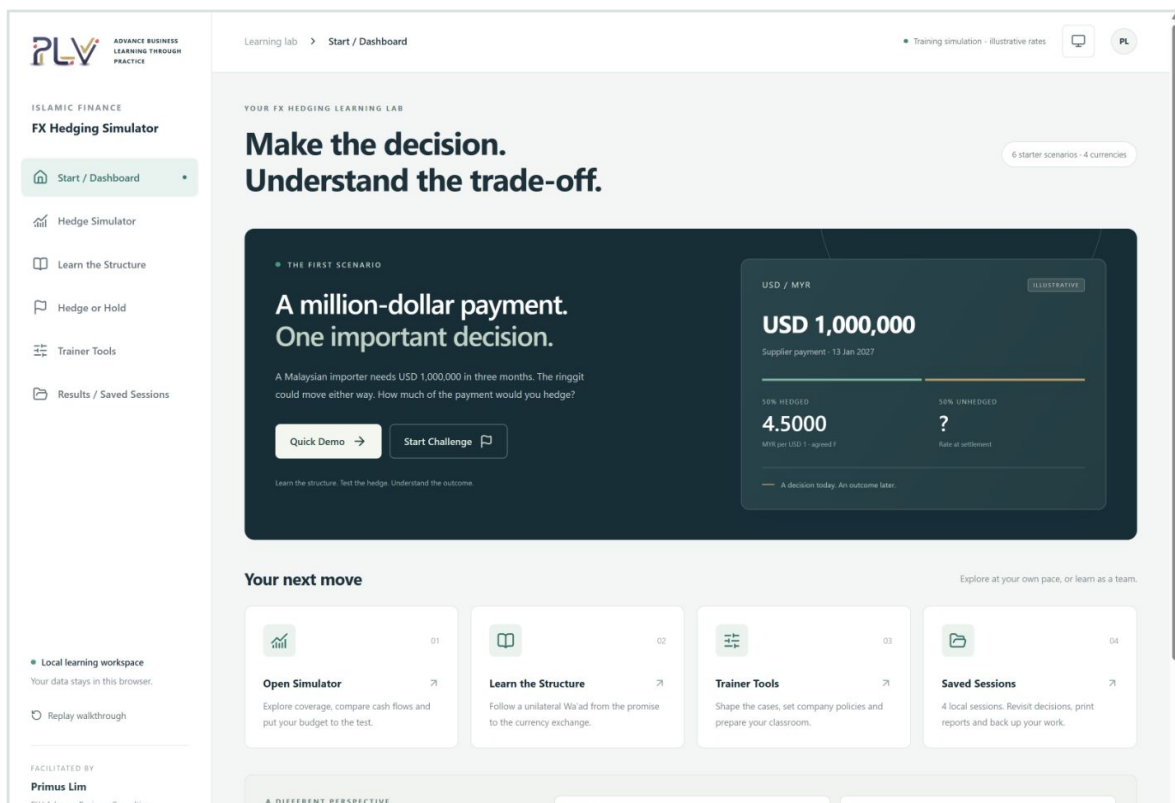


PLV LEARNING LAB

Islamic FX Hedging Simulator

User & Trainer Manual

Learn the structure. Test the hedge.
Understand the outcome.



Includes a Shariah-endorsed structure example

A unilateral binding Wa'ad FX hedge, with the published Malaysian SAC basis, bank product references, and worked importer/exporter cash flows. All case amounts and rates are illustrative.

Prepared for participants and trainers

PLV Advance Business Consulting Sdn Bhd

Trainer: Primus Lim

For education and simulation. Illustrative rates and simplified assumptions. No trade execution or Shariah certification.

01 / QUICK START

Start in Windows

- 1. Open the project folder.** In File Explorer, open **28-PLV Islamic Derivatives > PLV Islamic FX Hedging**.
- 2. Double-click the START file.** Run **START-PLV-ISLAMIC-FX-HEDGING.bat**. This computer already has the installed, built application.
- 3. Open the local address.** If the browser does not open automatically, enter **http://127.0.0.1:4173** in Edge or Chrome.
- 4. Keep the server window open.** To stop the application, press **Ctrl+C** in that window, then Y if Windows asks, or close the window.

Keep your sessions together

Use the same browser, profile and exact address each time. Browser data does not transfer automatically between Edge, Chrome and the embedded browser. Normal launches work offline; external source links need internet.

Find the guidance you need

Topic	Page	Topic	Page
Dashboard and first exercise	3	Challenge workflow	9
Simulator inputs	4	Scoring and rationale	10
Islamic structure and approval basis	5	Trainer tools and lesson plan	11
Worked importer example	6	Save, export and restore	12
Exporter and fee examples	7	Troubleshooting and limits	13
Formulas and remaining risks	8	Sources and terminology	14

First setup on another Windows computer

Install Node.js 24 LTS with npm and PATH support, copy the complete project folder, then double-click **SETUP-PLV-ISLAMIC-FX-HEDGING.bat**. Initial setup needs internet. It installs dependencies, builds the app and runs the domain tests. After the completion message, use START. The project requires Node 22.12 or later; the tested runtime was Node 24.19.0.

Do not open dist/index.html directly. No PowerShell execution-policy change is needed. If the app is already running, open its URL instead of starting another copy.

02 / FIND YOUR WAY

Your first ten minutes

Area	Use it to
Start / Dashboard	Launch Quick Demo or Start Challenge. Skip or replay the introductory walkthrough.
Hedge Simulator	Edit one exposure, compare coverage, inspect calculations, save a session and open its report.
Learn the Structure	Walk through promise, preparation and exchange; try the sequence exercise and four concept checks.
Hedge or Hold	Commit a solo or local-team decision before revealing the outcome; discuss and assess the reasoning.
Trainer Tools	Create and review fictional cases, set company policy, stress rates, timing and classroom display.
Results / Saved Sessions	Reopen or duplicate records, review results and export or restore JSON backups.

Run the first exercise

- 1. Choose Quick Demo.** Rimba Circuit Works needs USD 1,000,000 on 13 January 2027. The reference date is 13 October 2026: 92 calendar days.
- 2. Compare 0%, 50% and 100%.** With $F = 4.50$ and settlement spot = 4.80, expect MYR costs of 4,800,000; 4,650,000; and 4,500,000 before extra fees.
- 3. Change settlement spot to 4.20.** Observe that the hedge can cost more than remaining unhedged. Discuss what was knowable when the decision was made.
- 4. Open Show calculation.** Trace the hedged and unhedged portions. Then open Learn the Structure to see the actual currency exchange.
- 5. Save a named session.** Use a fictional name such as Class A - importer 50%, then reopen it under Results / Saved Sessions.

Read the quotation first

Every rate is MYR per 1 unit of foreign currency. USD/MYR 4.5000 means MYR 4.50 for USD 1. A higher number means a weaker ringgit: it raises an importer's MYR cost and an exporter's MYR receipts.

03 / SIMULATOR INPUTS

Set up a hedge comparison

Input	Meaning and entry guidance
Direction and currency	Importer = payable / buy FCY. Exporter = receivable / sell FCY. Choose USD, SGD, EUR or GBP against MYR.
Exposure amount Q	The identified foreign-currency amount. Enter a positive number; the hedge cannot exceed this exposure.
Reference / settlement dates	Use the actual teaching dates. Settlement must be on or after reference. Dates show the timeline, not an extra calculation multiplier.
Indicative spot S0	Context at the reference date. Changing S0 alone does not change settlement results.
Budget rate B	MYR per FCY 1 used for the company's target cost or receipts.
Agreed forward quote F	A manually entered, all-in illustrative quote for the direction and date. The app does not price a bank forward.
Settlement spot ST	The assumed executable customer-direction spot on the settlement date. Changing it explores possible outcomes.
Hedge coverage h	Use 0%, 25%, 50%, 75%, 100% or a custom value from 0% to 100%. Exporter rates use the same quotation direction.
Additional transaction costs	Off by default. If enabled, fixed MYR plus MYR per hedged FCY unit, charged once per strategy with nonzero coverage.

Read the results together

Total cost / proceeds is the actual modelled MYR amount. **Effective rate** is that total divided by Q. **Economic benefit** compares it with remaining unhedged. **Budget variance** compares it with $Q \times B$. Positive benefit or variance is favourable in either direction.

Use the coverage chart, cost/proceeds bars and settlement sensitivity lines with the comparison table. The table includes the standard coverage choices plus your custom choice without duplicating it. These charts show scenarios, not forecasts. **Reset** restores the selected case's original inputs.

Invalid or incomplete inputs hide the results until corrected. Rates and amounts accept at most six decimal places. Money is displayed to two decimals; effective-rate comparisons can show six.

04 / PUBLISHED SHARIAH BASIS

An Islamic FX hedging example

Selected structure: unilateral binding Wa'ad + later Sarf

This is an example of a structure permitted in published Malaysian SAC guidance. The approval relates to that described structure and its conditions. The fictional PLV case, software and numerical assumptions have no separate Shariah certification.

What is the approval basis?

Bank Negara Malaysia's announcement dated 25 August 2010 reports the SAC decision of 22 June 2010 permitting Islamic financial institutions to use a binding unilateral promise for FX hedging. It also states a restriction on consideration or a fee charged to the promisee for the promise. This manual uses a no-promise-fee example. [\[1\] BNM SAC resolution](#)

Real bank product references

Maybank Islamic Promissory FX (PFX-i) describes an Islamic FX forward using the customer's unilateral binding promise, with Wa'ad and Sarf as the underlying concepts. [\[2\] Product description](#)

UOB Malaysia Foreign Exchange Forward-i describes the customer undertaking on the deal date to buy foreign currency on a future value date, followed by the Sarf exchange on that date. This is the buy-side sequence used on page 6. [\[3\] Product description](#)

How to teach the sequence

Stage	What happens in this selected example
1. Promise	Customer makes a unilateral binding undertaking for the identified hedged amount, rate and date. No currency exchange is shown at this stage.
2. Preparation	Confirm the continuing business exposure, settlement instructions and availability of both currencies.
3. Currency exchange	On the stipulated date, assuming performance, the parties execute the actual exchange under the applicable Sarf requirements.

The cited 2010 resolution is dated guidance, not a complete statement of all current rules or all possible structures. Actual use depends on the bank's approved documentation and applicable requirements. Product references establish the teaching basis; they do not indicate endorsement of PLV or reproduce a bank's full agreement.

05 / WA'AD-BASED HEDGE CASH FLOWS

Worked example: USD importer

A fictional Malaysian importer must pay **USD 1,000,000** for goods on **13 January 2027**. On 13 October 2026 it selects **50% coverage** at **MYR 4.50 per USD 1**. Budget rate $B = 4.55$; $S_0 = 4.48$ for context; fees are off. The structural basis is on page 5; these are invented teaching figures.

At the promise and settlement dates

At the reference date, the customer undertakes to buy **USD 500,000** at the agreed rate on the settlement date. No currencies move in this initial illustration. At settlement, assuming performance:



If $ST = 4.80$, the remaining USD 500,000 is bought at spot for MYR 2,400,000. Total cost = 2,250,000 + 2,400,000 = **MYR 4,650,000**. The effective rate is 4.6500; the USD 1,000,000 is available for the supplier payment.

Coverage	MYR total cost	Benefit vs unhedged	Budget variance
0%	4,800,000	0	-250,000
50%	4,650,000	+150,000	-100,000
100%	4,500,000	+300,000	+50,000

The MYR 150,000 is a comparison

It is the difference between the unhedged cost of MYR 4,800,000 and the 50% hedged cost of MYR 4,650,000. Do not add a separate MYR 150,000 payout to the cash flows. The result is still MYR 100,000 worse than the MYR 4,550,000 budget.

If the ringgit strengthens instead

At $ST = 4.20$, 50% coverage costs MYR 4,350,000 versus MYR 4,200,000 unhedged: benefit **-MYR 150,000**. Full coverage still costs MYR 4,500,000. The opportunity cost does not, by itself, prove the original risk-management decision was poor.

06 / CHECK THE SIGNS AND UNITS

Exporter and fee examples

A fictional exporter expects **USD 500,000**. Set exporter mode, $F = 4.50$, $B = 4.55$, $ST = 4.20$, $h = 50\%$, with fees off. The customer undertakes to sell the hedged **USD 250,000**. At settlement, assuming performance, the hedge exchange reverses the importer's cash-flow directions:



The remaining USD 250,000 is sold at 4.20 for MYR 1,050,000. Total receipts = **MYR 2,175,000**; effective rate = 4.3500. A higher MYR receipt is favourable to this exporter.

Coverage	MYR proceeds	Benefit vs unhedged	Budget variance
0%	2,100,000	0	-175,000
50%	2,175,000	+75,000	-100,000
100%	2,250,000	+150,000	-25,000

If ST rises to 4.80, the same 50% hedge gives MYR 2,325,000 versus MYR 2,400,000 unhedged: benefit -MYR 75,000. The MYR-per-USD quote is never inverted in exporter mode.

Optional additional transaction-cost exercise

Exercise	Verified result
Importer, page 6; fixed MYR 1,000	Cost 4,651,000; benefit 149,000; effective rate 4.651000.
Exporter above; fixed MYR 1,000	Proceeds 2,174,000; benefit 74,000; effective rate 4.348000.
Importer; fixed MYR 100 plus MYR 0.001 per hedged USD	$K = 100 + (0.001 \times 500,000) = 600$. Cost 4,650,600; benefit 149,400.

These are generic extra transaction-cost assumptions, not quoted bank charges or a fee for the promise. Exclude spread already included in F . At 0% coverage K is zero. Keep fees off when presenting the no-promise-fee structure example on pages 5-6.

07 / FORMULA REFERENCE AND REMAINING RISKS

Understand the calculation

Let Q be the FCY exposure; h the coverage fraction; $H = Q \times h$ the hedged units; $U = Q - H$ the unhedged units. F , ST and B are MYR per FCY 1. Let K be additional MYR transaction costs. $\text{Baseline} = Q \times ST$; $\text{budget} = Q \times B$.

Calculation	Importer: payable	Exporter: receivable
Total MYR amount	$H \times F + U \times ST + K$	$H \times F + U \times ST - K$
Benefit vs unhedged	Baseline - total cost	Net proceeds - baseline
Budget variance	Budget - total cost	Net proceeds - budget
Effective rate	Total cost / Q	Net proceeds / Q

$K = 0$ when fees are off or $H = 0$; otherwise $K = \text{fixed MYR} + (\text{MYR per hedged FCY unit} \times H)$. S0 provides context only. Dates do not multiply the amounts. The engine retains decimal precision and rounds the displayed result.

Useful self-checks

At $h = 0$, the result equals $Q \times ST$ and no hedge fee applies. At $h = 1$, changes in ST do not change the conversion result. If $ST = F$, benefit is zero before fees and $-K$ after fees. Without fees, a partial hedge's effective rate lies between F and ST .

Four risks still remain

Risk	Question for the participant
Counterparty	Will the other party deliver the promised currency?
Liquidity	Will the required currency be available on settlement day?
Operational	Are dates, instructions and processing correct?
Forecast exposure	What if the order shrinks or the receipt arrives late?

Natural hedge and changed exposure

USD 1,000,000 payable less USD 600,000 usable receipts in the same relevant time bucket leaves USD 400,000 net payable. Do not net different currencies, late receipts or unavailable funds. If an exposure later shrinks, preserve the existing hedge record and discuss the resulting mismatch; the simulator does not cancel or resize the undertaking.

In Learn the Structure, complete the three-step ordering exercise and four concept checks.

08 / COMMIT BEFORE THE REVEAL

Run Hedge or Hold

Choose solo practice or local teams sharing one trainer-controlled computer. A game contains up to 12 selected rounds; each round is an independent exposure. The selected cases play in library order. It is not online multiplayer.

Step	What to do
1. Set up	Choose the rounds and up to 12 unique team nicknames. Use fictional data. Set timing and display preferences in Trainer Tools before a new game.
2. Read the brief	Review exposure, direction, dates, budget, F, S0, policy range, disclosed stress rates and tolerance. Keep the future settlement outcome hidden.
3. Decide and commit	Each team chooses coverage, writes its reasoning and answers four concept questions. Commit locks the choice, answers, scenario version, round ID and timestamp.
4. Reveal	After all teams commit, reveal the narrative event cards in sequence, then ST. Every team receives the same predetermined outcome.
5. Debrief and mark	Compare actual results and stress results. Award rationale marks with a written explanation before completing the round.
6. Continue or finish	Complete the round, then move to the next independent exposure, or finish early. Review the separate pending and marked results.

Timer and reload behaviour

The optional timer supports 15-1,800 seconds, pause and resume. A running deadline survives reload; paused time is retained. Expiry does not create a choice or auto-commit. There is no speed bonus. Reopen Hedge or Hold or its saved game to resume after reload. Uncommitted draft text is not saved.

Replays preserve the history

New attempt of this round creates a new attempt and retains prior commitments as superseded history. Those older attempts are excluded from ranking but remain in the JSON record. If the outcome is already known, use a different case for a fresh assessment.

Facilitator display rule

Keep Trainer Tools and exploration case titles off the participant projector before commitment: they may reveal outcomes. The trainer reveal gate is a classroom convenience, not authentication or exam security.

09 / 100-POINT LEARNING RUBRIC

Score the decision fairly

Component	Points	Award basis
Company policy	20	Coverage lies within the disclosed minimum and maximum, otherwise 0.
Stress-budget protection	40	Worst budget shortfall W across disclosed stress rates, compared with positive tolerance T.
Concept checks	20	Four questions, 5 points each, with explanations at debrief.
Rationale	20	Trainer gives 0-5 each for exposure, policy/budget, trade-offs and remaining risk; a written marking reason is required.

Stress score: an outcome-independent check

For each disclosed ST, calculate budget variance for the committed strategy. Its shortfall is $\max(0, -\text{variance})$. W is the largest such shortfall. If W is at most T, award 40. Otherwise:

$$\text{Risk points} = \max(0, 40 \times [1 - (W - T) / T])$$

W = T earns 40; W = 1.5T earns 20; W at or above 2T earns 0. The actual revealed settlement rate is not used to set this score.

Worked score: first importer case, 50% coverage

Use the page 6 figures, stress rates 4.20 / 4.55 / 4.90 and T = MYR 125,000. The worst cost occurs at 4.90: MYR 4,700,000 versus the MYR 4,550,000 budget. Therefore W = MYR 150,000.

Part	Calculation	Points
Policy	50% is within the case's disclosed range	20
Stress protection	$40 \times [1 - (150,000 - 125,000) / 125,000]$	32
Concepts	Four correct answers x 5	20
Automatic subtotal	Pending rationale	72 / 80
Rationale example	Four criteria at 5 each, with saved explanation	20
Marked total	72 + 20	92 / 100

Pending /80 subtotals and marked /100 totals have separate ranking groups. Points and denominators add across completed rounds; ties at the displayed one-decimal precision share a rank. Solo rationale remains self-review. Other scenarios have different policy ceilings, so 100% is not always aligned.

10 / TRAINER TOOLS

Prepare and facilitate a class

Open **Trainer Tools** privately, then **Open trainer workspace**. Set team nicknames and decision duration for the next game. Projector mode increases classroom readability; countdown is optional and reveal sound is off by default. Back up the library before changing an existing class setup.

Create a scenario that teaches one decision

Choose **Create scenario**, or Edit / Duplicate a case. Supply a fictional company and business purpose, direction, currency, Q, dates, S0, F, B, ST and any extra costs. Then enter policy minimum/maximum, positive tolerance T, comma-separated stress rates, up to eight narrative events (one per line) and debrief notes.

Check the rate units and date sequence, recalculate an anchor result, and review the narrative before marking a case trainer-reviewed. That label is a content-review status, not Shariah certification. Editing a built-in creates a custom copy. Custom edits increment the version; committed rounds keep their existing snapshot.

A practical 25-minute lesson

Time	Activity	Key question
0-5 min	Quick Demo; compare 0%, 50%, 100%	Why does a higher USD/MYR rate hurt an importer?
5-10 min	Promise, preparation and Sarf exchange	What actually moves on the promise date?
10-17 min	Read the brief; teams reason and commit	What choice is defensible before the outcome is known?
17-22 min	Reveal, compare results, mark rationale	Does a negative benefit prove poor risk management?
22-25 min	Natural hedge, exposure changes, backup	What risks remain even at full coverage?

Starter library coverage

The six starter cases cover USD importers and exporters under opposite settlement movements, a SGD importer and a EUR exporter. GBP is available in the scenario editor. Use contrasting policies and stress tolerances to avoid teaching one coverage percentage as universally correct.

Close the class with a recoverable record

Finish or save the game, review pending rationale assessments, export the full JSON backup, and retain participant reports if required. The app folder being in OneDrive does not back up browser storage.

11 / KEEP YOUR WORK PORTABLE

Save, export and restore

Explorations. Enter a session name and use **Save session**. Reopen, duplicate or delete with confirmation under **Results / Saved Sessions**. Save changed inputs as a new session to preserve the earlier snapshot.

Challenges. Successful commitments and state transitions save automatically. History includes scenario snapshots, team decisions, timestamps, outcomes and marks. Check any visible storage error; an unsuccessful write is not a saved action.

Full JSON backup: the recovery copy

1. Export. Choose **Export full JSON backup** in Results / Saved Sessions. Store the downloaded .json in a folder you control, such as a dedicated class backup folder.

2. Use the text fallback if needed. The export action also shows **Portable backup JSON**. Copy the full text into a UTF-8 .json file if your browser blocks downloads.

3. Validate before restoring. Choose **Import JSON** and select the file, or use **Restore from pasted JSON**. Read the validation preview, then **Apply import**.

4. Confirm the correct import type. A full backup replaces local data after confirmation; export current data first. Individual session/scenario imports add entries and handle colliding custom IDs by copying them. Invalid JSON leaves current data unchanged.

CSV comparison and participant PDF report

In the Simulator use **Export CSV**, or use a team's comparison CSV in challenge debrief. It contains assumptions, units, costs and calculated comparisons. Signed values may open as text in Excel because the export guards against spreadsheet formula injection.

Open **Participant report** or a revealed team's report, then **Print / Save as PDF**. In normal Edge/Chrome choose Save as PDF, landscape orientation and no browser headers/footers. Inspect the resulting report before sharing. The native print dialog and OS download completion were not verified in the embedded-browser test session.

Storage limit	Maximum
Saved sessions / custom scenarios	100 each
Teams / planned rounds per game	12 each
Retained attempts per game	120
Application data / imported JSON file	2 MB

Storage is specific to the device, browser profile and exact origin. Clearing browser data can remove it. Use fictional classroom data; there is no account, cloud sync or automatic OneDrive backup. Example imports are in the project's examples folder.

12 / GET BACK TO A WORKING SESSION

Troubleshooting and scope

Problem	Action
Node or npm not found	Install Node.js with npm, reopen the terminal and run SETUP again.
Production build missing	Run SETUP. Do not open dist/index.html directly.
Port 4173 is in use	If PLV is already running, open its URL. Otherwise stop the other service yourself, then retry START.
Browser cannot connect	Keep the server window open. Enter http://127.0.0.1:4173 exactly and read any terminal error.
Setup download fails	Check internet/proxy access to npm and retry SETUP. Keep the error text if it fails again.
Saved sessions are missing	Check the original browser/profile and address. Restore a JSON backup if data was cleared.
JSON is rejected	Read the field error; use a valid json backup within 2 MB and the supported schema. Current data is preserved.
Storage recovery error	Export the raw recovery file before restoring a valid backup or confirming reset-all.
Print or download is blocked	Use normal Edge/Chrome. Transfer work by JSON from the browser where it was created; storage is separate.

What this version verifies and models

The application build recorded 60 passing domain tests, two passing server tests, a successful type check and production build, and browser checks of calculations, learning, challenge, import and restore flows. Detailed evidence and limits are in **docs/TEST-RESULTS.md**.

The model compares settlement cash flows for one identified exposure. It assumes the business flow occurs, the undertaking is performed, counterparties deliver and currencies are available. It does not execute trades, obtain live quotes, certify Shariah compliance or calculate default compensation, cancellation costs, accounting or mark-to-market.

Local means this computer

The server listens only on 127.0.0.1. A phone cannot join it automatically. Responsive layout is available, but this version has no hosted classroom service, network joining or secure examination controls.

13 / REFERENCE DESK

Sources and terminology

Public source pages checked on 2 October 2026. Links below open the primary source; internet access is required. The numerical examples are PLV teaching assumptions, not bank quotes. Product terms may change.

[1] Bank Negara Malaysia. [Resolutions of the SAC, 25 August 2010](#). Reports the 102nd meeting decision on unilateral Wa'ad in forward currency hedging and the restriction on consideration for the promise.

[2] Maybank Islamic. [Promissory FX \(PFX-i\)](#). Public description of the customer's unilateral promise and the Wa'ad / Sarf concepts.

[3] UOB Malaysia. [Foreign Exchange Forward-i](#). Public customer buy-side undertaking and subsequent Sarf exchange sequence.

[4] Bank Negara Malaysia. [Shariah Resolutions in Islamic Finance, 2nd edition](#). See section 84, printed pages 137-139, for historical FX transaction discussion. This is a dated reference, not a complete current rulebook.

Terms used in this manual

Term	Meaning
Wa'ad	Promise or undertaking; this teaching example uses one binding unilateral customer promise.
Sarf / Bai' al-Sarf	Currency exchange; actual execution follows the applicable requirements and approved documentation.
FCY / MYR	Foreign currency / Malaysian ringgit.
Coverage	The proportion of the identified exposure hedged: H / Q.
Opportunity cost	An unfavourable comparison with the realised unhedged outcome; not a separate settlement payment.
Tolerance T	The disclosed positive MYR shortfall threshold used in the challenge's stress score.

PLV training contact

PLV Advance Business Consulting Sdn Bhd

Primus Lim | +60 16-252 9208

info@plvadvancebusiness.com | plvadvancebusiness.com

For education and simulation. Illustrative rates and simplified assumptions. No trade execution or Shariah certification.