Morocco QEG

Test and Measurement Report
Version 2 – June 2014

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Please send your completed Test and Measurement Reports to QEGdataform@hotmail.com.

WEBSITES

WEBSITE	DESCRIPTION
www.fixtheworldproject.net	Main website of 'Fix The World' campaign
hopegirl2012.wordpress.com	Blog for HopeGirl/FTW/QEG

VERSION RECORD SHEET

VERSION NO.	DATE	SUMMARY OF CHANGE	ISSUED BY
V 1.0	May 2014	Initial measurements of QEG.	James Robitaille
V 2.0	June 2014	Further measurements added to demonstrate High Power in QEG system.	James Robitaille

ACRONYMS & ABBREVIATIONS

ACRONYM	MEANING
QEG	Quantum Energy Generator
RMS	Root Mean Squared
VAR	Volt Ampere Reactive
T&M	Test & Measurement
COP	Coefficiency of Performance
RPM	Revolutions Per Minute
AC	Alternating Current
DC	Direct Current
C	Capacitance
L	Inductance
V	Voltage
I	Current

CONTENTS

1. Introduction

This report describes the activities undertaken in assessing the Quantum Energy Generator (QEG) built in the small village of Aouchtam, Morocco in April/May of 2014, and shown in Figure 1. The process for building this QEG may be found in a document entitled 'QEG User Manual' and available on the HopeGirl blog website (www.hopegirl2012.wordpress.com).

It is the intention for this report to provide all of the details for how the QEG was assessed experimentally using a variety of Test and Measurement (T&M) equipment. This will allow for the information to be shared in an open source manner, allowing for other groups to replicate the same experiments with their own version of the QEG.

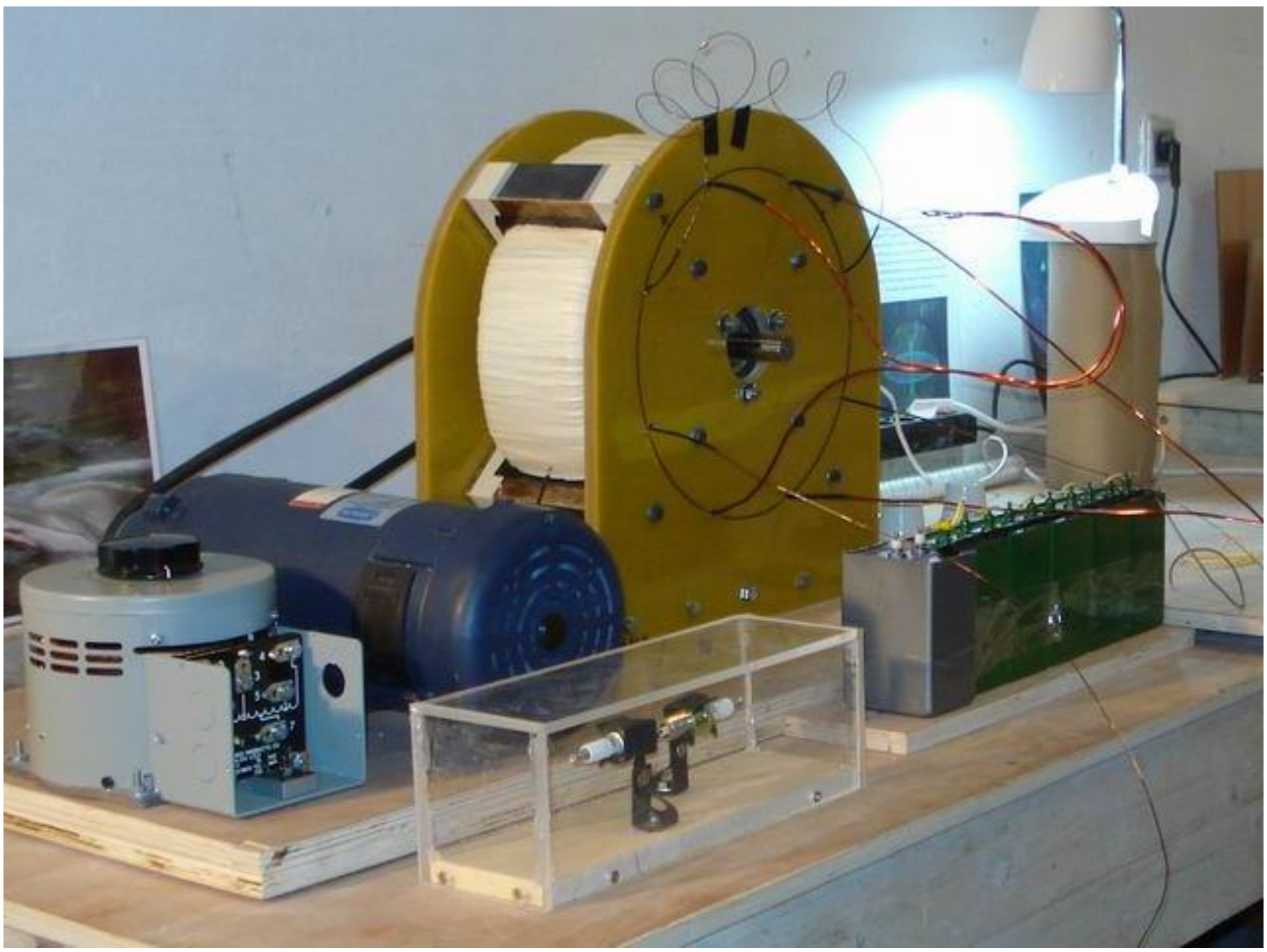

Figure 1: QEG built in Morocco

1.1 Process for Issuing a QEG Test & Measurement Report

In order to maximize the possibility of replicating the QEG progress on a global scale by many groups operating in many countries, a process has been created to provide a series of up-issued reports by each QEG group with details about the QEG experiments. The process for each QEG group to issue a 'QEG Test & Measurement Report' is as follows:

1. Make a copy of a QEG Test & Measurement report, ensuring that the copy has 'TEMPLATE' on the cover.

2. Change the relevant text throughout the document where appropriate e.g. from 'QEG Morocco' to 'QEG Paris', as well as updating the 'Contacts & Websites' page.

3. Make a record of the equipment used to make measurements in the 'Test & Measurement Equipment' Section. This may include pictures and datasheet information. This will ensure that anyone attempting to replicate any group's QEG results can do so using the same or similar equipment.

4. Provide details of any relevant measurements and experiments undertaken on the QEG in the 'Measurements' section. This includes details such as the circuit diagram for the particular set-up, how the system was measured, the resulting measurement data (perhaps as screen shots from an oscilloscope or an Excel chart), and some discussion about the findings from the results. This will allow other QEG groups to understand the train of thought involved in making a series of experiments in a particular way.

5. Record each new version of the report in the 'Version Record Sheet'. So, for example, a QEG group may make Version 1 of their QEG T&M report publicly available with details of 5 experiments in the 'Measurements' section. They may then complete another 10 experiments which are added to the 'Measurements' section. This second version of the report, Version 2, will then be up-issued with details of all 15 experiments. Also include the Version number on the Title Page to ensure that other QEG groups can work with the most up to date version of a particular QEG group's Test & Measurement Report.

6. Send your completed report to QEGdataform@hotmail.com for publication to the website. Fix the World Project will publish all the reports on their website at: http://www.fixtheworldproject.net/qeg-open-source-documents.html. Each report is published as a PDF. Firstly this will compress the size of document making it easier for other QEG groups to download the document. Secondly it will make it difficult for others to edit a particular version of a QEG T&M report, ensuring consistency in each version of the report. You can either convert your document to a PDF or request that the FTW team do it before publishing.

2. Test & Measurement Equipment

This section describes the measurement equipment used to assess the QEG. Where possible, pictures and datasheet information is provided so that other QEG groups may use the same or similar equipment for their own experiments.

2.1 Tektronix P6015 1000X High Voltage Probe

The Tektronix P6015 1000X High Voltage Probe shown in Figure 2 is used to measure the high voltage aspects of the system, which in some cases were in excess of $10kV_{RMS}$. The datasheet information is shown inTable 1. The probe can be connected to an oscillscope via a BNC connector and the resulting voltage waveform can be analysed.

Figure 2: Tektronix P6015 1000X High Voltage Probe

MANUFACTURER	Tektronix
MODEL	P6015
BANDWIDTH	DC-75MHz
SCALING	1000X
MAXIMUM VOLTAGE	$20kV_{RMS}$ / $40kV_{Pk}$

Table 1: Tektronix P6015 x1000 High Voltage Probe – Datasheet Information

2.2 Stangenes 0.5-0.1W Current Probe

The Stangenes 0.5-0.1W current probe shown in Figure 3 is used to measure the current in the system. The datasheet information is shown in Table 2. The probe can be connected to an oscillscope via a BNC connector and the resulting current waveform can be analysed and compared against the voltage waveform to calculate power.

Figure 3: Stangene 0.5-0.1W Current Probe

MANUFACTURER	Stangenes
MODEL	0.5-0.1W
BANDWIDTH	1Hz – 20MHz
SCALING	10X
MAXIMUM CURRENT	$50A_{RMS}$ / $5kA_{Pk}$

Table 2: Stangenes 0.5-0.1W Current Probe – Datasheet Information

2.3 Fluke 187 True RMS Multi-Meter

The Fluke 187 True RMS Multi-Meter shown in Figure 4 is used to measure the voltage and current at certain points in the system. The datasheet information is shown in Table 3. This multimeter was useful for providing an RMS voltage reading that was floating and not grounded so that the system was not perturbed.

Figure 4: Fluke 187 True RMS Multimeter

MANUFACTURER	Fluke
MODEL	187
BANDWIDTH	0.5Hz – 1000kHz
MAXIMUM VOLTAGE	$1kV_{RMS}$
MAXIMUM CURRENT	$10A_{RMS}$

Table 3: Fluke 187 True RMS Multimeter – Datasheet Information

2.4 Tektronix TDS3054 Oscilloscope

The Tektronix TDS3054 portable oscilloscope shown in Figure 5 is used to view the current and voltage waveforms so that power can be calculated. The datasheet information is shown in Table 4. With 4-channels it is possible to simultaneously monitor the voltage and current on both the primary and secondary coils.

Figure 5: Tektronix TDS3054 Oscilloscope

MANUFACTURER	Tektronix
MODEL	TDS3054
BANDWIDTH	500MHz
NO. CHANNELS	4
SAMPLE RATE ON EACH CHANNEL	5GS/s

Table 4: Tektronix TDS3054 Oscilloscope – Datasheet Information

2.5 Maplins Plug-In Energy Saving Monitor

The Maplins Plug-In Energy Saving Monitor shown in Figure 6 is used to calculate the power going into the variac and motor from the mains electricity. Throughout the report this is referred to as 'Power IN' and is an RMS value. The datasheet information is shown in Table 5.

Figure 6: Maplins Plug-In Energy Saving Monitor

MANUFACTURER	Maplins
MODEL	13A Plug In Energy Saving Monitor
BANDWIDTH	50-60 Hz
VOLTAGE RANGE	90 - 250 V_{RMS}
MAXIMUM CURRENT	13A
POWER RANGE	0.2W - 3120W

Table 5: Maplins Plug-In Energy Saving Monitor – Datasheet Information

2.6 Fluke i30S Current Probe

The Fluke i30S current probe shown in Figure 7 is used to measure the current in the system. The datasheet information is shown in Table 6. The probe can be connected to an oscillscope via a BNC connector and the resulting current waveform can be analysed and compared against the voltage waveform to calculate power.

Figure 7: Fluke i30S Current Probe

MANUFACTURER	Fluke
MODEL	I30S
BANDWIDTH	DC – 100KHz
SCALING	10X
MAXIMUM CURRENT	20ARMS

Table 6: Fluke i30S Current Probe – Datasheet Information

3. Measurements

This section will describe the details of each experiment conducted on the QEG, the measurements obtained, and a commentary on the findings from the results.

3.1 Experiment 1

DATE	29th April 2014
LOCATION	Aouchtam, Morocco
LEAD ENGINEER	James Robitaille
DATA PROCESSED BY	Mr. Jalapeno

3.1.1 Description of Experiment

This aim of this QEG set-up was to tune the system by varying the capacitance on the Primary Coil and look for a peak power in the Secondary Coil. The Secondary Coil includes a Diode Bridge Rectifier that converts AC to DC and powers a load of three 100W 240V bulbs in serial. At this stage the system was floating i.e. not grounded, and the exciter circuit had not yet been included. It was hoped to see a clear peak in the Power OUT with a certain value of capacitance.

3.1.2 Experimental Set-Up

VARIABLE	PRIMARY COIL	SECONDARY COIL
No. Turns	3100T (26H inductance)	350T (400mH inductance)
Capacitance	Variable Capacitance (85-191nF)	None
Load / Resistance	None	3 x 100W 240V bulbs in Serial (DC)
Diode Bridge Rectifier	No	Yes
Grounded	No	No
Exciter Circuit	No	No

Table 7: Experimental Set-Up

The circuit diagram for this experiment is shown in Figure 8. Note that a spark gap with an 8mm separation has been included across the capacitor bank in th Primary Coil. This is used as a protector to avoid high voltages in excess of 15kV causing arcing in the QEG core itself.

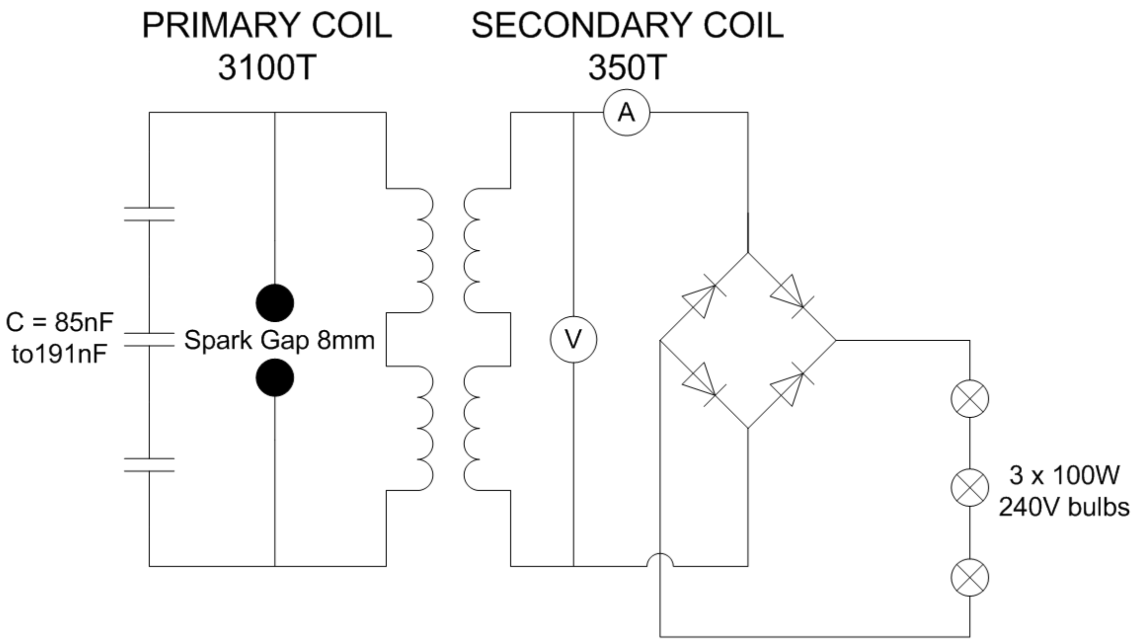

Figure 8: Circuit diagram for Experiment

3.1.3 T&M Equipment Used

MEASURED	DEVICE	POSITION
AC Power IN (RMS)	Maplins Plug-In Monitor	Plugged into mains electricity and connected to variac
AC Voltage OUT (RMS)	Tektronix P6015	Secondary Coil Output to Scope
AC Current OUT (RMS)	Stangenes 0.5-0.1W	Secondary Coil Output to Scope
RPM	RPM Meter	Rotation of shaft / rotor in core

Table 8: T&M Equipment used in Experiment

3.1.4 Measurements

In Figure 1 the RMS voltage and current across the Secondary Coil are plotted with a varying capacitance on the Primary Coil. At this stage of investigations there were only a limited number of capacitors available, and so only 6 values were assessed. The voltage, plotted in dark blue and on the left hand y-axis, remained steady no matter what the capacitance, as did the current, plotted in pink against the right hand axis. The oscilloscope showed that there were zero degrees phase shift between current and voltage for all capacitance values.

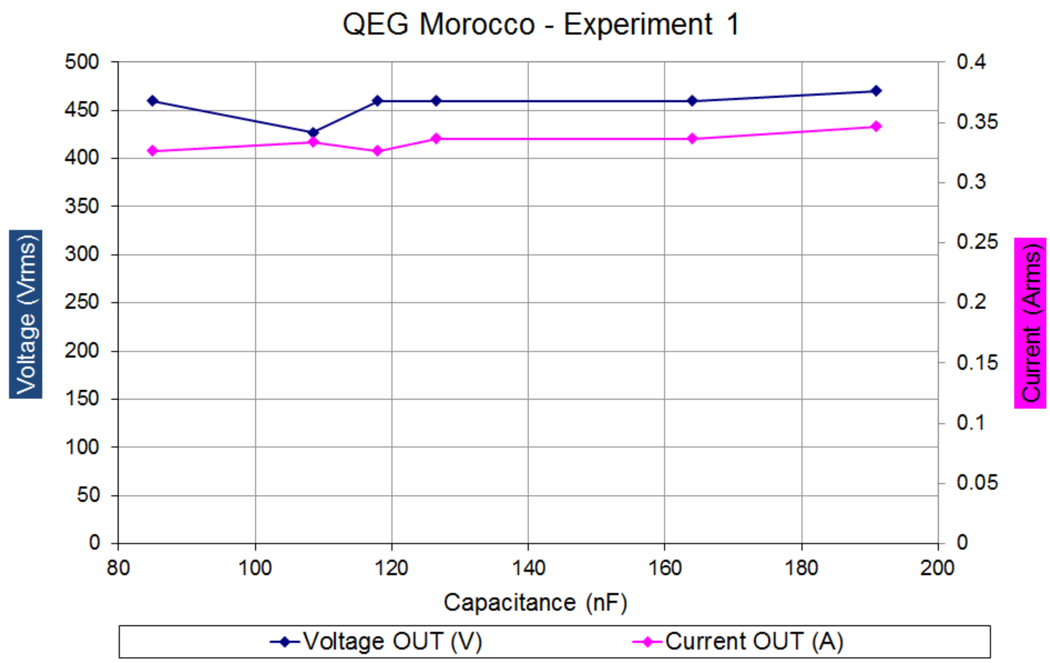

Figure 9: Voltage & Current OUT across Secondary Coil (AC)

Next the Voltage OUT and Current OUT were used to calculate the Power OUT, and compared against the Power IN from the plug-in power monitor. The comparison is shown in Figure 10, and shows that for a consistent Power IN of around 900W, the Power OUT across the Secondary Coil did not vary by much, at around 150W in all cases. This gives a Power Efficiency of around 17% for all the capacitance values assessed.

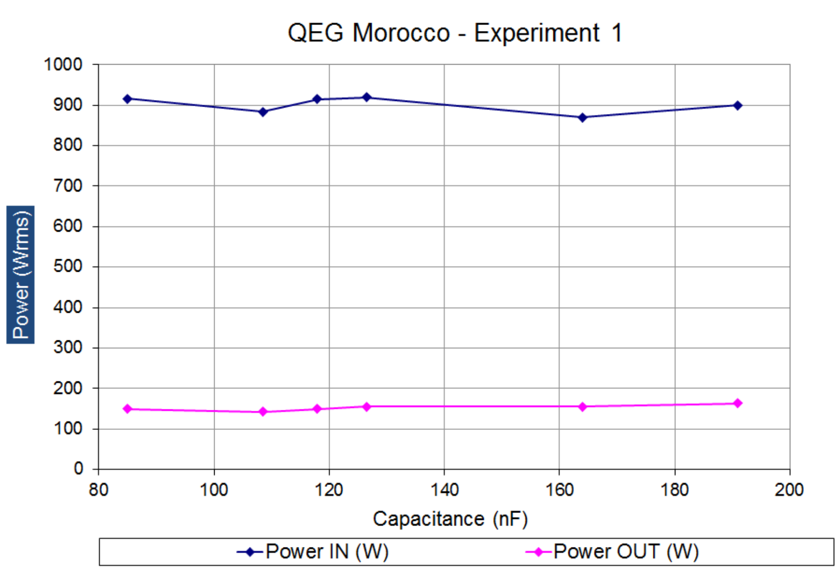

Figure 10: Power IN vs. Power OUT

In addition to the power measurements, an RPM meter was used to measure the rotation of the rotor in RPM (Revolutions Per Minute) in order to calculate the frequency in the Primary LC Circuit by using Formula 1. The resulting data is plotted in Figure 11 and does shows a peak frequency of 100Hz with C = 108.5nF.

Core Frequency (Hz) = [RPM/60] x 2

Formula 1: Calculation of Core Frequency from RPM

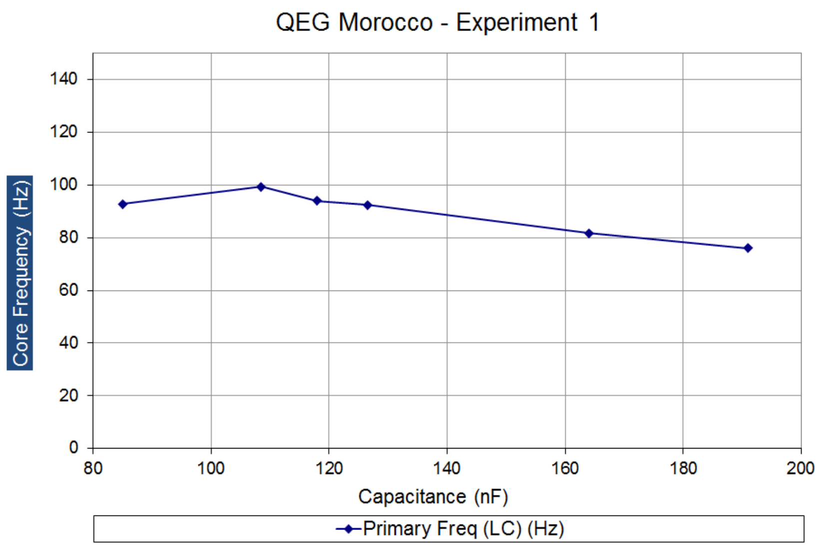

Figure 11: C value vs. Core Resonant Frequency

3.1.5 Findings

In this configuration of the QEG, varying the capacitance on the Primary Coil had almost no effect on the Power OUT from the Secondary Coil for all of the capacitance values assessed. It is possible that a peak Power OUT may occur between the capacitance data points, however at this stage there were a limited number of capacitors available.

3.2 Experiment 2

DATE	24th May 2014 21:30pm
LOCATION	Aouchtam, Morocco
LEAD ENGINEER	James Robitaille
DATA PROCESSED BY	James Robitaille
VIDEO	YouTube: 'QEG Morocco – Showing Overunity in VARS'

3.2.1 Description of Experiment

The purpose of this QEG set-up was to demonstrate the available power in the QEG core in the form of VARs (reactive power). Four different test set-ups were used to examine the power in both the primary and secondary windings with the secondary loaded (first 2 tests), and then with the primary loaded (second 2 tests). All 4 tests were performed with input power set to 600 Watts RMS during resonance for standardization. A standard load of (6) 100 Watt, 240 volt incandescent lamps wired in series (600 Watts @ 1440 Volts, 251.5Ω cold) was used for all 4 tests. At this stage the system was tested without the exciter coil, grounds or antenna in order to demonstrate the capacity of the basic generator before final tuning.

3.2.2 Experimental Set-Up

VARIABLE	PRIMARY COIL	SECONDARY COIL
No. Turns	3100T (26H inductance)	350T (400mH inductance)
Capacitance	167nF	None
Load / Resistance	None	6 x 100W 240V bulbs in Serial / 251.5Ω cold
Diode Bridge Rectifier	No	No
Grounded	No	No
Exciter Circuit	No	No

Table 9: Experimental Set-Up

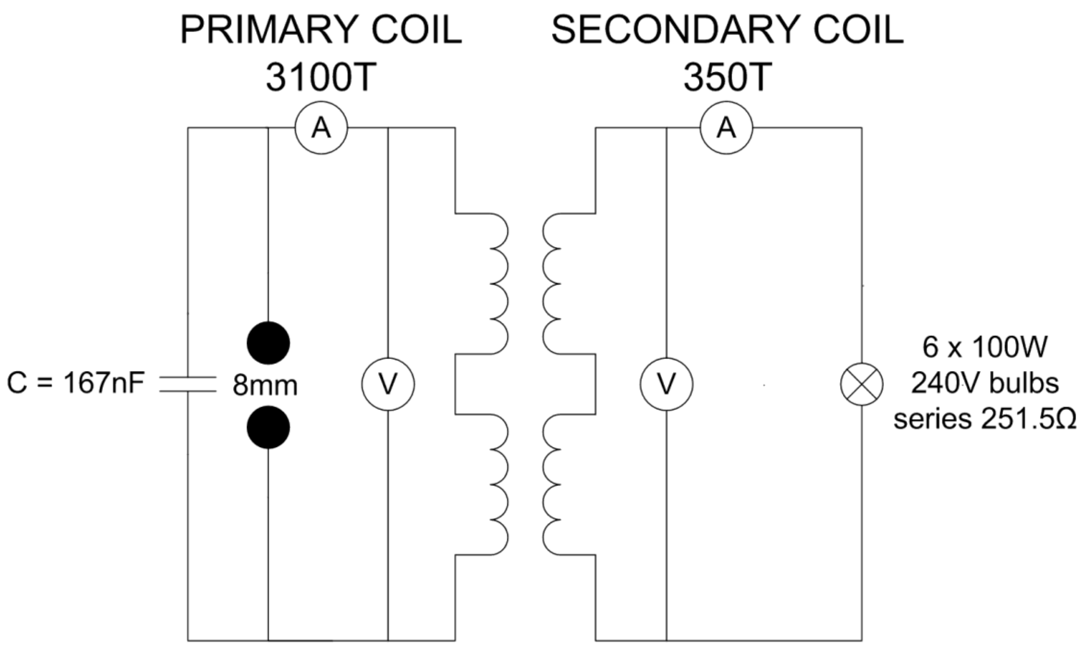

Figure 12: Circuit diagram for Experiment

3.2.3 T&M Equipment Used

MEASURED	DEVICE	POSITION
AC Power IN	Maplins Plug-In Monitor	Plugged into mains electricity and connected to variac
AC Voltage Primary	Tektronix P6015	Primary Coil to Scope
AC Current Primary	Fluke i30S	Primary Coil to Scope
AC Voltage Secondary	Tektronix P6015	Secondary Coil to Scope
AC Current Secondary	Stangenes 0.5-0.1W	Secondary Coil to Scope

Table 10: T&M Equipment used in Experiment

3.2.4 Measurements

To measure this set-up, the Power IN was gradually increased and fixed at 607W_{RMS}, as shown in Figure 13. This still is taken from a video of both Experiment 2 and Experiment 3 that is available on YouTube called 'QEG Morocco – Showing Overunity in VARS'. It has been raised by an independent electrical engineer that using this type of wall power monitor may not be the most accurate way of measuring power going into the system. In future measurements due consideration will be made to this issue.

Figure 13: Power IN from 240V Mains Supply

In Figure 14 an oscilloscope shot of the voltage and current AC waveforms across the Secondary Coil are shown. Both the voltage (Ch 1 – yellow) and the current (Ch 2 – cyan) have a fairly regular waveform, with 0° phase difference, indicating this is Active Power. The voltage is 1590$V_{pk\text{-}pk}$ / 405V_{RMS} (using a 1000X probe) and the current is 0.89$A_{pk\text{-}pk}$ / 0.23A_{RMS} (using a 10X probe) giving a Power OUT of 1415$W_{pk\text{-}pk}$ / 93V_{RMS}. The frequencies of the waveforms are 145.2Hz.

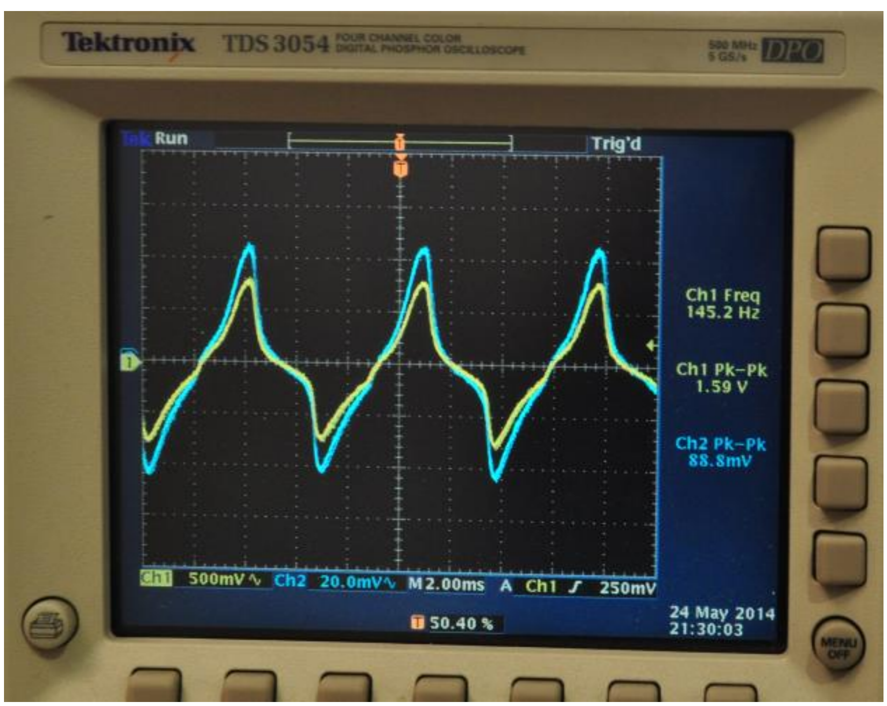

Figure 14: Oscilloscope shot of Voltage & Current AC waveforms across Secondary Coil

Next the power in the Primary Coil was analysed. In **Error! Reference source not found.** an oscilloscope shot of the voltage and current AC waveforms across the Primary Coil are shown with the same fixed Power IN of $607W_{rms}$. Although the voltage (Ch 1 – yellow) has a fairly regular waveform, the current (Ch 2 – cyan) has an irregular waveform with a 'double peak', possibly indicating that the system is not fully tuned. The voltage is $14kV_{pk-pk}$ / $4100V_{RMS}$ (using a 1000X probe) and the current is $1.63A_{pk-pk}$ / $0.5A_{RMS}$ (using a 10X probe). It is difficult to be certain of the phase difference between the voltage and current due to the double peak nature of the current waveform. This set-up gives a Reactive Power of $22.8kVAR_{pk-pk}$ or $2050kVAR_{RMS}$, and a Reactive Power Efficiency of 338%. The frequency is 73.8Hz.

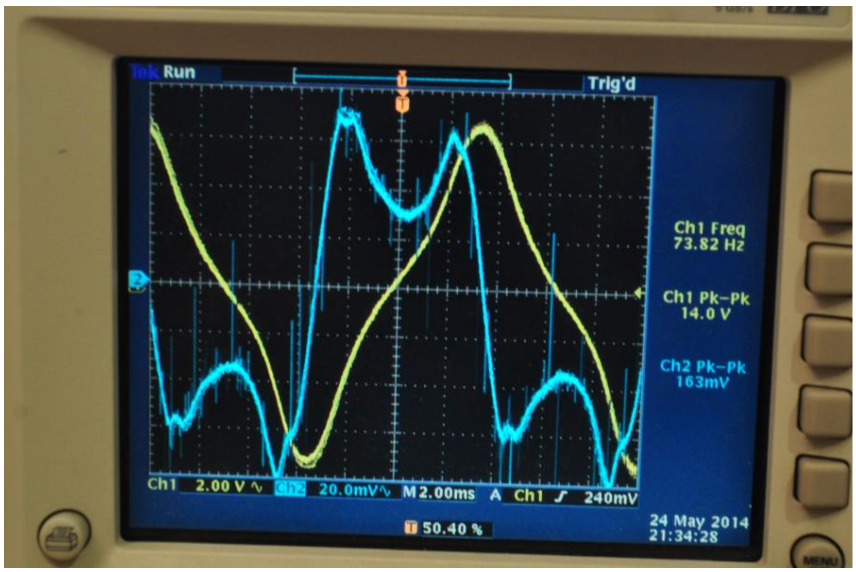

Figure 15: Oscilloscope shot of Voltage & Current AC waveforms across Primary Coil

3.2.5 Measurements Summary

MEASUREMENT	POWER IN (MAINS)	POWER OUT (PRIMARY COIL)	POWER OUT (SECONDARY COIL)	POWER OUT (TOTAL)
Frequency	-	73.8 Hz	145.2 Hz	-
Voltage	-	$14kV_{pk\text{-}pk}$ / $4100V_{RMS}$	$1590V_{pk\text{-}pk}$ / $405V_{RMS}$	-
Current	-	$1.63A_{pk\text{-}pk}$ / $0.5A_{RMS}$	$0.89A_{pk\text{-}pk}$ / $0.23A_{RMS}$	-
Phase Difference	-	Indeterminate	0°	-
Reactive Power	-	$22.8kVAR_{pk\text{-}pk}$ / $2.05kVAR_{RMS}$	None	-
Reactive Power Efficiency	-	338%	-	-

Table 11: Summary of Measured Data

3.2.6 Findings

In this configuration of the QEG, measurements were made on both the Primary and Secondary Coils. It was noted that the shape of the current waveform on the Primary Coil may indicate that the system is still not fully tuned, and so there is scope for further tuning and gaining possibly higher Power Efficiencies in future experiments.

In addition, a very high Reactive Power was measured across the Primary Coil. The voltage was measured as $14kV_{pk\text{-}pk}$ / $4100V_{RMS}$ and the current as $1.63A_{pk\text{-}pk}$ / $0.5A_{RMS}$. This gives a Reactive Power of $22.8kVAR_{pk\text{-}pk}$ / $2050kVAR_{RMS}$ and a Reactive Power Efficiency of 338%. The next step is to convert this Reactive Power into Active Power by use of a Transverter to create self-looping and active power output from the system. See Section 3.4 for more details on this.

3.3 Experiment 3

DATE	24th May 2014 21:45pm
LOCATION	Aouchtam, Morocco
LEAD ENGINEER	James Robitaille
DATA PROCESSED BY	James Robitaille
VIDEO	YouTube: 'QEG Morocco – Showing Overunity in VARS'

3.3.1 Description of Experiment

As with Experiment 2, this experiment aimed to quantify the high voltage and current values produced in the QEG core. However, this time the system was altered to look at the power available with the load of 6 light bulbs moved from the Secondary Coil to the High Voltage Primary Coil. In addition, a bank of capacitors totaling 14.2uF was added to the Secondary Coil, which has a much lower inductance than the Primary Coil – 400mH compared to 26H. It was therefore intended with this set-up to resonate the QEG with the Primary Coil instead of the Secondary Coil.

3.3.2 Experimental Set-Up

VARIABLE	PRIMARY COIL	SECONDARY COIL
No. Turns	3100T (26H inductance)	350T (400mH inductance)
Capacitance	167nF	14.2uF
Load / Resistance	6 x 100W 240V bulbs in Serial / 251.5Ω cold	None
Diode Bridge Rectifier	No	No
Grounded	No	No
Exciter Circuit	No	No

Table 12: Experimental Set-Up

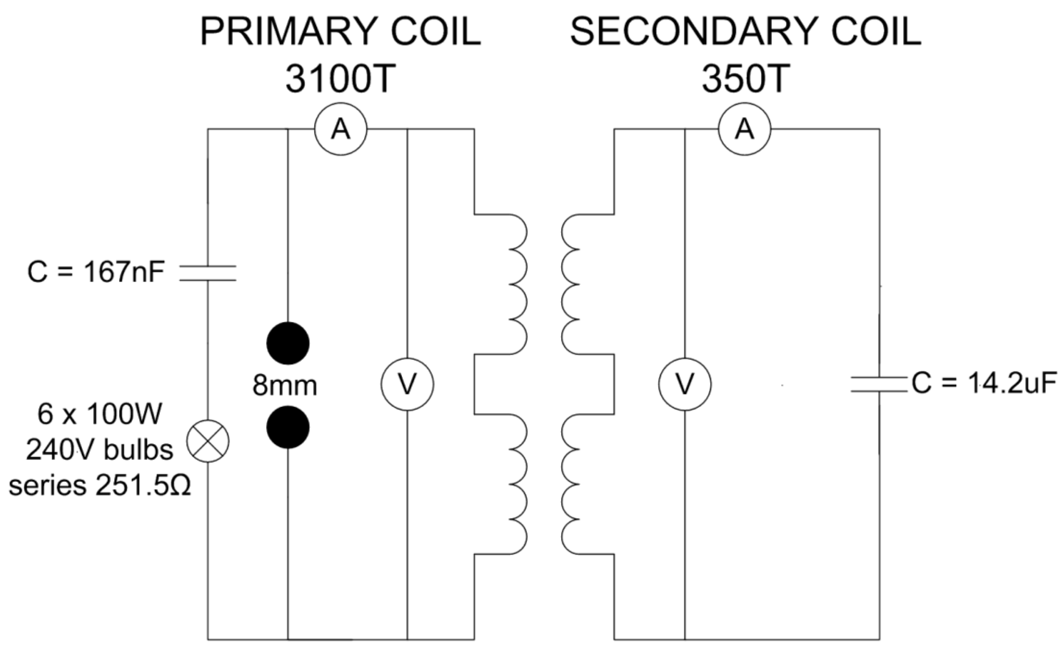

Figure 16: Circuit diagram for Experiment

3.3.3 T&M Equipment Used

MEASURED	DEVICE	POSITION
AC Power IN	Maplins Plug-In Monitor	Plugged into mains electricity and connected to variac
AC Voltage Primary	Tektronix P6015	Primary Coil to Scope
AC Current Primary	Fluke i30S	Primary Coil to Scope
AC Voltage Secondary	Tektronix P6015	Secondary Coil to Scope
AC Current Secondary	Stangenes 0.5-0.1W	Secondary Coil to Scope

Table 13: T&M Equipment used in Experiment

3.3.4 Measurements

As with Experiment 2, the Power IN was gradually increased and fixed at 606W_{RMS}, as shown in Figure 17. As is shown in the accompanying video of this experiment (see YouTube: 'QEG Morocco – Showing Overunity in VARS'), as the power was increased using the variac, thus increasing the frequency, there were three separate resonances in the system. The first two resonant frequencies did not phase lock, and it was not possible to get steady measurements on the oscilloscope. The third resonant frequency, which occurred with a Power IN of 607W, did phase lock, and this data will be presented in this section.

Figure 17: Power IN from 240V Mains Supply

In Figure 18, an oscilloscope shot of the voltage and current AC waveforms across the Secondary Coil are shown. The voltage (Ch 1 – yellow) has a fairly regular sine waveform, but the current (Ch 2 – cyan) has a 'double peak' waveform, again possibly suggesting the system requires further tuning. The voltage is 1090V_{pk-pk} / 369V_{RMS} (using a 1000X probe) and the current is 8.16A_{pk-pk} / 2.92A_{RMS} (using a 10X probe) giving a Reactive Power OUT of 8560VAR_{pk-pk} / 1078VAR_{RMS}. The frequencies of the waveforms are 86.2Hz. Compared to a Power IN of 607W, this equates to a Reactive Power Efficiency of 178%.

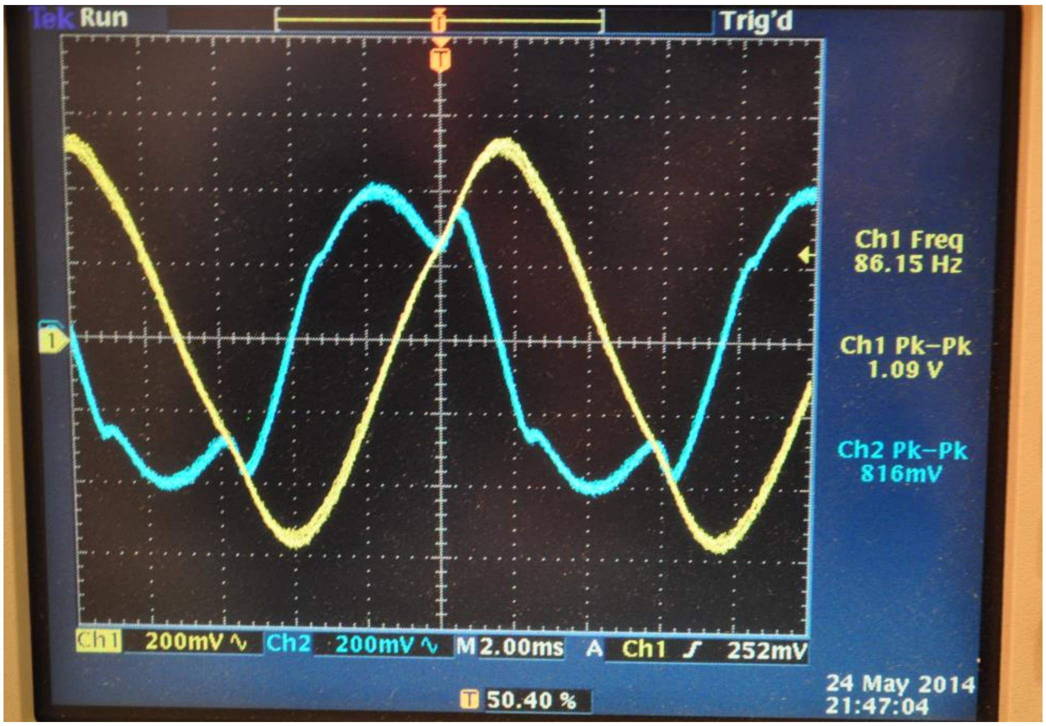

Figure 18: Oscilloscope shot of Voltage & Current AC waveforms across Secondary Coil

Next the power in the Primary Coil was analysed. In Figure an oscilloscope shot of the voltage and current AC waveforms across the Primary Coil are shown with the same fixed Power IN of 607W_{rms}. Although the voltage (Ch 1 – yellow) has a regular sine waveform, the current (Ch 2 – cyan) has an irregular waveform, indicating the system is not fully tuned. The voltage is 4.76k$V_{pk\text{-}pk}$ / 1474V_{RMS} (using a 1000X probe) and the current is 1.36$A_{pk\text{-}pk}$ / 0.4A_{RMS} (using a 10X probe). This set-up gives a Reactive Power of 5.9k$VAR_{pk\text{-}pk}$ or 590kVAR_{RMS}, and a Reactive Power Efficiency of 97%. Again the phase difference is difficult to determine. The frequency is 168.4Hz.

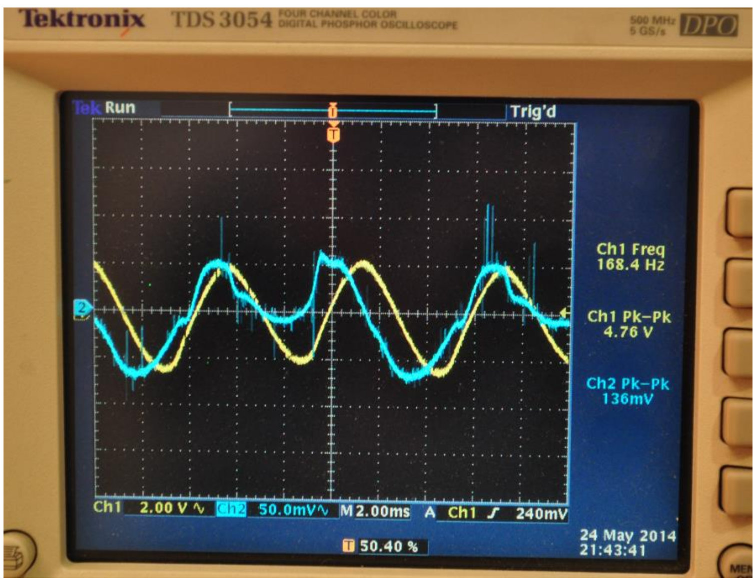

Figure 19: Oscilloscope shot of Voltage & Current AC waveforms across Primary Coil

3.3.5 Measurements Summary

MEASUREMENT	POWER IN (MAINS)	POWER OUT (PRIMARY COIL)	POWER OUT (SECONDARY COIL)	POWER OUT (TOTAL)
Frequency	-	168.4 Hz	86.2 Hz	-
Voltage	-	$4.7kV_{pk-pk}$ / $1474V_{RMS}$	$1070V_{pk-pk}$ / $369V_{RMS}$	-
Current	-	$1.26A_{pk-pk}$ / $0.4A_{RMS}$	$8A_{pk-pk}$ / $2.9A_{RMS}$	-
Phase Difference	-	Indeterminate	Indeterminate	-
Reactive Power	-	$5.9kVAR_{pk-pk}$ / $590VAR_{RMS}$	$8.6kVAR_{pk-pk}$ / $1078VAR_{RMS}$	-
Reactive Power Efficiency	-	97%	177%	-

Table 14: Summary of Measured Data

3.3.6 Findings

In this configuration of the QEG, measurements were made on both the Primary and Secondary Coils with a Power IN of $606W_{RMS}$. Reactive Power was measured across both the Primary and Secondary Coils, giving $5.9kVAR_{pk-pk}$ / $590VAR_{RMS}$ and $8.6kVAR_{pk-pk}$ / $1078VAR_{RMS}$ respectively, which equates to Reactive Power Efficiencies of 97% and 177%. It was noted that the shape of the current waveform on the Primary Coil indicates that the system is still not fully tuned, and so there is scope for further tuning and measuring possibly higher Power Efficiencies in future experiments.

3.4 A Note on Next Steps

In All 4 experiments, high amounts of Reactive, or VAR Power with Power Efficiencies of up to 338% were measured.

It remains now to self-loop the system so that a portion of the Power OUT is fed back into the Power IN and the device can therefore run itself, and provide up to 10kW of useable RMS output power.

In order to reach the next level in development, it will be necessary to introduce a Transverter circuit into the system. A Transverter comprises of various electronic components such as a microcontroller, IGBTs, diodes and capacitors. The Transverter will allow the conversion from Reactive Power (VAR) into Active Power (Watts).

Work on the Transverter design is ongoing. These details will be included in future updates to this report as further developments are undertaken.