Capability statement

Estimating services

making the difference
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The estimating challenges facing today’s project teams

Predictability of project cost outcome is more important than ever

In the current economic climate, the challenge to the oil and gas, refining and petrochemicals industries is to deliver projects safely, to budget and schedule, and demonstrate value to stakeholders. To enable the board to make informed and therefore confident decisions, owners and operators require estimates that are within the accuracy parameters defined by their governance structures; delivered in a transparent and timely manner.

Our understanding

- Our experience indicates that a significant number of natural resource projects completed recently (or currently in execution) were subject to cost ‘blow outs’ and schedule overruns
- The current challenges testing the estimating function include global factors such as unfamiliar territory, multiple and often remote locations and increased project complexity. Global supply chains, new methods of contracting, sovereign risk and increased governance are added challenges
- Although industry tools and systems support the development of estimates, they do not address these factors

Making the difference

EstimaTTor is Turner & Townsend’s estimating service that will provide the most accurate estimate possible. It is a combination of:

- Robust, first principles, resource based analytical estimating systems including Aspentech, CCS Candy and WinEst. This gives our estimators the facilities and reports they need to depict project resources and costs accurately across the lifecycle of a project.
- An extensive and fully maintained cost database built up across regions, over time
- Benchmark data from projects we have undertaken
- A global network of:
  - Estimators who understand local markets
  - An economics team who provide forecasts of how costs will change
  - Commercial oil and gas subject matter experts with project experience that extends from pre-development, feasibility, concept selection and definition, FEED, project execution operations and decommissioning and includes related infrastructure and facilities

What is needed is a greater understanding of what drives the variance between actual costs on project completion, and the original sanction estimate, and a robust methodology that uses tools, processes and data.
As projects get larger, more complex and in many cases, more remote, predictability of project outcome is more important than ever. The impact of underestimating project scope and cost can include:

- Insufficient funds to complete the project
- Lost time interrogating and explaining variance
- Delays on the go/ no go’ decision
- Team disruption, with loss of focus on delivery
- Risk to approvals for future projects
- Negative impact on the value of the business (stakeholder dissatisfaction)

Companies can gain a competitive advantage by ensuring their projects are completed on schedule and within budget.

Turner & Townsend’s combination of decades of estimating experience and expertise, an extensive and fully maintained cost database, and a first principles, resource based analytical estimating system delivers increased estimating accuracy through all stages of the project cycle, and includes related infrastructure and facilities.

Our global estimating team has a unique combination of oil and gas onshore, offshore and related infrastructure experience including OSBL, civils and marine. This experience combined with our estimating expertise, data management and tools deliver increased estimating accuracy and reduce risk.
Estimating throughout the project lifecycle

Turner & Townsend delivers reliable, independent cost estimating services at all AACE International estimate classes from concept to close-out.

Our team of experienced estimators can support owner teams with independent onshore and offshore estimating services which are unbiased, free of stakeholder influence and a single source of truth for project managers and company decision makers.

Rough order of magnitude estimates AACE class 5 and class 4

Class 4 and 5 estimates are prepared for strategic planning, concept screening, alternative scheme analysis and preliminary budget approval. This can include capacity factored and/or parametric modelling.

Conceptual estimates AACE class 3

Class 3 estimates are prepared to provide assurance or project cost definition for specific project options. We apply the most suitable estimating tools and system, both proprietary and in-house, according to facility and design definition. This can include parametric modelling, equipment factored or industry standard tools and systems.

Detailed estimates AACE class 2

To prepare full class 2 estimates, we either undertake quantification through manual measurement and our quantity, weight and cost assurance service, (QuanTTum), or we can adopt and verify contractor quantities.

AACE class 1

Class 1 estimates are generally prepared for discrete parts of the total project, typically by subcontractors for bids or by owners for check estimates. These include detailed equipment, MTO and unit cost; vendor quote and competitive pricing; estimate assurance; project close-out and benchmarking.

Key benefits:

Effective estimating practice contributes value to operators in several direct and indirect ways:

- **Backing the right projects**: estimating by an independent (non-engineering) party, such as Turner & Townsend, improves confidence that you are investing in the right projects.
- **Improving accuracy**: effective estimating will help the project team maintain the assurances they give.
- **Reducing risk**: Using a rigorous estimating framework helps to deal with the unknowable. A reliable process using relevant historical project data and experienced estimators increases confidence and reduces uncertainty.
- **Managing costs and resources**: CAPEX approval processes are under increasing scrutiny and doing more with less is now the reality for owners and operators. We can help you understand who, what, where, when and how costs and resources will be consumed, supporting you to control your project and spend efficiently.

Turner & Townsend has supported our programme to enhance our estimating capability for facilities modifications over the past year. They have responded effectively to our requirements and have contributed significantly to the excellent progress made in this key area.

PLT Unit Strategic Planner,
BP
Estimate assurance

Verifying the accuracy of a cost estimate is a unique challenge, requiring a structured and systematic approach.

When providing estimate assurance services, we typically review the following:

1. **Estimate methodology**: Establish an appropriate estimate methodology to ensure a reliable estimate. This will be aligned to the project work breakdown structure and schedule and any internal governance/approval processes of the operator. It will also align with AACE International.

2. **Scope**: Verify the level of scope definition and understand the cost drivers.

3. **Assure**: Quality assure the estimate.

4. **Risk**: Use industry recognised risk analysis processes.

5. **Benchmark**: Use data from similar projects.

Our estimate assurance services consider the key factors highlighted in this diagram:

**Key benefits**

Our estimate assurance services have the following key benefits:

- **Independent, unbiased outputs**: Inform leadership and influence decisions on cost allocations and potential savings via value engineering.

- **Make the best use of project funds**: An effective, well defined and consistently applied estimate assurance process is more likely to result in better planning and more effective use of project funds.

- **Understand the risk**: Provide an indication of probable outcomes based on an assessment of the current risks.

- **Provides greater transparency**: as well as collective accountability for outcomes and a better position for negotiating final prices. If we are not directly involved with the preparation of the original capital/operating cost estimate, then we can provide an independent view of the validity and accuracy of the estimate produced for your project. We can carry out the assurance concurrently with the estimate preparation to reduce the possibility of extensive rework and to enable the team to meet the estimate deadline.

Our framework for estimating excellence is supported by our extensive knowledge base in the oil and gas, refining and petrochemical industries; our people and our systems.
Independent, post-project estimate reviews

Making future projects more successful

Our post-project review of the sanctioned estimate will test the robustness of the estimate against actual costs.

Our post-project estimate reviews are conducted to determine:

1. Which project costs exceeded their estimate and why?
2. Which projects came in lower than estimated and why?
3. Where project costs differed to original estimates, was the difference related to market conditions, design changes, contractual issues, scope creep, time, estimating error?
4. Did the project procurement strategy deliver the savings anticipated?
5. Did the value engineering exercises deliver the value add?
6. Did the estimate align with the business case?
7. Were scope changes dealt with effectively from savings within the estimate?
8. Did the low cost sourcing centre deliver the expected saving?
9. Was the estimated cash flow linked to programme reflective of actual cash flow?

Key benefits

- **Improved accuracy**: of future estimates
- **Supports business case development**: for future projects
- **Allows for comparisons**: across different projects
- **Provides critical analysis**: of project outcome and contributes to corporate learning and knowledge management initiatives
Estimating support services

Supporting critical decisions about the project
In today’s economic climate, operators are looking for opportunities to make both short and long term decisions that can positively impact their balance sheets. As well as bringing industry hands-on experience in the development of estimates and estimate assurance, we also provide a range of supporting services.

Evaluating quantities
We use our bespoke electronic measurement tool – QuanTTum to extract quantities from the engineering model and design providing the client’s team prompt access to accurate data.

Procurement
This service includes locating suppliers, obtaining quotes, negotiating terms and conditions, developing/issuing purchase orders, and tracking and expediting deliveries

Market studies – economics
Our team of economists track over 150 different cost indices, collected and analysed to determine cost trends for inputs such as labour, materials, services, equipment and construction trades. We analyse economic data, source statistics, and forecast likely economic changes within the project construction arena to help clients gain an understanding of the evolving economic situation and likely impact on project costs.

Market studies – contractor engagement and fabrication data
This service includes development of request for information documentation and engagement with the contracting and fabrication community to provide relevant in-country data

Client bespoke estimating manuals
These manuals are established from base norms and with location factors applied, developed using our global knowledge base.

Processes and procedures
The development and implementation of standardised processes, procedures and tools as well as templates.

Cost and schedule risk analysis
Our quantitative risk analysis provides a measure of risk exposure allowing us to monitor performance, make informed decisions and determine appropriate contingencies through analysis of both cost and schedule based risks.

Key benefits
One company, covering all your estimating requirements

- **Explore more options, evaluate more quickly**: our global locations and access to in-depth project cost databases allows us to apply data intelligently and support critical decision making
- **Increase your efficiency**: from project resource augmentation to full managed services, we bring additional experience, systems and tools from outside your organization, supporting corporate learning
- **Set standards for your estimating ad improve**: by using our local people, who have global experience and leverage global best practice methodologies and processes, we can support and improve your in-house capabilities
What is Turner & Townsend’s EstimaTTor service?

**EstimaTTor is...**

Turner & Townsend’s managed service that provides high quality, accurate estimates in natural resources and related infrastructure projects and programmes

**Six pillars of excellence**

EstimaTTor is based on six pillars of excellence:

<table>
<thead>
<tr>
<th>A global network of:</th>
<th>Consistent methodology and procedures</th>
<th>Extensive cost data</th>
<th>Benchmark cost, schedule and technical data</th>
<th>Robust first principles estimating systems</th>
<th>QuantTTum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimators who understand local markets</td>
<td>Fully developed WBS</td>
<td>Built up across regions over time</td>
<td>Built up across regions over time</td>
<td></td>
<td>Electronic measurement</td>
</tr>
<tr>
<td>Cost managers who understand current costs</td>
<td>Basis of estimate</td>
<td></td>
<td></td>
<td></td>
<td>Quantity verification</td>
</tr>
<tr>
<td>Our economics team who provide forecasts of how costs will change</td>
<td>Commodity costs</td>
<td></td>
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<td>Change management</td>
</tr>
<tr>
<td>Subject matter experts</td>
<td>Cost codes</td>
<td></td>
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<td>Impact on estimate</td>
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</tbody>
</table>
Upstream offshore and onshore estimating experience

**Onshore oil development, Alaska. Managed services including estimating. 2016 - ongoing**
With over 30 years technical and conceptual expertise in the Arctic region, we are a strategic partner to our client’s project management team providing estimating, planning, cost, risk, and document control to support the development of the Environmental Impact Statement and pre-FEED work for the surface facility portion of the project.

**Offshore gas development, UK North Sea, cost estimating and estimate support services. 2008-2015**
We provided long-term estimating, planning and cost engineering services to the project’s development and assurance services during fabrication of the wellhead and riser topsides, where we validated the actual progress on site, and revised the project forecast cost and schedule to complete.

**FLNG Mozambique, estimating services. 2014 – 2015**
We provided an independent, full field CAPEX estimate at FID for the FLNG facility (including transportation, integration and commissioning, and subsea facilities) which provided our client with a benchmark for the final anticipated cost of the project. In addition, we reviewed three consortiums’ estimating data (quantities) through front end engineering design against the schedule of rates to support analysis of bids.

**FLNG, Malaysia, estimating services. 2016**
With FLNG still in its very early stages, there are a number of risks and project management challenges to navigate. These are further impacted by the low oil price environment, making predictability of project cost outcome more important than ever. Turner & Townsend was appointed to provide independent estimating and benchmarking of the contractors’ (consortium) estimate.

**Compression project, Australia, estimating and estimate support services. 2012 - 2015**
Drawing on our global network of estimating experts and extensive cost data, we provided cost estimating and benchmarking services to provide the cost estimate required for our client’s final investment decision application for the refurbishment and expansion of the existing gas hub at that location.
**Midstream including LNG estimating experience**

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipelines, tanks and terminals managed service, North America. 2013 - ongoing</td>
<td>Currently we provide the services of cost management, planning and scheduling, cost and schedule risk analysis and a vast array of portfolio and leadership reporting to support the planning and execution of our client’s maintenance, regulatory and capital projects across the western and mid-continent regions of the United States.</td>
</tr>
<tr>
<td>LNG, North America, managed service including estimating and estimate assurance. 2013 – ongoing</td>
<td>We are a strategic partner to our client, providing a project controls managed service. Additional specialist services included an open book estimate review which supported our client to accurately position the project budget and assist negotiations with contractors. The project secured FID in November 2014 and our services are ongoing.</td>
</tr>
<tr>
<td>Pipeline expansion, Russia, estimating services. 2011 - 2012</td>
<td>We coordinated our client’s portion of the construction estimate between the consortium engineering contractor and the project management team, and also developed the owner’s cost estimate and subsequently managed the budget and forecast. In addition, procedures, trend program, organization charts, reporting, and staffing plans were also developed and monitored.</td>
</tr>
<tr>
<td>LNG plant and associated infrastructure expansion, Indonesia, estimating services. 2013 - 2016</td>
<td>We supported the development of the FEED estimate and the EPC estimate for the onshore LNG facilities, developed the preliminary materials take-off for the new LNG plant train 3 and provided contract strategy and document preparation for the early works packages.</td>
</tr>
<tr>
<td>LNG buildings and onshore infrastructure, Australia, estimating services. 2011</td>
<td>Using our estimating tools, processes and data, we supported the development of class 2.5 estimates for the civils, camp and airport elements of the onshore infrastructure scope.</td>
</tr>
</tbody>
</table>
Downstream estimating experience

Biofuels Expansion Project, Brazil, estimate assurance services. 2012 - 2013
Turner & Townsend provided dedicated and experienced cost experts to support the development and finalisation of the estimate assurance review, and cost and risk schedule analysis, on two separate trips to the site.

Petrochemical plant, UK, cost management including estimating. 2012 – ongoing
With no formal processes or procedures in place for the management and reporting of costs, our client appointed us to provide cost management services. Since appointment, Turner & Townsend has developed the cost management function within our client’s company from day-to-day transactional activities only to the proactive management of costs.

Petrochemical Plant, Iraq, early civils and marine estimating. 2014 – ongoing
Our involvement includes carrying out assess stage preparation for a class 2 cost estimate of the OSBL elements for the early works of a large scale GTL process plant site. This included assessing the extent of the civils/marine scope and production of all necessary quantifications to support the overall estimate.

Refinery, North America, managed service including estimating. 2013 - ongoing
Our comprehensive project controls support including integration of contractor and owner information, estimate assurance, planning and schedule development, and cost and schedule control on multiple projects in the major projects program.

Refinery, Australia, estimating services. 2014 – ongoing
We are supporting various capital works projects and shutdown activities on site by providing comprehensive estimating support at levels I, II and III, integrating engineering, contractor and owner information, highlighting any areas of concern and implementing improvements to predict with a good level of confidence each projects total outturn cost.
Using a wealth of current costs, outturn costs, estimated costs and budget data

With trusted technology platforms

Our experts will help you make critical decisions about your project

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We are an independent consultancy with a global footprint that maps our clients’ project and corporate locations. Our information supports operator teams with independent estimating services for all facility types and related oil and gas infrastructure, and delivers outputs that are unbiased and intended to be a single source of truth for projects, project managers and decision makers.

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