

Phase 3: Research Plan : ESS SPECIFIC

Now that you have a research question, you can begin to build your research plan. Given that you will undertake your research, experimentation and data collection alone (and likely over the holidays/after school) it's important that you have clear direction. **You will have to conference this phase with your supervisor and completed with a high level of detail.** You should meet with your supervisor to develop this, but you can also ask for help from teachers, parents, the librarian, or other experts who could be useful.

Research Question: To what extent can biofuels be used in the Indian urban public transportation sector?		Supervisor's Signature and Date:
Bibliography: <i>In this box, record the bibliographic details of your sources in APA format.</i> <ul style="list-style-type: none"> • 		To Do List: <i>In this box, you're to write the research jobs that you need to do. This should show some sort of methodology.</i> <ul style="list-style-type: none"> • Data collection – Opinions (Group 3 side of ESS) • Familiarisation with ESS Specific terminology
Key Questions: <i>In this box, you should break down your research question into key questions that need to be answered to help you respond to your main research question.</i>	Possible Sources <i>In this box, you should record bibliographic details or exact references of useful texts – this should not include locations like "library".</i>	Arising Issues & Concepts: <i>In this box, you should keep notes on issues that arise and then how you go about solving them. You can also write questions for yourself or your supervisor.</i>
What types of energy resources are currently available and used in Indian urban centres, and how much energy is required and expended?	<ol style="list-style-type: none"> 1. https://www.witpress.com/Secure/elibrary/papers/EQ14/EQ14063FU1.pdf 2. https://timesofindia.indiatimes.com/auto/news/govt-plans-to-shift-public-transport-logistics-to-clean-energy-source-gadkari/articleshow/84463950.cms 3. https://www.intelligenttransport.com/transport-news/129174/wbcds-indian-government-electric-vehicles/ 4. https://www.itf-oecd.org/sites/default/files/docs/decarbonising-india-transport-system.pdf 	DIESEL, EV for small vehicles, petrol
In which industries and urban developments have biofuel uses been trialled, and what were the conclusions from these?	<ol style="list-style-type: none"> 1. https://www.transport.govt.nz/area-of-interest/environment-and-climate-change/biofuels/ 2. https://www.mbie.govt.nz/dmsdocument/15020-increasing-the-use-of-biofuels-in-transport-consultation-paper-on-the-sustainable-biofuels-mandate-pdf 3. https://www.nzherald.co.nz/nz/finnish-company-pitches-renewable-diesel-for-wellingtons-bus-fleet/OZN5KLW6XUYTJT172KSAJ4ABVA/ 4. https://biofuels-news.com/news/norwegian-city-rolls-out-biogas-biodiesel-buses-to-reduce-carbon-footprint/ 5. https://www.researchgate.net/publication/227415213_Test_run_of_biodiesel_in_public_transport_system_in_Belgrade 	ENERGY CYCLING Driver training in smooth, efficient operation
To what extent can biofuels and biodiesels act as a replacement for ordinary combustion fuels? Are there any mechanical or longevity concerns? Are there any differences in efficiency?	<ol style="list-style-type: none"> 1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3135615/ 2. https://www.forbes.com/sites/judeclemente/2015/06/17/why-biofuels-cant-replace-oil/?sh=6fdb5434f60f 3. https://www.pnas.org/content/103/30/11206 4. https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-generation-and-markets/liquid-fuel-market/engine-fuel-quality/ 5. https://www.liquidbiofuels.org.nz/documents/resource/WLB10-legislation-and-standards-for-biofuels.pdf 6. https://www.cleanindiajournal.com/reducing-transforming-organic-food-waste/ 	Food sources available
To what extent does biofuel production decrease emissions?	<ol style="list-style-type: none"> 1. https://www.transport.govt.nz/area-of-interest/environment-and-climate-change/biofuels/ 2. https://www.energy.gov/sites/prod/files/edg/media/BiofuelsMythVFact.pdf 	
What potential perspectives do the usage of biofuels bring?	<ol style="list-style-type: none"> 1. https://www.dw.com/en/biofuels-good-or-bad-for-the-environment/a-44354834 2. https://e360.yale.edu/features/the_case_against_biofuels_probing_ethanols_hidden_costs 	

Phase 3: Research Plan : ECO SPECIFIC

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Bibliography: In this box, record the bibliographic details of your sources in APA format. <ul style="list-style-type: none"> • 		To Do List: In this box, you're to write the research jobs that you need to do. This should show some sort of methodology. <ul style="list-style-type: none"> • Familiarisation with Economics terminology
Key Questions: In this box, you should break down your research question into key questions that need to be answered to help you respond to your main research question.	Possible Sources In this box, you should record bibliographic details or exact references of useful texts – this should not include locations like "library".	Arising Issues: In this box, you should keep notes on issues that arise and then how you go about solving them. You can also write questions for yourself or your supervisor.
What are the costs associated with the production and storage of biofuel material? How does this compare to normal combustion fuels?	<ol style="list-style-type: none"> 1. https://www.sciencedirect.com/science/article/abs/pii/S1361920919312222#:~:text=Biofuel%20production%20cost%20estimates%20in,also%20he%20range%20for%20EtOH. 2. https://www.epa.gov/environmental-economics/economics-biofuels 3. https://www.iea.org/data-and-statistics/charts/biofuel-and-fossil-based-transport-fuel-production-cost-comparison-2017 	
How sustainable are the costs of biofuels to government transportation organisations and private transportation companies?	<ol style="list-style-type: none"> 4. https://www.scionresearch.com/_data/assets/pdf_file/0005/63293/Biofuels_summary_report.pdf 5. http://www.hcs.harvard.edu/~res/wp-content/uploads/2014/05/GEGpaper.pdf 	
How can biofuels compare to alternative renewable energy methodology in pricing and operability?	<ol style="list-style-type: none"> 1. https://www.sciencedirect.com/science/article/abs/pii/S0960852415000917 2. https://www.azocleantech.com/article.aspx?ArticleID=337 3. https://www.conserve-energy-future.com/advantages-and-disadvantages-of-biofuels.php 	
What other markets could an increase in biofuel production impact?	<ol style="list-style-type: none"> 1. https://www.fao.org/3/i0100e/i0100e04.pdf 2. https://www.sciencedirect.com/science/article/pii/S2590174520300362 3. https://www.globalccsinstitute.com/archive/hub/publications/147548/biofuels-markets-targets-impacts.pdf 	