to, and is, transitioning to sustainable energy, and from fossil energy to electricity in the transport and heating sectors
- ▶ Power capacity per capita is strongly correlated to per capita income, and is clearly necessary for growth, although not sufficient
- ▶ In order for South Africa to increase energy delivery via sustainable electricity, electricity production may need to increase by a factor of 2 to 3 times as much as envisaged in the IRP 2016 draft report, over the next 30 years
- ▶ Approximately 2/3 of future electricity will need to be produced by utility scale operations, with as much as 1/3 generated from embedded generation
- ▶ Large scale distributed storage devices will form an integral part of electricity T&D systems of the future, well within the time frame of the IRP