

Evaluating the evidence on electricity reform: Lessons for the South East Europe (SEE) market

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This paper discusses the evidence on electricity reform and relates it to the current situation of the South East Europe (SEE) electricity market. We begin by discussing the main elements of the European Union (EU) electricity reform model. Then we go on to discuss emerging good practice in the regulation of national electricity markets in the EU. This is important because it reflects the key role placed on independent regulation of the electricity sector in the EU reform model. Next, we evaluate the empirical evidence on the success of the EU reform model in particular before and the success of electricity reforms more generally. This leads on to a discussion of the particular context of SEE electricity reform and what specific issues this raises. We conclude with a discussion of the importance of more general institutional context of SEE electricity reform. The paper suggests that it will be a substantial, but worthwhile, challenge to create a workable supra-national electricity market in the region.

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1. Introduction

The purpose of this chapter is to discuss the prospects for successful reform in the South East Europe (SEE) electricity markets with the emerging evidence on electricity reform from around the world.

It is important to start by saying that the analysis of electricity reform is complicated. This is because reform can take many different forms, involves a number of interrelated steps and is an ongoing process. While many countries have engaged in electricity reform, few have made the sort of progress that the leading countries or jurisdictions have made (e.g. the UK, Norway and Texas) and even among the leaders, electricity reform remains ongoing. In these circumstances evaluation of reforms is difficult because what is being analysed is so often incomplete, even in the terms set by national governments for their own reforms. The interrelatedness of the reform steps also renders attempts at evaluating the impact of any given step (e.g. privatisation or the introduction of incentive regulation etc.) problematic. These observations immediately give rise to the suggestion that it is not clear that a proper evaluation of the impact of electricity reform using econometric analysis of a sample of jurisdictions can be expected to produce sensible results or even that detailed country case studies can allow a clear set of lessons to be identified.

For advocates and critics of reform this complexity poses different problems. For advocates, it may be difficult to produce evidence that electricity reform is clearly working. For critics it may be difficult to find clear evidence against reform. Advocates will always find it easy to say, most countries have not properly implemented the full package of reform measures and it is too early to draw conclusions. Critics will always be able to point to cases where reform has significantly failed – California being the classic case.

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It is useful to be up front about what has driven electricity reform. Reform has primarily been driven by the failure of the vertically integrated electricity supply industry, often state owned, to deliver (see Helm, 2004). By the early 1980s the electricity industry in developed countries could be characterised as having excess capacity, having made expensive technology choices and being productively inefficient. At the same time in developing countries, there was a chronic shortage of capacity and the need for massive investment in generation and the extension of networks (see Bergara et al., 1997). In these countries electricity supply was unreliable and electricity companies were chronically short of funds. Electricity reform was primarily about improving efficiency in developed countries and improving access and reliability in developing countries. Modern electricity reform initially began in Chile (1982), UK (1989) and Norway (1990) and has been led by Anglo-American and Latin American countries since then.

Electricity reform should however be seen in its wider macroeconomic context. Electricity is a key sector in the modern economy and moves to improve the operation of the market more generally since 1980, form the backdrop to electricity reform. In all of the leading countries, electricity reform has been part of wider moves towards privatisation, smaller government and the extension of the role of the market. This is especially true in transition economies where electricity sector reform is clearly merely a part of wider reforms.

From this wider perspective electricity reform requires careful evaluation, not just in terms of its effect on electricity consumers and producers but also in terms of the promotion of efficient markets and good government more generally.

The SEE electricity markets constitute an important electricity reform experiment for the whole world. This is because these countries have been given a clear reform model to follow (from the European Union), have access to large amounts of technical assistance and reform is happening in the context of associated reforms in other sectors and government more generally. Thus the SEE is and will be a test of both the transferability of the EU reform model within the EU (from the leading reformers) and also its transferability to a set of developing countries more generally. It is an experiment that is being watched closely by the World Bank, the European Bank for Reconstruction and Development (EBRD) and the European Union (EU). On the down side one might go so far as to suggest that if the reform model cannot be transferred successfully to this set of countries, it bodes ill for the further extension of the reform model to other countries in Asia or Africa. On the up side the capacity for mutual learning (from the rest of the EU and from each other) and the scope for mid-course correction will be high and hence the chances of ultimate success would seem to be good.

The rest of this chapter proceeds as follows. First, I will discuss the main elements of the EU electricity reform model. Second, I will go on to discuss emerging good practice in the regulation of national electricity markets in the EU. This is important because it reflects the key role placed on independent regulation of the electricity sector in the EU reform model. Third, I will evaluate the evidence on the success of the EU reform model in particular before, fourth, going on to discuss the evidence on the success of electricity

reforms more generally. Next we will consider the particular context of SEE electricity reform and what specific issues this raises, before concluding with a discussion of the importance of more general institutional context of SEE electricity reform.

2. The European Electricity Reform Model

Electricity reform in the EU has been primarily driven by two electricity directives in 1996 and 2003 (see Jamasb and Pollitt, 2005).² These directives outline a number of key elements that are summarised in Table 1.

Table 1
EU Electricity Directives
Source: Vasconcelos (2004)

		1996 DIRECTIVE	2003 DIRECTIVE
Generation	Monopoly →	Authorisation Tendering	
Transmission	Monopoly →	Regulated TPA Negotiated TPA	Regulated TPA
Distribution		Single Buyer	
Supply	Monopoly →	Free	Free
Customers	No Choice →	Choice for Eligible (=1/3)	All Non-Household (2004) All (2007)
Unbundling of transmission and distribution	None →	Accounts	Legal
Cross-Border Trade	Monopoly →	Negotiated	Regulated

In essence the directives compel member states to move away from monopoly vertically integrated electricity supply industries towards deregulated electricity markets characterised by competitive wholesale generation, free entry of new plants, unbundled transmission and distribution wires, regulated non-discriminatory tariffs, competitive final supply markets and regulated trade across international inter-connectors.

The 2003 directive (03/54) sets a number of key objectives to be achieved by 1 July 2007 in each member state. These include the creation of an independent sector regulator, the legal unbundling of transmission and distribution businesses from competitive generation

² In September 2007, the EU Commission announced a ‘third package’ of electricity and gas market reform proposals. These could form the basis of a further directive aimed at creating a ‘truly competitive energy market’. See http://ec.europa.eu/energy/electricity/package_2007/index_en.htm

and supply, free entry into generation markets and regular monitoring of the progress of supply competition and 100% market opening to competition for all customers (including households). Special arrangements and other directives allow for measures to promote renewable generation (in addition to the market incentive provided by the EU Greenhouse Gas Emission Trading Scheme – EU ETS).

The EU is very keen on the creation of a single European electricity market but recognises that in the meantime regional markets may emerge where wholesale power is traded and dispatched across a region involving more than one country. Such markets exist among Nordic countries (Nord Pool, which began in 1996) and are emerging in the France-Belgium-Netherlands regional market which began operating in November 2006³.

At the same time as pursuing a reform agenda via energy directives (similar pressure has come from reform directives in Natural Gas) the EU Commission has been making use of competition law to investigate market abuse allegations against electricity and gas utilities as part of the EU Energy Sector Inquiry (European Commission, 2007). This investigation highlights the need for structural reforms, such as those embodied in the Electricity Directives to be accompanied by vigorous competition law enforcement where abuses of market power become evident in a deregulated system. Such investigations may force further structural reforms beyond those envisaged by the current directives and reflect the experience of individual countries. Both the UK and Chile have similarly used competition law enforcement mechanisms to progress electricity reform beyond the level required by the enabling legislation (see Newbery, 2005, and Pollitt, 2004a).

This brings us to some of the central theoretical propositions on which EU electricity reform is based. Basically electricity reform in the EU is an application of the theory of competitive markets in the context of an industry that has a number of vertically related stages of production, some of which are natural monopolies. This implies that the vertical stages must be clearly separated and moves towards reintegration must be policed (see Newbery, 1999). The natural monopoly elements are essential to production and hence need to be regulated according to theories of regulation (see Joskow, 2005). Such theories suggest that *independent incentive based regulation* is the best way forward. For the competitive stages of production, what is required are an *increase in the number of firms* (perhaps to five or more actual or potential competitors⁴) and *reduced entry barriers* (especially via the removal of legal restrictions on entrants and the monitoring of discrimination in entry conditions set by other stages of production). *Increased market size* (e.g. via the creation of regional markets) and the creation of an independent system operator facilitate competition by immediately increasing the number of competitors, reducing entry barriers and eliminating the scope for discrimination in dispatch of plant.

³ See www.belpex.be

⁴ The US Department of Justice Horizontal Merger Guidelines use 1800 is the key value of the Herfindahl-Hirschman Index, above which markets are thought to be highly concentrated and where significant mergers raise ‘significant competitive concerns’ (see http://www.usdoj.gov/atr/public/guidelines/horiz_book/hmg1.html).

An HHI value of 1667 is obtained if there are six equally sized firms in the market, 2000 if there are five firms, thus going below five firms raises ‘significant competitive concerns’. The HHI is calculated as the sum of the squares of individual firm market shares, multiplied by 10,000.

The theoretical underpinnings of electricity reform are thus relatively straightforward and very much part of the EU's wider Single Market agenda which rests on the same desire to have efficient regulation (and limitation) of natural monopolies and increased competition across and within borders.

It is worth pointing out that EU electricity reform model does not include a number of elements that have been present in some of the leading reform countries. First, there is no requirement for privatisation of any of the currently state-owned assets. There is de facto a requirement to increase private involvement because competition in generation and supply must mean that privately owned entities can enter the market (particularly from other countries). Clearly in Latin America, the UK, New Zealand and parts of Australia there have been significant privatisations of electricity assets, though public ownership continues to be significant in Norway and New Zealand. It is also the case that in the EU-15 around 50% of electricity assets are yet to be privatised (though many companies are now part privatised)⁵. Second, ownership unbundling of transmission system operation or transmission assets is not required by EU directives. This is in spite of the observation that all of the leading reform countries have independent transmission system operation (with or without ownership of the transmission assets). However the EU Energy Sector Inquiry seems likely to force change in this area at the EU level. Many leading reform scholars have advocated both ownership unbundling for transmission and privatisation of electricity assets (e.g. Joskow (2006), Newbery (1999), Littlechild (2000)) as key elements of reform packages.

3. Best Practice in European Electricity Reform

While the general requirements of the EU reform model are clear, there is wide variation in the progress with the implementation of the model. While only a few countries have failed to comply with the model as required by the directive (e.g. Greece), rather more countries have complied reluctantly and belatedly with key elements of the model. The most spectacular delay in compliance was the introduction of an independent electricity regulator in Germany only in July 2005 (years after many developing countries and after all other EU countries). Compliance with the directive however does not imply a through-going electricity reform. In many countries incumbent firms remain dominant in both generation and supply markets and further structural reform seems necessary if the theoretical conditions on which successful reform is based are to be achieved (see Jamasb and Pollitt, 2005).

The key body charged with overseeing electricity reform in EU countries is the designated national regulatory agency for electricity. There is a strong correlation between the strength of this regulatory agency and the progress with electricity reform in a given country (see Green et al., 2006). As this agency is a central focus of how countries can make progress with reform we concentrate our discussion of best practice on the reform of this agency.

⁵ See www.privatizationbarometer.net

Green et al. (2006) identify three aspects of best practice in regulatory reform. First, the *form of regulation*, which relates to the powers and responsibilities of the regulatory agency. Second, the *process of regulation*, which relates to way that this agency carries out its activities. And finally, the *outcome of regulation*, which relates to the measurement of success for a regulatory agency. In each case suggest metrics for best practice.

Larsen et al. (2005) focus on the form of regulation by examining the competencies and strengths of the regulatory agency. These include whether regulatory rules are set ex ante or ex post (ex ante being better for investment and efficiency of decision making), the extent of ministerial involvement (less being better due to the need to minimise arbitrary political intervention) and the strength of information acquisition powers (stronger being better for the monitoring of market power and the setting of regulated tariffs). Strong and effective regulators have control over tariff setting, network access terms, issuing of licences, setting of delivery terms and in settling disputes and enforcing punishments, as opposed to having any of these functions left to government ministers. An important element of independence is the tenure and terms of appointment of heads of regulatory agencies or commissioners (longer terms, less subject to arbitrary dismissal being better). Other elements worthy of consideration are the way the agency is financed (with freedom from general government expenditure pressure being better) and the way that employees are appointed and remunerated (with freedom from civil service pay scales being better where these are very low, and being acceptable where the quality of the civil service is high). The Larsen et al. analysis shows that there is a wide variation in the detail of the powers of EU regulators but that the most effective have more independence and control over the necessary elements of independent regulation.

Strength of regulatory powers is of course tempered by the initial structure of the industry in terms of the amount of horizontal and vertical separation that exists. A strong regulator will find it much more difficult to deal with a vertically integrated monopoly than with a carefully unbundled and competitive industry due to the control over information that such an incumbent exercises and its political influence. Table 2 shows some form and situation indicators for regulatory agencies in SEE. If we take wholesale competition, legal unbundling of networks, a fully independent regulator, price or revenue cap with a 3-5 year incentive period as the best form and situation that exists, only Slovenia meets all of these criteria. We also see that by the end of 2006 only Bulgaria had privatised more than 50% of its state owned electricity enterprises, with several countries showing no significant privatisation.

Table 2
Some form and situation indicators for SEE electricity markets (end 2006)

	<i>% state electricity assets privatised⁶</i>	<i>Industry structure</i>	<i>Type of unbundling</i>	<i>Independence of regulator</i>	<i>Transmission tariff setting</i>	<i>Distribution tariff setting</i>	<i>Incentive period (years)</i>
Albania	0%	Monopoly	None	Partially	Price/revenue cap	NA	3
Bosnia-Herzegovina	c.15%	Monopoly	Limited Legal/Accounting	Partially	Cost+	NA	
Bulgaria	>50%	Wholesale comp	Legal/Accounting	Fully	Cost+	Cost+/Revenue cap	5
Croatia	0%	Monopoly	Legal	Partially			
UNMIK	0%	Monopoly	None		NA	NA	
FYROM	c.32%	Wholesale comp	Ownership/Legal	Partially	Revenue cap	Price cap	To be implemented
Montenegro	0%	Monopoly	Accounting	Partially	Price cap	Price cap	1
Romania	17%	Wholesale comp	Legal/Accounting	Fully	Revenue cap	Price cap	5
Serbia	0%	Monopoly	Legal	Partially			
Turkey	0%	Wholesale comp	Legal	Fully	Revenue cap	Revenue cap	5
Greece	49%	Monopoly	Accounting	Fully	Cost+	NA	
Slovenia	19%	Wholesale comp	Legal	Fully	Price cap	Price cap	3

⁶ Source: www.privatizationbarometer.net, country chapters and estimates (assuming distribution share in asset value 35%).

Strength of the regulatory agency must translate into an effective process of regulation. This involves the competence with which the regulator carries out the tasks that it has been assigned. A key element of good process is transparency and hence predictability and accountability for decision-making. Transparency in regulation involves an effective process of consultation that allows views of competent industry and third party stakeholders to be expressed, publication of information on the web and an openness to learning from outside. In addition, regulators need to be procedurally efficient. This involves the publication of a detailed work plan and general consultation documents, the following of a regular pattern of reviews (particularly of regulated prices), the use of best practice methodologies (such as sophisticated benchmarking techniques for measuring efficiency of networks) and attention to proper incentivisation of non-price elements such quality of supply and investment. Good process also involves a willingness to be subjected to external ex post evaluation of decision-making. Evidence of regulatory failure to make well thought out or timely decisions would be evidence that a regulatory agency needed to improve its process of regulation.

Measures of process might include: whether all documents are on the website; whether important documents are in English (for international evaluation); if there is a work plan on the website; whether targets of work plan have been delivered; if there is use of external advice; if there is ex post assessment of decision making and whether the regulator is an active member clubs of regulators (e.g. European Regulators' Group for electricity and gas (EREG) in the EU)⁷. Answering Yes to all of these would indicate a strong process of regulation.

Clearly regulatory agencies need to be measured against outcomes. This is potentially rather difficult as clearly outcomes may not be fully under the control of the regulator and may rely on structural change that the regulator does not have the powers to deliver.

For developing and transition countries the adequacy of the amount of investment, the level of capacity shortages and outages, the size of system losses (technical and non-technical) and the percentage non-payment are important indicators which reform seeks to improve. For all countries, including developed ones, price trends, switching rates in retail competition, cost of regulation per unit of energy delivered are important indicators of how the regulator is doing. In addition the performance of the sector with respect to specific regulatory decisions is also an important measure of success.

These measures can only be looked at country by country over time. As an example if we take the UK regulatory agency, Ofgem (see Green et al., 2006). There have been large price reductions in regulated transmission and distribution charges (30% and 50% respectively between 1993 and 2005) and a trend reduction in overall prices towards EU average. There has also been significant customer switching in all market segments, but particularly among households where 1.5% of households switch per month. The cost of regulation remains low in relation to the total electricity bill at 0.17m Euros per TWh and is subject to a revenue cap of RPI-3% for each year in the period 2005-2010. Detailed cost benefit analyses of specific regulatory decisions have been undertaken with some

⁷ See www.ereg.org

doubt being cast on the cost effectiveness of full retail competition due to the high IT costs (Green and McDaniel, 1998) and the introduction of new wholesale market trading arrangements (Evans and Green, 2003), both of which were overseen by Ofgem (or its predecessor Offer).

4. Evidence on the EU Reform Model

In this section we address the issue of what the evidence is on the EU reform model in terms of delivery. It is important to stress that the EU reform model is primarily aimed at improving the productive efficiency of the sector by lowering costs and prices. For several SEE countries this may not be the primary aim, thus evaluation of reform impact will therefore take a different form for EU-15 countries than for the transition and developing countries within the SEE.

We examine five studies that look at the cross country evidence on the impact of electricity reform at the sector level. Two of them use OECD (and hence mainly EU) countries, while the other three are explicitly on the EU. All involve panel data analysis of some kind.

We begin with two academic studies (Steiner, 2001 and Hattori and Tsutsui, 2004). Both of these studies analyse similar datasets. Steiner (2001) conducts a panel data analysis on four variables: electricity price per unit, ratio of industrial to residential electricity price, generation capacity utilisation ratio and generation reserve margin. The first two measures get at the competitive aspects of reform and whether reform lowers prices or improves the efficiency of relative prices. The second two measures examine the cost efficiency of reform directly by looking at whether reform improves efficiency in the use of capital, given that OECD countries began their reforms with often significantly more capacity than was necessary.

Steiner (2001) uses panel data for 19 OECD countries covering 1986-1996. This study is an early test of the reform model as the first electricity directive was only to be enforced by 1999. She tests a number of elements of the reform model separately: namely unbundling of transmission, the introduction of a wholesale power pool, third party access to transmission and also privatisation (which we have said is not part of the EU model). On unbundling she finds that the separation of generation and transmission is not associated with lower prices but is associated with a lower industrial to residential price ratio and higher capacity utilisation rates and lower reserve margins. However this study assumes that 'unbundling' occurs when there is accounting separation of businesses within a vertically integrated company as well as stricter models of unbundling (legal and ownership). 'Accounting unbundling' is the weakest possible form of unbundling. On the introduction of a wholesale power pool, there is a significant reduction in prices and the ratio of industrial to residential prices (the impact on cost efficiency is not examined), On the introduction of third party access the sign on prices and the price ratio is negative as expected but not significant, while it is not significant for the cost efficiency measures. Privatisation seems to raise prices and the price ratio but has no significant effect on the cost efficiency measures.

Hattori and Tsutsui (2004) examine a similar OECD data on the impact of unbundling of transmission from generation, third party access, the existence of a wholesale market and the impact of privatisation. They use analysis similar to Steiner but over a longer period 1987-1999. They find that the unbundling variable seems to raise prices. However they use legal (or ownership) unbundling as their measure of unbundling. Hence, unlike Steiner, 'accounting unbundling' does not constitute unbundling. The introduction of a wholesale power pool also seems to raise prices, while the introduction of third party access or retail competition does seem to reduce prices. Meanwhile privatisation is associated with lower prices, such that a reform involving privatisation, wholesale power pool, third party access and legal unbundling has no overall impact on price. As several of the reforming companies in this sample reform quite late in the sample period it is not clear whether some of the differences in the two papers is coming from these late reforming countries.

The conclusion from these two careful papers is that it is difficult to find clear econometric evidence one way or the other on the reform model in its early phases.

Later evidence, of a less robust but more focussed kind, is provided by Ernst and Young (2006) and Thomas (2006). Both of these examine the price impacts of reform.

Ernst and Young (2006) conducted a report for the UK government's Department of Trade and Industry (DTI) that asks a number of questions. These include: does liberalisation lower prices, does liberalisation lower costs and price-cost margins, do liberalised markets increase price volatility, does liberalisation inhibit investment, do liberalised markets provide reliable and secure supply, and do liberalised markets interact effectively with other public policies (such as on climate change)? They use a sample of EU-15 countries and examine this question for electricity and gas with a large number of simple regressions. Their answer to all of these questions in the case of electricity is yes.

Thomas (2006) examines a number of reports including Kema (2005) and European Commission (2005) which look at (or comment on) electricity prices. These studies suggest that reforms in the EU have been associated with lower prices. However he is critical of the evidence they present. He suggests that most focus on the period 1995-2000 over which the reforms were not fully implemented, that commodity prices are not adequately accounted for (this is important given that they may have been falling over the sample period) and that recent price rises seem to have wiped out previous falls. Furthermore he suggests that the EU reform model's real test is whether it can deliver timely investment to meet the emerging investment gap following the elimination of short run inefficiency and initially high reserve margins.

Finally, in a more careful academic price study, Florio, Florio and Doronzo (2007) examine the impact of reform on household electricity prices in 15 EU countries over the period 1978 to 2005. They distinguish three reform variables: public ownership, entry regulation and vertical integration on a 0 to 6 scale (0=no public ownership, 0=no entry regulation and 0=no vertical integration). They find that for simple log linear functional

form panel data equations none of the reform variables are individually significant. The signs on the entry regulation and vertical integration are (generally) in line theoretical predictions that less of each of these variables implies lower prices, while the sign on public ownership is negative, indicating that more public ownership leads to lower prices. This study is interesting in that it tries to distinguish reform elements. However clearly some countries have failed to implement throughgoing reforms e.g. Germany failing to vertically disintegrate its industry, while others have successfully introduced competition and vertical disintegration without full privatisation (e.g. Sweden). Thus it would seem that measures of progress on individual reform variables may not reflect the overall success of a reform *package*.

A key conclusion from all of these studies is that econometric evidence on the impact of the EU model is limited and will take more time to emerge. It has also been largely focussed on price and short run cost efficiency. There has been little attempt to test overall reform progress (e.g. with a single reform variable) or to distinguish *all* the elements of reform carefully (e.g. incentive regulation). Clearly the ability of the model to deliver efficient investment, especially in generation, has not been established by econometrics. However it is encouraging that Norway, Finland, Sweden and UK seem to show that markets can meet generation investment requirements and that incentive regulation can incentivise adequate network investment.

However as Littlechild (2006) points out experience with some elements of the European reform model such as full retail competition is very limited, even globally. Even after 8 years that UK has just reached 50% switching by residential customers to non-incumbent suppliers and most EU countries are a long way behind this.

At this point we note the result of larger macroeconomic study by Copenhagen Economics (2005) which looked at the impact of EU-15 reforms - over the period 1990-2001 - in electricity, telecommunications, air transport, rail transport, urban transport, gas and postal services. This study used a general equilibrium model to estimate the overall macroeconomic impact of these reforms. This showed that the combination of lower prices and lower costs in all these sectors was of the order of 2% of GDP, of which two thirds arose from electricity and telecoms reforms (p.22). This sort of permanent rise in GDP/social welfare is well worth having. However the range of benefits was wide in terms of social welfare ranged from 0.4% in Greece to an impressive 6.5% in Finland. The report states that 'Those member states who opened markets more and who started early have gained the most.' (p.22-23).

In closing I should point out that there is evidence of successful reform at the country level within the EU, e.g. for the UK (Newbery and Pollitt, 1997, and Domah and Pollitt, 2001) and for Nordic countries (von der Fehr and Bergman, 2005), but as countries may have implemented additional measures to those required by the EU (e.g. privatisation in the UK), it is not conclusive that these provide evidence for the EU reform model per se.

5. *Evidence on electricity reform in developing and transition economies*

In developing and transition economies the focus of electricity reform is not on short run efficiency improvement and price reduction. Reform may include significant price increases, with many prices having to be increased substantially to ensure cost recovery. Privatisation may also be significant as part of an overall move to improve the operation of the market within the country. In addition countries may be introducing transparent and effective processes of independent regulation for the first time.

There have been a large number of studies looking at electricity reform in developing countries generally (see Jamasb et al., 2004). The evidence of these studies covers a wider range of variables than those tested in the EU focussed studies and addresses additional issues such as the role of wider institutional arrangements (outside the electricity sector), energy resource endowments (whether self-sufficiency encourages reform), the impact of reform on investment and energy losses and the role of privatisation and independent regulation.

Jamasb et al. (2004) summarise the econometric evidence contained in Wolak (1997), Zellner and Henisz (2000), Bacon and Besant-Jones (2001), Drillisch and Reichmann (1998), Holborn (2001), Siniscalco et al. (2001), Ruffin (2003), Bergara et al. (1997) and Zhang et al. (2002). They conclude, based on these studies, that:

1. Political and judicial institutions and energy resource endowments matter for progress with reform.⁸
2. Privatisation improves efficiency if accompanied by independent regulation. Competition improves efficiency in generation. Independent regulation alone is not significant for efficiency.
3. Privatisation has no significant effect on prices, competition has a mixed effect on prices, regulation has no significant effect on prices.
4. Private investment is stimulated by the strength of property rights protection and the presence of independent regulation.⁹
5. Vertical integration reduces the amount and value of privatisation.

In addition to the econometric evidence there have been a number of detailed analyses of aspects of reforms or the whole reform programme in some of the early reformers. Thus there are well-documented case studies of electricity reform in Chile, Argentina, Peru, Philippines, Brazil, Columbia and Ukraine (see Jamasb et al., 2004). None of these countries has pursued the EU model as far as the EU (no developing country has full

⁸ This has been supplemented further by evidence in Weizmann and Bunn (2004).

⁹ This is also supported by Cubbin and Stern (2005), see section 6. Guasch et al. (2003) further find that concession contracts – including in the electricity sector - in Latin America were less likely to be renegotiated if a regulator was in place at the time of contracting. Given the fact that increased likelihood of contract renegotiation raises the riskiness of investment, this constitutes evidence that appropriate ex ante regulation improves the investment environment.

retail competition) but there have been significant positive experience and illustrations of how problems may be overcome. Some of the gains have been very high: Toba (2003) estimated that the liberalisation of Philippine electricity generation produced a one-off gain equivalent to around 10% of GDP, while Mota (2003) estimated that the privatisation (and incentive regulation) of Brazilian electricity distribution produced a one-off gain of more than 2% of GDP.

The evidence suggests that privatisation, wholesale market competition and independent regulation are key elements of a reform in a developing country. However the leading countries sometimes exhibit features not seen in the EU (e.g. cost based bidding into the power pool in Chile). Where all three of these are present there is evidence of improved efficiency though prices may have to rise from uneconomic levels. The presence of initially uneconomic prices presents a key political problem for developing countries. While developed countries may find prices falling due to reform or have the capacity to absorb or adjust to rising prices for low income groups via the tax and benefit system this may be more difficult for a developing country.

While there seems to be plenty of potential for improvement from a judicious combination of reforms in the transition countries in SEE, the problems in delivering benefits to society are not underestimated. This may be particularly true of the smaller SEE countries. For small countries, where the scope for competition may be limited and managerial expertise is scarce, the benefits of a full reform package may be small in relation to the costs. Besant-Jones (2006), in a developing country context, defines small power systems as being less than 1000 MW. However he notes that Guatemala has a competitive wholesale power market with a capacity of 1875 MW. Without adequate interconnection wholesale competition may therefore be an issue in some SEE countries (e.g. Albania, Bosnia-Herzegovina, UNMIK, FYROM and Montenegro). See Appendix 1 for a table indicating the size of the SEE countries. Another issue related to size is highlighted by Domah et al. (2002), who suggest that small developing countries are likely to have a human resource problem in regulation where the need to achieve minimum efficient scale for a regulatory agency may imply a large number of highly skilled staff relative to size of the electricity sector.

6. Key challenges facing successful reform in SEE

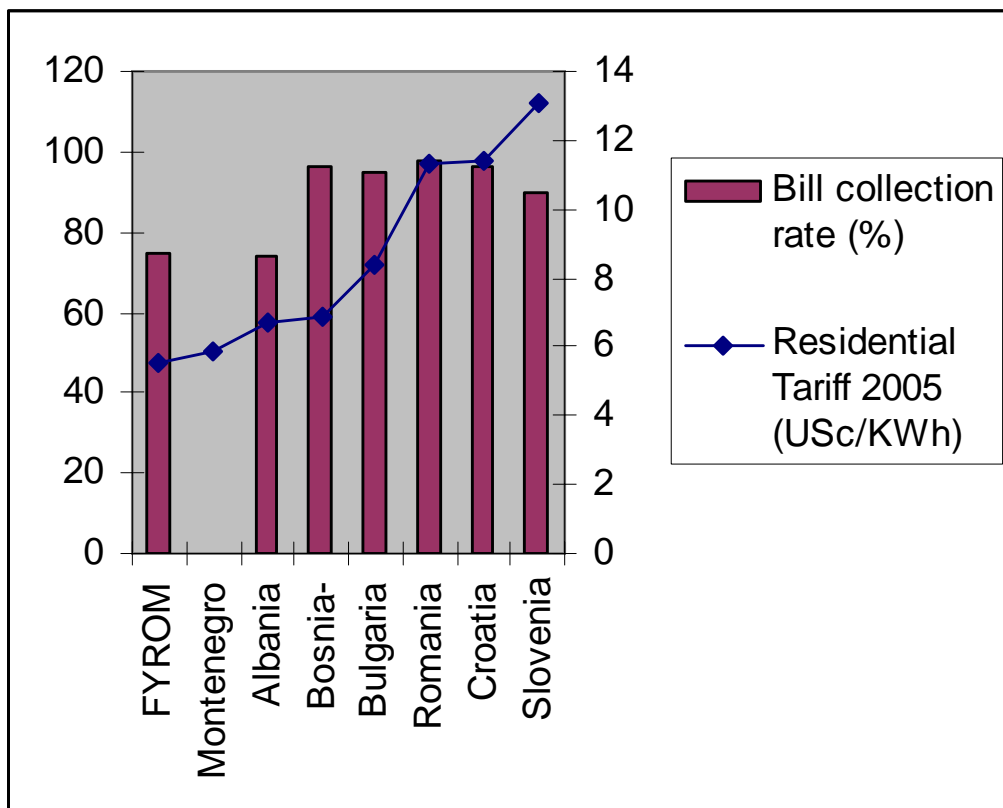
In this section we ask a number of specific questions which electricity reform in the SEE will need to address. These questions arise from the need to implement the EU reform model but are not necessarily addressed by the evidence on electricity reform available to date. These include: how can prices be raised to economic levels; how to attract (often foreign) investment; how to create a regional market (rather than a set of national markets); when to deregulate the residential market; and when (and how) to privatise electricity assets?

First, how can prices be raised to economic levels? An essential part of a successful reform in any country is that price distortions are minimised. This is important for a number of reasons. These include the need to achieve cost reflective tariffs that ensure

the financial viability of efficient firms in the industry. Investment and quality of supply can only be ensured if they are capable being sustainably financed from customers. Additionally customers should face the correct price signals on which to base their consumption and investment decisions. Cheap subsidised energy reduces the incentive to economise on fuel and creates an energy intensive economy with high environmental impact. That is not to say that there should be no subsidies to any customers. Several countries do have explicit policies of uniform residential tariffs across the country (e.g. Turkey). This may not represent a major distortion as long as the uniform pricing is revenue neutral from the point of view of the whole industry and there is efficient revenue recycling scheme such that revenue received by suppliers in different regions is cost reflective.

The transition and developing economies within the SEE have already seen substantial price rises. However Figure 1 indicates that sub-economic pricing and tariff recovery rates exist in several countries. It is difficult to explain the substantial variation in published residential prices between adjacent countries. If Slovenia has economic prices, clearly Macedonia (FYROM), Montenegro, Albania and Bosnia-Herzegovina are a long way short of this. This is evidence of a substantial under pricing of residential electricity. Bill collection rates, even at low prices, are only 80% in Albania and Macedonia.

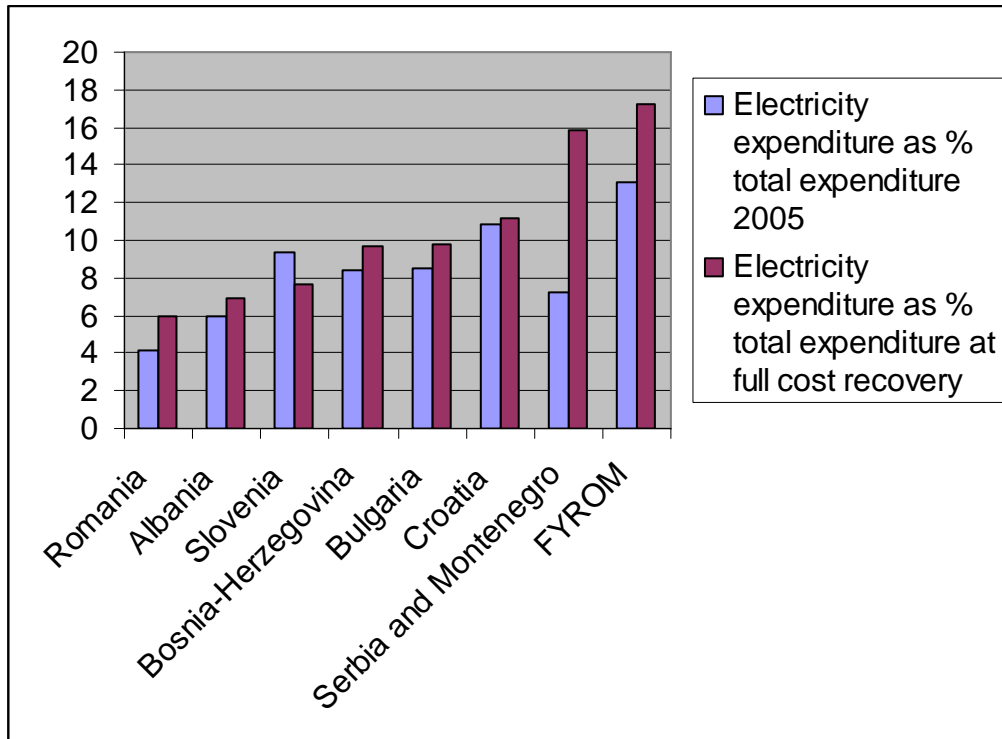
Figure 1
Economic Prices in SEE?
 (Source: EBRD, 2006)



Note: Bill collection rate for Montenegro not available

The scale of the challenge posed by any attempt to raise prices is indicated in Figure 2. This figure shows the percentage of household income being spent on electricity by the bottom decile in various SEE countries in 2005. It also shows what this percentage would be if prices were raised to economic levels (even after taking account of the effect on demand of higher prices). For FYROM, Croatia and Serbia and Montenegro the imposition of economic cost recovery would lead to substantial rises in required expenditure to over 10% of income. The true cost of such price rises may be even higher as the current expenditure figures reflect actual household expenditure: disguising the impact of theft, bill arrears and the cost of alternative fuels (e.g. wood) as electricity consumption is reduced. If a household spends 10% or more of its expenditure on electricity this constitutes the usual definition of fuel poverty (see Fankhauser and Tepic, 2005). Although the term makes little economic sense (one could just as well define 'food poverty' or 'transport poverty') and simply reflects general 'poverty', it is a political concern. In advanced countries with well developed welfare systems, a rise in prices of one good consumed by the poor to economic levels might simply be handled by an increase in welfare payments within the tax and benefit system. In developing countries with unresponsive or poorly developed welfare systems this may not be an option, hence the original reason for direct price intervention for poor consumers. Only rising incomes and an improved tax and benefit system may eliminate the need for distortionary pricing.

Figure 2
Fuel Poverty in SEE
 (Source: Fankhauser and Tepic, 2005)



Schemes for the specific protection of low income users can be efficiently designed, such that richer customers pay a levy and the marginal price of energy facing low income consumers is cost reflective. It is also desirable that even if some consumers must receive ‘free’ electricity, that someone pays for it. Following liberalisation in Argentina nearly 650,000 urban slum dwellers had their connections regularised with in some cases local authorities paying electricity suppliers for electricity that free at the point of delivery (Pollitt, 2004b). The local authorities imposed a local electricity tax on those who did pay to finance the payments.

Second, how to attract new (often foreign) investment? There is a need for new investment in many of the electricity systems of SEE. In particular there is a requirement for new generation capacity, capable of meeting environmental targets set by the EU, and the upgrading of transmission and distribution networks. Such investment needs to be substantially foreign in order to embody the latest technology and operational efficiencies. The attraction of such investment requires security of property rights both via the judicial system and regulatory process but also in terms of physical security (from conflict or theft). Governments can work to reduce regulatory uncertainty and commit to cost reflect tariffs for electricity companies. Power purchase agreements can help offer a degree of certainty to generation investors but do potentially lock in high prices (this was the case in Northern Ireland where a single buyer model with long term power purchase

agreements was followed to ensure the success of privatisation (see Pollitt, 1997)). However proper incentive regulation and competitive wholesale markets can help ensure that private sector investment does flow (following Bergara et al., 1997). Indeed Cubbin and Stern (2005) find that better regulation increases electricity investment by 15-25% for their sample of developing countries.

Third, how to create a regional market (rather than a set of national markets)? Regional markets require adequate cross-border transmission capacity and appropriate supra-national regulation. Many of the SEE countries are very small and interdependent. Clearly a single electricity market for the region would seem to make a lot of sense. For it function effectively there would need to be adequate cross-border transmission capacity to reduce the amount of time when transmission constraints effectively mean that the markets become national again and hence allow the benefits of cross-border trading. Agreeing to the required transmission investment is difficult. An international grid operator has recently in 2007 been created in Central America to operate a new long distance transmission link in that region, having first been proposed in 1996, indicating the problems of getting agreement on how to create and regulate such international entities.¹⁰ Part of the delay in the South American case was getting approval for an investment where the benefits and costs were unequally shared between the countries, making those whose net benefits were lower slower to agree to an investment the benefits of which largely accrued to others.

A proper regional market (in the sense of Nord Pool or France-Belgium-Netherlands) needs to be regulated by a supra-national regulatory or quasi-regulatory body. This would be necessary to monitor market power within the regional system, especially where national competition authorities are not competent or empowered to investigate abuses in one part of the system which effected another part. Much of the 'regulation' can be done through the market rules (as in Nord Pool) but a supranational regulator would seem to be important. The EU Commission might be able to fulfil this role but not all the countries are in the EU and hence a regional regulator (in the style of FERC's relationship to the state level PUCs) would seem to be necessary. A supra-national regulator might also provide information sharing on distribution and final tariff calculations and provide the sort of comparative information, collected on a similar basis, that can be used in national distribution price control reviews. In this way it might find parallels in the high degree of cooperation between Nordic Regulators and the emerging role of ERGEG at the EU level.

Fourth, when should the residential market be deregulated? Although this policy is now in force across the EU it remains controversial for developing countries.¹¹ In the SEE the

¹⁰ See www.eprsiepac.com. The countries involved are Honduras, Guatemala, El Salvador, Nicaragua, Costa Rica and Panama.

¹¹ Even in progressive markets, like the UK, questions can be asked about the efficacy of residential competition. There is evidence (see for example, Salies and Waddams Price, 2004) that a substantial group of customers may never switch from incumbents (who then charge them higher prices) and that these customers may be the poorer ones; and that many of those that do switch may not switch to better deals. This appears to raise questions about the rationality of consumer choice in general. However it is not clear

degree of market opening to competition is limited. Table 3 indicates the degree of market opening in the SEE. No country has opened all of its residential market to competition and several have more limited market opening. Besant-Jones (2006) expresses the World Bank experience with electricity market competition in developing countries. He suggests that cost-based spot markets have often been effective (especially in Latin America) and are simpler and less risky than price based spot markets, that competition can be allowed to evolve slowly (no developing country has full retail competition), bilateral trading is possible for developing countries and a temporary single buyer arrangement can be considered. Clearly until competition is viable and distributional issues are less acute (perhaps due to effective levy arrangements, welfare payments or simply rising incomes), retail competition would seem to be a politically dangerous experiment for a developing country used to subsidised energy.

Table 3
Degree of Market Opening in SEE, 2006
 (Source: ERRA website)

	<i>Size of open market by sales</i>
Albania	2 large customers
Bosnia-Herzegovina	None
Bulgaria	25%
Croatia	>50%
UNMIK	4 large customers
FYROM	~30%
Montenegro	None
Romania	81%
Serbia	16%
Turkey	30%
Greece	65%
Slovenia	64%

that the answer to these issues is price regulation, it may be better information and regulatory monitoring, combined with a clear commitment to caveat emptor, given that competitive deals are available.

Finally, when (and how) should electricity assets be privatised? Much of the SEE electricity sector remains state owned. The evidence we reviewed in the previous section showed that privatisation combined with incentive regulation and competition yielded substantial benefits for developing and transition countries. Krishnaswamy and Stuggins (2003) provide a roadmap to privatisation. This involves sorting out labour agreements, fuel supply agreements and rights of way before privatisation. Such deals need to be politically expedient but time limited. Indeed the UK government did do deals with unions to guarantee jobs and with domestic coal suppliers ahead of privatisations, however these were time limited to ensure that there was minimal disruption from these sources in the early years of privatisation but that eventually the benefits of competition from the ending of these deals could be realised. It is also important to raise prices to economic levels before privatisation. This is important not just to ensure investor interest but also that easy gains from improving revenues are captured by the state not by private investors. The actual privatisation process needs to be via transparent international tendering with a willingness to allow foreign ownership, to involve the offering of majority stakes to attract strategic investors, though golden shares and restrictions on resale may be important for maintaining some political control over the evolution of market structure (which might otherwise become concentrated in the face of weak competition policy enforcement). Foreign ownership is beneficial because it provides capital and because it provides new technology and management techniques.¹² The temptation to create national champions needs to be resisted, not least because it promotes corruption and is ineffective in promoting national investment (Ades and Di Tella, 1997)¹³. Clearly countries need to avoid the sort of dishonest and collusive equity for debt swaps and asset stripping which characterised some of the Russian privatisations that have had such significant and long-running political consequences.

7. Institutions, politics and progress with reform in the SEE

The EBRD conduct an annual assessment of the progress of reform in the electricity sector and more generally in the SEE. The results for 2006 are summarised in Table 4. This shows that on a scale of 1-4 (4 being the best), there is still some way to go in the implementation of reforms in the electricity sector. However Table 4 also shows the progress of reform in competition policy more generally – this is much less advanced. This immediately indicates that the wider institutional framework within which electricity reform is progressing may be more challenging. Competition policy is an essential part of any electricity reform because reform places a greater burden on competition authorities to monitor the electricity market and deal with any market abuses. The final column of Table 4 goes further by noting the legal origin of SEE countries in the famous LLSV (1999) paper. This paper suggested that countries with socialist and indeed French legal

¹² Blackman and Wu (1999) provide such evidence on the positive impact of FDI in the Chinese electric power sector. Neuhaus (2006) provides evidence more generally on the positive correlation between FDI and economic growth in central and eastern Europe.

¹³ Ades and Di Tella (1997) use a sample of 32 developed and developing countries. They find that corruption is higher in countries with higher levels of industrial subsidy. The extra corruption in turn offsets a substantial proportion of the direct investment effect of subsidy, leaving subsidies significantly less effective than otherwise.

origin had a strong disadvantage in economic development, relative to English legal origin countries.

Table 4
Progress with Reform and Legal Origin 2006

	Electric power	Competition Policy	Legal origin
	EBRD Transition score 2006 Max=4+, Min=1		LLSV (1999)
Albania	2.7	2	Socialist
Bosnia-Herzegovina	3	1.7	Socialist
Bulgaria	3.7	2.7	Socialist
Croatia	3	2.3	Socialist
UNMIK			Socialist
FYROM	3	2	Socialist
Montenegro	2.3	1	Socialist
Romania	3.3	2.7	Socialist
Serbia	2.3	1.7	Socialist
Turkey			French
Greece			French
Slovenia	3	2.7	Socialist

e.g. *Electric Power*, 3=Law passed providing for full-scale restructuring of industry, including vertical unbundling through account separation and set-up of regulator. Some tariff reform and improvements in revenue collection. Some private sector involvement.

Competition Policy, 2= Competition policy legislation and institutions set up; some reduction of entry restrictions or enforcement action on dominant firms.

Source of EBRD Transition score: www.ebrd.com

The link between electricity reform and institutions more generally remains poorly explored. Electricity reform requires fundamental change of the institutions in the electricity sector (e.g. the creation of an independent regulator and an Independent System Operator), however these institutional changes occur in the context of ‘deeper’ institutions such as competition policy, the judiciary, political fora etc... The extent to which electricity reform can make up for deficiencies in these ‘deeper’ institutions is limited. Argentina provides a classic case of an excellent electricity reform (which was successful for almost 10 years) derailed by wider government’s institutional failures (Pollitt, 2004b).

The literature on the wider institutional context emphasises: the connection between ‘deep’ determinants and financial crises (Bordo, 2006), the association of legal origin and economic growth (LLSV, 1999) and how poor resource endowments, can with difficulty, be overcome by good general institutions (Easterly and Levine, 2002).

These observations suggest that the SEE countries need to focus on strengthening property rights more generally, pay attention to the nature of the legal systems being put in place and overcome resource endowment (energy security) concerns with good institutional arrangements to deal with the issues raised by resource endowments. It is important to also realise that mere institutional form is not a substitute for effective

institutional operation (there is likely to be a Lucas critique in institutional form) and that the details of laws are important beyond general legal origin (see Siems, 2006, who takes the LLSV work further to ask what differences exist in the detailed law codes between countries?).

Institutional change requires political support. Anderson and Sitter (2007) point out that while the institutional changes required by EU energy directives aimed at creating a single European energy market by homogenising national institutions. The reality is that 'homogeneous integration may be the exception rather than rule' (p.3) and that political differences explain actual patterns of integration. This reflects the conclusions of an earlier World Bank (1995) study that suggested that successful liberalisation of economic activity required a sufficient combination of political desirability (political benefits must outweigh costs), political feasibility (leadership must be strong enough to overcome opposition) and political credibility (promises to compensate losers and protect winners must be believed). Attempts to build institutions which promote competition and independent regulation also require such political pre-conditions.

General institution building is undoubtedly very difficult but can be done. Chile provides a clear example of a successful electricity reform in a developing country with very effective general institutions. Indeed Chile ranks 27th in the Global Competitiveness Index (above Spain, Greece and Italy) in 2006. It is to be hoped that SEE countries will provide less politically painful (than Chile), but equally economically successful examples in the future.

8. *Conclusions*

In closing I draw a number of conclusions.

First, electricity reform is complex and the evidence is difficult to evaluate. Reform remains a work in progress where careful thought is needed on the exact institutional changes to put in place in the electricity sector. In particular there must be a willingness to learn and change the arrangements as information comes through and problems are identified.

Second, it is not clear that the EU electricity reform model in its entirety is the best for SEE. The EU model is only at the trial stage in the EU-25. Evidence from other developing countries suggests that alternative arrangements do exist, are workable and do bring substantial benefits.

Third, electricity reform is part of wider institutional reforms. It will not be successful unless there is sufficient institutional reform in the rest of the economy to support developments in the electricity sector.

Fourth, small countries either need to be integrated into bigger electricity markets or to have special arrangements. The project to create a single regional market is therefore more important to small countries than to large ones.

Fifth, market integration raises institutional fit issues. The track record on successful supra-national electricity markets is limited. Nord Pool is a great example but clearly relies on substantial similarities in the institutional arrangements within Nordic countries and a history of economic cooperation. It is a substantial challenge to make such arrangements work in the SEE.

Finally, climate change and security of supply issues pose enormous challenges to the EU electricity reform model. It is unclear, even at the EU level, whether these challenges will eventually derail the competitiveness agenda embodied in the EU Electricity directives. Clearly the EU ETS and increased market integration and co-ordination can be consistent with meeting climate change and security of supply objectives. However in all European countries these issues will test politicians commitment to market based reforms.

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Appendix 1

Table A1 – Basic Data on SEE countries
(Sources: EBRD, CIA Factbook, ERRA, World Bank)

		Population	GDP per cap	TWh consumption
		million	PPP USD 2005	
Albania		3.2	5201	6
Bosnia-Herzegovina		3.8	7822	10
Bulgaria		7.7	8820	44
Croatia		4.4	13185	16
UNMIK		2	1600	4
FYROM		2	7268	8
Montenegro		0.7	3800	5
Romania		21.7	9165	59
Serbia		10.4	4400	27
Turkey		72.6	8400	150
Greece		11.1	22300	60
Slovenia		2	21500	14