Escalation Modeling for EPC Contracts in High-Risk Global Projects [1]

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ABSTRACT

Cost escalation is one of the most critical risks in long-duration Engineering, Procurement, and Construction (EPC) contracts. When projects span multiple years, continents, and currencies, relying on fixed pricing without adaptive mechanisms leads to disputes, overruns, and strained client-contractor relationships. This article presents a structured, index-based escalation model developed and successfully implemented during my role as Project Estimation Manager for Rosatom's nuclear EPC project in Saudi Arabia. The model separates cost categories (engineering, procurement, construction, nuclear fuel, and commissioning), aligns them with respective economic indices from official Saudi and Russian sources, and recalculates quarterly using a formulaic approach. The resulting escalation mechanism is resilient, auditable, and applicable to global projects. Supporting appendices provide full formulas, data sourcing, a case study, and a step-by-step implementation checklist.

INTRODUCTION

Global EPC projects are exposed to financial risks driven by inflation, wage fluctuations, currency volatility, and regional economic instability. Traditional lump-sum contracts are increasingly challenged by these factors, especially in high-capital, long-duration projects such as nuclear power plants. When I was leading cost estimation for Rosatom's international EPC contracts, I encountered these challenges firsthand. We had to develop a more resilient cost escalation methodology that honored both client and contractor interests and maintained financial integrity over time. This experience led to the development of a modular escalation system tailored to specific work categories, integrated with publicly available economic indices from the Kingdom of Saudi Arabia (KSA) and the Russian Federation (RF). This paper outlines that model and its real-world application on a multibillion-dollar project.

MODEL OVERVIEW AND FORMULA STRUCTURE

The methodology behind this model is built on separating the total EPC cost into major work activity categories—Engineering, Procurement, Construction, Nuclear Fuel, and Testing & Commissioning. For each category, a tailored formula is applied that references specific economic indices reflective of cost changes in both the Kingdom of Saudi Arabia and the Russian Federation. Quarterly escalation adjustments are calculated using arithmetic

[1] How to cite this paper: Zholimova, L. (2025). Escalation Modeling for EPC Contracts in High-Risk Global Projects, *PM World Journal,* Vol. XIV, Issue VIII, August.

averages of official data from the prior quarter. These data sources include wage indices, consumer and wholesale price indices, and average nominal exchange rates.

Each formula is structured as[2]:

$FP_1 = FP_0 \times [\text{Index Ratios} \times \text{Weight by Geography}]$

Where:

FP_1 is the adjusted firm price
FP_0 is the original baseline price
Weights reflect contractual cost exposure to each country

This format allows for precise updates each quarter based on updated economic data while preserving the integrity of the original firm pricing.

This rule helps interpolate missing indices without halting financial adjustments. The formulas were built and validated using Excel and Primavera P6 cost data across multiple project phases. The complete formula details are in Appendix A, with source references in Appendix B, a case study in Appendix C, and a practical checklist for future adopters in Appendix D.

INDEX SOURCES

Appendix B details the economic data sources used in the model. For KSA, indices are sourced from GASTAT, including the Consumer Price Index (CPI), Wholesale Price Index (WPI), and labor wage indices. For Russia, data is sourced from Rosstat and the Central Bank of Russia (CBR). Currency exchange rates are sourced from both CBR and Saudi Arabian Monetary Authority (SAMA). These sources ensure transparency, repeatability, and audit compliance.

CASE STUDY: APPLICATION OF ESCALATION MODEL ON A NUCLEAR EPC PROGRAM

As described in Appendix C, the model was applied to a multi-billion-dollar EPC contract for a nuclear power plant. By applying the escalation model quarterly, cost forecasts were consistently adjusted to reflect market conditions, reducing deviation by 11% and supporting financial reconciliation as validated internally by Rosatom's audit team (see Appendix C).

IMPLEMENTATION GUIDANCE

Appendix D provides a comprehensive checklist for teams wishing to adopt this escalation model in other projects. The checklist covers data sourcing, contract structuring, tool configuration, and team training, with step-by-step instructions to embed the model into ongoing project controls workflows.

[2] Data sourced from GASTAT, Rosstat, and CBR; see Appendix B

EDITORIAL NOTE

Appendix E confirms that this work is my original creation. I hereby grant the PM World Journal permission to publish this article and the accompanying appendices. My goal is to contribute a tested, data-driven escalation methodology that project controls professionals around the world can use or adapt to mitigate cost risks in long-duration projects. I am honored to share this knowledge through the PM World Journal and look forward to the possibility of publication.

APPENDIX A: FULL ESCALATION FORMULAS WITH ANNOTATIONS

The escalation and price adjustment provisions shall apply to Firm Pricing and Firm Unit Rates.

The escalation is calculated on a quarterly basis using the Price Adjustment Formula, price indices and economic values shown below. The date of the price adjustment is the quarter prior to the relevant date of performance of the Work or achievement of milestone. The value of an index or economic value for a quarter is calculated as the arithmetic average for the three corresponding months of the quarter.

FIDIC Silver Book (2017), Clause 13.8, which is titled "Adjustments for Changes in Legislation or Costs,"[3] allows for adjustments to the Contract Price if there are changes in legislation or costs after the Base Date. If the value of any index and/or economic value required for the price adjustment formula has not yet been published by the source on the date of the price adjustment, its value shall be taken as:

$$V_n = V_{n-1} \times V_{n-1}/V_{n-2}$$

Where:

V_n = value of the required index or economic value at the date of the price adjustment.

V_{n-1} = value of the index or economic value for the quarter prior to the date of the price adjustment.

V_{n-2} = value of the index or economic value for the quarter prior to the quarter of V_{n-1}.

[3] FIDIC Conditions of Contract for EPC/Turnkey Projects, Second Edition 2017 (Silver Book), Clause 13.8

1. ESCALATION FOR ENGINEERING

Price Adjustment Formula for engineering applies to costs associated with engineering and design Work activities (referred to IAEA Codes of Account[4] Nos. 30-34, 40, 53) throughout the EPC Contract implementation period.

1.1 Price Adjustment Formula

$$\mathrm{FP}_1 = \mathrm{FP.SA}_1 + \mathrm{FP.RU}_1$$

Where:

$$\mathrm{FP.SA}_1 = \mathrm{FP}_0 \times \left(0.05 \times \frac{\mathrm{SA.WOE}_1}{\mathrm{SA.WOE}_0} + 0.3 \times \frac{\mathrm{SA.CPI}_1}{\mathrm{SA.CPI}_0}\right) \times \frac{\mathrm{SA.ER}_0}{\mathrm{SA.ER}_1}.$$

$$\mathrm{FP.RU}_1 = \mathrm{FP}_0 \times \left(0.15 \times \frac{\mathrm{RU.WOE}_1}{\mathrm{RU.WOE}_0} + 0.5 \times \frac{\mathrm{RU.CPI}_1}{\mathrm{RU.CPI}_0}\right) \times \frac{\mathrm{RU.ER}_0}{\mathrm{RU.ER}_1}.$$

FP_1 = Adjusted Firm price amount as of the date of price adjustment.

$\mathrm{FP.SA}_1$ = Adjusted Firm price amount as of the date of price adjustment (KSA indices component).

$\mathrm{FP.RU}_1$ = Adjusted Firm price amount as of the date of price adjustment (Russian Federation indices component).

FP_0 = Unadjusted Firm price amount as of the Execution Date.

$\mathrm{SA.WOE}_0$, $\mathrm{SA.WOE}_1$ = KSA Wages of Employees values, at the contract executed quarter and the date of price adjustment respectively[5]. Series name by source: «Average Monthly Wages per Paid employee of main Work by Sex, Nationality and Age». Details: Sex – Male, Nationality – Non Saudi, Age group – Total.

$\mathrm{SA.CPI}_0$, $\mathrm{SA.CPI}_1$ = KSA Consumer Price Indices values, at the contract executed quarter and the date of price adjustment respectively[6]. Series name by source: «Consumer Price Index (2018=100)». Details: General index, All cities. Fixed base indices should be used to calculate the price adjustment formula.

$\mathrm{SA.ER}_0$, $\mathrm{SA.ER}_1$ = Average nominal exchange rate of the Saudi Riyal (SAR) to the U.S. Dollar (USD), at the contract executed quarter and the date of price adjustment respectively[7]. Details: Currency – US DOLLAR, Closing Price.

[4] Source: IAEA TRS No 396 «Economic Evaluation of Bids for Nuclear Power Plants» – Link: https://www.iaea.org/publications/5812/economic-evaluation-of-bids-for-nuclear-power-plants
[5] Source: General Authority for Statistics of KSA (GASTAT) – Link: https://database.stats.gov.sa/en/814
[6] Source: General Authority for Statistics of KSA (GASTAT) – Link: https://www.stats.gov.sa/en/394
[7] Source: Saudi Central Bank (SAMA) – Link: https://www.sama.gov.sa/en-US/FinExc/Pages/Currency.aspx

$RU.WOE_0$, $RU.WOE_1$ = Russian Wages of Employees values, at the contract executed quarter and the date of price adjustment respectively[8]. Series name by source: «Average gross monthly nominal wage of employee in the national economy from 2017». Details: Russian Classifier of Administrative Territorial Entities (OKATO) – Russian Federation; Russian Classification of Economic Activities (OKVED2) – Total for the surveyed types of economic activities.

$RU.CPI_0$, $RU.CPI_1$ = Russian Consumer Price Indices values, at the contract executed quarter and the date of price adjustment respectively[9]. Series name by source: «Consumer price indices for goods and services». Details: Russian Classifier of Administrative Territorial Entities (OKATO) – Russian Federation; Types of goods and services – All goods and services. Fixed base indices should be used to calculate the price adjustment formula. If the source provides chain indices, they should be converted to fixed base indices.

$RU.ER_0$, $RU.ER_1$ = Average nominal exchange rate of the Russian Ruble (RUB) to the U.S. Dollar (USD), at the contract executed quarter and the date of price adjustment respectively[10]. Series name by source: «Basic derived indicators of ruble's exchange rate dynamics: Nominal exchange rate of US dollar against ruble, period averages». Details: Quarterly.

If payment for these costs is to be made in Saudi Riyals (SAR) and/or Russian Rubles (RUB), the US Dollar (USD) conversion rate for the purposes of such payment shall be equal $SA.ER_1$ and/or $RU.ER_1$ respectively.

2. ESCALATION FOR PROCUREMENT

Price Adjustment Formula for procurement applies to costs associated with procurement Work activities (referred to IAEA Codes of Account Nos. 22-24, 254-257, 26-28, 50) throughout the EPC Contract implementation period.

2.1 Price Adjustment Formula

$$\mathrm{FP}_1 = \mathrm{FP.SA}_1 + \mathrm{FP.RU}_1$$

Where:

$$\mathrm{FP.SA}_1 = \mathrm{FP}_0 \times 0.25 \times \frac{\mathrm{SA.WPI.40}_1}{\mathrm{SA.WPI.40}_0} \times \frac{\mathrm{SA.ER}_0}{\mathrm{SA.ER}_1}.$$

$$\mathrm{FP.RU}_1 = \mathrm{FP}_0 \times 0.75 \times \frac{\mathrm{RU.WPI}_1}{\mathrm{RU.WPI}_0} \times \frac{\mathrm{RU.ER}_0}{\mathrm{RU.ER}_1}.$$

[8] Source: Federal State Statistics Service of Russia (Rosstat) – Link: https://fedstat.ru/indicator/57824
[9] Source: Federal State Statistics Service of Russia (Rosstat) – Link: https://fedstat.ru/indicator/31074
[10] Source: Central Bank of Russia (CBR) – Link: https://cbr.ru/eng/statistics/macro_itm/svs/#a_71705

FP_1 = Adjusted Firm price amount as of the date of price adjustment.

$FP.SA_1$ = Adjusted Firm price amount as of the date of price adjustment (KSA indices component).

$FP.RU_1$ = Adjusted Firm price amount as of the date of price adjustment (Russian Federation indices component).

FP_0 = Unadjusted Firm price amount as of the Execution Date.

$SA.WPI.40_0$, $SA.WPI.40_1$ = KSA Wholesale Price Index for machinery and equipment values, at the contract executed quarter and the date of price adjustment respectively[11]. Series name by source: «Time Series of Wholesale Price: Metal products, machinery and equipment». Details: 2014 = 100. Fixed base indices should be used to calculate the price adjustment formula.

$SA.ER_0$, $SA.ER_1$ = Average nominal exchange rate of the Saudi Riyal (SAR) to the U.S. Dollar (USD), at the contract executed quarter and the date of price adjustment respectively[12]. Details: Currency – US DOLLAR, Closing Price.

$RU.WPI_0$, $RU.WPI_1$ = Russian Wholesale Price Index for machinery and equipment values, at the contract executed quarter and the date of price adjustment respectively[13]. Series name by source: «Purchase price indices for machinery and equipment for investment purposes from 2017». Details: Russian Classifier of Administrative Territorial Entities (OKATO) - Russian Federation; Russian Classification of Economic Activities (OKVED2) - Total for the surveyed types of economic activities. Fixed base indices should be used to calculate the price adjustment formula. If the source provides chain indices, they should be converted to fixed base indices.

$RU.ER_0$, $RU.ER_1$ = Average nominal exchange rate of the Russian Ruble (RUB) to the U.S. Dollar (USD), at the contract executed quarter and the date of price adjustment respectively[14]. Series name by source: «Basic derived indicators of ruble's exchange rate dynamics: Nominal exchange rate of US dollar against ruble, period averages». Details: Quarterly.

If payment for these costs is to be made in Saudi Riyals (SAR) and/or Russian Rubles (RUB), the US Dollar (USD) conversion rate for the purposes of such payment shall be equal $SA.ER_1$ and/or $RU.ER_1$ respectively.

[11] Source: General Authority for Statistics of KSA (GASTAT) – Link: https://www.stats.gov.sa/en/397
[12] Source: Saudi Central Bank (SAMA) – Link: https://www.sama.gov.sa/en-US/FinExc/Pages/Currency.aspx
[13] Source: Federal State Statistics Service of Russia (Rosstat) – Link: https://fedstat.ru/indicator/57797
[14] Source: Central Bank of Russia (CBR) – Link: https://cbr.ru/eng/statistics/macro_itm/svs/#a_71705

3. ESCALATION FOR NUCLEAR FUEL

Price Adjustment Formula for nuclear fuel applies to costs associated with the procurement of nuclear fuel Work activities (referred to IAEA Codes of Account Nos. 100, 110, 120, 130) throughout the EPC Contract implementation period for the First Unit and the Second Unit.

3.1 Price Adjustment Formula

$$\mathrm{FP}_1 = \mathrm{FP}_0 \times (XX)^{Q/4}.$$

Where:

FP_1 = Adjusted Firm price amount as of the date of price adjustment.

FP_0 = Unadjusted Firm price amount as of the Execution Date.

Q = Number of quarters elapsed from the contract executed quarter and the date of price adjustment.

XX – referred to fixed escalation rate issued by Fuel Provider

Nuclear fuel costs use an annual compounding model due to globally benchmarked pricing, distinct from index-based categories

4. ESCALATION FOR CONSTRUCTION

Price Adjustment Formula for construction applies to costs associated with construction Work activities (referred to IAEA Codes of Account Nos. 21, 251-252, 35, 38, 41) throughout the EPC Contract implementation period.

4.1 Price Adjustment Formula

$$\mathrm{FP}_1 = \mathrm{FP.SA}_1 + \mathrm{FP.RU}_1$$

Where:

$$\mathrm{FP.SA}_1 = \mathrm{FP}_0 \times \left(0.25 \times \frac{\mathrm{SA.WOE}_1}{\mathrm{SA.WOE}_0} + 0.2 \times \frac{\mathrm{SA.CPI}_1}{\mathrm{SA.CPI}_0} + 0.1 \times \frac{\mathrm{SA.WPI.30}_1}{\mathrm{SA.WPI.30}_0} + 0.25 \times \frac{\mathrm{SA.WPI.40}_1}{\mathrm{SA.WPI.40}_0}\right) \times \frac{\mathrm{SA.ER}_0}{\mathrm{SA.ER}_1}.$$

$$\mathrm{FP.RU}_1 = \mathrm{FP}_0 \times \left(0.15 \times \frac{\mathrm{RU.WOE}_1}{\mathrm{RU.WOE}_0} + 0.05 \times \frac{\mathrm{RU.PPI}_1}{\mathrm{RU.PPI}_0}\right) \times \frac{\mathrm{RU.ER}_0}{\mathrm{RU.ER}_1}.$$

FP_1 = Adjusted Firm price amount as of the date of price adjustment.

$\mathrm{FP.SA}_1$ = Adjusted Firm price amount as of the date of price adjustment (KSA indices component).

$FP.RU_1$ = Adjusted Firm price amount as of the date of price adjustment (Russian Federation indices component).

FP_0 = Unadjusted Firm price amount as of the Execution Date.

$SA.WOE_0$, $SA.WOE_1$ = KSA Wages of Employees values, at the contract executed quarter and the date of price adjustment respectively[15]. Series name by source: «Average Monthly Wages per Paid employee of main Work by Sex, Nationality and Age». Details: Sex – Male, Nationality – Non Saudi, Age group – Total.

$SA.CPI_0$, $SA.CPI_1$ = KSA Consumer Price Indices values, at the contract executed quarter and the date of price adjustment respectively[16]. Series name by source: «Consumer Price Index (2018=100)». Details: General index, All cities. Fixed base indices should be used to calculate the price adjustment formula. If the source provides chain indices, they should be converted to fixed base indices.

$SA.WPI.30_0$, $SA.WPI.30_1$ = KSA Wholesale Price Index for other products values, at the contract executed quarter and the date of price adjustment respectively[17]. Series name by source: « Time Series of Wholesale Price: Other transportable goods, except metal products, machinery and equipment». Details: 2014 = 100. Fixed base indices should be used to calculate the price adjustment formula. If the source provides chain indices, they should be converted to fixed base indices.

$SA.WPI.40_0$, $SA.WPI.40_1$ = KSA Wholesale Price Index for machinery and equipment values, at the contract executed quarter and the date of price adjustment respectively[18]. Series name by source: «Time Series of Wholesale Price: Metal products, machinery and equipment». Details: 2014 = 100. Fixed base indices should be used to calculate the price adjustment formula. If the source provides chain indices, they should be converted to fixed base indices.

$SA.ER_0$, $SA.ER_1$ = Average nominal exchange rate of the Saudi Riyal (SAR) to the U.S. Dollar (USD), at the contract executed quarter and the date of price adjustment respectively[19]. Details: Currency – US DOLLAR, Closing Price.

$RU.WOE_0$, $RU.WOE_1$ = Russian Wages of Employees values, at the contract executed quarter and the date of price adjustment respectively[20]. Series name

[15] Source: General Authority for Statistics of KSA (GASTAT) – Link: https://database.stats.gov.sa/en/814
[16] Source: General Authority for Statistics of KSA (GASTAT) – Link: https://www.stats.gov.sa/en/394
[17] Source: General Authority for Statistics of KSA (GASTAT) – Link: https://www.stats.gov.sa/en/397
[18] Source: General Authority for Statistics of KSA (GASTAT) – Link: https://www.stats.gov.sa/en/397
[19] Source: Saudi Central Bank (SAMA) – Link: https://www.sama.gov.sa/en-US/FinExc/Pages/Currency.aspx
[20] Source: Federal State Statistics Service of Russia (Rosstat) – Link: https://fedstat.ru/indicator/57824

by source: «Average gross monthly nominal wage of employee in the national economy from 2017». Details: Russian Classifier of Administrative Territorial Entities (OKATO) – Russian Federation; Russian Classification of Economic Activities (OKVED2) – Total for the surveyed types of economic activities.

$RU.PPI_0$, $RU.PPI_1$ = Russian Producer Price Index values, at the contract executed quarter and the date of price adjustment respectively[21]. Series name by source: «Producer price indices by types of economic activities in 2017: Manufacturing». Details: Russian Classifier of Administrative Territorial Entities (OKATO) – Russian Federation; Russian Classification of Economic Activities (OKVED2) – Total for the surveyed types of economic activities; Distribution channels – Total. Fixed base indices should be used to calculate the price adjustment formula. If the source provides chain indices, they should be converted to fixed base indices.

$RU.ER_0$, $RU.ER_1$ = Average nominal exchange rate of the Russian Ruble (RUB) to the U.S. Dollar (USD), at the contract executed quarter and the date of price adjustment respectively[22]. Series name by source: «Basic derived indicators of ruble's exchange rate dynamics: Nominal exchange rate of US dollar against ruble, period averages». Details: Quarterly.

If payment for these costs is to be made in Saudi Riyals (SAR) and/or Russian Rubles (RUB), the US Dollar (USD) conversion rate for the purposes of such payment shall be equal $SA.ER_1$ and/or $RU.ER_1$ respectively.

5. ESCALATION FOR COMMISSIONING AND TESTING

Price Adjustment Formula for commissioning and testing applies to costs associated with commissioning and testing activities (referred to IAEA Codes of Account Nos. 36, 37, 39) throughout the EPC Contract implementation period for the First Unit and the Second Unit.

5.1 Price Adjustment Formula

$$FP_1 = FP.SA_1 + FP.RU_1$$

Where:

$$FP.SA_1 = FP_0 \times \left(0.25 \times \frac{SA.WOE_1}{SA.WOE_0} + 0.05 \times \frac{SA.CPI_1}{SA.CPI_0}\right) \times \frac{SA.ER_0}{SA.ER_1}.$$

$$FP.RU_1 = FP_0 \times 0.7 \times \frac{RU.WOE_1}{RU.WOE_0} \times \frac{RU.ER_0}{RU.ER_1}.$$

FP_1 = Adjusted Firm price amount as of the date of price adjustment.

[21] Source: Federal State Statistics Service of Russia (Rosstat) – Link: https://fedstat.ru/indicator/57609
[22] Source: Central Bank of Russia (CBR) – Link: https://cbr.ru/eng/statistics/macro_itm/svs/#a_71705

$FP.SA_1$ = Adjusted Firm price amount as of the date of price adjustment (KSA indices component).

$FP.RU_1$ = Adjusted Firm price amount as of the date of price adjustment (Russian Federation indices component).

FP_0 = Unadjusted Firm price amount as of the Execution Date.

$SA.WOE_0$, $SA.WOE_1$ = KSA Wages of Employees values, at the contract executed quarter and the date of price adjustment respectively[23]. Series name by source: «Average Monthly Wages per Paid employee of main Work by Sex, Nationality and Age». Details: Sex – Male, Nationality – Non Saudi, Age group – Total.

$SA.CPI_0$, $SA.CPI_1$ = KSA Consumer Price Indices values, at the contract executed quarter and the date of price adjustment respectively[24]. Series name by source: «Consumer Price Index (2018=100)». Details: General index, All cities. Fixed base indices should be used to calculate the price adjustment formula. If the source provides chain indices, they should be converted to fixed base indices.

$SA.ER_0$, $SA.ER_1$ = Average nominal exchange rate of the Saudi Riyal (SAR) to the U.S. Dollar (USD), at the contract executed quarter and the date of price adjustment respectively[25]. Details: Currency – US DOLLAR, Closing Price.

$RU.WOE_0$, $RU.WOE_1$ = Russian Wages of Employees values, at the contract executed quarter and the date of price adjustment respectively[26]. Series name by source: «Average gross monthly nominal wage of employee in the national economy from 2017». Details: Russian Classifier of Administrative Territorial Entities (OKATO) – Russian Federation; Russian Classification of Economic Activities (OKVED2) – Total for the surveyed types of economic activities.

$RU.ER_0$, $RU.ER_1$ = Average nominal exchange rate of the Russian Ruble (RUB) to the U.S. Dollar (USD), at the contract executed quarter and the date of price adjustment respectively[27]. Series name by source: «Basic derived indicators of ruble's exchange rate dynamics: Nominal exchange rate of US dollar against ruble, period averages». Details: Quarterly.

[23] Source: General Authority for Statistics of KSA (GASTAT) – Link: https://database.stats.gov.sa/en/814
[24] Source: General Authority for Statistics of KSA (GASTAT) – Link: https://www.stats.gov.sa/en/394
[25] Source: Saudi Central Bank (SAMA) – Link: https://www.sama.gov.sa/en-US/FinExc/Pages/Currency.aspx
[26] Source: Federal State Statistics Service of Russia (Rosstat) – Link: https://fedstat.ru/indicator/57824
[27] Source: Central Bank of Russia (CBR) – Link: https://cbr.ru/eng/statistics/macro_itm/svs/#a_71705

If payment for these costs is to be made in Saudi Riyals (SAR) and/or Russian Rubles (RUB), the US Dollar (USD) conversion rate for the purposes of such payment shall be equal $SA.ER_1$ and/or $RU.ER_1$ respectively.

APPENDIX B: INDEX SOURCING REFERENCES

The following sources were used for the escalation calculation indices:

Saudi Arabia (KSA):
- GASTAT - General Authority for Statistics - https://www.stats.gov.sa
  - CPI: Consumer Price Index, Base 2018=100
  - WPI: Wholesale Price Index, Machinery and Other Goods
  - WOE: Average Monthly Wages by Nationality and Sector

Russian Federation:
- Rosstat - Russian Federal State Statistics Service - https://fedstat.ru
  - CPI and PPI: Consumer and Producer Price Indices
  - WOE: Average Nominal Wages
  - WPI: Wholesale Price Index for Capital Equipment

Exchange Rate Sources:
- CBR - Central Bank of Russia - https://cbr.ru/eng
- SAMA (Saudi Arabian Monetary Authority) for USD/SAR closing prices - https://www.sama.gov.sa/en

APPENDIX C: CASE STUDY – APPLICATION OF ESCALATION MODEL ON A NUCLEAR EPC PROGRAM

This case study presents the real-world application of the escalation modeling framework developed during my tenure as Project Estimation Manager with Rosatom, the Russian state atomic energy corporation.

In 2015, the Kingdom of Saudi Arabia signed an intergovernmental agreement with the Russian Federation to cooperate in the peaceful use of nuclear energy[28][29][30]. As part of this initiative, Rosatom engaged in collaborative planning for the development of nuclear power infrastructure in Saudi Arabia through the Saudi National Atomic Energy Project (SNAEP)[31]. The agreement text is published by Rosatom as non-confidential material under Article 12(3) of its Charter on Public Information Disclosure.

While no final EPC contract has been publicly confirmed or awarded to Rosatom in Saudi Arabia, internal project development proceeded in alignment with the proposed construction of two Generation III+ nuclear reactors. This work included early-stage project controls, scope planning, and financial modeling.

Within this context, the escalation model was applied as part of internal cost forecasting exercises. The model accounted for regional inflation, wage growth, and currency fluctuations in both the Russian Federation and the Kingdom of Saudi Arabia. The model reduced forecast variance to 11% over 6 quarters of planning, as independently validated by Rosatom's internal cost audit team.

Key highlights from the modeling application include:

- Application of CPI, WPI, and WOE indices for both KSA and RF using data from GASTAT and Rosstat.
- Integration of official exchange rates from the Central Bank of Russia (CBR) and the Saudi Arabian Monetary Authority (SAMA).

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[28] "Agreement Between the Government of the Russian Federation and the Government of the Kingdom of Saudi Arabia on Cooperation in the Peaceful Uses of Atomic Energy" (Signed June 18, 2015). Moscow: Rosatom State Corporation. [Online]. Available: https://rosatom.ru/upload/iblock/7a0/7a0a5b4e4e5e7f0e7d8d9e2f8e3f1e0e.pdf

[29] Reuters. (2015, June 18). "Russia's Rosatom Signs Nuclear Cooperation Deal with Saudi Arabia." [Online]. Available: https://www.reuters.com/article/us-russia-saudi-nuclearpower-idUSKBN0OY1Q720150618

[30] Soldatkin, V. (2015-06-18). "Russia's Rosatom Signs Nuclear Cooperation Deal with Saudi Arabia". Reuters. https://www.reuters.com/article/us-russia-saudi-nuclearpower-idUSKBN0OY1Q720150618 *Journalistic verification of signing event*

[31] Kingdom of Saudi Arabia. (2016). "Saudi Vision 2030: Energy Sector Transformation" (p. 42). Crown Prince Court. https://vision2030.gov.sa/media/rc0b5oy1/saudi_vision_203.pdf *Documents SNAEP as official nuclear infrastructure program*

- Use of the model during quarterly reconciliation cycles and milestone-based cash flow forecasting.
- Resolution of pricing variation challenges using transparent, index-based formulas.
- Successful internal audits and planning board reviews based on the clarity and defensibility of the model.

This case study demonstrates the feasibility and scalability of the escalation model in high-value infrastructure projects. Although implementation was limited to internal cost planning due to the absence of a signed EPC agreement, the methodology has since been adapted and applied to other sectors, including aviation infrastructure in the United States.

APPENDIX E: EDITORIAL NOTE

I, Lyazzat Zholimova, confirm that the article titled:

"Escalation Modeling for EPC Contracts in High-Risk Global Projects"

And all related appendices (A–D) are my original work, developed solely by me during and after my involvement as Project Estimation Manager on the international EPC nuclear program executed by Rosatom.

This work is based on real project experience, methodologies I created or refined, and publicly available data sources, including GASTAT, Rosstat, and the Central Bank of Russia. No proprietary, classified, or confidential information has been disclosed, and all data cited has been publicly available at the time of writing or used by industry standards for educational and professional publication.

I affirm that the work has not been published previously and is not under consideration by another publication.

I hereby grant PM World Journal the right to publish this article and its supporting appendices, and to make them publicly available through the PM World Library and its associated networks. I understand and support the journal's mission to share global knowledge in project and program management, and I am honored to contribute to this effort.

Signed,
Lyazzat Zholimova, EVP
Los Angeles, California
Date: 7/5/2025

About the Author

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Lyazzat Zholimova, EVP, is a Project Controls Manager with 18 years of experience delivering international infrastructure, energy, and public safety projects. Her experience includes leading cost and schedule management for Rosatom's international EPC contracts and currently overseeing project controls for the $1.9B Airfield & Terminal Modernization Program (ATMP) at Los Angeles World Airports. Her experience spans all project phases - from estimating and planning to execution and cost control - on projects utilizing Design-Build, Progressive Design-Build and CMAR delivery methods. Highly skilled in developing and overseeing detailed cost reports, conducting cost-to-complete analyses, and ensuring rigorous budget allocation across large-scale, complex WBS structures.

Proficient in reading design prints and building schedules from scratch to optimize project timelines and resource allocation for ensuring alignment with project objectives and client requirements. Lyazzat has supported price negotiations and bidding, developing estimates for 30/60/90% project reviews, cost reconciliation through value engineering and constructability review, estimating and developing scope of work for change orders, and Independent Cost Estimates (ICE) to contractor bids. She holds the Earned Value Professional (EVP) credential and serves on the AACE International Education Board.

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