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Regulation of Transmission Expansion in Argentina:

Part II – Developments Since the Fourth Line

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Regulation of transmission expansion in Argentina Part II: Developments since the Fourth Line[1]

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Abstract

The innovative transmission expansion policy introduced in Argentina in 1992 has been refined and modified since then. Refinements include provision for transmission companies and others to propose quality and substation expansions. There have been several such expansions, and no lack of investment in quality and reliability of supply. A 'second round of reforms' in 1998 introduced transmission rights and a method of 'risk-bearing expansions'. These and other reforms were rescinded before they became effective. In 1999 a Federal Transmission Plan was introduced, to build lines designated by the federal and provincial governments. This reflected a decision to give greater weight to political rather than economic considerations, rather than a failure to meet the original economic aims of reform. The original reform led to less investment in major transmission lines but used existing lines more intensively, which was more efficient. Competition to construct expansions developed, and led to lower construction costs. Thus, contrary to a widespread perception, the Argentine transmission expansion mechanism was a considerable success in terms of meeting the requirements of users efficiently. This experience suggests that involving users in the regulation of monopoly networks is feasible, and the scope for it may be greater than generally appreciated. However, the reconciliation of economic and political considerations needs further consideration.

Key words: Argentina, electricity, transmission, regulation

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Executive Summary Part Two

Introduction

Argentina's electricity reform introduced in 1992 is widely regarded as successful. However, the transmission expansion element of that policy is regarded as unsuccessful, as exemplified by a delay to the Fourth Line from Comahue to Buenos Aires. Part One of this paper explained that the reason for the policy was because conventional regulation could not be trusted to deliver more efficient investment decisions. The Fourth Line was in fact uneconomic, and delay was beneficial. In terms of economic efficiency, the episode illustrated a success rather than a failure of the reform.

Since 1992 there have been discussions and further reforms, including with respect to quality of service, the role of distribution companies, the Area of Influence method and transmission rights, culminating in a second round of reforms in 1998. Since then there has been a new Federal Plan for regional expansions, and a change in policy direction mainly since the financial crisis. Part Two of this paper examines the nature of these reforms and changes, and the lessons to be learned.

1. Quality of supply

The quality of supply in general improved after privatisation. In 1997 the Government asked CAMMESA to investigate the situation, and its report did not identify any lack of investment in quality of supply. Resolution 208/1998 nonetheless provided a special procedure to facilitate quality of supply expansions. Only two quality expansions have been proposed under that route, of which one was rejected for reasons more related to the provincial regulation of distribution companies. Calculations suggest that the reliability benefits of further major expansions would be only a fraction of the costs involved. The Public Contest method has not failed to deliver needed quality expansions.

2. Distribution companies

Distribution companies were expected to play a role in maintaining and improving quality of supply. Regulatory arrangements for distribution companies differ with respect to responsibility for transmission failures and obligation to pass on penalties paid by transmission companies, and ability to pass on costs of transmission expansions. This variety reflects Argentina's federal nature. Penalties for non-supplied energy were intended to provide an incentive to support transmission expansion: in practice ENRE reduced these penalties over time. In a widely cited case two distribution companies had voted against a quality expansion proposed by the transmission company (a reserve transformer in Bariloche area). But their provincial regulators had indicated that they did not consider the investment economic. In other cases distribution companies did support transmission expansions. It was not that the original scheme was applied and failed: it was not fully applied. Several provincial governments are now developing their own arrangements within the Public Contest framework.

3. Second round of reforms

In 1997 the government commissioned studies to extend the competitive market. These identified the Area of Influence method and the absence of transmission rights as major deficiencies. The Area of influence method had been introduced for reasons of practicality. Despite its limitations, consultants to the Secretary of Energy could not identify a better method. In a 'second round of reforms' in 1999 the government left the method in place. The government also proposed congestion rights and a new 'risk-bearing expansion' method to allow a wider range of participation.

4. The Federal Plan

Provincial governments pressed for more regional expansions. In 1999 the outgoing Menem government increased a surcharge on electricity to establish a Federal Transmission Fund to be allocated by the Federal Council of provincial governments. The incoming government made the Federal Transmission Plan a priority, with the objective to finance transmission expansions that the Secretary of Energy identifies as financeable. It introduced a new Open Season method for inviting private participation, and suspended the previous second round of reforms. The Golden Rule (transmission expansions should lower total costs) did not in practice apply to such expansions. Five (later four) new regional lines were identified, that would also link the radial system into a meshed network.

5. Temporary reversal of policy

In March 2001 the impending economic crisis led to the recall of Carlos Bastos, who had introduced the original reforms. He suspended the Federal Plan and reinstated variants and extensions of the earlier market-oriented reforms. Within a few months Congress repealed these measures.

6. The crisis and afterwards

The economic crisis led to devaluation, pesification and price freezes. In 2003 there was a temporary process for Upgrade expansions paid for to a greater extent by all users. The Federal Plan was relaunched. The Patagonian Line is going ahead but other lines have been delayed by shortage of funds. The Salex Fund has been used for various purposes, including compensating generators for international oil prices in face of frozen tariffs.

8. Review of performance

There have been significant transmission expansions since the 1992 reform, but fewer lines than previously. The Fourth Line is the main line built under the Public Contest method. The emphasis has shifted to other investments to make better use of the existing system. There has been valuable investment in enhancing system control. Competitive tender has roughly halved the cost of building new lines. There have been up to four bids for each major expansion, and several new transmission companies are now in operation.

There has been a significant overall improvement in the performance of the transmission system.

9. Economists' concerns about a market approach

Economists have expressed various concerns about a market approach in the context of merchant interconnectors. Concerns include market imperfections, lumpy investments, stochastic capacity, conflicts of interest with existing operators leading to inefficiencies, loop flows, coordination problems between market participants, gaming, and lack of forward markets. In practice, these issues have generally not been problematic in the context of the Public Contest method in Argentina: some issues are less serious in a radial network, some were foreseen and dealt with, some do not characterise the way market participants have acted in practice.

10. Conclusions

Argentina's policy of transmission expansion has been widely held to be unsuccessful. The delayed Fourth Line is usually cited as evidence. Part One of this paper showed that that experience was in many respects a success rather than a failure. Other criticisms are that the approach has failed to deliver quality of supply, partly as a result of reluctance of distribution companies to participate; that the Public Contest method was deficient, that transmission rights were lacking; that there were problems in achieving consensus among the parties. Part Two has shown that there is no substance in most of these claims; that quality investments have not been lacking; that provincial governments rather than the Public Contest method hindered participation of distribution companies; that reforms introduced congestion rights but were suspended by a subsequent government for reasons unrelated to economic efficiency. The approach of the 1990s that emphasised the competitive market has now been replaced by federal and provincial planning, using regional expansions to encourage growth and development of the sector. The original approach has been replaced, not because it was economically inefficient but because it was politically unacceptable.

In comparing market and regulation, economic analysis needs to recognise that regulation and government have public choice objectives that influence their decisions. In Argentina, as in Australia, governments have built transmission lines beyond the point of economic efficiency. In contrast, contrary to widespread views, the market approach in Argentina seems to have led to economically efficient outcomes except where influenced otherwise by government. It is for consideration how far competitive tender and the involvement of users can be extended to other sectors and countries. How best to deal with the combination of economic and non-economic objectives is also a challenge. But experience in Argentina shows that involving users in network investment decisions may be more effective than generally recognised.

Introduction

From 1992 to 2002, major expansion of the Argentine electricity transmission sector depended on users proposing, voting and paying for such expansions, via the so-called Public Contest method. Many commentators hold this policy to have been unsuccessful, and in particular to have delayed much-needed investment in the "Fourth Line". Part One of this paper[4] examined Argentine policy and experience, with specific emphasis on the following questions:

- Why, given the potential difficulties involved, did Argentina nonetheless adopt this novel scheme for transmission expansion?
- Is there evidence that the mechanism unnecessarily and uneconomically delayed investment in the "Fourth Line", or exhibited other problems?

The experience of inefficiency and over-expansion of transmission in the state-owned era led policymakers to conclude that the conventional regulatory framework could not be trusted to deliver more efficient investment decisions. Closer examination of the Fourth Line experience suggests that the Fourth Line was uneconomic, and the decision to delay the investment pending further analysis was beneficial. The Public Contest method subjected transmission expansion decisions to economic decision-making for the first time, and the Fourth Line experience demonstrated the need for convincing reasons for new investment. The lack of replication of the Fourth Line as demand has continued to grow does not indicate that the method for regulating electricity transmission expansion has failed, but rather that it is more economic to transport gas to the Buenos Aires area, and to generate electricity there, than to build new lines to transmit electricity. The Fourth Line experience should be regarded as a success rather than a failure.

Since the Fourth Line debate, there have been continued discussions, notably about the area of influence method and transmission rights. There have also been several policy developments, notably concerning quality of supply expansions, and a second round of reforms in 1999, including so-called 'risk-bearing expansions'. During the two Menem governments (1989-1999) these reforms typically reflected, refined and extended the pro-market policy developed by Carlos Bastos (Secretary of Energy 1991-96). Then came the creation of a Federal Transmission Fund and – with a change of government - a Federal Transmission Plan and a change of policy. Just before the economic crisis of late 2001 Carlos Bastos returned briefly to office, and policies were temporarily reversed. However, since the crisis there has been a further increase in the role of government and a corresponding reduction in the role of market participants.

The present paper examines how and why the initial regulatory mechanism for transmission expansion has been modified over time, and what effects this has had. It examines criticisms of the initial mechanism, and identifies what lessons can be learned from this experience for the success or otherwise of the initial and innovative policy on transmission expansion. It is organised in ten sections: Quality of supply and substations, Distribution companies, Second round reforms, the Federal Plan, the Temporary reversal

[4] Littlechild and Skerk 2004.

of policy, the Crisis and thereafter, a Review of the performance of the arrangement, and a discussion of Economists' concerns about the market approach, and Conclusions.

1. Quality of supply

1.1 Concerns about quality of supply and CAMMESA's investigation

In general, the quality of supply in Argentina improved considerably after privatisation. For example, Table 1 sets out the extent of non-supplied energy in the Argentine system as a whole, in each year since privatisation. There was a particularly significant reduction over the first few years, followed by a moreorless steady performance except for higher outages in 1999 and again in 2002 after the economic crisis.

Table 1 Non-supplied energy in Argentine system (GWh per year)[5]

Year	Voltage reduction	Shortages	Total (MWh)
1992	122	3	125
1993	43	14	57
1994	9	15	24
1995	5	14	19
1996	1	4	5
1997	0	8	8
1998	0	2	2
1999	0	14	14
2000	0	8	8
2001	0	8	8
2002	0	14	14

It was nonetheless sometimes argued that the distribution companies were not given sufficient funds, or sufficient incentives or penalties, to propose and support transmission expansions to improve quality of supply, or that transmission companies themselves did not have a sufficient role in the process. In consequence, it was said, the Public Contest method failed to secure investments needed to improve quality and reliability of supply. Transmission and distribution companies began to lobby for changes, for example to pass through to customers' end-user tariffs the costs of transmission expansions designed to improve quality, so as to allow the development of such expansions.

The Secretary of Energy – now Alfredo Mirkin, who had succeeded Carlos Bastos in October 1996 - asked CAMMESA to investigate the basis of such arguments. To that end, CAMMESA examined the quality of service on the 500 kV transmission network, and reported in late 1997.[6]

[5] Source: Cammesa
[6] "Shortages and Non-supplied Energy", study by CAMMESA submitted to Secretary of Energy, 21 October 1997.

CAMMESA concluded that two investments were appropriate to improve the quality of service on that network. One possible investment was not directly related to transmission, but involved a different use of hydro generating facilities.[7] The other proposal was the refurbishment of the Northwest corridor as said to be requested by ENRE, and in fact part of a long-running story. This was approved and carried out, although arguably it was more properly seen as a straightforward project to expand the export capacity of the northwest corridor than as a quality of supply expansion. The story is reported here for completeness, as an interesting though not typical illustration of the working of the expansion mechanism. But the main point to make is that in late 1997 CAMMESA did not find any significant lack of investment to maintain or improve quality of supply in the 500 kV network.

1.2 Reinforcement in the North West

The 500 MW line from Almafuerte up to El Bracho was originally installed in 1987 to provide a load flow to meet demand in the northwest. (See Figure 1 below.) But after the market developed, it began to appear attractive to install generation in the northwest, and to use the line in the opposite direction, south from El Bracho through Almafuerte to supply Buenos Aires. In 1994/95 270 MW of gas-fired generation capacity was installed in Tucumán, near El Bracho. Then in 1996/97 a natural gas producer Pluspetrol installed a further two 140 MW open cycle plants, buying gas from the wellheads just north of there. This changed the direction of flow on the line, to about 100 MW south.

In 1998 Pluspetrol wished to install additional generation capacity in Tucumán, by closing its open cycles through a steam cycle. But for stability reasons there was a constraint on the load flows from the North-West to Buenos Aires that operated jointly with load flows from Comahue to Buenos Aires. To meet the constraint, CAMMESA decided that it was more economic to reduce generation in the northwest than in Comahue, and that the problem would be more severe if new gas fired generators gained access. Transener advised that reliability would decrease if the new generation plant were built in Tucumán. (Transener's commercial interest lay in building and/or operating more transmission lines to improve such reliability.)

ENRE indicated that, in order to maintain reliability Pluspetrol should pay for certain transmission improvements (automatic generation disconnectors). This was not strictly within ENRE's powers: it was an issue between the Tucumán generators themselves, all of whom would benefit by being able to export more once this expansion had been made. Nevertheless, Pluspetrol found it worthwhile to pay for the transmission expansion, which increased capacity by 100 MW at a cost that was relatively small (about $2m) compared to the cost of building new generation (estimated $230m). It seems to have

[7] The proposal was to use of part of the pumped storage facilities at the government-owned Rio Grande power plant to take power instead of supply power in peak hours, so as to provide greater and more economic ability to shed load without disconnecting other users. It was calculated that this would provide an economical solution to the quality problems claimed by the transmission and distribution companies. The government never carried out the project, though the possibility is reportedly still under discussion.

proceeded as a Minor Expansion. Later expansions in the same area were done via the standard Public Contest method.[8]

1.3 Resolution 208 on quality of supply and substation expansions

With the exception of this one exceptional investment that was already under discussion, CAMMESA's investigation did not identify any lack of high-voltage transmission investments related to quality and reliability of supply. Nevertheless, to meet any concerns, Regulation 208 introduced in May 1998 modified the 1992 Regulations by providing two new ways of authorising expansions via the Public Contest method, and by allowing a wider variety of persons to propose expansions.[9]

To shorten the consultation time needed, Resolution 208 authorised existing transmission concessionaires (as well as users/beneficiaries) to initiate a new kind of expansion under the title 'transmission expansions for additional quality and security of supply improvement, including Special Expansions'. Special Expansions are those that cannot be associated directly with particular lines or substations, and might include (e.g.) power stabilisers, automatic generation disconnection, reactive power equipment, etc. The concessionaires would make information available in advance for evaluation by all the beneficiaries and ENRE. The Secretary of Energy and beneficiaries were given the power to propose expansions to provide additional quality and security of supply, on the basis of information provided by CAMMESA. CAMMESA's support was needed for an expansion to improve security of supply. ENRE had to be satisfied that the expansions were economically beneficial, defined as where the annual charge to cover the cost of construction, operation and maintenance of the expansion is less than the expected annual reduction in costs of non-supplied energy. (This was a specific way to apply the Golden Rule for quality of supply expansions.)[10]

With the exception of security of supply expansions, the beneficiaries of quality of service expansions would have to vote to approve proposals for expansions.[11] The definition of Area of Influence was modified for quality expansions, so that the beneficiaries are all those market participants that reduce their expected non-supplied energy as a result of the expansion. They participate in the fee according to their expected reduction in non-supplied energy in the first two years after the expansion is brought into

[8] Transformer and capacitors at Recreo and two 132 kV lines from Recreo, total cost about $23m, accepted between September 1998 and January 1999. See Appendix.
[9] SE Resolution 208/ 27 May 1998.
[10] Appendix C to Annex 16 section 2 iii. This last condition applies in Generation zones. Appendix D sets out additional conditions for Demand zones, defined as where distribution companies and large users constituted more than 70 per cent of the beneficiaries. Quality of supply expansions may not be obtained, either partially or totally, for the purpose of increasing the capacity of the transmission network.
[11] In the special case of security of supply expansions, the decision was a matter for the Secretary of Energy, supported by CAMMESA. The total cost would be paid by demand via the capacity payment - a charge proportional to peak demand that mainly covered capacity payments to generators.

service. Resolution 208 gave specific rules for how the costs of Special expansions were to be covered.[12]

Resolution 208 also enabled the owner of an existing substation to initiate a Public Contest expansion process. This must not be carried out as part of any other expansion,[13] so it will typically be to expand transformer capacity. In addition to information required for any Public Contest request, the owner must provide a detailed budget cost breakdown into engineering, inspection, materials and installation costs. The owner also has to provide technical, economic, reliability, security, transmission capacity and/or system response studies. ENRE has to be satisfied that these studies justify taking forward the proposal, and that the budgeted operation and maintenance costs are acceptable. ENRE has to inform the beneficiaries of the proposal. With a view to ensuring transparency, ENRE must publicise any intention by the transmission company to also participate in the tender process for construction, and the beneficiaries have to approve this participation. The work is put out to tender. The owner of the substation inspects the installation and is remunerated for its reasonable costs in doing so.

Resolution 208 of 1998 thus enabled a wider set of agents - the transmission company, the Independent System Operator, the regulator ENRE and the Secretary of Energy, as well as the users (beneficiaries) of the network - to propose and approve quality expansions of the transmission system, and expansions at existing substations. For these expansions the set of beneficiaries was modified. However, the circumstances under which responsibility was transferred were carefully defined, and in other respects the mechanism remained as for transmission investments generally. Specifically, the beneficiaries had to approve all such expansions, whoever proposed them. The Public Contest thus remained the accepted method for dealing with major expansions.

1.4 Implementation of Resolution 208 expansions

The Appendix to the paper sets out the 25 major transmission expansions that have been proposed under the Public Contest method. Of these, 8 expansions (covering 10 projects) were proposed by transmission concessionaires (3 by Distrocuyo and 5 by Transener) under the provisions of Resolution 208. (Minor expansions that may have improved quality of supply or related to substations are difficult to identify since ENRE does not issue resolutions on them.) 6 of these 8 expansions related to transformers, without particular reference to quality of supply. Of these 6 expansions, 1 was accepted without difficulty, 3 were accepted but subject to modification or delay (mainly as a result of

[12] Automatic generation/compensation disconnection devices should be paid for by the generators in a corridor, independently of whether it was an importing or exporting area. Stabilisation devices should be paid for by all producers that sell energy in the market, in proportion to their transmission capacity payments to Transener. Automatic load disconnection devices should be paid for by producers in the case of an exporting area according to the traditional Area of Influence method, and by demanders in the case of an importing area according to the same criteria.

[13] Regulations Artículo 16, new para 15 bis et seq

pesification following the crisis), and 2 were suspended at the request of the provincial regulator[14].

The other two of these expansions were quality of supply improvements. The first was a reconfiguration of breakers at Ezeiza substation, proposed in 1999 and accepted though somewhat delayed.[15] The other was a reserve transformer at Alicurá substation to serve Bariloche district. This was proposed in August 2000, opposed at the public hearing in May 2001 and finally rejected by ENRE in September 2001. Although this was the only quality of supply proposal that was rejected by beneficiaries, some commentators have used this example as support for the suggestion that the public contest mechanism does not adequately provide for quality expansions because distribution companies cannot or do not effectively participate. It is therefore worth exploring this case in more detail as part of the discussion of the role of distribution companies in the next section.

1.5 Scope for additional quality expansions

Can it be argued that there was or is a plausible case for further major transmission expansions to improve quality and reliability of supply, which for some reason were not proposed, either by distribution companies or others? The following calculation attempts to identify the most significant potential investment and to compares its benefit against its cost. Would it pass the Golden Rule that benefits including reduced value of non-supplied energy should exceed costs?

Table 1 showed that the worst year for non-supplied energy in the Argentine system as a whole was in 1999, when non-supplied energy rose to 14 GWh. In that year, about 7 GWh of the 14 GWh total was attributable to failures of generation and high-voltage (500 kV) transmission lines, mostly the latter.[16]

The standard "official value" of non-supplied energy for economic dispatch purposes, often used by CAMMESA for Non Supplied Energy cost calculations (i.e. the Golden Rule test), is $1500/MWh. On this basis the value of non-supplied energy attributable to weaknesses in high-voltage transmission was at most about 7000 MWh x $1500/MWh = $10.5 million in 1999.

About half the outages in 1999 were associated with the Comahue – Buenos Aires corridor.[17] The most efficient investment to reduce this non-supplied energy would be to

[14] Following two proposals in February 2001, the regulator EPRE from Mendoza province claimed that it was not adequately involved in the process. ENRE forwarded details and waited for an affirmative response to continue, but to date this has not been received. No doubt the economic crisis was relevant here too.
[15] It went to public hearing in December 2001 [reason for delay? check supported by beneficiaries then?] but was presumably delayed by the crisis since it was not approved by ENRE until January 2003 and put out to tender in January 2004, and is presently under construction.
[16] CAMMESA Annual Report 1999, pp. 80, 85 (Table 2). There was also public concern at the accident in the distribution company Edesur's new substation in February 1999, which produced severe and prolonged shortages in Buenos Aires. Those who favoured more transmission investment may have encouraged such concern.
[17] Source: internal CAMMESA report.

build a Fifth (reliability) Line replicating the previous four lines in this corridor, but used only for reliability purposes.[18] The reduction in outages might be valued at say ½ x $10.5m = $5 m in 1999. The lower loading would also reduce transmission losses by, say, $4m in 1999. This implies a maximum total annual benefit of about $(5 + 4 =) $9m in 1999. In other years around that time the benefit would have been much less, perhaps of the order of half that amount.

In contrast, the annual cost of the 1300 km Fourth Line was about $35m.[19] On this basis, the value of the improved quality and reliability of supply provided by a Fifth (reliability) Line from Comahue to Buenos Aires would be at most (in 1999) about one quarter of the cost of obtaining it, and in many years only about one eighth. It is difficult to argue that such an investment would be economic, or that the Public Contest method had failed in not proposing and approving such a reliability line. Moreover, the benefits for other reliability lines seem likely to be even lower.

1.6 Conclusion on quality of service

These various developments and calculations do not support concerns and allegations that the regulatory framework failed to bring about needed quality and reliability expansions of the 500 kV transmission network. Quality of supply improved significantly after privatisation. A review by CAMMESA in 1997 found no significant need for projects to remedy quality of supply. A modification in 1998 to the original regulatory framework allowed transmission companies as well as beneficiaries to propose certain expansions, and allowed regulatory authorities to approve other projects. Several such investments were proposed and accepted. Calculations suggest that further major expansions designed for quality improvement alone would not be economic. In short, the Public Contest framework for transmission expansion did not fail to deliver economically worthwhile investments to improve the quality or reliability of the Argentine high voltage transmission system.

There may, however, be scope for clarifying the role of distribution companies and the attitudes of provincial governments, as now examined.

2. Distribution companies

2.1 Role of distribution companies

The initial Regulations[20] envisaged that distribution companies as well as generators would play their part in promoting new investment in the transmission system.

[18] This line would not avoid the cost of any double faults, nor would it relieve congestion. The 5 lines could each be run at 4/5 capacity but in order to preserve their reliability property in the event of one failing they could not exceed such loading.
[19] Winning bid $24.5m plus annualised equivalent of $80m Salex, say $10.5m.
[20] Market Regulations Annex 16 per Resolution SE 137 (30 November 1992), in force from February 1993. There were some revisions subsequently e.g. the creation of Salex Accounts by SE 274/1994.

Distribution companies would have obligations to achieve and maintain specified qualities of service, with penalties in the event that they failed to do so. In important respects they could maintain or improve the quality of service by means of investments in the transmission and sub-transmission networks as well as in their own distribution networks. Distribution companies would therefore have an incentive to initiate and/or support such investment, insofar as it was the most economic means to meet their quality performance standards. In fact, there was some expectation that the distribution companies, especially the three national concessionaires[21], would take the lead in proposing such expansions.

Some critics say that the system did not work as planned, and that distribution companies did not propose or support transmission expansions to the extent envisaged. Some say that the distribution companies were not given sufficient funds, or sufficient incentives or penalties, to propose and support such transmission expansions. In consequence, it is said, the Public Contest method failed to secure investments needed to improve quality and reliability of supply.

However, there has not been any extensive examination of the attitudes that distribution companies did take on expansion issues, or of the reasons for their stance, and it seems likely that the situation varied according to the type of distribution company. In consequence, it is a matter of dispute whether the outcome reflects some intrinsic failure in the Public Contest method for this type of investment, or whether such problems as did arise were attributable to inadequacies in the setting or enforcing of penalties or in the provision of funds.

The next two sub-sections examine in more detail the nature of the penalty regime on the transmission and distribution companies. Subsequent sections look at the widely cited example concerned Bariloche, and at more recent developments involving distribution companies and provincial governments.

2.2 The role of penalties

Transener and other transmission companies were subject to penalties for failures on their own grids. These penalties were proportionate to the tariffs for capacity and connection charges, and proportionate to the number of hours during which the line or transformer was unavailable. Penalties paid by Transener and other transmission companies were then distributed amongst all market participants, including generators, distribution companies and large users, in proportion to their payments of transmission capacity charges and connection charges associated with the line or transformer that failed.

Similarly, distribution companies were subject to penalties for failures on their own grids.[22] However, whether they were held responsible for failures on transmission grids,

[21] Edenor, Edesur and Edelap in the Buenos Aires area, formed out of the national company SEGBA.

[22] The most notable case is that in 1999 Edesur paid $80 m for a severe fault in its own 132 kV grid. This comprised $51m penalty by ENRE (higher than the norm for the loss of supply involved) plus $20m in compensations agreed directly with customers plus $9m resulting from later judicial decisions. Source:

and what they did with any penalty payments they received from transmission companies, varied according to the type of distribution company. There are three main categories of these:

- the Federal concessions (Edenor, Edesur and Edelap, privatised successor companies of the federal company SEGBA), which accounted for about 60 per cent of energy distributed in the country,
- the provincial concessions put into private ownership (in about half of the provinces, including Buenos Aires province), and
- the distribution companies remaining in provincial government ownership (in the other half of the provinces).

In the case of the Federal concessions, penalties paid by Transener to the distribution company were retained rather than passed on to end-users (consumers). However, the Federal distribution companies were also subject to penalties for Non-Supplied Energy due to failures in the external transmission grids.[23] These penalties were embodied in the concession contracts and enforced by ENRE. The aim was to provide a net incentive on these distribution companies to support new transmission investment. Some of these distribution companies complained that they had not been provided with funds to support transmission expansions. A contrary view was that the purchasers of distribution companies were aware of their obligations to meet quality standards. If transmission investments were the most economic way to achieve the specified standards and avoid the concomitant penalties, bidders should have factored the possibility and cost of supporting transmission investments into their bids for the distribution companies.

It had therefore been expected that the Federal distribution companies (at least) would be active players in the expansion of the transmission grid. They would contract ahead for new generation, and/or for generation and transmission, and to this end would promote transmission expansions where necessary.[24] In the event, their incentive to contract for generation gradually disappeared,[25] and was not insisted upon. Within a few years the notion that these distribution companies should consider supporting transmission expansions in order to meet their quality of service obligations had also (and conveniently for them) been forgotten.

In the case of the privatised provincial distribution companies, arrangements vary. Buenos Aires province has a mechanism whereby the distribution company is held responsible for non-supplied energy due to transmission failures, but penalties paid by

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Edesur Balance and Accounts 1999, p. 44.For further discussion, see Santiago Urbiztondo, "El 'Apagón de Edesur' ", FIEL/DE-UNLP, Preliminary version, April 2003.

[23] This was also the case with distribution companies acting in the role of transmission companies for large consumers buying directly in the market.

[24] This would be a matter of commercial profitability, not a legal or licence obligation. Although some other countries envisaged that there would be a formal obligation on the distribution companies to enter into contracts for a minimum percentage of their demand, Secretary of Energy Bastos considered that an obligation to contract was inconsistent with a competitive market.

[25] Spot market prices continued to fall to such an extent that distribution companies found long-term contracting unattractive. Prices of $50/MWh had been envisaged at the time of privatisation, but within a few years spot prices were down to $30 and even $20/MWh.

Transener have to be passed through to end-users. In contrast, the distribution company Edersa in Río Negro province is also required to pass transmission penalties through to end-users but is not held responsible for failures by the transmission companies.

Where distribution companies were not held responsible for failures in the transmission system, there was no particular incentive on them to support new transmission investment. Where in principle they were held responsible for failures in the transmission system, there might have been such an incentive, but they complained if the tariffs did not make explicit arrangement for transmission investment, hence argued that there could be no such obligation.[26]

In the case of the distribution companies remaining in provincial ownership (e.g. in Neuquén province), they typically retain penalty payments paid by Transener and other transmission companies, and are typically not required to make penalty payments for failures by these transmission companies. Their incentive to support transmission expansions is unclear.

Table 2 represents these cases in terms of a 2 x 2 matrix, with examples in all four cells.

Table 2 Responsibilities and obligations of distribution companies

	Responsible for transmission failures	Not responsible for transmission failures
Retain transmission penalties	Federal concessions (Edenor, Edesur, Edelap)	Provincially owned (e.g. Neuquén)
Not retain transmission penalties	Some provincial concessions (e.g. BA)	Some provincial concessions (eg. Río Negro)

Resolution 208 modified the Area of Influence method so that the total cost of quality expansions was allocated to the buyers (distribution companies and large customers). But it said nothing about passing these costs to end-user tariffs. It tried to make it clear that distribution companies would have to pay for transmission quality improvements according to their existing responsibilities. Some distribution companies tried to argue that they did not have responsibilities here. The only expansions where costs could be passed directly through to end-users were security expansions.[27]

26 In Buenos Aires province, for example, the pass-through arrangements for the successor distribution companies to ESEBA (EDEN, EDEA and EDES) made allowance only for transmission charges as they applied at the date of privatisation. This was argued to imply that the costs of subsequent expansions were not to be passed through to customers. Neither did the price control formula for calculating the Value Added in Distribution make any mention of an element to pay for such expansions. Distribution companies typically took the view that the lack of provision in tariffs for transmission expansion made it virtually impossible to propose or support any such expansion. Interestingly, the other quality of supply expansion that was approved (at Ezeiza) involved the cost passed to end users tariff of the Distribution Companies of Buenos Aires (the beneficiaries).

27 Costs of security expansions were included in the capacity charge, which the concession contracts made provision for including in the end-user tariffs.

It was open to provincial governments, who effectively regulated the non-Federal distribution companies, to resolve this issue if they considered that the implicit obligations were unclear or insufficient. They could have allowed the pass through of transmission expansion costs, or made some other allowance for such expenditure. In the event, most provinces were reluctant to do so.

2.3 Penalties and role of ENRE

It has been suggested that ENRE and the provincial governments either reduced or did not always enforce the system of penalties for non-supplied energy as originally intended, and that this reduced or removed the incentive of distribution companies to support new transmission investment. As with funding and obligations to support transmission expansions, the situation is similarly varied from one jurisdiction to another, but it is possible to say something about ENRE's role. ENRE was responsible for regulating transmission companies and the Federal concessions (Edenor and Edesur in Buenos Aires and Edelap in La Plata).[28]

The concession contracts for the federal distribution companies specified from the beginning the following schedule of penalties. After an initial one-year trial period, the penalty for non-supplied energy would be $1000/MWh for the next three years. From the beginning of the fifth year of the concession period, penalty rates would be increased, to $1400/MWh for users of up to 10kW maximum demand, $2300/MWh for users between 10 kW and 50 kW, and $2700/MWh for users over 50 kW.

In practice, matters were not quite so clear-cut. Shortages were only penalised if they exceeded a specified cap value for each transformer centre to low voltage networks, regardless of whether the shortages were caused within the distribution grid itself or by an external transmission grid. In addition, non-supplied energy due to maintenance is not computed.

ENRE was responsible for the methodology for measuring and controlling shortages. It engaged in discussions with distribution companies about this. The combined net effect of the penalty rates and enforcement provisions is not entirely clear. However, it seems that the implementation of the new methodology from the fifth year onwards offset the impact of the increased penalty rates. It has been calculated that total penalty payments divided by total non-supplied energy averaged about $300/MWh in the first three year period after the trial year, and reduced to about $150/MWh after 1997.[29] Arguably this is too weak a signal to encourage expansions on the transmission grid. Since the penalty rates themselves increased, this suggests that ENRE's interpretation of the methodology

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[28] As noted, ENRE's regulatory responsibilities also extended to other distribution companies acting as transmission providers to large users that had decided to buy in the market. Allowing large users to participate in the market increased competition and enabled them to protect themselves against excessive prices. It was also a tool to drive Federal reform policy into the provinces even where provincial governments were opposed to reform.

[29] Source: calculation by R Sanz while at CAMMESA.

for measuring and penalising shortages reduced the incentives of the federal distribution companies to participate transmission expansions.

2.4 Reserve transformer in Bariloche[30]

In August 2000 Transener requested an expansion of capacity at its Alicurá substation, in the form of a supplementary transformer for use as cold reserve. The company explained that this proposal arose from the lack of alternative means of supplying two towns (San Carlos de Bariloche in Río Negro Province and San Martin de los Andes in Neuquén Province) in the event of an outage of the single transformer at Alicurá. ENRE held a public audience on 31 May 2001. Transener put forward two possible solutions (differing only in the configuration of the bus bar expansion at the substation). One would cost $8.8m, the other $6.2m, though Transener hoped to reduce these costs. At 15% interest and amortised over five years, the annual fees would be $2.5m and $1.7m respectively.

The provincial regulator from Río Negro Province claimed that neither solution satisfied the Golden Rule requiring that system costs should be lower with the investment than without it.[31] This regulator said that it had obligations to maintain security of supply, recognised the problem identified by Transener, and agreed that an investment was needed to guarantee security of supply to users. However, the provincial regulator would not allow the distribution company to pass through to users the cost of the alternatives proposed by Transener. Nevertheless, recognising the need for investment, it offered an alternative that would meet the Golden Rule and maintain quality of supply. This was to move to Alicurá a moveable reserve transformer, then based at Puelches substation, which together with some improvements at the substation would cost about $0.97 million in total. It was implied that the cost of this could be passed through to users.

The identified beneficiaries were the distribution companies EDERSA from Río Negro Province (a privatised company) and EPEN from Neuquén Province (still owned by the Province). Their voting shares as beneficiaries were about 75% and 25% respectively. EDERSA noted that Transener stood to gain from this expansion, even though it was investing nothing, since the expansion would reduce the risk of penalties to which Transener was exposed. EDERSA's concession contract specifying the basis of its tariffs took into account its investment in its own grid, but made no mention of investments in the transmission network, and made provision for passing through any penalties deriving from failures in the transmission and sub-transmission networks. It followed that this expansion had no economic benefit for EDERSA.[32]

[30] ENRE Public Audience 31 May 2001; Resolution ENRE 0501/ 14 September 2001.
[31] Calculations were reportedly shown in a power point presentation at the public hearing but were not included in the transcript.
[32] Interestingly, the town of Bariloche was served by a municipal cooperative that accounted for 70 of the 75 per cent share of EDERSA in the project, but since the cooperative was supplied by EDERSA it had no vote of its own.

Transener rejected the provincial regulator's proposed alternative investment as technically infeasible, without giving further detail.[33] As regards the argument of the distribution company about not being able to pass through its costs, Transener said that responsibility for supply was precisely the signal for distribution companies to support investments in the transmission system. [34] It was true that Transener would be penalised for substandard performance in the absence of the expansion, but the more important issue was the quality of service for customers.

Since the opposition to the proposed expansion exceeded 30 per cent, ENRE declared the proposal rejected. Formally, both distribution companies voted against it. But it seems that it was ultimately the provincial regulators, rather than the distribution companies, that prevented the proposed expansion. Whether there was a genuine difference of view on the technical issue of the adequacy of the moveable transformer, or whether the provincial regulator genuinely considered that the cost involved exceeded the value of the extra reliability, is unclear.

Some have conjectured that the provincial regulator was ultimately looking to persuade the federal government to pay for the needed expansion rather than provincial customers. Reliability conditions in Bariloche were certainly a matter of wider concern since Bariloche is an important tourist centre in Argentina. If this aim was indeed in mind, it eventually succeeded. When the Secretary of Energy announced an Upgrade Expansion programme in 2003 (see below), to be paid for mainly by users generally, the originally proposed scheme in Bariloche (now costing $9 m) emerged at the top of the list. [35]

2.5 Transmission expansions involving distribution companies and provinces

The problems posed by distribution companies may have been overestimated. Of the eight expansions (covering ten projects) proposed under Resolution 208, only one (Alicurá transformer for Bariloche) was rejected, and that was because the relevant provincial regulators made it clear that they were opposed to the expansion. The others were passed by a 100% vote in seven cases. In the remaining two cases the only objector

[33] Transener said only that the risk of outage that it assumed during the long time needed to move a transformer from Puelches (or from another substation at Choele Choel) to Alicurá was a matter for its own decision.

[34] Any penalty incurred by Transener is paid to the affected market participants, including distribution companies. The issue is whether they pass it on to end-users. The federal successor companies (Edenor, Edesur and Edelap) were not required to pass the penalty payments to end-users, but at the same time they were held fully responsible for any failures on the part of the transmission companies. In the case of Río Negro, penalty payments from Transener are refunded directly to end-users, but the distribution company is not responsible for failures on the part of transmission companies. As a consequence, there is a lack of incentive for such distribution companies to improve the transmission grids.) Transener may thus have had the Federal concessions in mind, perhaps as an ideal, and failed to appreciate or acknowledge the role of the provincial regulators in setting quality of service targets and penalties for their distribution companies.

[35] When Transener presented the Alicurá proposal to the public hearing, it mentioned that it had also proposed additional transformers for Campana, Ramallo and Henderson substations. The first two proposals had been accepted at public hearings. However, the relevant distribution company EDEN had rejected the expansion at Henderson substation, and this proposal seems to have been aborted without coming to a public hearing. The Henderson proposal too was accepted under the Upgrade scheme.

was one large consumer, accounting for only 6.9% of the votes in one case and 3.2% in the other. With the exception of the Alicurá/Bariloche case, distribution companies both privately owned and provincial-owned, cooperatives, and other large consumers all voted in support of the expansions. The number of voters varied: one in three cases, two in three cases, three in two cases, eight in one case and ten in one case. Distribution companies in several jurisdictions, including Mendoza, Buenos Aires, Santa Fe, Cordoba and San Luis, plus the Federal jurisdiction, supported the expansions. The distribution companies involved seem to come from all of the cells in Table 1, with the possible exception of companies not responsible for transmission failures and not retaining any penalties paid for such failures.

The distribution company of San Juan Province (Energía San Juan or ESJ) promoted a second circuit at 220 kV to increase capacity of supply from Mendoza. It put up two alternatives, with different starting points. One was opposed by 45% of votes (opponents being a thermal generator in Mendoza and a large user in San Juan Province). The other was opposed by 47% of votes (opponents being the distribution company in Mendoza, the same large user and another large user). Thus, although named as beneficiaries, these generators and large users did not need the line. In addition, the provincial regulators of San Juan, Mendoza and neighbouring La Rioja province sent notes to ENRE pointing out that the government was proposing to support a 500 kV line between the same points.[36]

Some economists explored the possibility of a new mechanism to augment the federal Public Contest method, using the same idea of coalitions of beneficiaries. [37] A simplified version of this idea was taken up by the distribution companies in Buenos Aires province so as to maintain and improve the quality of supply in that province, within the general framework of transmission expansion and the Public Contest method.[38] Experience to date is encouraging, and confirms that getting agreement between users is not an obstacle to this kind of approach. Other provinces are reportedly considering following Buenos Aires in this respect.

Some provinces are beginning to accept the notion that the cost of desired improvements in quality and reliability should be passed through to customers. For example, the regulator in San Juan province seems to have perceived a danger that continuing delays in

[36] Resolution SE 665/1999 was in force under which the government proposed to support the Mining Line financed by the Federal Transmission Fund (see below). Existing Federal funding (see below) was already supporting construction of 132 kV lines: some 2705 km of new 132 kV lines were constructed in the sub-transmission systems over the period 1992 to 2002. Source: CAMMESA Annual Report 2002.

[37] "This mechanism is based on the competitive selection of projects that are financed through an escrow fund created by regional network users. Coalitions of future beneficiaries reveal their preferences through a cost/benefit ratio, which is the criterion to rank and approve projects. This mechanism presents several advantages over existing procedures: it promotes self-revelation of beneficiaries, avoiding centralized administrative discretion; it alleviates the free-riding problem; and it does not require ex-post auditing of actual path flows." Abdala and Chambouleyron 1999, Abstract.

[38] There is a well-organised framework, an agreed Ten Year plan of investment, and a cooperative spirit between transmission and distribution companies, municipal cooperatives, and the provincial government. The national economic crisis has been a problem, but initial funds are now available, and a coordinated programme transmission expansion is underway in the 500 kV and 132 kV systems, including the Olavarría – Barker 132 kV line in 2001. See Littlechild and Ponzano 2004.

the Mining Line (see below) could have an adverse impact on quality of supply in that province. In June 2004 it announced that cost of the prospective 500 kV line to Mendoza (the first section of the Mining line) would be passed through to users with a view to partially financing the first part of the Mining Line, at the same time asking for Federal Council support as discussed below.

Argentine experience does not suggest a serious failure of the mechanism for transmission expansion as regards the participation of the distribution companies. The problem seems to lie more with the stance of some provincial governments. In some cases, ambiguities or weaknesses in the regulatory framework for distribution companies may have reduced or removed the means or the incentive for them to participate. But the actual participation of distribution companies in many transmission expansions suggests that the Public Contest method itself was not defective. Some provinces are now taking forward developments within that framework. It would be more accurate to say that the original scheme was not fully applied in certain respects, than that it was applied and had failed.

3. Second round of reforms

3.1 Reviewing the market

Reform of the electricity sector had been designed and implemented under Carlos Bastos, Secretary of Energy 1992-1996, and Domingo Cavallo, Minister of Economy. Their successors Alfredo Mirkin and Roque Fernandez decided to take stock of the situation five years after the initial reform, with a view to a possible second round of reforms. In March 1997 Mirkin commissioned a review by consultants NERA.[39]

The commissioning of the review should not be seen as an indication that the Government had concluded that the user-oriented transmission expansion mechanism had failed and needed to be replaced.[40] The scope of the review was wide-ranging, covering six major topics.[41] Transmission expansion was by no means the Government's only or major concern: transmission and distribution combined were only part of one of these six

[39] The authors of the NERA report were Kent Anderson, Sally Hunt, Hethie Parmesano, Graham Shuttleworth and Stephen Powell.

[40] Some accounts may be read as suggesting this. E.g. "Once the fourth line was approved, however, the government began to search for alternative mechanisms for identifying and financing transmission expansion projects. The government and others in the industry believed that there were other worthwhile transmission improvements besides the fourth line…. The government feared that the combination of voting and the surplus fund accounts might not provide the proper incentives for transmission improvements." Gómez-Ibáñez, 2003, pp. 316-317.

[41] "Price signals in the Wholesale Power Market (MEM) in Argentina; Development of the contract market and its role in the quality of supply; The systems of commercialisation that are currently in place, and those that might be developed for the future; The coherence of regulations governing the different players, with special emphasis on the transmission and distribution of electricity; The mechanism for setting costs and prices in the distribution concessions; and The relationship of the Electricity Sector to Gas and Hydrocarbons Markets." NERA 1998, p. 3

topics. Moreover, the Government made clear that the aim was to extend the 'deregulated' or market approach, not to limit or replace it.[42]

NERA's report in January 1998 complimented the highly sophisticated 'state of the art' design of the Argentine system. It commented that "on the whole the results have been impressive". Indeed, "judged by the results … there is not very much wrong with the system". [43]

NERA noted that "transmission expansion is the major problem we have found in the system". But even here the concern was qualified: the delayed Fourth Line did get built and there was no internationally agreed best solution to the transmission expansion problem.[44] Four major distortions related to transmission expansion were identified.[45] The two most problematic features were "the absence of transmission rights and the use of the Area of Influence method to assign responsibility for payment". Of these, NERA considered the former the most fundamental, and recommended the introduction of transmission rights. But NERA did not recommend the abolition of, or changes to, the Area of Influence method.[46]

After further analysis, the Government introduced further reforms in October 1999 in almost all aspects of the electricity sector. These were embodied in Resolution 543 on transmission and Resolution 545 on all other aspects of the sector[47].

Resolution 543 (discussed in the next three sections) addressed the outstanding transmission issues, especially financial transmission rights that NERA proposed, and it introduced a novel concept of 'risk-bearing expansion'. Resolution 545 covered a wide variety of areas and extended to 486 pages. Its main aim was two-fold: to make the

[42] The terms of reference stated "The main output of this project should permit a deepening of the current wholesale power market in Argentina, as well as the implementation of certain de-regulating mechanisms that will facilitate easier and more efficient transactions in this market." NERA 1998, p. 3.
[43] NERA 1998 p. 3
[44] "The only major problem has been the delay in constructing the fourth transmission line; but despite the problems encountered in getting agreement to build the line, the line was successfully put out to bid in 1997." (p. 3). "Transmission expansion is one of the most difficult analytical problems, and every competitive system has a different method for dealing with it. No country has developed a system that is agreed to be state of the art." (p. 11)
[45] NERA 1998, p. 11. "We believe that the current system gives rise to four major distortions. They work in different directions, some encouraging building and some discouraging it. In any particular case the outcome depends on the mix of factors. The four distortions … are as follows:
The generators may not be willing to pay for economic lines until long after they should have been started.
The use of the Salex fund may encourage uneconomic construction of transmission.
Generators may have an over-incentive to commit funds to expansion (which might offset the first distortion in some cases, but cannot be assumed to do so).
The combination of these factors may encourage uneconomic location decisions." NERA 1998, p. 55.
[46] This was not because NERA wished to limit the extent of change. It made recommendations for significant change in the other areas examined, notably to eliminate bidding restrictions and the peak capacity payment, increase the scope for demand bidding, encourage the development of a standardised forward contracts market, reduce contract restrictions, and increase retail access.
[47] Respectively Resolutions SE 543/1999, 19 October 1999, and SE 545/1999, 21 October 1999.

market for energy more competitive by reducing restrictions on bidding[48] and reforming capacity payments, and to encourage markets for reserves (such as ancillary services, short- and long-term reserves and frequency regulation, and enabling demand-side involvement etc.) These two resolutions were explicitly designed to refine and develop the existing market-oriented arrangements, not to withdraw or replace them.

3.2 The Area of Influence method: initial thinking

The main concerns about the Public Contest method have been that the associated Area of Influence method allocated votes in proportion to use of the line rather than in proportion to economic benefit, and that this effectively disenfranchised the distribution companies and large customers in Buenos Aires. These concerns were expressed by several commentators, analysed in some detail, and much repeated.[49] It is therefore interesting to examine what the designers of the Area of Influence method had in mind.

A criterion based on use rather than benefit reduced the extent of subjectivity required to apply the method. Use could be observed, recorded and verified, at least historically. Economic benefit was a broader and not directly observable concept, and likely to be the subject of more dispute.[50] The rules as specified made the process workable and the calculations relatively immune to political pressures.

Use rather than benefit also meant that CAMMESA's model of the system, the most developed model available at the time, could be used to calculate votes. This obviated the need to negotiate what method of benefit measurement to use, which would have been time-consuming and perhaps inconclusive. Some have suggested that the voting rules should accurately reflect benefits.[51] This was certainly a consideration, but the more practical criterion was whether the rules were sufficiently accurate for their purpose.

[48] For the most part, generators had to submit their variable costs six months ahead. It was proposed to reduce this to one week. Over time, it was hoped to reduce this further, and thereby gradually to migrate to daily (or hourly or more even more frequent) bidding. This would still be based on variable costs, but the idea was to reach a point were it would be easy to change to a free (unrestricted) bidding system in the future.

[49] "A key problem of the Area of Influence method is that it does not in fact identify beneficiaries or accurately measure users' share of benefits." NERA 1998, p. 70. See also references in Part One of this paper. Most of the later commentators reference the research by Chisari et al 2001. These authors use examples from a simulation model to identify flaws in that mechanism. In summary, the suggested flaws are the exclusion of consumers from the mechanism, the exclusion of market participants in the 'swing bus', the assignation of votes and fees based on usage rather than profit, and the possibility of strategic vetoes on expansion. (p. 713)

[50] It is presumably for similar reasons that, in the market economy generally, goods and services are normally produced and sold according to usage rather than benefit.

[51] E.g. Chisari et al 2001. "Voting was less burdensome than a negotiated agreement. But voting also placed a premium on the accuracy of the rules for measuring how much different parties would benefit from the line, and thus how many votes they had." Gómez-Ibáñez 2003, p. 313..

The original requirement that beneficiaries should be in a defined influence area was an attempt to limit the range, subjectivity and manipulability of the calculations.[52] In addition, a defined influence area meant that negotiation was confined to a relatively small and manageable subset of all the parties that might claim in principle to have an interest in a particular project. Thus, for example, application of the rules in the case of the Fourth Line identified 17 parties in the influence area, compared to some forty generators, two dozen distribution companies, and over a thousand large users in the electricity system as a whole. This surely reduced transactions costs.[53]

The concern about customers and distribution companies in Buenos Aires being disenfranchised follows from the choice of Buenos Aires as the reference node. The thinking of the transmission privatisation team on this issue, when it came in 1993 to flesh out the general rules laid down in the general framework of 1991, was as follows.[54]

1) In 1991 it was decided to use Ezeiza as the reference node for calculating marginal price.[55] (Ezeiza was the main 500 kV node near Buenos Aires, which area accounted for about 60 per cent of national demand, although choice of node was unimportant for this particular purpose.) There needed to be a good reason to choose a node other than Ezeiza for calculations using the Area of Influence method in applying the Public Contest method.
2) The main investment decisions for the foreseeable future would not be *whether or when* to build new generation to meet increasing demand in Buenos Aires, but rather *where* to build it. Specifically the choice was whether to generate electricity in Comahue and transport it to Buenos Aires or whether to transport gas from Comahue to Buenos Aires and generate electricity there. This had two implications.

- First, if new generation would be built at about the same time anyway, then prices would fall anyway, and consumers would be broadly indifferent as to where the generation was located and whether a new transmission line was built. Location would be a matter for generators. So the ability of consumers and distribution companies to vote in this matter was not crucial.

[52] "We were wary of the unqualified terms 'benefits' and 'beneficiaries' since we did not know how they would be interpreted. By specifying an area of influence we hoped to tie down the calculation to something more tangible." (R Sanz, personal communication, April 2004).

[53] The rules for expansion also reduced transactions costs in other ways. For example, the rules for Contract Between Parties, Minor Expansions and dedicated facilities (Article 31) enabled those projects to go ahead with minimal restrictions. 170 such projects worth nearly $300m were approved from 1994 to 2002 (see below). Similarly, the provision that 30 per cent of the votes were needed to block a project (rather than 70 per cent required to approve it) meant that parties who were relatively indifferent to an expansion were not required to vote to support it. (See Gómez-Ibáñez 2003, p. 314.) Parties with relatively minor interests at stake could not overrule a project that was in the substantial interest of the majority.

[54] R Sanz, personal communication, April 2004

[55] Resolution SEE 38/1991 set the initial market regulations as guidelines to implement economic transactions among state-owned utilities. The National Load Dispatch Centre (DNC), forerunner of CAMMESA until September 1992, had used Ezeiza as the load centre of the system in calculating marginal costs. Resolution SEE 61/1992 extended and improved (and also derogated) SEE 38/ 1991, providing more detailed rules and prepared the market for private participation. It explicitly set Ezeiza 500 kV substation as the Market Node.

- Second, there was no provision for electricity distribution companies to contribute explicitly to the cost of building gas pipelines to Buenos Aires to be used to generate electricity there, so would it be sensible to make them contribute explicitly to the cost of building electricity transmission lines for electricity generated in Comahue? It was important not to distort the main investment decisions.[56]

3) A consideration was which parties could take investment decisions quickly. The private generators could, and indeed had done so historically as part of the former integrated generation and transmission companies AyE and Hidronor. In contrast, distribution companies did not previously have a part in the decision process on transmission, were not all privatised, and were subject to regulatory limitations and delays. If, to overcome this, a distribution company were to be allowed to transfer the additional cost of this transmission investment to customers, then a regulatory approval process would have to be specified in the rules, and might take time to implement.
4) Distribution companies were in any case imperfect representatives of electricity customers. They were effectively part of the regulated or "planned" sector of the electricity industry, whereas generation companies were part of the market sector. Deliberately to provide a larger role for distribution companies meant reducing or compromising the extension of the market sector to transmission expansion.

In light of these considerations, there did not seem a sufficiently strong reason in 1992 to require that the Public Contest method should try to invent a new model based on benefit when a workable method based on usage was to hand. Nor did it seem sensible to require the Area of Influence method to use a node other than Ezeiza in order to give a higher vote to Buenos Aires distribution companies.

The transmission privatisation team was conscious that the rules might not be suitable for all future circumstances (including if and when the network became meshed rather than radial). However, they also knew that if appropriate it would be possible to revise the rules in the light of experience, and to meet changing circumstances.[57] They were designing rules to meet the main issues of the then-foreseeable future, within the context of a flexible framework that allowed revision as and when proved necessary.

[56] It is arguable that, in a fully adjusted competitive market, consumers in Buenos Aires would pay the full cost of electricity generation wherever generated, since the gas and electricity prices would adequately reflect the costs involved. On this view, if the electricity distribution companies did not contribute explicitly to the cost of the transmission expansion, consumers would pay for it via the bid price of the generators. Various restrictions in the Argentine arrangements, and the lack of initial adjustment, meant that prices were not fully cost-reflective in this way.

[57] With recent and prospective lines increasing the meshed nature of the grid, it is important to consider whether the Area of Influence method needs to be changed. One possibility is to continue with it subject to constraints on the extent to which market participants in areas distant from an expansion should be deemed beneficiaries. Interestingly, initial studies suggest that the problems of a meshed system may not be so much that the Area of Influence method fails to identify some users of a potential expansion (like the Buenos Aires distribution companies), but that it identifies as users parties from implausibly distant parts of the system. For example, Yacyretá in the North-East might be identified as a user of the potential Comahue-Cuyo line in the South-West.

3.3 The Area of Influence method: subsequent thinking

There were obviously opportunities to revise the transmission expansion rules later, and many parties urged this, not least ENRE and various economists. It is worth noting, however, that even some who have been most critical of the weaknesses of the Public Contest method do not suggest changing the approach to the more conventional regulated transmission model. They look to improvements in the use of the Public Contest and Area of Influence models rather than to their abolition.[58]

In the event, when the review of the electricity reforms took place, neither NERA nor the Secretary of Energy deemed changes to the Area of Influence model to be necessary, whereas significant other changes were in fact made. In fact, the Area of Influence method was not even mentioned as an issue. Why was this? One reason (reinforced in this paper) is that, despite the theoretical criticisms, it was not clear that any economic transmission expansions had been frustrated by the Area of Influence model, nor any uneconomic expansions artificially stimulated by them. A second reason is that there was no pressure for change from market participants themselves. They were accustomed to the Area of Influence model being used to determine the allocation of costs on a daily basis in the generation dispatch system.

A third reason is that no convincingly superior alternatives had been put forward. This was evidently the conclusion that NERA reached. It listed several alternatives to the Area of Influence method, but pointed out that each of these alternatives had drawbacks, and it could not find a better method. [59]In the view of several commentators this is still the situation today.[60]

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[58] "We still maintain that the problems with the present system are basically those summarized from our paper. We think the system can be improved, not necessarily abolished; some of the corrections are purely technical. Exclusion of consumers and markets participants in the 'swing bus': this is just a matter of correcting the present mechanism (to include Buenos Aires). We think that if those gains had been computed earlier, the fourth line would have been constructed some years before it was. Assignation of votes and fees based on usage rather than profits: again, this can be corrected with a good estimate of true economic incentives (or perhaps including the 'swing bus' in the calculations is enough as a proxy for economic incentives). Strategic vetoes: this problem can be addressed from the perspective of competition policy. The same problem would be present in several other mechanisms. However, there are problems that influence transmission investments but that are not intrinsic to the decision methodology. On the one hand, Distribution Companies under the present tariff regulation (full pass-through of cost of energy to customers) do not have the incentive to look for better prices or to establish contracts with generators and therefore to invest in transmission. On the other hand, uncertainty and lack of agreement about the growth of demand, investment indivisibilities and capital market imperfections tend to delay investments. Transmission rights do not seem to be a solution. Those same problems of imperfections in capital markets justify our scepticism on physical or financial rights to foster investments. The present mechanism, corrected, can get the same results without paying the costs of dealing with a new market of uncertain efficiency and competition policy problems (in a "small numbers" economy). Of course, several of these issues deserve more discussion and research." Omar O. Chisari and Carlos A. Romero, personal communication, 9 June 2003 (abbreviated with the agreement of the authors).

[59] "Alternatives to the Area of Influence method include methods that allocate costs by: estimated benefits, MW capacity or demand, MW-distance, or MWh output or usage. Like the Area of Influence method, each of these methods has drawbacks. Most of the methods are also somewhat arbitrary and open to dispute, also like the Area of Influence method. The most logical alternative – to allocate costs on the basis of estimated benefits – is not arbitrary, but is the most difficult to accomplish. … It might be possible to improve the

However, NERA considered that any drawbacks of the Area of Influence model would not be a serious problem: "We believe that the adoption of Financial Transmission Rights (FTRs) would make the method of funding by private coalitions so much more attractive that the alternative method of allocating payment responsibilities by regulatory formula would eventually be used only rarely." [61]

3.4 Financial transmission rights

As noted in Part One, the Comahue generators had expressed concern about free-riding on transmission expansions. They and various authors had seen transmission property rights as a desirable development. NERA took this view. Having noted four problems (or distortions) with the Argentine transmission expansion system, it explained "how Financial Transmission Rights (FTRs) solve these four problems, and how they help solve several other problems considered in later chapters of this report".[62]

These FTRs were equivalent to tradable Transmission Congestion Contracts (TCCs) as developed shortly before then by Hogan (1992). Variants of this idea had been proposed in Argentina.[63] These FTRs or TCCs would give the owner the right to the difference in nodal prices along any link. NERA said that this would make a generator more willing to pay for a new line, replace the potentially distorting Salex fund, reduce the incentive to over-expand, and remove the incentive to over-build generation at removed locations and in Buenos Aires. NERA also acknowledged two problems of this approach: the need for the regulator to determine the MW amount of rights to be assigned to a particular line, since this may vary substantially from time to time, and the problem that the addition of capacity in one part of the network may have positive or negative effects on capacity in other parts.

NERA's case for reform certainly reflected the prevailing view at the time: that the delay to the fourth line was a major problem and that, in most other countries, "the need to expand transmission capacity rapidly is not so acute as it is in Argentina".[64] In retrospect,

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allocation of payment responsibilities through a benefits-related calculation, but we doubt that a satisfactory method could be found." NERA 1998, p. 71.

[60] E.g. Pérez-Arriaga and Rubio 2000. Pérez-Arriaga notes that the 'Beneficiaries method' explored in New Zealand and California depends critically on the assumptions made, including about extent and location of future investment and demand response. (personal communication, 28 June 2004)

[61] NERA 1998, p. 71.

[62] NERA 1998, p. 62.

[63] E.g. Abdala, Arrufat and Torres 1997, advising the Comahue generators, developed the idea of granting incremental transmission capacity rights so as to alleviate free riding problems. Jeffrey Roark of Southern Electric (owners of Alicurá hydro station) sent papers on this to NERA, and no doubt many others did too. (Mr Roark was involved in building the Fourth Line as Power Market Analyst, Southern Electric International. He is now Senior Straategic Planning Advisor, Tennessee Valley Authority.

[64] NERA 1998, pp. 11-12. NERA was also aware of concerns expressed by generators that lack of property rights was deterring further transmission investment.

as argued in Part One of this paper, the delay was not harmful nor was the need to expand transmission capacity acute.[65]

Nevertheless, the case for financial transmission rights is one that several economists have advocated, and generators in Argentina were generally sympathetic.[66] NERA reflected this view, and drew attention to potential distortions in the absence of such rights. Concerns about free riding in the absence of such rights do seem to have been a factor influencing some generators to vote against the Fourth Line on the first occasion. [67] In drawing up initial policy the transmission privatisation team may have underestimated the extent to which gas-fired generators would simply build more capacity if the fourth line were built to meet the demand from existing hydro capacity.

NERA did not establish how far the identified distortions actually did operate in practice in Argentina, nor in which overall direction. And it is not clear that any economic investments actually were precluded or delayed by the absence of financial transmission rights in Argentina. Nevertheless, NERA's recommendations were attractive to the Government in many respects, insofar as they promised to strengthen the role of market-based decision-making. And whereas granting physical property rights to network users seemed inconsistent with the fundamental principle of open access to Argentine networks, financial rights seemed a way of reconciling open access with the need to protect new investors against free riding.

However, the best form of implementation of financial transmission rights was not obvious at the time.[68] The Energy secretariat needed time to consider the issue.[69] The analysis that NERA had begun was therefore continued and developed in detail in the

[65] Indeed, Part One suggests that the transmission system was over-expanded and if there was an acute need it was to *stop* building long and expensive lines.

[66] An early advocate was Hogan 1992, 2003. For some further discussion of FTRs and TCCs in the Argentine context see Abdala and Chambouleyron 1999, Gómez-Ibáñez 2003.

[67] See Part One, though as noted there, the term free-riding has to be interpreted with care. It is not the case, as some imply, that existing generators pay for the expansion then entrants come along and ride for free. If entrants make use of the new line to the same extant as incumbents, then they pay the same for it. The concern of hydro-generating incumbents was a slightly different one: that they might vote for an expansion that would be profitable for them if no entrants appeared, but if this caused thermal generators to appear and preclude them from using some peak capacity, then they would have committed themselves to fund an investment that was unprofitable for themselves.

[68] "Ideally, TCCs could help create a market-oriented system where private investors – not the government – decided when and where additional transmission capacity was needed based in part on the values of the TCCs. // TCCs were a relatively new idea, however, and there was relatively little practical experience to guide Argentina. … the first transmission system to implement TCCs – the PJM in the United States – was not scheduled to do so until April 1999. And even then no one had fashioned TCCs into a working program of investment incentives." Gómez-Ibáñez 2003, p. 318.

[69] The Secretariat had been expecting recommendations to do with the Area of Influence method, was surprised by the emphasis on FTRs in the final NERA report, wondered whether these recommendations were appropriate to Argentina, and considered that FTRs might be part of the solution rather than the whole or main solution.

second half of 1998 by an Expert Group directed by the Secretary of Energy Alfredo Mirkin.[70]

Mirkin stepped down at the end of 1998, as did other officials that had worked with him. The analysis was substantially finished; it was accepted in principle by the incoming Energy Secretary Cesar Mac Karthy and Under-Secretary Luis Sbértoli, who put it out to consultation.[71] Mac Karthy issued the 'second round of reform proposals' in October 1999. They included congestion rights to developers of new lines - more precisely, the rights to differences in nodal prices.[72] The congestion rights to existing lines were to be auctioned on an annual basis, and the proceeds of these bids assigned to the Salex Fund, which would continue to be used for transmission expansion. Perhaps not surprisingly, given the original thinking, subsequent experience, and NERA's remarks, no change was proposed to the Area of Influence method.

3.5 Risk-bearing expansions

Financial rights were not in fact the Secretariat's first priority for transmission reform. The Energy Secretary's main proposal was a novel method for building new transmission lines, in addition to the previous three methods. It was called the "Risk-bearing Expansion" method.[73]

> This method would be initiated when a group of investors who promised to assume responsibility for at least 30 per cent of the cost of a line approached ENRE. ENRE would then conduct two auctions. The first would be to determine which investors would get to finance the line. The investment rights would be awarded to the group of investors that forecast the highest percentage utilization of the line.[74] The second auction would be to award a concession to construct, operate and maintain the new line [as in the Public Contest method].

[70] The Group comprised Ignacio Pérez-Arriaga, Alex Papalexopulus and Larry Ruff, together with three representatives of the Secretary of Energy: Beatriz Arizu, José Sanz and Ramón Sanz.
[71] The new Under Secretary Luis Sbértoli asked Beatriz Arizu to stay on and formalise in regulatory amendments the proposals on transmission and other market issues that had been developed by the Expert Group. José Sanz too stayed for some time. Sbértoli and Ruy Varela had worked in the transmission planning sector of Agua y Energía before leaving to found the consulting group Sigla in 1976/7. At the beginning of the Menem government (1989-91) Sbértoli had joined the Secretariat of Energy with responsibility for planning the energy sector.
[72] SE Resolution 543/1999, 19 October 1999.
[73] They are also called 'At risk' expansions. It is not that they are riskier than other expansions, but that investors rather than users bear the risks associated with future levels of demand and price.
[74] "In this first auction the initiating investors and any other interested parties submitted sealed bids for the capacity rights. The bid would specify the proportion of the line's construction cost the bidder wanted to assume and the average percentage of the total capacity of the line the bidder believed would be utilized during the fifteen year amortization period. ENRE would rank the bids in descending order of expected capacity utilization and then go down the list until 100 per cent of the construction cost was covered. The expected capacity utilization of the last bid accepted would be used later in calculating the remuneration of the investors." (footnote in original)

> The at-risk method differed from the voting method in that the investors proposing the line did not have to be generators or other participants in the wholesale power market. Moreover, the investors, rather than the users, would be directly responsible for making the fifteen annual payments to the COM concessionaire. In return, the investors would have the right to charge users a toll equal to the payment due the COM concessionaire times the ratio of the actual to the expected utilization of the line. This scheme forced investors to assume part of the risk of whether the new line was needed. Investors would lose money on the tolls if utilization was lower than they expected and make profits if utilization was higher. In addition, the investors would have the rights to the TCCs from the line.[75]

Two additional features might be noted. Resolution 543 provided that this Risk Expansion method could draw on the Salex Funds for up to 30 per cent of the construction cost if the bids received did not fully cover it. Access to Salex Funds was necessary to prevent the lack of this feature distorting choice between expansion methods, to reduce the waiting time until enough parties were willing to support a line, and to constitute a contribution from 'passive' network users that might benefit in a general way from a new facility. Nevertheless, since reliance on use of Salex seemed inconsistent with the concept of investors bearing risk, the limit was put at 30 per cent of the cost whereas the Public Contest method was able to draw on Salex Funds for up to 70 per cent of the cost.

Second, the hurdle for automatic vetoing of a proposed Risk Expansion was set at 60 per cent of the votes, calculated according to the traditional Area of Influence method, compared with 30 per cent under the Public Contest method. This was to discourage unjustified opposition, on the basis that if some investors were willing to assume a risk there was no cause to oppose them. Also, the existence of financial transmission rights could make some users immune to congestion and uninterested in supporting an expansion – or even in favour of congestion because it increased the value of their transmission rights, and therefore opposed to expansion that would reduce this value. However, if opposing votes were not above 60 per cent but there was nevertheless "well-founded opposition according to ENRE criteria", it was open to ENRE to examine the social benefit of the line, to which end it could request consultants to investigate the matter.[76] But it could only do this if opponents of the proposal presented some convincing evidence that the social benefits of the line were actually negative, and it could only veto the proposal if its investigation confirmed this. ENRE had to inform participants of its final decision within 90 days.

[75] Gómez-Ibáñez 2003, p. 318. Note that the provision for users paying a toll equal to the concession payment multiplied by the proportion of actual to expected utilisation of the line was also a means of reducing payments in the early years before the line had reached its full capacity.

[76] The Secretariat of Energy envisaged that 'social benefit' would be evaluated in conventional economic terms (aggregate change in consumer surplus plus producer surplus), but this was not written into Resolution 543, thereby introducing uncertainty about its interpretation.

The Risk-bearing Expansion method was not mentioned in the NERA report. It seems to have been developed within the Secretariat of Energy and its advisory group rather than to have been urged on them by consultants, academics, generators or other market participants. It does not appear to have been taken directly from the economic literature, though it reflected economists' interest in a process for encouraging the revelation of benefits, as a response to the problem faced by a regulator having to measure these benefits. (This was a different problem from the free-riding problem identified by NERA.) The proposal was also informed by recent experience in the UK telecommunications sector, where spectrum auctions had led to higher bids than could have been predicted by an ex ante regulatory evaluation of benefits.[77]

The Secretariat of Energy seems to have been conscious of the criticisms that the mechanism for transmission expansion was not working. But rather than abandon it, the aim was to achieve greater flexibility in proposing and financing transmission investment. Worthwhile investments might be held up because market participants were unduly pessimistic, or unable to agree among themselves. This method would allow others to step in and enable the investment to go ahead. It would enable others to take the risks about future usage that market participants might be reluctant to assume, and could thereby reduce transactions costs.[78]

Resolution 543 embodying transmission rights and risk-bearing expansions was passed on 19 October 1999, followed on 21 October by Resolution 545 reforming the rest of the electricity sector (discussed above). These two resolutions represented the culmination of a carefully considered 'second round of reform' in the Argentine electricity sector.[79] With the exception of one brief interlude to be discussed shortly, these were the last reforms consistent with the original philosophy.

These reforms in Resolution 543 had a mixed reception. For example, generators supported congestion rights but argued that the rights for existing lines should be allocated to existing users rather than auctioned for the benefit of the national government. They also objected that the Risk-bearing Expansion method left them with substantial obligations to finance new capacity but with no say in whether it should be undertaken. In contrast, Resolution 545 was largely discussed with the market before implementation, and substantial consensus was reached.

[77] In retrospect, the UK telecommunications bidders nay have overbid, and lower bids were subsequently observed in other European countries. There is also evidence that market interconnectors in Australia did not turn out to be profitable. See Littlechild 2003, 2004.

[78] Other measures were considered but not implemented. For example, some parties were not willing to propose an expansion by Contract Between Parties because other parties would use the capacity but pay only operation and maintenance cost, with no contribution to the cost of construction. Deputy Secretary Luis Sbértoli considered the possibility of an expansion method that allowed the parties to a Contract Between Parties to levy on other users a regulated capacity charge to recover the cost of construction that had been put out to tender.

[79] Resolution 208/1998 introducing quality expansions was also a modification in sympathy with the initial philosophy, but not developed as part of the 'second round' of reform.

There was little time to appraise the effect of these reforms. On 24 October the general election took place, and President Menem's government fell. The fate of the reforming resolutions is explained shortly. But one further set of resolutions was passed before the change of government took place.

4. The Federal Plan

4.1 The Federal Council

Argentina is a federal country in which the provincial governments have significant power. This had caused difficulties even before privatisation.[80] It also caused difficulties in reforming the sector, and the parties had to come to an accommodation. A priority was to resolve the inadequate (and sometimes non-existent) payments made by provincial utilities to the national energy companies. This was problematic: some provinces declared unilateral discounts to themselves or demanded that they should pay lower than commercial prices, other provinces were in financial difficulties.[81] The Government therefore offered a further inducement to participate in reform: "the provinces which adhere to the tariff principles emanating from the new organization will be eligible to participate in a Subsidy Fund for Regional Compensation of Tariffs to End Consumers".[82]

The Electricity Regulation Act (Law 24065) provided for a surcharge (sometimes called a stamp) of up to $3.00/MWh on purchases by large users and distribution companies in the wholesale electricity market. The Federal Council (CFEE), a pre-reform vehicle for negotiating with the provinces,[83] determined the criteria for the allocation of these funds.

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[80] "Since [1979], most of the provincial electric power enterprises were created to undertake distribution functions, previously carried out by AyE. However, as a consequence of the autonomy exercised by the provinces in conducting their activities – given the federal spirit of the Constitution – the co-ordination between provincial and federal enterprises and the SE [Secretary of Energy] for the operation and development of the electric system did not turn out very well. // Before 1990, the legal framework for the Argentine electric power sector did not impose a clear and coherent regulatory system that fostered efficiency. There were overlapping regulatory jurisdictions among different levels of government authority, which did not allow a clear definition of the principal-agent relationship. In many provinces, electricity was supplied by enterprises that depended on the local political power and that responded to the authority of the local executive power: they were only restricted by the need to have the provincial legislature approve their accounts. In general, tariffs to consumers were not related to costs, but rather to political objectives, causing major cross-subsidies between consumers." Bastos and Abdala 1993/6, p. 134

[81] "According to an SEE report (1992), the provinces showed distinct difficulties in honouring their commitments." Bastos and Abdala 1993/6, p. 134 footnoting "Process of Transformation of the Electricity Sector", Cabinet meeting, SEE (1/9/92).

[82] "The formal acceptance by provinces of the new sector scheme established by the regulatory framework was provided for in Law 24065. [Article 70, Section b of this Act and its implementing regulations] … The provinces were then faced with the decision to adhere or not to the national regime." Bastos and Abdala 1993/6, p. 136.

[83] The Federal Electricity Council (Consejo Federal de Energía Eléctrica, or CFEE), created in 1960, is "a national organization in which the provinces are represented together with the SEE [Secretariat of Electricity]. CFEE acts as adviser to the National Executive Power (NEP) [the Executive Branch of the National Government] and coordinates and administers various specific project funds created to develop the sector." Bastos and Abdala 1993/6, p. 63

Article 70 of Law 24065 provided that 60 percent of these surcharge revenues would be distributed to provinces that adhered to the federal scheme for distribution tariffs, in order to subsidize consumers. The remaining 40 percent would be directed to another Fund for electricity development in the country's interior, including rural electrification.

The surcharge was initially set at $3.00/MWh in 1991, then reduced to $2.40/MWh in 1993.[84] During the course of the 1990s the level of purchases in the wholesale market increased from about 40,000 to 70,000 GWh per year, and the total proceeds of the surcharge increased accordingly. From 1993 to 2000 the 60% proportion intended to subsidize tariffs yielded a total of $642m (an average of $80 m/year). The 40% proportion available for electricity development in the country's interior, at the disposal of the Federal Council, yielded a total of $428 m. To this latter figure should be added $413m from a liquid fuel tax.[85]

During the 1990s, the role of the Federal Council was limited to spending the revenue from this surcharge. It seems to have had a significant impact on the development of the sub-transmission and distribution networks.[86] However, the Federal Council had no impact on the expansion of high-voltage 500 kV lines, or on sector policy generally. This was now to change.

4.2 The Federal Transmission Fund

Throughout the 1990s, there were strong political and industry pressures to make more transmission expansions than the Public Contest method had delivered, and beyond what the newly introduced provisions for congestion rights and Risk expansions were expected to provide. A wide variety of new lines were canvassed.[87] The Federal Council was particularly active in criticising policy and advocating a larger role for state planning, and in 1998 it commissioned a study of needed high-voltage expansions.[88] The criticisms

[84] Resolutions SE 317 (15 October 1993) and SE 335 (29 October 1993).
[85] Source: www.cfee.gov.ar. The liquid fuel tax derives from Law 23966, Articles 7 & 19, of 1 August 1999.
[86] Investments are detailed by province at www.cfee.gov.ar. Analysis by Mercados Energéticos suggests that, with the exception of one 500/132 kV substation in 1997, the funds were used for expansions and developments at 132 kV or lower, including low voltage grids, isolated generation in small towns, rural electrification and small hydroelectric power plants. 132 kV lines approved and built totalled 3893 km from 1978 to 1991 and 1441 km from 1992 to 2001; of the latter figure 707 km were expansions on regional (sub-) transmission networks and 734 km were expansions in distribution networks. Since some 2705 km of new 132 kV lines were constructed in the sub-transmission systems over the period 1992 to 2002 (CAMMESA Annual Report 2002), it seems that the Federal Council Funds accounted for about a quarter of the total. The Public Contest method accounted for somewhat less. The balance presumably came from the Contract Between Parties method or by distribution companies without support of the Federal Council.
[87] Some provinces argued that other provinces had benefited from federal funding of transmission investment before reform, and that it was unfair that they themselves would have to pay for it.
[88] "… it is evident that the model then current was not capable of generating the economic signals that would induce the market participants to invest in this way, which was aggravated by the total disappearance of the State both from planning and from investment itself. This was clearly perceived by the Council in 1998, in which year it commissioned studies to identify the most urgent projects at 500 kV, a process that culminated in November 1999 with an agreement among all the provinces to implement what became

intensified after the failure of the Edesur distribution system in February 1999.[89] The government felt constrained to respond to the pressure for regional expansions, and held discussions with the Federal Council during 1999.

In December 1999, Secretary Mac Karthy issued Resolution 657 to finance additional regional expansions by increasing the amount of the surcharge, to be put into a Federal Transmission Fund, and involving the Federal Council in the spending of the proceeds. [90]

This Resolution was expressed quite differently from previous statements of President Menem's Government and its other Energy Secretaries. They had emphasised the role of competition and markets following the Electricity Regulation Act (Law 24065 of 1992.

In contrast, Resolution 657 harked back to an Electricity Act from a previous era (Law 15336 from 22 September 1960) that embodied a different philosophy. That earlier Act had set up the Federal Council. Resolution 657 now recalled that the Secretary of Energy, advised by the Federal Council, had responsibility for planning and coordination of projects and integrated services of the National Interconnected Network. It noted that, to this end, the Federal Council had made a feasibility study to identify potential beneficiaries of possible high voltage transmission expansions, including a preliminary analysis of closing the high voltage rings.[91]

Resolution 657 argued that a regime of competition such as the MEM requires political action on the part of the national state, so as to guarantee transparency and access by consumers to the markets; that it was the responsibility of the national state to establish and preserve adequate conditions in the market, particularly in those zones or regions

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known as the Federal Plan of Electricity Transmission, with the objective of securing the execution of four projects at 500 kV, that is to say, the Mining Line, the interconnections NEA-NOA [Northeast – Northwest], the interconnection MEM-MEMSP [with Patagonia] and the interconnection Comahue-Cuyo. // To make this a reality, a totally novel financial engineering was designed, which among other things assumed the already evident necessity of a strong participation by the state, and no less importantly by the private sector, all this in a strategy designed so that state participation was the trigger for the private, to make it economically feasible. …// In short, at the heart of CFEE, all the Argentine provinces assumed the necessity of planning in this vital area where it was not being done, and of participating in investments if these were to be carried out in the necessary time periods." CFEE, Tenemos Mucho Que Hacer [We have much to do], at www.cfee.gov.ar, as accessed 2 August 2004.

[89] Even though this was irrelevant to transmission expansion, and associated with the installation of new transformer rather than with the lack of investment. It was the first tangible opportunity to criticise the electricity sector reforms. The $80m penalty on the distribution company was extremely high, unparalleled worldwide before or since, yet some still deemed it insufficient.

[90] SE Resolution 657/1999, 3 December 1999.

[91] That is, the extensions in question would link the ends of the radial arms located in the outlying regions, and thereby create rings of high voltage lines. This would convert the existing radial network to a more meshed network. "Additional radial lines into the Buenos Aires region would be needed as demand grew, including new links to the Northeast and eventually a fifth line to Comahue. // Equally intriguing was the potential for new ring or circumferential transmission lines to improve the reliability of the electricity system. The biggest need was for a medium- or high-voltage ring around the Buenos Aires metropolitan area. … There were also some advocates in the industry for another high-voltage ring line to connect the outer regions of the country (for example, Comahue – Cuyo – Northwest – Northeast)." Gómez- Ibáñez 2003, pp. 316-317. The Federal Council's study itself was not made public.

where there were monopoly situations or the risk of them; that there were economies of interconnected networks; that the procedures initially developed for the expansion of the transmission network implicitly assumed an underlying growth and homogeneity of supply from the high voltage network to all the provinces; and that this assumption was appropriate for zones of relatively high growth and concentration of demand, but did not envisage the situation of some provinces and regions caused by asymmetrical growth in the high voltage network.

The 23 provinces in the Federal Council had earlier asked the Secretary of Energy to increase the surcharge from $2.40/MWh to $3.00/MWh: he now did this with effect from May 2000. The additional $0.60/MWh was to be put into a Federal Transmission Fund (FFTEF) that the national government could use for extending the 500 kW transmission system by means of 'expansions intended to meet demand'. To facilitate this, the Federal Council was allowed to initiate a Risk-bearing expansion (other methods were not mentioned). The criteria for such expansions were that they would be of benefit to the Electricity System to improve quality and/or security and/or reduce the costs of dispatch in a scenario of progressive integration of the regions; that they were unlikely to be realised exclusively by the private sector, for reasons of scale; and that they would constitute investment for "expansion of a federal character".

No figures were mentioned at this stage, nor was there any definition of 'benefit'. With an annual demand of about 70,000 GWh, the increased $0.60/MWh would yield about $40m per year for such new projects.[92]

Resolution 657 establishing the general policy framework for regional expansions was introduced on 3 December 1999. On the same day the Secretary of Energy declared that the interconnection with Patagonia was financeable – that is, it had met the conditions of Resolution 657. Its purpose was "to interconnect a remaining isolated area". It had been chosen for support under this policy. He instructed the Federal Council to prepare the documentation to start the process.[93] Four days later, he extended this support to the so-called Mining Line, whose purpose was "to improve conditions for developing mining activity in marginal areas".[94]

Why was there such a sudden change of policy on the part of President Menem's administration? In its closing days, it is not uncommon for an outgoing Argentine (and Brazilian) administration to pass many resolutions (sometimes hundreds) as an acknowledgement for past or future political support, knowing that it will not have to

[92] Other provisions of Resolution 657/1999 included 1) an instruction to the Federal Council to write the statutory rules for the Federal Fund before 1 March 2000, which resulted in the Federal Council's Acta 97 discussed below, and 2) a rule that a line cannot be financed by the Federal Fund if the average participation of generators is greater than 20 per cent (of average net present value discounted at 10 per cent). (Note that the Fifth Line (Comahue – Cuyo version) did not fit this rule, and the criteria were later relaxed.)

[93] Resolution SE 658 (3 December 1999): the Patagonia interconnection is the line between Choele-Choel and Puerto Madryn.

[94] Resolution SE 665/1999 7 December 1999: the Mining Line is Gran Mendoza – San Juan – La Rioja - El Bracho.

carry them out and the incoming administration can reject them if it wishes. The Resolution accepting the Mining Line was issued just two days before the Menem administration left office on 9 December. Perhaps these were simply empty political gestures, and the Federal Transmission Fund would not have been introduced if the Menem government had been re-elected.

On the other hand, three factors suggest that the government might well have taken a similar decision even if it had been re-elected.

- First, the government was under very considerable political pressure. It saw its proposal to create a new class of lines, with political as well as market characteristics, as a reasonable way to accommodate that pressure without conceding an undue role for national planning.[95] Tying these lines to the risk-bearing expansion method meant that the new Fund would be used to 'finance' rather than subsidise them.
- Second, existing Law placed an obligation on the government to bring about a single interconnected system in the country. Patagonia was the only area not yet interconnected, and plans had been prepared before reform started to remedy this. It was difficult to reject that Law and policy.
- Third, the Patagonia line would help to resolve an embarrassing and artificial situation whereby electricity prices in that system were two to three times the average level in the rest of the system. The line would benefit the monopoly generator there, but would at the same time facilitate suspending and revising the Market Regulations. In the longer term an interconnected system would eliminate the problem. The line could also offer prospects of revenue from new generation transmitted in the opposite direction, into the main system. The Mining Line was also considered to have economic prospects if the anticipated growth in demand materialised. Provision of adequate power facilities would have been beneficial to mining companies, reliability would be improved, it would have been a worthwhile investment and the Fund would be repaid.

The new policy was thus arguably part of an aim to combine very strong political pressures and obligations with a predominantly market-based policy, while maintaining good relations with the provinces, rather than a concession motivated by the forthcoming loss of office. The Federal Council pressed for the new policy to be introduced before the Menem government left office because it was not convinced that the incoming government would be that sympathetic. In the event, the incoming government turned out to be more sympathetic than the outgoing one.

[95] Such a policy had in fact been discussed earlier. Mirkin and staff had considered the possibility of some limited federal assistance to facilitate non-radial lines in order to better integrate the market, while leaving the majority of the risk and decision-making with market participants. Policy continued to be strongly debated within government. Under-Secretary Sbértoli would have preferred a separate law to be passed justifying each proposed regional expansion, together with provision for an associated increase in the surcharge, rather than a blanket increase to $3.00 that would create an expectation of further expansion. In contrast, Secretary of Energy Mac Karthy was himself from Patagonia district, and sympathetic to the policy proposed by the Federal Council.

4.3 The Federal Transmission Plan

Whatever the explanation of the previous decision, it turned out to be a sign of a changing political climate. An increased – indeed central - role for government reflected the initial approach of the new post-Menem administration led by Fernando De La Rua.[96] Within a few months this approach began to supercede the previous market-oriented approach. On 18 May 2000 Daniel Montamat, Secretary of Energy in the new administration, explained that he was in course of formulating a Transmission Development Plan, in conjunction with the Federal Council, that envisaged the application of the additional surcharge just put into effect. This Plan would require a thorough reappraisal of transmission expansions, which could conflict with the possible Risk expansions and associated congestion rights created by Resolution 543/1999. No expansions had yet been proposed under the risk expansion method. Accordingly, he was suspending forthwith the application of the changes introduced in that Resolution.[97] Two weeks later he suspended Resolution 545/1999 too.[98]

The new approach was introduced over the next few months. On 30 June Resolution 174 confirmed that the transmission surcharge would be a permanent policy. [99] The Federal Transmission Fund would be used to finance projects that the Secretary of Energy would identify as high voltage transmission expansions intended to meet demand, as provided by Resolution 657/1999. But in addition – and no doubt this reflected further pressure from the provinces – the Fund could also be used for "projects to interconnect electrical regions in order to improve the quality and/or security of supply". The Secretary of Energy would take the final decision on the lines, but it was envisaged that the Committee of Administration (CAF) of the Federal Transmission Fund - composed of two representatives of the Secretary of Energy and one from the Federal Council - would propose them.

[96] "Fernando de la Rua's administration, which took office in January 2000, supported a renewed federal role in the provision of transmission infrastructure, and even went so far as to question the soundness of privatisation and the regulatory system's capacity to ensure reliable electricity services." Bouille et al, 2003, p. 47. It is not uncommon for parties in opposition at the time of such reforms to accept privatisation but to criticise and change the nature of the regulatory regime.

[97] Resolution SE 133/2000, 18 May 2000. In addition, some flaws had been perceived in the Risk-bearng Expansion method. Beneficiaries had to pay a proportion of the fee according to the load factor of the line, without any transference to them of congestion rights, which left them vulnerable to proposals by investors who retained all the congestion rights. Secondly, 60 per cent of the votes seemed a difficult hurdle to overcome for those who opposed a line, and there was some concern about the subjectivity of 'convincing evidence' on social benefit, and about how reliable ENRE's evaluation of social benefits could be.

[98] The new Government was not necessarily opposed to Resolution 545/1999 introducing the other reforms in the electricity sector, and was not sure what abolishing them would imply, hence wanted time to consider them first. To that end, Resolution 153 (31 May 2000) suspended Resolution 545 pending review. In the event, a formal review was never completed, there were reportedly political differences within the Government as to the role of the market, and eventually Resolution SEM 128 (9 February 2001) derogated (i.e. repealed) Resolution 545 entirely.

[99] Resolution SE 174/2000, 30 June 2000

Article 8 of Resolution 174 endorsed the concept of the Federal Transmission Plan introduced earlier by the Federal Council.[100] Under the extended criteria, all five lines in the Federal Transmission Plan were specified as financeable from this Fund, not just the two lines declared financeable earlier.[101].

The five lines presented for consideration by the Federal Council, with the Federal Council's summary comments, were as follows:

- Comahue – Cuyo interconnection (660 km): to improve the transmission of generation from Comahue and to improve the quality of service in Cuyo. From 2003 this will take on great importance for Cuyo (where local prices are predicted to be greater than in the national Wholesale Market).
- NOA-NEA (northwest – northeast) interconnection (1015 km): associated with the expansion of generation in NOA, and to give the possibility of exporting it (these exports would need to be postponed without the expansion of the line)
- interconnection of the national system MEM with the Patagonia system MEMSP (354 km): to permit the optimisation of both systems, and improve joint operation and economic reserve for MEMSP.
- Interconnection CUYO – NOA, the Mining line with 3 possible sections (175 km, 165 km and 215 km, total 555 km): the most economic means of facilitating mining growth in the mountain area.
- Buenos Aires - Mar del Plata (350 km), to solve the historical problems of the Mar del Plata city supply.

These lines are indicated on the system map in Figure 1.[102]

[100] Resolution 174 refers to a 'general agreement' between all provincial representatives at the Federal Council on 11 November 1999. This agreement was the antecedent for Resolution 657/99, and was later ratified and extended in another plenary meeting at the Federal Council on 6 April 2000. As a result of this last meeting the Federal Council issued an official document (CFEE Acta No. 97 of 6 April 2000). This document created what the Federal Council called 'a new mechanism to finance expansions' to be presented to the Secretariat of Energy. (This was basically to finance new lines that fulfilled the criteria of Resolutions 657/99 and later 174/2000, using the Federal Transmission Fund.) A list with five lines to be developed under this procedure was attached to the Federal Council document and described as a Federal Transmission Plan. Resolution 174 approved what the Federal Council proposed in its Acta 97.

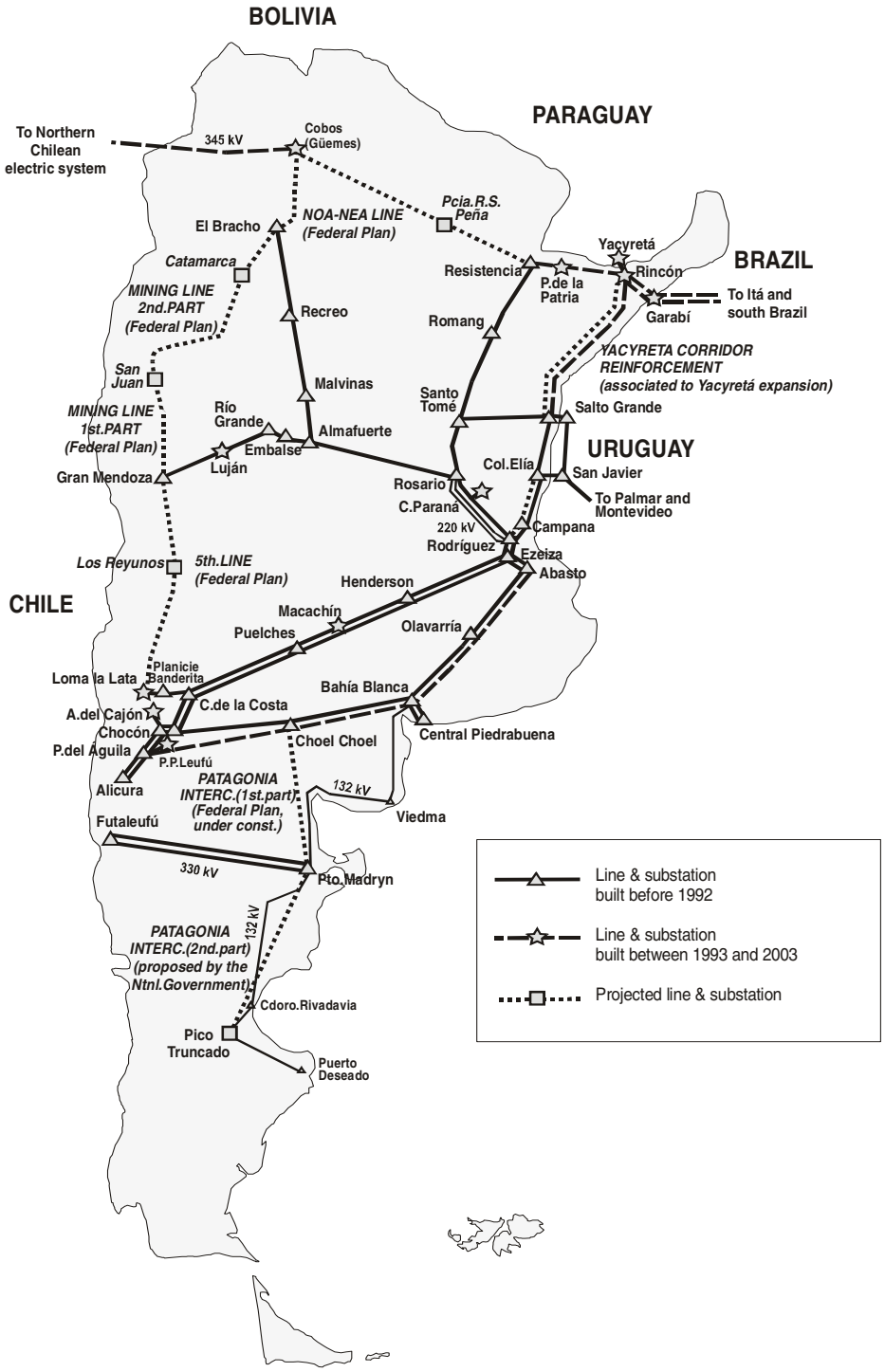
[101] The declaration that the five lines in the Federal Plan were "financeable" does not mean that there were sufficient funds to pay for them all. The real feasibility test is carried out when the line is finally approved. This happens when a Promotion Contract is signed between the initiators of the project and the CAF, and the Execution Committee (formed by CAF and the private initiators) is formally constituted. At that stage, all the parties, including CAF, have to commit a firm bid (in $) that determines the participation of each one in the investment and in the ownership of the transmission rights.

[102] Source: Mercados Energéticos

Figure 1 Transmission expansions

ARGENTINA

HIGH VOLTAGE TRANSMISSION GRID (500 kV) - 2004



4.4 The Open Season method

On the same day as Resolution 174 endorsed the Federal Transmission Plan, Resolution 175 introduced the concept of an 'Open Season' for initiating transmission expansions and inviting joint private/public funding.[103] Resolution 175 and its successors[104] also sought to integrate the concept of expansions via the Federal Transmission Fund with existing methods for transmission expansion.

- The Federal Transmission Fund, represented by CAF, was incorporated as a 'special participant' within the existing methods (Public Contest and Contract between Parties).
- A concept called "expansions through Financial Transmission Rights (FTR) Allocation" was introduced (subsequently used in practice for cases where the Federal Transmission Fund was involved).[105]
- The concept of a Non-Initiating Beneficiary was introduced to provide some protection to these market participants.[106]
- The concept of Open Season was created to take forward the Federal Plan. This was a new way to initiate an expansion, with three possibilities according to who initiated the process:
    a) the Federal Transmission Fund via CAF
    b) any market participant seeking partial funding from the Federal Transmission Fund
    c) any market participant without participation of the Federal Transmission Fund.

  Any of these Open Season processes could be used to introduce any of the existing methods (Public Contest or Contract between Parties) or the new Financial Rights Allocation method.
- By declaring an Open Season on a particular line, and specifying the duration of that process, the government would invite the private sector to participate in financing it. [107]

Private sector participants would compete for each line in terms of their proposed participation, calculated as the annual amount offered divided by the estimated fee. If the

[103] Resolution SE 175/2000, 30 June 2000. This also provided that the Salex Fund could be an initiator too, if the other initiators or the CAF requested use of its funds, provided that ENRE approved.
[104] Notably Resolution SEM 178 (8 November 2000), which was a revised version of 175, that included for the first time the concept of 'expansions through financial rights allocation'.
[105] Recall that Resolution 133/2000 had suspended Resolution 543/1999 that had introduced the Risk-bearing expansion method and congestion rights.
[106] The idea was that initiators of a line would pay for it and own the FTR Allocation. Any other existing beneficiary (identified through the Area of Influence method) would not have to pay for the line. In the event of a new beneficiary being identified (e.g. via an increase in demand or the arrival of new generation) – this would be a Non-Initiating Beneficiary - each initiator that had been paying for the line would have two options: to retain the FTR without any charge to the new beneficiary for use of the line, or to oblige the new user to pay a share of the fee in proportion to its use of the line, transferring to it a corresponding share of the FTR Allocation.
[107] There was no limit on the private participation in any project, but in case the private participation was lower than 20 per cent, a representative of the Federal Transmission Fund should chair the 'Execution Committee' of the project.

sum of the offers were not enough to cover the total cost, the Federal Transmission Fund would make up the remaining funds necessary, up to a maximum equal to the expected benefit of the line.[108] If, even with the maximum Fund support, there were not sufficient offers to cover the expected fee, the CAF would ask for new offers. If the estimated fee were not reached after the second call, the expansion would be discarded, otherwise it would be accepted. If the Federal Fund did not have sufficient funds to support all the lines presented, priority would be given to those lines with higher expected profitability, calculated on the basis of the estimated fee and expected benefits, where these values were as specified in Resolution 218/2000.

The Open Season method was thus a means by which the Government and the Federal Council could propose and implement high voltage expansions. It incorporated an attempt to reveal the willingness of the private sector to participate in such investments. And even now some within the Government were keen to ensure that the Open Season method remained consistent with a primarily market methodology. But several features of the method remained unclear, such as what criteria the government would use to select expansions when no private interest was manifest, as with the Mining Line.

4.5 Initial experience with the Open Season method and the Federal Plan

A week later, the Secretary of Energy declared Open Season for the five lines in the Federal Transmission Plan.[109] All of the lines adopted would get a Financial Transmission Rights (FTR) Allocation. Since the Regulations and processes were not entirely clear, there was a period of discussions, lobbying by interested parties, and government clarifications. Four months later, in November 2000, the Secretary of Energy (now Debora Giorgi) respecified the process of the Open Season in the light of preceding negotiations.[110]

Shortly afterwards, Presidential Decree 1135 confirmed Resolution 657/99 establishing the Federal Transmission Fund (FFTEF) "which shall have as its objective the financing of transmission expansions that the Secretary of Energy identifies as financeable." [111] The Decree indicated that the Federal Transmission Plan envisaged a total investment of $750 million.[112] The underlying aim was reaffirmed: "From the economic point of view, this measure is indispensably driven by the goal of sponsoring growth and development of the

[108] Resolution 175 introduced the concept of 'benefit to the electricity system' for the Open Season process, defined as the difference between the total expected cost of the system with and without the investment in question. For those expansions where support from the Federal Fund was requested, the detailed methodology to evaluate benefits was to be developed by CAF, but in the event this did not happen.
[109] Resolution SE 182/2000, 7 July 2000.
[110] Resolution SEM 178/2000, 8 November 2000.
[111] Decree 1135/2000, 29 November 2000. The Decree was said to speed up the normal constitutional process; it also helped to reassure the Federal Council, who feared that Secretary of Energy Resolution SE 657/1999 might be insufficient to ensure the promised funding. (Tax increases can only be approved by Congress.) The Budget Law for 2001 (Art. 74, Law 24501/29 December 2000) also made provision for the $0.6/MWh surcharge.
[112] Although the annual income of the Federal Fund was only about $40m, it was hoped to attract substantial private participation.

sector, the positive effects of which will propagate themselves throughout the rest of the economy."

The Decree referred to previous delays ("extensions in the timetable caused by the intrinsic complexity of the Plan and the need to consider the many improvements in the system suggested by the possible proponents and the provinces" – not helped by the lack of clarity of the regulations.) Giving a political impetus to the policy, it emphasised that "a new delay in the project would have prejudicial effects on the development of the prized plan, and even the uncertainty about its statutory basis would bring the risk of lack of investment and the stagnation of a sector with ample possibilities of growth, in view of the possible desertion of those potentially interested in developing the expansion."

Next day, the Secretary of Energy announced a revised and higher profile composition of the Committee of Administration (CAF) of the Federal Transmission Fund.[113]

In response to claims from several potential investors that the Federal Plan was unclear, and that there were significant uncertainties about the money that the government would finally commit for each line, the Federal Council decided to clarify the projects itself. Resolution 218 approved details of the projects and allocation criteria and also listed the expected benefits and the estimated fee and methodologies to be applied for each expansion, as per an earlier publication of the Federal Council. [114] The main details were as follows:

1. Northwest-Northeast: PC method with Federal Fund support, estimated annual fee $49.4m reduced to $48.4m by using Salex Funds totalling $4.1m, benefit $12.8m/year.
2. Patagonian interconnection: FTR allocation method, estimated annual fee $19.4m, benefit $23.4m/year.
3. Fifth line (Comahue – Cuyo): PC method with Federal Fund support, estimated annual fee $43.0m, reduced to $35.5m by using Salex Funds totalling $33.0m, benefit $9.3m/year.
4. First and second sections of Mining Line: FTR allocation method, estimated annual fee $33.1m, benefit $36.6m/year.
5. Mar del Plata line: discarded, no benefits identified.

The covering preliminaries to the Resolution noted that, after the Patagonia line payments, up to 30 per cent of the available funds in the Federal Fund would support investments in the Comahue-Cuyo and Northwest-Northeast lines, the remaining 70 per cent would support the Mining Line, and no funds were available for the Mar del Plata line. This increased information was a response to the private investors that had requested

[113] CAF would now have four members instead of the previous three, comprising the Secretary of Energy as President, another representative of the Secretariat, and two representatives of the Federal Council instead of the previous one. Resolution SEM 228/2000, 30 November 2000. In practice, CAF works in the same offices as the Federal Council, as an internal division of it, and most representatives are or were members of the Federal Council. The present Secretary of Energy, Daniel Cameron, was also a previous member of the Federal Council.

[114] CFEE Note No. 14400, 15 November 2000, previously approved in plenary session of 28 July 2000, as cited in Annex II of Resolution SEM 218 (20 November 2000).

more detail about the expected use of the Federal Funds. However, this indication about the allocation of funds was a political decision rather than a criterion for allocating funds or determining state participation in a new line.

The only accepted offer from the private sector during the Open Season was for the 400 kV Patagonia line. The Aluar aluminum plant, which also owns and is supplied base load by the 472 MW hydro plant at Fuatelufú in the Patagonia system, proposed to contribute 20% of the cost.[115] In January 2001 Aluar offered $4m for the transmission rights to the Patagonia line, subject to the signing of a promotion contract.[116]

There was limited interest in taking forward the other lines. Taking them in turn:

- Mendoza province in Cuyo region was interested in the Comahue-Cuyo line, but failed to interest the Comahue generators.
- Generators in the north-west were interested in a line to the north-east in order to export to Brazil, but only if they did not have to pay for it. Taking such costs into account, the possibility of further exports westwards to Chile was more attractive.
- The mining companies in the northwest needed cheap power supplies in order to expand, but many of them already had contracts to buy power supplies from Chile, which was more economic than from Comahue via Cuyo.
- Whether it was more economic to build a line from Buenos Aires to Mar del Plata than to install local generation depended on the precise assumptions. However, there was a political problem with supporting investments in this region. [117]

In February 2001, after much internal discussion (reflecting the support or otherwise for a market approach) the government formally derogated the suspended Resolution 545 of 21 October 1999, in which the previous government had introduced all the second-round reforms to the electricity sector other than transmission expansion.[118] This suggests that the pro-market forces within the De La Rua government had not prevailed.

The Public Contest method still applied, and indeed was actively of interest given the accumulating funds in the Salex account.[119] The generators wished to use the Funds to develop the Comahue-Cuyo line. However, only 70 per cent of the cost could be supported from this source, and the generators were reluctant to fund another expansion only a few months after the Fourth Line became operative. Negotiations between the

[115] The company was considering expanding its aluminum plant and needed additional generation, probably via a CCGT, but could use the line as backup and to export energy into the national system. It was eventually agreed that the company would contribute 31% of the cost and the government 69%, as noted below.
[116] Resolution SEM 33/2001, 12 January 2001.
[117] Even if Buenos Aires city or province were willing to contribute, the Federal Council was reluctant to spend funds on projects in this region, which was perceived as sufficiently wealthy not to need federal support. The Mar del Plata line was characterised as having no benefits in Annex II of Res SEM 218 2000 and was removed from the Plan.
[118] Resolution SEM 128(9 February 2001). Recall that Resolution SE 133 (18 May 2000) had already suspended the previous government's Resolution 543 (19 October 1999) that had introduced the transmission reforms, as described above.
[119] The Comahue Corridor December 1999 account, set up after the Fourth Line, reached $54 million at the end of February 2001.

Comahue generators and the Federal Government for support from the Federal Transmission Fund continued through much of 2000 and 2001.

At this point, the Federal Transmission Plan was clearly leading the investment process. Transener and other transmission companies naturally supported it in public presentations.[120] But how far it could be called a Plan, and how far it was economic, are both debatable. It reflected studies carried out by the Federal Council, of lines proposed by the provincial governments. New transmission lines were argued to be economic. But this was on the basis of assumptions proposed by the provinces via the Federal Council, which typically involved no generation being built in the regions. The implications of alternative assumptions involving generation built in the provinces were not explored in any detail (and were not of interest to the Federal Council). Moreover, an expansion no longer had to meet the Golden Rule – it was sufficient that the Secretary of Energy found that an Open Season expansion was 'feasible' based on its 'social benefit'.[121]

None of the lines now said to be important had been identified as needed in CAMMESA's study in 1998. The Patagonia line, chosen as the first priority, was no doubt useful to its primary beneficiary. But whether it was economic according to the usual criterion of net present value of total costs or benefits is doubtful.[122] Issuing the Certificate of Convenience and Public Necessity, ENRE did not claim that it passed the Golden Rule, referring instead to the previous evaluation of feasibility by the Secretary of Energy.[123]

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[120] E.g. Silvio M Resnich, President of Transener and of the Argentine Transmission Companies Association (ATEERA), 'Expansion of Regional Transmission Systems', January 2001, and later.

[121] The Federal Plan says that, at the request of CAF, the Secretary of Energy has to evaluate the feasibility of a line based on the associated 'social benefit' (without further explanation of this term) before a line is declared financeable. This feasibility evaluation substitutes for the Golden Rule, and has to be carried out according to the methodology that CAF proposes at the beginning of the Open Season process.

[122] In supporting the line, the Federal Transmission Plan referred to the optimisation of both systems, and improving joint operation and economic reserve. As noted, the line provides reserve for supply to Aluar's aluminum plant (and better peaking conditions for it) but not for the rest of the system. In principle Aluar could export energy into the national system, but in practice this benefit is limited since Aluar's power station Futaleufú has to compete with Comahue generators for use of the Comahue – Buenos Aires corridor. This corridor is congested in peak hours when hydro energy is available in Comahue, which is typically when water is available in Futaleufú. Other statements refer to the line reducing monopoly power in the Patagonian system. The extent to which the line could do this is very limited, since the new 354 km line to the Aluar aluminum transformer goes only half way to the remaining load centres of Patagonia. The existing 132 kV line over the remaining distance to those centres (some 400 km to the nearest one) effectively constitutes a bottleneck on further supply from the national system.

[123] At the public hearing on the Patagonia line, the exchange with an environmental organization is recorded as follows. "That in the said hearing the speakers expressed support for the proposed expansion with the exception of the Mayday Foundation (Middle Way and Harmonious Integral Development), which considered that the line did not constitute an interconnection between the two systems, since it was a work purely and simply for a large user, and was no solution to the problems of our interconnected system. // That with respect to such views, it should be explained that the feasibility of the project has already been analysed by the Secretariat of Energy and put by the same office through the Open Season method, for which purpose it considered that the project in question constitutes an interconnection between the two systems." ENRE 474/2001

The Federal Plan thus provided a mechanism for greater influence by ministers, the provinces, transmission incumbents, constructors, generators in exporting regions and large consumers in importing regions - for all of whom the previous policies of transmission over-expansion financed by others were attractive. A central planning and political approach had reasserted itself over the market approach embodied in the reforms of the 1990s.

5. Temporary reversal of policy

5.1 Bastos returns

At this point, the worsening macroeconomic crisis in Argentina took precedence over qualms about the role of the market. In March 2001 President de la Rua invited Domingo Cavallo to become Minister of Economy again. This led to a rapid change of direction.

> Cavallo, and the team he brought with him, reasserted the need for market discipline and significant public sector reforms. Cabinet ministries were reorganized, and Carlos Bastos – the chief architect of the reform and privatisation of the electricity sector in the early 1990s – was named Minister of Infrastructure and Housing, which included the Secretary of Energy and Mining. In June 2001, Bastos suspended Mac Karthy's executive order establishing FFTEF [the Federal Transmission Fund], and issued a separate decree that reaffirmed the original electricity reforms. The decree introduced a new market instrument (congestion licences) intended to make investments in transmission more attractive. Additionally it established a transmission reimbursement fund to provide additional payments to transmission companies, parties to BOM contracts, or holders of congestion licenses, if and when their investments enhanced the overall stability of the transmission system.[124]

The new policies proposed by Bastos are of particular interest in the present context because they did more than simply repeal recent policy and reinstate the previous policy of 1992 or 1999. As the quotation indicates, they involved new arrangements for transmission expansion that combined the roles of market, regulation and government. They were set out in Presidential Decree 804 followed shortly by Resolution 135.[125]

The preliminary statement to Decree 804 introduced the following ideas regarding transmission expansions:

1) During the last few years, transmission investments had been proportionately lower than those in generation and distribution, even though several different cost allocation measures had been implemented.[126]

[124] Bouille et al 2003, p. 47.

[125] Presidential Decree 804/2001, 19 June 2001, and Ministry of Infrastructure and Housing Resolution MIV 135/2001, 25 June 2001.

[126] Resolution MIV 135 refers to a 'prospective report' of the Secretariat of Energy, dated 2000, as identifying these delayed investments, which were mainly in regional transmission. It may seem surprising that Bastos identified lower investment in transmission as an implicit concern when it was actually an achievement of his reform to have used existing transmission lines more efficiently. Perhaps it was a way

2) Investments under the Federal Plan required a high degree of state financing, as indicated by the outcome of the Open Season process; this could not be justified, and consequently the Decree would derogate the Federal Plan
3) Those transmission expansions developed by the market should be treated separately from transmission services that are in the public service.
4) Several transmission projects could be developed at private risk, so a certificate of public convenience and necessity was not needed for them.
5) At the same time, some expansions to improve reliability needed to be considered under an alternative regime, different from the regime to be applied to expansions developed at private risk.
6) The existing methodology for transmission expansions tended to socialise congestion rent [that is, spread it over all participants], which was not effective for developing new investments. It would be better to allocate this rent between those parties that assumed the risk of developing the investment.

Decree 804 included the following provisions:

1) It recognised as market participants those who own 'congestion rights'(presumably because they trade energy along the line, capturing rent from price differences).
2) It made the Federal Government the owner of the congestion rights associated with existing lines. These rights would thereafter be sold via a public tender.
3) It identified as a congestion right that amount of money collected by nodal energy prices and transmission capacity charges.[127]
4) It derogated Decree 1135/2000 (and related Resolutions such as 657 and 174) that had confirmed the Federal Plan and authorised the increase of $0.6/MWh in the tariff surcharge.
5) It provided for ENRE to define which elements of the transmission grid under concession require a certificate of Public Convenience and Necessity.
6) It created a Transmission Remuneration Fund (Fondo de Remuneracion del Transporte) that replaced all the existing transmission accounts and funds. Among other things, reliability expansions would be financed through this new general account. Only demand would pay for such expansions according to a methodology to be determined.[128]
7) It instructed the Ministry of Infrastructure and Housing (then headed by Bastos himself) to implement detailed regulation.

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of acknowledging the political concerns associated with the Edesur incident, before explaining that there was a better way to solve such problems.

[127] Previously congestion rights (and before that the Salex Fund) extended only to revenues from differences in nodal energy charges. The additional reference to capacity charges implicitly accepts that nodal prices are not sufficient to remunerate transmission investment, as some argued earlier (see Part One Section 9).

[128] The new methodology was never published. It is understood that it would be based on load flows, and that the Secretariat of Energy would rank expansions through a centralised decision mechanism, without any specific allocation of collected funds by area or corridor. To avoid relying on the Federal Council to select expansions it was planned to use the remaining UESTY team at the Secretariat (Special Unit for Yacyretá Transmission System, see fn 93 in Part One).

Resolution MIV 135, issued a week later, provided a little more detail about Bastos's thinking. It approved 'guidelines' for the reform and delegated the development of detailed regulation to the Energy Secretariat. These 'guidelines', which indicate Bastos' haste in the circumstances, were not sufficiently detailed to replace the existing Market Regulations based on Resolution SSEE 61/1992 and associated Resolutions. The main provisions of MIV 135 were as follows:

1) Congestion rights associated with expansions developed by an independent transmission company would be owned by that company.
2) The Salex mechanism was derogated.
3) Transmission expansions were divided into two types: reliability expansions and other expansions. The latter should be developed according to private initiative and risk, and for approving such expansions ENRE should only check technical compatibility with the existing system and quality standards.[129]
4) Transmission revenues should consist of four components:
    i) differences due to nodal energy prices;
    ii) capacity charges, with specified maximum values of $0.40/MWh for each 100 km of lines whose length is less than 250 km, and $0.50/MWh per 100 km for lines exceeding 250km;
    iii) a reliability charge of $0.05/MWh for each 100 km of line;
    iv) connection charges as implemented by existing regulations.
5) The capacity and reliability charges would be paid only by energy buyers, who would pay in proportion to their use of the transmission system, which would be proportional to their energy purchases as well. Generators would pay transmission charges only through nodal prices and connection charges.[130]
6) The Secretariat was instructed to analyse whether these reforms were suitable for regional (sub-)transmission companies as well, or whether they needed modifications to make them suitable.

5.2 Response to Bastos

This reversion of policy was controversial. Generators had mixed views about congestion rights and the Risk-bearing expansion method, as noted earlier. Their more specific objection to Decree 804 did not concern transmission issues at all, but rather another aspect of the Decree, namely capacity payments. These had hitherto been paid based on peak output, and generators had long feared that such payments simply encouraged generators to bid lower on their energy costs. They advocated relating payments to capacity availability rather than to output. Bastos, in contrast, considered such payments unnecessary and inappropriate in a competitive market, especially when he was at the same time abolishing the caps on generator bidding. Decree 804 provided that the existing methodologies for spot price calculation (which was based on variable production costs and seasonal declarations of costs) and for capacity payments needed to

[129] That is, there was no question of checking the Golden Rule for these expansions. It was also envisaged that the Public Contest and Contract Between Parties methods would be superseded by Risk-bearing expansions.

[130] The Energy Secretariat was to develop the charging methodology. As Bastos came to realise that his reforms would be derogated he left the details to the Secretariat, and the task was never completed.

be changed to an energy price calculated hourly and based on the free bidding of generators and traders. This would better reveal the opportunity costs involved, improve the competitiveness of the market, and be more compatible with the gradual reduction of the State participation in the electricity sector as implemented in recent years.

Opposition also came from the Federal Council. Bastos had suspended the Federal Transmission Fund, which was the main vehicle by which the Federal Council (and hence the Provinces) exercised influence in this sector. Furthermore, he had done this by using a Presidential Decree, based rather controversially on a special emergency power given to Minister of Economy Cavallo for managing the economic crisis. This created a fear that he might next abolish the Federal Council itself (by derogating the earlier law establishing it). Given that the Federal Council mirrored the political complexion of Congress as a whole, its opposition to Bastos was a much more serious matter than the concerns of the generators.

Bastos attempted to implement the new reforms.[131] However, Congress repealed Bastos' policy in September 2001, just three months after it had been introduced.[132] There were reportedly discussions between Bastos and the Federal Council to consider a way forward. However, De la Rua, Cavallo and Bastos resigned in December 2001 as Argentina's economic crisis deepened.

6. The crisis and afterwards

6.1 The economic crisis

After the resignation of De La Rua on 20 December 2001, there were three different Presidents in twelve days. By the end of the year, Argentina had defaulted on its international debts. On 2 January 2002 President Duhalde took office on an interim basis to normalise the situation, without any deadline to achieve that. In the event he remained for somewhat over one year. To meet the economic crisis, the peso was allowed to float. Within six months it had fallen from parity with the US dollar to 3.6 pesos/dollar. In February 2002 the tariffs for all regulated services including electricity were frozen at their previous peso levels. Bank deposits denominated in dollars were converted to pesos at the rate of 1.4 pesos/dollar by decree and converted into government bonds.

All this obviously caused great difficulties for investors as well as for citizens generally.[133] Most companies, who had borrowed in foreign currency, were left

[131] MIV 259 (15 Aug 2001) provided that the reforms established in Resolution 135 would be put in force on 1 February 2002. SEM 190 (17 Aug 2001) formally terminated the Open Season process for the Northwest-Northeast interconnection. ENRE 474 (22 Aug 2001) issued the Certificate for the Patagonia interconnection, which was already underway and unaffected by the derogation of the Federal Plan in Decree 804.

[132] Law 25468, 12 September 2001, put into effect 12 October 2001, nullified his use of the special Decree.

[133] "Most privatised utilities were under foreign control at the start of the crisis and had prices that were officially pegged to the US dollar. This was the contractual underpinning of the large investments which overseas companies have made in Argentina since 1990. In the electricity sector total investment was

shouldering heavy losses. The utilities and their foreign owners were often blamed for the economic crisis. Not surprisingly, there was now significantly less willingness and ability by the private sector to invest in Argentine utilities, including in the transmission system. At the same time Government funds were strictly limited. There were contractual disputes between the companies and the government, which have not yet been resolved.

The Comahue generators continued to seek application of the Salex Funds, which had reached $99 million at the end of December 2001, but had fallen to $70 million with the devaluation. They feared that the government would wish to use the money for other purposes such as compensating frozen tariffs.

After much discussion, Resolution SE 1 (20 August 2002) allowed the Salex Funds to be used to pay for 100 per cent of the costs of capacitors on the Third and Fourth Lines in the Comahue corridor.[134] This special exemption to the 70 per cent rule was justified on the grounds that most of the cost of the expansion was denominated in US dollars for imported components, there was now a lack of credit for new investments, and the conversion of the Salex accounts (originally denominated in dollars) at 1.4 pesos/dollar had not reflected the real inflation at 3.6 pesos/dollar.

In addition, for this expansion Resolution 1 replaced the concept of the fee by a maximum price, and specified that the contract would be for Construction only. This facilitated regulation of the interest rate for capital remuneration. Transener would Operate and Maintain the capacitors according to a tariff to be set by ENRE. The latter aspect reflected the provisions for an expansion proposed by a transmission company in its own substation under Resolution 208/1998. This expansion thus became a hybrid case: proposed by generators under the normal Public Contest method, but treated as a substation expansion initiated by a transmission company because only the construction element would be put out to public tender.

The concept of a fee was also changed to a maximum price when other expansions initiated by the transmission company were renegotiated after devaluation. The maximum price was set partially in US dollars and the rest in pesos.[135] The fee excluding O&M is automatically recalculated each month in pesos according to the current exchange rate.

6.2 Upgrade expansions

In January 2003 the Secretary of Energy announced a one-off temporary process for so-called Upgrade Expansions, of two types, to ensure that the networks continued to meet security conditions in the face of growth in demand.[136] Security expansions were to meet a specified minimum standard that the proportion of non-supplied energy should not

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$12.5bn, of which 60% is represented by post-privatisation investments." Pollitt 2004, p. 3, citing CAAISE 2002, p 4.

[134] These capacitors at Choele-Choel and Olavarría cost $17m, paid in February 2004.

[135] For example, for the Campana transformer ENRE approved an amortisation period of 24 months, with a maximum price comprising one component of US $4.18 m and another of pesos 1.03 m.

[136] Resolution SE 1/2003, 2 January 2003

exceed 30 per cent of the demand in any area for ten days running. Adequacy expansions were to maintain voltage, and more generally to achieve or maintain the original design standards of the transmission equipment. These adequacy expansions were defined quite broadly to include several kinds of investment that fell outside the definition of security expansions as specified in Resolutions 208/1998 and 1/2002. The Resolution also incorporated a special chapter for regional transmission companies in Annex 16 of the Market Regulations.

The onus was on the transmission companies (Transener and the regional sub-transmission companies) to identify potential Upgrade projects (under this new resolution) and Security of supply projects (under Resolution 208/1998).[137] They should indicate them to CAMMESA before 30 January 2003, with a detailed description, explanation and estimate of cost.[138] CAMMESA was to check these, prioritise them, define the collection of projects that would minimise the risks to supply, and possibly propose alternative and more economic ways of dealing with the problems. ENRE was to give an opinion, and to indicate whether other related investments were in process. It would then be for the Secretary of Energy to decide which works to authorise.[139] Where appropriate there would be a competitive tender.

The costs of investment, operation and maintenance would be allocated 70 per cent in proportion to peak demand and 30 per cent in proportion to payments as beneficiaries of the expansion (under the Public Contest methodology). This means that (e.g.) the cost to beneficiaries of the Bariloche scheme would now be 30 per cent of what it would have been previously (plus a small amount for the remaining 70 per cent shared across peak demand in the whole system).

The Secretary of Energy decided that in the circumstances of the time it was opportune to use the uncommitted funds in the Salex Fund to help finance these transmission expansions. However, because the Salex Funds were earmarked for expansions to reduce congestion, they could only be loaned for these reliability projects.

Within two months the Secretary of Energy reported on progress.[140] The transmission concessionaires had proposed projects and CAMMESA had ranked them.[141] For the 500 kV network the Secretary of Energy approved three Security of Supply expansions (three transformers with a total cost of Arg $33m (pesos) or US $10.3m), and eight Upgrade

[137] Resolution 334/2002 had extended Resolution 208/98 (at the request of CAMMESA) by approving a new type of security expansion, called 'security scheme for frequency and voltage control on the interconnected system'. This type of expansion is complementary to other types of security projects (operation of security islands and black start). The Resolution also specified the rules for allocating the resulting charge to cover investment and O&M costs.
[138] Here and often elsewhere, strictly speaking the responsibility falls to the dispatch entity OED, which is a part of CAMMESA.
[139] Resolution SE 86 (30 January 2003) created a new Commission to advise the Secretary, comprising professionals from the Energy Secretariat, CAMMESA and ENRE.
[140] SE Resolution 106/2003, 28 February 2003
[141] ENRE had not commented except for noting that two projects had already been considered in the context of the tariff revisions of one of the concessionaires.

expansions (capacitors, reactors and other auxiliary devices costing Arg $ 33m (pesos) or US $10.3m).[142] He also approved expansions to the 132 kV sub-transmission networks.

6.3 The Federal Plan re-launched

President Nestor Kirchner was elected on 27 April 2003. Tariffs to end-users remained frozen, achieved by frozen remuneration for regulated network activities and a reduction in generators' income. This was said to be a transitory policy but without any deadline for ending it. From June 2003 onwards the exchange rate stabilised at just under 3 pesos to the US dollar.

In June 2003 the government re-launched the Federal Transmission Plan for using the Federal Transmission Fund (that is, using the proceeds of the additional surcharge of $0.06/MWh).[143] It focused on those four of the five lines originally identified for which positive benefits had been calculated:

- Comahue – Cuyo interconnection (660 km)
- NOA-NEA (northwest – northeast) interconnection (1015 km)
- interconnection of the national system MEM with the Patagonia system MEMSP (354 km)
- Interconnection CUYO – NOA (Minera or Mining line with 3 sections) (555 km).

The Government indicated that it would make its decision based on a variety of considerations, including the contribution from users or other sources. It gave first priority to the link with the Patagonia system, discussed earlier. A promotion contract (between the government and the private contributors that wanted to build the line) was signed 27 June 2003.[144] It is understood that the Federal Transmission Fund is contributing 69 per cent of the total cost and private investors (specifically Aluar, the aluminium factory in Patagonia) the remaining 31 per cent.[145]

For their part, the generators continued to be concerned about the government's intention to use the Salex Funds for other purposes (including to subsidise end-user tariffs that had been held down by the pesification and price freeze). They were keen to propose projects

[142] As noted above, the reserve transformer at Alicurá for Bariloche was top of the list of Security of Supply expansions, and the Henderson transformer rejected by the local distribution company was also included.
[143] SE 4 (13 June 2003) and SE 832 (7 November 2003). In view of the delays in implementing the Federal Plan of June 2000, the second of these Resolutions removed a deadline for using the Federal Fund for administrative procedures and consultancy services. (The previous deadline had been three years from the declaration of an open season or the commissioning date, whichever occurred first.) SE 830 (6 November 2003) approved the segmentation of the Mining Line into shorter sections in order to improve the conditions for its development. Resolution 4/2003 provided clarifications and specific rules for the public tender process for Federal Plan lines in the context of the economic crisis. For example, it allowed the initiators of an expansion to buy materials on behalf of the relevant future transmission company before the COM contract was signed, with a view to avoiding the uncertainty of devaluation on the funds in the Federal Plan, which were denominated in pesos.
[144] SE 5/18 June 2003
[145] As with all public tenders since the Economic Emergency Law was put in force, it was said that the Government's decision would also take account of buying Argentine materials. Some noted that since Aluar produced aluminium conductors it would presumably provide these materials for this line.

of more use to them while the Salex Fund was still available. From their perspective, the best use of the substantial funds in the Comahue corridor account was now the Fifth Line (Comahue- Cuyo). They therefore promoted this line, supported by the Federal Council and Transener.

At about the same time, the government added a second section of the Patagonian Line to the Federal Plan.[146]

In November 2003 Law 25822 formally ratified the Federal Transmission Plan as developed in previous resolutions. In addition, it:

- provided that the resources received by CAMMESA corresponding to the Federal Electricity Plan, and those that Law 24065 put under the administration of the Federal Council, should be immediately put at the disposal of the Federal Council as funds corresponding to the Federal Transmission Fund;
- authorised the Secretary of Energy to take the regulatory steps necessary to start the works in the Federal Transmission Plan, in particular notifying the 180 days of 'open season' for the Comahue – Cuyo line and the first (Mendoza – San Juan) tranche of the Mineral Line;
- provided that the rules covering exports of electricity to neighbouring countries should not adversely affect users in bordering provinces, either by modifying the nodal factor or by any other element that distorts the local electricity markets. In the same way the operation of buying and selling electricity energy to neighbouring countries would be subject to the national tax regime;[147]
- entrusted the Secretary of Energy, with his counterpart in Chile, to study and evaluate a regulatory regime specifically for the interconnection between Argentina and Chile;[148]

[146] This is a 500 kV line from Puerto Madryn to Pico Truncado, just north of President Kirchner's province of Santa Cruz. Although the line will be financed through the Federal Fund, there seems to be an expectation that financial support for the line will come directly from the national treasury. it seems difficult to identify significant benefits with this line, and there is an element of circularity in the justifications. In the absence of generation based in the oil fields near Pico Truncado, it is difficult to see who the users would be, but it would only be economic to develop and export generation from that area if the cost of transmission were near zero.

[147] In the absence of exports to Brazil, prices in the North-East nodes (an exporting area as a result of Yacyretá power station) would be about 12 per cent less than in Buenos Aires reflecting transmission losses. The introduction of exports to Brazil changed the direction of flow and increased prices in nodes near the border to about 15 per cent more than in Buenos Aires. Provinces in the North-East argued through the Federal Council and Congress for a different nodal pricing model to avoid this effect of increased exports.

[148] It is not clear whether this refers to an existing or future interconnection. 1) The 345 kV line built in the northwest never connected to the Argentine system. The owner (InterAndes) wanted such an interconnection but Transener and the northwest distribution companies were opposed since quality standards in the Great Northern system of Chile are very low, so the interconnection could reduce the performance of the Argentine system and increase penalties on the transmission and distribution companies. An identified problem was the lack of an agreement between both ISOs in order to set quality standards for interconnections between the two countries. 2) The Fifth Line (Comahue – Cuyo version) would make it easier and cheaper to interconnect with the central system of Chile. In the light of the experience just noted, the lack of a general agreement for interconnection quality standards could have been seen as an obstacle to future developments.

- constituted a 'Promotion Committee' for the two lines above, comprising two representatives of each of the provincial governors of Mendoza and San Juan, a representative of all the distribution companies of each province, and a representative of the electricity generators of Comahue. The Committee will be authorised to take forward the works and to determine their general characteristics, in collaboration and with a view to achieving appropriate results and will be responsible for providing information to Congress about the development of these works.

The above provisions of the Law as passed by Congress were put into effect. There were also additional provisions:

- that the Salex Funds should be used exclusively to finance expansion of the transmission system;
- that the Salex Funds corresponding to the Comahue – Buenos Aires and Central Cuyo corridors would be applied in their entirety to financing the Comahue – Cuyo line and the first tranch (Mendoza – San Juan) of the Cuyo – NOA interconnection (the Mining Line), respectively, for the next 24 months.

The President noted but did not approve these Salex provisions. They had been included to reassure the generators and secure their support for the Law. [149] However, the government presumably wished to keep control of scarce funds and to maintain flexibility for their use for other purposes.[150]

The Government has indeed subsequently used the Salex Fund for other purposes, especially to handle the disparities between the actual generation costs and the frozen tariffs. Figure 2, which charts the evolution of the Salex Fund over the decade since it was created in 1994, shows that in January 2004 US $50 million (about Arg $150m) was taken as compensation to the Liquid Fuels Reserve Fund.[151]

Thus, whereas the Salex Fund was once used to reinforce and facilitate decision-making by market participants, paying their own costs, now it is used to reinforce and facilitate decision-making by Government, with contributions invited from the private sector but taken into account in an unspecified way.

[149] Law 25822 passed on 19 November 2003 and the other provisions including those ratifying the Federal Plan (initiated by Secretary of Energy resolutions SE 174, 175, 178 and 182 of 2000), which were a reassurance sought by the Federal Council, were approved by the President and put into effect 4 December 2003. The provisions about the Salex Funds have not been put into effect.

[150] Some of these funds could be used to compensate generators for the frozen end-user tariffs. However, the generators opposed the use of these Funds for tariff compensation, fearing that using Salex Funds for this purpose would delay the structural adjustments in tariffs that were necessary after devaluation. Accordingly, they argued instead (together with the Federal Council) for using the Fund to develop the Fifth Line.

[151] This Fund was set up to compensate generators for the costs of liquid fuel needed in winter because of constraints on natural gas supply. These fuel costs are set by international markets in US dollars, while tariffs were frozen in Argentine pesos. It has also been said that the Salex Fund was used to pay a US$350 million debt owed to various hydroelectric entities including the Binational company Yacyretá. *IBL Troubled Company Reporter*, Vol 4, Issue 249, 17 December 2003.

As at 31 December 2003 the Federal Transmission Fund stood at Arg $116.6m plus US $25.6m. This is not sufficient to finance all lines in the Federal Plan. The problem was much exacerbated after the devaluation, since investments are now only made if the government pays cash. For example, nearly five years after it was first proposed and endorsed, nothing has yet been done towards the Mining Line. Serious supply problems have been forecast for San Juan province in case the existing interconnection is not reinforced.[152]

Meanwhile, on 24 August 2004 the government sent to Congress a draft bill creating a new Federal Public Utility Services Regime. Its preamble remarks that, at the time of privatisation (late 1989), "the bodies created to monitor compliance with the regulatory frameworks and the concessions and licences granted did not prove appropriate. On the other hand, the State's conduct became self-damaging, as the State was deprived of income to which it was entitled and, at the same time, its expenditure soared. The aim of the bill is to address this issue, "as advised by international experience", and also "to reinstate the State's full exercise of its rights and compliance with its duties and obligations".

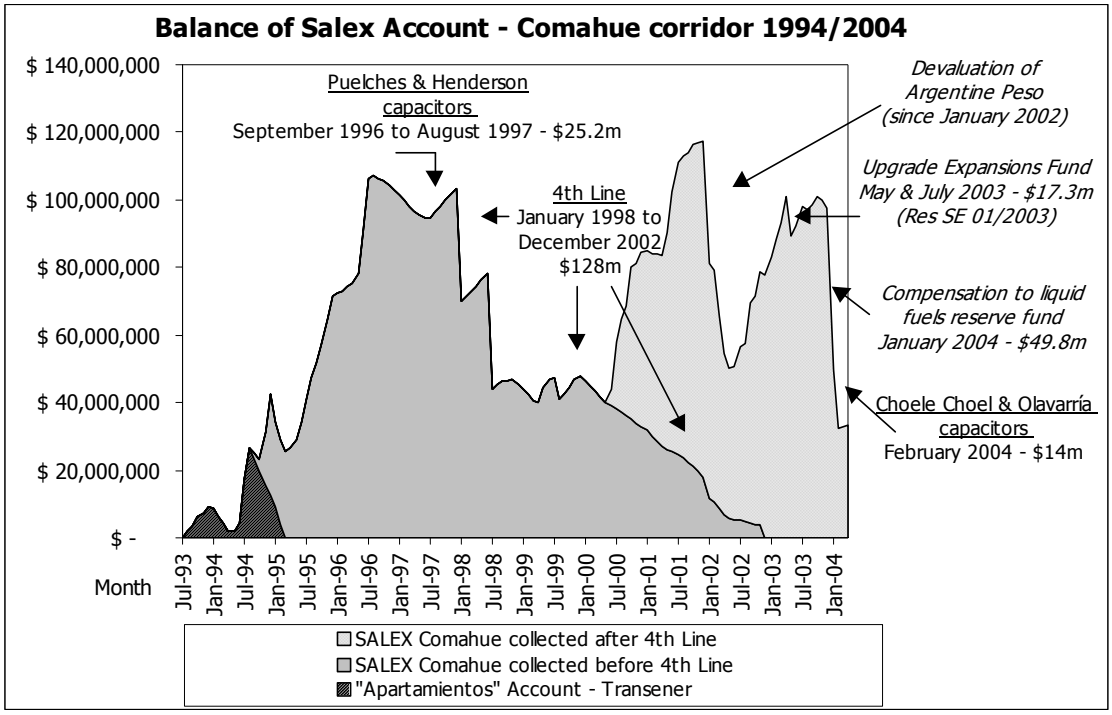
The bill introduces several new (and restrictive) conditions for concessions, licenses and permissions. These include, for example conflict resolution exclusively under Argentine jurisdiction, contracts required to be in local currency, and regulated tariffs calculated according to costs and a regulated return. Rates are to be fair and reasonable, and "the mean minimum rate must be an instrument to encourage economic development and the highest level of social equity".

As with all public service concessions, the Federal Government will explicitly introduce an investment plan for each concession. [153] It is not yet clear how this will be implemented for electricity transmission companies, but undoubtedly increases the extent of regulation and central planning.

[152] As noted above, In June 2004 the San Juan regulator announced that it would allow the costs of the 500kV line to Mendoza (the first part of the Mining line expansion) to be passed through to end-users, in order to help to provide additional funding for the line.

[153] Article 5 entitled Duties of the State provides that "In order to foster the country's economic development and a more equitable distribution of income, the State shall …(f) demand that execution of the investment plan ensure long-term supply of service with the most suitable technology;,,,." Article 6 provides that "Pursuant to the mandate of Article 5 of this Law, the Executive Branch of Government shall in all cases define the investment plan to be carried out during service provision, and shall specifically include it within the related contractual framework."

Figure 2 Evolution of Salex Fund 1994-2004



7. Review of performance

7.1 Transmission expansion 1992 to 2002

What has been the overall record of transmission expansion since privatisation? Table 3 shows the high-voltage transmission lines installed from 1992 to 2002.

Table 3 Construction of 500 kV transmission lines in Argentina 1992 - 2002[154]

Year	Operator	Project	Length
1993	Transener	Piedra del Águila grid interconnection	6 km
1994	Transener	Piedra del Águila grid interconnection	6 km
1994	EBY	Yacyretá – Rincón (3 x 3.6 km) grid intercon.	11 km
1994	Yacylec	Rincón – Resistencia	267 km
1994	L L Lata	Loma la Lata–Planicie Banderita grid intercon.	37 km
1996	Litsa	Rincón – Salto Grande	506 km

[154] Source: Mercados Energéticos. CAMMESA Annual Report 2002 gives a similar total length of line over the same period, but with different timings: 1993 251 km, 1994 279 km, 1996 592 km, 1999 52 km, 2000 1303 km, total 2477 km. It is possible to reconcile the data to a large extent by assuming that some projects are entered a year or two earlier or later in one or other data set. If about 246 km from CAMMESA's 1993 total corresponds to pre-1987 investment (see note to Table 3 in Part One), there remains unexplained about 25 km from CAMMESA's 1996 total. The 1999 Rincón – Garabí lines (2 x 135 km) are not included in CAMMESA's figures because they are considered "international transmission" and consequently are not part of the 500kV national grid.

1996	Litsa	Rincón – San Isidro	80 km
1997	P P Leufú	P P Leufú – P Águila grid interconnection	18 km
1999	Transener	P Águila – Abasto (Fourth line)	1292 km
1999	Transener	A Cajón – Chocón grid interconnection	52 km
1999	InterAndes	Cobos - Atacama (Chile) 345 kV	409 km
2000	Endesa	Rincón – Garabí (Brazil)	135 km
2000	AES	Power plant grid grid interconnection	6 km
2002	Endesa	Rincón – Garabí 2nd circuit	135 km
Total			2960 km

How is this performance to be evaluated? Overall, nearly 3000 km of new 500 kV lines built over ten years is an average of about 300 km per year. It is true that more 500 kV transmission lines were built before privatisation – nearly 400 km to 500 km per year, depending on the precise period taken.[155] But that was at a time when the system was being formed into an interconnected system. And the major line that did go ahead after privatisation was a particularly large and important investment.[156] So the length and character of lines built under the reformed transmission expansion arrangements was quite substantial.

However, there are important qualifications. Three of the longer lines listed in Table 4 were planned before privatisation and financed by the federal government as part of the development of Yacyretá hydro plant. A further two lines link the same plant with Brazil. The InterAndes line is separate from the interconnected system, and was financed by a Chilean generating company supplying energy to mining companies in the north of Chile. A further six lines, at most 18 m long, simply connect generating plants with the high-voltage grid. The 52 km line from Agua del Cajón to Chocón served the same function. This leaves the Fourth Line as the only high-voltage (500 kV) line built under 'standard' Public Contest conditions (though there were several 132 kV lines and other types of transmission investment).

But is this a sign of the inadequacy of the expansion arrangements? Part One of this paper presented evidence that the previous rate of transmission building was excessive. An achievement of the post-privatisation period was precisely to avoid the building of unnecessary lines. In a state of excess capacity the priority is to make better use of existing lines.

What is the evidence on other types of investment in the transmission system? Table 4 sets out ENRE's summary of the transmission projects completed during 1994 to 2002. It ranks the projects in order of size (but does not include all the transmission lines in the above table). It shows that during this period a total of 186 new transmission projects were put into effect, with a total value of $837.3 m. Where information is available, some details of the investments are noted in the table.

[155] 6870 km from 1974 to 1987, an average of 491 km/yr over 14 years, or 382 km/yr if the period is extended to 1991. See Table 1 in Part One of this paper.
[156] See section 4.3 in Part One.

Table 4 Transmission projects completed during 1994 to 2002[157]

		Number	Value $m
Transener system (500 kV)			
Comahue- Buenos Aires (4th line) 1292 km 1999	PC	1	250
Rincón (Yacyretá) - Salto Grande 506 km 1996	PC	1	135
Rincón (Yacyretá) – Resistencia 267 km 1994	PC	1	70
Henderson – Puelches capacitors 1996	PC	1	24
Paso de la Patria – Sta Catalina 132kV link[158]		1	c20
Macachin substation (500/132kV)		1	c20
Next three projects (average $13m)		3	38
Agua del Cajón – Chocón 52 km 1999			
Ramallo (power plant interconnection) 2000			
Recreo capacitors 2000	PC		
Remaining 40 projects (average $2m)		40	83
Total		49	640
6 Regional sub-transmission companies (mainly 132 kV)			
Three largest projects Transba (average $8m)		3	23
Three largest projects Transnoa (average $6m)		3	17
Next three largest projects Transnoa (average $4m)		3	12
Next three largest projects Transba (average $3m)		3	9
Next three largest projects Transnoa (average $2)		3	7
Remaining projects (average $1m)		122	129
Total		137	197
Overall Total		186	837

About a quarter of these projects (49) were within Transener's jurisdiction, related primarily to the 500 kV system, but they accounted for just over three-quarters of the total value ($640.2m). The Fourth Line and two other long lines (listed as costing $250m, $135m and $70m respectively) accounted for 79 per cent of this amount. The next six projects in size ranged from $24m to about $10m. The remaining 40 high voltage (500 kV) projects cost $83m in aggregate, an average of just over $2m each.

The other three quarters of the total number of projects (137), accounting for just under a quarter of the total value ($197m), were carried out within the areas of the six regional sub-transmission companies operating primarily at 132 kV. The projects were evidently smaller than in the 500 kV system, the largest being about $10m. The largest 15 projects from the two most active systems accounted for $68m of the total value, an average of $4.5m each. The remaining 122 projects therefore averaged about $1m each.

[157] Source: ENRE Annual Report 2002, ch. 3 pp. 49-55. Some cost figures have been deduced from text there and from other data. PC denotes Public Contest mechanism used. As also noted later, it is not clear that this list is complete.

[158] It is not clear why this 132 kV line is listed as in Transener's 500 kV system.

Subtracting the major lines from the investments in the 500 kV system suggests that other investments totalled over $100m during this period. In particular, there was substantial investment in better control systems, to expand the existing capacity more economically than by building new transmission lines. There was also nearly $200m of investment in the regional sub-transmission networks.

To illustrate the change in emphasis on investment, over the period 1993 to 2003 the length of transmission lines increased by 20 per cent, main transformers by 21 per cent, compensators by 27 per cent and substations by 37 per cent, whereas series capacitors increased by 176 per cent. As a result, transmission capacity limits increased by 105 per cent, more than sufficient to meet the increase in system demand of over 50 per cent.[159]

Table 5 shows that the number of expansion projects generally increased over time, at least until the crisis at the end of 2001. So too did the value of these projects, after distinguishing separately the three largest 500 kV lines in Transener's area. Note that in 2002, after the crisis and devaluation, the number and value of investments decreased sharply.

Table 5 Transmission expansion projects over time

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Number of projects										
Transener	2	9	5	5	5	6	5	9	3	49
Regional Cos	0	5	4	8	18	26	20	36	20	137
Total	2	14	9	13	23	32	25	45	23	186
Value of projects $m										
3 major lines	70	0	135	0	0	250	0	0	0	455
Other work	5	14	28	10	24	23	34	40	7	185
Transener	75	14	163	10	24	273	34	40	7	640
Regional Cos	0	1	3	12	29	49	23	63	17	197
Total	75	15	166	22	54	321	57	103	24	837

7.2 Competition in transmission

[159] Transener slide presentation, 2003. R.Sanz, 2004, has slightly different calculations for 1992-2002 but the same overall conclusion. Transmission capacity increased in the same proportion as did demand, namely 60 per cent. Half the increase reflected new investment in 500 kV lines (an increase of 30 per cent) while the other half was consequent on the introduction of supplementary control devices in the main corridors. As a result of the greater efficiency of control, the ratio of kilometres of EHV lines to load decreased by 25 per cent (put another way, the average load factor increased by about a third). This made better use of existing facilities and reduced charges to generators and other users.

Leaving aside the issue of what expansions were decided upon, to what extent was there competition to construct, operate and maintain transmission expansions, and what were the effects of this?

Of the 25 proposed public contest expansions listed in the Appendix, 12 have gone to competitive bids. (The other proposals have been rejected, suspended or are being renegotiated.) Of these 12 we have details of the bidding in 7 cases. One expansion attracted only 1 bid, three attracted two bids, two attracted three bids, and one – the Fourth Line – attracted four bids.[160]

Setting aside substation expansions proposed by the transmission company that owns them, 10 expansions have been put out to competitive tender. The Table in the Appendix indicates that all but the Fourth Line has been won by or with a new independent transmission company.[161] Transener won the expansion proposed by itself, to reconfigure its own Ezeiza substation, but the tender nonetheless attracted three bids.

The Fourth Line was perhaps the most dramatic example of competition. There were four bidders including Atalaya Energy (a consortium formed by the generators themselves) and Transener. These four submitted a total of 13 bids, since Transener offered two alternatives to its basic offer and its main competitor offered seven alternatives. This reflected a desire to offer as keen a fee as possible, including by the use of new technologies that had not yet been applied in Argentina. Although the possibilities of these technologies were discussed between the generators and constructors, the tender documents were not entirely clear and the bidders preferred to include more than one option in order avoid any risk of rejection. In the event the generators accepted the lowest fee bid, from Transener, which involved an innovative Cross Rope technology. The value of this bid was $24.521m, which was only fractionally below the lowest rival bid of $24.999m.

The record suggests that, although there has been less investment in transmission lines than before the reform, this has not been at the expense of efficiency. The longest new line that has been built is a very substantial one; there has been valuable investment in enhancing system control; and there has been a significant improvement in the performance of the transmission system over the period from privatisation to the economic crisis.

There are also additional merits of the Public Contest process. For example, it has incentives not only to use known methods to improve reliability but also to discover new

[160] With the exception of the Fourth Line, there is no obvious correlation between number of bids and size of expansion or type of work. The single bid was for a 132 kV line value $10.6m, the double bids were for capacitors and 132 kV lines average value $7.6m, and the triple bids were for a 132 kV line and substation reconfiguration averaging $8m.

[161] These are Yacylec, LITSA, Cobra (5 expansions), Siemens/Cobra, and ABB/Transener, The Appendix also shows that the amortization period has varied from 15 years down to 1. Not surprisingly, the period is generally longer for larger investments (say over $50m) although the periods for investments below this value show more dispersion.

opportunities for improving performance, with consequent improved information about the transmission system.[162] The arrangement also facilitates financing of large projects.[163]

7.3 Reductions in cost

If competition to provide transmission expansions is a reality, what effects has it had? It seems to have secured significant reductions over time in the cost of building and operating new lines. A commonly cited statistic is that the first three lines, successively of length about 300 km, 500 km and 1300 km, were all secured for nearly the same fee – about $2m per month or $24m per year.[164] It began to be said in Argentina that a new transmission line costs $24m whatever the length. Taken at face value, the quadrupling in line length for the same price implies a cost reduction of about 77 per cent. However, the calculation is a little more complex because other equipment and some exceptional costs were involved as well. It is therefore worth trying to sort this out.[165]

Before privatisation the companies AyE and Hidronor would use a budget estimate of about $230,000/km or more for planning purposes, and in practice always exceeded this figure.[166]

The first major line to be built after privatisation was the 267 km Rincón – Resistencia line for Yacyretá power station. This was originally estimated to cost $228,000/km, consistent with previous practice. The winning bid by Yacylec was a monthly fee of nearly $2.3m over 15 years, present value about $197m.[167] However, the tender included the cost of building the substation at Rincón, and there were exceptional costs because the line had to cross the 3 km wide Parana river near Resistencia. Table 5 above (based on the ENRE report) puts the cost of the line itself at $70m. Even this adjustment implies an average cost of $267,000/km, greater than the usual estimates before privatisation. Possible explanations are that the 'client' was the joint-government-owned Yacyretá station, for whom lowest cost may not have been the highest priority; bidding took place

[162] "Capacity prices in the outlying regions were penalized if the connections to the market were not reliable, thereby adding a price signal to encourage participants to improve system reliability. Consultants would crawl the system looking for places to install things that would improve stability and eliminate constraints, or that would improve the unreliable links. You end up with a lot of people knowing quite a lot about the transmission system." J D Roark, personal communication to Prof W Hogan.

[163] "I have always admired the transmission enhancement feature of the Argentine market. It needs financial rights to make it complete, but it works as it is. Though it is facilitated by the relatively simple spider-radial nature of the Argentine system, there are some very important features of this procedure that modern-day proposals lack. In particular, when a line is accepted as a legitimate system procurement by CAMMESA and by (at least 70% of) the beneficiaries, it takes on an official stature. It will have the same revenue-collection status as any regulate line; its costs will be billed out over time, and they will be collected under the existing transmission tariff. The credit of the market stands behind the project, and this makes the project financeable. … In short, for me it stands out as a better thought-out idea than most of the modern day proposals." J D Roark, personal communication, 23 May 2003.

[164] E.g. Woolf 2003a, p. 266, Woolf 2000b.

[165] The following notes reflect calculations made earlier by R Sanz.

[166] Source: R Sanz, personal communication

[167] Figures of $2.4m and $205m in the Appendix include the three short 3.6 km lines connecting the plant with the local substation.

during the privatisation process (it was completed in 1994) so Transener was not able to bid; and there was limited competition for the tender.

The second major line was the 506 km Rincón – Salte Grande line in 1996, also for Yacyretá power station. The winning bid was a monthly fee of $1.8m over 10 years, present value about $131m. Table 5 (per ENRE) puts the total cost at $135m. But in this case the ENRE figure seems to comprise about $49 m for a substation and other works and about $86m for the line. Dividing the latter by the length 506 km implies an average cost of $170,000/km. This is a significant reduction on the previous cost, and reflects stronger competition. It was not thought that Transener could lose this contract, but the winning bidder was the construction company Litsa, which thereby became the second independent transmission company in Argentina.

The third major project was the 1292 km Fourth Line, approved in 1997. The winning tender was a monthly fee of $2m over 15 years. However, this was after reducing the total cost by $80m from the Salex Fund. Table (per ENRE) puts the total cost at $250m before application of the Salex Fund. Here too there was a substation and other works estimated to cost about $82m with the line costing about $168m. Dividing the latter by the 1292 km length implies a cost of about $130,000/km.[168] The price reduction reflected an active concern by buyers (mainly generators) to minimise their costs, and fierce competitive bidding by construction companies in which Transener was keen not to cede its leading position.

To summarise, the cost seems to have fallen from the range $230,000/km to $267,000/km in the period up to 1994 to about $130,000/km in 1997. Thus, a more accurate conclusion is that, under the impact of private ownership and competition, the cost of building 500 kV transmission lines roughly halved.

7.4 Analysis of expansions by method used

Many of the transmission expansion arrangements put in place at the time of privatisation of the power sector in 1992 in principle still apply. However, the freezing of electricity tariffs in February 2002 following the crisis and devaluation of the peso has essentially precluded normal regulatory processes. The private sector now generally sees new investment as too risky. Nonetheless, there have been about eight years of experience under relatively normal conditions.

Table 6 shows that under 10 per cent by number of the expansion projects (16) were financed by the Public Contest method. A quarter (45) were financed by Contract between Parties. Over 60 per cent (118) were Minor expansions.[169] The remaining 4 per cent (7) proceeded under Article 31. However, the Public Contest expansions were by far the biggest by value, accounting for two-thirds of the expansions by value ($538m). Contract between Parties accounted for a quarter ($217m). Minor expansions accounted

[168] On the bidding and general context see Galetovic and Inostroza 2004.
[169] Of these, 113 were Minor Expansions by Contract between Parties and 5 were Other Minor Expansions. There was no difference in the average value of these two sub-categories.

for 8 per cent in total ($70m). Article 31 expansions were 1.5 per cent by value ($12m).[170]

This means that the average sizes of expansions were Public Contest $34m, Contract between Parties $5m, Article 31 $1.7m and Minor expansions $0.6m.

With a small number of projects of differing sizes, overall averages can be misleading. ENRE reports that, of the nine largest projects, five were built using the Public Contest method and four used Contracts between Parties. We may calculate that the four largest Public Contest projects had a total cost of $479 m. This means that the remaining 12 Public Contest projects totalled $60m, an average of $5m each. In other words, apart from the four largest projects, the 12 remaining Public Contest projects had the same average size as the 45 projects by Contract Between Parties.

Table 6 Evolution of projects over time, by method of approval[171]

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Number of projects										
Public Contest	1	0	2	0	1	2	2	8	0	16
Contract BP	0	1	2	7	6	11	8	5	5	45
Minor projects	0	12	3	5	16	19	14	31	18	118
Article 31	1	1	2	1	0	0	1	1	0	7
Total	2	14	9	13	23	32	25	45	23	186
Value of projects $m										
Public Contest										
- 3 majors	70	0	135	0	0	250	0	0	0	454
- other PC	0	0	24	0	2	1	16	41	0	84
Contract BP	0	0	3	16	45	62	32	41	18	217
Minor projects	0	13	3	5	7	9	8	19	6	70
Article 31	5	2	1	1	0	0	1	3	0	12
Total	75	15	166	22	54	321	57	103	24	837

The Appendix provides some further detail on the major expansions using the Public Contest method. Most of these have already been mentioned in Parts One or Two of this paper.

8. Economists' concerns about a market approach

It has been argued that merchant transmission investment can be shown to be efficient under a restricted set of assumptions, but that in reality those assumptions generally do

[170] It is not clear that ENRE's figures include all the Article 31 expansions – for example, the 202 km 220 kV line from Tucumán to the Australian-owned goldmine in the Andes.
[171] Source: ENRE 2002 Annual Report.

not obtain.[172] These authors also acknowledge that essentially the same is true of regulated transmission investment.[173] The question therefore arises: how do these alternative methods perform in practice, in the kinds of conditions actually observed?

Argentine policy does not involve merchant investment in the same sense as, say, Australian merchant transmission.[174] Nevertheless, the kinds of assumptions identified as key ones for merchant transmission could well be important for a policy that bases investment decisions on the decisions of users instead of regulators. It is therefore relevant to examine how the Argentine framework for transmission expansion deals with the potentially problematic conditions identified by the above authors.

8.1 Imperfections in wholesale energy markets that may distort investment because prices do not reflect marginal costs.

Argentina has adopted a vigorous structural policy to prevent market power in the wholesale markets, by selling generation plants separately, and also by prescribing bidding on the basis of cost. Market power is not reported as a significant problem. In fact the generators in Comahue used the Fourth Line as a means of competing more effectively with generators in Buenos Aires

8.2 Lumpy transmission investments that may lead to underinvestment to avoid spoiling market prices, or to premature investment to pre-empt new entry.

Lumpiness and size were not an issue with the Fourth Line: 500 kV was always the envisaged capacity and there seems to have been no discussion of a 132 kV line (or a larger one) instead. Insofar as consumers or distribution companies are involved in the decision as users, they have no interest in under-investment to maintain high prices or to pre-empt new entry. As a result of the nodal pricing mechanism in Argentina, and the application of the Area of Influence method, generators in the main supply areas have been the main decision-makers, and they would suffer from under-investment in transmission since it would lead to congestion and lower prices for them. The main concern in Argentina (albeit unjustified) has been delayed rather than premature transmission investment, at least under the Public Contest method. The present paper suggests that installation of the NW capacitors may be been premature, but this seems to be explained by unexpected developments there, and is not considered to have pre-empted new entry.

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[172] Joskow and Tirole 2003, 2004, also Joskow 2003.

[173] "In principle, a regulated Transco model can deal directly with issues associated with lumpy investment, market power in wholesale power markets, gaming behavior of merchant investors, stochastic attributes of transmission capacity, and avoids the need to separate transmission ownership and system operations. However, a regulated Transco model will necessarily confront inefficiencies resulting from asymmetric information and political interference in planning and investment processes and may be less effective than a merchant model in providing the high powered incentives that lead to the identification of innovative transmission investment options, construction costs minimization, and efficient tradoffs between generation and transmission investments." Joskow and Tirole 2004, p. 34.

[174] Littlechild 2003, 2004.

8.3 Stochastic capacity that may complicate the defining of property rights.

Stochastic capacity and the definition of property rights were not an issue with the transmission expansion scheme as initially implemented. After concerns were then expressed about the lack of property rights, steps were taken to remedy this. Concerns then focused on who should receive the proceeds of the property rights on the existing lines, and on the potential conflict with the subsequent Government's Federal Transmission Plan, but not on problems of defining the property rights with stochastic capacity. The policy instituting property rights was derogated shortly after it was introduced, so there is no evidence on its operation. Whether property rights were actually needed is unclear, since the presumption that economic expansions were not being implemented no longer seems to be valid.

8.4 Conflicts of interest and moral hazard problems, and associated inefficiencies, in relation to dispatch and maintenance, as a result of the separation of ownership and system control..

An early decision in Argentina was to make scheduling the responsibility of an Independent System Operator (CAMMESA), separate from transmission companies as well as generation companies. In the event there have been no allegations of inefficiencies in scheduling. Allowing rival companies to maintain their own expansions might have led to problems, but the regulatory framework provided for incumbent transmission companies to advise on the technical implications of a new line, gave them responsibility for technical compatibility and supervising the installation of a line installed by others, and provided for them to be adequately remunerated for this. There were some teething problems with the bid for the Fourth Line, given the conflicting interests of Transener, but these were satisfactorily resolved with the assistance of the regulator ENRE.[175] Proponents of expansions often invited Transener itself to take responsibility for maintenance of certain equipment.[176] A later modification to the regulatory framework provided for the owner of a substation to propose, operate and maintain investments needed to maintain quality of supply, and this facilitated several expansions. In sum, where there were potential conflicts and moral hazard problems, they were acknowledged and dealt with.

8.5 Loop flows that complicate the problem of defining and allocating property rights.

Loop flows were not a significant problem in Argentina for two reasons: first, loop flows are more problematic in meshed networks, whereas the high voltage transmission Argentine network was (initially) almost entirely radial; second, there was no attempt initially to define property rights for each line. This is not to say that loop flows are non-

[175] Galetovic and Inostroza 2004. See the discussion in Part One.

[176] A significant example is the 52 km 500 kV line between Agua del Cajón and Chocón, developed under Article 31. A COM contract to this effect was signed between the promoter Capex and Transener, as mentioned in the preliminaries of Resolution ENRE 761 (11 June 1998).

existent in Argentina,[177] and the designers of the regulatory framework, as transmission engineers, were well aware of them. However, loop flow did not impact significantly on what they envisaged as the immediate investment decisions involving generators in Comahue and the northwest. Nor was it an economic investment priority in the early 1990s to join other radial lines that might create further loops. It was therefore more sensible to leave the issue for resolution in the light of experience. In the event, there have been discussions and proposals to reform various aspects of the regulatory framework, some of which have been implemented, and there is also exploration of how far the present Area of Influence method can be adapted to deal with loop flows. On the whole, however, loop flows per se do have not been a focus of concern.

8.6 Coordination problems between market participants and transmission operators whereby

a) for example, expansions are announced but not implemented.

The authors suggest posting a bond to prevent such actions. The regulatory framework in Argentina requires that anyone proposing a price for a construction, operation and maintenance contract accompanying a Public Contest expansion should post a bond to guarantee that it honours this price. However, there does not seem to be evidence of proponents announcing transmission lines but not implementing them (though some expansions have of course been voted down or halted by opposition of provincial regulators).

b) negotiations between market participants are unable to resolve problems because of transactions costs, asymmetric information, absence of future players, non-excludability of winners and free-riding, and hold-up of potential losers.

As explained, the Fourth Line is a now-classic case where negotiations between market participants in fact *were* successful in resolving coordination problems and taking forward the investment. Transactions costs were *not* an obstacle there, and have not been reported in other cases. There were (initially at least) asymmetric expectations about the future as between market participants, but these were intrinsic in a situation of uncertainty, and equally applicable to the regulatory body. They were resolved (to the extent necessary) by discussion between the parties. The original framework provided for minor expansions, where the potential transactions costs might be high in relation to the value of the investment, to be taken forward by the transmission company. In 1998 this principle was extended to major investments for quality and security of supply. Also, owners were given the ability and incentive to propose expansions in the specific case of substations, where owners might be better informed than users.

The proposed (but later cancelled) modification to introduce congestion rights did bear on potential problems associated with non-excludability, free-riding and hold-up, and the modification to introduce ‘risk-bearing expansions’ did bear on potential problems

[177] There are loops in the northeast corridor as a result of the pre-existent transmission system developed for Salto Grande in the 1980’s and the expansions developed for Yacyretá in the 1990’s.

associated with the absence of future players. Whether such problems did in fact preclude significant economic investment in transmission is unclear but there are no obvious examples of such precluded investment. There were concerns that future generators might benefit from expansions supported by existing generators. However, the Public Contest mechanism ensured that as beneficiaries they had to pay their allocated share of the costs of all approved investment. Apart from issues associated with usage versus benefit they did not benefit from transmission investments paid for by others.

A few transmission investments were voted down, but not because some users were free riders on the investment of others, or because of failure of beneficiaries to agree. Rather, they were halted by opposition of provincial regulators, in one main case on the basis that the expansion was not worthwhile. Other provincial regulators are reported to have been concerned about expansions if they meant higher prices to customers. There is some uncertainty whether ENRE and provincial regulators enforced the penalty system to provide the intended incentive, or provided the intended revenues to finance transmission reinforcement. Yet in BA province (and prospectively elsewhere), negotiations between market participants and provincial regulators have overcome even these regulatory and government obstacles.

> c) gaming between merchant investment projects whereby (for example) there are complementary projects undertaken by different entities along successive lengths of a line, and the remuneration based on price differentials is such that "each would like to have a capacity slightly lower than the other. Hence none dares to move first as the other will be sure to collect the entire rent."[178]

The Argentine mechanism depends on users proposing and approving the projects, requires technical and economic approval of the ISO and the regulator, and provides for remuneration that is not based on such price differentials. Users have an incentive to look at complementary projects together, and (though this may not seem consistent with the original philosophy) the regulator also has to be satisfied that a proposal is economic. Such an inefficient outcome as described has not occurred, and it seems inconceivable that it would do so.

8.7 Lack of forward markets for a long-term investment raise problems of financing, credibility vis-à-vis projects with shorter lead times, and are vulnerable to regulatory uncertainty and opportunism.

The regulatory framework takes pains to prevent delays to transmission investments, for example by setting strict limits on the times within which CAMMESA, the incumbent companies and the regulator ENRE must discharge their duties. It has been argued that the Public Contest method actually facilitates the financing of large and long-term investments. By embodying remuneration in a series of individual, voluntarily agreed and legally binding contracts between users and proponents, these investment projects are less vulnerable to regulatory uncertainty and opportunism than if they were subject to periodic (five-yearly) regulatory appraisals of allowed costs and returns.

[178] Joskow and Tirole 2003, p. 55.

8.8 Summary

To summarise, various concerns have been raised about the efficiency of merchant transmission investment under realistic assumptions. These concerns would be problematic if they applied also to the Public Contest method. However, in practice they do not seem to have been problematic in the case of transmission expansions in Argentina. There are various reasons for this. To some extent these concerns are less relevant because the Argentine network is more radial than other networks. To some extent these problems were foreseen and dealt with by consciously designed elements of the regulatory framework. And to some extent these problems do not seem to characterise the way that market participants act in practice. While it is important to examine any regulatory framework in the light of such concerns, Argentine experience suggests they can be overcome.

9. Conclusions

9.1 Summary of Part One

In privatising its electricity sector in 1992, Argentina adopted innovative arrangements with respect to transmission regulation. The incumbent transmission company was forbidden to initiate expansions in capacity. With the exception of minor investments, users were to propose and finance such expansions, either by agreement (the Contract Between Parties method) or by using a prescribed voting scheme (the Public Contest method, with votes based on usage in a defined Area of Influence).

It is widely held that this particular policy innovation has been unsuccessful. Most importantly, it is held to have delayed by many years a much-needed Fourth Line into Buenos Aires.

Part One of this paper explained that the regulatory arrangements for transmission expansion in Argentina reflected a strong and plausible belief, based on much previous experience, that a traditional framework of regulation would fail to deliver the improved efficiency that would be crucial to maximising economic development in that country. Closer examination shows that the Fourth Line was delayed by only a year and a half rather than by many years. Far from being much-needed,it was economic, both at the time it was first proposed under the new arrangements, and indeed when later implemented. The system of extracting congestion revenues (rather than passing through local prices to local consumers) provided an additional incentive on market participants to eliminate this loss of congestion revenues. This together with the use of the Salex mechanism for offsetting the costs of construction, seems to have been primarily responsible for making the Line privately profitable. Deferring the Fourth Line investment was therefore economically beneficial rather than costly, and also enabled construction costs to be reduced by introducing a more competitive bidding mechanism.

9.2 Summary of Part Two

Other criticisms of the Argentine approach are that it failed to deliver needed expansions to improve quality and reliability of supply, particularly as a result of reluctance to participate by distribution companies; that the Area of Influence method failed to reflect benefits to users properly; that investment was deterred by a lack of transmission property rights; and that there were problems in negotiating and securing consensus among the parties involved. Accordingly, Argentina has been held up as an example of "how not to do it" with respect to transmission regulation. More generally, it is used to suggest that conventional methods of regulation are preferable to methods that give a greater role to market participants.

Part Two of this paper has shown that these other criticisms and perceptions are incorrect.

The regulatory arrangements were modified in 1998 to allow a greater role for the transmission company, the system operator CAMMESA and the regulator ENRE in proposing and authorising expansions to improve quality and maintain reliability, and in substations. Several such expansions were made. Participation by distribution companies may have been hindered by lack of clarity about funds and obligations, but these ambiguities could have been resolved by provincial governments, who on occasion were responsible for preventing or delaying proposed expansions. Calculations do not suggest that (before or after the 1998 modification) there was a failure to make economic quality or reliability expansions in the high-voltage 500 kV system.

In 1998/99 the government examined experience in the sector to date and introduced a 'second round of reforms'. This included the introduction of financial transmission rights, and a new method for facilitating Risk expansions. No change was deemed appropriate to the Area of Influence method: no better system of votes was identified, it was thought not to be a limitation with the introduction of transmission rights, and there is no evidence that the method prevented economic expansions from taking place.

Fewer major transmission lines were built after privatisation than before. Most were government-sponsored lines from a particular powerstation (Yacyretá) jointly-owned with another government, and other international links. There were also several connections to new power stations. After allowing for these, the Fourth Line was perhaps the only significant line to be built using the Public Contest method. But this was not a failure of that method. It reflected the excessive investment before privatisation. It was more economic to increase the capacity of the existing lines, notably by investing in new control equipment. The Public Contest method did this, and thereby increased efficiency. Transmission capacity limits doubled, sufficient to meet a 50 per cent increase in demand, with investment increases in the range one fifth to one third. Transmission load factor increased by about one third, and line construction costs halved.

The negotiations between market participants over the Fourth Line were not problematic and nor did they preclude consensus. In fact the generators that voted against the initial proposal worked actively with the proponents to develop a proposal that all could

support, and this succeeded. Concerns have been raised about merchant transmission, associated with market imperfections, lumpy investments, conflicts of interest, loop flow problems, coordination problems, regulatory uncertainty, and other factors. These concerns either did not apply to the user-driven arrangements for transmission expansion in Argentina, or were dealt with by appropriate provisions in the regulatory framework.

These developments were prematurely halted when the original aims of the regulatory framework were complemented then in practice largely superceded by a different philosophical approach. In late 1999 the outgoing Government proposed to increase the surcharge on electricity sales in order to finance additional regional expansions. A new government in 2000 enthusiastically took up this idea and withdrew the recent 'second round reforms' as potentially inconsistent with its Federal Transmission Plan. A Federal Transmission Fund "which shall have as its objective the financing of transmission expansions that the Secretary of Energy identifies as financeable" would now be used to implement policy "indispensably driven by the goal of sponsoring growth and development of the sector, the positive effects of which will propagate themselves throughout the rest of the economy".

In practice this meant a major expansion in each regional area, chosen by the Government with the advice of provincial representatives. Since the economic crisis in 2001/2, private investment has reduced and the role of the Government has increased further. In 2003 the Government funded a program of Upgrade Expansions, chosen by itself with the advice of CAMMESA. These were financed by the uncommitted funds in the Salex Fund that was once used to facilitate and reinforce decision-making by market participants under the Public Contest method. However, funding constraints have limited the implementation of the Federal Transmisson Plan. A new Public Services Bill proposes numerous restrictions on concessions, an increased role for regulation, and a government-specified investment plan in each contract.

9.3 Economics and politics

The initial mechanism for transmission expansion in Argentina has been modified, not because it was failing to produce an *economically efficient* outcome, but because (in a changing political climate) it was not considered to produce a *politically acceptable* one. It seems no exaggeration to say that the novel form of transmission regulation established in 1992 was resisted, then supplemented and effectively replaced, precisely because it *was* economically efficient. That is, despite some teething difficulties with the method, transmission expansions generally took place where users considered the benefits outweighed the costs, and not otherwise. Expansions did not take place according to political preferences or "national objectives" of stimulating growth in particular regions or interconnecting particular areas of the country (at higher voltages than the load flow would indicate).

A conventional role for regulation might have facilitated the achievement of such political and national objectives. Certainly, the active stance of the regulatory body ENRE in criticising the Public Contest method suggests that a conventional role for

regulation would have led to more and sooner transmission expansions, particularly large expansions in outlying regions. But this would have been costly, and it would also have given greater rein to political, managerial and special-interest group objectives rather than to economic or customer-oriented ones. In 1992 Argentina made a conscious choice to reject the conventional role for regulation, based on long experience and a realistic expectation of how regulation would actually work in practice. It gave a greater role to users instead of regulators. This worked well until it was effectively replaced, not because it had failed with respect to economic objectives, but because the new government wished to encourage transmission expansions to meet such "national objectives".

9.4 Implications for further research and policy

What are the implications of these two papers for future research and policy? They suggest that it is insufficient for economic analysis simply to characterise the 'efficient outcome' and identify various ways in which a market approach could fail to meet it,. Experience in Argentina suggests this is misleading in two main respects. First, evidence from before and after the reform is that regulation and government have their own objectives, and the outcome of conventional regulation is likely to be far from efficient (in the conventional sense of maximising the aggregate net present value of benefits). Second, evidence from the period when the reform was operative is that the feared market failures did not apply, and the for the most part the outcomes seemed near to economic efficiency. The two best-known exceptions were attributable to actions or interventions by central and provincial government.[179]

For policy, the obvious questions are whether the distinctive and successful aspects of transmission expansion policy in Argentina are applicable elsewhere. Putting proposed new lines and investments out to tender has reduced costs there without undue problems, so should it not be applied in other countries? Or will an RPI-X or incentive price cap approach ensure adequate efficiency? And how far does the success of such a tendering policy depend on the actual or potential availability of competitors in construction? Allowing users to determine expansion has also proved effective and efficient – would it work in other countries, and particularly in less developed countries than Argentina? Transactions costs are surely not a central issue here: they apply to both methods in all countries. It might be argued that market institutions are weaker in many developing countries, but so too are regulatory and government institutions.

An issue for both economists and policymakers is how best to deal with the conflicting pressures for 'economic' and 'non-economic' objectives. It is conventional to assume that the only aim is consumer sovereignty, implying economic efficiency. However, it is apparent that to a greater or lesser extent governments also seek other objectives related to (e.g.) income distribution, alleviation of market power, and regional considerations. In Argentina, as in Australia, governments clearly want to pursue both economic and non-

[179] Specifically, these were the creation of congestion revenues and to a lesser extent their use via Salex Funds to halve the cost of the Fourth Line, and the opposition of the provincial governments to the reserve transformer in Bariloche.

economic objectives. Should arrangements for transmission expansion, and the regulatory framework generally, seek to accommodate and indeed promote such non-economic objectives as legitimate expressions of the public will? Or should they seek to limit their influence as essentially self-serving political pressures that are against the long-term interests of consumers generally?

The introduction of market-related transmission expansions has exposed the limited economic case for some of the larger expansions, and driven government back towards regulated investment subsidised by users generally. Whether this is viewed as desirable or undesirable depends in part on the view taken on the earlier questions. In either case, economists need to consider how best to accommodate and analyse these different objectives in economic models and in regulatory policy.

The answers to these questions lie beyond this paper. Perhaps the important immediate lesson is that transmission experience in Argentina (and elsewhere) shows that there are alternatives to what might be called conventional regulation of monopoly networks. These alternatives involve a greater role for users of the network, with a smaller but still needed role for regulation. They have the potential to harness market disciplines more comprehensively so as to serve customers and other users more efficiently. There are indeed potential issues to do with transactions costs, incentives, information asymmetries and so on, but these can be dealt with. There are also political objectives to consider. However, involving users may well be more effective than conventional regulatory approaches, if the aim is to discover and promote the aggregate interests of customers and users of the network generally.

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Appendix

Public Contest Expansions in Argentina

#	Expansion	Independ. TransCo or Constructor	Estimated total investment @12%	Salex funds allowed	Amorti-sation Period [years]	Monthly canon	Process timing	Number of bids and values	Observations / Current status
1	Yacyretá - Rincón – Resistencia 500kV line 3x3.6+267km	Yacylec	$ 205.0m	No	15	$ 2.4m	Contract signed 15/12/1992 InOp: September 1994	Bids not available	Accepted
2	Rincón - Salto Grande + Rincón San Isidro 500kV line 506+85km	LITSA	$ 131.1m $ 175.1m	No	10	$ 1.8m $ 2.5m	Contract signed 7/11/1994 InOp: September 1996	Bids not available	Accepted Public tender called by Federal Government.
3	Piedra del Águila – Abasto ("4th Line") 500kV line 1291km	Initial Bid: Tenesa	$ 429.3m	---	15	$ 5.0m	Prop: 1994 PubH: 17/2/1995 Rej: 28/3/1995	Initial bid $54.6m/yr first 3 years, $61.4m/yr next 12 years	Rejected Res ENRE 49/1995 ENRE File ID: 668/94 2nd attempt in 1996
4	Henderson & Puelches capacitors 500kV	Transener	$ 23.7m	No check	1	$ 2.1m	Prop: 1994 PubH: 16/2/1995 Acpt: 2/3/1995 Tend: 4/7/1995 InOp: September 1996	Initial Bid $3.5m/month Winning bid: $2.1m/month Bids not available	Accepted Res ENRE 40/1995 ENRE File ID: 809/94
5	Arroyito - Chocón Oeste 132kV line 50km	---------	---	---	----	---	Prop: 1995 Rej: 13/2/1996	-------	Rejected Res ENRE 74/1996 ENRE File ID: 1084/95
6	Piedra del Águila – Abasto ("4th Line") 500kV line 1291km	Transener	$ 256.0m	$ 127.8m	15	$ 2.0m	Prop: 1996 PubH: 25/9/1996 Acpt: 24/10/1996 Tend: 27/10/1997 InOp: December 1999	Max.Fee: $ 43.7m/yr Winning bid: $ 24.5m/yr 4 consortia / 14 bids (**)	Accepted Res ENRE 613/1996 ENRE File ID: 2167/96
7	'Salto Grande' transformer 500/132 kV 150 MVA	Cobra	$ 7.7m	No	6	$ 0.15m	Prop: 1997 PubH: 14/1/1999 Acpt: 24/2/1999 Tend: 11/11/1999 InOp: April 2001	Max.Fee: $2.2m/yr Winning bid: $1.8 m/yr Bids not available	Accepted Res ENRE 296/1999 ENRE File ID: 3280/97
8	'Recreo' capacitors 500 kV	Cobra	$ 9.3m	$ 6.8m	5	$ 0.1m	Prop: 1997 PubH: 30/7/98 Acpt: 23/9/1998 Tend: March 1999 InOp: October 2000	Max.Fee: $1.7m/yr Winning bid: $1.5m/yr 2 bids (1 rejected)	Accepted Res ENRE 1472/1998 ENRE File ID: 4190/97

Public Contest Expansions in Argentina

#	Expansion	Independ. TransCo or Constructor	Estimated total investment @12%	Salex funds allowed	Amorti-sation Period [years]	Monthly canon	Process timing	Number of bids and values	Observations / Current status
9	'Recreo' transformer 500/132kV 150 MVA	Cobra	$ 5.2m	$ 5.2m	2	$ 0.2m	Prop: 1997 PubH: 10/9/98 Acpt: 30/9/1998 Tend: March 1999 InOp: June 2000	Max.Fee: $3.0m/yr Winning bid: $2.9m/yr Bids not available	Accepted Res ENRE 1490/1998 ENRE File ID: 4478/97
10a	Recreo – San Martín 132kV line 115km	Cobra	$ 6.9m	No	10	$ 0.1m	Prop: 1998 PubH: 22/12/1998 Acpt: 27/1/1999 Tend: 13/12/1999 InOp: May 2001	Max.Fee: $2.8m/yr Winning bid: $1.9m/yr 3 bids	Accepted Res ENRE 120/1999 ENRE File ID: 5113/98
10b	Recreo – Frías 132kV line 75km	Cobra	$ 4.6m	No	10	$ 0.1m			
11	Expansion of 'Resistencia' substation (132 kV)	Transnea	$2.4m	No	2	$ 0.1m	Prop: 1998 PubH: 8/9/2000 Acpt: 27/9/2000 Tend: December 2000 InOp: not available.	Max.Fee: $1.5m/yr Winning bid: $1.3 m/yr	Accepted Res ENRE 544/2000 ENRE File ID: 5870/98
12	'Cañada Honda' substation 132/33/13.2 kV 30 MVA	---------	$ 4.9m	No	10	$ 0.1m	Prop: 2000 (Initially proposed in 1998 as minor expansion) PubH 17/7/01 Acpt: 25/7/2001 S: 13/11/2002	Max.Fee: $0.8m/yr	Accepted Res ENRE 416/2001 Suspended by ENRE (pesification) Res ENRE 523/2002 ENRE File ID: 5893/98
13a	'Capiz' transformer 132/66/13.2 kV 20MVA	Distrocuyo	$ 1.3m	No	8	$ 0.02m	Prop: 1999 PubH 21/1/2000 Acpt: 13/6/2000	Max.Price: $1.3m (Capiz) and $2.7m (Cruz de Piedra)	Initiated by Transco (SE208/98) Accepted Res ENRE 329/2000 Delayed - contract under renegotiation (pesification) ENRE File ID: 6775/99
13b	'Cruz de Piedra' transformer 132/66/13.2 kV 60MVA	Distrocuyo	$ 2.7m	No	8	$ 0.04m			
14	Olavarría – Barker 132kV line 139km	Cobra	$ 10.6m	No	7	$ 0.2m	Prop: 1999 PubH: 10/2/2000 Acpt: 8/3/2000 Tend: August 2000 InOp: 18/10/2001	Max.Fee: $1.4m/yr / 15 years Winning bid: $2.2 m/yr / 7 years 1 bid	Accepted Res ENRE 130/2000 ENRE File ID: 6935/99 and 7310/99
15	Mendoza – San Juan 220 kV line	---------	---	---	----	---	Prop: 1999 Rej: 29/3/2000	-------	Rejected withdrawn? Res ENRE 191/2000 (Preliminary Project) ENRE File ID: 6967/99

Public Contest Expansions in Argentina

#	Expansion	Independ. TransCo or Constructor	Estimated total investment @12%	Salex funds allowed	Amorti-sation Period [years]	Monthly canon	Process timing	Number of bids and values	Observations / Current status
16	'Ezeiza' substation New configuration of breakers	Transener	$ 4.5m	No	2	$ 0.2m	Prop: 2000 PubH: 18/12/01 Acpt: 22/1/2003 Tend: 23/1/2004	Max.Price: $6.6m Winning bid: $4.5m 3 bids	Initiated by Transco (SE208/98) Accepted Res ENRE 60/2003 Under construction ENRE File ID: 7804/00
17	Güemes – Las Maderas 132kV line 2x7km + 89km	Initial bid: Siemens / Cobra	$ 4.7m (renegotiated to $ 3.2 in 2004)	No	5	$ 0.1m	Prop: 2000 PubH 11/1/01 Acpt: 3/5/2001	Initial bid for total price: $3.2m	Accepted Res ENRE 261/2001 and 230/2004 Delayed - renegotiation of Initial Bid conditions due to devaluation and pesification Tender announced 8/7/04 ENRE File ID: 8562/00
18a	'Ramallo' transformer 500/220 kV	Transener	$ 8.9m	$ 6.1m	1.5	$ 0.5m	Prop: 2000 PubH 22/6/01 and 3/12/02 Acpt: 1/10/2003	Max.Price: $8.9m (Ramallo) and $6.4m (Rosario)	Initiated by Transco (SE208/98) Accepted Res ENRE 495/2003 (Approved after several modifications) Tender announced 5/8/2004 ENRE File ID: 8534/00 and 10158/01
18b	'Rosario' transformer 500/132 kV	Transener	$ 6.4m	$ 4.4m	1.8	$ 0.3m			
19	'Alicurá' transformer 500/132 kV 100 MVA	---------	$ 6.6m	No	5	$ 0.1m	Prop: Aug 2000 PubH Sep 01 R: 14/9/2001	-------	Initiated by Transco (SE208/98) Rejected Res ENRE 501/2001 ENRE File ID: 8695/00
20	'Campana' transformer 500/132 kV 300 MVA	Transener	$ 4.5m	$ 3.2m	2	$ 0.2m	Prop: 2000 PubH: 7/8/01 Acpt: 16/10/2003	Max.Price: $4.5m	Initiated by Transco (SE208/98) Accepted Res ENRE 550/2003 (Approved after several modifications) Tender announced 19/8/2004 ENRE File ID: 9068/00

Public Contest Expansions in Argentina

#	Expansion	Independ. TransCo or Constructor	Estimated total investment @12%	Salex funds allowed	Amorti-sation Period [years]	Monthly canon	Process timing	Number of bids and values	Observations / Current status
21	'Montecaseros' transformer 132/66/13.2 kV 30 MVA	---------	$ 1.3m	No	1	$ 0.1m	Prop: Feb 01 Susp: 31/1/2002	Max.Fee: $1.4m/yr	Initiated by Transco (SE208/98) Suspended at Provincial Regulator request before Public Hearing Res ENRE 47/2002 ENRE File ID: 9895/01
22	'Anchoris' transformer 132/66/13.2 kV 30 MVA	---------	$ 1.8m	No	1	$ 0.2m	Prop: Feb 01 Susp: 31/1/2002	Max.Fee: $1.9m/yr	Initiated by Transco (SE208/98) Suspended at Provincial Regulator request before Public Hearing Res ENRE 48/2002 ENRE File ID: 9972/01
23	Choele Choel & Olavarría capacitors 500kV	ABB / Transener	$ 14.0m	$ 14.0m	1	$ 1.2m	Prop: 2001 PubH: 11/10/2002 Acpt: 13/11/2002 Tend: 18/6/2003	Max.Price: $14.0m Winning bid: $14.0m 2 bids (1 rejected)	Accepted Res ENRE 518/2002 Under construction ENRE File ID: 10330/01
24	'Almafuerte' transformer 500/132 kV 300 MVA	Transener	$ 7.3m	$ 5.1m	0.8	$ 0.8m	Prop: Oct 02 PubH: 30/10/03 Acpt: 4/12/2003	Max.Price: $7.3m	Initiated by the Transco (SE208/98) Accepted Res ENRE 616/2003 Tender announced 16/7/2004 ENRE File ID: 12019/02
25	Loma La Lata – El Trapial 132kV line 2x140km	---------	$ 22.0m	No	10	$ 0.3m	Prop: 2003 PubH: 16/04/2004 Acpt: 3/6/2004	Max.Price: $22.0m	Accepted Res ENRE 323/2004 Tender announced 19/8/2004 ENRE File ID: 15055/03

(*) Monthly fee is taken as the Maximum Canon for those expansions that were rejected or suspended, and taken from the public tender process for accepted expansions. It is calculated after any Salex contribution to initial costs but before any Salex contribution to the ongoing fee.
(**) Two consortia (*Transener* and *Líneas de Transmisión del Comahue*) presented more than one bid reflecting alternative specifications. Detail of bids: *Atalaya Energy* $39.5m/yr; *Compañía Transportadora de Electricidad del Comahue* $38.0m/yr; *Transener* a) $26.0m/yr b) $24.5m/yr c) $24.8m/yr; *Líneas de Transmisión del Comahue* a) $27.8m/yr b) $27.2m/yr c) $27.0m/yr d) $27.1m/yr e) $26.5m/yr f) $26.3m/yr g) $25.7m/yr h) $25.0m/yr i) $24.9m/yr.
Abbreviations on process timing: Prop: Proposed; PubH: Public Hearing; Acpt: Accepted; Rej: Rejected; Susp: Suspended; Tend: Tender bids presented and usually technical proposals opened; InOp: In operation