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Water Expert





The Presentation

- The EU LIFE+ Investing in Water auditing process
- Managing Water
 - sources of water for Maltese businesses and hotels
 - water consumption patterns and trends; how to determine non-guest related consumption in hotels and how to identify abnormal consumption (e.g. leaks)
 - The EU LIFE+ Investing in Water self-assessment tool
 - Service water consumption : recommendations and water saving solutions
 - potential for water saving in businesses and hotels

The Water Audits



- First assessment of its kind carried out in Malta.
- The amount of water used by Businesses and Hotels in Malta is largely unknown.

The Auditing Process



- Selection of representative businesses and hotels

The Auditing Process



- 20 audits carried out among businesses and 19 audits in hotels in the period February – April 2012;
- Around 60 audits completed to date

Profile of the Audited Businesses (until mid-2012)



Type of Business	No. of Audited Business	Sectoral Representation
Manufacturing (including food)	6	21%
Pharmaceutical	1	25%
Offices	9	-
Servicing/importers	2	15%
Beverage	2	29%

Profile of the Audited Hotels (until mid-2012)



Category	No. of Hotels Audited	Sectoral Representation
3-star	7	16%
4-star	9	21%
5-star	3	20%

The Auditing Process

- 1-to-1 meetings with business/hotel owner/general manager, generally supported by technical staff
- Specially prepared 4-page questionnaires that allows the assessor to evaluate water consumption patterns, sources of the water, awareness/investments in water saving/water recycling, etc. and
- to determine the potential for further water savings, water recycling and rainwater harvesting as applicable
- measurement and recording of tap/shower water flows and toilet cistern capacities
- evaluation of process water systems

Managing Your Water

1. Know your sources
 - Town water
 - Bowser water : 1st class (potable) or 2nd class (non-potable)
 - Own borehole : registered /unregistered
 - Rain water harvesting (water used as 1st class water or 2nd class water)
 - Own RO
 - Treated sewage effluent
 - Recycled greywater
 - Condensate water
 - Brine from brackish water ROs and process water
 - Seawater

Sources of Water in the 20 Audited Businesses



Water Source	Number of Businesses
Town water as the only source	17
Businesses resorting to bowser water (apart from town water)	2
Businesses having a registered borehole (apart from town water)	1
Practising rainwater harvesting	3

Sources of Water in the 19 Audited Hotels



Water Source – 1 st class water	Number of Hotels
Town water as the only source	10
Hotels resorting to 1 st class bowser water (apart from town water)	3
Hotels producing their own 1 st class water (by Reverse Osmosis)	5
Hotel supplementing town water with harvested rainwater	1

Sources of Water in the 19 Audited Hotels



Water Source – 2nd class water	Number of Hotels
Town water only	6
Seawater	3
Bowser water	4
Owning registered boreholes	3
Sewage treatment plant	1
Reverse Osmosis	3
Greywater recycling	1
Rainwater harvesting	7

Managing Your Water

1. Know your sources
2. Match the source with demand
 - infrastructural considerations: Does the premises's consumption justify a separate supply for 1st class and 2nd class water?
 - source considerations: is there a source of wastewater that can be recovered? e.g. Rainwater, condensate from A/Cs, brine from brackish water ROs, backwash water from sand filters, rinse water (in laundries and bottle washers)
 - Choose the right technology for treatment/recovery and calculate payback

The Quality of Data Collected

- 19 businesses provided water consumption data, 8 of which provided monthly consumption figures, 8 presented ARMS bills and 3 provided a single figure for water consumption for 2011. Of these 13 were considered to be reliable data sets.
- 15 of the 19 hotels provided consumption data, 11 of which were in the form of monthly consumption levels, 3 presented ARMS bills, while 1 hotel was in a position to provide daily consumption data. Only 8 of the 15 data sets were considered to be comprehensive and reliable. 9 of the data sets showed good correlation between water consumption and guest nights.

Managing Your Water

1. Know your sources
2. Match your sources
3. Know your consumption
 - take daily, weekly, monthly readings off your town water meter (or RO, or other sources)
 - install water meters on your sources
 - install water meters on the major water consumers or take spot measurements
 - benchmark your consumption

Water Consumption Profile for the Audited Businesses



Type of Business	Water-Intensification Ratio	Range
Manufacturing (including food)	103	49 – 282
Pharmaceutical	900*	-
Offices	33	25 – 83
Servicing/importers	30*	
Beverage	748	628 - 818

* Based on 1 result

Water Intensification Ratio = water consumption per employee per working day in litres

Water Consumption Profile for the Audited Hotels



Category	Total Water Consumption per guest night for 2011 (litres/day)
3-star	199
4-star	292
5-star	462

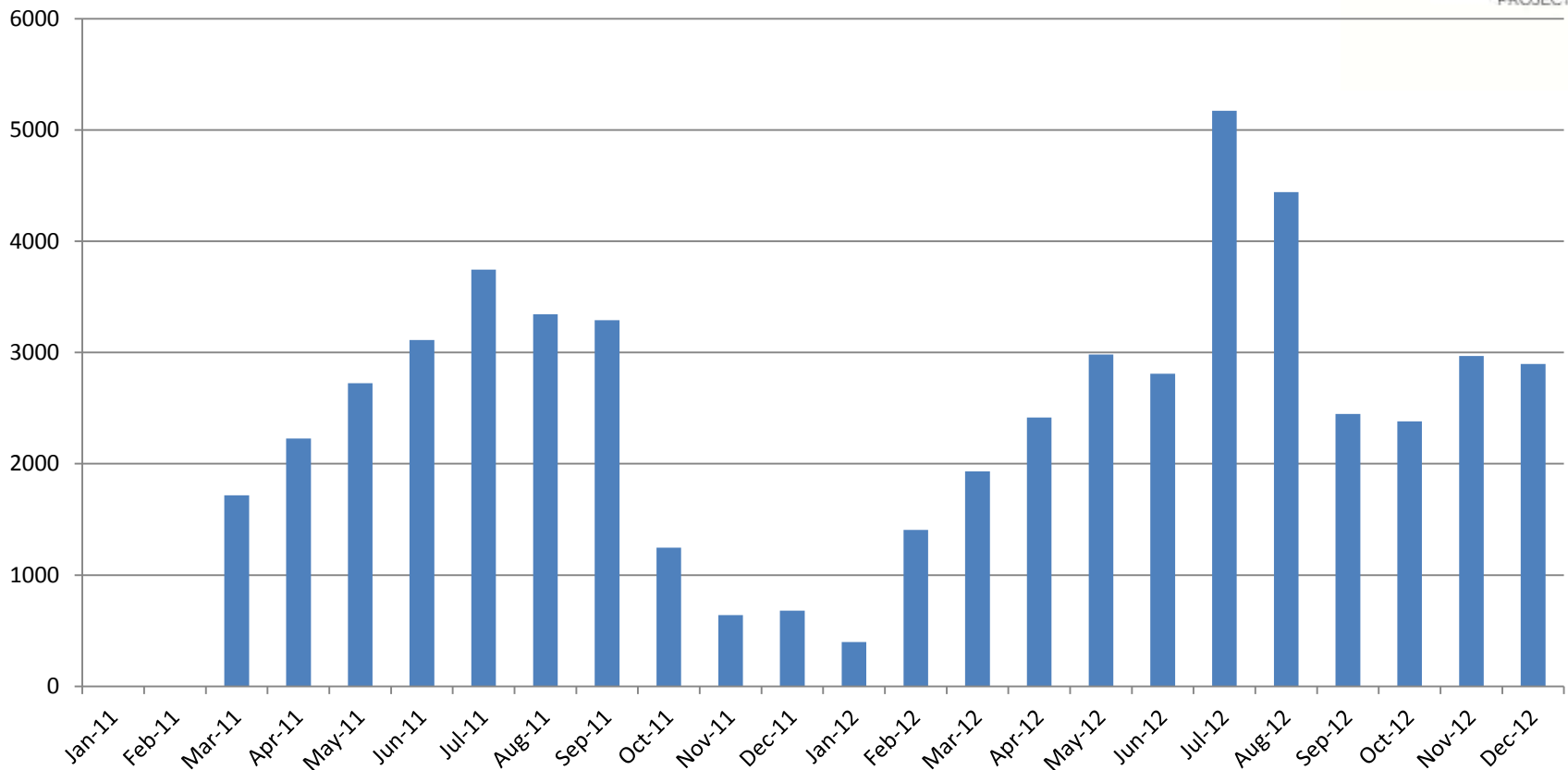
Managing Your Water

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 - install water meters on the major water consumers or take spot measurements
 - benchmark your consumption
 - Plot your consumption and identify trends

Analyses of monthly consumption data for a Hotel

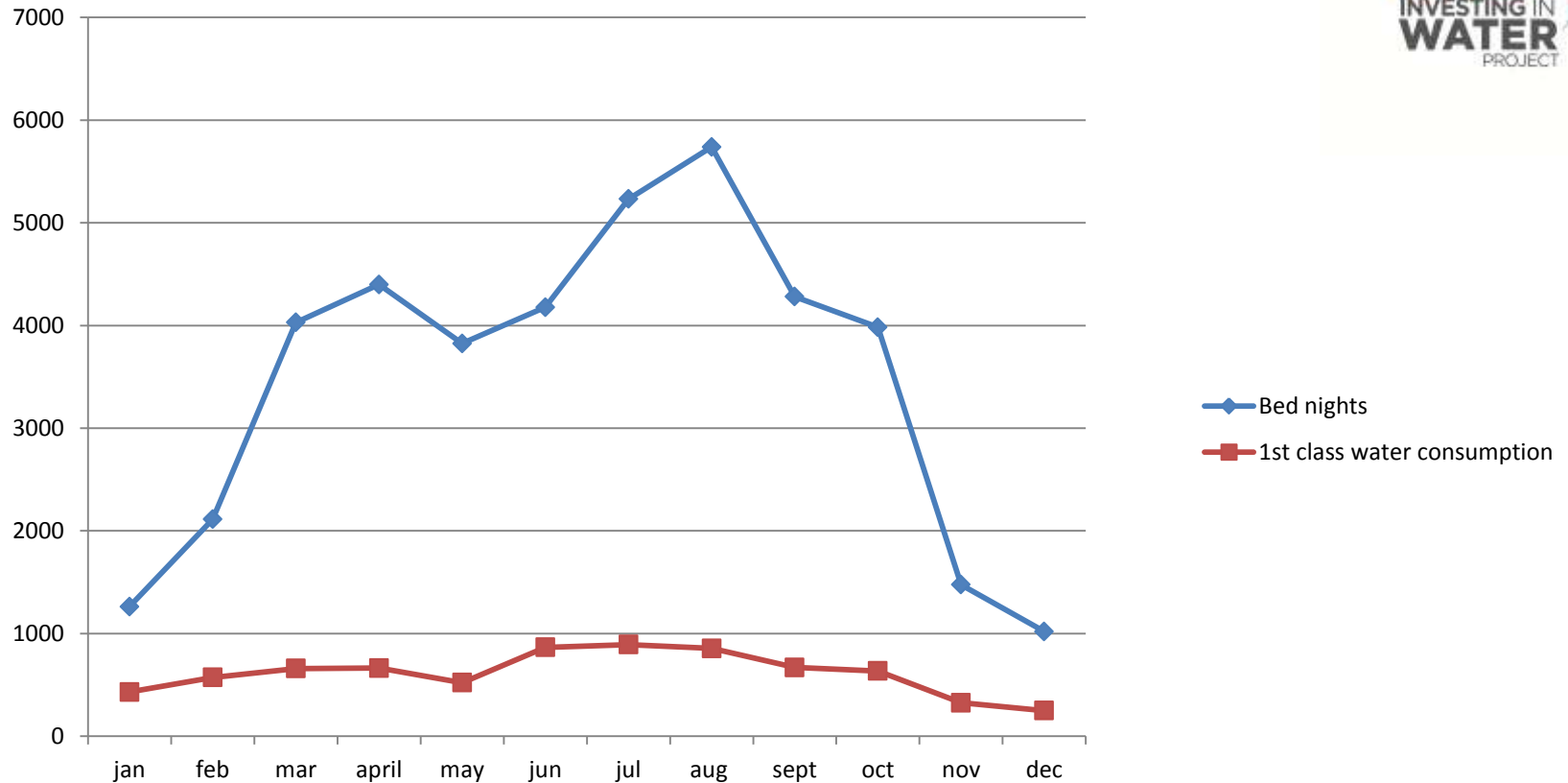


Total Consumption (m³/month)



Very low consumption in winter attributed to rainwater harvesting

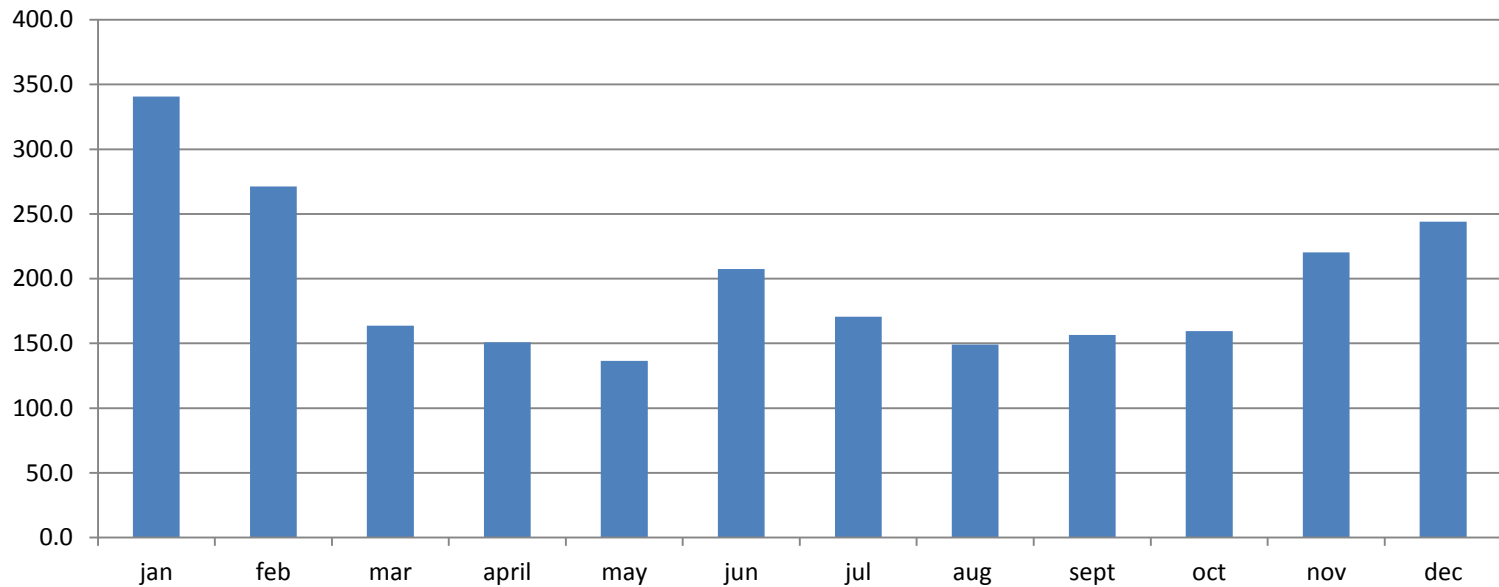
Analyses of monthly consumption data for a Hotel



Analyses of monthly consumption data for a Hotel



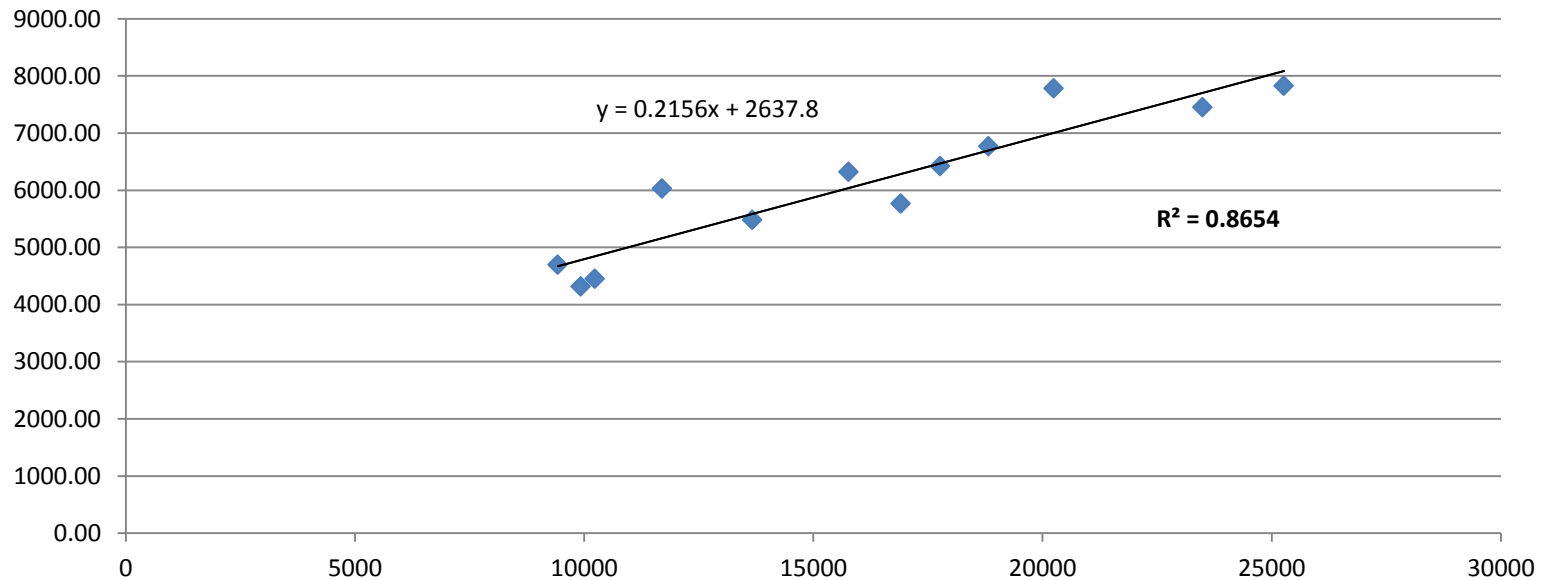
Water Consumption per guest night
(litres/guest night per day)



Analyses of Monthly Consumption data for a hotel



Correlation - 1st class water consumption (m³/month) with guest nights



Non-guest related consumption to total water consumption Ratio = $2637/6108 = 43\%$

Home Insert Page Layout Formulas Data Review View

Clipboard Font Alignment Number Styles Cells Editing

Calibri 11 A A

General

Conditional Formatting as Table Cell Styles

Insert Delete Format

Sort & Filter Find & Select

F19 fx

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2		Mains	RO1	RO2	Total		Bed								
3					1st class		nights								
4		m3	m3	m3	m3										
5	Jan	0	1839	3161	5000		9424								
6	Feb	0	2178	2639	4817		10231								
7	Mar	0	2746	3041	5787		13665								
8	Apr	0	3821	2693	6514		17763								
9	May	213	3598	2510	6321		15769								
10	Jun	0	3966	3854	7820		20245								
11	Jul	0	3705	3793	7498		23493								
12	Aug	322	3475	4030	7827		25268								
13	Sep	129	3812	3443	7384		18819								
14	Oct	0	3287	3242	6529		16904								
15	Nov	0	3430	3173	6603		11695								
16	Dec	0	2487	2514	5001		9922								
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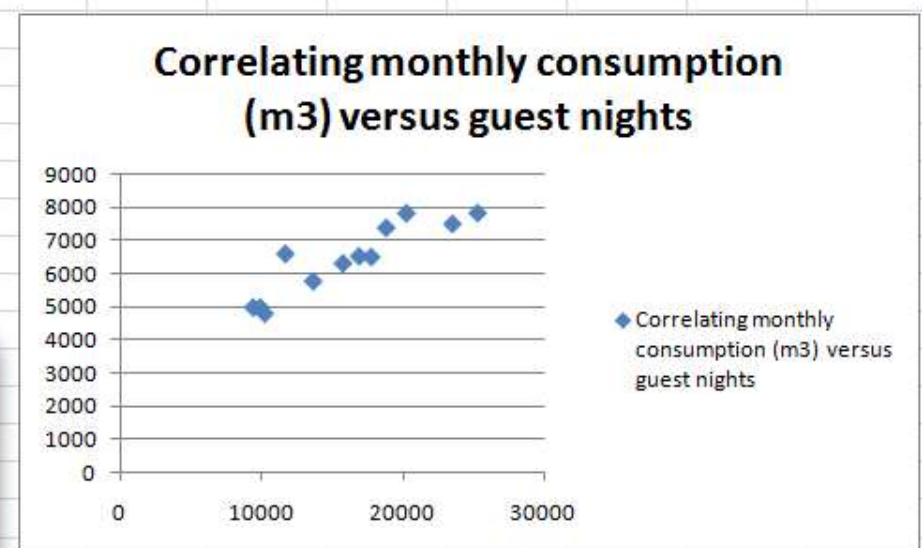
Ist class Water Correlation 2nd class water Sheet1

Ready 100%

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G5 =C5+D5+B5

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2		Mains	RO1	RO2	Total		Bed								
3					1st class		nights								
4		m3	m3	m3	m3										
5	Jan	0	1839	3161	5000		9424								
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11	Jul	0	3705	3793	7498		23493								
12	Aug	32													
13	Sep	12													
14	Oct														
15	Nov														
16	Dec														



Edit Series

Series name: Correlating monthly consumption (m3) = Correlating mo...

Series X values: =Sheet1!\$G\$5:\$G\$16 = 9424, 10231, 1...

Series Y values: =Sheet1!\$E\$5:\$E\$16 = 5000, 4817, 57...

OK Cancel

Workings ver 1 - Microsoft Excel | Chart Tools

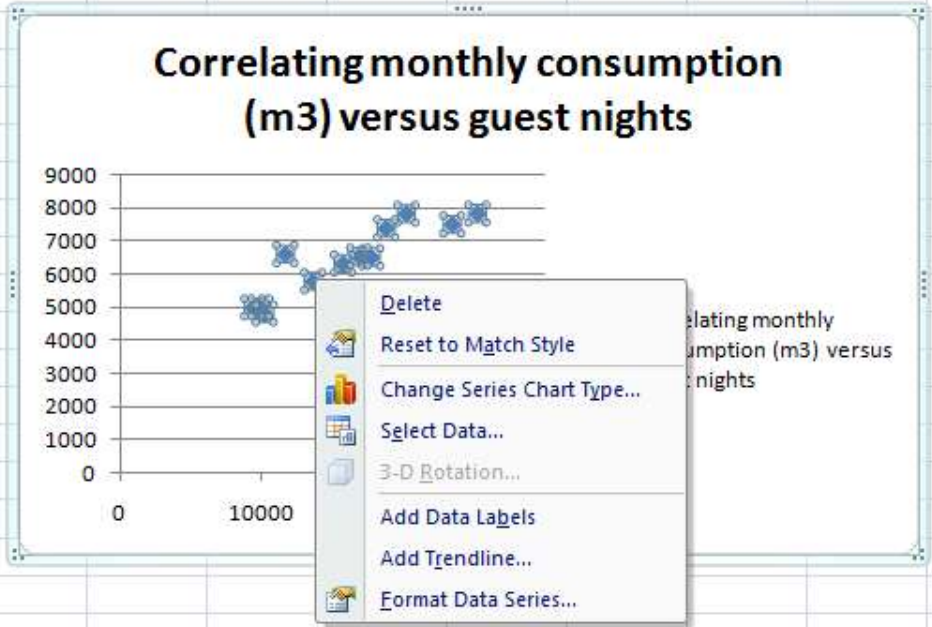
Home | Insert | Page Layout | Formulas | Data | Review | View | Design | Layout | Format

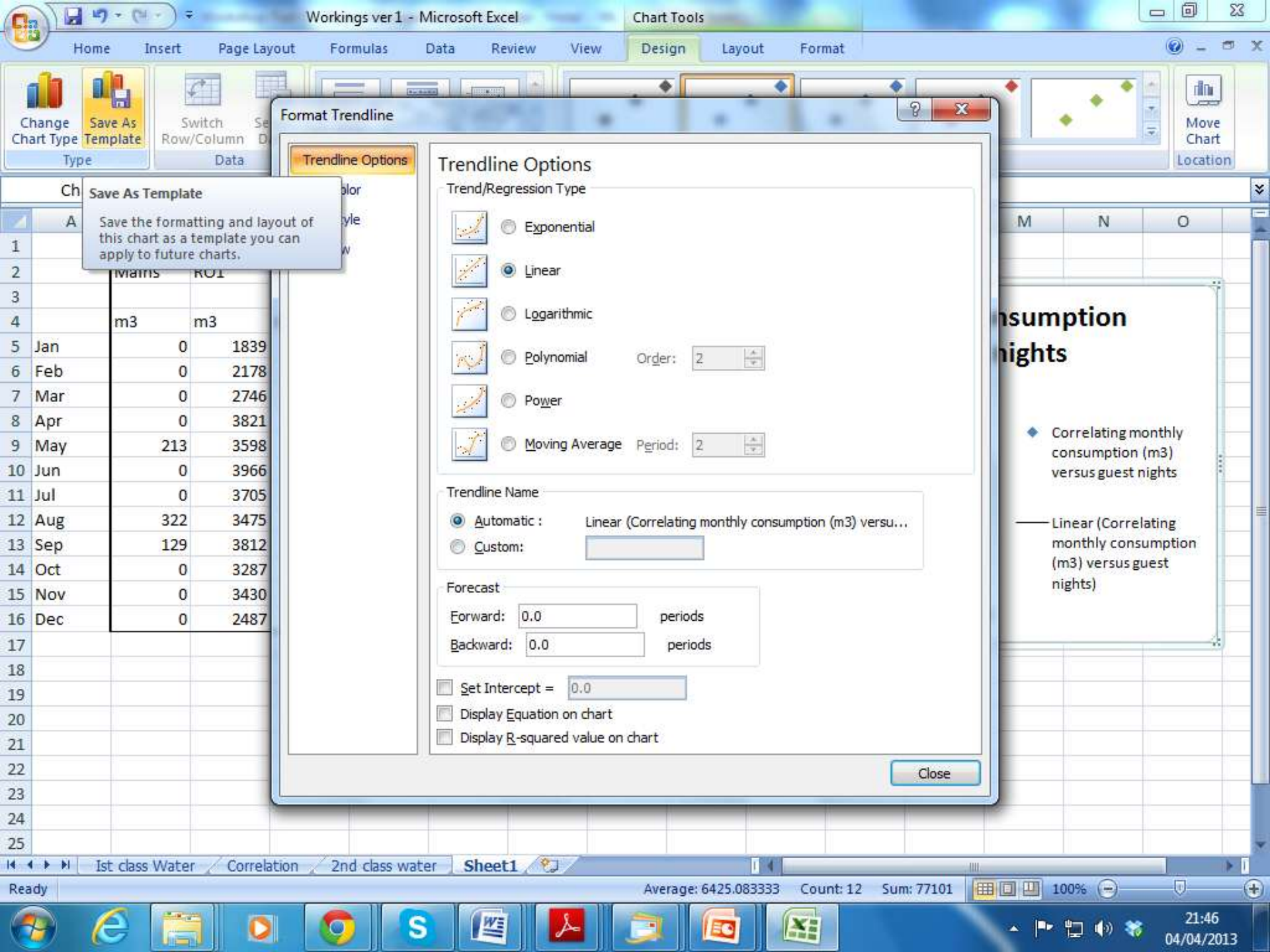
Change Chart Type | Save As Template | Switch Row/Column | Select Data

Chart Layouts | Chart Styles

Chart 1 | fx =SERIES("Correlating monthly consumption (m3) versus guest nights",Sheet1!\$G\$5:\$G\$16,Sheet1!\$E\$5:\$E\$16,1)

	Mains	RO1	RO2	Total 1st class	Bed nights
	m3	m3	m3	m3	
5 Jan	0	1839	3161	5000	9424
6 Feb	0	2178	2639	4817	10231
7 Mar	0	2746	3041	5787	13665
8 Apr	0	3821	2693	6514	17763
9 May	213	3598	2510	6321	15769
10 Jun	0	3966	3854	7820	20245
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13 Sep	129	3812	3443	7384	18819
14 Oct	0	3287	3242	6529	16904
15 Nov	0	3430	3173	6603	11695
16 Dec	0	2487	2514	5001	9922





Workings ver 1 - Microsoft Excel

Chart Tools

Home Insert Page Layout Formulas Data Review View Design Layout Format

Change Chart Type Save As Template Type

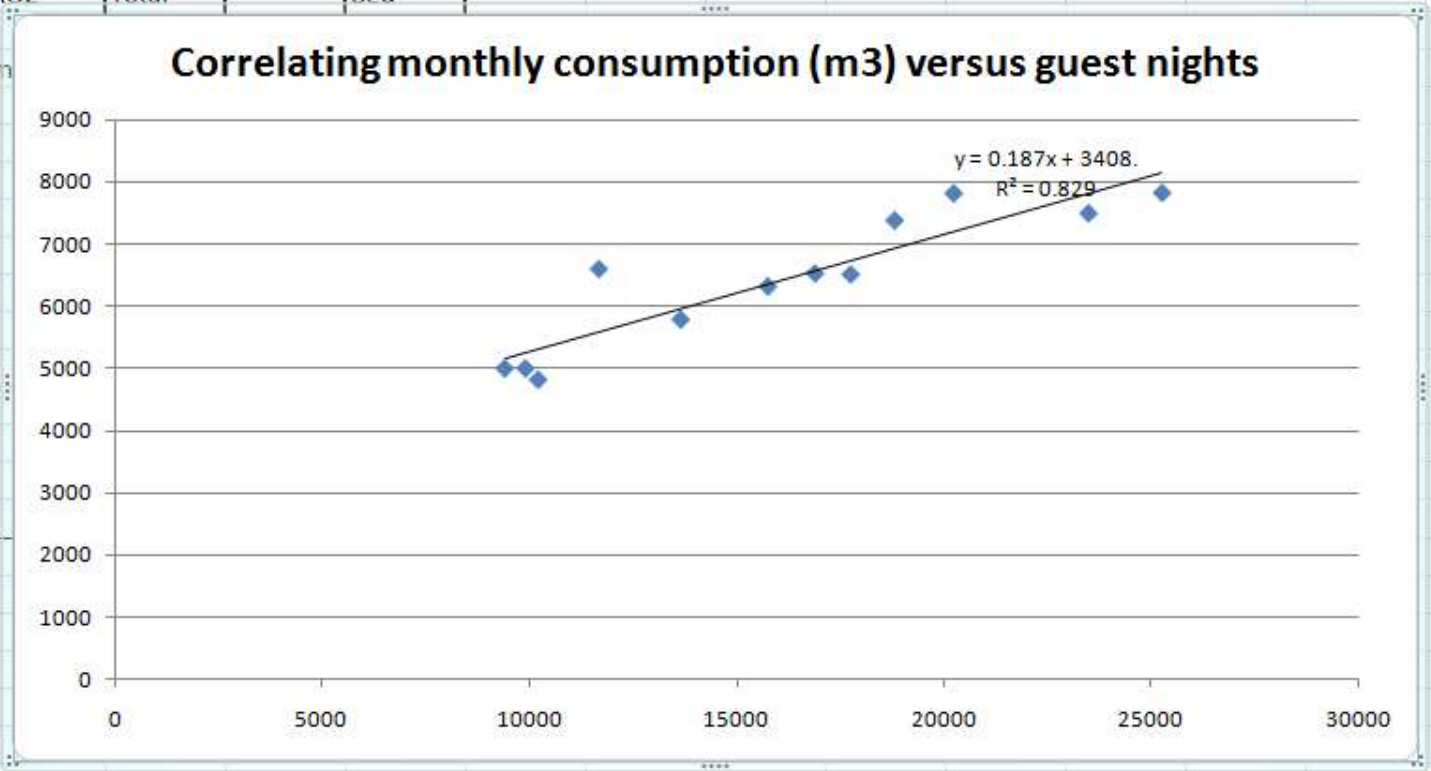
Switch Row/Column Data Select Data

Chart Layouts Chart Styles

Move Chart Location

Chart 1

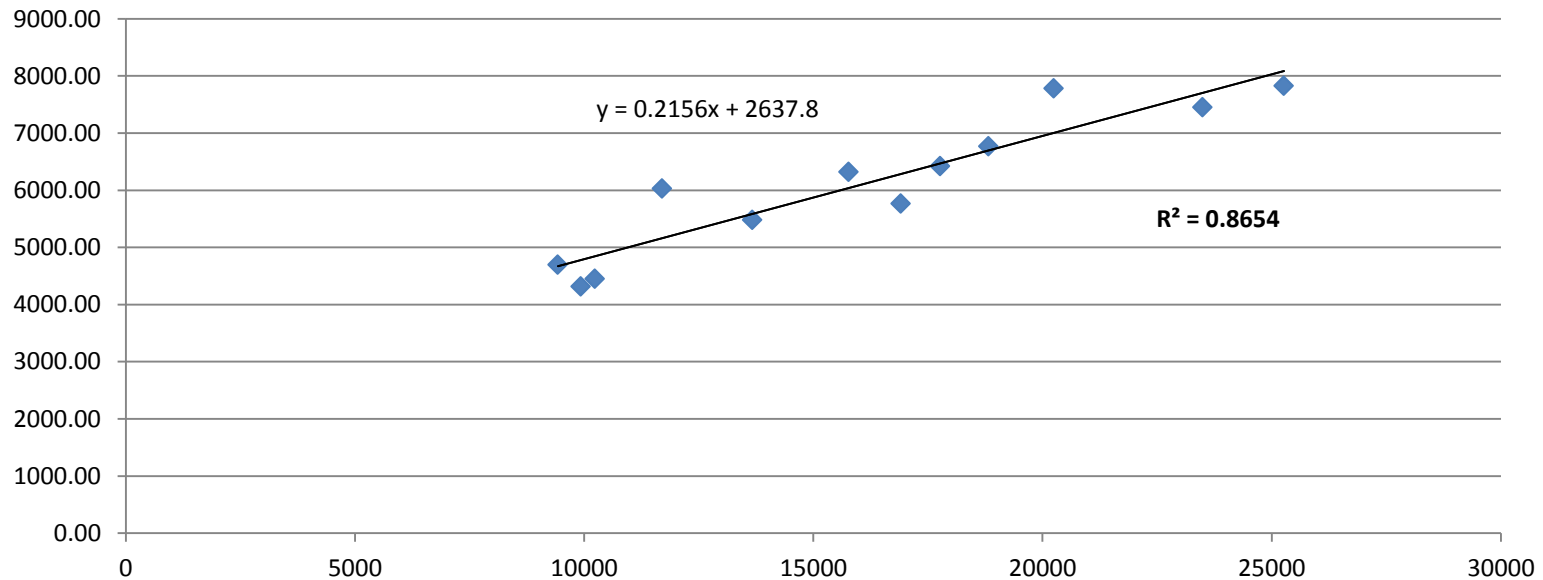
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
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Analyses of Monthly Consumption data for a hotel



Correlation - 1st class water consumption (m³/month) with guest nights

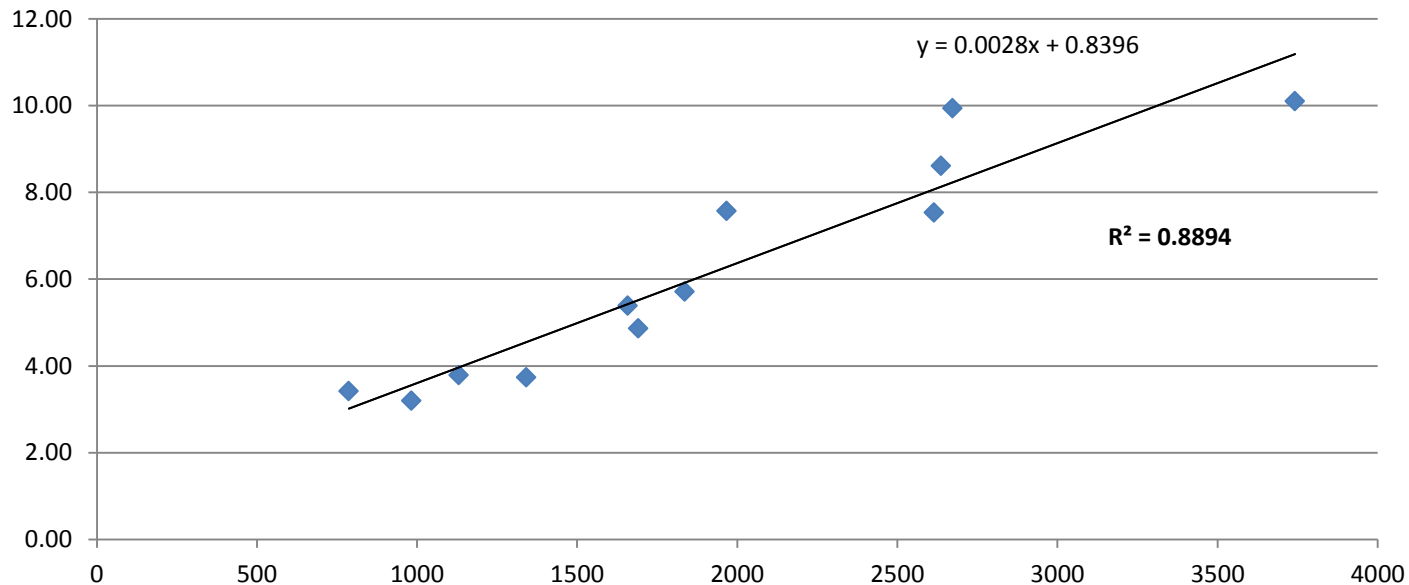


Non-guest related consumption to total water consumption Ratio = $2637/6108 = 43\%$

Analyses of Monthly Consumption data for a 3-star hostel-type hotel



Correlation - Water Consumption (m³/day) with guest nights



Non-guest related consumption to total water consumption Ratio = $0.8396/6.15 = 14\%$