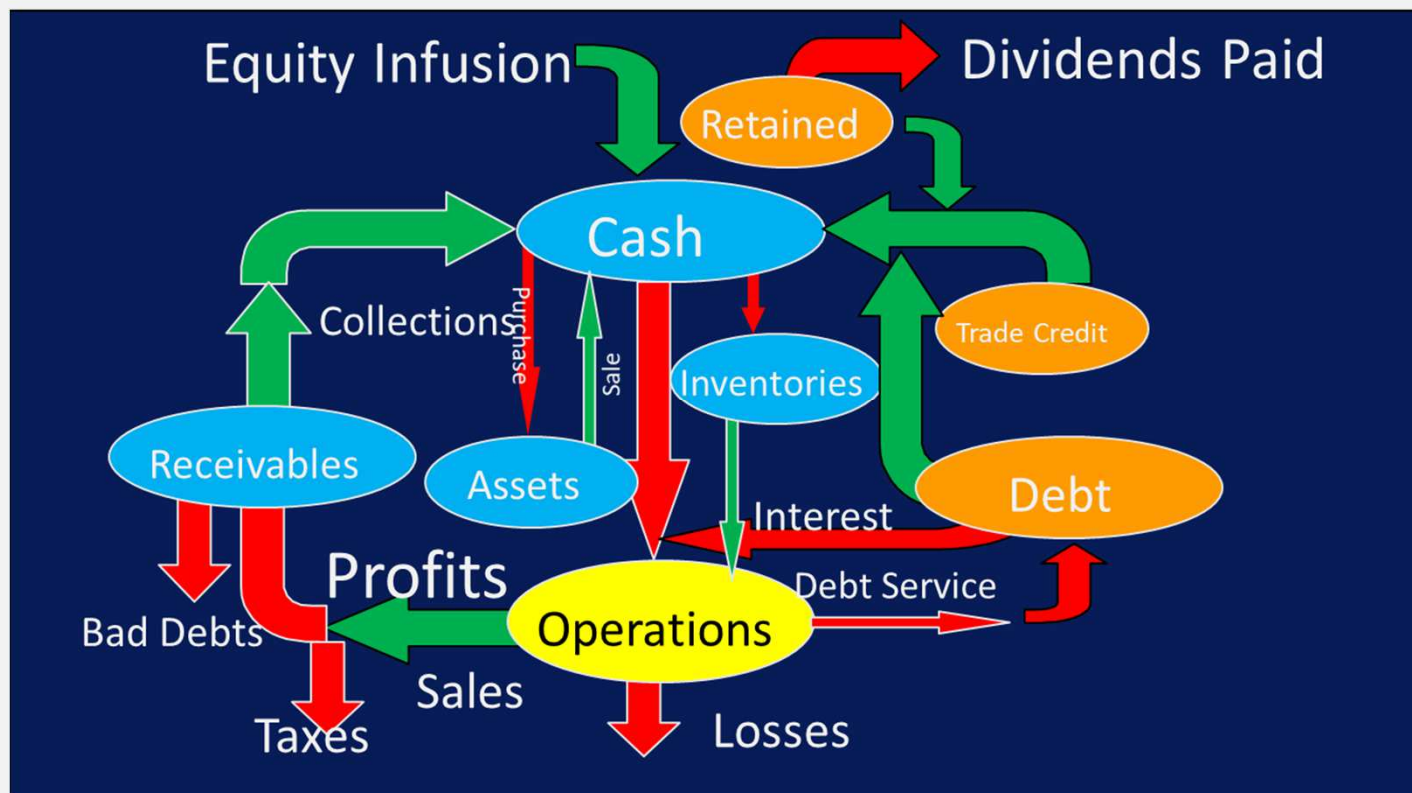




# Introduction to Financial Modeling



# The Modeler's Key Objective is to Best Reproduce the Utilities Fund Flow System



Organization  
Reduces the  
Madness!!



# Key Components of a WSS Financial Model

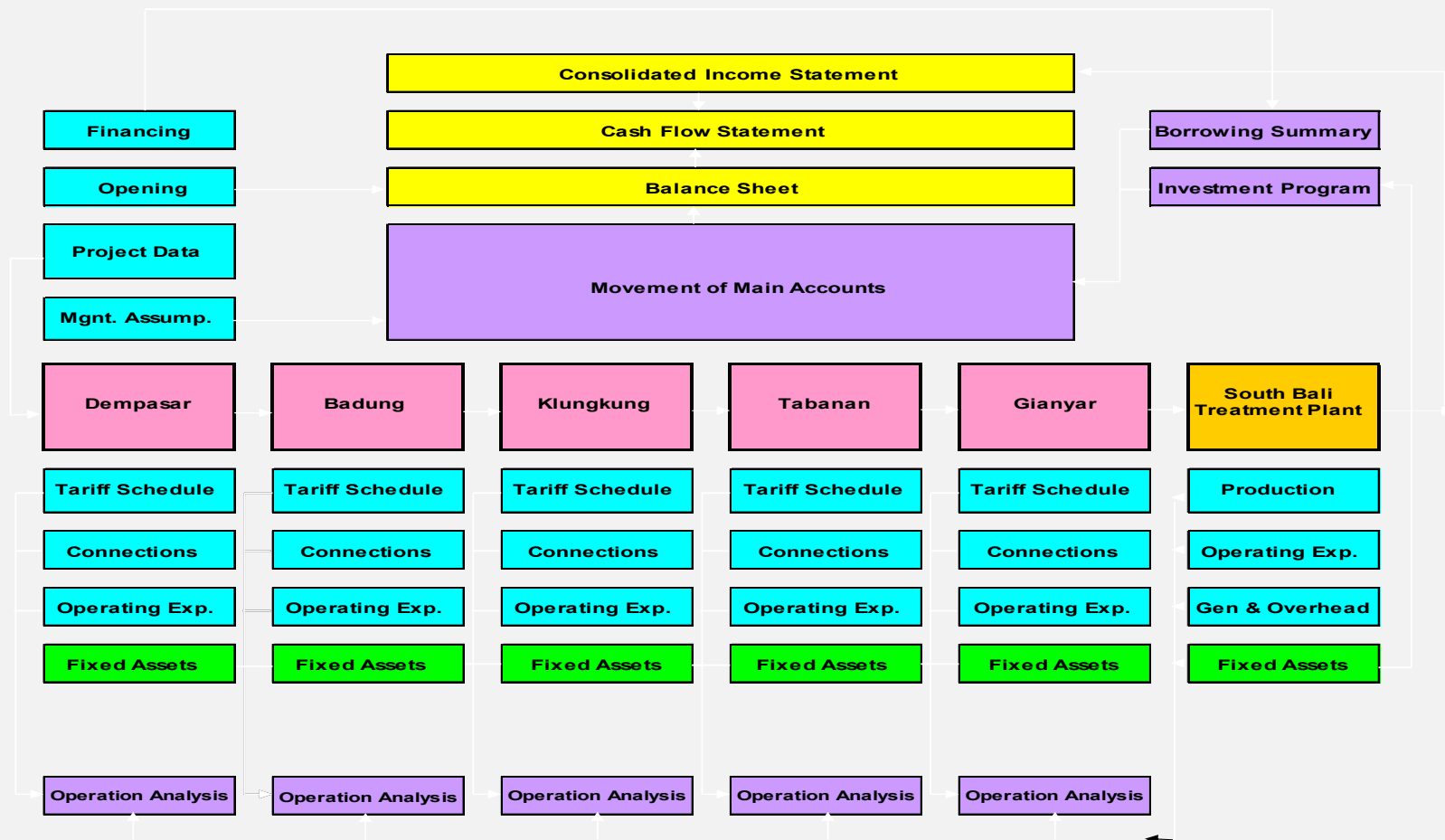
## Financial Module

- Income Statement
- Cash Flow
- Balance Sheet
- Investment Program
- Borrowing Summary
- Account Movements

## Operations Module

- Installed Capacity
- Revs. & Production
- Operating Expenses
- Financial Management Assumptions
- Projected Returns

# Conceptual Design of Regional Company Financial Model



# How I Organize Models

- Title
- Dashboard
- Project Data Sheet
- Opening Balance Sheet
- Management Assumptions
- Demand, Production & Operations
- Investment (CAPEX) Program
- Financing Options
- Output Statements
- Movement of Accounts
- Rate of Return Calculations

# The Dashboard

- Extremely useful schedule as it allows to view a summary of indicators and carry out simulations directly.
- Should include:
  - Demographic data
  - Average tariffs
  - Key performance indicators
  - Financing Options & Results
  - Cash flow Results
  - Project probability indicators
  - Projected key indicators

## Major Water Utility

Project Demographics	
	2016
Total Population	603,296
Population Growth Rate	1.8%
Individuals per Household	4.4
Number of Households	137,113
Number of Residential Connections	52,575
Monthly Income of Low Income HH	9,439
Effective Water Tariff (PHP/m <sup>3</sup> )	29.24
Environmental Tariff	3.00
Non-Revenue Water (NRW)	33.0%
Minimum Charge for first 10 m <sup>3</sup>	208.00
Average Usage (m <sup>3</sup> /Connection/Day)	0.85
Opening Total Water Connections	52,575
Percent of Population Served	231,330
Percent Coverage	38.3%
Average Monthly Water Bill	619
Percent of Monthly Bill	6.6%
Min. Charge & Env Fee to Low Income	2.2%

Max Service Coverage	42.4%
Year for Max Coverage	2021

Sources and Uses Statement		in MM Pesos	
Uses			%
Capital Expenditure	311	97%	
Interest During Construction	8	3%	
<b>Total</b>	<b>319</b>	<b>100%</b>	
Sources			%
Outstanding Loans	-	0.0%	
Commercial loan 1	100	31.3%	
Commercial loan 2	-	0.0%	
Subsidized Govt. Loan	-	0.0%	
Internal Generated Financing	219	68.7%	
Government Capex Grants	-	0.0%	
LGU Contributions	-	0.0%	
<b>Total</b>	<b>319</b>	<b>100%</b>	

Financing Plan & Returns	
Project NPV (in PHP million)	1,099
Project FIRR	19.7%
Discount Rate	8.0%

Operational and Financial Results											
Projection Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Percent Coverage	40.1%	40.6%	41.2%	41.8%	42.4%	41.6%	40.9%	40.2%	39.5%	38.8%	38.1%
Net Income	132.69	132.69	112.88	125.83	150.06	171.07	154.24	157.46	162.32	164.77	168.19
Operating Cash Flow	215.26	194.02	218.03	248.63	274.82	250.54	252.96	257.53	258.76	260.26	259.90
Operating Cost Coverage Ratio	1.81	1.58	1.64	1.72	1.80	1.69	1.70	1.72	1.72	1.72	1.72
Service Connections	55,817	59,230	62,823	66,607	70,592	70,592	70,592	70,592	70,592	70,592	70,592
Total Assets: Less Savings Accounts (MM Pesos)	888	993	1,008	1,019	1,036	1,022	1,004	985	966	947	928
Return on Capital	17.8%	13.0%	12.3%	12.6%	12.7%	10.3%	9.5%	8.9%	8.2%	7.8%	7.3%
Return on Fixed Assets	15.4%	13.0%	14.4%	17.0%	20.0%	18.6%	19.6%	20.9%	21.9%	23.1%	24.1%
Return on Investment (ROI)	14.95%	13.36%	11.20%	12.35%	14.49%	16.74%	15.36%	15.99%	16.81%	17.40%	18.13%
Water Losses	33.0%	33.0%	29.0%	29.0%	29.0%	27.0%	26.0%	26.0%	23.0%	23.0%	23.0%
Consolidated Water Surplus (Deficit) Mm <sup>3</sup> /year	7.2	7.2	5.9	4.6	3.9	3.2	3.5	4.5	4.5	4.5	4.5
Staff Productivity Index (Staff/000 SC)	5.29	4.79	4.41	3.95	3.54	3.54	3.54	3.54	3.54	3.54	3.54
Debt Service Coverage Ratio	3.09	3.20	3.55	4.57	4.44	3.78	3.90	4.04	4.14	4.25	4.33
Ratio of Min. Charge & Env. Fee to Income	2.20%	2.52%	2.52%	2.52%	2.52%	2.52%	2.52%	2.52%	2.52%	2.52%	2.52%

## Project Concept: Consolidated Expected Performance

Analytical Perspective: NRW Reduction & Connections						
Connection Program and Performance Indicators						
	2017	2018	2019	2020	2021	2022
New Connections	3,242	3,413	3,593	3,784	3,985	4,195
NRW	33%	29%	29%	29%	27%	27%
Cash on hand (days)	30	30	30	30	30	30
Collection Ratio	97%	97%	97%	97%	97%	97%
Days Inventories	35	35	35	30	30	30
Staff (1000 Connections)	4	4	4	4	4	4

Investment Program and Financing					
	2017	2018	2019	2020	2021
<b>Investment Program (PHP Millions)</b>					
Loans					
Commercial Loan 1		50	50		
Commercial Loan 2					
Concessional Loan 3					
Outstanding Loans					
Total Loans	50	50	-	-	-
<b>Capital Contributions</b>					
WSP Internal Generation	67	57	30	32	33
Use of Short-Term Deposits	-	-	-	-	-
National Government Grants					
LGU Contributions					
Total Capital	67	57	30	32	33
Total Financing	117	107	30	32	33
Additional Equity Needed	-	-	-	-	-

Loan Financing Terms			
	Commercial		Subsized
	Loan 1	Loan 2	Loan 3
- Interest Rate	8%	0%	0%
- Tenor	12	-	-
- Grace Period - Principal	2	-	-
- Grace Period - Interest	-	-	-
- First Drawdown	2017	0	0

Debt Service Viability		DIE & DFA Ratios	
Sufficient Cumulative Cash Flow ?	Yes	Debt to Equity Ratio	0.82
Lowest Annual DSCR (Total)	3.20	Commercial Debt/ CAPEX	31%
Balance Sheet Check	OK		





# Opening Balance Sheet

Opening Positions Are Expressed in:		Million Riels	
ASSETS	2009	LIABS & EQUITY	2009
Cash & Equivalents	45,798	Trade and Other Payables	213,665
Trade and Other Receivables	137,623	Interest Payable	22,410
Inventories	66,123	Income tax Payable	3,641
Other Current Assets	144,607	Short term Borrowings	78,092
Short-Term Deposits	-		
<b>Total Current</b>	<b>394,151</b>	<b>Total Current Liabilities</b>	<b>317,808</b>
		Fx Loans	239,975
		LC Loans	-
		Accumulated FX Losses	-
Property, Plant and Equipment	669,966	Customer Deposits	53,787
Construction Work in Process	11,000	Provision for Retirement Benefits	765
Capitalized Interest	100	Capital	605,698
		Retained Earnings	(152,679)
Intangible Assets	137		
Accumulated Depreciation	10,000		
<b>Total Non Current</b>	<b>671,203</b>	<b>Total Long Term Liabilities and Equit</b>	<b>747,546</b>
<b>Total Assets</b>	<b>1,065,354.0000</b>		<b>1,065,354.0000</b>

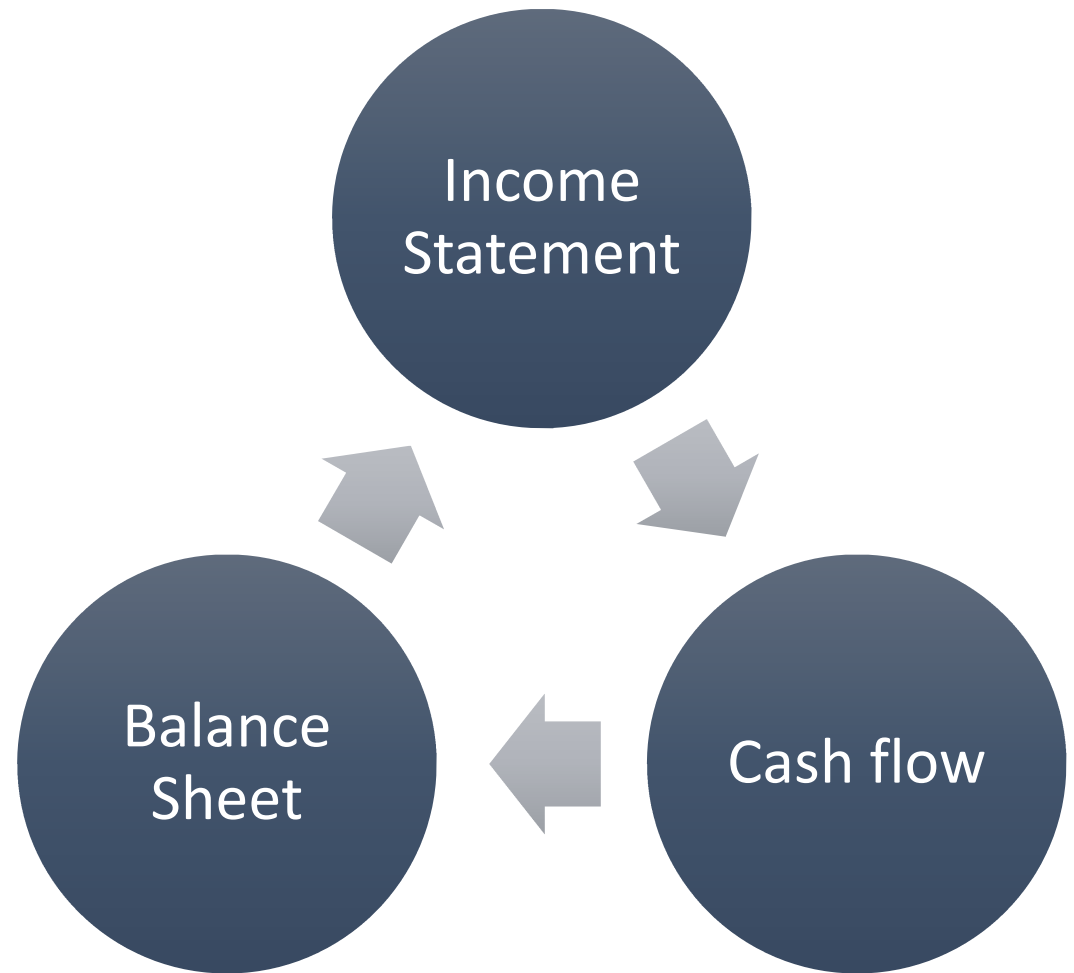


# Financial Management Parameters

	2010	2011	2012	2013	2014	
Cash Position	0.7	0.7	0.7	0.7	0.7	Months of Operating Expenses
Provision for Bad Debt	1%	1%	1%	1%	1%	On Outstanding Receivables
Power Accounts Receivable	1.2	1.2	1.2	1.2	1.2	Months of Annual Revenues
Inventories	0.5	0.5	0.5	0.5	0.5	Months of Operating Expenses
Other Current Assets	50.0	60.0	60.0	60.0	60.0	Days of Operating Expenses
Interest Earned	6%	5%	5%	5%	5%	Earned on Short-Term Deposits
Short Term Borrowings						Percent of CAPEX
Accounts Payable	2.1	2.0	2.0	2.0	2.0	Months of Operating Expenses
Tax on Interest						
Customer Deposits	0.065	0.065	0.065	0.065	0.065	Amount per New Service Connection
Taxes Payable	0.3	0.3	0.3	0.3	0.3	Months of Income Tax Change
Interest Payable	1	1	1	1	1	Months of Interest Expense
Income Taxes	20%	20%	20%	20%	20%	On Profit Before Taxes



# The Financial Statements



# Waterfall Cash Flow

- The waterfall format allows the financial analyst to review the cash position according to financial management priorities.
- A financial cashflow solution is derived only if the yellow line is zero.

## FLOW OF FUNDS STATEMENT

Million FMs

	2011	2012	2013	2014	2015	2016	2017
<b>INTERNAL CASH GENERATION</b>							
Net Income Before Int	683	658	666	657	640	630	637
Add: Depreciation Exp	319	319	319	319	319	319	319
<b>Operating Cash Flow</b>	<b>1,002</b>	<b>976</b>	<b>985</b>	<b>976</b>	<b>959</b>	<b>949</b>	<b>955</b>
Add: Beg Cash Position	50	155	159	157	156	155	154
Working Cap Inc/(Dec)	165	(45)	5	(5)	(3)	(3)	(3)
<b>CASH BEFORE DEBT SERVICE</b>	<b>886</b>	<b>1,177</b>	<b>1,139</b>	<b>1,138</b>	<b>1,118</b>	<b>1,107</b>	<b>1,113</b>
<b>DEBT SERVICE</b>							
Interest Charges	300	290	270	200	80	-	-
Principal Repayments	800	800	800	800	300	-	-
<b>Total Debt Service</b>	<b>1,100</b>	<b>1,090</b>	<b>1,070</b>	<b>1,000</b>	<b>380</b>	<b>-</b>	<b>-</b>
<b>CASH AFTER DEBT SERVICE</b>	<b>(214)</b>	<b>87</b>	<b>69</b>	<b>138</b>	<b>738</b>	<b>1,107</b>	<b>1,113</b>
<b>CAPITAL INVESTMENT REQUIREMENTS</b>							
Investment Projects	-	-	-	-	-	-	-
Capitalized Interest	-	-	-	-	-	-	-
Annual Capital Investment	-	-	-	-	-	-	-
Add: Cash Ending Balance	155	159	157	156	155	154	153
<b>FINANCING REQUIREMENTS</b>	<b>(369)</b>	<b>(72)</b>	<b>(88)</b>	<b>(18)</b>	<b>583</b>	<b>953</b>	<b>960</b>
<b>FUNDS FROM LOANS &amp; GRANTS</b>							
Grants	-	-	-	-	-	-	-
commercial	-	-	-	-	-	-	-
Donor	-	-	-	-	-	-	-
Loan3	-	-	-	-	-	-	-
Outstanding Loans	-	-	-	-	-	-	-
Funds From Loans	-	-	-	-	-	-	-
<b>CASH SURPLUS/(DEFECIT)</b>	<b>(369)</b>	<b>(72)</b>	<b>(88)</b>	<b>(18)</b>	<b>583</b>	<b>953</b>	<b>960</b>
<b>If Cash Surplus:</b>							
(Purchase)/Sell Deposits	-	-	-	-	583	953	960
<b>If Cash Deficit:</b>							
Sale of Deposits	369	31	-	-	-	-	-
<b>Additional Equity Needed</b>	<b>-</b>	<b>41</b>	<b>88</b>	<b>18</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total Cash Raised</b>	<b>369</b>	<b>72</b>	<b>88</b>	<b>18</b>	<b>-</b>	<b>-</b>	<b>-</b>

## Davao City Water District

### BALANCE SHEET

Thousands

25.5 Pesos=1US\$

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>ASSETS</b>										
<b>FIXED ASSETS</b>										
Land	4,738	4,738	4,738	4,738	4,738	4,738	4,738	4,738	4,738	4,738
Plant in Service	465,980	551,645	639,969	733,589	828,838	908,735	990,707	1,024,652	1,024,652	1,024,652
Less: Acc. Depreciation	215,940	226,011	238,430	253,285	270,551	289,697	310,727	332,145	352,920	373,072
Net Fixed Assets	254,777	330,372	406,277	485,042	563,024	623,776	684,717	697,245	676,470	656,318
Work in Process	2,112	-	-	-	-	-	-	-	-	-
<b>TOTAL FIXED ASSETS</b>	256,889	330,372	406,277	485,042	563,024	623,776	684,717	697,245	676,470	656,318
Other Assets	7,006	7,006	7,006	7,006	7,006	7,006	7,006	7,006	7,006	7,006
<b>CURRENT ASSETS</b>										
Cash	31,824	33,786	36,006	25,591	27,079	27,489	27,895	27,979	28,668	29,034
Short-Term Deposits	-	-	-	-	-	-	-	27,439	77,155	126,488
Escrow Deposits	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779
Prepaid Expenses	16	17	19	20	21	-	-	-	-	-
Accounts Receivable (Net)	36,303	40,661	33,749	30,101	33,014	32,956	32,957	32,957	32,957	32,957
Inventories of Spares	16,462	17,299	18,993	20,800	22,527	23,337	24,149	15,942	15,665	15,396
<b>TOTAL CURRENT ASSETS</b>	100,383	107,542	104,545	92,290	98,419	99,560	100,780	120,095	170,224	219,654
<b>TOTAL ASSETS</b>	364,279	444,920	517,828	584,339	668,450	730,342	792,503	824,346	853,700	882,978
<b>LIABILITIES &amp; NET WORTH</b>										
<b>EQUITY</b>										
Paid in Capital	120,479	120,479	120,479	120,479	120,479	120,479	120,479	120,479	120,479	120,479
Retained Earnings	12,812	30,630	59,476	101,136	152,311	196,985	237,712	278,019	315,313	353,275
Grants	-	-	-	-	-	-	-	-	-	-
Capital Contributions	81,586	143,613	193,428	224,316	263,461	288,046	317,222	317,222	317,222	317,222
<b>TOTAL NET WORTH</b>	214,877	294,722	373,383	445,931	536,250	605,510	675,413	715,720	753,014	790,977
<b>BORROWINGS</b>										
Outstanding Loans	124,032	117,188	110,006	102,454	94,849	87,186	79,132	70,677	62,140	53,183
Loan 1	-	-	-	-	-	-	-	-	-	-
Loan 2	-	-	-	-	-	-	-	-	-	-
Loan3	-	-	-	-	-	-	-	-	-	-
Other Credits	-	-	-	-	-	-	-	-	-	-
Less: Current Portion	6,843	7,182	7,553	7,605	7,663	8,055	8,454	8,537	8,957	9,456
<b>TOTAL BORROWINGS</b>	117,188	110,006	102,454	94,849	87,186	79,132	70,677	62,140	53,183	43,727
<b>CURRENT LIABILITIES</b>										
Accounts Payable	14,851	22,524	24,004	25,591	27,079	27,489	27,895	27,979	28,668	29,034
Notes Payable	-	-	-	-	-	-	-	-	-	-
Guarantee Deposits	10,519	10,519	10,519	10,519	10,519	10,519	10,519	10,519	10,519	10,519
Current Portion of Debt	6,843	7,182	7,553	7,605	7,663	8,055	8,454	8,537	8,957	9,456
<b>TOTAL CURRENT LIABILITIES</b>	32,213	40,225	42,076	43,714	45,261	46,063	46,868	47,035	48,144	49,009
<b>TOTAL LIABS. &amp; NET WORTH</b>	364,279	444,953	517,912	584,494	668,698	730,704	792,959	824,895	854,342	883,713

# Phnom Penh Water Supply Authority

## INCOME STATEMENT

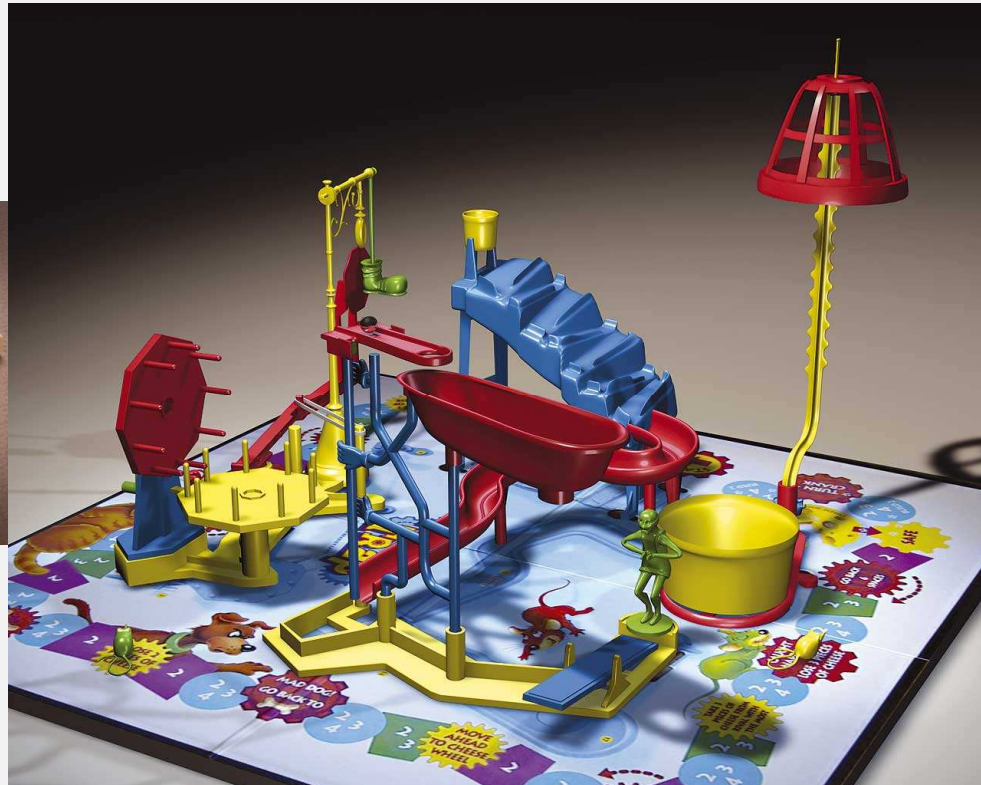
Million Riels

3960 Riels = 1US\$

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Revenues</b>										
Water Sales	29,376	34,717	39,310	40,269	40,269	42,283	44,296	44,296	44,296	44,296
Installation Charges	4,394	4,056	4,157	-	-	-	-	-	-	-
Interest on Time Deposits	0	-	-	573	1,635	2,745	3,978	5,390	6,878	8,419
Penalties & Fines	264	312	314	322	282	296	310	310	310	310
<b>NET REVENUES</b>	<b>34,034</b>	<b>39,085</b>	<b>43,782</b>	<b>41,164</b>	<b>42,186</b>	<b>45,324</b>	<b>48,584</b>	<b>49,997</b>	<b>51,484</b>	<b>53,025</b>
<b>OPERATING EXPENSES</b>										
<b>Water Supply and Distribution</b>										
Chemical Treatment	981	1,224	1,426	1,497	1,572	1,651	1,733	1,820	1,911	2,007
Power Costs	4,899	6,461	7,529	7,906	8,301	8,716	9,152	9,610	10,090	10,595
Transportation & Equipment	2	2	3	3	3	3	3	3	3	4
Maintenance Materials	0	55	276	282	288	294	300	306	311	316
Labor Costs	1,391	1,522	1,605	1,685	1,706	1,792	1,881	1,975	2,074	2,178
General & Administrative	34	37	40	42	42	44	46	49	51	54
Bad Debt Expense	0	245	277	314	320	-	-	-	-	-
Other OPEX	2,050	2,163	2,282	2,396	2,516	2,641	2,773	2,912	3,058	3,211
Subtotal	9,358	11,709	13,437	14,124	14,748	15,141	15,890	16,675	17,499	18,363
<b>NET OPERATING PROFIT</b>	<b>24,677</b>	<b>27,376</b>	<b>30,345</b>	<b>27,040</b>	<b>27,438</b>	<b>30,182</b>	<b>32,694</b>	<b>33,322</b>	<b>33,986</b>	<b>34,662</b>
Depreciation	0	267	1,548	2,563	2,563	2,563	2,563	2,563	2,563	2,563
Interest	425	850	2,178	3,347	3,028	2,709	2,391	2,072	1,753	1,434
Subtotal	425	1,117	3,726	5,910	5,591	5,273	4,954	4,635	4,316	3,998
<b>INCOME BEFORE TAXES</b>	<b>24,252</b>	<b>26,259</b>	<b>26,619</b>	<b>21,130</b>	<b>21,847</b>	<b>24,910</b>	<b>27,741</b>	<b>28,687</b>	<b>29,670</b>	<b>30,665</b>
Income Taxes	4,850	5,252	5,324	4,226	4,369	4,982	5,548	5,737	5,934	6,133
<b>NET PROFIT/(LOSS)</b>	<b>19,401</b>	<b>21,007</b>	<b>21,295</b>	<b>16,904</b>	<b>17,477</b>	<b>19,928</b>	<b>22,192</b>	<b>22,950</b>	<b>23,736</b>	<b>24,532</b>



# Useful Tips & Common Mistakes



## Useful Tips

- Instead of putting all the assumptions on one sheets, apply assumptions where they are most needed for review and use a Dashboard.
- Be methodical and make full use of the required steps.
- Color code inputs values and key variables and lock formula cells, especially if used by third party.
- All statements should be protected.
- Statements and schedules should all be on the same columns.
- Data availability should drive the complexity of the model.
- If formulas are overly complex, divide into steps.

# Color Coding Legend

## Color Codes For Numbers and Cells:

**Green Nos. = Inpputs from the Dashboard**

**Blue Nos. = Inputs from Assumptions Sheet**

**Black Nos. = Formula cells. Do not input**

**Red Cells = Formula Cells. Do not Input**

**Light Grey Cells = Input Areas**

**Light Green Cels = Formula Cells**

**Light Blue Cells = Referecne Areas**

**Tan Cells = Formula Cells do Not input**

## Common Mistakes

- The model becomes the **End Goal**, not the financial results.
- The model tries to do too many things, tariff structure, trend analysis, volume forecasts, demand elasticity. Develop separate subsidiary models.
- Not properly organized.
- Cutting corners.
- Detailed breakdown/elaboration on non material variables.
- Requiring inordinate amounts of data.
- Add historical presentation to projections
- Investment period should be no longer than 5-years (7 for hydropower).
- Projection period should be no more than 25 years.
- Escalating revenues with expenses.
- Accumulating cash or negative cash balances.
- Linking to other workbooks.

# Steps for Developing a Financial Projection

- Step 1: Assess data information accessibility of WSS entity.
- Step 2: Determine key indicators that require focus. Use the Audit Reports.
- Step 3: Populate Opening Balance Sheet Position from most current audit report
- Step 4: Determine which Balance Sheet Accounts that are immaterial and do not require movement
- Step 5: Determine Financial Management Parameters by calculating historical ratios. Check balance sheet accounts in first year projection against historical values. Recalibrate if material difference.
- Step 6: Work with WSP to develop complete 5-year investment program and new financing sources and terms. Develop amortization of existing loans associated with balance sheets balances.
- Step 7: Develop detailed schedule for WSS production, sales and revenues and OPEX. This is the most custom worksheets. Key technical parameters need to coincide with investment program.
- Step 8: Develop base projection in constant costs and check results: (i) annual cash flow positions by priority, (ii) movements of balance sheet accounts; (iii) statistical indicators.
- Step 9: Perform Tariff Adequacy analysis
- Step 10: Make modifications if necessary and finalize
- Step 11: Review with management for buy-in and to various technical and management assumptions.
- Step 12: Develop a list of agreed action items for monitoring during project implementation.