

Understanding the Mechanics of CPIF Contracts

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“Back in the days, Green Bay Packers coach Vince Lombardi had a most interesting beginning to pre-season training. All the players knew that at the first team meeting, the legendary coach would waste no time getting straight to the point. Many of the men, half Lombardi’s age and twice his size, were openly fearful, dreading the encounter. The coach did not disappoint them, and, in fact, delivered his message in one of the great one-liners of all time. Football in hand, Lombardi walked to the front of the room, took several seconds to look over the assemblage in silence, held out the pigskin in front of him, and said, ‘Gentlemen, this is a football.’ In only five words, Lombardi communicated his point: We’re going to start with the basics and make sure we’re executing all the fundamentals.”

[Source: <http://packerville.blogspot.com/2010/05/gentlemen-this-is-football.html>]

Just like a professional football player needs to understand the fundamentals of their sport, it is equally important for contracting and procurement professionals to have a solid understanding of contracting principles and concepts. The first part of this article provides an overview of the basic principles associated with government contract types. It provides information about the government’s contract type selection objectives, factors affecting contract type selection, the degree of risk assumed by the government and contractor under the various types of contracts used in government contracting and the major differences between fixed-price and cost-reimbursement contracts. The second part of the article builds upon those fundamentals and provides insight into the mechanics of cost-plus-incentive-fee (CPIF) contracts. It provides a framework to analyze proposed CPIF contracts and demonstrates how CPIF pricing arrangements can be manipulated to alter the allocation of risk between the government and contractor. Procurement Counselors can use this information to help their clients negotiate more favorable CPIF pricing arrangements, reduce their cost performance risk and increase their potential fee (profitability).

The author’s [“Understanding the Mechanics of FPIF Contracts”](#) article in the December 2015 Edition of the [APTAC Connection Newsletter](#) covered many of the same contract type fundamentals that are included in the first part of this article. Those principles were incorporated in this article to make this a “stand-alone” resource and to provide the context for subsequent analyses of CPIF pricing arrangements.

Understanding the Mechanics of CPIF Contracts (cont.)**The Government's Contract Type Selection Objectives**

It is important to recognize that government solicitations identify a proposed contract type and that acquisitions conducted under FAR Part 15-Contracting by Negotiation allow the government and contractor to negotiate the associated pricing arrangement, allocation of risk and incentives. Per FAR 16.103(a), the Government's objective is to negotiate a contract type and price (or estimated cost and fee) that will result in reasonable contractor risk and provide the contractor with the greatest incentive for efficient and economical performance. Additionally, contracting officers should attempt to minimize the contract administration costs for both parties.

Contract Type - Administration Cost Considerations

Contract administration costs can vary widely depending upon the selected contract type. In general, any contract that requires "re-opening" after issuance to assess the actual costs of performance or determine the incentives earned will require more administration than one where the price is fixed. For instance, a firm-fixed-price (FFP) contract for commercial items may require minimal administration, monitoring and oversight. Conversely, a CPIF contract for the development and testing of a new system capability involves significantly more risk and requires greater oversight and administration by the government and contractor. The contractor needs to have an acceptable accounting system that captures, reports and facilitates bi-weekly or monthly invoicing of allowable incurred costs. The government needs to provide an appropriate level of surveillance during contract performance to assure the contractor has effective cost controls in place and is using efficient methods.

Even after the contract has been physically completed, both parties may continue to incur administration costs during the audit and settlement of all interim and disallowed costs. If an incurred costs audit is required, contractors may have to wait more than two years after the contract has been physically completed before the Defense Contract Audit Agency (DCAA) commences the audit. [Ref: [GAO-13-131, December 12, 2012, DOD Initiative to Address Audit Backlog Shows Promise, but Additional Management Attention Needed to Close Aging Contracts](#)]

Although many government accounting systems do not capture these transaction costs, they are real for contractors. This point may need to be raised with small business clients that have not had a cost-reimbursement or incentive type contract before. Failing to include contract compliance and administration costs into their proposed price could have an adverse impact on their margins.

Factors affecting Contract Type Selection

FAR Part 16 provides policies and guidance for selecting a contract type appropriate to the circumstances of the acquisition. There are many factors that the contracting officer should consider in selecting and negotiating the contract type, such as the expected degree of price competition, type and complexity of the requirement, confidence in cost estimates, potential exposure to escalating commodity prices and/or labor rates, and the adequacy of the contractor's accounting system. These

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factors may vary widely from one acquisition to the next. As such, contracting officers should exercise sound judgment when selecting contract types and should avoid the use of “cookie cutter” acquisition strategies.

Per FAR 16.301-2, the contracting officer shall use cost-reimbursement contracts only when the circumstances do not allow the agency to define its requirements sufficiently to allow for a fixed-price type contract; or uncertainties involved in contract performance do not permit costs to be estimated with sufficient accuracy to use any type of fixed-price contract.

Why it is Important to Understand the Factors Affecting Contract Type Selections

Many experienced procurement counselors know that the level of contracting officers’ education, training and experience vary widely. Occasionally, contracting officers select inappropriate or less than ideal contract types and pricing arrangements. This could have a negative impact on competition, small business participation, a contractor’s cash flow and profitability, contract administration costs, the allocation of risk between the government and contractor and the contractor’s motivation, performance risk and willingness to innovate.

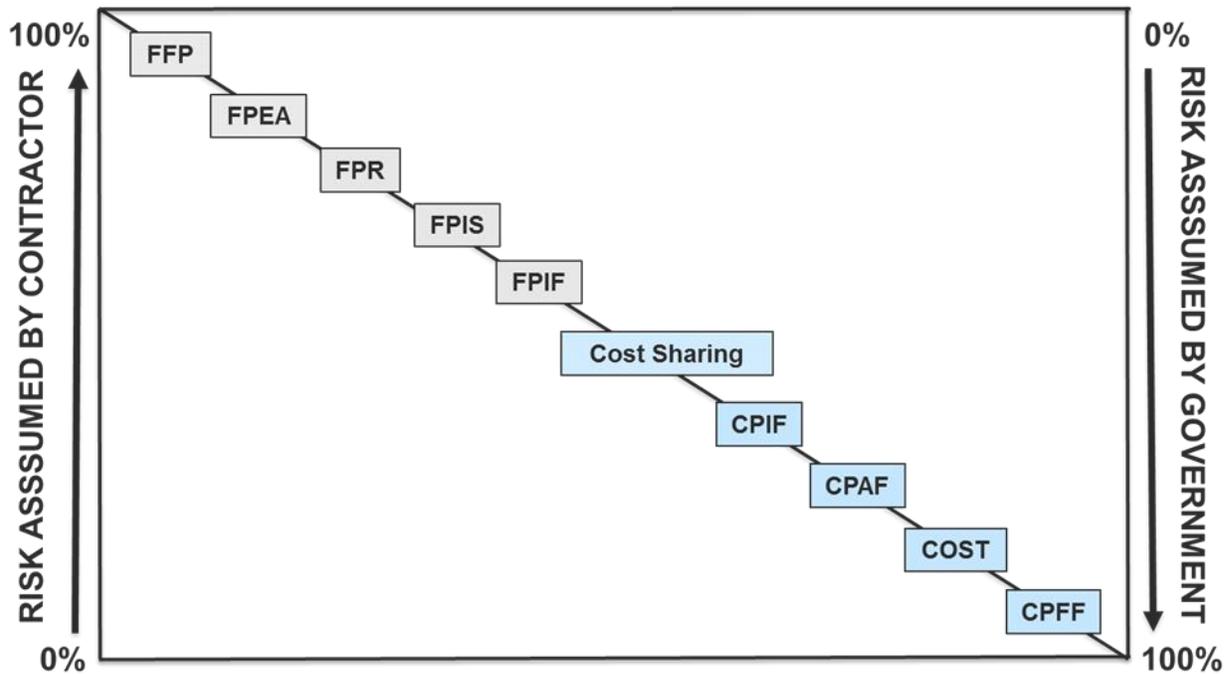
Procurement counselors who understand the factors affecting contract type selection can use that information to help their clients question the selection of an inappropriate contract type and propose an alternative that may be more closely aligned with the agency’s acquisition objectives. Additionally, procurement counselors can show their clients how to influence government acquisition strategies via tailored sources sought responses and capability briefings.

The Degree of Risk Assumed by the Government and Contractor Under Various Contract Types

The following chart depicts the assumption of risk for the spectrum of contract types used in government contracting. When viewing this chart it is important to keep in mind that contract types vary according to the degree and timing of responsibility (risk) assumed by a contractor and the nature of the profit/fee incentive (opportunity).

At one end of the spectrum are firm-fixed price (FFP) contracts where the contractor has full responsibility for contract performance. The amount of their profit or loss under a FFP contract is dependent upon their ability to control performance costs. At the other end of the spectrum are cost-plus-fixed-fee (CPFF) contracts where the contractor provides their best effort to complete the contract requirement(s), receives reimbursement for incurred allowable costs and receives a fixed fee regardless of the performance outcome. The contractor assumes the greatest cost performance risk under a FFP contract and, conversely, the government assumes the greatest cost performance risk under a CPFF contract. “In between are the various other types of incentive contracts, in which the contractor’s responsibility for the performance costs and the profit or fee incentives offered are tailored to the uncertainties involved in contract performance”. [FAR 6.101(b)]

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Contracting professionals use (cost) share ratios to depict the degree of risk assumed by the government and contractor. The share ratio for firm-fixed price (FFP) contracts is depicted as 0/100. The first number is the government’s percentage of risk and the second number is the contractor’s percentage of risk. A 0/100 share ratio means that the contractor assumes 100 percent of risk under a FFP contract and a 100/0 share ratio means the government assumes 100 percent of the risk under a CPFF contract.

Incentive contracts (FPIS, FPIF and CPIF) will contain a formula for adjusting the profit or fee based upon actual costs. For example a 70/30 share ratio for a cost overrun situation indicates the government cost share will be \$0.70 and the contractor’s share will be \$0.30. In that situation, the contractor’s profit or fee would be reduced by \$0.30 for each dollar above the target cost up to the point of total assumption (PTA) in a FPIF contract and up to the point where the contractor earns the minimum fee in a CPIF contract. The mechanics of how the fee adjustment formula works will be discussed later.

Major Differences between Fixed-Price and Cost-Reimbursement Contracts

The following chart provides a top-level summary of the major differences between fixed-price contracts and cost-reimbursement contracts.

In federal government contracts, the total amount of remuneration the contractor receives over and above their allowable costs is called “profit” under fixed-price contracts and “fee” under cost-reimbursement contracts. However, per FAR 15.404-4(a)(1), it should be remembered that the government’s profit or fee pre-negotiation objectives do not necessarily represent net income to contractors. The contractor’s actual realized profit or fee may vary from the negotiated profit or fee

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because of such factors as the contractor’s efficiency, cost containment/reduction initiatives, incurrence of costs the government does not recognize as allowable, payment of federal and state taxes and, if applicable, the contract’s profit/fee adjustment formula.

	Fixed Price	Cost Reimbursement
What’s promised	Must deliver acceptable goods & services	Best efforts
Price paid	Fixed or determined by formula	Based upon costs and/or formula
Price ceiling	Limited to buyer liability	No ceiling (in theory)
What’s paid	Final negotiated costs	All allowable costs
Profit	Not Limited	Statutory limit, CPFF only - FAR 15.404-4(c)(1)
When paid	After delivery (Interim payments possible)	As costs are incurred (Bi-weekly or monthly vouchers)
Cost Risk	Fixed Price	Cost Reimbursement
Contractor	High	Low
Government	Low	High

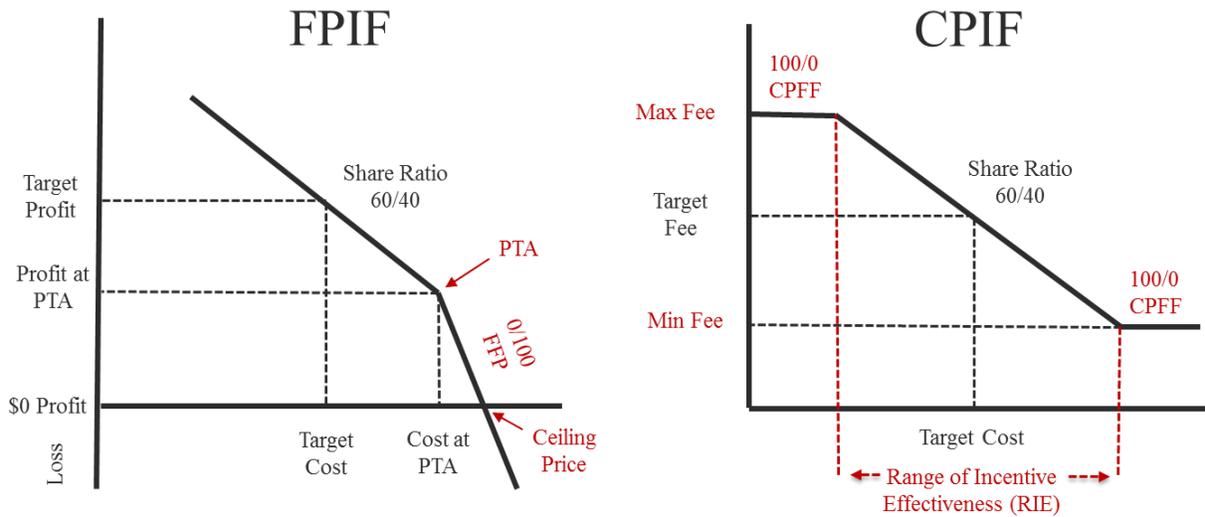
When relying upon adequate price competition to determine fair and reasonable prices for well-defined products and services, the government will typically not have any insight into the contractor’s estimated costs of performance and/or profit. Consequently, the government will pay the contractor the negotiated price. Under a cost-reimbursement contract, the government will have access to the contractor’s proposed and incurred costs. In that case, the contractor is paid “all allowable costs” in accordance with the following five-part “allowability” test. The costs must be: (1) allowable in accordance with FAR Part 31 cost principles, (2) allocable on either a direct, indirect or general and administrative (G&A) basis, (3) fair and reasonable, (4) in accordance with the contract terms and conditions (T&Cs), and (5) in accordance with generally acceptable accounting principles (GAAP) and/or, if applicable, cost accounting standards (CAS) under FAR Part 30. Per FAR 30.000, CAS “... does not apply to sealed bid contracts or to any contract with a small business concern (see 48 CFR 9903.201-1(b) [FAR Appendix] for these and other exemptions).” Also, pre-contract costs are generally unallowable unless specifically authorized in the contract.

In theory, there is no cost ceiling in a cost-reimbursement contract since cost-reimbursement contracts do not contain a ceiling price element. However in reality, government agencies do not have unlimited budgets, and they may elect to stop funding, terminate, or cancel contracts that have experienced significant cost overruns. As such, it is important to understand the government’s need to impose cost control incentives in all cost reimbursement contracts.

It should also be noted that cost-reimbursement contracts, including CPIF contracts, do not have a point of total assumption (PTA). At the PTA in a FPIF contract, the cost overrun share ratio shifts to a 0/100

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(FFP contract) share ratio and the contractor’s profit is reduced dollar for dollar up to the ceiling price. Under a CPIF contract, the contractor can experience a significant cost overrun well beyond the outer boundary of the cost overrun share ratio and still earn the negotiated minimum fee. When the contractor’s costs are beyond the range of incentive effectiveness, the point where the share ratio (fee adjustment formula) is still in effect, the CPIF contract converts to a CPFF contract. The following graphs compare and contrast these important differences between FPIF and CPIF contracts.



Overview of CPIF Contracts

It is recommended that procurement counselors understand the proposed contract’s typical applications, criteria for use, pricing elements (i.e., target cost, target fee, minimum and maximum fees, and fee sharing formulas), the contractor’s obligations and the regulatory and practical limitations associated with the use of the contract. Additionally, it is important to understand the principle risks that the contract type attempts to mitigate. Knowledge of these factors will make it easier to understand the relationship and interdependency between the contract type pricing elements, performance risk, and incentives. The following chart provides a high level summary of CPIF contracts (see next page).

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	Cost Plus Incentive Fee (CPIF)
Principle risk to be mitigated	Highly uncertain & speculative costs of performance; Government assumes risk, & benefits if costs are lower & pays more if work cannot be completed within expected costs of performance
Criteria for use	An objective relationship can be established between fee & such measures of performance such as actual costs, delivery dates, & other performance benchmarks
Pricing elements	Target cost, minimum & maximum fees; formula for adjusting fee based upon actual costs and/or performance
Contractor obligations	Make a good faith (best) effort to meet contract requirements within estimated/target costs
Contractor incentive(s)	Realizes higher fee by completing work at lower cost and/or by meeting other objective performance targets
Typical applications	Services or development & test programs (Engineering and Manufacturing Development, Full Scale Development, Systems Development and Demonstration)
Principle limitations	Negotiated; adequate accounting system; added surveillance; Limitations of Cost clause FAR 52-232-20 through 23, Acquisition of non-commercial items only (FAR 16.301-3(b))

[Source: Author adapted from the Defense Systems Management College (DSMC) “Comparison of Major Contract Types Chart” dated January 2014]

CPIF Description

Federal Acquisition Regulation (FAR) 16.405-1 provides the following description of cost-plus-incentive-fee (CPIF) contracts. However, the FAR does not provide instructions on how to structure the CPIF pricing elements to incentivize contractor performance and how to properly allocate risk between the government and contractor. The development of contract pricing arrangements is rightfully left up to a contracting officer’s judgment and analysis and the contractor’s ability to negotiate desired changes. Unless a small business has prior experience or has received training/counseling on complex contract types, such as FPIF and/or CPIF contracts, they may not know how to evaluate the government’s proposed incentive contract or how to negotiate a more favorable pricing arrangement.

16.405-1 -- Cost-Plus-Incentive-Fee Contracts.

(a) Description. The cost-plus-incentive-fee contract is a cost-reimbursement contract that provides for the initially negotiated fee to be adjusted later by a formula based on the relationship of total allowable costs to total target costs. This contract type specifies a target cost, a target fee, minimum and maximum fees, and a fee adjustment formula. After contract performance, the fee payable to the contractor is determined in

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accordance with the formula. The formula provides, within limits, for increases in fee above target fee when total allowable costs are less than target costs, and decreases in fee below target fee when total allowable costs exceed target costs. This increase or decrease is intended to provide an incentive for the contractor to manage the contract effectively. When total allowable cost is greater than or less than the range of costs within which the fee-adjustment formula operates, the contractor is paid total allowable costs, plus the minimum or maximum fee.

Per FAR 16.405-1(b), a CPIF contract is appropriate to acquire services or development and test programs when a cost-reimbursement contract is necessary and the contracting officer and contractor can negotiate a target cost and a fee adjustment formula that provides sufficient motivation to the contractor to control costs and achieve the government's cost and, if applicable, performance objectives.

Multiple-Incentive Contract Considerations & Analysis Tools

CPIF contracts may also include technical performance incentives when the government has established performance objectives and it is highly probable that the required development is feasible. However, FAR 16.402-4 provides the following guidance and caution when structuring a multiple-incentive arrangement.

A properly structured multiple-incentive arrangement should –

(a) Motivate the contractor to strive for outstanding results in all incentive areas; and

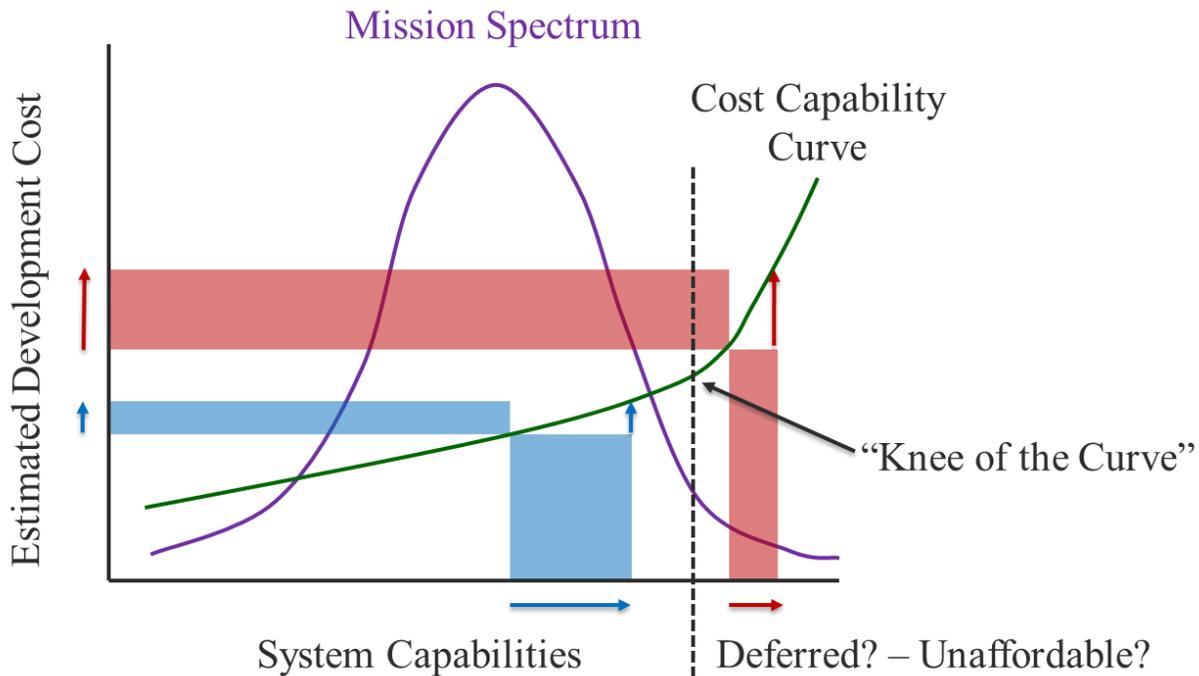
(b) Compel trade-off decisions among the incentive areas, consistent with the Government's overall objectives for the acquisition. Because of the interdependency of the Government's cost, the technical performance, and the delivery goals, a contract that emphasizes only one of the goals may jeopardize control over the others. Because outstanding results may not be attainable for each of the incentive areas, all multiple-incentive contracts must include a cost incentive (or constraint) that operates to preclude rewarding a contractor for superior technical performance or delivery results when the cost of those results outweighs their value to the Government.

When evaluating multiple award incentives, the contractor should assess the cost and performance incentives in concert to determine where they could potentially earn the most fee under the contract. It is important that a contractor does not get overly enamored with achieving the highest performance goal, especially if it will take more resources and time than originally estimated to achieve that goal. The contractor should be cognizant that expending more money to attain a performance incentive goal could cause it to earn an overall lower fee under the multiple incentive pricing arrangement. This could be the case when the added costs to achieve the performance goal create a far greater fee reduction

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under the cost-fee adjustment formula than what they earned under the technical performance incentive(s).

Given the interdependency of cost and technical performance and the likelihood that the costs to achieve higher levels of performance are not linear, the contractor may want to develop a “cost capability curve” to facilitate their analysis of the multiple incentive pricing arrangement. The following illustration depicts a notional cost capability curve. It is based upon the cost as an independent variable (CAIV) concept. DoD uses CAIV, along with a robust risk management plan, as a tool in controlling cost growth in major defense acquisition programs. After DoD establishes their system performance and cost objectives, the government program manager will make cost more of a constraint, and less of a variable, while attempting to develop/acquire the needed capability. Contractors could adapt this concept and interject a similar discipline when planning for and managing performance under a multiple incentive contract. The goal would be to develop a “total incentive fee capture strategy” that is based upon estimated costs of performance, cost capability curve(s) and the specific technical and cost fee incentives in the multiple-incentive contract.



[Source: Author adapted from DoD’s cost as an independent variable (CAIV) concept and principles]

The above chart depicts the estimated development costs on the vertical axis and the range of (increased) capabilities on the horizontal axis. The purple bell shaped curve depicts the government agency’s mission spectrum and the underlying required system capabilities. The green curved line depicts the estimated costs to achieve a desired system capability. It should be noted that the line is not

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linear because it typically takes more time and resources to achieve state of the art, future generation system capability advancements. The chart shows two separate/independent development efforts in blue and red. These demonstrate the relationship between development costs and the achievement of enhanced system capabilities along an estimated “Cost Capability Curve.”

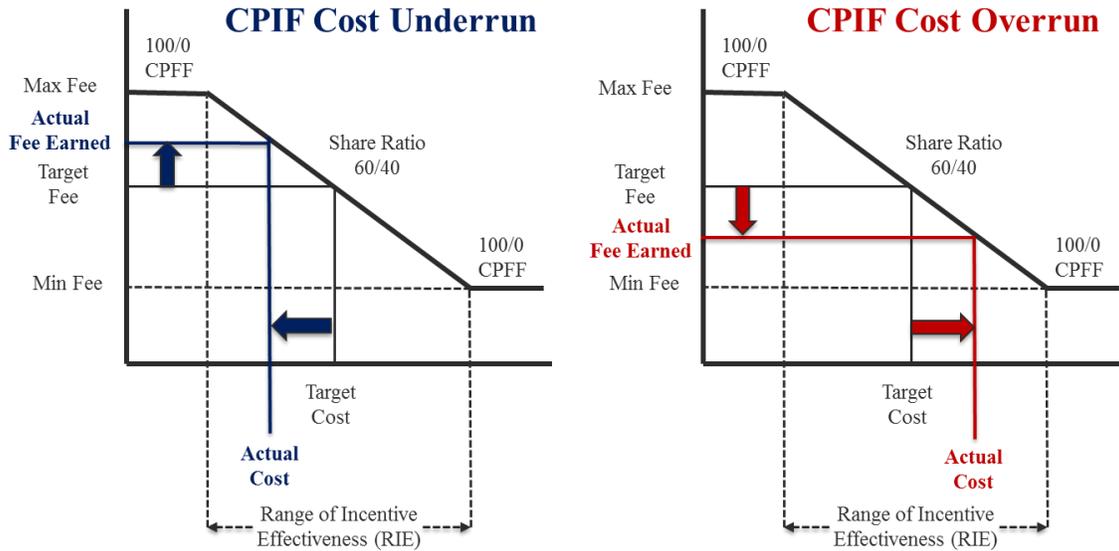
As a contractor or defense program office attempts to achieve greater system capabilities, there may be an exponential growth in costs. The dashed line depicts the “knee of the cost capability curve.” Beyond that point, the contractor or defense program office may get less “bang for the buck” since it costs significantly more to achieve those enhanced system capabilities. If the government program office has a constrained budget, it may elect to defer acquiring those costly capabilities and seek interim non-material solutions.

A contractor that wants to capture the maximum amount of fee in a multiple award incentive contract could apply those same CAIV principles, discipline and tools during contract planning and execution. They can use cost capability curves to determine which technical performance goals are achievable within their negotiated target cost, provide sufficient reward and return on their investment, and will most likely result in the highest overall (cost and technical performance) incentive fee earned under the multiple incentive contract. Additionally, this information can be used along with the contractor’s internal cost performance reports to determine if they are executing to plan. In the event the contractor encounters significant problems in their attempt to achieve one of the technical performance goals, they will have the necessary data and insight to determine if continued performance is warranted in light of the potential adverse impact on the amount of total fee they may earn.

CPIF Fee Adjustment Formulas

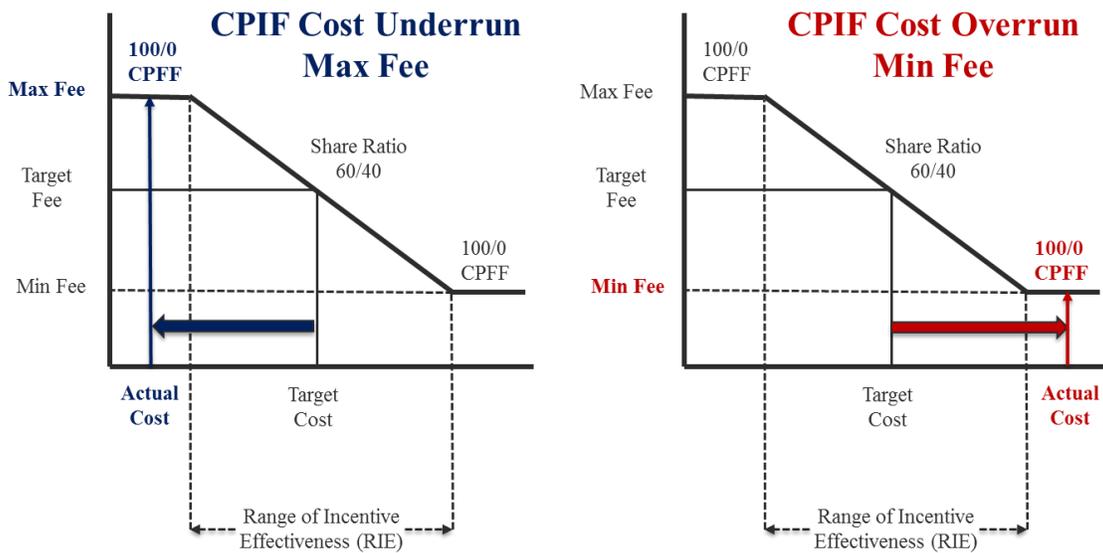
Graphing the contract type provides a rough visualization of the pricing arrangement and facilitates analysis of the allocation of risk between the parties. Fee is always depicted on the vertical axis and costs are depicted on the horizontal axis. The following graphs depict how the fee adjustment formula works under a cost underrun and cost overrun. In these examples, the pricing arrangement includes a 60/40 share ratio across the range of incentive effectiveness. This means that for each dollar below the target cost up to the point where the maximum fee becomes effective, the government gets to keep \$0.60 and the contractor gets to keep \$0.40 of the savings. Conversely, for each dollar above the target cost up to the point where the minimum fee becomes effective, the government share of the cost overrun is \$0.60 and the contractor’s fee is reduced by \$0.40. *(See next page for graphs)*

Understanding the Mechanics of CPIF Contracts (cont.)



CPIF Range of Incentive Effectiveness, Maximum & Minimum Fees

It is important to recognize that a CPIF pricing arrangement incorporates a minimum and maximum fee and that the cost control incentive resides between the start of these two cost points. The cost point(s) where the cost share ratio is in effect is called the “Range of Incentive Effectiveness (RIE).” Beyond those points, the government and contractor no longer share or participate in cost underruns or overruns, the contract converts to a 100/0 CPFF cost share ratio, and the contractor earns the respective (fixed) minimum fee or maximum fee. When calculating the fee adjustment, the parties will need to be cognizant of those pricing element constraints.

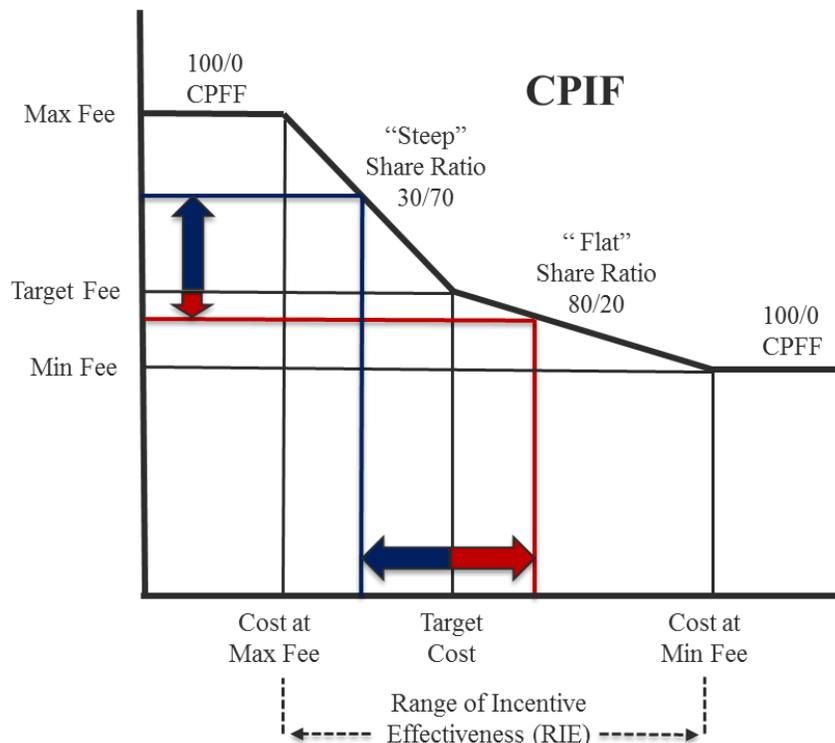


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How “Steep” and “Flat” Share Ratios are used to Allocate Risk

The CPIF contract depicted above is a relatively simple pricing arrangement since it contains just one share ratio. A contracting officer could include a number of different share ratios in the proposed contract. For instance, the CO could include a 30/70 share ratio for costs under/below the target cost and an 80/20 share ratio for costs over/above the target cost. Provided the target cost represented the most probable cost of performance, this pricing arrangement would provide greater incentive to the contractor to complete the contract under the target cost since their fee would be increased by 70 cents for each dollar below the target cost up to the cost point where the contractor earns the maximum fee. Conversely, the contractor’s fee would be reduced by 20 cents for each dollar over/above the target cost up to the cost point where the contractor would earn the minimum fee.

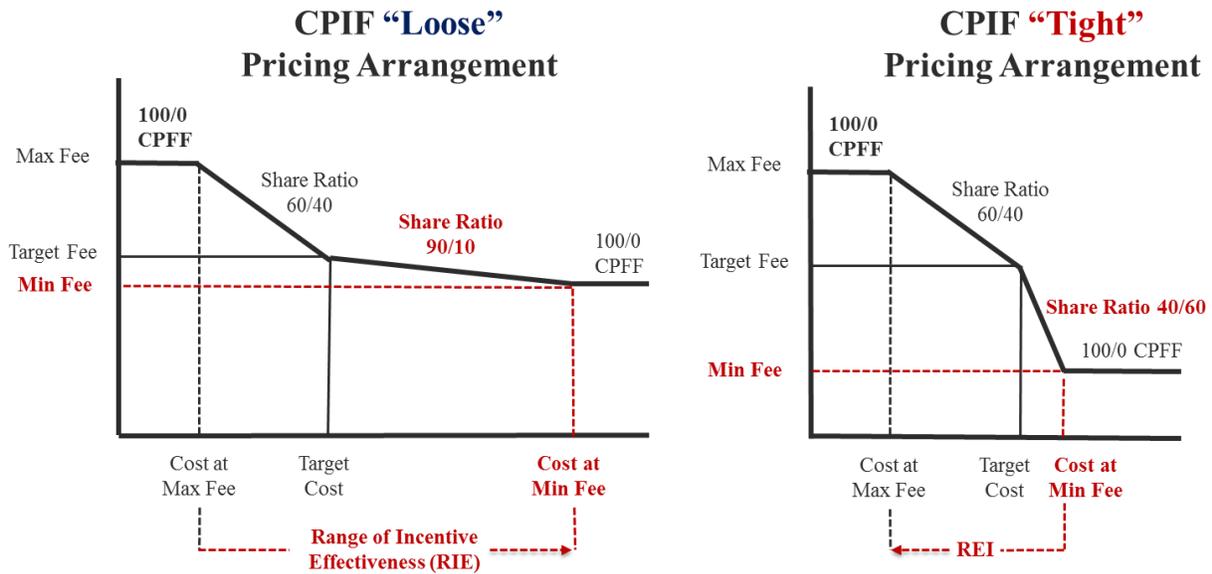
The following rough graph depicts the incorporation of different share ratios for below and above the negotiated target cost. Notice the relative steepness of each share ratio and the resulting impact on how much fee the contractor earns below target cost and loses above target cost. In this example, the cost underrun and cost overrun amounts are approximately equal in magnitude. However, due to the different share ratios and the corresponding slopes, there is a significant difference in their impact on fee. Graphing a pricing arrangement facilitates the analyses of the fee adjustment formula(s), range of incentive effectiveness, and the allocation of risk.



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“Loose” versus “Tight” CPIF Pricing Arrangements

Sometimes you will hear contracting professionals refer to an incentive contract as either “loose” or “tight.” A “loose” pricing arrangement tends to favor the contractor because it allocates, via a flat cost share ratio, more of the cost overrun risk onto the government, and allows the contractor to incur costs well beyond the target cost before reaching the PTA in a FPIF contract or the minimum fee in a CPIF contract. Conversely, a “tight” pricing arrangement tends to favor the government because it allocates, via a steep share ratio, more cost overrun risk onto the contractor, and moves the PTA in a FPIF contract and the minimum fee in a CPIF contract closer to the target cost. In a cost overrun, the contractor’s fee will be reduced at a higher rate under a “tight” pricing arrangement. A contracting officer can also tighten the CPIF pricing arrangement by providing a greater incentive for the contractor to complete the contract under the target cost. This tightening will benefit the contractor and government as long as the target cost reflects the most probable cost of performance and there is a reasonable expectation that the contractor can satisfactorily complete the contract below the target cost. The following graphs compare and contrast notional “loose” and “tight” CPIF pricing arrangements.



In the above examples the target cost was not changed. To create a “looser” CPIF pricing arrangement that favors the contractor, you should use a “flat” cost overrun share ratio that places more cost responsibility onto the government and attempt to increase the target cost as much as possible. This will have the combined effect of lowering the contractor’s cost performance risk, raising the minimum fee amount, increasing the contractor’s fee in a cost overrun situation, and increasing the cost point where the contractor earns the minimum fee significantly above the target cost.

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Understanding the Mechanics of CPIF Contracts

It is important to understand that each pricing element in a CPIF pricing arrangement works in concert to define the risk allocation between the government and contractor. Additionally, it is important to remember to establish a reasonable target cost and range of probable costs. It serves no useful purpose for the contracting officer to establish a share ratio for a cost underrun when there is very little probability the contractor will even meet the target cost. Most government program managers prefer establishing a conservative versus aggressive target cost. They do not want to report to their chain of command that their program's major contractor is experiencing a cost overrun.

The best way to see how CPIF contracts work is to provide some examples and different scenarios. For example, assume your client negotiated the following CPIF contract:

Target Cost (TC)	\$ 5,000,000
Target Fee (TF)	<u>\$ 500,000</u>
Target Price (TP)	\$ 5,500,000
Share Ratio above TC	60/40
Share Ratio below TC	80/20
Minimum Fee	\$ 250,000
Maximum Fee	\$ 750,000

(1) The contractor has completed performance and the final negotiated cost is \$5,900,000. The contractor wants to know what price the government is going to pay his company.

To answer that question, you need to assess if the contractor had a cost underrun or cost overrun. This is an important first step because the CPIF pricing arrangement had different share ratios above and below the target cost. Remember the target cost is negotiated. The government pays the contractor's actual costs plus adjusted fee based upon the sharing formula, provided the fee does not go below the minimum fee or above the maximum fee. The following shows how to calculate the fee adjustment and determine the total price the government will pay under this scenario.

Target Cost (TC)	\$ 5,000,000	
Actual Cost	<u>\$ 5,900,000</u>	
Over Target Cost	900,000	Cost overrun
Contractor Share	X <u>0.40</u>	Share ratio above Target Cost 60/40
Fee Adjustment	(360,000)	Reduce fee in a cost overrun
Target Fee	<u>500,000</u>	
Adjusted Fee	140,000	But note that this is below the \$250,000 Minimum Fee
Actual Cost	\$5,900,000	
Minimum Fee	+ <u>250,000</u>	
Total Price Paid	\$ 6,150,000	

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When calculating a fee adjustment, it is important to use the correct share ratio if there are different share ratios for costs below and above target costs. Also, the share ratio (60/40) actually represents the fee adjustment for each dollar (\$0.60/\$0.40) above target cost. That is why the fee adjustment calculation used 0.40 vice 40. Although it may seem obvious, it is important to take a big picture view of the contractor's cost performance and then recognize that the contractor's fee is reduced in cost overruns and increased in cost underruns. Additionally, it is important to look at any constraints in the pricing arrangement such as a minimum fee or maximum fee. This helps ensure the fee adjustment is calculated correctly.

(2) What price would the government pay if the final negotiated costs were \$4,500,000?

Target Cost (TC)	\$ 5,000,000
Target Fee (TF)	\$ 500,000
Target Price (TP)	\$ 5,500,000
Share Ratio above TC	60/40
Share Ratio below TC	80/20
Minimum Fee	\$ 250,000
Maximum Fee	\$ 750,000

Target Cost (TC)	\$ 5,000,000	
Actual Cost	\$ 4,500,000	
Under Target Cost	500,000	Cost underrun
Contractor Share	X 0.20	Share ratio below Target Cost 80/20
Fee Adjustment	+ 100,000	Increase fee in a cost underrun
Target Fee	500,000	
Adjusted Fee	600,000	Does not exceed Maximum Fee

Actual Cost	\$4,500,000
Adjusted Fee	+ 600,000
Total Price Paid	\$ 5,100,000

(3) What is the Range of Incentive Effectiveness (RIE) for the above CPIF pricing arrangement?

To answer this question, you will need to calculate the respective cost points where the contractor earns the minimum fee of \$250,000 and maximum fee of \$750,000 as follows.

(a) At what cost point does the contractor earn the minimum fee?

To find this cost, you will need to subtract the minimum fee from the target fee and then divide the difference by the contractor cost share in the cost overrun share ratio. This number will then be added to the target cost to determine the cost point where the range of incentive effectiveness ends and the contractor starts to earn the minimum fee. It is important to remember that you add this (positive) number to the target cost since the cost point where the contractor earns the minimum fee is located to the right of the target cost (above the target cost). Additionally, it is important to use the cost overrun share ratio when calculating the cost where the contractor earns the minimum fee if there are different share ratios for cost underruns and cost overruns.

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Target Fee (TF)	\$ 500,000	
Minimum Fee	<u>\$ - 250,000</u>	
Difference	\$ 250,000	
	<u>÷ 0.40</u>	Contractor cost overrun share responsibility 60/40
	\$ + 625,000	
Target Cost	<u>\$ 5,000,000</u>	
	\$ 5,625,000	Cost where contractor starts to earn the Minimum Fee

To verify that the above methodology is correct, let's assume that the final negotiated cost was **\$5,625,000** and calculate the associated fee reduction.

Target Cost (TC)	\$ 5,000,000	
Actual Cost	<u>\$ 5,625,000</u>	
Over Target Cost	625,000	Cost overrun
Contractor Share	<u>X 0.40</u>	Share ratio above Target Cost 60/40
Fee Adjustment	(250,000)	Reduce fee in a cost overrun
Target Fee	<u>500,000</u>	
Adjusted Fee	250,000	This is the Minimum Fee

As verified by the above fee reduction calculation, the cost point where the contractor starts to earn the \$250,000 Minimum Fee is \$5,625,000.

(b) At what cost point does the contractor earn the maximum fee?

To find this cost, you will need to subtract the maximum fee from the target fee and then divide the difference by the contractor cost share in the cost underrun share ratio. This number will then be subtracted from the target cost to determine the cost point where the range of incentive effectiveness ends and the contractor starts to earn the maximum fee.

Target Fee (TF)	\$ 500,000	
Minimum Fee	<u>\$ - 750,000</u>	
Difference	\$ (250,000)	
	<u>÷ 0.20</u>	Contractor cost underrun share responsibility 80/20
	\$(1,250,000)	
Target Cost	<u>\$+5,000,000</u>	
	\$ 3,750,000	Cost where contractor starts to earn the Maximum Fee

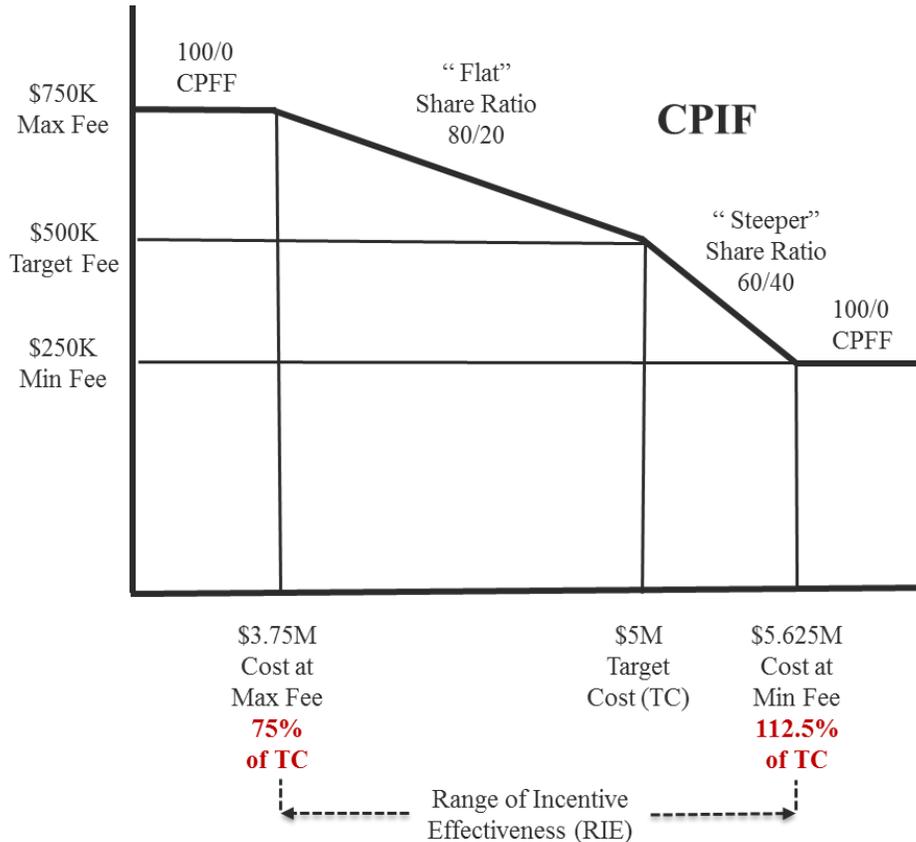
The range of incentive effectiveness is between \$3,750,000 and \$5,625,000.

(4) Graph the CPIF pricing arrangement and assess if it is a "loose" or "tight" pricing arrangement?

When graphing a pricing arrangement you should approximate the relative steepness of the share ratios and the relative locations of the various cost points and fees associated with the pricing arrangement. You should annotate the share ratios, target cost, target fee, minimum and maximum fees, and the

Understanding the Mechanics of CPIF Contracts (cont.)

range of incentive effectiveness. Additionally, it is recommended that you calculate the percentage increase from target cost where the contractor starts to earn the minimum fee and the percentage decrease from target cost where the contractor starts to earn the maximum fee. As noted previously, graphing the pricing arrangement will help you “visualize” the allocation of risk.



The CPIF pricing arrangement depicted above is loose when you determine the range of incentive effectiveness covers costs from \$3.75M through \$5.625M. This is primarily due to the flat 80/20 share ratio below target cost. In a cost underrun, the contractor would earn an additional \$0.20 in fee for each dollar below the target cost until the contractor reaches \$3.75M. At that cost point, the cost underrun share ratio of 80/20 is no longer in effect, the contract becomes a CPFF contract and the contractor earns the maximum fee of \$750K. If the probable cost of performance is \$5M, then one might question the contractor’s ability to earn the maximum fee of \$750K. This would require the contractor to reduce the cost of performance by 25% from the target cost.

In a cost overrun situation, the pricing arrangement is relatively tight. This is due to the steeper 60/40 cost overrun share ratio. The contractor’s fee will be reduced by \$0.40 cents for each dollar above the target cost up to \$5.625M. The contractor earns the minimum fee when costs exceed the target cost by just 12.5%. When viewed holistically, this contract pricing arrangement favors the government since the contractor’s cost share participation in cost underruns is relatively low and their cost share responsibility for cost overruns is relatively high. Additionally, the contractor must reduce their costs by 25% to earn

Understanding the Mechanics of CPIF Contracts (cont.)

the maximum fee. Depending upon the range of probable costs, that cost reduction may or may not be realistic or achievable.

(5) Assuming that the \$5M target cost is reasonable, how might you alter the above CPIF pricing arrangement to favor the contractor?

Based upon the preceding analysis, the original pricing arrangement did not provide much incentive for the contractor to incur a cost underrun. Additionally, the contractor's fee was reduced significantly in a cost overrun situation. The easiest way to address those issues is to switch the share ratios and use a 60/40 share ratio for cost underruns and an 80/20 share ratio for cost overruns.

ORIGINAL CPIF CONTRACT		REVISED CPIF CONTRACT	
Target Cost (TC)	\$ 5,000,000	Target Cost (TC)	\$ 5,000,000
Target Fee (TF)	<u>\$ 500,000</u>	Target Fee (TF)	<u>500,000</u>
Target Price (TP)	\$ 5,500,000	Target Price (TP)	\$ 5,500,000
Share Ratio above TC	60/40	Share Ratio above TC	80/20
Share Ratio below TC	80/20	Share Ratio below TC	60/40
Minimum Fee	\$ 250,000	Minimum Fee	\$ 250,000
Maximum Fee	\$ 750,000	Maximum Fee	\$ 750,000

(6) What is the Range of Incentive Effectiveness (RIE) for the revised CPIF pricing arrangement?

(a) At what cost point does the contractor earn the minimum fee?

Target Fee (TF)	\$ 500,000	
Minimum Fee	<u>\$ - 250,000</u>	
Difference	\$ 250,000	
	$\div 0.20$	Contractor cost overrun share responsibility 80/20
	+\$1,250,000	
Target Cost	<u>\$ 5,000,000</u>	
	\$ 6,250,000	Cost where contractor starts to earn the Minimum Fee

(b) At what cost point does the contractor earn the maximum fee?

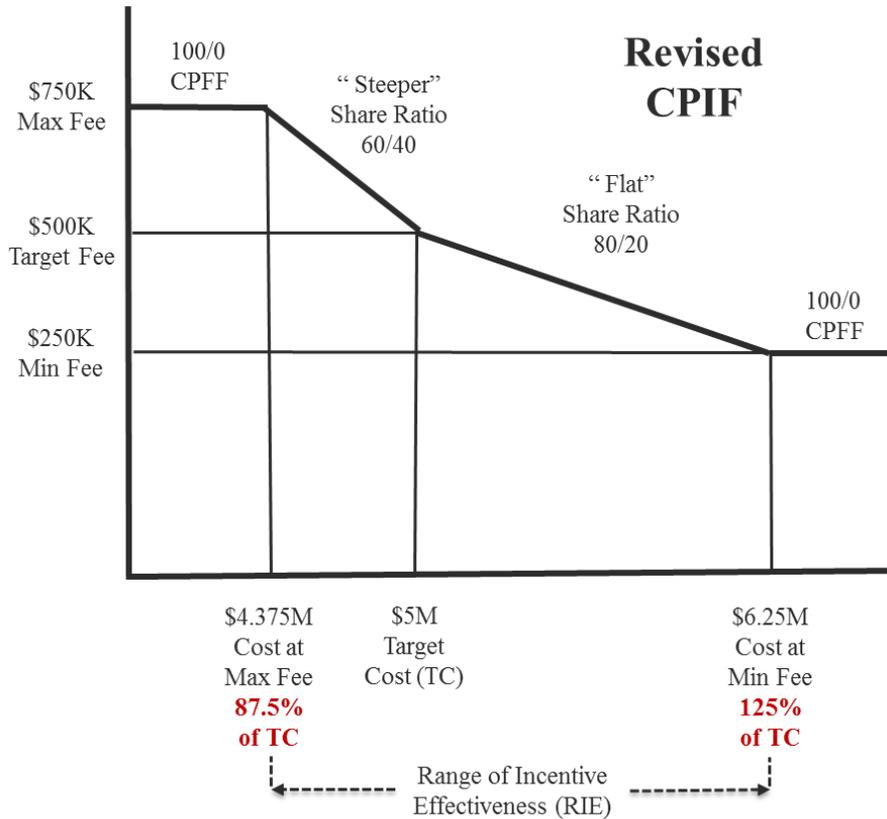
Target Fee (TF)	\$ 500,000	
Minimum Fee	<u>\$ - 750,000</u>	
Difference	\$ (250,000)	
	$\div 0.40$	Contractor cost underrun share responsibility 60/40
	\$ (625,000)	
Target Cost	<u>\$+5,000,000</u>	
	\$ 4,375,000	Cost where contractor starts to earn the Maximum Fee

The range of incentive effectiveness for the revised CPIF contract is \$4,375,000 to \$6,250,000.

Understanding the Mechanics of CPIF Contracts (cont.)

(7) Graph the revised CPIF pricing arrangement and assess if the changes made it more favorable for the contractor.

The following graph depicts the revised CPIF pricing arrangement with the “switched” cost underrun and cost overrun share ratios.



The change in share ratios made the revised CPIF pricing arrangement more favorable to the contractor. They now can earn more fee under a cost underrun for smaller cost reductions and can achieve the maximum fee of \$750K by reducing costs by 12.5% vice having to reduce costs by 25% under the original pricing arrangement. Additionally, the revised pricing arrangement shifts greater cost responsibility for a cost overrun onto the government. The contractor can now earn more than the fixed minimum fee on costs up to \$6.25M vice \$5.625M under the original pricing arrangement.

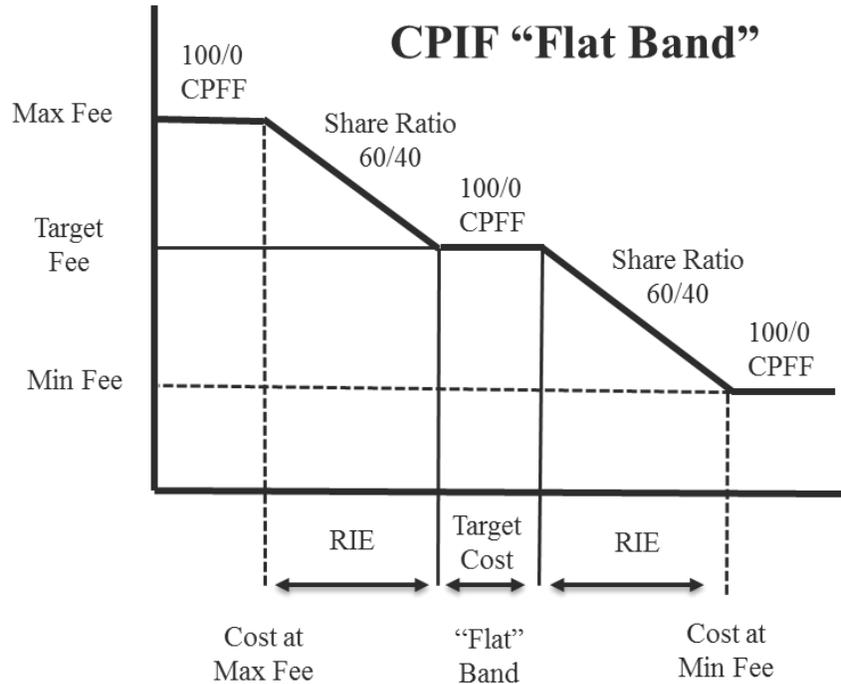
The revised CPIF contract does not change the magnitude of the range of incentive effectiveness. Instead, it shifted where the RIE started and ended and, more importantly for the contractor, moved the cost point where the contractor can earn the maximum fee closer to the target cost and extended the cost point where the contractor earns the minimum fee significantly beyond the target cost. The revised pricing arrangement provides more incentive for the contractor to reduce costs below the target cost. The revised pricing arrangement recognizes the uncertainty associated with establishing a target cost and the reality that cost overruns are more prevalent under CPIF contracts.

Understanding the Mechanics of CPIF Contracts (cont.)**CPIF Target Cost “Flat Band”**

The author believes that the most important pricing element in a CPIF contract is the target cost. If the target cost is overly optimistic or unachievable, the parties may have “built-in” a guaranteed cost overrun and/or unintentionally reduced the amount of fee the contractor can earn. In that situation, the cost underrun fee adjustment formula provides no incentive to the contractor since it is highly unlikely that they can reduce costs below the unreasonably low target cost and still meet the government’s desired performance objectives.

Given the strong relationship between target cost and the potential fee that could be earned under a CPIF contract, the target cost is one of the most highly contested pricing elements during negotiations. It should be remembered that a CPIF contract is being used to mitigate the risk of highly uncertain or speculative costs of performance and that the government and contractor may not always agree on a finite target cost. When there is a difference in target cost positions that leads to a negotiations impasse, the contractor may want to propose a CPIF target cost “flat band” that reflects the range of disputed target cost positions. The flat band works like the fixed CPFF maximum and minimum fee pricing elements in the CPIF contract. In the event the final negotiated costs fall under the target cost flat band, the contractor’s fee will not be reduced or increased and the contractor will receive the stipulated fixed fee. A notional CPIF target cost flat band pricing arrangement is depicted below. It should be noted that there are two distinct ranges of incentive effectiveness when a target cost flat band is used.

Understanding the Mechanics of CPIF Contracts (cont.)



Summary

This article provides a refresher on the government’s contract type selection objectives, factors affecting contract type selection, the degree of risk assumed by the government and contractor under various government contracts, and the major differences between fixed-price and cost-reimbursement contracts. Additionally, the article provides insight into the mechanics of cost-plus-incentive-fee (CPIF) contracts. The CPIF contract examples and scenarios provided in the article demonstrates how CPIF contracts could be manipulated to change the risk allocation between the government and contractor.

Knowledge of the relationship and interdependency between the contract type, performance risk and incentives can be used to help clients influence acquisition strategies and negotiate more favorable contract types and pricing arrangements.

The most important pricing element in a CPIF contract is the target cost. To make the CPIF pricing arrangement more favorable for the contractor, the target cost should be as high as can be reasonable supported, the underrun cost share ratio should be steep to allow the contractor to earn a significantly higher fee if they reduce costs below the target cost, and the cost overrun cost share ratio should be flat to place more of the overrun cost responsibility onto the government. In concert, these actions will reduce the contractor’s cost performance risk and increase their potential fee (profitability).

The author welcomes questions, suggestions, and comments about this article. He can be reached at (406) 994-7739 or via email at Jeff.Cuskey@montana.edu.

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