

HYLIGHTS

Hydrogen for Transport in Europe

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Policy support tool: Methodology and manual

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THE IDEAS PRESENTED IN THIS DOCUMENT WERE REVIEWED BY CERTAIN "HYLIGHTS" PROJECT PARTNERS TO ENSURE BROAD GENERAL AGREEMENT WITH ITS PRINCIPAL FINDINGS AND PERSPECTIVES. HOWEVER, WHILE A COMMENDABLE LEVEL OF CONSENSUS HAS BEEN ACHIEVED, THIS DOES NOT MEAN THAT EVERY CONSULTED STAKEHOLDER OR "HYLIGHTS" INDUSTRY PARTNER NECESSARILY ENDORSES OR AGREES WITH EVERY FINDING IN THE DOCUMENT. THE PRODUCER OF THIS DOCUMENT IS THE SOLE RESPONSIBLE FOR ITS CONTENT AND RECOMMENDATIONS.

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1 Introduction

THIS DOCUMENT SERVES AS A MANUAL FOR USERS OF THE 'HYLIGHTS POLICY SUPPORT CALCULATION TOOL'. TO USE THE HYLIGHTS POLICY SUPPORT CALCULATION TOOL, YOU NEED MICROSOFT EXCEL 2003 OR 2007.

THE OVERALL PURPOSE OF THE TOOL IS TO CALCULATE:

1. THE COST PER KILOMETRE FOR A VEHICLE IN A CERTAIN COUNTRY
2. THE ALLOWED ADDITIONAL COST OF A VEHICLE COMPARED TO A REFERENCE VEHICLE

IN THIS DOCUMENT YOU CAN FIND AN OVERVIEW AND EXPLANATION OF ALL OPTIONS OF THE TOOL. THE METHODOLOGY BEHIND THE TOOL IS EXPLAINED AS WELL. AN ANALYSIS OF THE OUTCOMES AS CONDUCTED DURING THE HYLIGHTS PROJECT CAN BE FOUND IN A FOLLOWING REPORT.

WHEN YOU START THE HYLIGHTS POLICY SUPPORT CALCULATION TOOL YOU WILL SEE THE FOLLOWING SCREEN (SEE FIGURE 1.1). EACH OF THE FUNCTIONS WILL BE EXPLAINED IN THE FOLLOWING CHAPTERS. THE NEXT CHAPTER WILL START WITH AN EXPLANATION OF THE METHODOLOGY BEHIND THE TOOL. CHAPTER 3 INCLUDES THE FUNCTIONALITIES PROVIDED BY THE TOOL AS WELL AS THE DEFAULT VALUES. THE ANNEX GIVES AN OUTLINE OF THE DIFFERENT TAXATION SCHEMES OF THE COUNTRIES INCLUDED IN THE TOOL FOR THE PRIVATE CARS.

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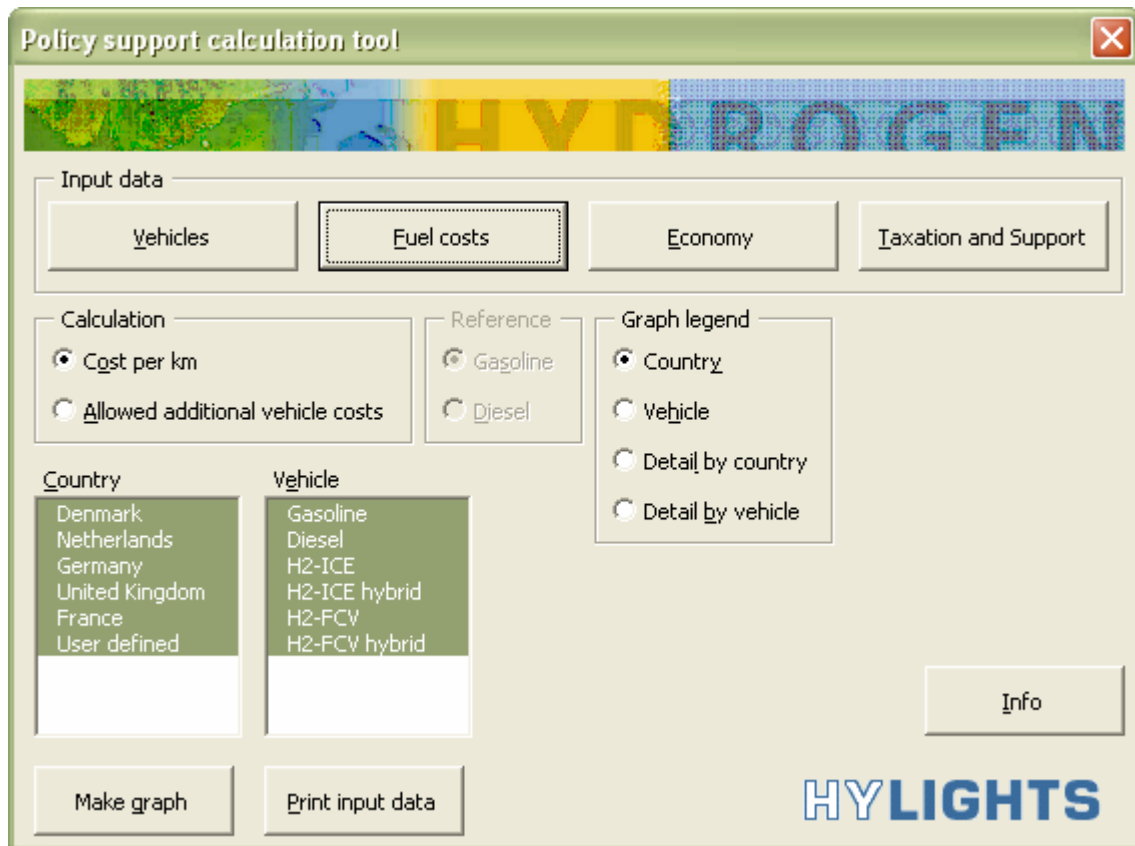


FIGURE 1.1: SNAPSHOT OF THE HYLIGHTS POLICY SUPPORT CALCULATION TOOL MAIN MENU

2 Description of the methodology behind the tool

THE POLICY SUPPORT TOOL CAN CALCULATE AND COMPARE FOR SEVERAL COUNTRIES:

1. THE COST PER KILOMETRE (€/KM) GIVEN THE VEHICLE AND FUEL COST (SEE PARAGRAPH 2.1)
2. THE ALLOWED ADDITIONAL COST (€/VEHICLE) GIVEN THE FUEL COST AND COST PER KILOMETRE (SEE PARAGRAPH 2.2)

THE TOOL INCLUDES FIVE COUNTRIES (DENMARK, GERMANY, FRANCE, UK AND THE NETHERLANDS). BY COMPARING THE OUTCOMES (FOR BOTH COST PER KILOMETRE AND ADDITIONAL VEHICLE COST) INSIGHT CAN BE GATHERED INTO THE IMPACT OF THE DIFFERENT TAXATION SCHEMES. SINCE NOT ALL EU COUNTRIES ARE INCLUDED THERE ALSO IS A USER DEFINED 'COUNTRY' WHICH ALLOWS THE USER TO REPLICATE A POLICY SCHEME OF ANY OTHER COUNTRY HE OR SHE PREFERS TO INCLUDE. AN ANALYSIS OF THE OUTCOMES AND AFFECT OF DIFFERENT POLICY SUPPORT SCHEMES ON THE COST PER KILOMETRE AND ALLOWED ADDITIONAL COST WILL BE DESCRIBED IN A SEPARATE REPORT.

FIGURE 2.1 GIVES A SCHEMATIC OVERVIEW OF THE TOOL TO COME FROM THE VEHICLE AND FUEL COST TO THE COST PER KILOMETRE OR CALCULATE THE ALLOWED ADDITIONAL COSTS. THIS CHAPTER WILL EXPLAIN THE CALCULATIONS MADE BY THE TOOL TO DO SO. PARAGRAPH 2.1 AND PARAGRAPH 2.2 EXPLAIN HOW THE VEHICLE AND FUEL COSTS ARE USED TO CALCULATE THE COST PER KILOMETRE AND THE ALLOWED ADDITIONAL COST FOR HYDROGEN FUELLED VEHICLES. IN THE TEXT BOXES IN THIS CHAPTER SOME EXAMPLES ARE GIVEN OF THE CALCULATIONS MADE BY THE TOOL. THESE SERVE AS AN EXAMPLE ONLY.

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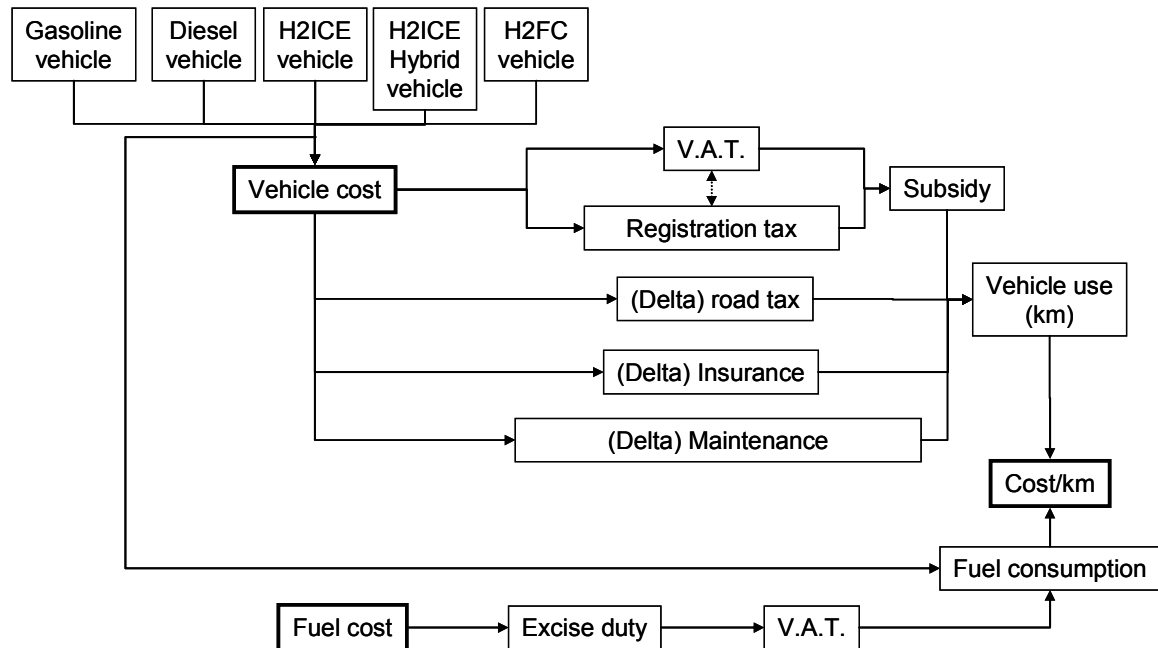


FIGURE 2.1: OVERVIEW OF THE POLICY SUPPORT METHODOLOGY

2.1 CALCULATING THE COST PER KILOMETRE

THE COST PER KILOMETRE CALCULATION CONSISTS OF A VEHICLE COST PART AND A FUEL COST PART. BOTH OF THESE PARTS HAVE AN IMPACT ON THE COST PER KILOMETRE. THE CALCULATIONS MADE TO GET FROM VEHICLE COST AND FUEL COST TO THE COST PER KILOMETRE WILL BE EXPLAINED IN THE FOLLOWING PARAGRAPHS.

2.1.1 THE VEHICLE COST PART

TO GET FROM THE VEHICLE COST (AS SHOWN IN FIGURE 2.1) TO THE AVERAGE YEARLY VEHICLE COST PER KILOMETRE (OVER THE DEPRECIATION PERIOD) SEVERAL STEPS HAVE TO BE MADE. FIRST OF ALL - IF APPLICABLE - REGISTRATION TAX AND VAT ARE ADDED TO THE VEHICLE COST (SEE DEFAULT VEHICLE COST IN PARAGRAPH 3.2)¹. THIS DETERMINES THE TOTAL VEHICLE COST. DEPENDENT ON THE COUNTRY VAT HAS TO BE ADDED ON THE VEHICLE COST BEFORE REGISTRATION TAX OR AFTER (SEE ANNEX). THERE IS AN OPTION TO INCLUDE SUBSIDY ON THE VEHICLE. THIS WILL DECREASE THE VEHICLE COST AFTER VAT AND REGISTRATION TAX.

EXAMPLE CALCULATION FOR GERMANY:		
VEHICLE COST (GASOLINE)		€ 19,850
REGISTRATION TAX		€ 0
VAT (16%)	+	€ 3,176
TOTAL VEHICLE COST		€ 23,026

AFTER CALCULATING THE TOTAL VEHICLE COST INCLUDING TAX (AND SUBSIDY) THE DEPRECIATION OF THE VEHICLE IS TAKEN INTO ACCOUNT TO CALCULATE THE YEARLY VEHICLE COST². BASED ON THE DEPRECIATION DURATION AND PERCENTAGE (OF THE TOTAL VEHICLE COST) THE YEARLY VEHICLE COST IS CALCULATED PER YEAR. THAN THE NET PRESENT VALUE IS CALCULATED OVER ALL THE YEARLY VEHICLE COSTS OVER THE DEPRECIATION PERIOD, TAKING THE INTEREST RATE INTO ACCOUNT. THIS CALCULATION HAS TO BE MADE IN ORDER TO MAKE THE COSTS IN YEAR 8 (PAID IN €_{YEAR8}) COMPARABLE WITH COSTS MADE IN THE PREVIOUS YEARS.

EXAMPLE CALCULATION FOR GERMANY:		
DEPRECIATION OF VEHICLE (INITIAL COST OF € 23,026)		
DEPRECIATION PERIOD AND PERCENTAGE		NPV (4% INTEREST)
YEAR 1 (25%)	€ 5,756.50	€ 5535.10
YEAR 2 (15%)	€ 3,453.90	€ 3193.32
YEAR 3 (10%)	€ 2,302.60	€ 2047.00
YEAR 4 (10%)	€ 2,302.60	€ 1968.27
YEAR 5 (10%)	€ 2,302.60	€ 1892.57
YEAR 6 (10%)	€ 2,302.60	€ 1819.78
YEAR 7 (10%)	€ 2,302.60	€ 1749.79
YEAR 8 (10%)	+ € 2,302.60	€ 1682.49
TOTAL	€ 23,026	€ 19888.32
TOTAL YEARLY COST PER KM (€/KM)		€ 0.166

BY DIVIDING THE TOTAL NPV BY THE DEPRECIATION PERIOD (EIGHT YEARS IN THIS EXAMPLE) MULTIPLIED WITH THE VEHICLE USE (YEARLY NUMBER OF KILOMETRES

¹ IT IS HOWEVER UP TO THE USER TO DECIDE IF REGISTRATION TAX AND VAT ARE INCLUDED IN THE CALCULATION FOR THE DIFFERENT VEHICLES (SEE PARAGRAPH 3.2.4 HOW THIS CAN BE DONE). HOWEVER, NOT EVERY COUNTRY HAS REGISTRATION TAX ON VEHICLES, SO EVEN IF THIS (A 0% TAX) IS INCLUDED IT WILL NOT MAKE A DIFFERENCE ON THE OUTCOME.

² THE DEFAULT VEHICLE DEPRECIATION PERIOD IS 8 YEARS (SEE PARAGRAPH 3.2.3) WITH A DEPRECIATION OF 25% IN YEAR 1, 15% IN YEAR 2 AND 10% IN EACH OF THE SIX FOLLOWING YEARS. THE INTEREST RATE IS DEFAULT SET AT 4%.

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DRIVEN, SET AT 15.000 KM/YEAR BY DEFAULT) YOU GET THE AVERAGE COST OF THE VEHICLE PER KILOMETRE.

NOT DISCUSSED YET IN THE ABOVE CALCULATION ARE THE ROAD TAX, INSURANCE AND MAINTENANCE. THESE COSTS ARE INCLUDED AS A DELTA, MEANING THE DIFFERENCE BETWEEN THE HYDROGEN FUELLED VEHICLE AND A GASOLINE FUELLED VEHICLE (OR DIESEL IF THE USER SETS THE DIESEL VEHICLE AS DEFAULT VEHICLE). DEFAULT VALUE FOR THESE VARIABLES IS ZERO (MEANING THESE COSTS ARE EQUAL TO THE GASOLINE OR DIESEL VEHICLE), SO THEY DO NOT ADD ANY EXTRA COST ON THE COST PER KILOMETRE AS SHOWN IN THE EXAMPLE ABOVE. HOWEVER, IF THE USER WANTS TO DO THE CALCULATION WITH THESE COSTS, THEY ARE ALSO INCLUDED ON A YEARLY BASIS BASED ON THE NPV CALCULATION.

2.1.2 THE FUEL COST PART

THE FUEL COST IS INCLUDED IN THE COST PER KILOMETRE. BY TAKING THE FUEL COST BEFORE TAX AND ADDING THE EXCISE DUTY (A FIXED NUMBER PER LITRE) AND MULTIPLYING THIS WITH THE VAT PERCENTAGE YOU GET THE TOTAL COST OF THE FUEL (€/LITRE OR €/GJ). DEPENDING ON THE VEHICLE (GASOLINE, DIESEL, ETC) THE TOTAL COST OF FUEL (PER GJ) IS MULTIPLIED WITH THE FUEL CONSUMPTION RESULTING IN THE FUEL COST PER

EXAMPLE FOR GASOLINE IN GERMANY

GASOLINE COST (€/LITRE)	0.546
EXCISE DUTY (€/LITRE)	+ <u>0.655</u>
	1.201
VAT (19%)	+ <u>0.228</u>
	1.429
FUEL CONSUMPTION (L/KM)	+ <u>0.058</u>
TOTAL FUEL COST PER KM (€/KM)	0.083

KILOMETRE PER YEAR. THESE COSTS ARE ALSO MADE PRESENT USING THE NPV CALCULATION BASED ON THE SAME DEPRECIATION PERIOD AND INTEREST RATE AS FOR THE VEHICLE. THE DEPRECIATION PERCENTAGE IS NOT INCLUDED FOR THE FUEL.

2.2 CALCULATING THE ALLOWED ADDITIONAL COST

THE TOOL PROVIDES THE POSSIBILITY TO CALCULATE THE ALLOWED ADDITIONAL COST OF A HYDROGEN FUELLED VEHICLE. STARTING POINT OF THIS CALCULATION IS THE ASSUMPTION A HYDROGEN FUELLED VEHICLE SHOULD HAVE THE SAME COST PER KILOMETRE AS A GASOLINE (OR DIESEL) VEHICLE. THE OUTCOME OF THIS CALCULATION SHOWS HOW MUCH A HYDROGEN FUELLED VEHICLE MAY COST MORE (OR LESS) TO REACH THE SAME COST PER KILOMETRE. ALSO FOR THIS CALCULATION A DISTINCTION IS MADE IN VEHICLE AND FUEL COSTS SINCE THE BALANCE BETWEEN THESE COSTS MAY BE DIFFERENT FOR HYDROGEN FUELLED VEHICLES.

THE CALCULATION STARTS BY TAKING THE TOTAL VEHICLE COSTS, WHICH FOR GASOLINE OR DIESEL VEHICLES IS THE TOTAL VEHICLE COSTS INCLUDING REGISTRATION TAX AND VAT (DEPENDING ON WHICH REFERENCE VEHICLE IS

CHOSEN). FOR THE HYDROGEN VEHICLES THE COST OF THE GASOLINE OR DIESEL VEHICLE WITH VAT IS TAKEN, SINCE HYDROGEN VEHICLES ARE EXEMPTED FROM HAVING TO PAY REGISTRATION TAX. BASED ON THE DEPRECIATION AND NPV CALCULATION (AS DESCRIBED IN THE PARAGRAPH 2.1.1) THE AVERAGE YEARLY COST FOR THE VEHICLES IS CALCULATED. THE TOTAL ALLOWED ADDITIONAL COST OF A HYDROGEN VEHICLE COMPARED TO A GASOLINE (OR DIESEL) VEHICLE IS THE DIFFERENCE BETWEEN THE COST OF A GASOLINE VEHICLE AND THE HYDROGEN VEHICLE MULTIPLIED BY THE DEPRECIATION PERIOD (EIGHT YEARS IN THIS EXAMPLE). THIS FIGURE INDICATES HOW MUCH MORE EXPENSIVE (IF THE FIGURE IS POSITIVE) A HYDROGEN VEHICLE MAY BE (AFTER VAT) TO GET THE SAME VEHICLE COST PER KILOMETRE.

EXAMPLE CALCULATION FOR THE NETHERLANDS		
	GASOLINE	FC VEHICLE
TOTAL VEHICLE COST (€)	31,053.70	23,621.50
AVERAGE YEARLY VEHICLE COST (€/YEAR) (AFTER DEPRECIATION AND NPV)	<u>3,352.76</u>	<u>2,550.33</u>
TOTAL ALLOWED ADDITIONAL COST OF THE VEHICLE (€)		6,419.44

THE SAME IS DONE FOR THE FUEL COST. IN OTHER WORDS, THE FULLY TAXED GASOLINE OR DIESEL COSTS PER YEAR AND KILOMETRE (SO INCLUDING EXCISE DUTY AND VAT) ARE TAKEN AND BASED ON THE NPV CALCULATION AND YEARLY DRIVING DISTANCE THE YEARLY FUEL COST ARE CALCULATED. THE HYDROGEN COST ARE BASED ON THE GIVEN HYDROGEN PRICE INCLUDING VAT. EXCISE DUTY IS EXCLUDED FOR HYDROGEN BECAUSE IT STILL REMAINS UNCLEAR IF THERE WILL BE AND IF SO HOW MUCH EXCISE DUTY THERE WILL BE ON HYDROGEN. THE DIFFERENCE BETWEEN THE FUEL COST FOR GASOLINE AND HYDROGEN MULTIPLIED WITH THE DEPRECIATION PERIOD GIVES THE ALLOWED ADDITIONAL COST OF THE FUEL. THIS FIGURE INDICATES HOW MUCH MORE EXPENSIVE (IF THE FIGURE IS POSITIVE) THE FUEL MAY BE (AFTER VAT) TO GET TO THE SAME FUEL COST PER KILOMETRE.

EXAMPLE CALCULATION FOR THE NETHERLANDS		
	GASOLINE	FC VEHICLE
FUEL COST (€/KM/YEAR)	0.07	0.05
AVERAGE YEARLY FUEL COST (€/YEAR)	<u>1,057.36</u>	<u>706.05</u>
TOTAL ALLOWED ADDITIONAL COST OF THE FUEL (€)		2,810.45

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By adding the total allowed additional cost of the vehicle to the total allowed additional cost of the fuel gives insight into the total allowed additional cost of a hydrogen vehicle compared to a gasoline vehicle in order to reach the same cost per kilometre. Again this indicates if a hydrogen vehicle and/or fuel can be more expensive to get to the same cost per kilometre.

3 Manual of the tool

THIS CHAPTER WILL OUTLINE WHAT THE OPTIONS ARE AND WHICH FUNCTIONS YOU CAN USE WHEN YOU USE THE TOOL. THE DEFAULT VALUES WILL BE GIVEN IN THIS CHAPTER AS WELL.

3.1 MAIN MENU

IN THE MAIN MENU (SEE FIGURE 1.1) YOU HAVE AN OVERVIEW OF ALL THE FUNCTIONS OF THE POLICY SUPPORT CALCULATION TOOL. IN THE FOLLOWING PARAGRAPHS YOU WILL FIND HOW YOU CAN USE THE MAIN MENU OPTIONS.

3.1.1 MAKE GRAPH

IN THE GRAPH SECTION OF THE MAIN MENU YOU CAN CHOOSE OF WHICH OF THE TWO OPTIONS YOU WANT TO USE. THE POLICY SUPPORT CALCULATION TOOL ALLOWS YOU TO CALCULATE:

1. COST PER KILOMETRE
2. ADDITIONAL VEHICLE COST

THE 'COST PER KILOMETRE' GRAPH WILL SHOW YOU WHAT THE KILOMETRE COST OF A VEHICLE IN A CERTAIN COUNTRY IS, WHILE THE 'ADDITIONAL VEHICLE COST' GRAPH SHOWS THE ADDITIONAL COST OF A VEHICLE IN A CERTAIN COUNTRY ARE COMPARED TO A REFERENCE VEHICLE (TAKING INTO ACCOUNT THE SAME COST PER KILOMETRE).

TO GET BACK TO THE MAIN MENU THERE IS A 'MAIN MENU' BUTTON ON THE GRAPH. AFTER CLICKING ON THIS BUTTON YOU WILL RETURN TO THE MAIN MENU.

3.1.2 REFERENCE

THE REFERENCE SECTION CAN ONLY BE USED WHEN YOU WANT TO CALCULATE THE ADDITIONAL VEHICLE COSTS. WHEN YOU WANT TO CALCULATE THE ADDITIONAL VEHICLE COSTS FOR A VEHICLE COMPARED TO A GASOLINE VEHICLE, SELECT GASOLINE. BY DOING SO THE TOOL WILL CALCULATE WHAT THE ALLOWED ADDITIONAL COST OF A VEHICLE MAY BE WHEN YOU WANT TO HAVE THE SAME COST PER KILOMETRE AS A GASOLINE VEHICLE. IN THE GRAPH THE ALLOWED ADDITIONAL COST OF GASOLINE (WHEN SELECTED IN THE VEHICLE SECTION) WILL BE ZERO.

SELECT DIESEL WHEN YOU WANT TO CALCULATE THE ADDITIONAL VEHICLE COST COMPARED TO THE COST PER KILOMETRE OF A DIESEL VEHICLE. IN THE GRAPH THE ADDITIONAL VEHICLE COST OF DIESEL (WHEN SELECTED IN THE VEHICLE SECTION) WILL BE ZERO.

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3.1.3 LEGEND

THE LEGED SECTION OF THE MAIN MENU ALLOWS YOU TO CHOOSE THE DETAIL OF THE GRAPH LEGEND WHEN THE GRAPH IS SHOWN. YOU CAN CHOOSE:

- COUNTRY: SHOWING THE TOTAL COSTS PER VEHICLE TYPE FOR EACH COUNTRY
- VEHICLE: SHOWING THE TOTAL COSTS PER COUNTRY FOR EACH VEHICLE TYPE
- DETAIL BY COUNTRY: SHOWING THE DETAILED COSTS (VEHICLE, FUEL AND TAX PARTS) PER VEHICLE TYPE FOR EACH COUNTRY
- DETAIL BY VEHICLE: SHOWING DETAILED COSTS (VEHICLE, FUEL AND TAX PARTS) PER COUNTRY FOR EACH VEHICLE TYPE

3.1.4 COUNTRY

YOU CAN SELECT THE COUNTRIES YOU WANT TO HAVE INCLUDED IN THE CALCULATION AND SHOWN IN THE GRAPH. BY HOLDING THE 'CTRL' KEY SEVERAL COUNTRIES CAN BE INCLUDED. SEE SECTION 3.3 FOR MORE INFORMATION ON THE 'USER DEFINED' COUNTRY.

3.1.5 VEHICLE

YOU CAN INCLUDE AS MANY VEHICLES AS YOU WANT IN THE VEHICLE SECTION OF THE MAIN MENU. BY HOLDING THE 'CTRL' KEY SEVERAL VEHICLES CAN BE SELECTED. VEHICLE OPTIONS ARE:

- GASOLINE – FOR A GASOLINE VEHICLE, BEING THE VW GOLF 2002
- DIESEL – FOR A DIESEL VEHICLE, BEING THE VW GOLF 2002
- H2-ICE – FOR A LIQUID HYDROGEN FUELLED INTERNAL COMBUSTION ENGINE (ICE) VEHICLE
- H2-ICE HYBRID – FOR A LIQUID HYDROGEN FUELLED ICE HYBRID VEHICLE
- H2-FCV – FOR A GASEOUS HYDROGEN FUELLED FUEL CELL (FC) VEHICLE
- H2-FCV HYBRID – FOR A GASEOUS HYDROGEN FUELLED HYBRID FC VEHICLE

IMPORTANT NOTE: THE DEFAULT VALUES FOR THE HYDROGEN FUELLED VEHICLES ARE BASED ON EUCAR/CONCAWE PROJECTIONS (2010+) AND DO NOT REFLECT CURRENT (2008) COSTS. MORE INFORMATION CAN BE FOUND IN CHAPTER 3.2.

3.1.6 MAKE GRAPH

THE 'MAKE GRAPH' FUNCTION WILL MAKE THE GRAPH FOR THE SELECTION YOU HAVE MADE. THE GRAPH WILL BE PRESENTED IN AN EXCEL WORKSHEET SO IT CAN BE PRINTED OR REVIEWED LATERON. AS PART OF THE OUTPUT THERE IS ALSO A TABLE WITH THE OUTCOMES AND A WORKSHEET WITH ALL THE ASSUMPTIONS MADE TO COME TO THE OUTCOMES.

3.1.7 PRINT INPUT DATA

THE OUTCOMES AS PRESENTED IN THE GRAPH GREATLY DEPEND ON THE SELECTED AND INCLUDED DATA AND FUNCTIONS. BY USING THE 'PRINT INPUT DATA' FUNCTION YOU CAN SEE WHICH ASSUMPTIONS YOU HAVE INCLUDED FOR GETTING A CERTAIN OUTCOME GRAPH. THIS MAY HELP YOU GETTING THE SAME RESULT AGAIN LATER.

3.2 INPUT DATA

THE INPUT DATA CAN BE CHANGED BY CLICKING ON THE BUTTONS 'VEHICLES', 'FUEL COSTS', 'ECONOMY' OR 'TAXATION AND SUPPORT'. THIS IS OPTIONAL. FOR ALL THESE OPTIONS IN THE INPUT DATA MENUS THERE ARE DEFAULT SETTING AND VALUES SO YOU CAN START USING THE TOOL DIRECTLY. THE INPUT DATA FUNCTIONS WILL BE DISCUSSED FURTHER IN THE PARAGRAPHS BELOW, YOU WILL FIND THE DEFAULT VALUES THERE AS WELL.

3.2.1 VEHICLES MENU

TO CALCULATE BOTH THE COST PER KILOMETRE AND THE ADDITIONAL COST SEVERAL ASSUMPTIONS HAVE TO BE MADE. BY USING THE VEHICLE FUNCTION YOU CAN REVIEW THE ASSUMPTIONS MADE FOR THE VEHICLES. IN THE FIGURE BELOW THE DEFAULT VALUES ARE PRESENTED.

	Gasoline	Diesel	H2-ICE	H2-ICE hybrid	H2-FCV	H2-FCV hybrid
Driving distance [km/year]:	15000	15000	15000	15000	15000	15000
Delta Maintenance costs [€/year]:	0	0	0	0	0	0
Delta Insurance costs [€/year]:	0	0	0	0	0	0
Delta Road tax [€/year]:	0	0	0	0	0	0
Vehicle costs [€]:	19850	21360	24310	29778	31193	34505
Fuel consumption [GJ/km]:	0,0019	0,001767	0,001675	0,001414	0,00094	0,000837

Buttons: Default values, Save, Close

FIGURE 3.1: OVERVIEW OF THE DEFAULT VALUES FOR THE VEHICLES³

THE VALUES IN THE 'VEHICLES' MENU ARE THE SAME FOR ALL COUNTRIES, SO AN EQUAL COMPARISON CAN BE MADE. TO YOUR LIKING YOU CAN CHANGE:

- DRIVING DISTANCE [KM/YEAR], WHICH IS THE TOTAL ANNUAL DRIVING DISTANCE WITH A CAR
- DELTA MAINTENANCE COST [€/YEAR], WHICH IS THE ADDITIONAL MAINTENANCE COST OF A VEHICLE COMPARED TO A GASOLINE VEHICLE
- DELTA INSURANCE COST [€/YEAR], WHICH IS THE ADDITIONAL INSURANCE COST OF A VEHICLE COMPARED TO A GASOLINE VEHICLE
- DELTA ROAD TAX [€/YEAR], WHICH IS THE ADDITIONAL ROAD TAX COMPARED TO A GASOLINE VEHICLE
- VEHICLE COSTS [€], WHICH IS THE VEHICLE COST (SO WITHOUT TAXES) OF A VEHICLE
- FUEL CONSUMPTION [GJ/KM], WHICH IS THE AMOUNT OF GJ A VEHICLE USES TO DRIVE ONE KILOMETRE

³ NOTE: THE VEHICLES IN THE TABLE ARE EQUAL TO THE EUCAR, CONCAWE, JRC (2007B) VEHICLES AS FOLLOWS: GASOLINE VEHICLE IS EQUAL TO THE PISI GASOLINE, THE DIESEL IS EQUAL TO THE DICI WITH DPF DIESEL, THE H2ICE IS EQUAL TO THE PISI HYDROGEN (COMP.), THE H2ICE HYBRID IS EQUAL TO THE PISI HYDROGEN (COMP.), THE H2FC IS EQUAL TO THE DIRECT HYDROGEN AND THE H2FC IS EQUAL TO THE DIRECT HYDROGEN HYBRID.

THE DEFAULT VALUES FOR THE VEHICLE COSTS AND FUEL CONSUMPTION ARE BASED ON THE EUCAR/CONCAWE/JRC WELL-TO-WHEELS REPORT (2007A AND 2007C). THE GASOLINE AND DIESEL VEHICLE COSTS ARE REFLECTIONS OF 2010+ VEHICLE RETAIL PRICE PROJECTIONS BASED ON A 2002 VW GOLF. THE DEFAULT VEHICLE COST FOR THE HYDROGEN VEHICLES ARE BASED ON HYWAYS PROJECTIONS AND REFLECT THE COST FOR THE HYDROGEN FUELLED VEHICLES WHEN 100,000 UNITS HAVE BEEN PRODUCED.

THE MAINTENANCE INSURANCE AND ROAD TAX COSTS ARE INCLUDED IN THE TOOL AS A DELTA. THIS MEANS THE COSTS ARE ASSUMED TO BE EQUAL (INDICATED BY THE 'ZERO') BETWEEN GASOLINE, DIESEL AND THE HYDROGEN VEHICLES. THESE FIGURES CAN BE CHANGED. FOR EXAMPLE, IF YOU SET THE DELTA MAINTENANCE COST TO € 200 FOR A HYDROGEN FC VEHICLE, THIS MEANS THE HYDROGEN FC VEHICLE HAS € 200 EXTRA COST ON TOP OF THE 'USUAL' MAINTENANCE COST OF A GASOLINE VEHICLE.

BASED ON YOUR OWN INSIGHTS ALL THESE FIGURES CAN BE CHANGED. WHEN YOU HAVE CHANGED THE VALUES TO YOU LIKING BUT WANT TO USE THE DEFAULT VALUES AGAIN, JUST CLICK THE 'DEFAULT VALUES' BUTTON TO RESET THE VALUES TO THE DEFAULT VALUES. IF YOU WANT TO SAVE YOUR CHANGES CLICK THE 'SAVE' BUTTON. AFTER MAKING CHANGES USE THE 'CLOSE' BUTTON TO CLOSE THIS MENU AND RETURN TO THE MAIN MENU.

3.2.2 FUEL MENU

THE FUEL MENU (SEE BELOW) ALLOWS YOU TO CHANGE THE UNTAXED FUEL PRICE (€/GJ). THE INCLUDED VEHICLES USE GASOLINE, DIESEL, GASEOUS HYDROGEN OR LIQUID HYDROGEN AS A MOTOR FUEL.

IF YOU CHANGE THE GASOLINE PRICE THIS WILL ONLY AFFECT THE GASOLINE VEHICLE COST, BECAUSE THIS IS THE ONLY VEHICLE USING GASOLINE. THE DIESEL PRICE AFFECTS ONLY THE DIESEL CAR.

FOR HYDROGEN THERE IS A DIFFERENCE. THE GASEOUS HYDROGEN IS USED IN THE FC VEHICLES, BOTH THE FC AND FC HYBRID. BY CHANGING THE GASEOUS HYDROGEN PRICE BOTH THE FC AND THE FC HYBRID WILL CHANGE IN COST.

LIQUID HYDROGEN IS USED IN THE HYDROGEN ICE AND HYDROGEN ICE HYBRID VEHICLES. CHANGES OF THE LIQUID HYDROGEN PRICE AFFECT BOTH THESE VEHICLES.

THE DEFAULT VALUES OF THE FUEL COSTS ARE BASED ON THE EUCAR/CONCAWE/JRC (2007A, P.57) METHODOLOGY. IN THAT STUDY THE GASOLINE AND DIESEL PRICE ARE COUPLED WITH THE OIL PRICE. IT USES AN 'OIL COST FRACTION' (OCF) TO LINK THE OIL PRICE TO GASOLINE AND DIESEL. WITH AN OCF OF 1 THE PRICE OF GASOLINE AND DIESEL WOULD TRACK THAT OF CRUDE OIL,

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WHILE WITH AN OCF OF 0.5 A DOUBLING OF CRUDE PRICE WOULD RESULT IN A 50% INCREASE OF THE GASOLINE AND DIESEL PRICE.

THE EUCAR/CONCAWE/JRC STUDY ASSUMES A BARREL OF CRUDE OIL WITH A PRICE OF 25 €/BBL, WHICH TRANSLATES INTO 4.6 €/GJ (GIVEN A BBL PROVIDES 5.46 GJ) AND WITH AN OCF FOR CRUDE TO GASOLINE AND DIESEL OF 1.3 THIS RESULTS IN 5.9 €/GJ FOR GASOLINE AND DIESEL.

THE DEFAULT COST PER BARREL FOR THE TOOL IS HOWEVER SET AT 70 €/BBL. THIS TRANSLATES INTO AN UNTAXED FUEL PRICE OF 16.667 €/GJ (0.546 €/LITRE⁴) FOR GASOLINE AND 16.667 €/GJ (0.598 €/LITRE⁵) DIESEL. THE HYDROGEN PRICE IS SET AT 6 €/KG (TAKING THE HYWAYS 2020 PROJECTION OF 4 €/KG IN 2020 INTO ACCOUNT), WHICH EQUALS 50 €/GJ.

The screenshot shows a dialog box titled "Policy support calculation tool - Fuel costs". It contains a table of fuel costs in €/GJ:

Fuel costs 2010 without tax [€/GJ]	
Gasoline:	16,667
Diesel:	16,667
Hydrogen (gaseous):	50
Hydrogen (liquid):	50

At the bottom of the dialog, there are three buttons: "Default values", "Save", and "Close".

3.2.3 ECONOMY MENU

THE ECONOMY MENU ALLOWS YOU TO CHANGE THE DEPRECIATION PERIOD OF THE VEHICLE AND THE YEARLY DEPRECIATION PERCENTAGE PER PERIOD, WHICH IS A PERCENTAGE OF THE TOTAL VEHICLE COST INCLUDING TAX. AS SHOWN BELOW (ON THE LEFT) A VEHICLE CAN BE DEPRECIATED OVER 15 YEARS. FOR EACH YEAR THE RATE OF DEPRECIATION CAN BE CHANGED. THE TOTAL HAS TO ADD UP TO 100%. IF THE YEARLY DEPRECIATION DOES NOT ADD UP TO 100% THE TOTAL BOX WILL COLOUR RED (RIGHT SIDE OF THE FIGURE) AND YOU HAVE TO CHANGE YOUR YEARLY DEPRECIATION RATE BEFORE YOU CAN CONTINUE.

THE DEFAULT VALUE FOR THE DEPRECIATION PERIOD IS EIGHT YEARS. THIS IS THE ECONOMIC DEPRECIATION PERIOD OF A CAR (WHICH IS NOT EQUAL TO THE TECHNOLOGICAL DEPRECIATION PERIOD SINCE A CAR CAN RUN FOR MANY MORE YEARS). THE DEPRECIATION PERCENTAGE FOR THE FIRST YEAR IS 25%, THE

⁴ GASOLINE 0.03278 GJ/L

⁵ DIESEL 0.03587 GJ/L

SECOND YEAR 15% AND THE FOLLOWING SIX YEARS 10%. THESE VALUES ARE BASED ON THE CALCULATIONS MADE BY THE ANWB. THE INTEREST RATE IS SET AT 4%, WHICH IS THE COST OF CAPITAL FOR AN END-USER OF A PASSENGER CAR (HE OR SHE CAN PUT MONEY IN THE BANK AND GAIN 4% INTEREST, OR INVEST IN A CAR).

THE FUEL COST IS ALSO LINKED TO THE DEPRECIATION TIME (NUMBER OF YEARS), SINCE IT IS ASSUMED YOU USE YOUR VEHICLE EVERY YEAR AND THEREFORE NEED FUEL. THE PERIOD AND INTEREST RATE ARE USED FOR THE NPV CALCULATION OF THE FUEL.

Year	Yearly depreciation [%]	Total
Year 1	25	100
Year 2	15	
Year 3	10	
Year 4	10	
Year 5	10	
Year 6	10	
Year 7	10	
Year 8	10	
Year 9	0	
Year 10	0	
Year 11	0	
Year 12	0	
Year 13	0	
Year 14	0	
Year 15	0	

Year	Yearly depreciation [%]	Total
Year 1	30	105
Year 2	15	
Year 3	10	
Year 4	10	
Year 5	10	
Year 6	10	
Year 7	10	
Year 8	10	
Year 9	0	
Year 10	0	
Year 11	0	
Year 12	0	
Year 13	0	
Year 14	0	
Year 15	0	

THE INTEREST RATE IS USED TO CALCULATE THE NET PRESENT VALUE (NPV) FOR THE COST OF THE VEHICLE AND THE FUEL. FOR EXAMPLE, THE DEPRECIATION IN YEAR 8 OF THE VEHICLE IS MADE PRESENT AGAINST THE INTEREST RATE BY DIVIDING THE COST BY $(1+4\%)^8$, SEE THE EXAMPLE IN PARAGRAPH 2.1.1.

3.2.4 TAXATION AND SUPPORT MENU

IN THE TAXATION AND SUPPORT MENU YOU CAN CHANGE THE INCLUDED SUBSIDIES AND TAXES. THIS CAN BE DONE FOR ALL VEHICLES SEPARATELY, BUT WILL BE EQUAL FOR ALL THE COUNTRIES.

IN THE VEHICLE SUBSIDY BOXES YOU CAN GIVE IN A NUMBER, WHICH WILL BE THE SUBSIDY IN EUROS FOR A VEHICLE AFTER TAX. THIS WILL BE DEDUCTED ONES FROM THE VEHICLE COST AFTER TAX. IT IS NOT A YEARLY SUBSIDY! KEEP IN MIND A SUBSIDY IS DIFFERENT FROM LOWER VEHICLE COST SINCE THE SUBSIDY WILL BE

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DEDUCTED FROM THE VEHICLE COST AFTER THE TAXES ARE ADDED, WHILE LOWER VEHICLE COST WILL BE BEFORE TAXATION. REDUCING THE VEHICLE COST WILL HAVE A BIGGER AFFECT ON THE VEHICLE COST THEN APPLYING A SUBSIDY.

YOU CAN CHOOSE TO INCLUDE OR EXCLUDE THE TAXES ON VEHICLE AND FUEL, BY CHECKING OR UNCHECKING THE BOXES. A CHECKED BOX MEANS THE TAX IS INCLUDED, WHILE AN UNCHECKED BOX MEANS THE TAX IS EXCLUDED.

THE TAXES ARE COUNTRY SPECIFIC. SOME COUNTRIES HAVE REGISTRATION TAX, WHILE OTHERS DO NOT. INCLUDING REGISTRATION TAX WILL THUS ONLY AFFECT THOSE COUNTRIES THAT DO HAVE REGISTRATION TAX (AN OVERVIEW OF THE TAXES PER COUNTRY IS PROVIDED IN THE ANNEX A). VALUE ADDED TAX (V.A.T.) AND EXCISE DUTY ON THE OTHER HAND IS APPLIED IN EVERY COUNTRY. BASED ON THE ACEA TAX GUIDE THE EXCISE DUTY FOR THE INCLUDED COUNTRIES IS SHOWN IN THE TABLES BELOW. CURRENTLY THERE IS NO CLARITY IF THERE WILL BE EXCISE DUTY ON HYDROGEN, BUT THE OPTION IS INCLUDED (BY DEFAULT THE EXCISE DUTY IS EXCLUDED). THE AMOUNT OF EXCISE DUTY ON HYDROGEN IS BASED ON THE AVERAGE OF GASOLINE AND DIESEL IN A COUNTRY.

TABLE 3.1: OVERVIEW OF THE DEFAULT VAT VALUES INCLUDED IN THE POLICY SUPPORT TOOL

	DENMARK	NETHERLANDS	GERMANY	UK	FRANCE	USER DEFINED*
VAT (%)	25	19	19	17.5	19.6	19

* THE VAT FOR THE USER DEFINED OPTION IS THE AVERAGE OF THE OTHER COUNTRIES INCLUDED.

SOURCE: ACEA TAX GUIDE 2007

TABLE 3.2: OVERVIEW OF THE DEFAULT EXCISE DUTY INCLUDED IN THE POLICY SUPPORT TOOL

	GASOLINE		DIESEL		HYDROGEN*	
	€/LITRE	€/GJ	€/LITRE	€/GJ	€/KG	€/GJ
DENMARK	0.508	15.497	0.404	11.264	1.606	13.380
NETHERLANDS	0.688	20.378	0.365	10.176	1.833	15.277
GERMANY	0.655	19.982	0.470	13.104	1.985	16.543
UK	0.682	20.805	0.693	19.321	2.408	20.063
FRANCE	0.589	17.968	0.417	11.626	1.776	14.797
USER DEFINED	0.620	18.914	0.470	13.104	1.921	16.009

* THE EXCISE DUTY OF HYDROGEN IS THE AVERAGE BETWEEN GASOLINE AND DIESEL

SOURCE: ACEA TAX GUIDE 2007

Policy support calculation tool - Taxation and support

	Gasoline	Diesel	H2-ICE	H2-ICE hybrid	H2-FCV	H2-FCV hybrid
Vehicle subsidy [€]:	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Include						
VAT Vehicle:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Registration tax Vehicle:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VAT Fuel:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Excise duty Fuel:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Country User Defined

Registration tax [%]:	<input type="text" value="0"/>
VAT [%]:	<input type="text" value="19"/>
Excise duty Gasoline [€/litre]:	<input type="text" value="0,62"/>
Excise duty Diesel [€/litre]:	<input type="text" value="0,47"/>

3.3 USER DEFINED OPTIONS

NOT ALL COUNTRIES ARE INCLUDED IN THE CALCULATION TOOL. BY USING THE USER DEFINED COUNTRY YOU CAN 'SIMULATE' A COUNTRY WITH A CERTAIN TAXATION SCHEME.

PUBLIC**References**

EUROPEAN AUTOMOBILE MANUFACTURERS ASSOCIATION (2007) 2007 TAX GUIDE: MOTOR VEHICLE TAXATION IN EUROPE, ACEA, 2007 EDITION

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Annex A: Taxation overview

THIS ANNEX WILL GIVE AN OVERVIEW OF THE CURRENT TAXATION OF PRIVATE VEHICLES (NOT COMPANY VEHICLES) OF THE COUNTRIES INCLUDED IN THE POLICY SUPPORT TOOL. THE REGISTRATION TAX (IF IMPLEMENTED IN A COUNTRY) AND ROAD TAX WILL BE DISCUSSED. THE VAT AND EXCISE DUTY WILL NOT BE DISCUSSED. AN OVERVIEW OF THE VAT IS PROVIDED IN TABLE 3.1 AND AN OVERVIEW OF THE EXCISE DUTY IS PROVIDED IN TABLE 3.2.

KEEP IN MIND THE DESCRIPTION OF THE CURRENT TAXATION SCHEMES ONLY HOLDS FOR 2007. IT IS LIKELY THE CURRENT TAXATION SCHEMES (LIKE REGISTRATION TAX AND EXCISE DUTY) ARE SUBJECT TO CHANGE IN THE COMING YEARS (ESPECIALLY BEFORE THE 100,000 HYDROGEN VEHICLES ARE PRODUCED). IN THE POLICY SUPPORT TOOL REGISTRATION TAX AND VAT ARE INCLUDED, ROAD TAX IS INCLUDED AS A DELTA. SINCE IT IS ASSUMED HYDROGEN VEHICLES HAVE TO PAY THE SAME AMOUNT OF ROAD TAX, NO ACTUAL FIGURES ARE INCLUDED, BUT THE OUTLINE OF THE TAX CAN BE FOUND IN THE DESCRIPTION.

A.1 TAXATION IN DENMARK

IN DENMARK THE FOLLOWING TAXES (APART FROM VAT) HAVE TO BE PAID WHEN PURCHASING A NEW CAR:

- VEHICLE REGISTRATION TAX ('REGISTRERINGSAFGIFT FOR MOTORKØRETØJER')
- NUMBER PLATE TAX ('NUMMERPLADEAFGIFT') OF € 158.27⁶ (NOT INCLUDED IN THE POLICY SUPPORT TOOL)
- SO-CALLED GREEN OWNER TAX ('GRØN EJERAFGIFT') (ROAD TAX), WHICH IS PAYABLE PERIODICALLY AND THE AMOUNT OF WHICH IS BASED ON THE VEHICLE'S FUEL CONSUMPTION
- COUNTERVAILING CHARGES COUNTERACTS THE DIFFERENCE IN TAX ON PETROL AND DIESEL AS FUEL TO CREATE EQUALITY BETWEEN CARS THAT USE DIESEL AND CARS THAT USE PETROL

VEHICLE REGISTRATION TAX

REGISTRATION TAX IS ADDED ON THE DUTIABLE VEHICLE COST (INITIAL VEHICLE COST BEFORE TAXES + VAT) IN A TWO STEP WAY. ON THE VEHICLE COST FIRSTLY A 105% CHARGE IS ADDED ON THE AMOUNT UNDER € 8,851 (DKK 65,990⁷) ON THE

⁶ THE AMOUNT IS DKK 1,180 CONVERTED TO € WITH A EXCHANGE FACTOR OF 0.134129

⁷ WITH AN EXCHANGE RATE OF 0.134129

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REMAINING VEHICLE COST A 180% TAX IS CHARGED. SOME EQUIPMENT (LIKE AIRBAGS AND ABS BRAKES) IS REDUCED FROM THE TAXABLE VEHICLE COST.

ECO-FRIENDLY VEHICLES (E.G. GASOLINE VEHICLES USING LESS THAN 4 LITRES PER 100 KM AND DIESEL VEHICLE USING LESS THAN 3.6 LITRES/100 KM) GET A REBATE (UNDER THE 'LEX LUPO' SCHEME), BUT HYBRID VEHICLES DO NOT. THIS REBATE IS SHOWN IN THE TABLE BELOW:

FUEL CONSUMPTION (KM/LITRE)		REGISTRATION PERIOD AND REDUCTION	
PETROL	DIESEL	2000 - 2005	2005 – 2007
25 – 28.6	28.1 – 32.1	1/6	0
28.6 – 33.3	32.1 – 37.5	1/3	1/5
33.3 – 40.0	37.5 – 45.0	1/2	2/5
> 40.0	> 45.0	2/3	3/5

FOR EXAMPLE: A GASOLINE VEHICLE WITH A FUEL CONSUMPTION OF 30.0 KM/LITRE GETS A 1/3 REDUCTION ON THE REGISTRATION TAX.

ROAD TAX

THE ROAD TAX (OR GREEN OWNER TAX) LINKS THE ENVIRONMENTAL PERFORMANCE OF TO THE ENVIRONMENTAL DAMAGE OF A VEHICLE. THE USER THUS HAS TO PAY A YEARLY TAX VARYING BETWEEN € 21 AND € 3,361 (DKK 160 AND DKK 25,060) BASED ON THE VEHICLE PERFORMANCE.

COUNTERVAILING CHARGE

DIESEL VEHICLES HAVE TO PAY AN ADDITIONAL COUNTERVAILING CHARGE (ON TOP OF THE GREEN OWNER TAX OR VEHICLE EXCISE DUTY). THE COUNTERVAILING CHARGE COUNTERACTS THE DIFFERENCE IN TAX ON PETROL AND DIESEL AS FUEL TO CREATE EQUALITY BETWEEN CARS THAT USE DIESEL AND CARS THAT USE PETROL. WHEN PETROL TAX IS INCREASED, THE COUNTERVAILING TAX IS INCREASED AND WHEN THE TAX ON DIESEL IS INCREASED, THE COUNTERVAILING CHARGE IS REDUCED. FOR NORMAL DIESEL CARS, THE COUNTERVAILING CHARGE IS CALCULATED AS A TAX SAVING BY USING DIESEL INSTEAD OF PETROL FOR 16,000 KM ANNUALLY. THIS MEANS THAT IF YOU DRIVE 16,000 KM ANNUALLY, YOU WILL PAY THE SAME AMOUNT IN TAX REGARDLESS OF WHETHER YOU DRIVE A PETROL OR DIESEL CAR.

A.2 TAXATION IN THE NETHERLANDS

IN THE NETHERLANDS THE FOLLOWING TAXES (APART FROM VAT) HAVE TO BE PAID WHEN PURCHASING A NEW CAR:

- PURCHASE TAX ('BPM')

- ROAD TAX ('MOTOR RIJTUIGEN BELASTING')
- REGISTRATION FEE

PURCHASE TAX

PURCHASE TAX IN THE NETHERLANDS APPLIES TO A VEHICLE WHEN IT IS REGISTERED IN THE NETHERLANDS. FOR NEW VEHICLES THE RATE IS 45.2% OVER THE VEHICLE COST (IS VEHICLE COST NET OF TAX). THERE IS A FUEL DISCOUNT OR PENALTY AS WELL (ADDED OR SUBTRACTED BEFORE REGISTRATION TAX). THE LIST PRICE IS REDUCED BY € 1,540 FOR GASOLINE VEHICLES, BUT INCREASED BY € 328 FOR DIESEL VEHICLES. SINCE 1 JUNE 2005, IN CERTAIN CIRCUMSTANCES, REGISTRATION TAX FOR DIESEL VEHICLES IS REDUCED BY €600 IF PARTICLE EMISSIONS ARE BELOW A CERTAIN LIMIT (VERY LOW DISCHARGES, THANKS TO A PARTICLE FILTER). ZERO-EMISSION VEHICLES (LIKE HYDROGEN FUELLED VEHICLES WITH FCs OR ICE) HAVE A NIL TARIFF UNTIL 1ST OF JULY 2013.

FROM THE FIRST OF JANUARY 2007 VEHICLES MAY RECEIVE A BONUS OR SURCHARGE BASED ON THEIR ENERGY LABEL (SEE FIGURE BELOW). THIS IS HOWEVER NOT INCLUDED IN THE DEFAULT VALUES OF THE POLICY SUPPORT TOOL.

LABEL	A	B	C	D	E	F	G
HYBRID	€ -6400	€ -3200	€ 0	€ +135	€ +270	€ +405	€ +540
CONVENTIONAL	€ -1400	€ -700	€ 0	€ +140	€ +800	€ +1200	€ +1600

AFTER ADDING THE REGISTRATION TAX THE VAT IS ADDED TO COME TO THE TOTAL VEHICLE COST.

ROAD TAX

THIS TAX IS A YEARLY TAX. THE AMOUNT DEPENDS ON THE VEHICLE CATEGORY, STATE OF RESIDENCE, THE WEIGHT AND THE TYPE OF FUEL. SINCE THIS TAX IS DEPENDENT ON THE STATE OF RESIDENCE IT IS HARD TO GIVE A COMPLETE OVERVIEW. AS AN INDICATION ROAD TAX VARIES BETWEEN € 76 – 2996 FOR GASOLINE VEHICLES AND 264 – 4832 FOR DIESEL VEHICLES. HYDROGEN FUELLED VEHICLES ARE ALSO EXEMPTED FROM THIS TAX UNTIL 1ST OF JULY 2013.

REGISTRATION FEE

ON INITIAL REGISTRATION IN THE NETHERLANDS, A FEE OF € 47.25 (€ 37 FOR THE VEHICLE REGISTRATION CERTIFICATE AND € 10.25 FOR THE REGISTRATION OF YOUR NAME) HAS TO BE PAID FOR ALL VEHICLES. IF THERE IS A CHANGE IN THE NAME TO WHICH THE VEHICLE NUMBER PLATE IS ALLOCATED, € 10.25 IS CHARGED FOR THE

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RE-REGISTERING YOUR NAME. THESE COSTS ARE NOT INCLUDED IN THE POLICY SUPPORT TOOL.

A.3 TAXATION IN GERMANY

IN GERMANY THE FOLLOWING TAXES (APART FROM VAT) HAVE TO BE PAID WHEN PURCHASING A NEW CAR:

- AN ADMINISTRATIVE FEE (€ 26,30) IS CHARGED FOR REGISTERING A VEHICLE (THERE IS NO REGISTRATION TAX)
- MOTOR VEHICLE TAX ('KRAFTFAHRZEUGSTEUER') CALCULATED ON THE BASIS OF THE CERTIFIED EMISSION STANDARDS FOR THE VEHICLE AND THE ENGINE CAPACITY

MOTOR VEHICLE TAX

MOTOR VEHICLE TAX IS PAID ONE YEAR IN ADVANCE AND CALCULATED ON THE BASIS OF THE CERTIFIED EMISSION STANDARDS FOR THE VEHICLE AND THE ENGINE CAPACITY. FOR PASSENGER CARS, THE TAX RATES ARE DETERMINED FOR EVERY 100CC OF ENGINE CAPACITY IN ACCORDANCE WITH EMISSIONS STANDARDS (SEE TABLE BELOW). TAX RATES FOR DIESEL VEHICLES ARE CLOSE TO TWICE THOSE FOR GASOLINE VEHICLES.

EMISSION LABEL	MOTOR	TAX (€ PER 100CC)
EURO 3 OR BETTER AND ALSO A 3-LITER AUTO	OTTO	6.75
	DIESEL	15.44
EURO 2	OTTO	7.36
	DIESEL	16.05
EURO 1	OTTO	15.13
	DIESEL	27.35
EURO 0 (ALLOWED TO DRIVE DURING AN OZONE-ALARM)	OTTO	21.07
	DIESEL	33.29
EURO 0 (NOT ALLOWED TO DRIVE DURING AN OZONE-ALARM)	OTTO	25.36
	DIESEL	37.58

FOR DIESEL VEHICLES THERE IS ALSO A TAX CREDIT OR INCREASE DEPENDENT ON THE EMISSION OF PM (PARTICULATE MATTER). FOR PM 0 TO PM 4 THERE IS A TAX

CREDIT OF € 330 AND FOR DIESEL VEHICLES WITHOUT ANY PM FILTER THE TAX IS INCREASED WITH € 1.20 PER 100CC.

THERE IS A SPECIAL TAX TARIFF FOR VEHICLES WITH A 'WANKEL' MOTOR OR AN ELECTRIC MOTOR. AFTER ADMITTANCE OF THE VEHICLE THERE IS A 5 YEAR EXEMPTION OF VEHICLE TAX. HEREAFTER, THE TAX IS CALCULATED BASED ON VEHICLE GROSS WEIGHT (< 2,000 KG = € 11.25; 2,000-3,000 KG = € 12.02; 3,000-3,500 KG = € 12.78). COMPARED TO THE TAX OF THE WANKEL MOTOR THE ELECTRIC MOTOR GETS A 50% DISCOUNT.

ALTERNATIVE FUELLED VEHICLES (E.G. FUELLED WITH BIOFUEL) AND HYBRID VEHICLES ARE TAXED JUST AS NORMAL VEHICLES.

A.4 TAXATION IN THE UK

IN THE UK THE FOLLOWING TAXES (APART FROM VAT) HAVE TO BE PAID WHEN PURCHASING A NEW CAR:

- VEHICLE REGISTRATION CHARGE (OF £ 38 OR € 47.93⁸)
- VEHICLE EXCISE DUTY (OR ROAD TAX)

ROAD TAX

UNDER THIS SCHEME, CARS REGISTERED FROM MARCH 2001 ONWARDS ARE PLACED INTO VED RATE BANDS ACCORDING TO THEIR CO₂ EMISSIONS (BASED ON 'TAILPIPE' CO₂). WITHIN EACH BAND, ALTERNATIVELY FUELLED CARS, INCLUDING HYBRID VEHICLES, BENEFIT FROM A SMALL DISCOUNT OF £5 TO £10, WHILE DIESEL CARS WITH LOWER CARBON DIOXIDE EMISSION RATES THAN SIMILAR PETROL CARS PAY A SMALL SUPPLEMENT TO COMPENSATE FOR THE FACT THAT DIESEL CARS MAY EMIT HIGHER LEVELS OF PARTICULATES AND OTHER LOCAL AIR POLLUTANTS SUCH AS NOX. THE EXCISE SCHEME IS REVENUE-NEUTRAL. IN 2006 THE VED GOT REDUCED FOR THE LOWEST EMISSION CARS TO ZERO; INCREASED FOR THE MOST POLLUTING CARS (GRADUATED VED BAND G) TO £300 FROM 2007 AND TO £400 FROM 2008; AND CUT FOR BAND B CARS TO £35 PER YEAR. A FULL OVERVIEW IS GIVEN IN THE TABLE BELOW.

⁸ WITH AN EXCHANGE RATE OF 1.26134

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VED		DIESEL CAR		PETROL CAR		ALTERNATIVE FUEL CAR	
BANDS	CO2 EMISSION FIGURE (G/KM)	6 MONTHS RATE (£)	12 MONTHS RATE (£)	6 MONTHS RATE (£)	12 MONTHS RATE (£)	6 MONTHS RATE (£)	12 MONTHS RATE (£)
BAND A	< 100	-	0	-	0	-	0
BAND B	101 – 120	-	50	-	40	-	30
BAND C	121 – 150	60.50	110	55	100	59.50	90
BAND D	151 – 165	74.25	135	68.75	125	63.25	115
BAND E	166 – 185	88	160	82.50	150	77	140
BAND F	185 – 225	107.85	195	104.50	190	99	180
BAND G	> 255	118.25	215	115.50	210	110	200

THERE IS AN EXEMPTION FROM VED FOR VEHICLES CONSTRUCTED BEFORE 1 JANUARY 1973 (HISTORIC VEHICLE TAXATION CLASS). ELECTRICALLY-PROPELLED VEHICLES ARE ALSO EXEMPTED FROM VED.

A.5 TAXATION IN FRANCE

IN FRANCE THE FOLLOWING TAXES (APART FROM VAT) HAVE TO BE PAID WHEN PURCHASING A NEW CAR:

- VEHICLE REGISTRATION TAX ('CARTE GRISE')
- ROAD TOLL (PÉAGE AUTOROUTIER)

REGISTRATION TAX

THE REGISTRATION TAX (BASED ON HORSE POWER) IS ISSUED BY THE REGIONS IN FRANCE. IT IS THEREFORE DIFFICULT TO SET PRECISE INDICATIONS OF THE REGISTRATION TAX. AS AN INDICATION THE REGISTRATION TAX VARIES BETWEEN € 25 AND € 46 PER HORSE POWER.

THE REGIONS HAVE THE POSSIBILITY TO PROVIDE A 50 OR 100% EXEMPTION OF REGISTRATION TAX FOR ELECTRIC, LPG AND E 85 VEHICLES. AN ADDITIONAL REGISTRATION TAX CAN BE ADDED FOR THE 'MOST' POLLUTANT VEHICLES (BASED ON THEIR CO2 EMISSIONS). VEHICLES EMITTING BETWEEN 200 AND 250 gCO₂/KM CAN GET AN ADDITIONAL TAX OF 2 €/gCO₂. VEHICLES EMITTING MORE THAN 250 g CO₂/KM VAN BE TAXED 4 €/gCO₂ ADDITIONALLY.

A DEDUCTION OF € 2,000 ON INCOME TAX IS GIVEN FOR LPG, ELECTRIC ENERGY OR NATURAL GAS VEHICLES, PROVIDED THAT THE CO₂ EMISSIONS OF THE VEHICLE ARE LOWER THAN 140 g/km. FOR THESE NEW VEHICLES AND VEHICLES THAT HAVE BEEN RETROFITTED THE DEDUCTION IS APPLICABLE IF THESE ARE BELOW THE MAXIMUM CO₂ EMISSION PER KILOMETRE AS SHOWN IN THE TABLE BELOW:

YEAR OF PURCHASE OR RETROFITTING	2006	2007	2008
MAXIMUM CO ₂ EMISSION FOR NEW VEHICLE (GRAMME CO ₂ /KM)	200	160	140
MAXIMUM CO ₂ EMISSION FOR RETROFITTED VEHICLE (GRAMME CO ₂ /KM)	200	180	160

FURTHERMORE PRIVATE INDIVIDUALS CAN OBTAIN AN INCENTIVE OF € 3,200 WHEN THEY BUY AN ELECTRIC CAR. IT REMAINS UNCLEAR IF HYDROGEN VEHICLES ARE CONSIDERED AS ELECTRIC VEHICLES.

AS DEFAULT VALUE IN THE POLICY SUPPORT CALCULATION TOOL A REGISTRATION TAX IS INCLUDED AS 15% OF THE VEHICLE COSTS, COMING DOWN TO € 2,977.50. THIS COMES CLOSE TO THE 80 kW (FOR THE DEFAULT GASOLINE VEHICLE) TIMES 36 €/kW (THE AVERAGE) REGISTRATION TAX.

ROAD TOLL

THE TAX IS LEVIED ON MOTORWAY OPERATORS AND BASED ON THE NUMBER OF KILOMETRES TRAVELLED. THE TAX RATE IS SET AT € 6.86 PER THOUSAND KILOMETRES TRAVELLED. SINCE THIS IS EQUAL FOR ALL VEHICLES, IT IS NOT INCLUDED IN THE POLICY SUPPORT TOOL.

A.6 TAXATION IN USER DEFINED COUNTRY

THE USER DEFINED COUNTRY GIVES FULL FLEXIBILITY. THE CALCULATION METHOD OF THE REGISTRATION TAX CONSISTS OF MULTIPLYING THE VEHICLE COST (BEFORE TAX) WITH THE REGISTRATION TAX. AFTER THIS MULTIPLICATION VAT WILL BE ADDED.