Exhibit 10.1  
 REGISTRATION RIGHTS AGREEMENT  
 This Registration Rights Agreement (this “Agreement”) is made and entered into as of March 5, 2024, by and among Atlas Energy Solutions Inc., a Delaware corporation (the “Company”), and each of the other parties listed on the signature pages hereto (the “Initial Holders”), and the other Holders (as defined below) that may become party hereto from time to time (each a “Party” and collectively, the “Parties”).  
 WHEREAS, this Agreement is being entered into pursuant to the Agreement and Plan of Merger, dated as of February 26, 2024 (the “Merger Agreement”), by and among HC Minerals Inc., a Delaware Corporation (“Purchaser”), the Company and Hi-Crush Inc. (“Hi-Crush”);  
 WHEREAS, in connection with the closing of the transactions contemplated by the Merger Agreement on the date hereof, as partial consideration for the acquisition of Hi-Crush by the Purchaser pursuant to the Merger Agreement, the Company issued to stockholders of Hi-Crush an aggregate of 9,711,432 shares of the Company’s common stock, par value $0.01 per share (the “Common Stock”), pursuant to the terms of the Merger Agreement; and  
 WHEREAS, pursuant to the Merger Agreement, the Company has agreed to provide the Initial Holders with certain registration rights under the Securities Act (as defined herein).  
 NOW THEREFORE, in consideration of the mutual covenants and agreements set forth herein and for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by each party hereto, the Parties hereby agree as follows:  
 1. Definitions. As used in this Agreement, the following terms have the meanings indicated: