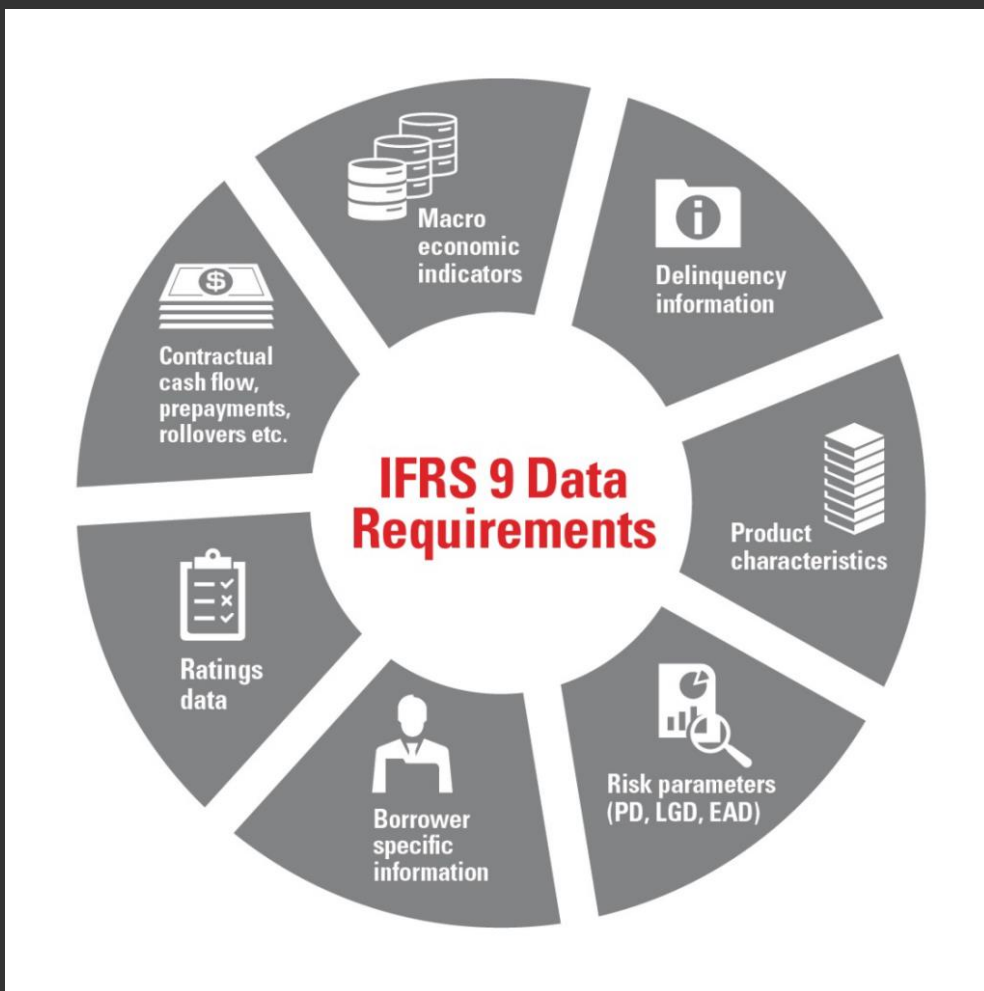
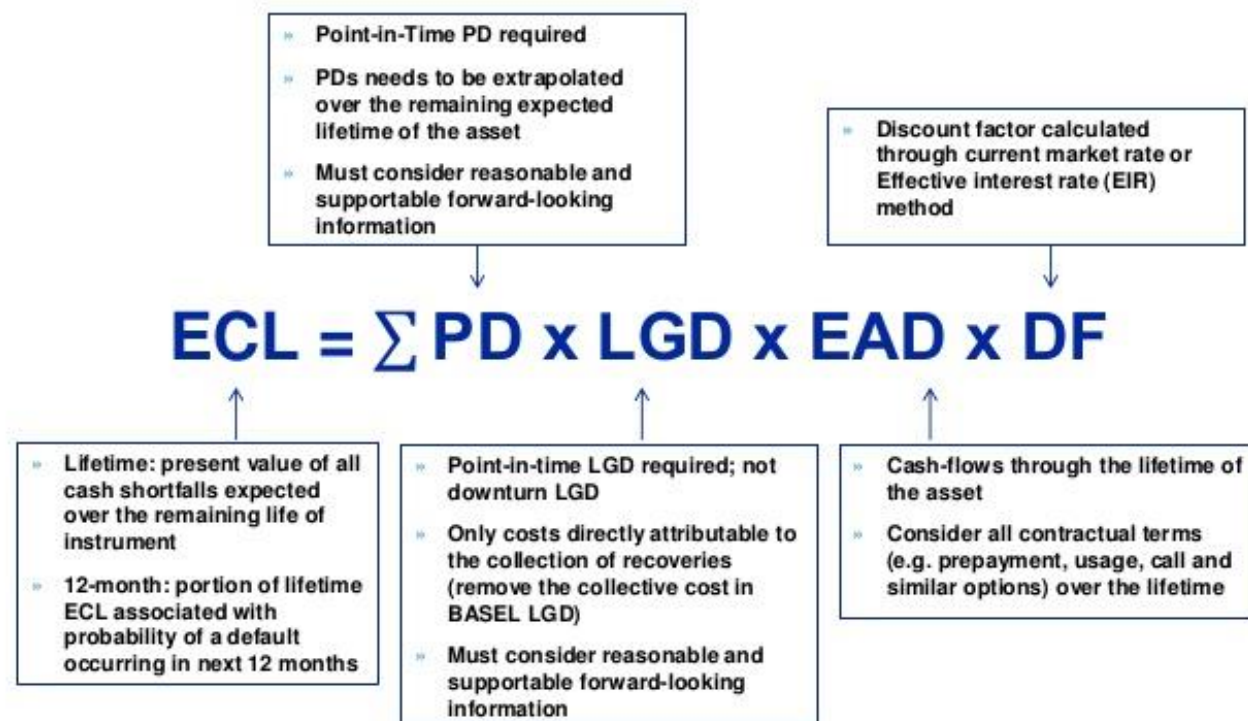


# ECL Calculator – User Manual



## Credit Loss calculation for IFRS 9



# IFRS 9 ECL Requirements Recap

*A host of complexities but essentially a very simple formula*

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$$ECL = EAD \times (PD \bullet Stage) \times LGD \times df$$

The diagram illustrates the ECL formula with callouts for each component:

- PD (Probability of Default):**
  - Outstanding
  - Committed
  - CCF
- Stage:**
  - 1, 2 or 3
  - Backwards transition
- LGD (Loss Given Default):**
  - Collateral
  - Haircut
  - LGD
- df (Discount Factor):**
  - Rating / DPD
  - 12mths
  - Lifetime

# Incorporated methodologies - EAD

*The Tool is based on several assumptions*

---

- ▶ This pertains to the amount outstanding with the Obligor at the time of likely default, including:-
  - ▶ **Drawn Amount**
    - ▶ This is attributable to the *amount of money actually drawn* (or used) by the Obligor from the approved/available line of credit.
    - ▶ The outstanding future amounts are projected based on *amortization assumptions* (straight line or bullet).
  - ▶ **Undrawn Amount**
    - ▶ This is attributable to the amount of money undrawn (or Unused) by the Obligor from the approved/available line of credit.
    - ▶ It can be *undrawn loans* or *off balance sheet commitments*, such as guarantees and LCs
  - ▶ **CCF**
    - ▶ The undrawn amounts are *converted* into likely future exposures using CCF factors (*20% / 50%* for less / greater than one year). This is fed as *input* to the Tool

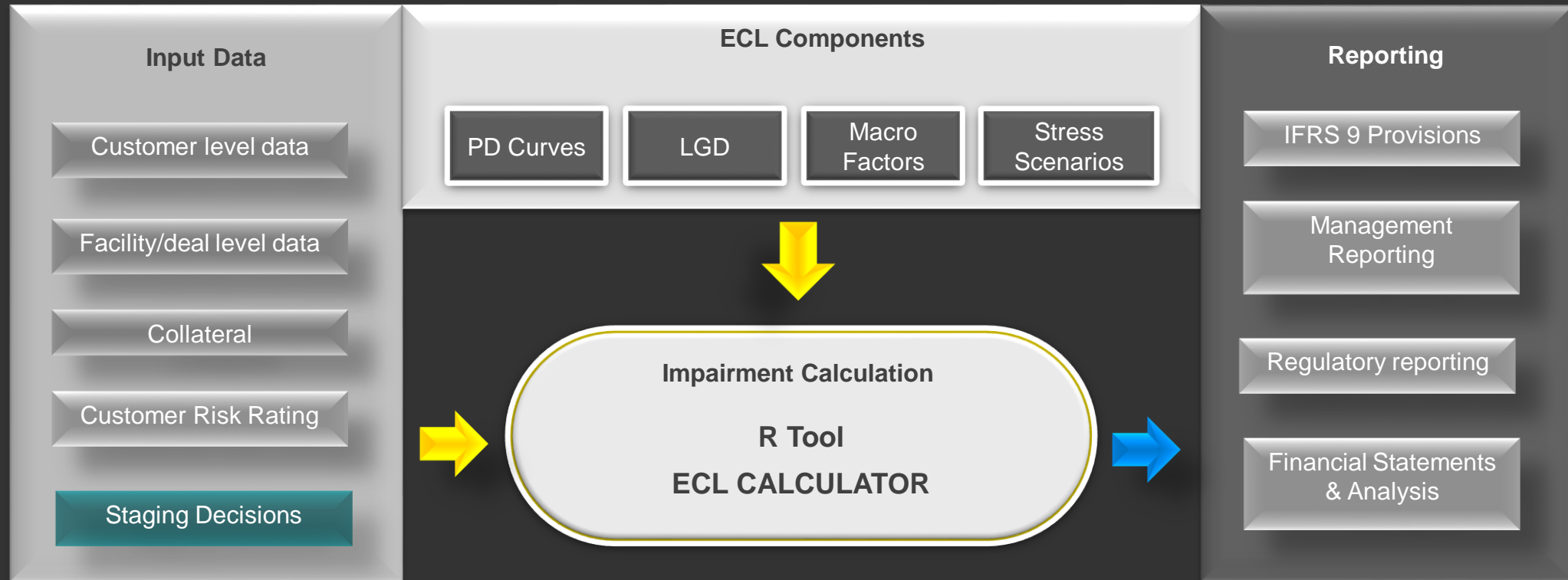
# Incorporated Methodologies - PD

*PD requires the application of complex statistical models*

- ▶ As required by the IFRS9, *PDs must be Forward Looking* and cover various *scenarios*. This is achieved as follows:-
  - ▶ **TTC and PiT PD**
    - ▶ *TTC PDs* represents the long term average historical default rates, fed as *input* to the Tool
    - ▶ Combining a TTC PD with a link function (*Vasicek*) will provide a forward looking *PiT PD*.
    - ▶  $Unconditional PD_T^{cum.} = 1 - (1 - Marginal Uncond. PD_{Constant})^T$
    - ▶  $PiT PD = \Phi\left(\frac{\Phi^{-1}(TTC PD) - \sqrt{\rho} * Z}{\sqrt{1 - \rho}}\right)$
  - ▶ **LGD**
    - ▶ LGD is an estimate of the loss that is likely to be incurred should an exposure actually default.
  - ▶ **Secured portion**
    - ▶ This pertains to the portion of a credit facility that is covered by *collateral* (i.e. Mortgage, Shares of Stocks, Cash)
    - ▶ *Haircuts* are established and applied on each collateral value, to conservatively adjust the values.
  - ▶ **Unsecured portion**
    - ▶ The *residual* amount of a credit facility, after deduction of the haircut adjusted collateral value.
    - ▶ For this portion an *LGD* of *XX%* has been assumed to be inputted by user
  - ▶ **Composite LGD**
    - ▶ The composite LGD is the *weighted average secured and unsecured* LGDs, *floored at xx%* to be inputted by user

# Tool Configuration

*Multiple calculations based on customer data and model assumptions*



# Tool Manual

## Components within the Tool

The screenshot shows the ECL Calculator web application. The browser's address bar contains the URL `27.0.0.1:4720`, which is circled in yellow with an arrow pointing to it from the text "By this url, Tool can be run from other systems besides host system.:". The application's left sidebar, titled "ECL Calculator", contains a menu with items: Introduction, Data Upload, User Inputs, Staging, LGD, ECL, and Audit Trail. This entire sidebar is circled in yellow, with an arrow pointing to it from the text "Menu items". The main content area has a tab labeled "User Manual" selected, with an arrow pointing to it from the text "User Manual to operate the Tool". The content under the "User Manual" tab is titled "IFRS 9 and expected loss provisioning" and includes sections on "What's different about impairment recognition under IFRS 9?", "Expected credit loss framework - scope of application", and "Three stages of impairment".

By this url, Tool can be run from other systems besides host system.:

Menu items

User Manual to operate the Tool

### IFRS 9 and expected loss provisioning

The International Accounting Standards Board (IASB) and other accounting standard setters set out principles-based standards on how banks should recognise and provide for credit losses for financial statement reporting purposes. In July 2014, the IASB issued International Financial Reporting Standard 9 - Financial Instruments (IFRS 9), which introduced an expected credit loss (ECL) framework for the recognition of impairment. This Executive Summary provides an overview of the ECL framework under IFRS 9 and its impact on the regulatory treatment of accounting provisions in the Basel capital framework

#### What's different about impairment recognition under IFRS 9?

Effective for annual periods beginning on or after 1 January 2018, IFRS 9 sets out how an entity should classify and measure financial assets and financial liabilities. Its scope includes the recognition of impairment. In the standard that preceded IFRS 9, the 'incurred loss' framework required banks to recognise credit losses only when evidence of a loss was apparent. Under IFRS 9's ECL impairment framework, however, banks are required to recognise ECLs at all times, taking into account past events, current conditions and forecast information, and to update the amount of ECLs recognised at each reporting date to reflect changes in an asset's credit risk. It is a more forward-looking approach than its predecessor and will result in more timely recognition of credit losses.

#### Expected credit loss framework - scope of application

Under IFRS 9, financial assets are classified according to the business model for managing them and their cash flow characteristics. In essence, if (a) a financial asset is a simple debt instrument such as a loan, (b) the objective of the business model in which it is held is to collect its contractual cash flows (and generally not to sell the asset) and (c) those contractual cash flows represent solely payments of principal and interest, then the financial asset is held at amortised cost. The ECL framework is applied to those assets and any others that are subject to IFRS 9's impairment accounting, a group that includes lease receivables, loan commitments and financial guarantee contracts. For the sake of simplicity, the remainder of this Summary will focus on the ECL framework as it applies to loans.

#### Three stages of impairment

Impairment of loans is recognised - on an individual or collective basis - in three stages under IFRS 9:

Stage 1 - When a loan is originated or purchased, ECLs resulting from default events that are possible within the next 12 months are recognised (12-month ECL) and a loss allowance is established. On subsequent reporting dates, 12-month ECL also applies to existing loans with no significant increase in credit risk since their initial recognition. Interest revenue is calculated on the loan's gross carrying amount (that is, without deduction for ECLs). In determining whether a significant increase in credit risk has occurred since initial recognition, a bank is to assess the change, if any, in the risk of default over the expected life of the loan (that is, the change in the probability of default, as opposed to the amount of ECLs).

Stage 2 - If a loan's credit risk has increased significantly since initial recognition and is no longer considered low, lifetime ECLs are recognised. The calculation of interest revenue is the same as for Stage 1.

Stage 3 - If the loan's credit risk increases to the point where it is considered credit-impaired, interest revenue is calculated based on the loan's amortised cost (that is, the gross carrying amount less the loss allowance). Lifetime ECLs are recognised, as in Stage 2.

# Tool Manual

## *Components within the Tool*

The screenshot displays the ECL Calculator application interface. On the left is a dark sidebar with a menu containing 'Introduction', 'Data Upload' (highlighted with a yellow arrow), 'User Inputs', 'Staging', 'LGD', 'ECL', and 'Audit Trail'. The main content area has a blue header with 'ECL Calculator' and a hamburger menu icon on the left, and an 'IFRS 9' logo with a cursor icon on the right. Below the header, there are three upload sections: 'Upload Bank Raw Data' with a file named 'Bank\_Demo\_data.xlsx', 'Upload Haircut Data' with a file named 'Haircuts.xlsx', and 'Upload TTC PD File' with a file named 'TTC\_PD.xlsx'. Each section shows a 'Browse...' button and a blue progress bar with the text 'Upload complete'. To the right of these sections is a button labeled 'Upload Data', which is circled in black. Below this button, a text annotation reads: 'After uploading corresponding datasets, click 'Upload Data' button. A message box appears to confirm the same'.

ECL Calculator

IFRS 9

Introduction

Data Upload

User Inputs

Staging

LGD

ECL

Audit Trail

Upload Bank Raw Data

Browse... Bank\_Demo\_data.xlsx

Upload complete

Upload Haircut Data

Browse... Haircuts.xlsx

Upload complete

Upload TTC PD File

Browse... TTC\_PD.xlsx

Upload complete

Upload Data

After uploading corresponding datasets, click 'Upload Data' button  
A message box appears to confirm the same

# Tool Manual

## Components within the Tool

ECL Calculator

Introduction

Data Upload

User Inputs

Staging

LGD

ECL

Audit Trail

Select Unsecured LGD :

0

0.75

1

Select Floored LGD :

0

0.1

1

Select Stage 2 DPD Threshold

30

Select Stage 3 DPD Threshold

90

Update haircut values

Delete

Add New

Edit Data

Data Selection ☒ single ☐ multiple

Show 

10

 entries Search:

	COLLATERAL_TYPE	DESCRIPTION	HAIRCUTS
1	1	Bank Guarantee	0.1
2	2	Fire Insurance	1
3	3	Real estate	0.5
4	4	Government Guarantee	0.1
5	5	Certified Cheques	1
6	6	Project Assets Mortgage	1
7	7	Shares/Bonds	0.5
8	9	Boat / Ship Mortgage	0.9
9	10	Commercial Mortgage	1

IFRS 9

User input selection tab: various options include

A) unsecured LGD

B) Floored LGD

C) Stage 2 DPD threshold

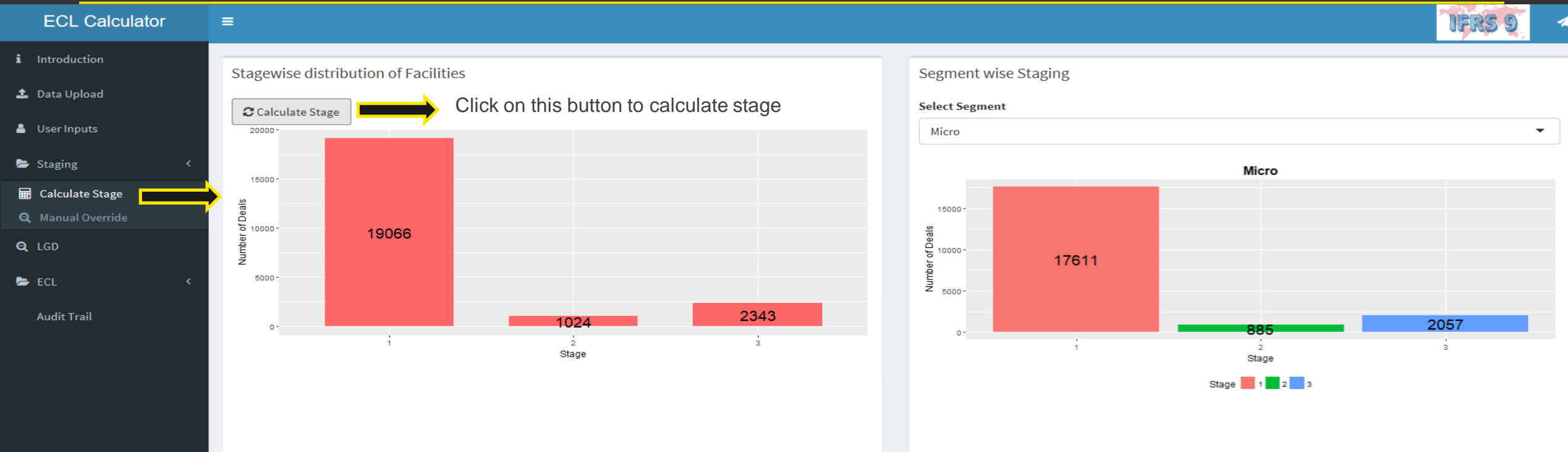
D) Stage 3 DPD threshold

E) Add/modify haircut values



# Tool Manual

Components within the Tool



# Tool Manual

## Components within the Tool

ECL Calculator

Introduction

Data Upload

User Inputs

Staging

Calculate Stage

Manual Override

LGD

ECL

Audit Trail

Delete

Add New

Edit Data

Data Selection

single

multiple

Search for Facility or Customer ID to see staging calculation

Search:

Show 10 entries

	CUSTOMER_ID	FACILITY_ID	SEGMENT	MATURITY_DATE	DPD	WATCHLIST_FLAG	RESTRUCTURED_FLAG	STAGE_EXPIRED_RULE	STAGE_DPD_RULE	STAGE_WATCHLIST_RULE	STAGE_RESTR
1	1001120	101092028	PF	2010-10-01	2679	N	Y	3	3	1	
2	1001233	24968	PF	2020-04-04	0	N	N	0	1	1	
3	1001266	101096303	PF	2004-09-30	6606	N	Y	3	3	1	
4	1001456	101096005	Corporate	2001-05-25	7099	N	N	3	3	1	
5	1001496	100000708	Retail	2014-12-31	6759	N	N	3	3	1	
6	1001549	38093	Retail	2022-09-07	55	N	N	0	2	1	
7	1001620	101095317	Corporate	2004-01-13	6868	N	Y	3	3	1	
8	1001729	101096104	Retail	2001-03-18	7532	N	N	3	3	1	
9	1001884	51287	Retail	2018-01-03	28	N	N	3	1	1	
10	1001975	101097251	Micro	2018-02-15	503	N	Y	0	3	1	

Showing 1 to 10 of 22,433 entries

Previous

1

2

3

4

5

...

2244

Next

See all the staging calculation and manually override any account stage by selecting the row and clicking Edit Data

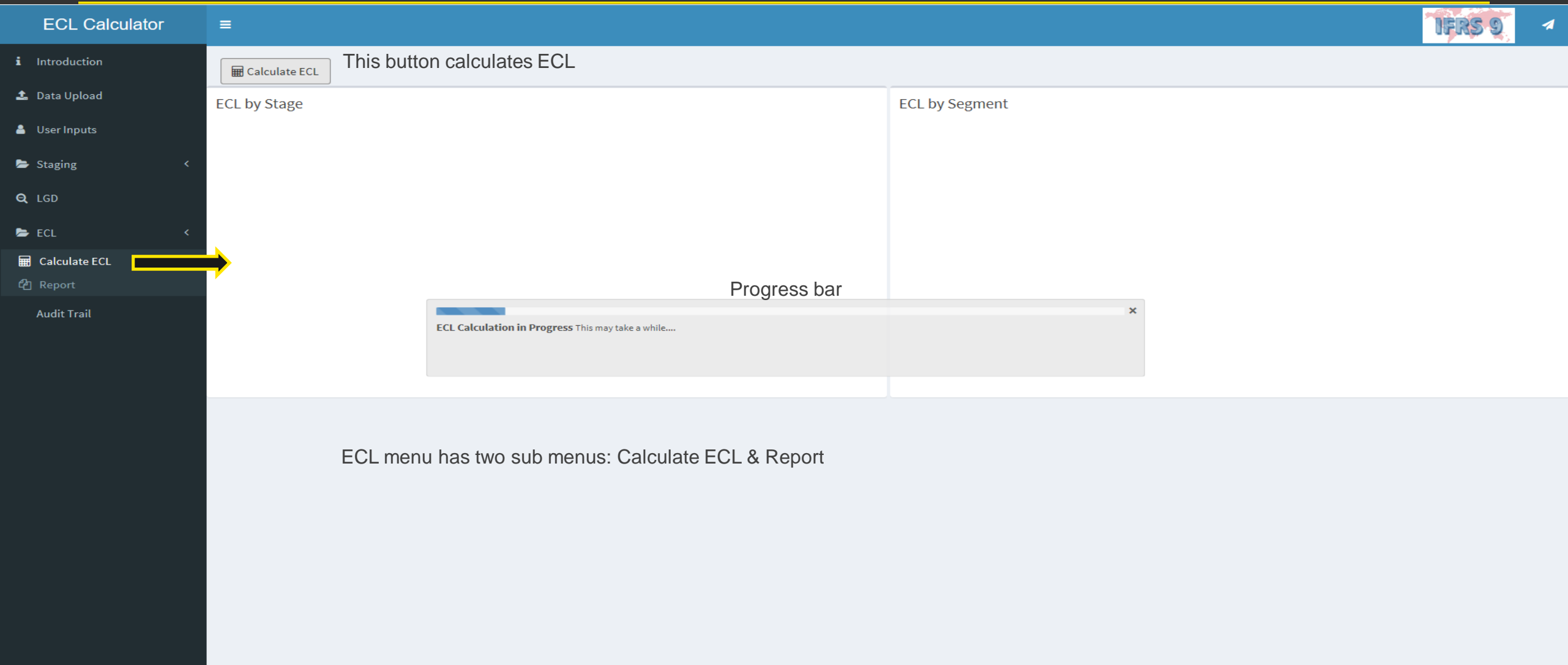
# Tool Manual

## Components within the Tool

ECL Calculator					IFRS 9	
<div> <div> Introduction Data Upload User Inputs Staging Calculate Stage Manual Override <b>LGD</b> ECL Audit Trail </div> <div> <div> Show 20 entries LGD Calculation </div> <div> <div>Search:</div> <div></div> </div> </div> </div>						
	CUSTOMER_ID	TotalHCadjColl	TotalEAD	LGD		
1	1001233	0	187639.67	0.75		
2	1001266	495000	1373550.24	0.48		
3	1001456	37000	328582.81	0.67		
4	1001549	0	77174.33	0.75		
5	1001620	187000	841858.04	0.58		
6	1011274	0	4666.11	0.75		
7	1011359	0	3850	0.75		
8	1011458	0	4800.8	0.75		
9	1011534	0	2000	0.75		
10	1011679	1250	2500	0.38		
11	1011683	900	1140	0.16		
12	1011717	0	12546.59	0.75		
13	1011730	0	4604	0.75		
14	1011812	6000	6263.71	0.1		
15	1011879	0	1835	0.75		
16	1011914	0	2700	0.75		
17	1012042	0	1800	0.75		
18	1012131	0	4950	0.75		
19	1012205	1250	1498	0.12		

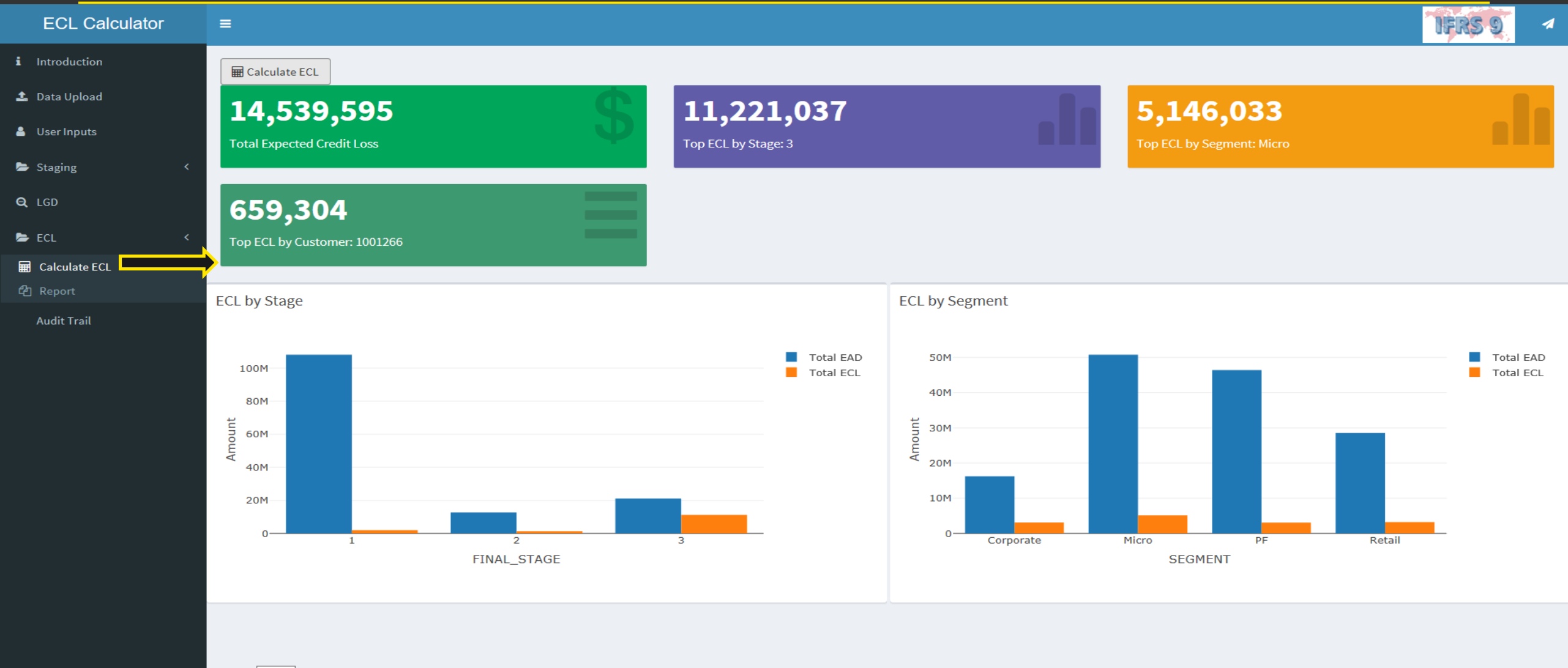
# Tool Manual

## *Components within the Tool*



# Tool Manual

Components within the Tool



# Tool Manual

## Components within the Tool

ECL Calculator

Introduction

Data Upload

User Inputs

Staging

LGD

ECL

Calculate ECL

Report

Audit Trail

IFRS 9

Show 20 entries

Search:

	FACILITY_ID	CUSTOMER_ID	SEGMENT	MIS_DATE	MATURITY_DATE	PRINCIPAL_PAYMENT_FREQUENCY	INTEREST_PAYMENT_FREQUENCY	OUTSTANDING_BALANCE	UNDRAWN_COMMIT	INTEREST_RATE	DISCOUNT_RATE	DPD	LGD	FINAL
1	127	2500138	PF	2018-01-31	2018-11-09	4	4	37730.87	0	0.03	0.03	0	0.1	
2	1630	2500182	PF	2018-01-31	2019-01-01	4	4	39380.51	0	0.03	0.03	0	0.1	
3	3905	2500208	PF	2018-01-31	2019-06-01	4	4	85875.87	0	0.03	0.03	0	0.1	
4	4434	2500226	Corporate	2018-01-31	2019-08-20	4	4	49732.9	0	0.03	0.03	0	0.1	
5	4466	2500228	PF	2018-01-31	2019-06-23	4	4	188101.01	0	0.03	0.03	0	0.1	
6	4802	2500237	PF	2018-01-31	2018-11-30	4	4	140798.66	0	0.03	0.03	0	0.1	
7	4839	2500238	PF	2018-01-31	2018-02-28	4	4	35896.27	0	0.03	0.03	0	0.75	
8	4981	2500243	PF	2018-01-31	2018-10-21	4	4	97258.43	0	0.03	0.03	0	0.75	
9	5681	2500264	PF	2018-01-31	2019-10-25	4	4	134681.77	0	0.03	0.03	0	0.75	
10	6126	2500262	PF	2018-01-31	2018-05-03	4	4	63763.03	0	0.03	0.03	0	0.13	
11	6321	2500278	PF	2018-01-31	2018-07-17	4	4	51551.94	0	0.03	0.03	0	0.1	
12	7368	2500303	PF	2018-01-31	2018-12-31	4	4	143221.16	0	0.03	0.03	0	0.75	
13	7655	2500308	PF	2018-01-31	2018-06-18	4	4	37376.76	0	0.03	0.03	0	0.1	
14	8683	2500108	PF	2018-01-31	2019-01-10	4	4	136647.09	0	0.03	0.03	0	0.75	
15	8691	2500327	PF	2018-01-31	2020-07-30	4	4	165504.4	0	0.03	0.03	0	0.75	
16	8789	2500335	Corporate	2018-01-31	2019-07-15	4	4	24999.55	0	0.03	0.03	16	0.1	
17	8937	2500336	PF	2018-01-31	2019-03-01	4	4	193271.61	0	0.03	0.03	0	0.75	
18	9481	2500346	PF	2018-01-31	2018-06-30	4	4	28644.23	0	0.03	0.03	0	0.1	
19	9780	1500532	Retail	2018-01-31	2018-02-26	4	4	359.07	0	0.03	0.03	0	0.1	
20	9818	2301616	Retail	2018-01-31	2018-04-01	4	4	1074.06	0	0.03	0.03	0	0.47	

Showing 1 to 20 of 25,433 entries

Generate Report

Generate a copy of the Report

Page 14

ECL Calculator: User Manual

# Tool Manual

## Components within the Tool

ECL Calculator

Introduction

Data Upload

User Inputs

Staging

LGD

ECL

Calculate ECL

Report

Audit Trail

Enter Unique ID

127

Check ECL computation

Enter unique ID and click 'Check ECL Computation' button to see the underlying ECL calculation

FACILITY_ID	CUSTOMER_ID	SEGMENT	MIS_DATE	MATURITY_DATE	PRINCIPAL_PAYMENT_FREQUENCY	INTEREST_PAYMENT_FREQUENCY	OUTSTANDING_BALANCE	UNDRAWN_COMMIT	INTEREST_RATE	DISCOUNT_I
127.00	2500138.00	PF	17562.00	17844.00	4.00	4.00	37730.87	0.00	0.03	

Upper table shows information of the account corresponding to unique ID provided

Second table shows ECL calculation

Dates	datediff	prIndicator	intIndicator	repayment	PrinEAD	accrnt	intpayment	intEAD	totalEAD	FinalEAD	daysdiscount	segment	PDrating	PDyear	concatenate	YearPD	PD	LGD	c
17844.00	NA	1.00	1.00	9432.72	0.00	NA	71.33	0.00	0.00	0.00	0.00	PF	1.00	1.00	1PF	0.01	0.00	0.10	
17813.00	-31.00	0.00	0.00	0.00	9432.72	24.03	0.00	71.33	9504.05	9504.05	282.00	PF	1.00	1.00	1PF	0.01	0.00	0.10	
17783.00	-30.00	0.00	0.00	0.00	9432.72	23.26	0.00	47.29	9480.01	9480.01	251.00	PF	1.00	1.00	1PF	0.01	0.00	0.10	
17752.00	-31.00	1.00	1.00	9432.72	9432.72	24.03	142.65	24.03	9456.75	9456.75	221.00	PF	1.00	1.00	1PF	0.01	0.00	0.10	
17721.00	-31.00	0.00	0.00	0.00	18865.44	48.07	0.00	142.65	19008.09	19008.09	190.00	PF	1.00	1.00	1PF	0.01	0.00	0.10	
17691.00	-30.00	0.00	0.00	0.00	18865.44	46.52	0.00	94.59	18960.02	18960.02	159.00	PF	1.00	1.00	1PF	0.01	0.00	0.10	
17660.00	-31.00	1.00	1.00	9432.72	18865.44	48.07	207.00	48.07	18913.50	18913.50	129.00	PF	1.00	1.00	1PF	0.01	0.00	0.10	
17630.00	-30.00	0.00	0.00	0.00	28298.15	69.78	0.00	207.00	28505.16	28505.16	98.00	PF	1.00	1.00	1PF	0.01	0.00	0.10	
17599.00	-31.00	0.00	0.00	0.00	28298.15	72.10	0.00	137.23	28435.38	28435.38	68.00	PF	1.00	1.00	1PF	0.01	0.00	0.10	
17571.00	-28.00	1.00	1.00	9432.72	28298.15	65.12	27.91	65.12	28363.28	28363.28	37.00	PF	1.00	1.00	1PF	0.01	0.00	0.10	
17562.00	-9.00	0.00	0.00	0.00	37730.87	27.91	0.00	27.91	37758.78	37758.78	9.00	PF	1.00	1.00	1PF	0.01	0.00	0.10	