

CNG AD-HOC COMMITTEE REPORT

Introduction

The CNG Ad-Hoc committee was charged with the mandate of reviewing two fuel options, (CNG or Diesel) available for the upcoming big bus purchase. The committee agreed that whatever the outcome of the information, they would make a recommendation, or at least relay the issues/options so the full board can make an informed decision.

The committee was made up of current commissioners, one from each standing committee. Commissioners on the committee are as follows;

- Chairman Chapin Kaynor,
Committee Chair
- Commissioner Harold
Garabedian
- Commissioner Chapin Spencer
- Commissioner John Sharrow
- Treasurer Marti Powers

All of the commissioners agreed to go through all of the information that would be provided and agreed on the original timelines.

Timeline

The original timeline was to meet at least two times over the course of two months with the hopes of having a final finding due at the September board meeting. As you will see, the information reviewed was so extensive that the committee agreed to have extra meetings which pushed out the findings report to the October board meeting. Attached to this report is the original timeline.

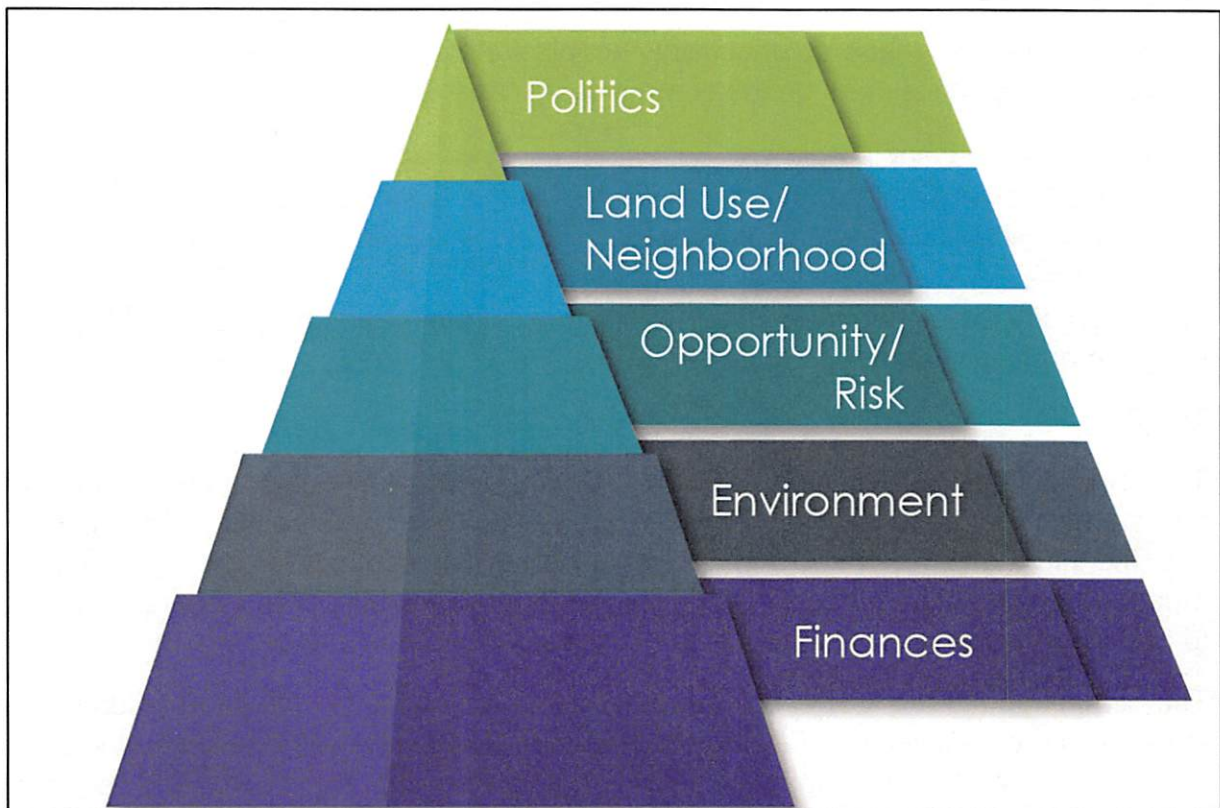
The committee agreed to meet with stakeholders that could provide information to them to assist in the final finding. Below outlines the meetings that were held with the dates, who attended and a brief comment on what was discussed. Attached to this report are the minutes from each meeting.

1. July 28th, 2016 – First meeting was to decide on the goals of the committee as well as go over the bids that were received for the big bus purchase.
2. August 11th, 2016 – Vermont Gas made a presentation to the committee as well as answer any questions the committee had.
3. September 6th, 2016 – The committee met with staff from Burlington Electric as well as VEIC. VEIC had released a report on electric bus options in August and there was discussion about that. Given the timeliness and subject matter of the report, the committee felt it was relevant to consider and address in its findings. Also discussed was the possibility of an electric bus pilot program with BED.

4. September 13th, 2016 – Meeting was to review all of the information and come up with the final findings. There was also a discussion on the formatting of the final report.

Findings

The Financial, Environmental & other business factors would be considered most important and Politics would be considered least important as suggested in the figure below.



Finances:

- Capital costs:
 - Diesel pricing is the lowest and allows replacement of the largest number of buses.
 - CNG is ~\$48,000 more per bus.
 - Electric is off-the-charts expensive but grants might help if we choose to do a limited pilot of electric buses.
 - Facility upgrades of ~\$200,000 needed for CNG.
 - Compression facility costs are large but would be subsidized by VGS and factored into fuel costs.

- Fuel costs:
 - Fuel costs over the life of a bus are expected to equal or exceed the capital cost.
 - Diesel costs are currently significantly below CNG but this is not expected to continue.
 - We are uncertain how VGS pipeline costs will affect future natural gas prices.
 - Prior forecasting of fuel costs from sources has been incorrect.
 - Due to lower engine efficiency, higher capital costs, and other factors, CNG equivalent per-gallon pricing must be about half of that of diesel for it to come out ahead overall.
 - Bottom line: Future fuel costs are uncertain, projections have proved unreliable, and current fuel costs tip strongly toward diesel.
- Other maintenance costs:
 - Maintenance costs are similar between diesel and CNG and both will require some training and parts expansion (due to advances in diesel technology).
 - Additional certification is needed for CNG.
 - Fueling cost: CNG fueling time and movement of vehicles to the fueling station is expected to incur a labor cost.
 - Electric bus maintenance is expected to be lower than either diesel or CNG, but we did not have data.

Environment:

- After reviewing much data, we concluded that CNG and modern diesel buses have similar emissions and similar upstream environmental costs. There are differences, but they are overall comparable and both are regulated to the same standard.
- Electricity converts to mechanical energy more efficiently than internal combustion. If electricity is generated from renewable sources (as is the case in Burlington), the combined benefit to the environment is large.

Opportunity/Risk:

- Due to the large up-front investment and large volume needed (our entire fleet plus additional customers) to make it economical, CNG requires a minimum 20-year commitment.
- It would be hard to pivot away from CNG if pricing projections don't pan out.
- Due to Vermont's energy goals (90% renewables by 2050), we expect future incentives for green transportation initiatives such as alternative fuel buses to become available.
- Staff and management attention to transition to CNG would compete with other project work.

Land use/Neighborhood:

- A potential concern for "Industrialization" of the neighborhood would need to be addressed if we pursue CNG.
- Land used for the CNG compression and filling station would not be available for other uses (such as parking).

Politics:

- We took great pains to consider political factors last. We wanted to make a sound financial, environmental, and business decision.
- CNG is generally considered "cleaner-burning" than diesel (though we found this to no longer be the case).
- Natural gas is currently a flashpoint of controversy in Vermont.
- VGS is branching into renewable natural gas (RNG) with a system of REC-like credits (RINs). We do not believe GMT's participation would speed or hamper that effort.
- Electric buses would be viewed by the public as the greenest choice, but are not economically feasible at this time.
- Diesel buses are status-quo, but because we can purchase 2 more diesel buses with our current capital budget, we would be taking 2 older diesel buses off the roads. This is an easy environmental and customer service benefit for the public to understand.

Recommendation

During the process of meetings, the Federal Government had released the funding of capital projects and through Vtrans, GMT received approximately \$6M to purchase buses. That amount, as well as our local match would allow GMT to purchase 11 diesel or 9 CNG buses.

After all of the documents were reviewed, most questions were answered and the financial impact on the purchase, the committee unanimously recommends that the upcoming bus purchase be done using the diesel option.

In a few years a group of about 30 buses will reach their end of life in a 5-year span. Propulsion options should be evaluated again in advance of those replacements.

Bibliography

Below is a list of documents that were reviewed, minutes of each meeting including who was in attendance as well as websites that were reviewed.

- Original Timeline memo dated July 15th, 2016
- Committee meeting dates and minutes
- Opportunity Assessment: Feasibility of Transitioning Chittenden County Transportation Authority's Bus Fleet to Operation on Compressed Natural Gas
Prepared by: Yborra & Associates, LLC Stephe Yborra - Managing Director
- Vermont Gas documents;
- Game Changer Executive Summary
Prepared by: Gladstein, Neandross & Associates
- Price Projections – CNG vs Diesel
- CNG Pricing & Graphs
- AVSG Proposal #1
- AVSG Proposal #2
- ANG Proposal
- Clean Energy Proposal
- Analysis of Alternative Fuel Vehicles dated October 10th, 2013
Prepared by: Steadman Hill Consulting, Inc.
- Vermont Gas Website Information;
 - a. <https://www.epa.gov/renewable-fuel-standard-program/renewable-identification-numbers-rins-under-renewable-fuel-standard#lifecycle>
 - b. <http://magazine.rewmag.com/article/february-2016/rng-rising-to-the-challenge-february-2016.aspx>
 - c. <http://www.eia.gov/todayinenergy/detail.cfm?id=11511>
 - d. <https://www.epa.gov/renewable-fuel-standard-program/program-overview-renewable-fuel-standard-program>
http://www.transcanada.com/docs/Investor_Centre/TransCanada-2015-CSR-Report.pdf
- TCRP – Report 93 dated 2003
- MJB&A Report #1 dated 2013
- MJB&A Report #2 dated 2013

Getting you where you need to go!

July 15th, 2015

To: Board Chair Chapin Kaynor and the CCTA Board of Commissioners

From: Mark A. Sousa
Assistant General Manager

Cc. Karen Walton
General Manager

Re: CNG Option

Bus Procurement/CNG Option

As you know, our RFP for our bus procurement is out. We have reviewed all the Approved Equals as well as answered all questions from the vendors. Please see the below timeline for next steps and action the Board will need to take;

July 25 – Bids are due. Staff will then review and put together a comparison sheet.

July 27 – Staff to meet with Vermont Gas to start reviewing the documents.

July 28 – Tentative Ad Hoc committee meeting to review the documents.

August 4 – Staff to finalize all information with Vermont Gas and start to formalize a presentation for the Ad Hoc Committee.

August 11 – Second meeting with the Ad Hoc committee. Questions and answer session.

August 19 – Presentation to the Board on the CNG option.

August 30 – Final Ad Hoc meeting (if necessary).

September 12 – Present all information to the Strategy Committee.

September 20 – Board decision on the CNG option.



**CNG Ad Hoc Committee
Green Mountain Transit**

Meeting Notes
Thursday, July 28, 2016, 8:00 am
15 Industrial Parkway, Burlington, VT

Present:

Chair Kaynor, Treasurer Powers, Commissioner Spencer, Commissioner Garabedian, and Commissioner Sharrow

Staff members Karen Walton, General Manager and Assistant General Manager Mark Sousa

Public Comment

None

Adjustment to Agenda

None

GOALS OF THE COMMITTEE

Chair Kaynor stated that his thoughts on the goals were that a decision needs to be made about the fleet going forward as to whether it should remain diesel or change to CNG. He said that we have about 15 buses passed their life cycle and that an order for buses should go out before the end of the year. This committee should do a deep dive into the fuel type, and understand and possibly recommend to the entire Board or at least summarize the issues/options. AGM Sousa added that the staff's intent is to get all of the information in front of the Board regarding price differential on the buses, and infrastructure costs both capital and operational. Chair Kaynor stated that the Board needs to be able to defend why we made each decision in relation to economic, political, and environmental needs.

GM Walton mentioned that VEIC was contracted by VTTrans to conduct a quick study comparing diesel bus costs with electric bus costs. She said that she requested that VEIC also factor in infrastructure costs. This study should be completed by the end of August and that Ms. Walton will bring the Board the results of the study.

REVIEW OF THE BUS PURCHASE BIDS

AGM Sousa stated that there were two bidders for the RFP. He reminded the committee that this RFP, though put out by GMT, was actually a statewide RFP. Gillig prices were deemed the lowest, both for the diesel and CNG buses, with a differential between the two being \$47,318.

VERMONT GAS MEETING

AGM Sousa said that the next meeting for the Ad Hoc Committee will include Vermont Gas and that they would be bringing the results of their RFP for the fueling station capital and operating costs. Some of the areas that the Ad Hoc Committee would like to discuss at the next meeting include: Looking at different fuel price scenarios; CNG vs. Propane; a larger discussion on the RNG; a reasonable assessment as to the changes that will have to be made for parts inventory, training, etc.; and what kind of Greenhouse Gas Emissions reduction would we see with CNG as opposed to the clean burning diesel we have now. The Committee also asked if there was a technology review they could look at.

Next Meeting: Thursday, August 11, 2016 at 10:00 a.m.

Meeting adjourned at 9:00 a.m.

**CNG Ad Hoc Committee
Green Mountain Transit**

Meeting Notes
Thursday, August 11th, 2016, 10:00 am
15 Industrial Parkway, Burlington, VT

Present:

Chair Kaynor, Treasurer Powers, Commissioners Garabedian, and Commissioner Sharrow.
Commissioner Spencer was absent.

Staff members Assistant General Manager Mark A. Sousa

Vermont Gas staff Owen Brady, Tom Murray and Rebecca Towne

Public Comment

None

Adjustment to Agenda

None

VERMONT GAS PRESENTATION

All three members from Vermont Gas presented a power point presentation. Several topics were discussed. Below is a list of items that were discussed;

- RNG discussion and where it comes from (Quebec & Salisbury)
- Feasibility study
- Capital funds as well as the third party companies
- Upgrade options on 1 Industrial as well as the use of Burlington DPW locations
- Diesel vs CNG
- Financial impacts from all sources. Bus purchase, upgrading of the facilities, third party involvement (mid-range average was used), and operational costs were included.
- REQ vs RIN.
- Future capacity utilizing digester projects.

Vermont Gas were tasked with sending the committee some documents for review. They included;

1. RIN backup
2. Chart backup
3. Tariff info
4. Third Party Proposals

NEXT STEPS

Chair Kaynor advised that he would like the committee to receive all information from all sources before meeting again. The VEIC report should be out which will include Hybrid Electric information as well as Electric Bus options.

GMT's bus procurement should be part of the information and that information will be collected for the committee review, per Mr. Sousa.

Next Meeting (Tentative): Thursday, September 15th, 2016 at 10:00 a.m.

Meeting adjourned at 12:15 p.m. by Commissioner Sharrow and seconded by Commissioner Powers.

**CNG Ad Hoc Committee
Green Mountain Transit**

Meeting Notes
Thursday, September 6th 2016, 8:30 am
15 Industrial Parkway, Burlington, VT

Present:

Chair Kaynor, Treasurer Powers and Commissioner Sharrow.
Commissioner Spencer was available via phone.

Staff members General Manager Karen Walton & Assistant General Manager Mark A. Sousa

VEIC members in attendance - Bethany Whitaker, Michelle McCutcheon-Shour
Burlington Electric members in attendance - Tom Lyle, Michelle Keller

Meeting opened at 8:30am.

Public Comment

None

Adjustment to Agenda

Moved #3 and #4

VEIC Report

- VEIC explained the report and all the components behind it
- 100K higher over the 12 year period
- Maintenance costs are not really captured yet and more information and data will be available as time goes on
- Quick charge buses and overnight charge buses were discussed
- BED explained their involvement in the electric bus program
- Legislation was discussed
- EV language was discussed at the State level
- Custom program was discussed and the formula of what identifies the program
- Pilot program was discussed and that GMT is not ready at this time to purchase electric buses but maybe after the first 15 buses were purchased, the next round could be looked at for electric buses
- Charging capacity at 15 Industrial was discussed and having a review of the facility
- Meeting with BED and GMT were the next steps as well as VEIC working on the Capital component of the project

Discussion on Vermont Gas and the information that was provided

- Discussion on the reports and information that was supplied to the committee were discussed and the need for more information going forward was also discussed
- RNG information was discussed
- Chart backup was discussed

NEXT STEPS

Going to another location was discussed and Mr. Sousa will be following up with Commissioner Garabedian. Commissioner Sharrow will be looking in the Milton facility to see if it makes sense to go there for a visit.

Next Meeting: Tuesday, September 13th, 2016 at 10:00 a.m.

Meeting adjourned at 10:30 p.m. by Treasurer Powers and seconded by Commissioner Sharrow.

**CNG Ad Hoc Committee
Green Mountain Transit**

Meeting Notes
Tuesday, September 13th 2016, 10:30 am
15 Industrial Parkway, Burlington, VT

Present:

Chair Kaynor, Treasurer Powers and Commissioners Spencer & Sharrow.
Commissioner Garabedian was available via phone.

Staff members in attendance: Assistant General Manager Mark A. Sousa

Meeting opened at 10:36 am.

Public Comment

None

Adjustment to Agenda

None

Discussion on all information gathered

The committee went through all of the information that was gathered. Priorities were set and an outline of all of the findings for each priority were discussed and written down.

Formatting the information

The committee discussed how the information would be disseminated and which committee would review the findings. The committee discussed the possibility of a pilot program of electric buses possibly after this round of buses to be purchased.

Communication

The committee agreed that the Strategy Committee would review the information and the final report. There was a discussion that verbal information would be relayed to the full Board and that the final report would be presented at the October meeting.

Meeting adjourned at 12:30 p.m. by Treasurer Powers and seconded by Commissioner Sharrow.