

**THE CITY OF GREATER  
SADBURY**

***GREEN FLEET***

**INTRODUCTION OF “HYBRID VEHICLES”  
INTO OUR MUNICIPAL FLEET**

**Priorities Committee**

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# PRESENTED BY

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# GREEN FLEET

- We all share in the responsibility of the pollution of our air and the environment.
- Automobile emissions are responsible for approximately 20% of the harmful greenhouse gases in our atmosphere.
- It is our responsibility to help reduce these emissions and secure the future.
- One step that the City of Greater Sudbury can take towards this task is to introduce “*HYBRID VEHICLES*” into our fleet

# GREEN FLEET

- In Canada, there are only about 3,500 hybrid vehicles in use.
- The makes and models of vehicles that currently offer the Hybrid technology is limited.
- The available vehicles are as follows:

# HONDA CIVIC



# HONDA ACCORD



# TOYOTA PRIUS



# TOYOTA CAMRY





# LEXUS GS450h



# NISSAN ALTIMA



# FORD ESCAPE



# LEXUS Rx400b



# TOYOTA HIGHLANDER



# **SATURN VUE GREEN LINE**



# CHEVROLET/GMC PICKUP



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- All of the vehicles that were shown have Hybrid technologies that utilize a gasoline engine and an electric motor to power the vehicle.
- However, differences exist in their efficiencies and performance.
- For the purposes of this presentation we will be describing the Hybrid Synergy Drive manufactured by Toyota.



# COMPONENTS OF THE HYBRID SYNERGY DRIVE

- Gasoline Engine
- Electric Drive Motor
- Power Control Unit
- High Voltage Battery
- Generator
- Planetary Gears

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- The Hybrid Synergy Drive is a full Hybrid because it can operate in three (3) distinct modes; gasoline only, electric motor only or a combination of both
- It delivers environmental cleanliness and fuel efficiency without sacrificing power and performance.

# START UP MODE

- When starting up, stopped at an intersection or lights, or moving at low speeds the vehicle is powered solely by the electric drive motor, drawing energy from the Hybrid battery through the power control unit.
- As well as saving on fuel and having zero emissions, the electric drive motor also helps the acceleration process by delivering maximum torque instantly.

# ACCELERATION MODE

- When the vehicle needs to accelerate quickly, as in passing another vehicle on a highway, the gasoline engine and the electric drive motor combine to supply power for smooth and powerful acceleration.
- The combination of mechanical power and electrical power deliver responsive acceleration when needed.

# CRUISING MODE

- Under cruising and normal driving conditions both the gasoline engine and the electric drive motor supply power to the wheels.
- At higher speeds, the gasoline engine does most of the work and the electric motor kicks in when needed.
- At lower speeds, it is the electric motor that does most of the work with the gasoline engine kicking in when needed.
- Gasoline engine power is divided between the wheels and the generator.
- The generator drives the Hybrid motor and recharges the Hybrid battery from surplus engine power.
- There is never a need to “plug in” the vehicle to charge the hybrid battery.

# DECELERATION/BRAKING MODE

- For most vehicles braking means a loss of energy through heat and friction.
- With a Hybrid vehicle, taking your foot off the accelerator or applying the brakes actually helps recharge the battery and boosts system efficiency.
- This regenerative braking transforms kinetic energy from the wheels into electricity which is stored in the Hybrid battery.
- The electric motor becomes a generator during braking.
- The Hybrid system is most effective in the stop and go driving of an urban situation.

# REVERSE MODE

- When you put a Hybrid car into reverse, under normal circumstances only the electric drive motor will be in operation.
- The gasoline engine is not required.
- The only time the gasoline engine will come on when in reverse is to charge a low Hybrid battery.

# “**LOWERED EMISSIONS**”

- Hybrid cars are environmentally friendly and clean cars with very low emissions.
- Typically Hybrids produce 70% fewer smog forming emissions than a conventional gasoline powered vehicle.
- Because Hybrids combine both gasoline engines and electric motors, greater fuel efficiencies are realized.



# PRICE COMPARISONS

TYPE OF VEHICLE	BASE PRICE	REBATES	DISCOUNTS	PURCHASE PRICE
TOYOTA PRIUS HYBRID	\$32,700.00	\$4,000.00	MAY BE ELIGIBLE FOR DISCOUNTS	\$28,700.00
HONDA CIVIC HYBRID	\$31,800.00	\$4,000.00	MAY BE ELIGIBLE FOR DISCOUNTS	\$27,800.00
FORD FOCUS GASOLINE	\$20,300.00	N/A	\$3,000.00 To \$3,500.00	\$17,300.00
DODGE CALIBER GASOLINE	\$20,500.00	N/A	\$2,000.00 To \$3,000.00	\$18,500.00

# WARRANTY COMPARISONS

VEHICLE	BASIC	POWER TRAIN	CORROSION	EMISSION	HYBRID
TOYOTA PRIUS HYBRID	3 Years 60,000 KM	5 YEARS 100,000 KM	5 YEARS UNLIMITED	3/60,000 8/130,000	8/130,000
HONDA CIVIC HYBRID	3 YEARS 60,000 KM	5 YEARS 100,000 KM	5 Years UNLIMITED	3/60,000 8/130,000	8/130,000
FORD FOCUS GASOLINE	3 YEARS 60,000 KM	5 YEARS 100,000 KM	5 YEARS UNLIMITED	8/130,000	N/A
DODGE CALIBER GASOLINE	3 YEARS 60,000 KM	5 YEARS 100,000 KM	5 YEARS 160,000 KM	8/130,000	N/A

# FUEL EFFICIENCY COMPARISON

TYPE OF VEHICLE	CITY DRIVING	HIGHWAY DRIVING
TOYOTA PRIUS HYBRID	4.0 L/100 KM 71 MPG	4.2 L/100 KM 67 MPG
HONDA CIVIC HYBRID	4.7 L/100 KM 60 MPG	4.3 L/100 KM 66 MPG
FORD FOCUS GASOLINE	9.0 L/100 KM 31 MPG	6.5 L/100 KM 43 MPG
DODGE CALIBER GASOLINE	9.0 L/100KM 31 MPG	7.3 L/100 KM 39 MPG

# CO2 EMISSION COMPARISON

TYPE OF VEHICLE	CO2 EMISSIONS KG/YR
TOYOTA PRIUS HYBRID	1968 KG/YR
HONDA CIVIC HYBRID	2160 KG/YR
FORD FOCUS GASOLINE	3744 KG/YR
DODGE CALIBER GASOLINE	3984 KG/YR

# PROS OF HYBRID VEHICLES

- Increased fuel efficiency through the combination of electric and gasoline to power the vehicle.
- Decreased emissions that are harmful to the environment. Up to 70% reductions when compared to a conventional gasoline powered vehicle.
- We can enhance the City of Greater Sudbury's efforts in reducing harmful Greenhouse gas emissions. "THINK GREEN"
- Through a carefully designed logo we can advertise, on these vehicles, that the City of greater Sudbury is "THINKING GREEN"

# CONS OF HYBRID VEHICLES

- The up front purchase price of a Hybrid vehicle is greater by approximately \$10,000.00 to \$15,000.00 per vehicle when compared to a gasoline powered vehicle of a similar size.
- It will take approximately four (4) years to realize the fuel savings equivalent to the purchase price difference.
- Specially trained technicians are required to repair and maintain a Hybrid vehicle. Dealerships have the technicians. Training would be involved for our technicians.
- When traveling outside of the City and the Hybrid vehicle has a mechanical failure it may be difficult to get repairs done.

# RECOMMENDED OPTIONS

OPTION 1: Status Quo – Continue to replace larger, less efficient cars with fuel efficient compact cars.

OPTION 2: Initiate a Pilot Project – In support of the City of Greater Sudbury's environmental initiatives, initiate a pilot project that would introduce seven (7) Hybrid vehicles into our Fleet system. Staff recommend that these vehicles be assigned to the By-law Enforcement Section because of the high daily use across the City of Greater Sudbury.

Staff is recommending Option #2

# HYBRID PILOT PROJECT FUNDING

The funding required for the purpose of purchasing the seven (7) Hybrid vehicles is estimated to be approximately \$225,000.00 and would be funded through the 2007 Fleet Capital account.



# THE GREEN MUNICIPAL FUND

On May 23, 2007, the Federation of Canadian Municipalities, through its Green Municipal Fund, issued a request for proposals (RFP) for financing to support projects that result in the acquisition or retrofit and operation of energy efficient or emissions reducing municipal vehicles.

The Green Municipal Fund will award a total of up to \$10 million in loans and up to \$1.6 million in grants to selected Canadian municipalities under the Request for Proposals.

The level of potential funding is linked to the projects anticipated environmental, social and economic benefit.

# Promotional Campaign

- Environmental Initiative staff to hold a contest to determine the wording for the decal that would be placed on the hybrid vehicles.

**Thank you**