Comments on the *Carbon Tax Policy Paper* issued by National Treasury in May 2013

Comments by the Energy Research Centre
at the University of Cape Town

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EXECUTIVE SUMMARY

The Energy Research Centre (ERC) welcomes the publication of South Africa's carbon tax policy paper (National Treasury 2013), following the earlier discussion document (National Treasury 2010). ERC had taken the opportunity to comment on the earlier document, based on our research. We are pleased to see that Treasury is moving beyond discussion, to formal policy. We offer these further comments in the hope that they may contribute to the implementation of a well-designed and environmentally effective carbon tax.

Our analysis of the carbon tax as proposed in Treasury's policy paper is that it is both low relative to the required task and includes a complex set of exemptions. The effective tax rate of R12-48 / t CO_2-eq is too little to transform South Africa's energy economy, and does not make a sufficient contribution to bending the curve of our national greenhouse gas (GHG) emissions, so that it starts following a benchmark 'peak, plateau and decline' GHG emission trajectory, as set out in our climate policy (RSA 2011).

Before commenting on the design, some fundamental issues need to be revisited. Climate change is real and already being observed – and it is a problem with some specific features. Climate change is a long-term problem requiring urgent solutions. For South Africa and globally, it is primarily an energy problem, that is, reducing GHG emissions from the use and supply of energy. Given how central energy (and forests in some countries) are to economic activity, that means climate change is not only an environmental problem, but deeply a question of our socio-economic development path. And it is not a question we can escape: because even if the costs of climate action might seem large, the one thing we do know about the costs of inaction is that they are even larger, and would be paid mostly by the poor. Climate change is also a collective action problem – solutions only work if all countries act, and resist the temptation to free-ride on the efforts of others. This does not mean that all countries need to do exactly the same. The key task of developing countries over the next decade, is to slow the growth of our emissions. It is necessary to now start to shift very large systems, to avoid being locked into a high-emissions, high-climate-impact world. This includes investments in infrastructure with long life-times, but about which decisions are being made now.

We understand the approach to introducing the system in a phased manner. But then the design needs to be more ideal, and appropriate to at least starting to bend the emissions curve. Given the low levels of the tax, the certainty and simplicity of absolute thresholds, and the greater marginal mitigation effect that can be achieved with the same burden to firms (unless emissions grow), there is a compelling case at low effective tax rate to apply absolute thresholds at the outset. Such thresholds could be agreed as part of a process of determining eligibility for transitional assistance.

1. **If a low tax rate, then have absolute thresholds**
    a. Relative thresholds mean the tax creates no disincentive for emissions growth. The set of so-called 'thresholds' are really exemptions, leading to a lower effective tax rate.
    b. Rather introduce absolute thresholds than relative ones – at the outset, not later. A marginal tax applied above thresholds of absolute emissions will have a greater marginal mitigation effect, with the same burden to firms unless emissions grow. This will enable a simpler tax design.
2. **Simplify the tax, apply it in full at the margin**
    a. Introduce a marginal carbon tax related to an absolute level, that is, levy the R120 on 40% of emissions, rather than the proposed minimum of R48 on 100% of emissions. This would achieve more mitigation, leaving the companies in the same financial position for a same level of emissions.

b. Instead of further exemptions for process emissions and trade-exposure, introduce transitional assistance for poverty alleviation, job retention and competitiveness. Z-factors can be applied elsewhere, as we suggest below.

3. **Instead of exemptions from tax, use revenues to provide assistance to ensure net benefit for poor households and establishing a transitional assistance programme for EITE industry**

   a. While not its objective, the carbon tax will generate revenue. This should be spent on assistance to the poor, to create jobs and to assist with competitiveness. These should be combined into a programme of assistance.

   b. Policy instruments for ensuring that poor households receive a net benefit under a carbon tax are important. Free basic alternative energy is a useful option. Direct transfers to households should also be considered.

   c. Instead of giving allowances for trade exposure (only), Treasury should give transitional assistance to energy-intensive and trade-exposed firms. Instead of paying less tax, eligible entities (assessed by the energy intensity of their exports) could receive transitional assistance. As designed, the 'thresholds' for trade-exposed sectors do not accurately target the industries who might have real need of transitional assistance. Z-factors contain a good idea, but should be applied to assistance, not exemptions.

   d. In applying the Z-factors to transitional assistance, the onus should be on firms within EITI sectors to demonstrate their eligibility (even though we have a broad understanding of firms in these sectors). It is here that thresholds for process emissions and energy- and trade-intensity would be appropriate. Such thresholds should be lowered over time.

   e. Assistance should be aimed at supporting the mitigation that firms can achieve, put forward by them in a mitigation plan. These mitigation plans would be reviewed by government, and once approved, firms would be accountable to implement them in exchange for the transitional assistance.

   f. Until a clear alternative to regulate emissions in the power sector is in place, electricity should not automatically be exempt from the carbon tax.

   g. This assistance should over time make South Africa a more efficient economy – cost-effective, energy-efficient and carbon-efficient.

4. **The price signal needs to be long in practice, and linked to the emissions trajectory**.

   a. A long-term price path should be set out in the tax policy, which may be indicative for the later decades. The current proposal is only for five years, much shorter than the time-horizons of major investments that could lock South Africa into a high-emissions path for several decades.

   b. The price increase should be real, not nominal.

   c. The price path could be indicative for later periods, with clear information as to how and when it will be adjusted.

   d. A fundamental basis for adjustment must be the tax's contribution to bending the GHG emissions trajectory. A link between the carbon tax and the emissions trajectory is essential to ensure environmental integrity. The carbon tax will provide more data, both that reported by companies for compliance with the carbon tax, and empirical information, to better estimate the responsiveness of the economy to a carbon price. Data systems should be established to enable research on the price elasticity of carbon in South Africa. This will provide a basis to assess the impact of the carbon tax on covered sectors, sub-sectors and major entities.

5. Use existing data for the carbon tax and improve over time

a. Data provided in compliance with the carbon tax and reporting requirements should also be independently verified by third-party experts, both as good practice and as a basis for biennial reporting to the UNFCCC. Treasury, DEA and others with data on GHG emissions should build on existing collaboration and further enhance it.

6. Keep a linked emissions trading scheme under consideration, and introduce off-sets once caps are set

a. It would be prudent to continue assessing the developments in carbon markets internationally, and whether it might be in South Africa's interest to transition to an emissions trading scheme over time.

b. The relation between cap and trade suggests that South Africa should not introduce off-sets, or carbon trade, until caps are in place caps (internationally and / or domestically).

Introduction and how to read this document

The Energy Research Centre (ERC) welcomes the publication on South Africa's carbon tax policy paper (CTPP) (National Treasury 2013), following the earlier discussion document (National Treasury 2010). ERC had taken the opportunity to comment on the earlier document, based on our research. We are pleased to see that Treasury is moving beyond discussion, to formal policy. We offer these further comments in the hope that they may contribute to the implementation of a well-designed and environmentally effective carbon tax.

Since the proposed design is complex, we start in the first section by reflecting on our understanding of the carbon tax. The comments then address the key design elements (section 2). Section 3 considers the crucial issue of recycling and how revenue will be spent. We have tried to understand the tax better with some numerical examples, in section 4. Other issues are raised in section 5, before we conclude our main substantive comments by proposing that there may be designs for a simpler, better carbon tax (section 6). Some specific technical comments are added in an Appendix.

1. What is the carbon tax policy?

Our understanding of the key features of the carbon tax are as summarised here (section 7 of the CTPP gives the full detail):

Key features

- Objective: The carbon tax aims to achieve GHG emissions reductions as its primary objective. It aims to do so in three main ways – changing producer and consumer behaviour; contributing to mitigation and adaptation being taken into account in investment decisions (including on infrastructure); and creating incentives for low-carbon technologies.
- Tax rate: The nominal rate is R120 / t CO_2-eq, deliberately set low and acknowledging that the effective rate is lower. To understand the effective tax rate, several other factors need to be considered – tax-free thresholds, increases in the tax rate over time, off-sets, and adjustments to reward good practice within sectors (Z-factors).
- Tax base: The carbon tax is to be implemented as a fuel input tax, i.e. it is levied on coal, crude oil and natural gas inputs (not directly on GHG emissions' nor on energy outputs)
- Gases: On six gases in principle, but effectively CO_2, CH_4, N20 and PFCs (SF_6 and HFCs not listed in any sectors).
- Coverage: it includes most sectors of the economy' only excluding agriculture, forestry and land use (AFOLU) and waste.
- Time period: There is a clear commitment that the tax starts from 1 January 2015. The first period is from 2015-2019, with a revisions prior to a 2020-2025 period
- Increases: The tax rate will increase 10% per year until the end of 2019. The rate of increase for 2020-25 will be announced in February 2019 at the latest.
- Tax-free thresholds: A key design feature is sector thresholds, which reduce the effective tax.
    - The tax is applied only to emissions above percentage-based thresholds of actual emissions.
    - All sectors do not pay tax on 60% of their emissions in the first phase.
    - Energy-intensive and trade-intensive (EITI) sectors get a maximum of 10% additional reduction (cement, chemicals, etc.)
    - Z-factors are allowed up to 5% plus or minus.
    - Overall there is a 90% maximum tax-free emissions (except AFOLU and waste)

- Rebates for CCS: A tax rebate for carbon capture and storage (CCS) will be considered.
- Recycling of revenues: The CTPP seeks to ensure that poor households and energy-intensive industries are cushioned from the impacts of a carbon tax. It is informed by modelling of several ways of recycling revenue. It favours increased investments (rather than reducing VAT, corporate or personal income tax, or direct transfers to households).
- No operational link to climate change damages or emissions trajectory.
    - Reference to national emissions trajectory: The paper acknowledges that the country's mitigation actions shall be measured against the benchmark emissions trajectory, consistent with the 2011 National Climate Change Response White Paper. It indicates that other policies have an effect. It does not attempt to define a contribution to bending the national emissions trajectory downwards.
    - Relation to climate damages: In principle, the CTPP would set the tax rate equivalent to marginal external damage costs. But it points to a lack of full understanding, and absence of global pricing of GHG emissions as reasons not to relate the tax rate to damage costs (yet).

2. Key design elements

The proposed design is complex, and not easy to understand. Figure 1 seeks to reflect our understanding of the Treasury's proposed design of the carbon tax. A simpler design may have signficant advantages.

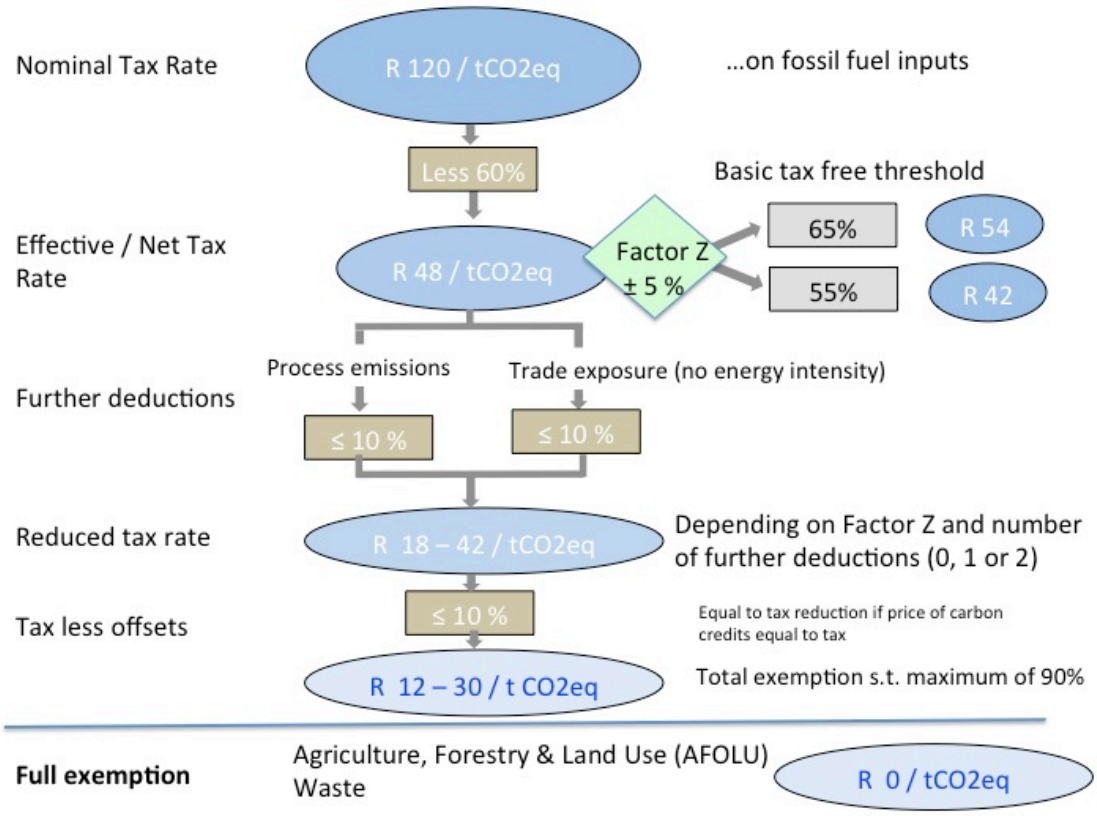

Figure 1: Flow diagram of tax rates

2.1 Tax base

The carbon tax is to be implemented as a fuel input tax, and is in principle economy-wide. However, with all sectors receiving partial exemptions, some full exemption, and some additional allowances, the tax base is less clear. Adding the basic tax-free threshold, additional allowances and off-sets (assuming these are available at the same carbon price) yields the

effective tax rates shown in Figure 2. The figure shows that sectors reported essentially fall into four categories (ignoring Z-factors). Electricity, which get the basic threshold and up to 10% off-sets, thereby paying 30% of the tax. A range of sectors get the exemption for trade-exposure only, plus 10% off-sets. Another group receive exemptions for both trade-exposure and process emissions, and up to 5% offsets. Finally, the AFOLU and waste sectors are entirely exempted, with a zero tax rate. Even lower rates would apply if Z-factor adjustments are included.

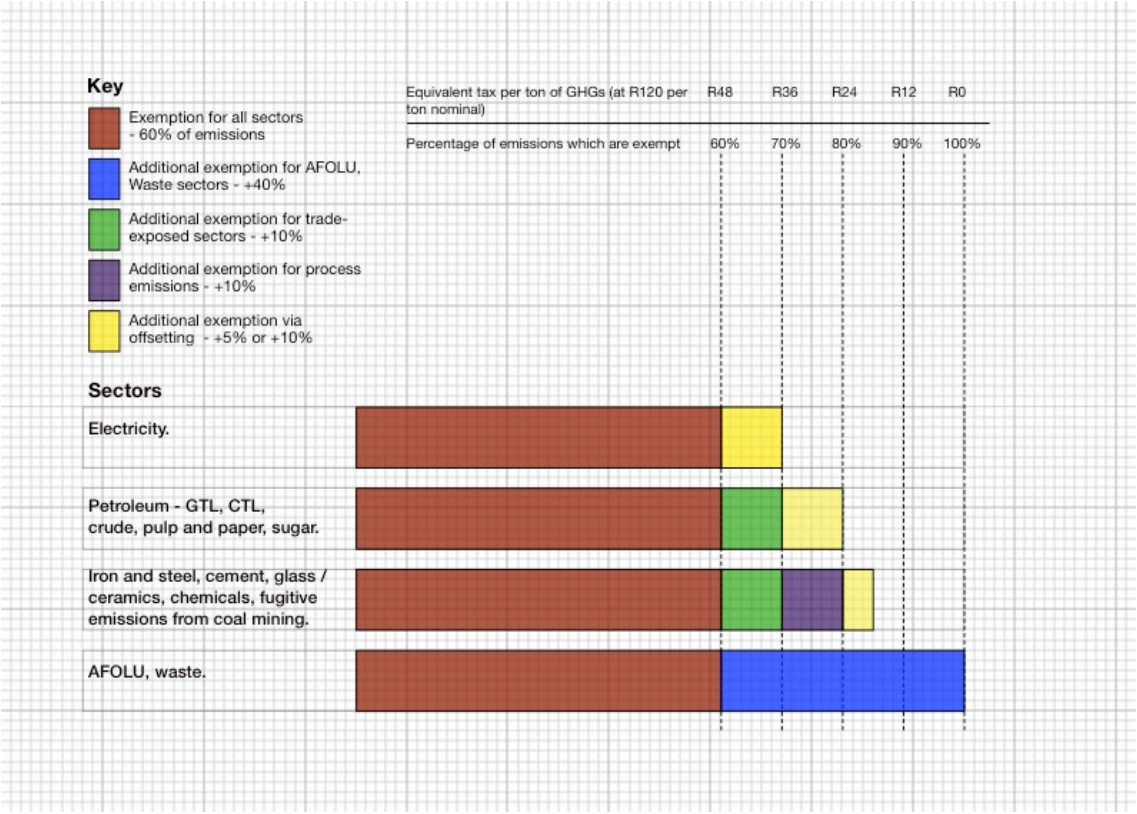

Figure 2: Effective tax percentage by sector, with max exemptions and offsets, assumed at same price, but excluding Z-factor adjustments

2.2 Tax rate

The CTPP takes the approach of starting the system with a low carbon tax rate. The rationale is to start the system at a low rate, calling for the 'initial modest effective tax rate' to be increased over time (para 40), by 10% per year (para 42 and 196). It is unclear whether the price increase is real or nominal.

The current design includes a low nominal tax rate (R120 / t CO_2-eq), and an even lower effective rate due to exemptions (60% for all sectors, and up to 100% for AFOLU and waste).

The press release accompanying Treasury's paper states that when the threshold and additional relief are applied 'the effective tax rate will range between R12 and R48 per ton of CO_2-eq (and zero for Agriculture and Waste)' (p.2). This assumes not only that the percentages in Figure 2 are applied, but additionally the Z-factor increases the basic threshold by 5%. This range is confirmed in our own reconstruction. It would rise to R54 if a Z-factor added 5%, and no further exemptions were applied or off-sets used. Hence the range cited by Treasury is accurate, for consideration of domestic pricing.

These tax rates will be insufficient to transform South Africa's energy economy. For example, analysis in the Long Term Mitigation Scenarios found that only from R100 per ton of CO_2-eq did the impact of a carbon tax on the South African economy become significant (Winkler et al, 2007' Figure 59). Yet the proposed approach has merit if it increases the acceptability of the tax

among those who have to pay it. But the low carbon tax should then be implemented consistently across the economy, and comprehensively across all sectors.

The so-called 'basic tax-free threshold' of 60%, means the effective tax rate is in a range from R12 to R48 / t CO_2-eq. This is insufficient to transform South Africa's energy economy.

2.3 Z-factor

The intention behind the Z-factor (para 188, and Box 2) appears to be to reward those firms in a sector that are improving their specific GHG intensity more than others. Firms that are relatively more carbon-efficient than others in their sectors would see a reduction in the 'basic' tax-free threshold by 5%, i.e. up to 65% discount. The least carbon-efficient would receive 'only' 55% of discount. Such incentives are a good element.

It might, however, be preferable not to use the Z-factor to further reduce the tax rate, but rather to define transitional assistance. Such assistance should be provided to firms for whom a carbon price might raise genuine competitiveness concerns, but also for job creation as a means to poverty alleviation. The Australian experience with a Jobs and Competitiveness Programme may be a useful example to explore in greater detail.

The Z factor could be stated conceptually as the ratio of the emissions intensity of the firms relative to a benchmark emissions intensity' and a simple representation in the following formula might help those mathematically inclined:

$$Z = \frac{EI_{firm}}{EI_{\ sector\ benchmark}}$$

Where EI is the specific emissions intensity in t CO_2-eq / unit of product.

Estimated emissions intensities are reported in Table 9. For electricity, the 1.04 t CO_2 / MWh is signficantly higher than historically reported by Eskom. Eskom annual reports reported average values of around 0.96 t CO_2 / MWh. More recently, Eskom reported 1.00 t CO_2 / MWh, indicating that it was including transmission and distribution losses.

Independent analysis, applying standard CDM methodologies to calculate the 'combined margin emission factor' for the South African grid yields a factor of 0.957 tCO_2 /MWh in 2009/2010 (Spalding-Fecher 2011). The combined margin (in simple terms) combines a build margin for new plants with an operating margin for existing plants.

It is unclear from the first four rows in Table 9 how the 'average' emission intensity for the existing fleet of power plants is derived, and it appears higher than other values. Given the scale of emissions from electricity generation, this deserves careful analysis.

2.4 Exemptions from the tax

The so-called 'sector thresholds' outlined in section 7.3 are effectively partial exemptions. The CTPP proposes to apply a 'percentage-based threshold of actual emissions'. In Table 8, 60% is listed as a 'basic tax-free threshold' which applies to all sectors.

These are relative thresholds, or in more plain language, if emissions grow dramatically during the period, the tax-free threshold is applied not only to the earlier emissions, but also to the emissions growth. *This means that no marginal effect can be achieved*. As an example, if a sector or firm emits 100 Mt in 2015, but 150 Mt in 2016 or a later year, the current proposal means that the do not pay tax on 90 Mt in 2016. If an absolute threshold were set (say at the 2015 value of 100 Mt, which would be grandfathering), then 60 Mt would be tax exempt. The additional 50 Mt should face the full tax rate.

Introducing a low rate with absolute thresholds has some merit. Relative thresholds are still a sub-optimal tax design, even if the tax rates were higher. Having *both* a low effective tax rate *and* relative thresholds means the environmental objective of the tax will be minimal.

While 'thresholds' are subject to review every five years, it would be preferable to use absolute thresholds from the outset. This would enable a marginal effect to reduce emissions, without increasing the burden on companies (unless emissions grow).

Treasury's proposal effectively charges a given percentage (maximum 40%, some even less), *regardless of what the actual emissions are and how much they grow*. So the R120 / t CO_2-eq becomes R48 at most (or as little as R12) per ton. Every additional ton also pays only this reduced rate. A company with one million tons CO_2 emissions pays R48 million if they are in a sector with no additional allowance beyond the basic 60%. So they get a 60% discount on their total tax bill.

Rather than having a firm with a 60% tax-free threshold pay only 40% of R120 on all of its emissions, i.e. R48 / t CO_2-eq, that firm should pay R120 on 40% of its emissions (as suggested in the paper itself, e.g. para 183). In other words, the most cost-effective way of providing more mitigation with the same financial outcome is for that company to charge the full tax of R120/ t CO_2-eq on only 40% of their emissions, and give them a full exemption for the first 60% of the emissions set. That would be a true threshold. The notional company would pay R48 million for their 1Mt CO_2-eq, but R120 on anything above that.

It would keep a strong investment signal but avoid the complexity and uneven distributional impacts of the proposed approach, and the technical hazards of compensation and exemptions.

Treasury should reconsider introducing absolute rather than relative thresholds. Given the low levels of the tax, the certainty and simplicity of absolute thresholds, and the greater marginal mitigation effect that can be achieved with the same burden to firms, there is a compelling case to introduce a low effective tax rate, applied to absolute thresholds at the outset. This can also be understood as a marginal carbon tax (above an absolute level), rather than a flat carbon tax, with a complex set of exemptions and off-sets. This would achieve more mitigation, leaving the companies in the same financial position for a set level of emissions.

2.5 Additional allowances

The Carbon Tax Policy Paper proposes further allowances, for trade exposure and process emissions, each an additional 10% beyond the 'basic' 60%.

2.5.1 For trade exposed sectors

In Table 8, all sectors have entries for the allowance for trade exposure, except for electricity (and AFOLU and waste, which are entirely exempt anyway). Except for electricity, the effective tax rate is R36 / t CO_2-eq at most (R120 less 70%). The allowances are presented as an alternative approach to border carbon adjusments (BCAs, section 7.6).

This allowance is designed in a manner that addresses only trade-intensity. Yet it cites *energy-intensive and* trade-intensive sectors (para 203 and Table 10). With no connection between the energy-intensity of exports (or imports), a crucial aspect of assistance to EITE sectors is missed. Competitiveness issues may apply if energy- and therefore emissions-intensive products are exported by South African firms to countries where no carbon price applies. Based on trade alone, there is no necessary connection.

Allowances for trade exposure, if retained, need to address both energy-intensity and trade-exposure, not only the latter.

Later in the CTPP, it is indicated that this 'concession will be structured as a graduated relief' (para 188). In essence, the greater the share of exports of a firm's total sales or output, the more additional relief it receives – up to 10%. Further formulas define trade intensity quantatively, seeking to provide firms the option to use either exports only, or exports plus imports, as a percentage of output or sales. For exports only, a factor of 0.4 is applied' for exports and imports, 0.2. So a firm that chooses to count only exports, which account for 18% of their total sales or output, would get relief of 7.2% (0.4*18).

2.5.1.1 Transitional assistance for EITE sectors

As discussed above, trade-exposed sectors must also be shown to be energy-intensive if they are to receive transitional assistance. Furthermore, rather than a blanket exemption for sectors that

trade energy-intensive goods, we believe Treasury could draw on the example of the Australian Jobs and Competitiveness Programme for defining assistance to eligible firms in EITE sectors. The Australian model works as follows: free carbon units (in the context of a trading scheme, and which are later converted to cash or cash-equivalent grants) are given to EITE sectors that have proven their eligibility under the scheme. Rather than assistance being organisation- or facility-based, eligibility is dependent on previously-defined process activities (which were defined by firms in conjunction with the government and approved by an expert advisory committee). Although the system is initially more complicated in terms of defining activities that should receive assistance, the model allows for very focused targeting of assistance for those activities that are both emissions-intensive and trade-exposed.

Eligible activities are assessed by their emissions-intensity, which is based on either a revenue metric (average emissions/million dollars revenue) or a value-added metric (emissions per million dollars value-added). The onus is on firms to demonstrate quantitatively or qualitatively that they are trade-exposed. The latter may be assessed on the basis of either a trade share (ratio of the value of imports and exports to the value of domestic production) of greater than 10% in baseline years, or based qualitatively on a demonstrated lack of capacity to pass through costs due to the potential for international competition, with a rigorous process of demonstration outlined.

If firms can show that particular activities are eligible under the scheme, assistance of 94% for high-EITE and 66% for medium-EITE sectors is given for a certain timeframe (in the Australian case, the first five years of the carbon pricing scheme), with a reduction of 1.3% per year built into the system. Such a system reduces job losses in those sectors that are legitimately vulnerable at least in the short-term, while also retaining the price signal that the tax sends over the medium- to long-term (Australia 2008).

We propose that firms must demonstrate their eligibility for transitional assistance, that assistance is also dependent on firms supplying the government with a mitigation plan, that following approval of the mitigation plan, the transitional assistance is allocated in the form of grants, and that firms report on the expenditure of the asssistance demonstrating how it has been used to implement the plan. Firms in the process of applying for transitional assistance might be allowed to withohold a portion of the carbon tax payments for three to six months. Those firms that can demonstrate that they are more efficient than the activity norm could claim higher levels of assistance, rather than the Z-factor functioning as an exemption.

The levels of assistance to eligible firms would be a function of a) their emissions intensity; b) assistance rates for firms in a comparable category or sector; and c) production. Effectively, firms would get back funds equivalent to the assistance offered, so that their effective tax rate is reduced. The levels of assistance to EITE firms should be reduced over time, and eventually phased out entirely. The purpose must be to help these sectors make a transition to a low-carbon economy, not to maintain a high-carbon economy.

2.5.2 For process emissions

Additional allowances are made for process emissions, a further 10%. The sectors that would receive this additional effective reduction are iron and steel, cement, glass and ceramics, chemicals, and fugitive emissions from coal mining (Table 8).

2.5.3 Sum of discounts and relation to off-sets

The sum of these discounts (called thresholds and allowances) is limited to 90%. This would not be meaningful if applied to the thresholds and allowances, without off-sets – as the highest total is 85%. If off-sets were added (and the assumption is that prices are the same, so percentages are comparable), then it could potentially go to 95%. This is possibly reflected in Table 8, in the sense that sectors that received both discounts for trade exposure *and* process emissions, in total 20%, are allowed only 5% off-sets. Sectors that have 'only' the 'basic' tax-free threshold, adding only either trade *or* process emission discounts, can off-set up to 10%. This relationship between the 90% limitation and discounts / off-sets should be more clearly stated (if this complex design is retained).

2.6 Off-sets

Covered sectors may use clean development mechanism (CDM) and voluntary carbon standard (VCS) credits. The maximum off-set is 10%, with some sectors only being allowed 5%. The precise effect will depend on the relative prices – the effective tax rate faced by various sectors, relative to the prices of CERs and credits from VCS.

2.7 Effective tax rates

Figure 3 shows the effective tax rates, in our understanding of Treasury's proposed design. It builds on the simpler presentation (in Figure 2, which was without Z-factors). With the addition of Z-factors, the four groups are shown at two extremes, with the maximum +5% and -5% applied to the tax-free threshold. Taking electricity, it would range from 55% to 65%, before off-sets. It can be seen that that the 90% limit would only apply in the case of one group (iron & steel, cement, glass/ ceramics, fugitive emissions from coal mining), if that group has the +5% Z-factor (i.e. is relatively efficient). With the 65% (basic plus Z), 20% for both process and trade-exposed exempations, and full 5% off-sets, firms in these sector would pay only 10% of the tax, R12 / t CO_2-eq.

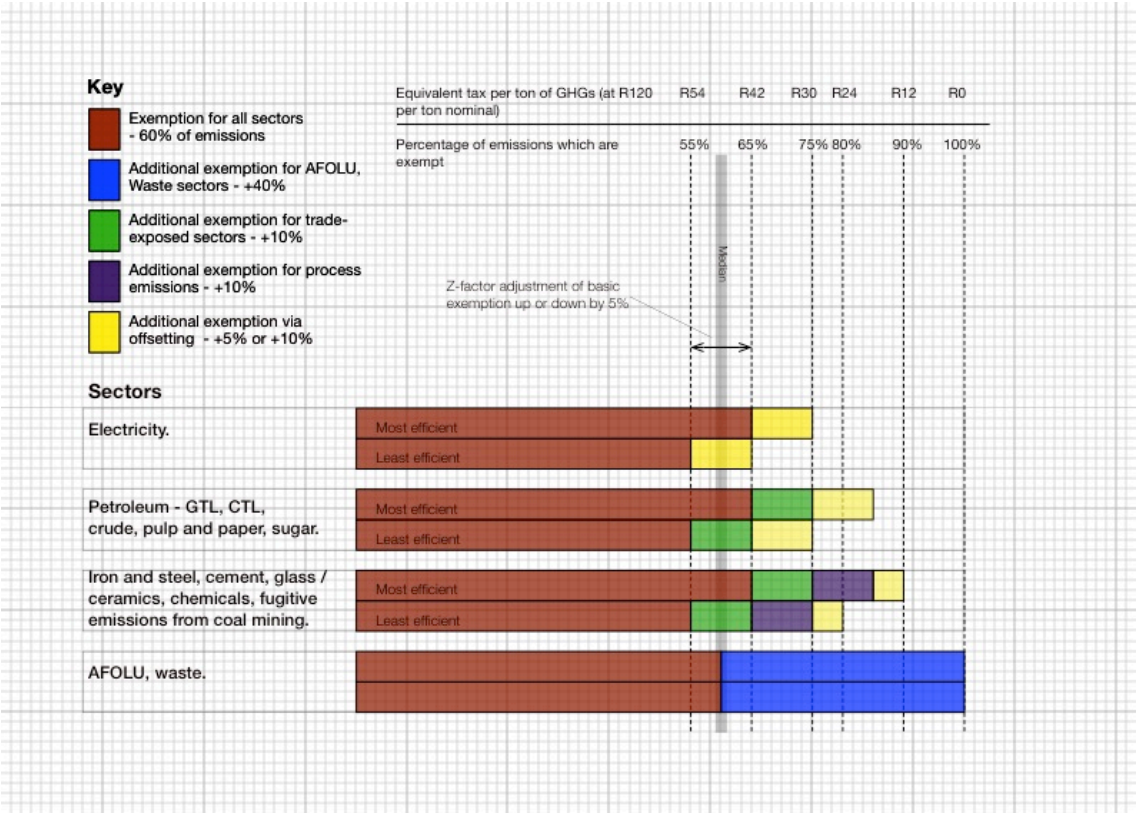

Figure 3: Effective tax percentage by sector, with max exemptions and offsets, assumed at same price, *including* Z-factor adjustments

2.8 A long-term price path linked to bending the emissions trajectory

The price signal sent is limited to a 10% annual increase for 2015-2019. This does not provide a sufficiently long price path, and therefore insufficient certainty for investments in long-lived infrastructure. Power plants, for example, have lifetimes of several decades, up to 50 years. A long-term price path should be set out in the tax policy, which may be indicative in the later decades. It should provide adjustment at pre-defined points, in relation to the tax's contribution to bending the GHG emissions trajectory.

Treasury clearly locates the carbon tax as a measure 'to ensure that the primary objective of GHG mitigation is achieved' (para 2). The long term mitigation scenarios identified an escalating carbon tax as the single most effective mitigation option. However, the CTPP does not link the tax level to the emissions outcome. It quotes our climate policy that the national emissions trajectory will be used 'as a benchmark against which the efficacy of the country's mitigation actions will be measured' (para 73). It goes on to say that the carbon tax is 'just one of the mitigation instruments'. This is insufficient. The impact of the carbon tax on emissions in covered sectors needs to be measured, reported and verified. It may be that some sectors are covered by other instruments, including regulatory ones.

A link between the carbon tax and the emissions trajectory is essential to ensure environmental integrity. Either the combined effect of the carbon tax and other major elements of climate policy can be assessed against trends in GHG inventories, or the impact of the carbon tax on covered sectors, sub-sectors and major entities can be assessed.

As cited in the proposed tax policy, the National Development Plan foresees an absolute constraint on GHG emissions internationally during 2030–2050, and a decline in South Africa's emissions from 2030–2035 onwards, which will require a structural transformation in the economy.

While South Africa 'does not (as yet) face a binding target for emission reductions' (para 13), there is a significant international pressure for all countries (and all major economies) to put forward more ambitious goals by 2015, to take effect from 2020. South Africa will need to consider its existing trajectory, defined internationally and in national policy for 2020 and 2025, and possibly set a goal for 2030, and indicatively up 2050.

A price signal that takes seriously these considerations is needed, particularly at a time when South Africa is entering a cycle of investment of infrastructure that will be around for 50 years and longer. An increase of 10% per year in the carbon price for five years does not constitute such a price signal, contrary to what is claimed in paragraph 197 (and it is unclear if the 10% increase is in real terms or only nominal, which would be much lower in real terms.) This is an insufficient price path which does not give certainty for long-term investors.

While understanding the rationale for a gradual approach of introducing the carbon tax, our analysis does not support the view that combined with a low tax rate and without a clear adjustment to the price path, the gradual approach 'will send the necessary policy and price signals to investors and consumers' (para 1). Effective tax rates of between R12 and R48 are too low to send a clear signal that our energy economy needs to shift beyond incremental change, and our society at large needs to make a serious transition.

3. Recycling and use of revenue

The carbon tax will generate revenues, though that is not its purpose. In assessing the socio-economic impacts of a carbon tax, it would be unbalanced to consider only the payment of revenue – the expenditure of the revenue also needs to be modelled. This is referred to as recycling of revenue. Under some recycling scenarios, a carbon tax can have positive economic impacts, with the paper noting that 'most positive impacts for the recycling of revenue emanate from the channelling of funds towards new productive investments in the respective sectors' (p. 10). Treasury's own modelling has shown that the overall impacts on GDP are modest. The critical distributional effects depend on how revenues are used. Broadly, the results of economy-wide modeling undertaken by Treasury and using a World Bank model (section 6 of the paper) are consistent with other analysis undertaken (Alton et al. 2012; Kearney 2008; Pauw 2007; Winkler & Marquard 2009).

It is good public finance management not to ring-fence such revenues, but the Carbon Tax Policy Paper indicates that on-budget expenditure could occur in parallel. The revenues should be used to alleviate poverty and fund further mitigation (beyond that induced by the carbon tax itself). Based on research at ERC, we would suggest that there are two broad categories to address – protecting the poor and assisting energy-intensive and trade-exposed sectors in industry to mitigate.

Assistance provided to poor households and energy-intensive and trade-intensive industries should be combined in a programme of transitional assistance. Several design principles are important:

a. To achieve the emission-reduction purpose of the carbon tax, thresholds (i.e exemptions) should be targeted only at those firms that need assistance.
b. The relief should enable a transition to a low-carbon economy, not reduce the carbon price signal in places where it is needed to ensure environmental integrity.
c. Fairness requires that the resources provided to EITE firms are balanced against the needs of others, particularly poor households.

3.1 Funding to alleviate poverty and create jobs

3.1.1 Free basic energy

Extending free basic electricity to a broader suite of energy services is an important component of ensuring that poor households benefit from a carbon tax, rather than suffering from higher energy bills. The CTPP refers only to free basic electricity on p. 17, but a heading sixty pages later suggests this might be extended to free basic *energy*. The only other energy source mentioned is LPG, which might be extended to cooking and heating services.

In relation to recycling mechanisms and free basic energy, the document uses the terms free basic energy and free basic electricity interchangeably. Based on research on energy, poverty and development at ERC, we would support the latter, broader consideration of using revenues to improve basic *energy* access. There are broadly two considerations that the carbon tax policy should take into account with regards to how to recycle revenues in respect of energy access:

- How best to protect poor consumers against electricity price rises as a result of the carbon tax.
- How to use additional revenues to improve access to energy services for the poor.

Households will not be directly paying the tax, but will see increases in their energy bills, and also in energy-intensive goods. It is recommended that protecting the poor against electricity price rises be achieved through the inclining block tariff.

With regards to best spend of additional revenues, there are several considerations:

- Free basic electricity (FBE): We do not support an increase in the consumption allocation of FBE. Any revenues for household energy access should be prioritised towards extending energy services to the currently unserviced population and filling current policy and funding gaps, rather than further increasing subsidies to those that are already being targeted – for example, extending FBE to backyard dwellers and other poor and low-income households excluded under the present policy, as in cases where several households are connected to one meter. These household clusters exceed the allowable electricity threshold, which makes them ineligible for FBE.
- Integrated National Electrification Programme – additional funding could be targeted towards this programme to extend access to the currently unserved population.

Implementation of the Free Basic Alternative Energy (FBAE) subsidy for unelectrified households is extremely poor and further funding should not be directed into this mechanism without substantial review of the original policy (DME 2007) and its implementation. In 2011, approximately 160 000 households received the FBAE subsidy (Statssa, 2012), against a picture of more than three million unelectrified households. The implementation challenges are far more complex than just inadequate funding. Municipalities lack personnel and resources to manage and admininster FBAE, and around 20% do not even have indigent registers in place. Thus far the implementation has met with many challenges (DoE 2013) and there are only very few successful projects (Atkins & Prasad 2013). An analysis of the successes and challenges of the FBAE is required and the following questions must be answered:

- Which approach to the implementation has worked?

- How can the challenges be met in municipalities where FBAE was tried but was not successful?
- Why was the policy not implemented more widely?

Municipalities are also not specifically obligated to adminster the national funding they receive for FBAE, and often this funding is diverted to provision of other basic services instead. Carbon tax revenues should not be channeled into a policy mechanism that is currently not working.

The use of these newly generated revenues could perhaps best be targeted to where there are current policy and funding gaps in relation to household energy access. National energy access interventions should cover all energy carriers that the poor use. Interventions may be directed at the distribution of energy carriers, improving end-user appliances, or programmes targeted directly at consumers (e.g. awareness and education). In this respect the following could be considered:

- **Liquefied petroleum gas** is currently under-utilised in the low-income domestic sector in South Africa. There are various benefits for the economy and poor consumers for increasing use of this energy carrier – firstly by helping to reduce peak-time electricity demand, and secondly by providing a viable alternative to paraffin for unelectrified households. The document makes mention of the development of the National LPG Strategy (para 51 and 238) in relation to energy access for poor households. Revenues may be directed towards initiatives aimed at improving the uptake of LPG as an energy carrier in the domestic sector through fuel switching incentive programmes and other demand stimulus initiatives.
- **Domestic appliances** for all energy carriers (wood, coal paraffin, electricity) used by the poor need attention with regards to standards and regulations, and establishing markets and distribution chains. Unreliable and inefficient appliances in the South African market currently have severely negative consequences for poor consumers in terms of health and cost (through reduced efficiency and of having to replace poor quality appliances more frequently) as well as detrimental environmental impacts in terms of local air quality and emissions. Some revenues might be used to assist poor households in modernising appliances, thereby contributing to reducing energy poverty.
- The **off-grid solar home system programme** is another energy access programme that could be considered for funding, and has battled over many years from slow implementation due to national funding cutbacks.
- The **low-pressure solar water heater** roll-out, previously facilitated through the Eskom rebate programme and currently being transformed into a contractual approach, is also advised to be considered for funding. The installed systems lack a maintenance scheme beyond the five-year warranty phase and households lack funds to ensure optimal functionality of the systems over technology lifetime. Associated with this need is a potential for job creation to capacitate households and communities with appropriate technology knowledge, technical skills and business skills to operate and maintain the solar water heaters.

Revenues from the carbon tax should be used to make energy (not only electricity) more affordable and accessible for poor households. Funding to avoid negative impacts on poor households' energy bills and proactively reducing energy poverty might include extending the inclining block tariff for electricity for unserved housholds; further electrification; uptake of LPG as an energy carrier; modernising appliances; off-grid solar home systems; and roll-out and maintenance of low-pressure solar water heaters.

3.1.2 Jobs and pro-poor development

Jobs are the top priority for South Africa. The carbon tax would positively contribute to employment, through shifting investment towards more labour-intensive sectors. This requires a shift away from energy-intensive sectors, and a just transition for the workers involved in those industries. The National Climate Change Response policy (RSA 2011), taking into account the

need to limit job losses in the short-term and for employment creation in general, has made provision for policy interventions in this regard. The National Employment Vulnerability Assessments are intended to 'assess the impact on jobs of climate change and climate change responses by sector and location to understand what job-related interventions may be required and where they may be required' (RSA 2011, section 9.1.1). Sector Jobs Resilience Plans (9.2.2) are intended to channel investment into certain sectors. These assessments and plans could be used to inform Treasury's use of carbon revenues for vulnerable sectors and identify possible funding instruments for creating jobs.

Furthermore, jobs in energy-intensive and trade-exposed sectors can be retained in the short-term through the transitional assistance scheme proposed above. This would prevent job losses in the first period of the tax while the correct investment signals are still sent to the economy as a whole.

One means of assisting the poor and creating employment is direct transfers to households. A study for the OECD found that empirical evidence from South Africa indicates that social cash transfers provide critical resources for funding job searches, enable better risk management, increase resilience of agricultural smallholders in maintaining production, and promote human capital development. While the measured direct effects on employment are modest, they are positive and statistically significant (Samson 2009). The National Development Plan is supportive of stronger social protection, noting that 'social cash transfers' are only one element of a broader set of measures. 'It is thus important to identify the linkages between cash and in-kind transfers and social welfare services and that these are closely linking with the justice system. This requires a coordinated and integrated approach to social protection.' (NPC 2012).

Treasury's own economy-wide modeling of the impacts of a carbon tax included the option of recycling revenue via direct transfers. It reduced the negative impact on GDP (compared to a case without recyling). It performed better in terms of deviation from baseline GDP than reductions in corporate or personal income tax; though VAT further reduced the deviation and investments in more productive sectors switched to positive. While this analytical result would point to investments, from a consideration of the overall socio-economic implications of a carbon tax, some pro-poor measures should be considered.

Treasury should consider a direct transfers to poor households, as a contribution to a broader system of social protection.

3.2 Funding for mitigation

The flagship programmes identified as near-term priorities in our climate policy and listed in section 8.3 need financial support. DEA should identify specific programmes in the broad categories and, together with institutional champions for practical programmes and measures, should identify the funding required. These funding needs could then be included in the national budget and medium-term expenditure frameworks, so that 'on-budget' activities are funded, and contribute to the revenue-neutrality of the carbon tax.

Transitional assistance for energy-intensive and trade-exposed sectors should be provided after taxing those sectors fully according to the design of the tax, but with transitional assistance then provided by the state. This assistance should be dependent on firms supplying National Treasury with a mitigation plan.

1. While not its objective, the carbon tax will generate revenue. This should be spent on assistance to the poor, to create jobs and to assist with competitiveness. These should be combined into a programme of assistance.
2. Policy instruments for ensuring that poor households receive a net benefit under a carbon tax are important. FBAE is a useful option. Direct transfers to households should also be considered.
3. Instead of giving allowances for trade exposure (only), Treasury should give transitional assistance to *energy-intensive and* trade-exposed firms. Instead of paying less tax, eligible entities (assessed by energy intensity of their exports) could receive transitional

assistance. As designed, the 'thresholds' for trade-exposed sectors do not accurately target the industries who might have real need of transitional assistance. Z-factors contain a good idea, but should be applied to assistance, not exemptions.

4. In applying the Z-factors to transitional assistance, we broadly know EITE sectors, but firms within these sectors should demonstrate their eligibility. It is here that thresholds for process emissions and energy- *and* trade-intensity would be appropriate. Such thresholds should be lowered over time.
5. Assistance should be aimed at supporting what mitigation firms can achieve, put forward by firms in a mitigation plan. These mitigation plans would be reviewed by government, and once approved, firms would be accountable to implement them in exchange for the transitional assistance.
6. Until a clear alternative to regulate emissions in the power sector is in place, electricity should not automatically be exempt from the carbon tax.
7. This assistance should over time make South Africa a more efficient economy – cost-effective, energy-efficient and carbon-efficient.

Lessons from international experience thus support a system whereby energy-intensive and trade exposed firms are required to prove their eligibility for receipt of transitional assistance.

The list of climate change-related tax incentives in Table 12 is useful, including accelerated depreciation for renewables for electricity and biofuels, CERs, biodiversity conservation, R&D, industrial policy incentives.

The introduction of energy efficiency savings tax incentives is welcomed (para 240 and Annexure C).

4. Some numbers and examples

Given the complex tax design, Figure 2 and Figure 3 sought to illustrate as simply as possible the implications of tax rates for different sectors. These were grouped into four types (ignoring Z-factors), or eight with the differentiation of relative carbon-efficiency of Z-factors. Some numerical examples may help to illustrate the implications for different fuels and examples of the total tax burden for some major emitters in South Africa.

4.1 Impact of tax on fuels and example firms

While conceived as a fuel input tax, a given level of carbon tax does not have the same impact on all fuels. The impact on coal prices is 37 times as much as the impact on the price of liquid fuels. This is due to coal being relatively cheaper per unit of energy (R/ GJ) than petrol and diesel (as shown in Table 1), and to the large proportion of fixed costs in the fuel price, which are unaffected by the carbon tax (e.g. comtributions to the Road Accident Fund). The total tax burden on particular firms is also helpful to understand the implications of a carbon tax.

Table 1: Implications for carbon tax on price of coal and petrol

	Coal	Petrol
Price	200 Rands/ton	R13 per litre
Price per unit of energy	11 Rands/GJ	392 Rands/GJ
Emissions factor	94.6 kg per GJ	69.3 kg per GJ
Carbon tax at R12 per ton of CO2eq means:	R20 per ton	3 cents per litre
Carbon tax at R48 per ton of CO2eq means:	R86 per ton	11 cents per litre
% price increase for a tax of R48:	43%	0.8%

Electricity supply is the biggest single sector of emissions' mitigation cannot be addressed by Eskom alone, but cannot be done without it. Assuming Eskom bought a full 10% of off-sets, depending on the Z-factor plants might get 65–75% reduction, it would pay between R30 and R42 per ton of CO_2-eq. Taking reported emissions of 229 Mt for the purpose of illustration (though these may have changed by 2015), this would result in total tax payment between R6.9 and R9.6 billion per year.

Sasol's main source of emissions is from coal-to-liquids. Reported figures of overall emissions are 47 Mt CO_2-eq per year, though total emissions from the Sasol group (including chemicals, and overseas operations) are 75 Mt CO_2-eq as reported in the 2011 Carbon Disclosure Project report, with 64.1 Mt in Scope 1 and 10.8 Mt in Scope 2 (CDP 2011). Taking the 47 Mt from annual reports, and assuming that Sasol as the only CTL provider cannot have a greater efficiency relative to any other, it would get 80% exemption (including off-sets), paying R24 / t CO_2-eq or a total of R1.13 billion per year. If the Z-factors were applied somehow, the effective tax rate would range from R18 to R30 per ton, and total payments from R0.85 to R1.41 billion per year.

4.2 Pass-through of tax to electricity prices

The Carbon Tax Policy Paper refers to a pass-through mechanism for electricity and liquid fuels, suggesting that 'the scope to pass on the carbon tax to consumers is quite high' (para 247). It indicates that investment decisions in electricity will still be influenced by the cost implications of the tax.

Electricity is the largest single sector of GHG emissions in South Africa. So while mitigation cannot be achieved in electricity supply alone, it is impossible without reducing emissions from Eskom and independent power producers (IPPs). The question whether NERSA is obliged to pass through taxes is a matter that might be referred to the new Tax Review Commission.

If electricity were exempt from a carbon tax, other policy instruments need to be applied for this sector. A regulatory instrument would be to require the IRP2010 to be implemented as planned, applying to both Eskom and IPPs. Future updates of the IRP, which is to be revised biennially, should be less emissions-intensive than IRP2010 (which foresaw a 34% reduction in emissions intensity compared to reference by 2030). The IRP does not specify who builds new power plants, and this has recently (December 2012) been done via Ministerial determinations of IPP programmes. Thus an approach of regulating emissions from electricity supply (and not taxing those under the regulated limit) would have to apply to all power producers and require their compliance.

Until a clear alternative to regulate emissions in the power sector is in place, electricity should not automatically be exempt from the carbon tax.

Regarding the existing levy of 3.5 c/kWh on electricity generated from non-renewable sources and excise duties on liquid fuels, Treasury makes a sound argument – that the low effective tax rate will not lead to real double taxation. This would change only with a significantly higher carbon tax rate.

Producing liquid fuel from coal is highly emissions-intensive. Secunda is the largest point-source of GHG emissions from a single facility in South Africa: about 60-65 Mt CO_2-eq per year. About half of these emissions are concentrated (and therefore would be less expensive for CCS than at power plants); the other half is relatively dilute. Sasol has made efforts to reduce its GHG intensity, setting a corporate target (much of which is achieved by its operations outside of South Africa) and indicating that any coal-to-liquid (CTL) plan will produce 20% less GHG emissions than earlier designs by 2020, and 30% by 2030. However, this is relative to a high-emissions plan, and if a new CTL plant such as Mafutha were built, this would still mean a significant increase in absolute emissions. In rough numbers, if Mafutha was half the size of Secunda, and had 80% of the emissions-intensity, this would still mean 28.5 Mt CO_2-eq per year. This is a case where transitional assistance is needed, in the context of a mitigation plan.

In the liquid fuel sector, it suggests pass-through is not allowable. Producers will therefore have to absorb costs, but may be able to receive assistance for refinery upgrades (which could be part of their mitigation plan if less emission-intensive per unit of product).

The electricity pricing policy indicates that taxes and levies are generally 'over and above the cost reflective charges' (DME 2008). However, it goes on to provide that 'additional pricing signals over and above the costs must be motivated specifically and be approved by NERSA' (pg 33). The latter therefore provides for motivation above and beyond cost-reflective tariffs (putting aside whether external costs should be include in cost-reflective tariffs). Under the Electricity Regulation Act, the Regulator may 'in prescribed circumstances, approve a deviation from set or approved tariffs'. There seems to be a legal basis for NERSA to approve pass-through of the carbon tax. The motivation could, however, also be for partial passthrough, as might the approval.

5. Other issues

5.1 Measurement, reporting and verification

The tax is on fossil fuel inputs, and nominally economy-wide. However, waste and AFOLU are entirely exempted. DEA is to approve emissions factors, and entities with emissions over 100 000 tons of GHGs per year will be required to report mandatorily. The levying of a carbon tax in turn can be expected to generate data. The provision of data for compliance with the carbon tax can, over time, become an important data source in its own right. Data provided in compliance with the carbon tax and reporting requirements should also be independently verified by third-party experts, both as good practice and as a basis for biennial reporting to the UNFCCC. Treasury, DEA and others with data on GHG emissions should build on existing collaboration and further enhance it.

5.2 Policy coherence: Economic as complement to regulatory instruments

The Carbon Tax Policy Paper identifies the importance of policy coherence. This is broadly the case across various components of climate policy, including adaptation, mitigation and means of implementation – finance, technology and human and institutional capacity. The overall test of coherence must be whether our country contributes its fair share to global mitigation efforts, and takes responsibility for our citizens – in particular the poor – to adapt to climate impacts. Given the lack of progress with global climate action, there is little doubt that we will face the impacts of world temperatures riusing by significantly more than 2°C. More specifically, coherence is needed across economic instruments (such as the carbon tax) and regulatory instruments (such as carbon budgets and emission reduction objectives).

Our analysis has shown that an effective carbon tax is the single biggest intervention for mitigation in South Africa. Of course, this depends on the tax rate, and what else is done. There are sectors in which regulatory instruments might be more effective than a tax. We agree that a carbon tax should be implemented 'as a complement to regulatory measures' (p. 7). Carbon budgets are an effective regulatory mechanism, if properly implemented. The climate change White Paper (RSA 2011) mandates sectoral carbon budgets to be defined within the first two years of the policy's adoption, i.e. by 2013.

Our previous research has suggested that, generally, either a budget or a tax would be used for a particular entity (Winkler & Marquard 2012). The carbon tax should apply in South Africa's major emitting sectors; or, if not, they should be subject to a carbon budget. Together, economic and regulatory instruments must ensure that our country's GHG emissions follow the 'peak, plateau and decline' trajectory to which we are internationally committed and which is a central part of our climate policy.

5.3 Tax to emissions trading

The Carbon Tax Policy Paper argues that the 'oligopolistic nature of the energy sector' (p.9) makes an emissions trading scheme (ETS) in South Africa less appropriate than a carbon tax. The lack of liquidity in a carbon market with limited number of market actors is the most compelling argument against an ETS. However, this argument does not hold if a South African ETS were linked to others, for example in the EU, China, Brazil, Australia and other countries. There is also significant attention to market-based mechanisms in the negotiations under the UNFCCC. Linking a carbon tax regime to ETSs elsewhere is not impossible, but probably more complicated, given the uncertainty of quantities of GHG reduced under a tax (but set by the cap in cap-and-trade). The paper only envisages an ETS complementing, not replacing, the carbon tax (para 129) 'around 2025'. Options should be kept open in this regard.

It would be prudent to continue assessing the developments in carbon markets internationally, and whether it might be in South Africa's interest to transition to an ETS over time.

6. Conclusion: a simpler, better carbon tax

Our analysis of the carbon tax as proposed in Treasury's policy paper is that it is both low relative to the required task and includes a complex set of exemptions. The effective tax rate of R12-48 / t CO_2-eq is too little to transform the country's energy economy, and does not make a sufficient contribution to bending the curve of our national GHG emissions, so that it starts following a benchmark 'peak, plateau and decline' GHG emission trajectory, as set out in our climate policy (RSA 2011).

Before commenting on the design, some fundamental issues need to be revisited. Climate change is real and already being observed – and it is a problem with some specific features. Climate change is a long-term problem requiring urgent solutions. For South Africa and globally, it is primarily an energy problem – that is, reducing GHG emissions from the use and supply of energy. Given how central energy (and forests in some countries) are to economic activity, that means climate change is not only an environmental problem, but deeply a question of our socio-economic development path. And it is not a question we can escape, because even if the costs of climate action might seem large, the one thing we do know about the costs of inaction is that they are even larger, and would be paid mostly by the poor. Climate change is also a collective action problem – solutions only work if all countries act, and resist the temptation to free-ride on the efforts of others. This does not mean that all countries need to do exactly the same. The key task of developing countries over the next decade is to slow the growth of our emissions. We must start now to shift very large systems, to avoid being locked into a high-emissions, high-climate-impact world. This includes investments in infrastructure with long life-times, but about which decisions are being made now.

We understand the approach to introducing the system in a phased manner. But then the design needs to be more ideal, and appropriate to at least starting to bend the emissions curve. Given the low levels of the tax, the certainty and simplicity of absolute thresholds, and the greater marginal mitigation effect that can be achieved with the same burden to firms (unless emissions grow), there is a compelling case at low effective tax rate to apply absolute thresholds at the outset. Such thresholds could be agreed as part of a process of determining eligibility for transitional assistance. Figure 4 sketches possible improvements to Treasury's carbon tax, applying the rationale for exemptions to transitional assistance. This simplifies the tax side, and elaborates on the revenue side.

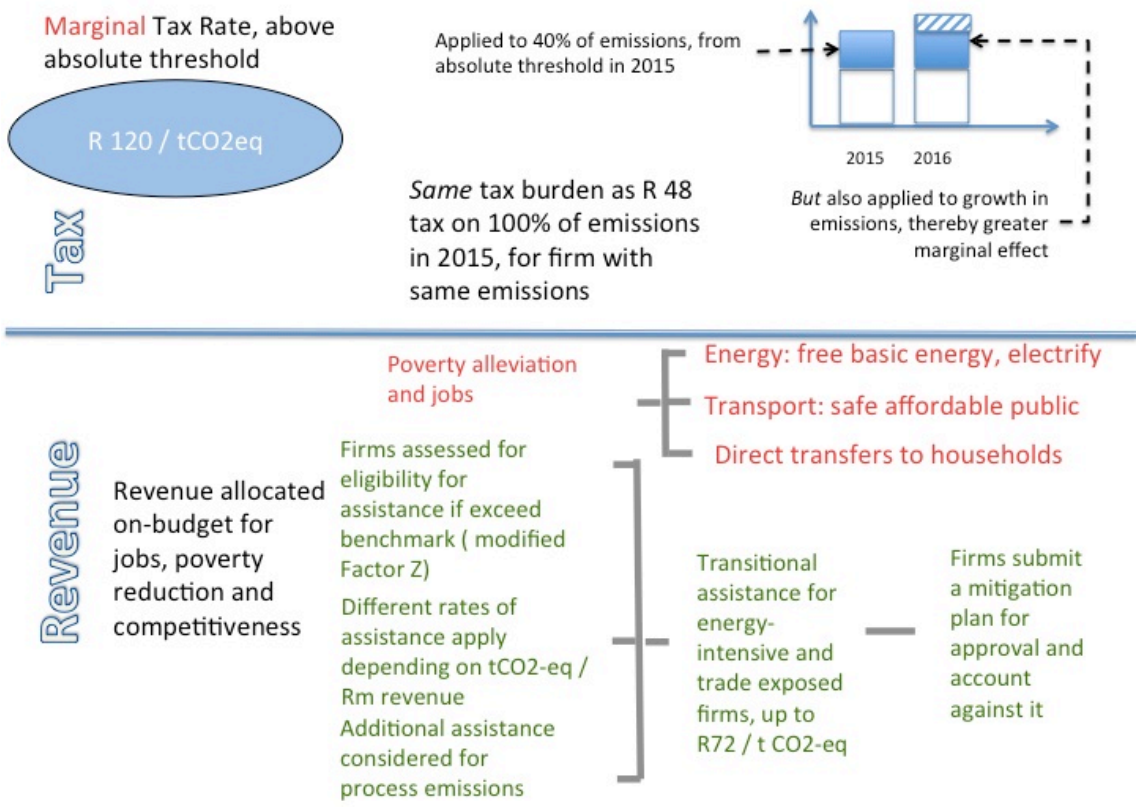

Figure 4: Suggested improvements to Treasury's carbon tax design

The approach suggested in Figure 4 is elaborated in the following main points:

1. **If a low tax rate, then have absolute thresholds.**
    a. Relative thresholds mean the tax creates no disincentive for emissions growth. The set of so-called 'thresholds' are really exemptions, leading to a lower effective tax rate.
    b. Rather introduce absolute thresholds than relative ones – at the outset, not later. A marginal tax applied above thresholds of absolute emissions will have a greater marginal mitigation effect, with the same burden to firms unless emissions grow. This will enable a simpler tax design.
2. **Simplify the tax, apply it in full at the margin.**
    a. Introduce a marginal carbon tax related to an absolute level, that is, levy the R120 on 40% of emissions, rather than the proposed minimum of R48 on 100% of emissions. This would achieve more mitigation, leaving the companies in the same financial position for a same level of emissions.
    b. Instead of further exemptions for process emissions and trade-exposure, introduce transitional assistance for poverty alleviation, job retention and competitiveness. Z-factors can be applied elsewhere, as we suggest below.
3. **Instead of exemptions from tax, use revenues to provide assistance to ensure net benefit for poor households and establishing a transitional assistance programme for EITE industry.**
    a. While not its objective, the carbon tax will generate revenue. This should be spent on assistance to the poor, to create jobs and to assist with competitiveness. These should be combined into a programme of assistance.

b. Policy instruments for ensuring that poor households receive a net benefit under a carbon tax are important. Free basic alternative energy is a useful option. Direct transfers to households should also be considered.

c. Instead of giving allowances for trade exposure (only), Treasury should give transitional assistance to energy-intensive as well as trade-exposed firms. Instead of paying less tax, eligible entities (assessed by the energy intensity of their exports) could receive transitional assistance. As designed, the 'thresholds' for trade-exposed sectors do not accurately target the industries who might have real need of transitional assistance. Z-factors contain a good idea, but should be applied to assistance, not exemptions.

d. In applying the Z factors to transitional assistance, the onus should be on firms within EITI sectors to demonstrate their eligibility (even though we have a broad understanding of firms in these sectors). It is here that thresholds for process emissions and energy- *and* trade-intensity would be appropriate. Such thresholds should be lowered over time.

e. Assistance should be aimed at supporting the mitigation that firms can achieve, put forward by them in a mitigation plan. These mitigation plans would be reviewed by government, and once approved, firms would be accountable to implement them in exchange for the transitional assistance.

f. Until a clear alternative to regulate emissions in the power sector is in place, electricity should not automatically be exempt from the carbon tax.

g. This assistance should over time make South Africa a more efficient economy – cost-effective, energy-efficient and carbon-efficient.

4. **The price signal needs to be long in practice, and linked to the emissions trajectory**.

a. A long-term price path should be set out in the tax policy, which may be indicative for the later decades. The current proposal is only for five years, much shorter than the time-horizons of major investments that could lock South Africa into a high-emissions path for several decades.

b. The price increase should be real, not nominal.

c. The price path could be indicative for later periods, with clear information as to how and when it will be adjusted.

d. A fundamental basis for adjustment must be the tax's contribution to bending the GHG emissions trajectory. A link between the carbon tax and the emissions trajectory is essential to ensure environmental integrity. The carbon tax will provide more data, both that reported by companies for compliance with the carbon tax, and empirical information, to better estimate the responsiveness of the economy to a carbon price. Data systems should be established to enable research on the price elasticity of carbon in South Africa. This will provide a basis to assess the impact of the carbon tax on covered sectors, sub-sectors and major entities.

5. Use existing data for the carbon tax and improve over time.

a. Data provided in compliance with the carbon tax and reporting requirements should also be independently verified by third-party experts, both as good practice and as a basis for biennial reporting to the UNFCCC. Treasury, DEA and others with data on GHG emissions should build on existing collaboration and further enhance it.

6. Keep a linked emissions trading scheme under consideration, and introduce off-sets once caps are set.

a. It would be prudent to continue assessing the developments in carbon markets internationally, and whether it might be in South Africa's interest to transition to an emissions trading scheme over time.

b. The relation between cap and trade suggests that South Africa should not introduce off-sets, or carbon trade, until caps are in place caps (internationally and / or domestically).

Appendix: Specific technical comments

- Para 82 says that '*After 2028*, the technology learning rates on new renewable options should lead to lower costs' (emphasis added). The costs of renewable energy technologies have already declined, and will be low well before 2028. Wind power is close to parity with coal, and PV costs have fallen dramatically in recent history.
- The reasons for the electricity price increase in the last sentence of para 82 omit the capital expenditure on the build programme, a key reason.
- Coal remaining the dominant energy source is a statement from IEP in 2003' this should be updated for IEP 2013.
- The paper refers to a carbon price range from US$8 to more than $300 (para 119). It does not make clear what emission reductions are achieved at various price levels.
- Is the impact of a R100 / t CO_2-eq tax when recycled via VAT –0.14 (i.e. –14%), or –0.14%? Para 155 refers to '–0.14', while Table 4 lists the same value, but has 'deviation from the baseline by 2035(%)' in the heading. Given that the text refers to a small impact, we assume it is not –14%, but then the text should add '%' after 0.14, and the table be labelled less ambiguously.
- The paper states that a carbon tax 'will fail to achieve the Copenhagen targets on its own'. While this is true *at this tax rate*, a higher rate might. The paper is silent on what tax tax would be needed to achieve South Africa's Copenhagen targets, or what combination of a tax and regulatory measures.
- In the World Bank study, from what level are CO_2 emissions reduced by 15%? It seems to suggest a reduction against absolute historical levels (emissions in a base year), which is different to South Africa's pledge to reduce 34% against the future growth trajectory. Elasticities in the original article refer to substitutability among energy inputs, as well as substitution between capital and energy. The conclusion that the carbon tax has lower welfare costs than sales taxes seems to hold only for the 'flexible' reference case, not the rigid case. This begs the question how substitutable forms of energy are, and how much capital can replace energy-intensive inputs.
- Para 147 refers to 547 Mt CO_2-eq in 2009; while para 31 has the same number for 2010.
- Keep electricity levy: The 3 c/kWh levy on electricity from non-renewable sources will be continued' it may be removed when the carbon tax rate increases. Treasury is of the view that double taxation is not a reality at these low initial carbon tax rate levels. This seems a sensible approach.
- Table 6 is a useful one!
- In Table 7, fugitive emissions are reported as 71,177 Mt CO_2-eq, or 16% of total emissions.. Are the 26 Mt from 'oil and natural gas' from SASOL – if so, that seems on the low side. On the other hand, 40 Mt from coal mining, presumably coal-bed methane, is on the high side.
    - Referring to a 'base year' for absolute targets, and 'baselines' for relative targets. 'Baseline year' is confusing.
    - Intensity-based targets as presented here are *specific* intensity improvements, that is per unit of product.
    - Intensity targets can also be economy-wide (and in that sense more *general)*, for instance both China and India have expressed their overall commitments to

act in terms of improvements of carbon intensity of GDP by 2020, against 2005 intensity levels (40-45% and 20-25% respectively).

- In Figure 2, it would be useful to understand which sectors make up industry.
- In the worked example of Z-factors (p. 55), the limitation on the 5% is not applied. Firm C's tax-free threshold is shown as 49.638%' it should only be 55% if the logic of ±5% were carried through.
- In Table 9, all emissions intensities should specify tons *of what*. This is done for many some (e.g. t CO_2/ ton of steel) but not others, for example, for coal to liquids.
- In para 209, over what period will Camden, Grootvlei and Komati be required to reduce emissions by 11 Mt CO_2 ? Each or all three together?

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