

# TABLE OF CONTENTS

## BASIC ANALYSIS

|   |    |
|---|----|
| About This Report.....                    | 1  |
| Executive Summary.....                    | 3  |
| About Biodiesel.....                      | 6  |
| Introduction.....                         | 6  |
| Commercial Forms & Applications.....      | 7  |
| Biodiesel Production Pathways.....        | 8  |
| Process Overview.....                     | 9  |
| Product(s) Generated.....                 | 9  |
| Process Inputs.....                       | 9  |
| Technology Maturity Assessment.....       | 10 |
| Highlights & Remarks.....                 | 12 |
| Industrial Site.....                      | 13 |
| Introduction.....                         | 13 |
| Process Unit Description.....             | 15 |
| Site Infrastructure Description.....      | 19 |
| Key Process Input and Output Figures..... | 23 |
| Labor Requirements.....                   | 23 |
| Capital Investment.....                   | 24 |
| Fixed Capital.....                        | 25 |
| Working Capital.....                      | 27 |
| Additional Capital Requirements.....      | 28 |
| Total Capital Investment.....             | 29 |
| Operating Costs.....                      | 30 |
| Operating Variable Costs.....             | 32 |

\* Available in 'Advanced' version only

|   |     |
|---|-----|
| Operating Fixed Costs.....                          | 33  |
| Depreciation.....                                   | 33  |
| Total Operating Cost.....                           | 33  |
| Product Value Analysis.....                         | 35  |
| Corporate Overhead.....                             | 36  |
| Return on Capital Employed (ROCE).....              | 36  |
| Process Economics Summary.....                      | 37  |
| Product Value Composition.....                      | 37  |
| Economic Datasheet.....                             | 37  |
| Economic Remarks.....                               | 39  |
| References.....                                     | 40  |
| Analysis Methodology.....                           | 41  |
| APPENDIX A - ABOUT INTRATEC.....                    | A-1 |
| APPENDIX B - TERMS & CONDITIONS.....                | B-1 |
| APPENDIX C - REPORT SHARING TERMS.....              | C-1 |
| APPENDIX D - EXTENDED ANALYSIS.....                 | D-1 |
| Utilities Consumption Breakdown.....                | D-2 |
| Utilities Consumption Figures.....                  | D-2 |
| Impact of Utilities on Operating Cost.....          | D-3 |
| Economic Analysis for Different Capacities.....     | D-4 |
| Introduction.....                                   | D-4 |
| Capital Investment Comparison.....                  | D-4 |
| Operating Cost & Product Value Comparison.....      | D-5 |
| Project Implementation & Construction Schedule..... | D-7 |
| Materials & Utilities Pricing Data.....             | D-9 |
| Analysis Pricing Basis.....                         | D-9 |
| Historical Prices.....                              | D-9 |

\* Available in 'Advanced' version only

|  |      |
|--|------|
| APPENDIX E - ADVANCED ANALYSIS*                            | E-1  |
| Process Unit (ISBL) Construction Cost by Functional Unit   | E-2  |
| Infrastructure Construction Cost by Piece of Equipment     | E-4  |
| Introduction   | E-4  |
| Construction Cost: Area 90 - Storage Installations         | E-5  |
| Construction Cost: Area 91 - Utilities Facilities          | E-7  |
| Construction Cost: Area 92 - Support & Auxiliary Buildings | E-9  |
| Site Infrastructure Cost Summary                           | E-11 |
| Plant Cost Breakdown per Discipline                        | E-12 |
| Introduction   | E-12 |
| Direct Costs Breakdown                                     | E-13 |
| Indirect Costs Breakdown                                   | E-14 |
| Plant Cost Breakdown Summary                               | E-15 |
| Process Flow Diagrams & Equipment List                     | E-16 |

\* Available in 'Advanced' version only

## LIST OF TABLES

|  |     |
|--|-----|
| Economic Analysis Summary.....   | 5   |
| Process Technology Maturity Scale.....   | 11  |
| Raw Materials Consumption.....   | 23  |
| Labor Requirements.....  | 23  |
| Plant Cost Estimate Accuracy Range (USD Million).....                          | 26  |
| Owner's Cost Summary.....  | 26  |
| Fixed Capital Summary.....   | 27  |
| Working Capital Breakdown.....   | 27  |
| Additional Capital Requirements Breakdown.....                                 | 28  |
| Operating Variable Costs Breakdown.....  | 32  |
| Operating Fixed Costs Breakdown.....   | 33  |
| Operating Cost Summary.....  | 33  |
| Corporate Overhead Costs Breakdown.....  | 36  |
| Biodiesel from Soybean Oil (Alkaline Catalyst) - Economic Datasheet.....       | 38  |
| Process Contingency Factor Estimation Methodology.....                         | 46  |
| Project Contingency Factor Estimation Methodology.....                         | 47  |
| Fixed Capital Estimate Accuracy Range.....                                     | 51  |
| Maintenance Cost Estimation Methodology.....                                   | 54  |
| Marketing & Advertising Cost Estimation Methodology.....                       | 56  |
| Research & Development Cost Estimation Methodology.....                        | 56  |
| Expected ROCE Factor Estimation Methodology.....                               | 57  |
| Net Utility Consumption Rates (per mt of Biodiesel).....                       | D-2 |
| Utilities Share in Total Operating Cost.....                                   | D-3 |
| Capital Investment Analysis for Different Capacities (MM USD).....             | D-5 |
| Operating Cost & Product Value Analysis for Different Capacities (USD/mt)..... | D-6 |

\* Available in 'Advanced' version only

Project Phases Schedule..... D-7

Materials & Utilities Prices (United States, Q1'21)..... D-9

Process Unit (ISBL) Construction Cost by Functional Unit..... E-2

Area 90 - Storage Installations: Scope Description..... E-5

Area 91 - Utilities Facilities: Scope Description..... E-7

Area 92 - Support & Auxiliary Buildings: Scope Description..... E-9

Site Infrastructure (OSBL) Construction Cost by Piece of Equipment..... E-11

Plant Construction Cost by Discipline..... E-15

\* Available in 'Advanced' version only

## LIST OF FIGURES

|   |      |
|---|------|
| Biodiesel Production Pathways Diagram.....                                  | 8    |
| Industrial Site Configuration.....  | 14   |
| Block Flow Diagram - Manufacturing Process.....                             | 16   |
| Plant Cost Summary (USD Million).....                                       | 25   |
| Capital Investment Summary (USD Million).....                               | 29   |
| Operating Cost Breakdown (USD/mt).....                                      | 34   |
| Product Value Composition (USD/mt).....                                     | 37   |
| Production Cost Report Development Methodology.....                         | 42   |
| Cost Contribution of Each Utility.....                                      | D-3  |
| Capital Investment (USD Million) Versus Plant Capacity.....                 | D-4  |
| Operating Cost (USD/mt) Versus Plant Capacity.....                          | D-5  |
| Implementation & Construction Schedule.....                                 | D-8  |
| Process Unit (ISBL) Construction Cost by Functional Unit.....               | E-3  |
| Site Infrastructure (OSBL) Construction Cost by Area.....                   | E-4  |
| Storage Installations Construction Cost per Piece of Equipment.....         | E-5  |
| Utilities Facilities Construction Cost per Piece of Equipment.....          | E-7  |
| Support & Auxiliary Buildings Construction Cost per Piece of Equipment..... | E-9  |
| Plant Construction Cost Summary.....  | E-12 |
| Direct Construction Costs by Discipline.....                                | E-13 |
| Indirect Costs Summary.....   | E-14 |
| Process Flow Diagram (1 of 1).....  | E-19 |

\* Available in 'Advanced' version only