## Introduction of Smart Burn Engine

The Smart Burn Engine is a novel smart contract system designed to allocate excess Dai from the Surplus buffer that Maker is not using as contingency reserve (such as for offsetting potential bad debt which can occur in the protocol due to severe market conditions). The current iteration of the Smart Burn Engine is defined in MIP101: 5.9: Surplus Buffer and Smart Burn Engine - STA9 and in MIP104: 9: Surplus Buffer and Smart Burn Engine.

The main difference between the Smart Burn Engine and the previous burn design is that in the new Smart Burn Engine, MKR tokens will be accumulated in the form of Univ2 LP tokens instead of being acquired and burned. In addition, Surplus Auctions (flaps) will be replaced by Dss Flappers. The audit of the contract is availablehere.

Dss Flappers will have a FlapperMom contract, which will allow for the disabling of the flapper without the GSM delay in case of emergency. Additionally, there is an OracleWrapper which allows for scaling down the oracle price, which can be used in the case of redenominated versions of the existing token.

Once the Smart Burn Engine is deployed and activated, it will periodically use DAI from the Surplus Buffer in order to acquire MKR tokens from the Univ2 DAI/MKR market. Acquired MKR tokens will then be matched with additional DAI sourced from the Surplus Buffer and supplied to the same market. In return, Maker will receive LP tokens that will be transferred to a protocol owned address. In so doing, the system will increase on-chain liquidity for MKR over time.

The Smart Burn Engine will activate when there is more than 50M + flapper.bump (lot size) DAI available in the Surplus Buffer. Market actions will only occur when the slippage is less than the allowed amount by flapper.want.

Steps of Smart Burn Engine:

1. Use DAI for MKR on Univ2 DAI/MKR market
2. Match acquired MKR with additional DAI
3. Supply the matched MKR & DAI tokens to Univ2 DAI/MKR market
4. Transfer acquired LP token to a protocol owned address

## Smart Burn Engine Parameters

Scope parameters

- Surplus Buffer Upper Limit: Burn Engine activation Threshold
- 50M DAI
- Annual rate of MKR Accumulation: How much DAI is used to acquire MKR per time (Effective rate of usage is doubled as MKR acquired is paired and supplied into LP)
- Rate is 100M DAI per annum
- Effective rate is 200M DAI per annum
- Rate is 100M DAI per annum
- Effective rate is 200M DAI per annum

Dss Flappers parameters

- Flapper.hop: Minimum seconds interval between kicks. Determines maximum allowed frequency of market actions taking place
- Flapper.want: Relative multiplier of the oracle price needed for the swap. For example, 0.98 * WAD allows for a 2% worse price than the oracle price. (MKR/USD oracle to reference built by Chronicle Labs)
- Vow.bump: Minimum amount of DAI above Surplus Buffer Upper Limit required for eligible market action. Bump is the amount of DAI sold for MKR
- Flappers.pip: A reference price oracle, used for bounding the exchange rate of the swap
- Receiver address: address which will receive the Univ2 MKR/DAI LP token

The Surplus Buffer Upper Limit and Annual rate of MKR accumulation determines when the Smart Burn Engine is activated/deactivated and what is the maximum allowed annual DAI used. The Dss Flappers parameters determine how frequently, and in what amounts, the market actions and liquidity supplied occurs, and the maximum allowed price discount relative to the oracle price.

The key tradeoff is between slippage and gas costs. Larger and less frequent market actions will result in larger slippage but will consume less gas in total. Thus, as the market liquidity increases over time and/or the gas market environment significantly changes, the parameters should be revisited and adjusted back to the optimal rate via adjusting market action size and frequency of Dss Flappers.

## Recommended Initial Parameters and Analysis

The parameters are configured based on the assumption that market agents will allocate liquidity towards the market before the activation via the executive vote in order to take advantage of the market activity.

With the assumption of Univ2 DAI/MKR liquidity of approximately $1M, the loss due to price slippage and gas cost is minimized at a market action size of 5000 DAI and a frequency of 26.28 minutes, assuming gas prices at 50 gwei and an historical 3 month average ETH price. The table including calculations and simulation for parameter configuration can be found here.

In the case where the transaction cost environment changes severely and suddenly, either due to gas price increase or sudden ETH price increase, the parameters will need to be reconfigured. In the worst case scenario, the Smart Burn Engine can be shut down via Mom contract. In the case where for some reason the target market liquidity would suddenly decrease (from a potentially non Maker controlled portion), or the token composition changes (due to inefficient trading of external actors), the market actions would automatically stop as they would exceed the maximum allowed price slippage.

Recommended Dss Flappers Parameters

- Hop: 1577 seconds
- Want: 0.98
- Bump: 5000 DAI
- Pip: 0xdbbe5e9b1daa91430cf0772fcebe53f6c6f137df
- Receiver: MCD_PAUSE_PROXY: 0xBE8E3e3618f7474F8cB1d074A26afFef007E98FB

This will result in an estimated 123.6K MKR acquired and 185.7M DAI used (accounting for matched DAI) per annum, which will result in accumulation and increased liquidity of approximately $183M worth of MKR/DAI Univ2 LP tokens. Finally the minimum market liquidity for kick to process is $600K.

We would prefer to recommend that the above proposed parameters are polled on-chain next Monday 26th of June and included in the upcoming executive vote, assuming the Stability Scope Responsible Facilitator approves the proposal.