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Sunset Credits – a tool for removing fossil fuel subsidies

Sunset Credit schemes offer an innovative approach to removing fossil fuel subsidies, avoiding the risk of popular discontent, while at the same time attracting investment for renewable energy and energy efficiency.

1. OVERVIEW

This White Paper describes an innovative approach to removing fossil fuel subsidies, without triggering popular backlash, while at the same time supporting the introduction of modern renewable energy technologies and building capacity in developing economies.

Under a Sunset Credit scheme, a government which is currently subsidising fossil fuel consumption would commit to continuing payments for a fixed period of time, most likely between three and 10 years. However, the ongoing subsidies would take the form of credits. The recipients will then be free to decide whether to continue benefiting from the subsidy, or to apply the credits to the purchase and installation of clean energy technologies. These might include energy efficiency measures, renewable heating, cooling or power generating equipment, depending on local conditions. In either case, the subsidy is removed at the end of a fixed period, in the region of three to 10 years.

Implementing a Sunset Credit scheme would require overcoming a number of barriers. These include dealing with the administrative burden; ensuring the presence of clean energy distributors and installers; and financing the replacement of ongoing subsidy payments with up-front investment in clean energy technologies.

By allowing third parties to aggregate Sunset credits once they have been spent on clean energy technologies, it should be possible to tap into sources of funding on advantageous terms from third party investors of various types. A Sunset Credit scheme would contribute to capacity-building among local clean energy solution providers, as well as in financial services and among policy-makers.

In particular the Sunset Credit approach would be ideal in situations – and there are more and more of them around the world – where clean energy already out-competes fossil energy on a level playing field. Schemes can still be implemented where clean energy is more expensive than conventional alternatives, but additional forms of support, in terms of deep concessionary finance or grant funding, would need to be found.

In macro-economic terms, Sunset Credit represents a jiu-jitsu move: it uses the very cash flow which represents a misallocation of resources in the economy to fund investment in clean technologies, and thus to remove the need for subsidy at source.

Sunset Credit schemes will not be appropriate in every situation. However, they might prove a useful tool for some governments wanting to retire fossil fuel subsidies which are draining their resources, without triggering the popular discontent which has made it so hard to take action in the past.

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2. ECONOMICS OF SUBSIDIES AND CLEAN ENERGY

The International Energy Agency (IEA) estimates that a total of \$409 billion was spent worldwide on subsidising fossil fuels, up from \$300 billion in 2009¹. The IEA further estimated that eliminating these subsidies would result in a 4.1% reduction in expected energy demand by 2020, and that unless action is taken, the cost of energy subsidies may reach \$660 billion by 2020, equivalent to 0.7% of global GDP. Given the ongoing rapid drop in the cost of renewable energy technologies, the impact of subsidy reduction could even be higher than these figures suggest.

At the G-20 Summit in Pittsburgh in September 2009, the leaders announced their intention to “phase out and rationalise over the medium term inefficient fossil fuel subsidies while providing targeted support for the poorest”. This statement was echoed by APEC in November that year, extending the coverage to a further 11 countries. Since then there has been some progress, but it has been patchy, with governments reluctant to impose energy price increases on populations during a period of great economic stress².

The issue of fossil fuel subsidies came under the microscope at Rio+20. On 18 June 2012, the day before publication of this paper, the Twitter hashtag #endfossilfuelsubsidies headed the trending list, followed by #rioplus20. Yet the draft document presented to the conference contained only weak wording on ending such subsidies – one of the reasons being the difficulties experienced by countries who have tried to remove them. Nigeria, Iran, India and other countries have experienced violent popular protests in recent years.

The paradox is that in an increasing number of sectors, renewable energy technologies could compete with fossil-fuelled alternatives on a level playing field without subsidies. The levelised cost of wind energy (i.e. the cost before taking into account any supporting policies) can be as low as 6.5 US cents per kWh, comparable with the cost of power from new coal plants and cheaper than power from natural gas in most of the world³. Power from biomass can be fully competitive with coal, as can geothermal and hydro, where they are available.

The factory-gate cost of solar photovoltaic (PV) modules has dropped by 76% in the last three years⁴. Although power from large-scale solar projects is not yet competitive at the wholesale level (i.e. grid-connected projects) with coal and gas-fired power, it is a different story for rooftop solar systems, which can already beat retail daytime electricity prices in a number of significant markets. In the developing world, solar lanterns provide cheaper lighting than kerosene. Wind-solar-battery hybrid systems are cheaper than diesel, and in large parts of the developing world certainly cheaper than building long-distance transmission lines from the nearest power station.

Meanwhile in Saudi Arabia and the Gulf, utilities continue to burn subsidised oil to generate electricity. Saudi Arabia has recently announced a major investment programme to generate one third of its electricity from solar power by 2032, but the implementation of such a program is made harder by the fact that prices of electricity to the consumer do not reflect the true costs. Saudi Aramco would earn around 9% unlevered internal rate of return if it was allowed to sell oil at world market prices rather than provide it at a deep discount to local electricity utilities. And of course a

¹ Analysis of Fossil Fuel Subsidies, World Energy Outlook. IEA, October 2011.
http://www.iea.org/weo/Files/ff_subsidies_slides.pdf

² The First Year of the G-20 Commitment on Fossil Fuel Subsidies: A Commentary on Lessons Learned and the Path Forward. Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD). http://www.globalsubsidies.org/files/assets/ffs_g20_firstyear.pdf

³ Best wind farms are competitive with power from natural gas if gas prices are \$5/MMBtu. At the time of writing natural gas prices in the US are at \$2.30/MMBtu due to a glut of shale-gas and a weak economic recovery. Prices in Europe are around \$8/MMBtu, and prices in Asia can be as high as \$18/MMBtu, with demand outstripping supply as Japan struggles to meet its energy demand without using its nuclear reactors in the wake of the Fukushima accident. <http://www.bloomberg.com/energy/>

⁴ Reconsidering the Economics of Photovoltaic Power (pre-publication); Bazilian, Liebreich et al, 2012.
<http://www.bnef.com/WhitePapers/download/82>

market price for electricity would encourage energy efficiency in a region known for its profligate energy use.

In the area of energy efficiency more broadly, there is a positive economic pay-off for many technologies, yet implementation is slow. Buildings remain un-insulated, inefficient boilers are kept burning, sub-functional heating and cooling controls maintain inappropriate temperatures, the wrong fuel sources are used to heat water, and so on. The payback time for energy efficiency technologies can be as short as a year; however, even with much longer payback times the returns from energy efficiency beat those available from any other riskless, inflation-proof investment. Although acceptance may be held back by lack of access to finance, agency issues, transaction costs and other well-known issues, the presence of fossil fuel subsidies may remove any remaining incentive to invest.

3. CHALLENGES OF PHASING OUT SUBSIDIES

If so many clean energy technologies are already competitive with fossil fuelled alternatives, what is holding the world back from removing subsidies? Subsidies are not only driving excessive pollution and emissions, but in a high energy-price world are blowing huge holes in national budgets.

First and foremost, there is the fear that any increase in energy prices will result in a popular backlash, leading to – in the case of democracies – punishment at the next election or – in the case of authoritarian regimes – Arab-Spring style uprisings. Policy-makers are caught in a bind: high energy prices make energy subsidies unaffordable just at the time when the population is under financial stress and most likely to protest against their removal.

The second reason which has held back the switch to cheaper clean alternative is that most clean energy technologies require high up-front capital expenditure, which is then offset over the life of the equipment by lower or non-existent fuel costs. Lack of access to finance is therefore a key barrier to their adoption in many of the poorer markets of the world, as well as among poorer population groups in richer countries.

There is a third reason, which must also be acknowledged: powerful vested interests often benefit from the subsidies. This is particularly true in the case of producer subsidies, which are not routed directly to end users, nor even to the utilities or distributors which serve them, but to coal, oil, gas and nuclear suppliers. The Sunset Credit mechanism described in this paper could still be effective in this situation, as long as these players themselves have opportunities to invest in clean energy. In other cases they will remain implacable opponents of any sort of subsidy reform.

In addition to consumer and producer subsidies, fossil fuels also benefit from hidden subsidies, whereby costs of their use turn up in defence and health budgets, or as environmental problems, locally or around the world, or in terms of the economic cost of fuel price volatility. The Sunset Credit approach cannot address hidden subsidies. These must be priced-in wherever possible using different mechanisms; where this can't be done, there is a need for regulation; and if neither of these is possible, the remaining option is to mandate disclosure and transparency. This paper does not cover the issue of removing hidden subsidies – which might be the subject of later work.

Finally, it must be noted that there may be good arguments for energy subsidies. They can form part of an economic development strategy; they may be needed for reasons of social protection for vulnerable populations. However, the IEA estimates that only 8% of current fossil fuel subsidies find their way to the very poorest – who do not make up the bulk of energy demand and may have no access to the modern energy sources which attract subsidies. The Sunset Credit approach described in this paper should be particularly attractive in those situations, as it would provide a mechanism to target existing subsidies more accurately. In any case, arguments for energy subsidies can never justify mechanisms that lead to the rejection of cheaper clean energy solutions in favour of higher-priced fossil-based sources of energy.

4. MECHANICS OF A TYPICAL SUNSET CREDIT SCHEME

A typical Sunset Credit scheme would work as follows:

- A subsidising government commits to pay a credit equal to the current level of subsidy for a fixed number of years, say between three and 10. The credit can be delivered in whichever way is most appropriate to local conditions: perhaps as a rebate on energy bills, a monthly or quarterly voucher, or as a physical token.
- The recipient is then charged the true market price of energy but, by using the credit in part-payment, sees no net increase in energy cost. Only one credit can be redeemed each month or quarter (as appropriate) against energy payments.
- Alternatively, the recipient can choose to redeem credits against selected clean energy solutions. These may include energy efficiency measures, renewable heat, cooling or power generating equipment, or clean transportation solutions, depending on local conditions. The application of these technologies reduces the recipient's energy demand *et voila!* – no more subsidies required (not to mention, for the user, no more trips to buy kerosene or LPG, fewer breathing problems from inhaled fumes, more reliable energy services, etc).
- Participating retailers and installers surrender the credits they have earned to a Redeeming Agent and are reimbursed the market price for their products and services. Retailers and installers compete for business in the normal way, and the consumer is price-sensitive (since unused credits can still be used against energy purchases) so prices are kept down. Redeeming Agents could be government agencies or third parties, who would aggregate credits on behalf of the government.

Structuring the credits so that they reduce over time would help progressively reduce subsidies. This would send a strong message to users that they should take up the investment option sooner rather than later. Good communications throughout the scheme are essential, to ensure that consumers are aware of the clock running down on the subsidies; otherwise they will be faced with an unexpected and potentially unaffordable jump in their bills at the end of the scheme.

The core idea behind Sunset Credits, of eliminating a pernicious subsidy by first providing a stream of guaranteed payments, is not a new one. For instance, it was used by the Tobacco Transition Payment Programme in the USA (also known as the Tobacco Buyout)⁵. Under this scheme, US tobacco quota holders and producers are paid over a 10-year period based on their production in the years 2002-04, whether or not they produce tobacco. Recipients were allowed to sell their rights under this scheme for a capital amount to a third party, enabling them to switch crops or leave farming, which many of them elected to do.

The elegance of the Sunset Credit approach described in this paper is to link the capitalised use of the credits to the purchase of clean energy technologies.

5. FINANCING SUNSET CREDITS

Where Sunset Credit gets really interesting is from a finance point of view. The Redeeming Agent could simply be an arm of the government, which would pay installers as solutions are deployed. However, a better approach would be to allow local financial institutions to act as Redeeming Agents, aggregating credits over time and surrendering them progressively to the government at their due dates for redemption. Redeeming Agents should also be allowed to sell their credits to third parties, which would allow significant liquidity to enter the market to fund clean energy installations, underwritten by the eventual redemption of credits by the government.

⁵ Tobacco Transition Payment Program Factsheet. US Department of Agriculture April 2011. http://apfo.usda.gov/Internet/FSA_File/tobacco_transition_11.pdf

Most importantly, the government would see absolutely no cashflow impact of the Sunset Credit scheme on its budget. Their outlays would exactly match the payments that would have been required to meet the ongoing subsidies. In the cast of third party Redeeming Agents, the payments to the agents match exactly the timing of credits issued to subsidy recipients for use against energy purchases.

Allowing Redeeming Agents to sell the credits they have amassed would have the significant additional benefit of allowing the scheme to be funded by a wide range of sources. Concessionary finance providers or overseas private investors could provide loans to the local Redeeming Agents, securitised against the government's eventual payments. Or they could simply buy pools of credits from Redeeming Agents to hold in the same way as they might hold the issuing government's debt.

Larger pools of Sunset Credits could even be sold on to long-term asset holders like pension funds and life insurance companies. One could imagine tradable Sunset Credit Bonds being issued – by private or concessionary finance houses – on the debt markets, perhaps underwritten by credits from multiple participating countries. It all depends on the volume of Sunset credits that are issued: if the mechanism takes off and issuance reaches into tens of billions of dollars, all things are possible.

Pools of Sunset credits would normally be expected to pay a yield premium over the issuing government's debt in order to compensate for their complexity. However, by tapping into lenders who have particular reasons to support the shift from fossil fuels to clean energy, it may be possible for Sunset Credit schemes to be funded at a discount to the general borrowing costs of the government in question. Such investors might include concessionary finance providers, ethical investors, or eventually the Green Climate Fund. Of course the lower the borrowing costs, the more situations in which clean energy technologies will be able to compete on an unsubsidised basis with fossil fuels.

Where there is a need or desire to drive the roll-out of clean energy technologies which are not yet quite competitive with fossil fuels, the Sunset Credit approach offers a number of entry points to provide extra support. There could simply be a separate source of "viability gap" funding, whether from domestic or international sources. Alternatively, Sunset credits could carry a premium if redeemed against clean energy technologies rather than used against fossil-based energy. So for instance a credit could be worth one dollar if redeemed against a purchase of LPG, but two dollars if used to install a solar water heater. This clean energy premium could be funded domestically or from the international community – perhaps ultimately from the Green Climate Fund.

6. CAPACITY BUILDING

One of the big challenges of implementing a Sunset Credit scheme would be to set up the administrative system needed to distribute credits and cancel them if used against fossil fuels. It would need to be fraud-proofed and regularly audited, since Sunset Credits would have cash value. In some countries outside help would need to be provided – funded perhaps by multilateral and bilateral financial institutions.

On the plus side, there would be very significant capacity-building co-benefits to a Sunset Credit scheme.

The scheme would create an immediate market for clean energy technology distributors and installers, providing opportunities for local entrepreneurs and businesses. It would make sense when planning the roll-out of the Sunset Credit scheme to ensure availability of training and certification in the relevant skills and technologies. Skills learned in meeting Sunset Credit demand would then be available for other segments not covered by the scheme, such as larger

houses, different types of commercial clients, new technologies, or geographical regions not eligible for purchase using Sunset Credits.

A Sunset Credit scheme would also support the development of local financial service providers with particular skills in energy-related lending. When the consumer is ready to use credits for clean energy investment, he or she signs over some or all future Sunset credits to the technology provider. Ongoing delivery of credits could continue to be made by the consumer – in which case the transaction looks very much like a standard hire-purchase agreement or loan – or credits could be paid by the government directly to the installer – similar to a PPP transaction or social housing payment. The installer in turn would route the credits to the Redeeming Agent. If the Redeeming Agent has provided the installer with a loan to cover installation, it is simply acting as bank – indeed local banks, post offices and savings institutions would make ideal Redeeming Agents.

Telecoms providers would also make ideal Redeeming Agents, especially in countries where mobile payment systems are widespread. It is possible to envisage a consumer's credits being applied to their mobile phone account, ring-fenced so that they can be used only to pay for fuel or clean energy solutions. When the account-holder wants to make a purchase from a certified clean energy technology provider, the mobile provider would extend credit and the credits would be routed to repayments.

In geographies where there is currently little or no availability of financial services, a Sunset Credit scheme could be set up using physical tokens. Tokens would be accepted in stores against fuel purchases or for designated clean technologies. They may develop into a type of parallel currency. Although this would bring risks – the potential for fraud or for economic collapse if the Sunset Credit scheme is ever suspended – it would also bring benefits. Replacing non-cash subsidies that can only be consumed by inefficient fuel burning with cash-like payments which provide a means of value storage and transfer should provide a boost to the local economy.

7. POTENTIAL SUNSET CREDIT VARIANTS

The Sunset Credit approach could be used wherever there is a) currently a direct subsidy which can be quantified; b) where some form of credit scheme can be set up and administered, and c) where the subsidy currently goes to a person or organisation in a position to make a decision on clean energy investment.

In designing a scheme the following questions need to be carefully considered:

- Exactly how are fossil fuel subsidies currently being delivered?
- Which clean energy technologies could reduce fossil fuel use locally?
- Are there already local distributors and installers of these technologies?
- Are the current subsidy recipients able to implement these technologies themselves?
- Do current subsidy levels provide sufficient incentive or are extra payments needed?
- What payment systems are in place which might be able to administer credits?
- Are there other local capacity-building needs which a scheme might support?
- Are there local or international investors who might provide advantageous funding?
- Are there stakeholders who might resist the implementation of a scheme?

With sufficient care taken in design, Sunset Credit schemes could be made to work in a variety of situations, including the following:

Electricity markets. There are a number of ways in which electricity subsidies are currently delivered in different markets. Most commonly, the utility is required by law to deliver power at a

price below cost, either to all users or to particular customer segments. The balance of costs are either provided by government, levied across other user groups or simply left unfunded – resulting in chronic underinvestment or repeated recapitalisation of the utility. A Sunset Credit scheme could work in one of two ways: either by providing the utility with credits which it can invest in renewable energy generating capacity; or by providing credits directly to the consumer for use on energy efficiency or distributed generation technologies. Providing the utility with credits and hoping they invest them in demand-side energy efficiency will not work: the utility would rather recognise the credits as revenue than invest in measures which reduce their sales.

Natural gas markets. Where mains gas is subsidised, a Sunset Credit scheme would be used to fund building insulation, improved heating equipment or solar thermal water heaters. Sunset credits could be distributed via utility bills – users would see no increase in their bills if they take no action; when they use the credits against investment in clean energy equipment they will be exposed to true energy prices, but their demand will drop, resulting in the same net bill.

LPG, Kerosene markets. Where retail consumers or small and medium-sized enterprises are buying subsidised LPG or Kerosene from local distributors, Sunset Credits would need to take the form of vouchers, tokens or m-payments (mobile phone banking credits) which can be redeemed in person. These would be distributed periodically to consumers, and in the event of a purchase of clean energy solutions under the scheme, further distribution of credits to that consumer would be reduced or eliminated accordingly. In designing capacity-building efforts, it would make sense to use the LPG/Kerosene distribution network for distribution of clean energy equipment where possible in order to eliminate a powerful potential source of opposition to the scheme.

Transport fuels. In the case of transport fuels, users – whether individuals or commercial fleet operators – would be given credits via vouchers, tokens, m-payments or fuel cards, to redeem against purchases at gas stations. As an alternative to using them to keep the cost of fuel low, the recipient would have the choice of using them when upgrading to more fuel-efficient vehicles, electric vehicles, or on public transport. Even where Sunset Credits are provided for transport fuels, they could in theory also be valid for investment in building energy efficiency improvements in order to keep overall energy bills down in the target population.

Oil & gas-based power generation. Some of the worst distortions in the pricing of fossil-fuels occur in energy-producing nations. Saudi Arabia meets over half of its electricity demand and Kuwait over two thirds by burning oil. In many oil- and gas-producing nations, national oil and gas companies are required to provide the utility with fuel at a deep discount to market prices – in the case of oil as low as \$4 per barrel. Under a Sunset Credit scheme, the utility would begin to pay the market price for fuel, but would receive a countervailing credit. Most likely the scheme would start by covering only part of the utility's fuel purchases, and would be extended over time to ease the transition. In the case of oil-fired generation, the utility would immediately have an incentive to switch to natural gas or solar power, freeing up oil to be sold on the international markets or retained in reserves for later extraction. This would not, however, provide any incentive for end users to save energy – and we are talking about the some of the least energy-efficient regions of the world. To achieve this, Sunset Credits would need to be provided directly to end users, allowing them to invest in energy efficiency or distributed generation, reducing demand for subsidised power. In the case of gas-producing nations, only a consumer Sunset Credit approach would work, since only energy efficiency measures can compete with low-cost gas, and the utility cannot be relied on to drive through measures which reduce demand for its own products.

Industrial energy users. The Sunset Credit approach could also be used to wean industrial users off energy subsidies. This would work in exactly the same way as with consumers: the business would be allocated a stream of credits, perhaps stepping down over time, which can either be used against energy bills or invested in energy efficiency or renewable energy technologies. It might be argued that credits should only be offered to those businesses which have opportunities to reduce energy use in a cost-effective way. However, even where

businesses have no such opportunities, it might make sense to provide a stream of saleable credits for some fixed period: faced with an inevitable rise in energy costs and a capital sum, some business owners may use the proceeds of selling all future credits to switch into a different and less energy-intensive line of business. Experience from the US Tobacco Buyout shows that some proportion of recipients would take this option.

Real estate. The commercial property sector provides particular challenges, because the recipient of energy subsidies tends to be the tenant, but tenants are generally reluctant to invest in building improvements if they think they might move out before the payback time elapses. The way to deal with this is to allow tenants who move out to qualify once again for credits. The new tenant moving in would, in turn, lose their right to Sunset Credits, but since they are the beneficiaries of energy efficiency or distributed generation investment, that should not pose a problem. Meanwhile the landlord benefits from an upgrade of the building, and so should be willing give their approval. There may need to be some changes to the legal framework for rental contracts in order to accommodate this approach.

8. RISKS AND CHALLENGES

Implementing a Sunset Credit scheme poses a number of risks and challenges:

Administrative burden. Implementing an Sunset Credit scheme will incur an administrative burden. Schemes might therefore not be possible in countries with extremely poorly-developed social and financial infrastructure.

Fraud. Any credit, voucher or token system brings with it the risk of fraud, in the form of forged vouchers or compromised issue / redemption agencies. Depending on the scheme design, credits may also start to circulate as a grey currency. There may be an immediate grey market for clean energy equipment, as some users will sell it as soon as it is installed, realising capital but exposing themselves to unsubsidised energy costs. On a macro-economic or environmental basis this may not matter, but social issues may need to be addressed.

Foreign exchange. The clean energy equipment which would be covered by Sunset Credit schemes may need to be imported, creating a potential forex exposure. However, since fossil fuel prices are denominated in dollars, it is likely to be smaller than the existing liability to which subsidising governments are exposed. Guaranteeing Sunset Credit payments in local currency (in part or in total) would reduce the country's dollar exposure, though it would push that risk onto the installers, Redeeming Agents or holders of pools of credits.

Supply chain. There is little point distributing Sunset Credit vouchers where there are no distributors or installers of the relevant clean energy technologies. Where this is missing, there is the risk of disgruntled consumers, seeing the clock ticking on subsidies, with no way to mitigate the impending price rise. To the extent possible the operation of distribution, installation and maintenance networks should be left to private individuals and companies, so that Sunset Credit spurs local entrepreneurship, rather than competing with it.

Maintenance. All technologies require maintenance, clean energy appliances included. Users may be unable to bear the cost of replacing equipment in the event of failure, so if they have to bear that risk they may well prefer to stick with subsidised fossil fuels rather than invest. Equipment certified under Sunset Credit therefore should be supported by a guarantee by the manufacturer, installer or a third party insurer for an extended period. Alternatively a piece of each credit payment could be held in a sinking fund or used to purchase insurance to cover maintenance costs, expected failure rates and perhaps also theft of equipment.

Delayed uptake. Some users may wait a few years before deciding that they should take advantage of the investment option under the scheme. Once they have used a significant proportion of their credits to subsidise their energy bills, the remaining credits might no longer

cover the cost of the clean energy installation. The falling cost of clean energy technology should partially mitigate against this – the solutions should get cheaper over time just as the recipients have fewer vouchers to spend. However, there is a need for good communications to warn consumers of the consequence of waiting. Stepping down the scale of credits over time might serve to focus the minds of credit recipients on the need to act quickly.

Agency problems. Sunset credits must be applied to whoever is actually able to make the investment decision on clean energy. There is no point in giving credits to a utility in the hope that it will invest in demand-side energy efficiency. Conversely, if the goal is for utilities to invest in clean energy power generating projects, then Sunset credits should be given directly to them, rather than to end consumers.

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