

Optimising Local Content through Economic Modelling

Local Content Optimisation: Modelling the Economic Impact of Local Content on Commercial Interests and Public Industrial Policy

Dr Michael Warner, November 2010

Summary

Local Content in the oil, gas and mining sectors is fast becoming a strategic factor in investment decision-making, project delivery and the formulation of public policy for industrial development. And yet investors, operating companies and public officials have few **quantitative tools** to inform dialogue over trade-offs or gauge the optimum levels of Local Content. This paper applies economic impact optimisation (EIO) modelling to demonstrate, for example, that introducing a mandatory Local Content target of 40% within a concession agreement negotiation may necessitate a reduction in royalty payments from 25% to 20% and a fall in corporation tax rates from 30% to 25%. Or, that in relation to project delivery, a 15% price advantage to domestic suppliers increases Local Content in capital expenditure by 2.1% and employment by 7,500, but at a cost-premium of \$110 million, a loss of 0.4% in the Internal Rate of Return (IRR) for investors, and a reduction in Government revenues of \$126 million.

Local Content as a Strategic Factor

In many emerging economies rich in mineral resources, Local Content is becoming a strategic consideration in investment decisions and project delivery.

To illustrate, in Kazakhstan legislation passed in 2010 mandates that new concession agreements to develop subsoil resources must deliver a minimum Kazakhstan Content in personnel employed and in goods, works and services. This law is being operationalised through a range of Local Content regulations. These include the setting of minimum local content targets in the award of major contracts; Kazakh-only tender lists for materials that Kazakh producers have a proven capability in supplying; and a minimum share of contract value to be awarded to Kazakh suppliers and sub-contractors within contracts won by international contractors.

Such regulations may well carry not only commercial implications for investors, operators, developers and service contractors, but also public policy

implications, for example if they lead to a reduction in national revenues or disincentive to inward investment. The challenge for investors and regulators is knowing *which* regulations will have precisely *what* degree of impact, and on *whose* strategic interests. Certain Local Content regulations, such as reporting requirements, may be fairly benign, whilst others may facilitate commercial or public policy objectives to be substantively modified.

Local Content is also becoming a strategic consideration in project delivery. For example, in November 2010, Petrobras (the Brazilian national oil company) with its partners BG Group, Galp Energia, and



Rio Grande Naval Pole Shipyard, Brazil - under construction in 2009

Repsol, signed contracts of \$3.46 billion with the Brazilian engineering contractor Engevix Engenharai S.A (in a strategic partnership with Swedish FPSO and platform builder GVA) to construct a series of eight hulls for floating oil and gas production vesselsⁱ. The contract is a demonstration of the Brazilian Government delivering on its policy to increase local content and revitalise the Brazilian ship-building industry as an intended consequence of developing the hydrocarbons off-shore in the Santos Basin.

The eight hulls are being built in the Rio Grande Naval Pole dry-dock shipyard in the state of Rio Grande do Sul, with Local Content required to reach 70%. The yard is a wholly new facility. As such, construction work at the yard inevitably carries elevated risks to investors: firstly, in the form of potential cost escalation, when compared to the international ship-building markets of Singapore, South Korea and China; and second, with the risk of delay to deployment of the vessels off-shore, and the knock-on effect of this on investors' ability to meet commitments to shareholders on first-oil, the timing of production volumes and on investment returns.

In an effort to counter these risks, all eight hulls are to be new-builds (rather than conversions from existing vessels), and to use standardised equipment and a repeatable, 'cookie-cutter' design. This will arguably allow for economies of scale (such as the bulk purchase of steel), enable an accelerated learning curve for Brazilian workers and project managers, and ultimately bring costs down vessel-by-vessel until achieving price parity with international marketsⁱⁱ.

What these two examples demonstrate is that in making investment decisions and in assuring that projects are delivered as anticipated, investors and national Governments and their regulators may need to take early and strategic consideration of Local Content. This paper considers three such strategic considerations, as follows:

- when negotiating new **concession agreements**^{iv}, what adjustments would be needed to accommodate mandatory targets on Local Content?
- how will new **Local Content regulations** and targets affect the commercial returns of investing companies?
- in the formulation of **Contracting Strategies** for major projects, what is the optimal level of Local Content that would satisfy both private and public interests?

Given its strategic importance, it is perhaps surprising that companies and regulators undertake so little quantitative modelling to inform their decision-making around Local Content

Given the strategic importance of these questions, it is perhaps surprising that companies and regulators seem to undertake so little quantitative modelling to inform their decision-making around Local Content. There are at least four reasons that explain this omission:

First, investors and operating companies tend to direct their economic modelling internally at their own commercial interests, rather than explore how such interests might best be served by concurrently aligning with the industrial and supply chain development policies of the host Government.

Second, when Local Content regulations are perceived to challenge the commercial returns of investors, the response of investors is often framed by legal representation - a challenge to be addressed through dispensation clauses in concession agreements, joint operating agreements or tender procedures; or an issue to be resolved through arbitration. With legal teams steering such negotiations, the importance of precisely quantifying the potential erosion of commercial value may be overlooked.

Third, Local Content regulations are predominantly a political issue, viewed by policy-makers as a tool for delivering on public commitments to create jobs, support domestic suppliers or provide economic benefits to local populations. In this context, publicity for new Local Content regulations, and tangible progress in reporting

measurable increases in Local Content become the priority, whilst quantifying the relative impact of new regulations on investors and the potential for conflict with other public policy takes second place.

Forth, it is possible that some policy-makers mistakenly believe Local Content to be a benign policy, with little consequential impact for other Government priorities, specifically national competitiveness, Government revenues, inward investment and anti-corruption. An absence of effort to quantify the unintended policy consequences of Local Content regulations may simply be a lack of awareness.

To address this need for better quantitative modelling of Local Content, and to answer the commercial and regulatory questions posed in this introduction, the remainder of the paper applies an economic impact optimisation (EIO) model to quantify the impacts of different Local Content scenarios. The model has been developed by the firm Local Content Solutions for use in training and for customisation with oil, gas and mining clients.

A Hypothetical Scenario

The model is applied to the hypothetical case of a new sub-surface natural resource development, located on-shore in a remote coastal region of an emerging economy. The volume of economically recoverable minerals is already known, and once the concession agreement is finalised, the development company, on behalf of its investors (which includes a 20% stake by a state-owned company), can proceed to project execution.

Road and rail links to the concession area are good, and there are two towns, one 10 km away of 50,000 inhabitants, the other of 300,000 and 30 km away; the latter located on the coast with mature port facilities.

The concession agreement being negotiated is the second such concession granted in the region. As such there is an established local supplier industry in both towns, with ten years experience in providing goods and services to a similar sized and configured operation, but one that is now past its peak production.

The project concept involves US\$6 billion capital investment over five years, comprising in-house engineering design, sub-surface engineering works, on-site power generation and processing facilities, and with evacuation via an upgraded road infrastructure to the local port. The operational life of the field is 24 years.

The main modules and assumptions of the EIO model applied to this scenario are summarised in Box 1.

Box 1 Modules and Assumptions of the EIO Model

This paper uses an Excel-based economic impact optimisation (EIO) model to assess the commercial and public policy implications of different regulations and strategies for Local Content and supplier development. The four modules and core assumptions of the model are as follows:

Modules:

- **Economic Environment Module** – inflation rate, sales price, royalty and tax rates, Government equity share, volume of recoverable minerals, rate of capital expenditure recovery/depreciation, production revenue sharing rates (sliding scale)
- **Costs and Procurement Module** – capital expenditure, operational expenditure, spread of expenditure across procurement categories.
- **Local Content Scenario Module** – maximum Local Content if contracts awarded on internationally competitive basis; maximum Local Content with premiums for additional training and management supervision; maximum local content with capital investment, incl. associated schedule delays.
- **Results Module**
 - Impact on Local Content
 - Impact on costs
 - Impact on schedule
 - NPV and Internal Rate of Return
 - Payback period
 - National revenues and taxes
 - Jobs created (direct, indirect, induced)
 - Investments in local supplier competitiveness

Core Assumptions:

- Local Content defined as proportion of contract value spent on goods and services of domestic origin;
- Expenditure aggregated by contract type
- Cost of premiums to increase Local Content proportionate to Local Content achieved. Rates differ for training and supervision vs capital investment.
- Training and supervision premiums spread across capital and operational expenditure. Capital investment premiums all in year one of capital expenditure.
- Capital investments to build local capability charged to investors at 50% of total cost (remainder taken by Govt, 1st tier contractors or finance institution)
- Schedule delays defer start date for investment, but construction period and IRR remain unchanged.

Negotiating Concession Terms to Deliver Local Content Targets

Taking the first of our strategic considerations: “when negotiating new concession agreements, what adjustments would be needed to accommodate mandatory targets on Local Content?”, let us assume that the regulatory authorities recently introduced a new law on subsoil mining (hydrocarbons, minerals and metals), and that this law requires capital expenditure to achieve 40% Local Content and operational expenditure 60%. The new law is applicable to the current concession negotiations.

Introducing mandated targets for Local Content of 40% and 60% breaches the minimum threshold for investment return, with the IRR falling to 9.3% and NPV turning negative by US\$0.4b

To inform these negotiations the investing consortium carried out a local market survey and concluded that for their base-case project concept, domestic supplier capacity could support 20% Local Content in capital expenditure and 36% in operations.

Framed by the terms of the adjacent mining concession, the Government and investing consortium have entered these negotiations with the following assumed terms:

- no signatory payment
- 25% royalty payment on gross sales
- 70% maximum annual recovery of capital expenditure on net revenues after royalties
- sharing of production revenues (after royalties and cost recovery) of 30:70 State : Investors up to 40,000 units production per day, and 60:40 for higher volumes thereafter^{vi};
- a composite tax rate (corporation tax, import duties, withholding taxes, and regional and local taxes) of 30%^{vii}.

The introduction of mandatory Local Content minimum targets into the negotiations was news to the investors who had assumed that, as per the previous concession, domestic suppliers would be

preferred only if internationally competitive on price, quality, volumes and delivery, ie 20% and 36% local content for capital and operational expenditure respectively.

Based on these initial, pre-law, assumptions, and a production period of 24 years, the projected rate of return (IRR) for the investing consortium was 12.0% (US\$0.8 billion at a 10% discount rate). The investors had set themselves an IRR threshold for investment of 10%, below which the Investment Committee would reject the proposal. Applying the EIO model to these parameters, at the new mandated 40% and 60% targets for Local Content the

10% minimum threshold for investment returns is breached, with the IRR falling to 9.3% and NPV turning negative by US\$0.4 billion (refer to Table 1).

Table 1 Modelled Impact of Mandated Local Content Targets on NPV and IRR

Local Content Scenario	% Local Content in CAPEX	% Local Content in OPEX	NPV (10% discount rate)	IRR
Base Case	20%	36%	US\$ 0.8b	12.0%
New Regulations	40%	60%	US\$ 0.4b	9.3%

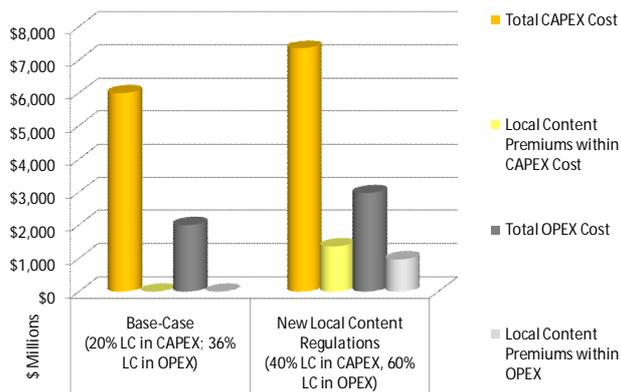
The EIO model was then used to spread the gross Local Content target of 40% across the different expenditure categories. This meant assuming higher than 40% for sub-categories of expenditure where the cost of achieving Local Content was proportionately less than for other categories, eg module fabrication versus long-lead equipment.

The EIO model suggests that to achieve 40% Local Content would require additional cost premiums of \$1.4 billion for investment in training, new equipment and plant. \$270 million of these premiums would be required to raise Local Content in domestic module fabrication capabilities from 12%, on the basis of an internationally competitive tender, to 27%. After ten years, although the local region supports some fabrication services, there is no capability to assemble the complex equipment integral to the scope of work. The 12% Local Content that the investors’ market surveys showed was possible comprises mostly of fabrication

services to complete and then install the modules. To reach 27% would require a wholly new level of inward investment in finishing and assembly capability, involving international manufacturers in a suite of alliances with local fabricators and manufacturers, as well as capital investment to construct larger and more sophisticated fabrication facilities. Such capital investments, even if shared with Government and finance institutions, would escalate the overall costs of the project, and delay the start of construction phase by approximately 12 months.

Figure 1 shows the aggregate level of additional cost premiums required to reach the new targets of 40% and 60% local content in capital and operational expenditure, respectively.

Figure 1 Impact of New Local Content Regulations on Project and Operational Costs



The size of these premiums and their adverse impact on investment returns suggests that either the Local Content targets be reduced, or the other terms of the concession are re-negotiated (perhaps not impossible if you recall that the State has a 20% interest in the venture). Table 2 shows how each parameter, taken in isolation, would have to change in order to achieve both the new Local Content targets and sustain the Base-case IRR of 12%. In summary, either royalties would need to fall from 25% to 5%, or production sharing, when in the higher volume band, be reversed from 60:40 in favour of the State, to 60:40 in favour of the investors.

In this scenario, the EIO modelling suggests that other parameters are less sensitive. Thus, moving from 70% to 100% allowable

cost recovery against net revenues would improve the IRR by an insufficient 0.2%; and likewise, reducing tax rates to zero would improve IRR by 0.7%.

The final row of Table 2 provides a possible composite set of adjusted terms, designed to deliver, concurrently, a 12% IRR and the new mandated Local Content targets.

Table 2 Adjustments to Proposed Concession Terms to Meet Local Content Targets and Maintain 12% IRR

Local Content	Royalty rate	Cost recovery rate	Production Sharing split	Composite Tax rate
Base Case 21% CAPEX 36% OPEX	25%	70%	30:70 60:40	30%
Parameters in isolation 40% CAPEX 60% OPEX	5%	100% insufficient	30:70 40:60	0% insufficient
Composite parameters 40% CAPEX 60% OPEX	19%	80%	30:70 50:50	25%

If, however, the investing consortium were willing to accept their minimum IRR of 10%, and assuming the Government were unwilling to compromise on royalty payments, cost recovery or the tax regime, then a 10% net change in the sharing of net production revenues in higher band (from 60:40 to 55:45) would be sufficient to support the additional premiums needed to deliver the mandated Local Content targets.

Whether in reality such negotiations would lead to compromise on the core terms of concession agreements is debatable. But even if not, modelling the impact of Local Content on future investment costs and returns, and showing how concession terms would need to respond to retain the same margins, would provide a readily comprehensible measure of the strategic importance of Local Content in such discussions.

Quantifying the Commercial Impact of Different Local Content Regulations

Let us now move on in time and assume that the said Law was not in place when the concession agreement was signed, but that the Base-Case described in the previous section prevailed, ie that Local Content is driven by the principle of contract award on an internationally competitive basis and is likely to be 20% for capital expenditure and 36% for operations. Let us also assume that

the terms of the concession remained as per the adjacent concession, namely: royalties 25%, cost recovery 70%, sharing of net revenues 30:70/ 60:40, and a tax rate of 30%.

Under this new scenario, the \$6 billion development project has been sanctioned by the authorities and investing consortium, and a development company established to deliver the project. The company is at the pre-FEED stage of project engineering, having adopted a preferred Base-Case concept and detailed cost estimates categorised according to a provisional contracting strategy. We will assume that at this stage the policy imperative for increased Local Content had not been factored in to the original negotiation of the concession agreement (there were no minimum targets set at this time), nor considered material to the selection of the preferred project concept.

Now let us introduce the newly formed Local Content Development Authority (LCDA) – part of the Ministry for Minerals and Energy. The LCDA has just issued a suite of draft Local Content regulations for consultation. The development company and its investors have been asked to consider these regulations. The proposed regulations are as follows:

- a 15% nominal price advantage at tender stage for nationally-registered service providers and suppliers who provide goods and services of ‘domestic origin’^{viii};
- domestic-only tender lists for the procurement of materials and provision of services for which the respective industry association considers that domestic suppliers have the necessary ‘capability’; and
- for contracts won by international contractors, a minimum of 40% of the contract value to be channelled to domestic sub-contractors and suppliers.

Application of the EIO model allows the impact of these different regulations to be compared. Table 3 captures the estimated level of Local Content that each regulation would introduce to the six main categories of the provisional contracting strategy. In

the table, the Base-Case represents the maximum level of Local Content achievable within each category if contracts are awarded on an internationally competitive basis for price, delivery and quality.

Table 3 Impact of New Local Content Regulations on Contracting Categories

Proposed Local Content Regulations	Contracting Categories (% Local Content)						
	Project Management and pre-FEED (in-house)	Long lead items	EPC Module Fabrication	EPC Construction and Installation	EPC Sub-Surface Engineering	Directly contracted services	Direct purchase/lease of equipment and materials
Base Case (no change to LC regulations)	11%	2%	12%	30%	5%	60%	35%
15% price nominal advantage for domestic suppliers	11%	2%	13%	33%	5%	70%	37%
Domestic-only tender lists where ‘capable’	11%	2%	14%	35%	5%	75%	48%
40% contract value to domestic suppliers in international contracts	11%	15% max	40%	40%	15% max	76%	60% max

In applying the EIO model, the following assumptions have been made:

- the **15% nominal price advantage** on contract award is applicable only to expenditure where domestic suppliers and contractors would successfully pass pre-qualification processes and the minimum mandatory thresholds within the technical part of an Invitation To Tender. The regulation also only applies to 1st tier contractors, ie the rule does not flow down to tendering processes for sub-contracts. It is assumed that this rule leads to an average 10% actual price escalation for applicable contracts;
- regarding **domestic-only tender lists**, the industry associations in the country apply a fairly loose definition of ‘capability’, assuming that if any domestic supplier or service provider has previously provided the relevant good or service under contract, then *de facto* they would be internationally competitive and eligible to be put on a domestic-only tender list. This is so, regardless of the developer’s specific requirements on quality, volume and international benchmarked pricing. The regulation is applicable to both

directly and indirectly procured services and goods, and would include such services as security, scaffolding, office maintenance and vehicle maintenance, and the supply of materials such as piping, bolts, gaskets, cables, certain valves and concrete. The rule does not envisage a relaxation of minimum technical requirements, but given the considerable 'stretch' required of many of these local firms to meet specifications, it is anticipated that premiums would be needed in additional on-the-job training and management supervision, and in some cases upfront capital investment, to ensure that volumes and delivery schedules can be met;

Most impactful is the proposed rule for a minimum of 40% Local Content within international contracts. This drives overall Local Content up 16.1%, but at cost in premiums of \$990 million and an 18 month schedule delay

- the rule on a **minimum 40% Local Content** within international contracts is intended to incentivise partnerships and consortium bidding among international and domestic firms, leading to inward investment and technology transfer. These alliances can be either joint ventures or arrangements whereby the international firm nominates domestic sub-contractors and suppliers as part of its tender.

Based on these assumptions, and taken in isolation, the 15% price advantage rules drives overall Local Content in capital expenditure up 1.9%, at a cost of \$110 million in premiums for additional training and supervision. The introduction of domestic-only tender lists for directly contracted services and materials raises Local Content by 3.6%, requires \$230 million in premiums (\$140 million for on-the-job training, management supervision and quality controls, and \$89 million in capital investments), and introduces a 12 month delay to allow local suppliers of materials to develop greater volume capacity.

Taken in isolation, most impactful is the proposed rule for a minimum of 40% Local Content within international contracts. This drives Local Content up 16 percentage points to 36% of capital expenditure.

However, to achieve this requires premiums of \$990 million and an 18 month delay to the start of construction, due to the need for new capital investment in new manufacturing capability and module fabrication facilities.

Looking in more details, informed by market surveys, the development company established that the maximum achievable Local Content in international contracts for the long-lead items (compressors, instrumentation etc.), sub-surface engineering and the direct purchasing or leased equipment and material is 15%, 15% and 60%, respectively. To achieve these maximums requires an increase in project costs of

\$480 million over 18 months, essentially to build in-country equipment repair and maintenance service capability and capacity.

Described above has been the impact of the regulations on capital expenditure. Figures 2 and 3 now show how these different Local Content regulations play out against the wider commercial and public policy objectives of the investors and Government, taking into consideration both capital and operational expenditure over the life of the project.

Figure 2 Impact of Local Content Regulations on Jobs and Cost Premiums

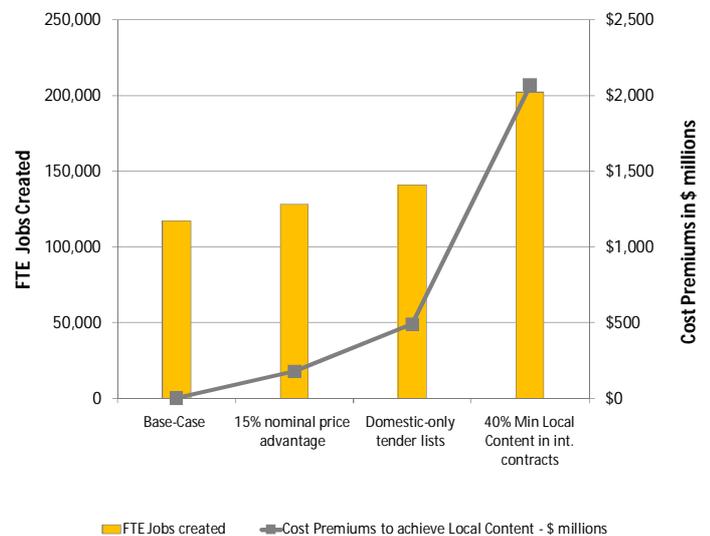
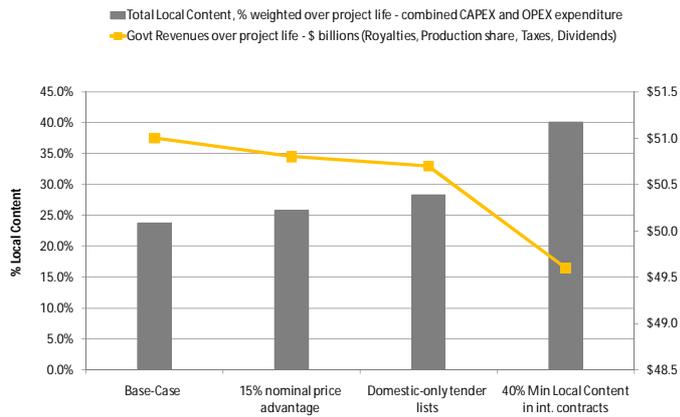


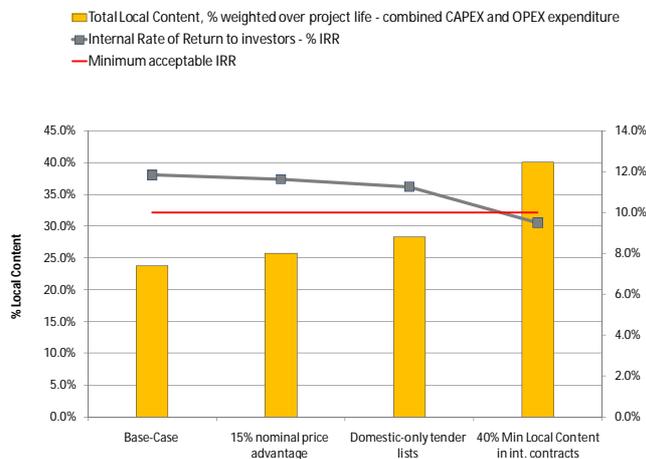
Figure 3 Impact of Local Content Regulations on Government Revenues



Figures 2 and 3 above provide insight into the potential trade-offs between the impact on job creation and cost premiums, and between Government revenues and Local Content.

Figure 4 plots the Local Content achieved for the proposed regulations, and their impact on the internal rate of return for the investing consortium.

Figure 4 Impact of Local Content Regulations on Investment Returns (IRR)



Due to the cost premiums required to meet these new regulations, all four proposals erode investment returns to below the 12% IRR Base-Case. The greatest impact on IRR is the 40% minimum Local Content in international contracts. As the project is currently configured, this regulation alone causes the project to fail to achieve the minimum acceptable IRR for investment of 10%.

In other words, even in isolation, the 40% minimum Local Content proposal is an investment 'show stopper', primarily because of the only means to achieve this to allow for substantial capital investment in manufacturing, assembly and module fabrication capability.

Quantifying Local Content within Contracting Strategies

In this last modelling scenario we will assume that two of the four proposed new regulations on Local Content have become mandatory, namely:

- a 15% nominal price advantage to producers and suppliers of services and goods of domestic origin, and
- domestic-only tender lists for materials and services where local suppliers are deemed 'capable' by representative industry bodies.

The pre-FEED engineering is now complete, and the Procurement department of the development company is about to convene a workshop where different contracting strategies will be compared for their impact on cost, risk (interface, schedule, quality, asset integrity) and Local Content. At the workshop, the three considerations relating to Local Content will be: (i) do the contracting strategies comply with the new regulations? (ii) what costs will be incurred in order to comply; and (iii) how will these costs impact on investment returns?.

Two contracting strategies are under consideration, as follows:

- **Stick-build strategy** - where the main construction and fabrication work is carried out near the project site, and the scope of work is unbundling to maximise access to procurement opportunities for local construction services contractors;
- **Modular strategy** - where the project components are pre-assembled in fabrication yards both in-country located along the coast (to spread the economic benefits) and overseas, and then transported to the site through the nearby port and upgraded road infrastructure.

Figures 5 and 6 contrasts the two (much simplified) Contracting Strategies.

Figure 5 – Stick Build Contracting Strategy

Scope Component	Project Management	Engineering	Procurement	Construction	Commissioning
Port and road upgrades	PM	E&P		Construction	
Labour camp and utilities					
Site preparation					
Power supply unit	EPCm			Construction	
Sub surface excavation	EPIC				
Processing facilities	EPCm			Construction	

Figure 6 – Modular Contracting Strategy

Scope Component	Project Management	Engineering	Procurement	Construction	Commissioning
Port and road upgrades	EPC			Construction	
Labour camp and utilities					
Site preparation					
Power supply unit	EPIC				
Sub surface excavation	EPIC				
Processing facilities	EPIC				

Analysis of the ‘Stick Build’ Contracting Strategy

Application of the EIO model demonstrates that the ‘stick-build’ contracting strategy can be configured to meet the new Local Content compliance requirements. For example, unbundling the various civil and facilities construction contracts fosters compliance with providing opportunities for ‘capable’ local service providers pursuant to the new regulation for domestic-only tender lists.

This contracting strategy can also support elevated levels of Local Content in directly contracted construction minor services of up to 80%. However, the EIO model anticipates schedule risks in delivering such high levels of content, and calculates that to manage these risks would demand a cost

From a Government policy perspective, compared to the ‘modular’ contracting strategy, the ‘stick-build’ strategy would deliver 6.7% more Local Content, generate 19,900 additional jobs and \$410 million of new investment in the industrial base, but at the cost of foregoing US\$1.9 billion in national revenues

premium of \$36 million to strengthen the capacity and capabilities of these local contractors. This is not investment that can take place on-the-job, but requires upfront capital investment and would subsequently delay the start of the project by eight months.

The 15% price advantage for domestic suppliers of directly procured equipment and materials would result in Local Content of 51%, but likewise, to assure quality, volumes and delivery, premiums of \$77 million would be needed to develop production capability, adding a further four months delay.

From a Government policy perspective, the ‘stick-build’ contracting strategy would, deliver a weighted overall average of 27.5% Local Content, generate 82,350 jobs during construction (although many of these would be temporary) and bring \$480 million of new investment into the domestic industrial base, of which \$113 million is long-term capital investment.

Analysis of the Modular Contracting Strategy

In comparison, the ‘Modular’ contracting strategy supports a series of autonomous lump-sum EPIC contracts for the construction of power supply unit, the sub-surface excavation work and processing facilities. The strategy also includes a single EPC contract, combining all civil and

related works (with the exception of a single, directly contracted construction contract to embrace the new regulation on domestic-only tender lists).

This contracting strategy has certain advantages for project delivery. It reduces the number of management interfaces, and puts downwards pressure on cost and risk by enabling international specialist contractors to manage all aspects of the scope of work

and utilise their established global framework agreements to source equipment, materials and labour.

From the developer and investors' perspective, the strategy is commercially advantageous, however, it fails to comply with the Local Content regulations. From a Government policy perspective, the 'cradle-to-grave' nature of these international contracts effectively locks-out purportedly capable domestic suppliers and service providers.

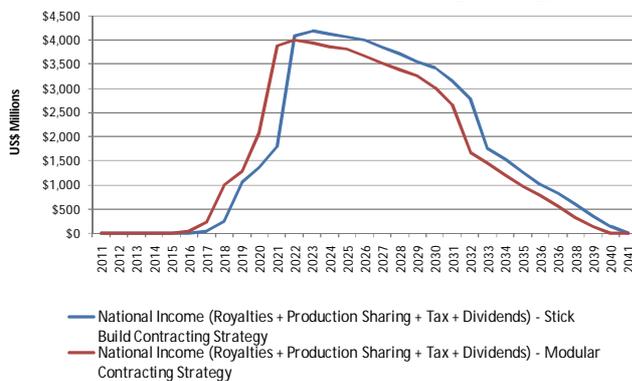
In summary, the Modular contracting strategy supports up to 20.8% Local Content compared to 27.5% for the 'stick-build' option, generates 19,950 fewer jobs, and brings \$67 million of new investment into the local industry. Most of this investment is in the form of additional on-the-job training, management supervision and quality control to support the modular fabrication work being carried out in-country. Table 4 contrasts the two contracting strategies.

Table 4 Comparison of Contracting Strategies

Stick-Build	Modular
27.5 % Local Content	20.8% Local Content
Local Content compliance	Local Content non-compliance
82,350 FTE jobs	62,400 FTE jobs
\$480 million capital investment in local industry	\$67 investment in on-the-job training and supervision of local suppliers
Stick-build carries a 7.8% cost variance with Modular	

Figure 7 further contrasts the two contracting strategies in terms of their contribution to total national income, ie the combination of royalty receipts, State share of production revenues, corporate and other taxes, and dividends (the latter being the assumed share of post-tax profit taken by the 20% State interest in the venture).

Figure 7 Comparison of National Revenues under 'Stick-Build' versus 'Modular Contracting Strategy



It can be seen that peak revenues for the 'stick-build' strategy accrue a year behind the 'modular' strategy, but are \$200million higher; whilst cumulative national income over the life of the project is \$52.7 billion for the 'stick-build' strategy and \$50.8 billion for the 'modular, a difference of \$1.9 billion.

Some Limitations of Local Content Optimisation Modelling

Clearly, the quantifications presented in this paper are only as accurate as the quality of the model, the data being used, and the assumptions made. In practice, the EIO model applied here would be customised and calibrated to the strategic alternatives under consideration, the local supplier market and the commercial interests and public policy priorities that the particular situation presents.

What it is hoped this paper has demonstrated is the power of even a simplified model such as this to inform dialogue between oil, gas and mining companies and investors on the one hand, and Government regulators and ministries on the other, about where the trade-offs and opportunities lie when striving for higher levels of Local Content.

At present, it is quite possible that new local content laws and regulations are being introduced without sufficient quantitative analysis of whether they may conflict with other public policies, for example the attraction of inward investment, development of industrial competitiveness, or raising and timing of national revenues.

Likewise, senior managers in oil, gas and mining companies sometimes react against new Local Content regulations or internal 'do good' pressure for higher levels of local content, without first precisely quantifying what these objections are.

If all stakeholders were to have a more quantified understanding of the commercial and public policy impacts of Local Content and associated regulations and strategies, it may well be that sensible, optimal, solutions could be realised - solutions that support industrial development and reliable and cost-efficient project delivery, without

destroying investment returns or conflicting with other public policies.

Applications of EIO Modelling

Below is a list of the potential applications of EIO modelling to support the management of Local Content as a strategic issue.

1. **Concession negotiations** –the strategic consequences of Local Content targets, negotiated as part of concession agreements.
2. **New Local Content regulations** – how proposals for driving Local Content and supplier development through new laws, regulations, tender procedures etc impact on commercial interests and public industrial policy.
3. **Investment decisions** – how different project concepts and engineering options compare in terms of their potential for Local Content and supplier development, and the impact of this on commercial interests and public policy.
4. **Contracting Strategy** – the impact of different contracting and procurement strategies on meeting Local Content regulations and on commercial interests and public industrial policy.
5. **ESIA (Environmental and Social Impact Assessment studies)** – strengthening economic analysis within ESIA studies to identify optimal measures to enhance the socio-economic impacts of major projects (jobs and supplier development)

without damaging commercial interests. At present ESIA provides only a static assessment of positive socio-economic impacts.

6. **Company Local Content Strategy** – many companies now prepare and update dedicated Local Content Strategy documents for each of the country businesses units. These Strategies need to be assessed for their impacts on commercial interests and alignment with public industrial policy.
7. **Government industrial policy options** – assessment of different policy options, leading to a clear understanding of their limits to prevent harming the investment climate or fuelling protectionism.

Conclusion

This paper has demonstrated the utility of economic impact optimisation modelling as a tool for developers to run scenarios based on the local content requirements of a particular country, and for Government policy-makers and informers to gauge the consequences of local content laws and regulations. But, as with all such tools, it is all about timing. Will it be possible to apply EIO modelling with a country's politicians and public servants before they pass legislation, or before they lock themselves into the public pronouncements of new Local Content regulations and targets. And will developers apply such modelling early enough to inform their assessment of project alternatives and contracting strategies?

ⁱ Law of the Republic of Kazakhstan on Subsoil and Subsoil Use, 2010

^l Source: Rigzone web-site, accessed 16th November 2010

ⁱⁱ Justi, A. et al (2009) Pre-Salt: the Brazilian opportunity to take local industry to the next level, OTC, Houston

^{iv} In this paper the term 'concession agreement' is used generically, defined here as any agreement made between a State and company for the exploration or development of mining resources (metals, minerals, oil or gas) in which the State offers incentives, such as exclusivity to seek profit, reduced tax or royalty rates, cost recovery or production sharing arrangements etc, in exchange for long-term capital investment in the country".

^v The case is intentionally non-specific about the type of mining involved, so as to be of relevance to readers from both the mineral/metals and hydro-carbon sectors.

^{vi} Many concession contracts, especially in mining for metals and minerals, depend on the tax regime to apportion state vs investor revenues, rather than production sharing. The EIO model accommodates both types of arrangement.

^{vii} Clearly this is a very generalised tax figure for illustrative purposes. In reality rates will differ.

^{viii} For the purpose so of this paper we will assume that 'domestic origin' is where 50% of the sales price of goods or services stays within the domestic economy, ie does not go to pay for the import of components, equipment or materials, or to expat or overseas-based labour.

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