

Energy efficiency potentials for different motor system levels – an empirical study of PFE implemented energy efficiency measures

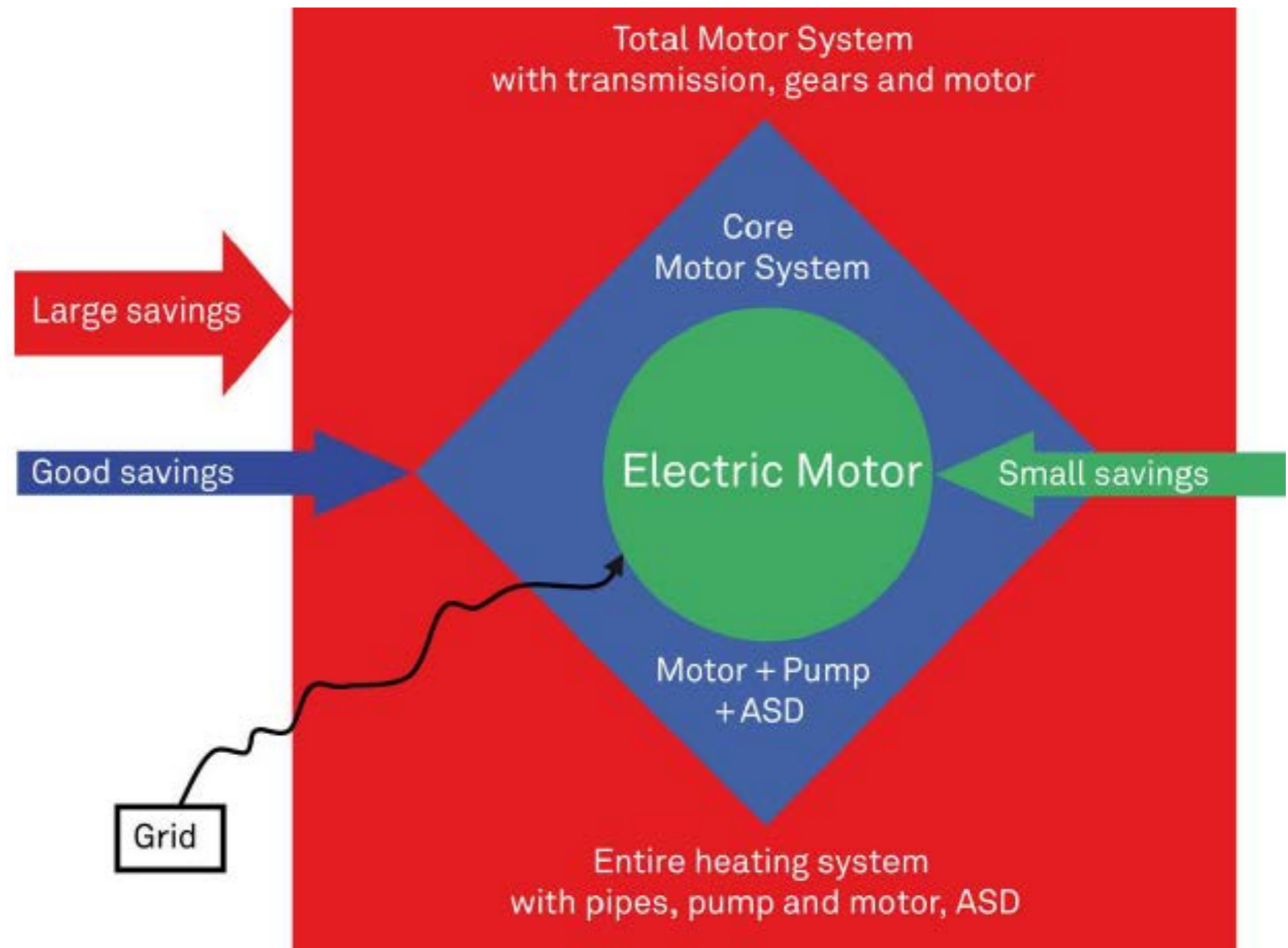
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Motor system levels

- Waide & Brunner, 2011
Energy-Efficiency Policy Opportunities for Electric Motor-Driven Systems

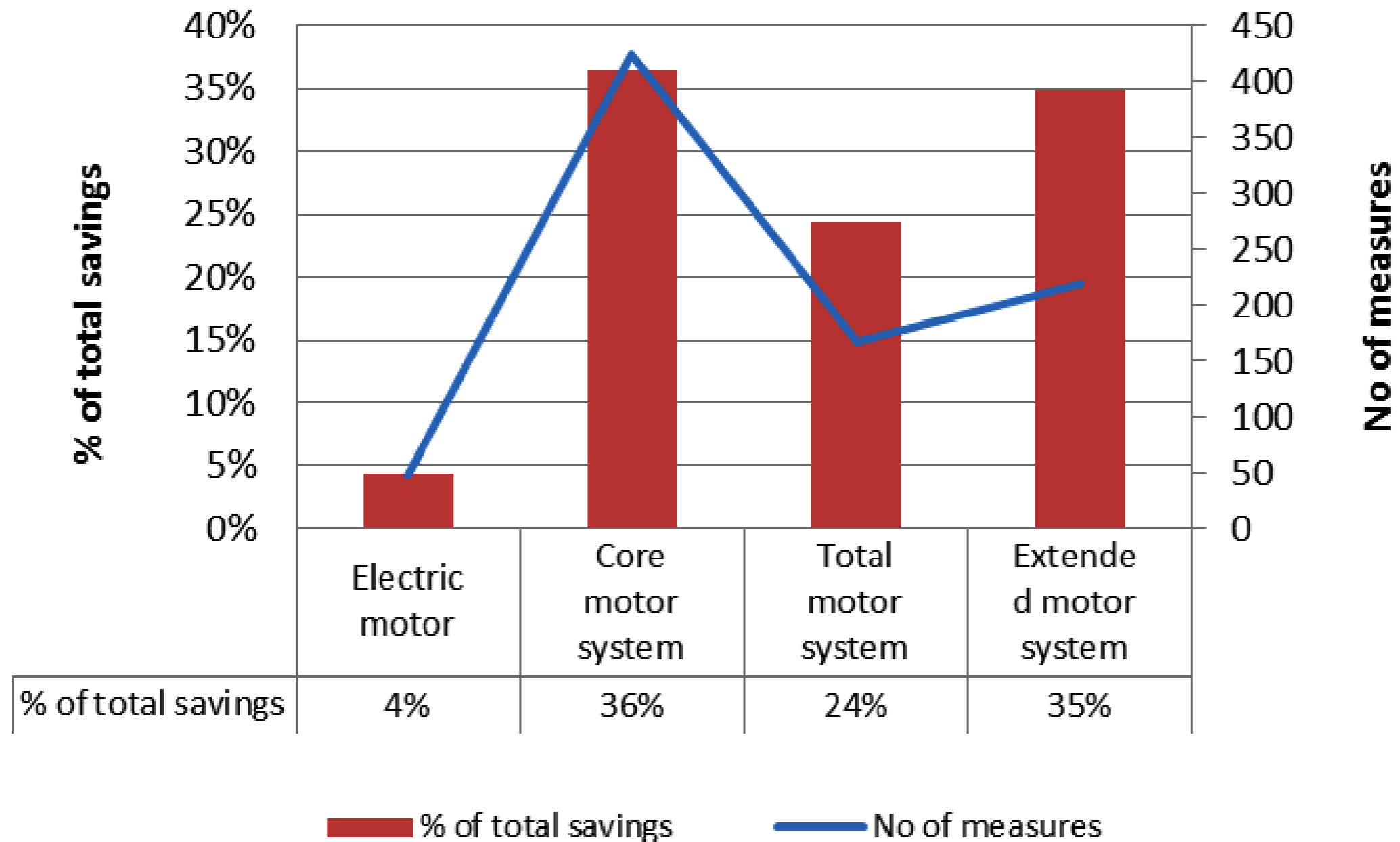
- Additional level –
boarder between
motor and human system



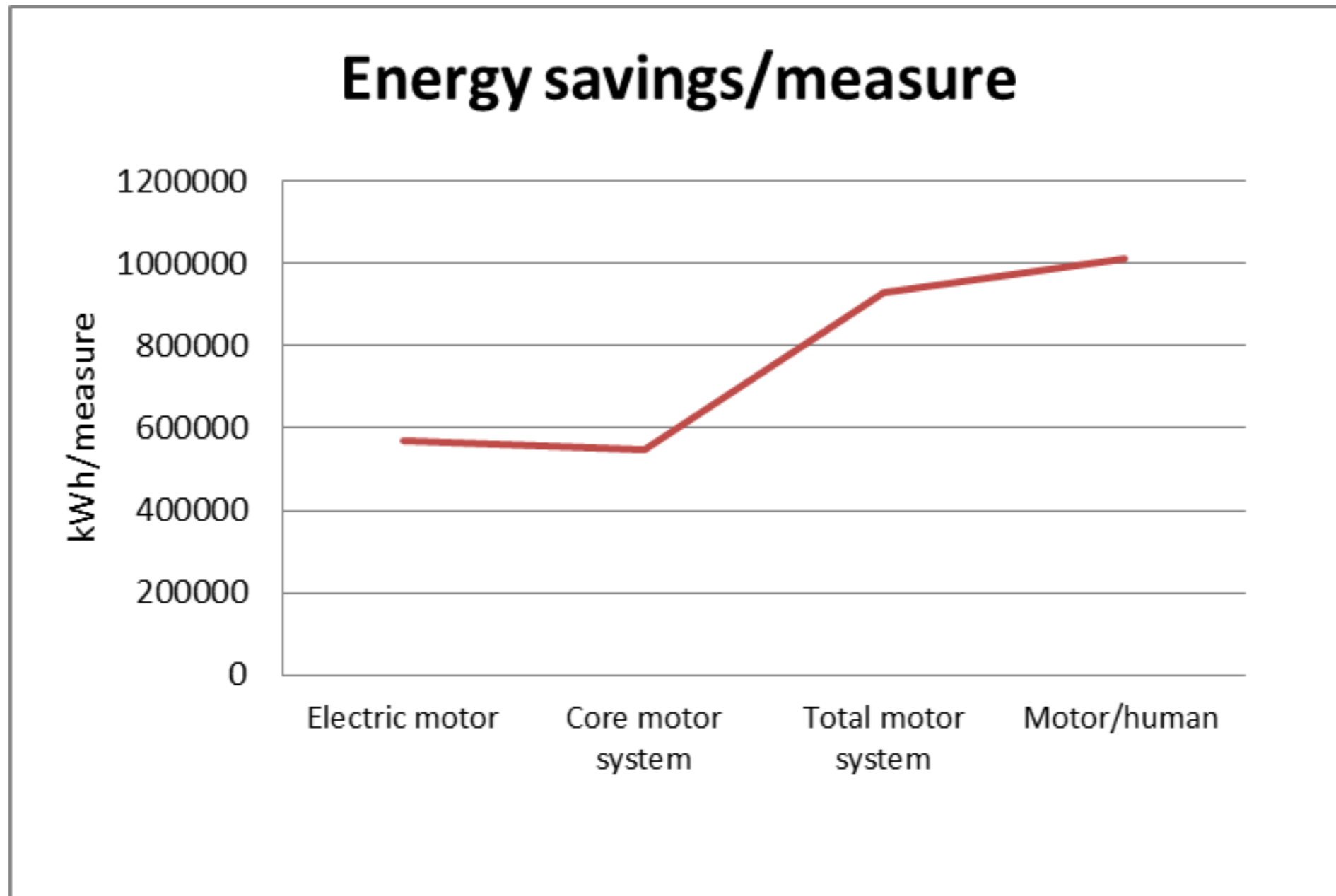
PFE's energy efficiency measures

Motor system level	Example from PFE
Level 1: Electric motor	<ul style="list-style-type: none"> Replace pump motor Change to more efficient electric motors Removal of motor Change of fan motor in washing machine
Level 2: Core motor system	<ul style="list-style-type: none"> Replacement of backwater pump Replacement of fan VFD on green liquor pump VFD on backwater pump
Level 3: Total motor system	<ul style="list-style-type: none"> Replacement of mixer Replacement of chips' conveyer Reduce consumption of compressed air New cooling tower
Level 4: Extended motor system (motor/human)	<ul style="list-style-type: none"> Adjust ventilation Automatic stop Change of operative time on paper machine More efficient production of compressed air Decrease specific electricity consumption

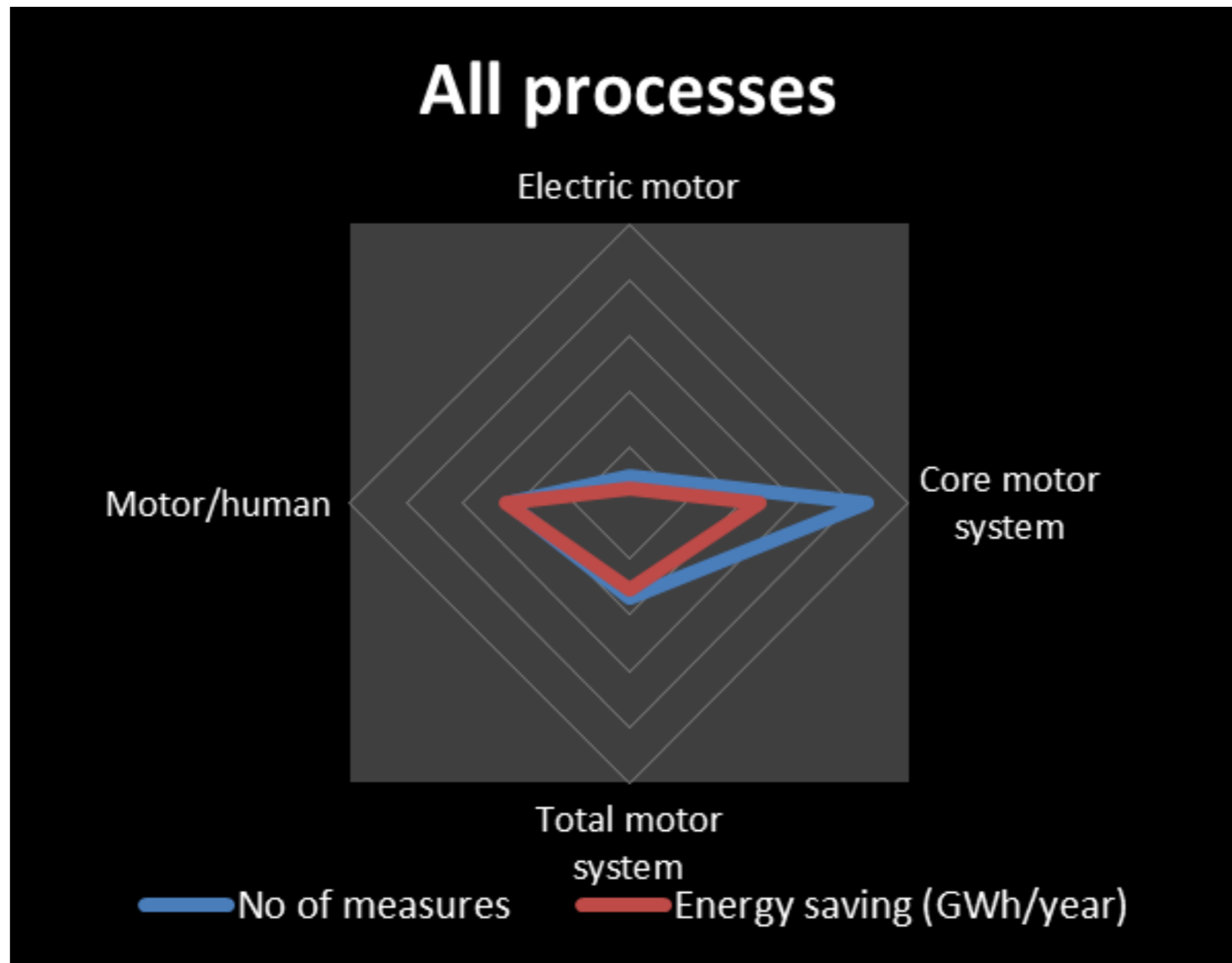
PFE's energy efficiency potential



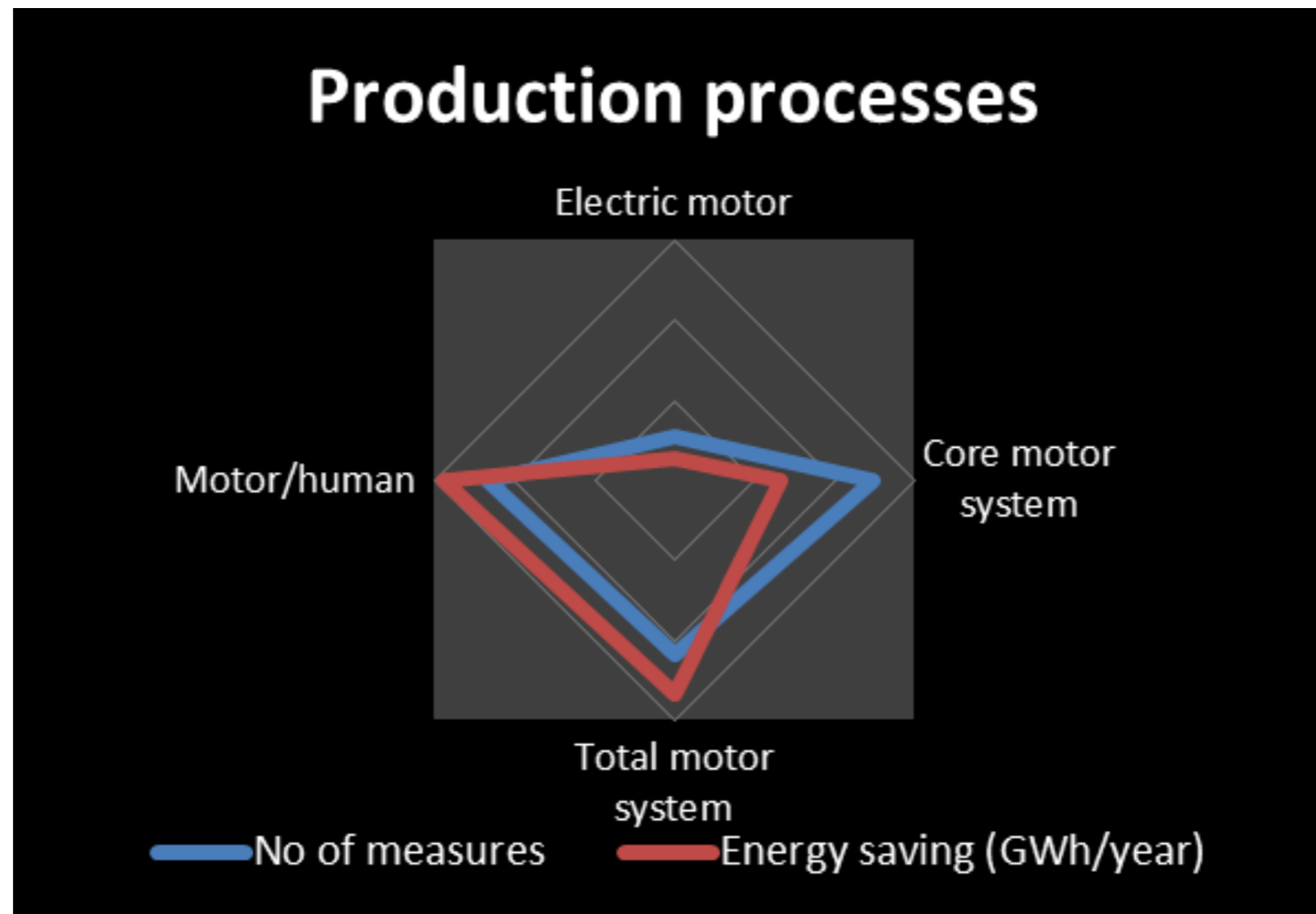
Specific energy savings



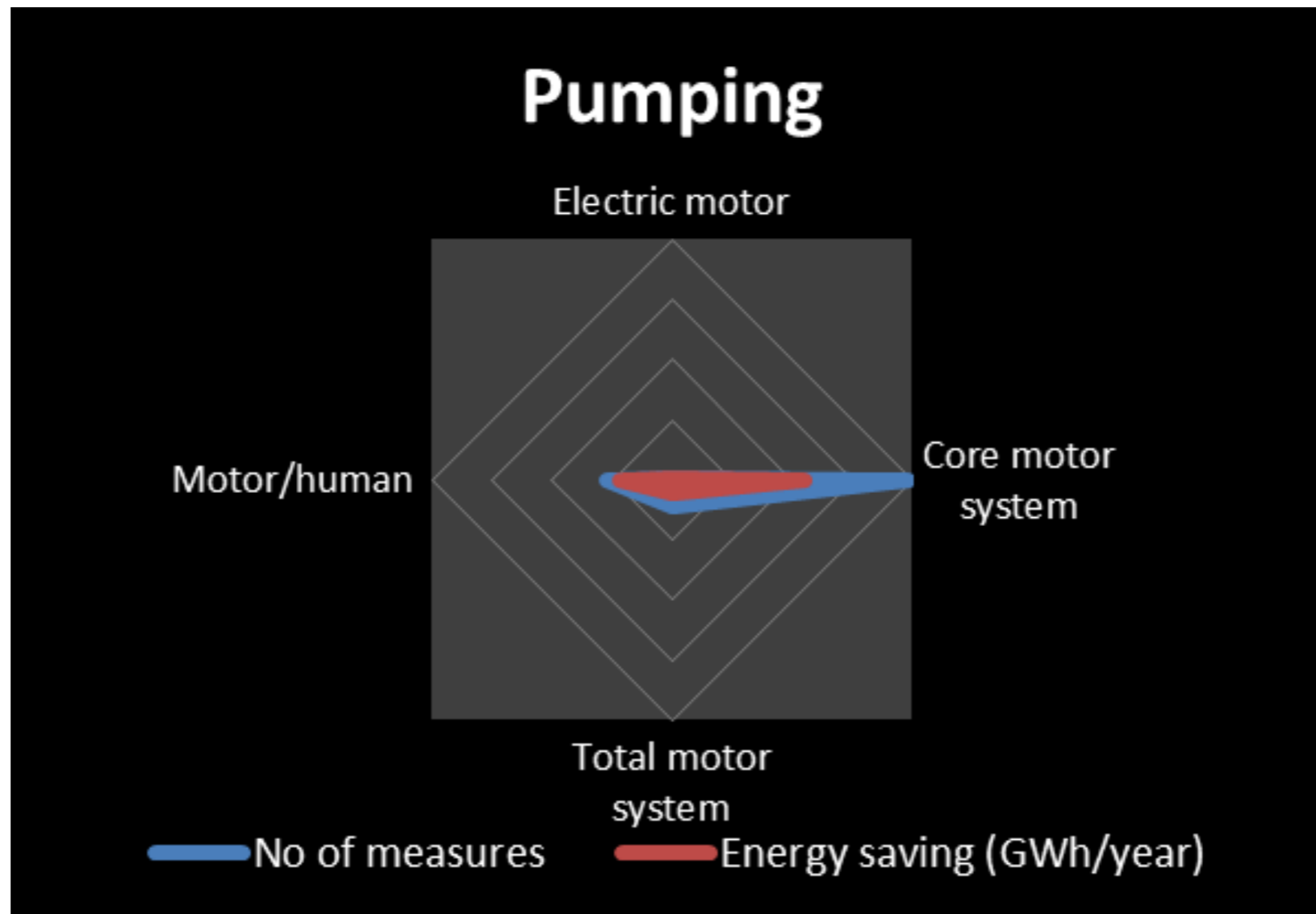
PFE's energy efficiency potential



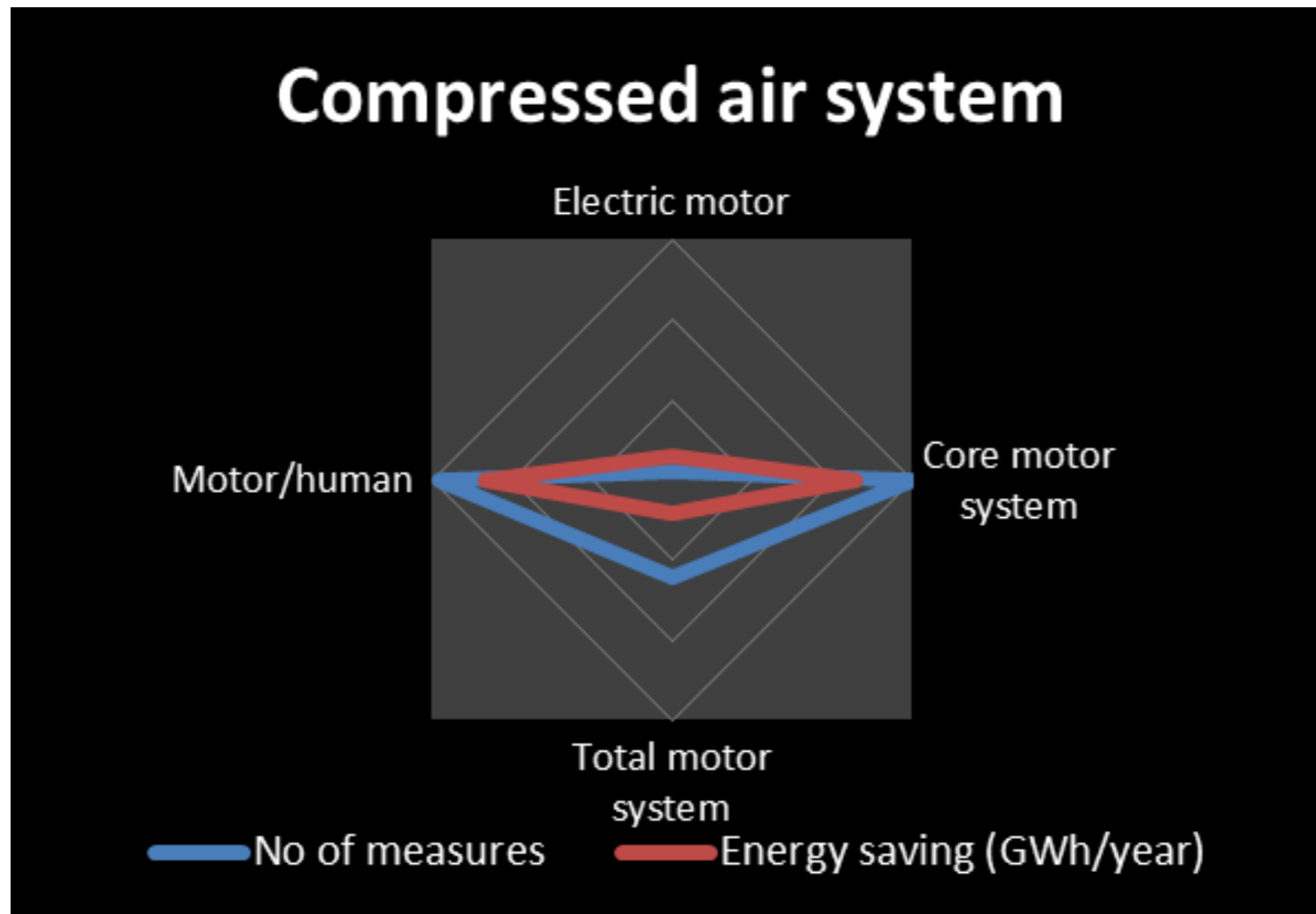
PFE's energy efficiency potential



PFE's energy efficiency potential



PFE's energy efficiency potential



Results

- Greater potential for energy saving in three higher levels
- Measures detected by means of energy management systems
- Energy efficiency requirements in the whole motor system should become more powerful than the mere requirements on energy-efficient motors

**Thank you for your
attention!**